FINAL PUBLIC REPORT
Technical Assistance
for the
Airports Safety and Security Assessment in Indonesia

Presented to:
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June 17, 2009

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Recommendations for improving the safety and security at Indonesian airports in accordance with the findings in this report will be included in subsequent tasks and related reports in accordance with the contract.

2 PROJECT ACTIVITIES

2.1 TASKS 3-6 WORKSHOP

Although not required by the contract, at the request of the Director General Civil Aviation, ASI presented a one day workshop covering Tasks 3-6. The workshop was held on 14 January 2009 in Jakarta and the Director General gave the opening address. The workshop was very well attended with approximately 30 representatives from the DGCA staff, various Indonesian airports and air carriers.

2.2 COMPLETION OF CERTAIN TASKS

This Final Report is submitted in accordance with the requirement of USTDA funded contract Tasks 7 and 8. ASI will have fully accomplished contract Tasks 7 and 8 upon the acceptance of this report by the Director General Civil Aviation.

3 TASK 7 EXTRAPOLATION TO ALL INDONESIAN AIRPORTS

3.1 OVERVIEW

ASI has completed Tasks 1 through 6 for Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha. These airports were chosen as the four pilot airports for this project because they represent four levels of aircraft activity throughout Indonesia. ASI identified the systems required to enhance the security and safety at each of these airports and developed the investment requirements and financing options to implement the security and safety enhancements in prior tasks.

In this task, ASI develops estimates of systems and investment requirements for Indonesian airports in each of four categories represented by the four pilot airports: (i) large international airports with extensive passenger and cargo traffic and multiple domestic and international carrier operations; Soekano-Hatta is the only airport in this category; (ii) tourist airports like Ngurah Rai with the bulk of traffic being domestic and international tourists, including a large number of charter operations; (iii) medium-sized airports like Polonia; and (iv) small airports like Sultan Taha with mostly domestic short-haul traffic.

Implementing these improvements will potentially provide developmental benefits to Indonesia including improved transportation efficiency from safer and more secure airport facilities. The safety improvements at the airports will reduce the possibility of accidents at the airports – take offs and landings and ground travel by the aircraft. This reduction in possible accidents will allow for greater activity at the airports, thereby increasing the efficiency of the airports. The security improvements at the airports will reduce the probability of costly interruptions in the

airport operations. They will also increase the ability of aircraft originating in Indonesia to be allowed to land in countries with rigorous safety and security requirements.

Transfer of new security technologies into Indonesian will permit implementation of the safety and security improvements using the most appropriate technologies for the specific airports. These technologies will be more advanced than the ones currently existing in the airports. Training Indonesia workers to operate and maintain equipment based upon the new technologies will improve the capacity of the work force to understand and work with the latest aviation systems resulting in additional jobs for the Indonesia workforce and additional income into the Indonesia economy. The additional jobs and income will be direct (direct work on the improvements), induced (equipment and services required to support the direct work), and indirect (the additional income will be used for services to support the population).

ASI has developed a typical schedule of investments for each category of airports. The schedule includes initial capital investments as well as the ongoing maintenance, personnel, and training costs that the additional capital investments require. In addition, ASI has developed a schedule of investments for the three organizations that operate the airports in Indonesia:[3] AP-I, AP-II, and DGAC. The investments are broken into security and safety investments for each airport group and for each organizational entity.

The actual schedule of investments with the ongoing costs will depend on the financing mechanisms that AP-I, AP-II, and DGAC employ. As such, the investments can be staged to ensure that the airports' security and safety functions are enhanced while minimizing the costs of financing the investments.

3.2 SYSTEM AND INVESTMENT REQUIREMENTS FOR SOEKARNO HATTA, NGURAH RAI, POLONIA, & SULTAN TAHA

3.2.1 SYSTEM REQUIREMENTS

The system requirements for Soekarno-Hatta, Jakarta, are given in Task 3, Section 2.1 for security and Section 2.3 for safety. The system requirements for Ngurah Rai, Depensar, are given in Task 3, Section 3.1 for security and Section 3.3 for safety. The system requirements for Polonia, Medan, are given in Task 3, Section 4.1 for security and Section 4.3 for safety. The system requirements for Sultan Taha, Jambi, are given in Task 3, Section 5.1 for security and Section 5.3 for safety.

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The purchase and installation costs for Soekarno-Hatta, Jakarta are given in Task 3, Section 2.1 for security and Section 2.3 for safety. The maintenance, personnel, and training costs for Soekarno-Hatta, Jakarta are given in Task 3, Section 2.2 for security and Section 2.4 for safety. The purchase and installation costs for Ngurah Rai, Denpasar are given in Task 3, Section 3.1 for security and Section 3.3 for safety. The maintenance, personnel, and training costs for Ngurah

[3] Hang Nadim Airport in Batam has been excluded from these estimates.

Rai, Denpasar are given in Task 3, Section 3.2 for security and Section 3.4 for safety. The purchase and installation costs for Polonia, Medan are given in Task 3, Section 4.1 for security and Section 4.3 for safety. The maintenance, personnel, and training costs for Polonia, Medan are given in Task 3, Section 4.2 for security and Section 4.4 for safety. The purchase and installation costs for Sultan Taha, Jambi are given in Task 3, Section 5.1 for security and Section 5.3 for safety. The maintenance, personnel, and training costs for Sultan Taha, Jambi are given in Task 3, Section 5.2 for security and Section 5.4 for safety. All of these costs have have been revised to 2009 USD using the historical inflation rates in Indonesia for 2007 and 2008 and forecasted inflation for 2009.

3.2.2.1 Capital Investment Requirements

The capital costs of the recommended security upgrades for the four pilot airports, Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha are summarized in Figure 1 below. The security upgrade costs are the greatest at Soekarno-Hatta totaling $25 million and the least for Sultan Taha totaling $3.3 million.

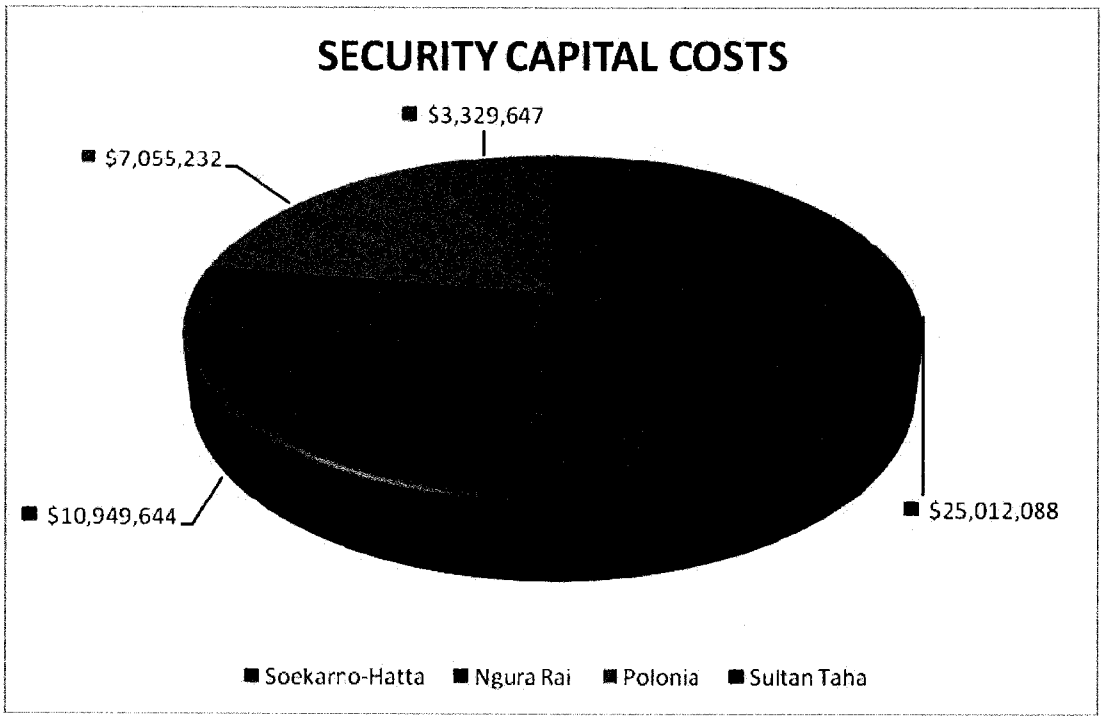

Figure 1: Security Capital Costs

The capital costs of the recommended safety upgrades for the four pilot airports, Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha are summarized in Figure 2 below. The safety upgrade costs are the greatest at Soekarno-Hatta totaling $6.5 million and approximately equal for the other airports at slightly more than $3.1 million.

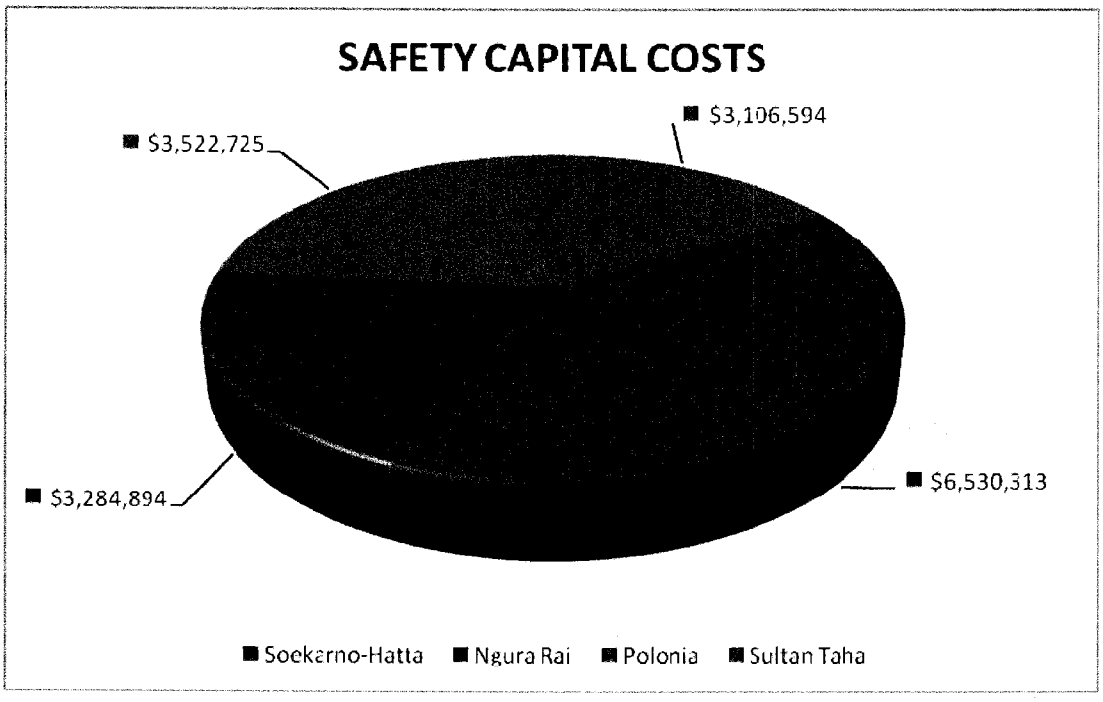

Figure 2: Safety Capital Costs

The capital costs of the recommended security and safety upgrades for the four pilot airports, Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha are summarized in Figure 3 below.

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FINAL REPORT

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1 BACKGROUND

1.1 GOVERNMENT OF INDONESIA INTENTIONS

Indonesia has approximately 163 airports which include from large to very small facilities, of which 24 are currently international airports. PT Angkasa Pura I and PT Anglasa Pura II are two state owned enterprises that manage 23 international airports. The remaining airports are small to very small with light traffic and are managed by the Directorate General of Air Communications (DGAC)[1], Indonesia's authority for civil aviation matters.

During the last six years the Government has implemented a liberal licensing policy which has resulted in the growth of airline market from two licensed air carriers to 21 that operate scheduled flights. In addition, because of competition, fares have decreased and there are numerous package deals available for intra- and inter-island travel. Charter carriers have also increased operations as many more Indonesians are taking advantage of lower air fares. This has resulted in the country's airports becoming very busy and strained to be able to provide passenger services including adequate safety and security.

The safety and security concerns at Indonesia's airports have particularly heightened in the aftermath of the September 11, 2001 terrorist attacks on the United States. Many of Indonesia's remote airports in the Indonesian archipelago offer attractive sites for the germination of terrorist activity bases. Airports could be even more attractive as venues for arms transfer and smuggling unless appropriate safety and security measures are put in place.

In 2000, the International Civil Aviation Organization (ICAO)[2] conducted an audit of Indonesia's safety and security procedures and systems. Later in 2004, ICAO conducted an Aviation Security Audit of Soekarno Hatta International Airport, Jakarta which included an extensive assessment of the security related sections and procedures of the DGAC. In 2005, the US Transportation Security Administration (TSA) performed a security audit of the Ngurahh Rai International Airport, Bali which again also focused both on the airport's security and on the ability of the security sections of the DGAC organization to provide appropriate compliance oversight. Despite the fact that Indonesia has attempted to address all of the issues raised in each of these audits, safety and security continue to be concerns at all airports to varying degrees. As

[1] In 2009, the DGAC became the DGCA or Directorate General of Civil Aviation under the newly formed Minster of Transportation organization.
[2] ICAO consists of 189 Contracting States. Indonesia is one of the 189 Contracting States.

a result, the Government of Indonesia has renewed its commitment to improve the safety and security at its airports.

1.2 CONTRACT SCOPE OF WORK

The United States Trade and Development Agency (USTDA) through a grant to the Government of Indonesia funded a technical assistance project for the Government to help identify and remedy the safety and security weaknesses in Indonesian airports. Aerospace Services International, Inc. (ASI) of Chantilly, Virginia, USA was selected by the Government of Indonesia and awarded a contract to perform these functions under the technical assistance grant.

The USTDA funded contract requires an assessment of current security and safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety and security at Indonesian airports. The contract also requires the development of an investment program and a financing plan for the recommended upgrades.

The technical assistance is to be performed at four airports that are representative of Indonesia's many airports nationwide. These airports must include:

1. A large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations such as Jakarta International Airport,

2. A tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations such as Bali International Airport,

3. A medium-sized airport such as Medan International Airport, and

4. A small airport with mostly domestic short-haul traffic which is to be determined in consultation between the Grantee and Contractor

These four representative airports will become pilots for the detailed safety and security audits and assessments, and will form the basis for extrapolating the systems upgrades and investments needed for all airports in the country.

The USTDA funded contract Terms of Reference (TOR) is divided into eight tasks. Task 1 of the contract requires that a detailed assessment be conducted of the existing airport safety and security systems and procedures at the four pilot airports identified by the Grantee (Government of Indonesia, Director General of Air Communications). The four airports chosen by the DGAC are:

- Soekarno Hatta International Airport, Jakarta;
- Ngurahh Rai International Airport, Denpasar, Bali;
- Polonia international Airport, Medan;
- Sultan Taha Sysrifudn Airport, Jambi.

The assessments are to determine the extent to which the current systems at these four airports are in compliance with prevailing ICAO requirements and international standards of safety and security.

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2.1 TASKS 3-6 WORKSHOP

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ASI has developed a typical schedule of investments for each category of airports. The schedule includes initial capital investments as well as the ongoing maintenance, personnel, and training costs that the additional capital investments require. In addition, ASI has developed a schedule of investments for the three organizations that operate the airports in Indonesia:[3] AP-I, AP-II,

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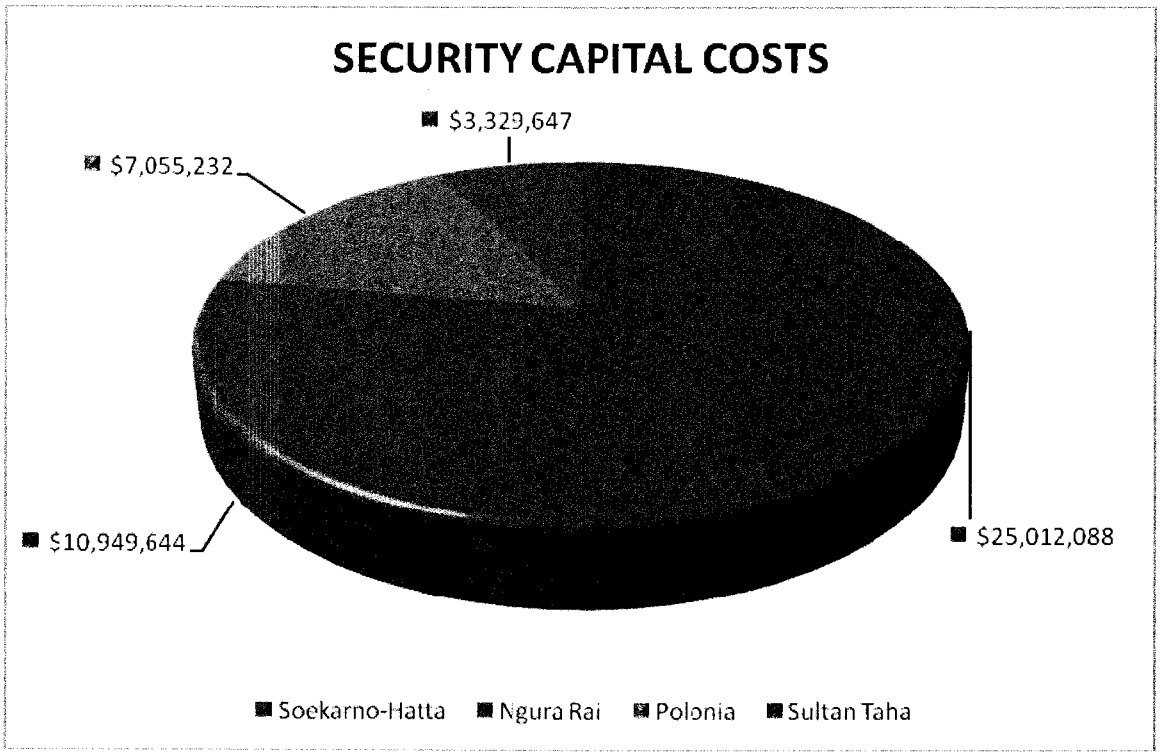

Figure 1: Security Capital Costs

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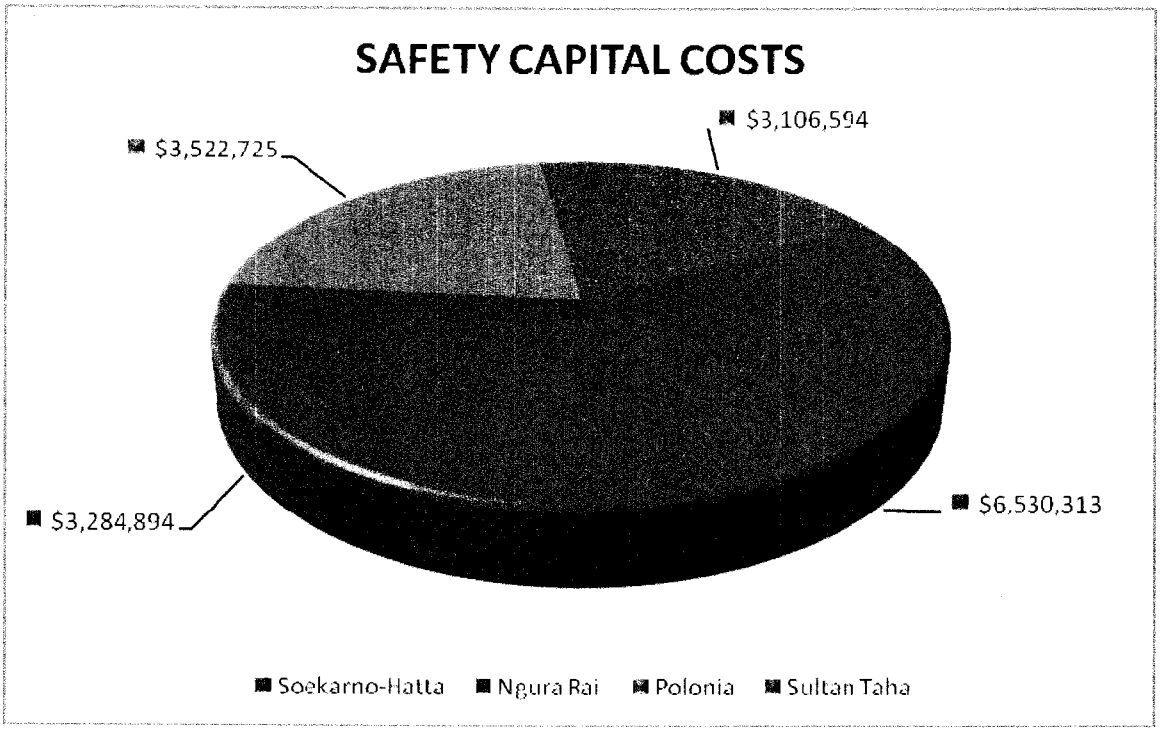

Figure 2: Safety Capital Costs

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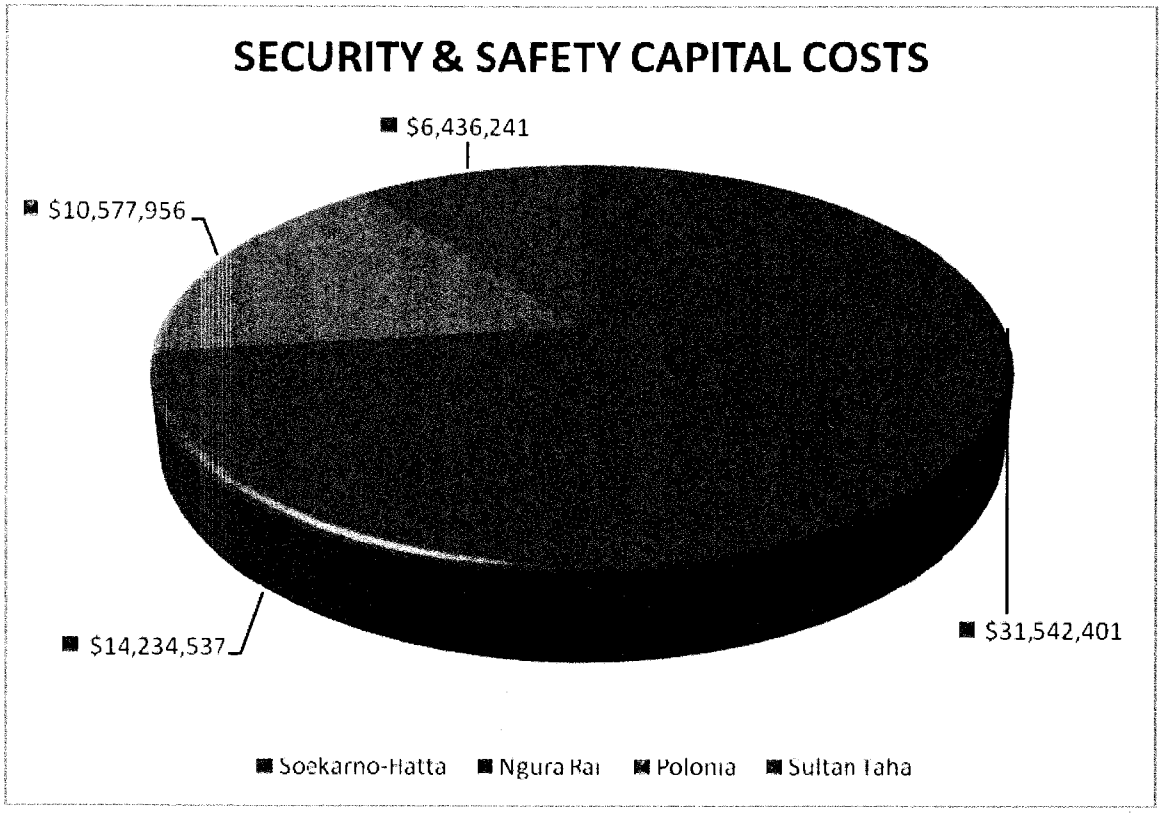

Figure 3: Security & Safety Capital Costs

Table 1 summarizes the capital costs for the four airports in 2009 USD.

Table 1: SECURITY & SAFETY CAPITAL COSTS

	Security	Safety	Total
Soekarno-Hatta	$25,012,088	$6,530,313	$31,542,401
Ngurah Rai	$10,949,644	$3,284,894	$14,234,537
Polonia	$7,055,232	$3,522,725	$10,577,956
Sultan Taha	$3,329,647	$3,106,594	$6,436,241
Total - Four Airports	$46,346,610	$16,444,525	$62,791,135

Operations and Maintenance (O&M) Investment Requirements

The Operations and Maintenance (O&M) costs for the four pilot airports and for the subsequence extrapolation to other Indonesia airports are estimated to increase annually to 2019 at the rate of consumer price inflation.[4] The estimated inflation to 2019 is given in Figure 4 below.

[4] ASI chose the Consumer Price Inflation rather than the GDP deflator estimating future costs because the published CPI rates appear to reflect personnel costs and training costs better historically in Indonesia.

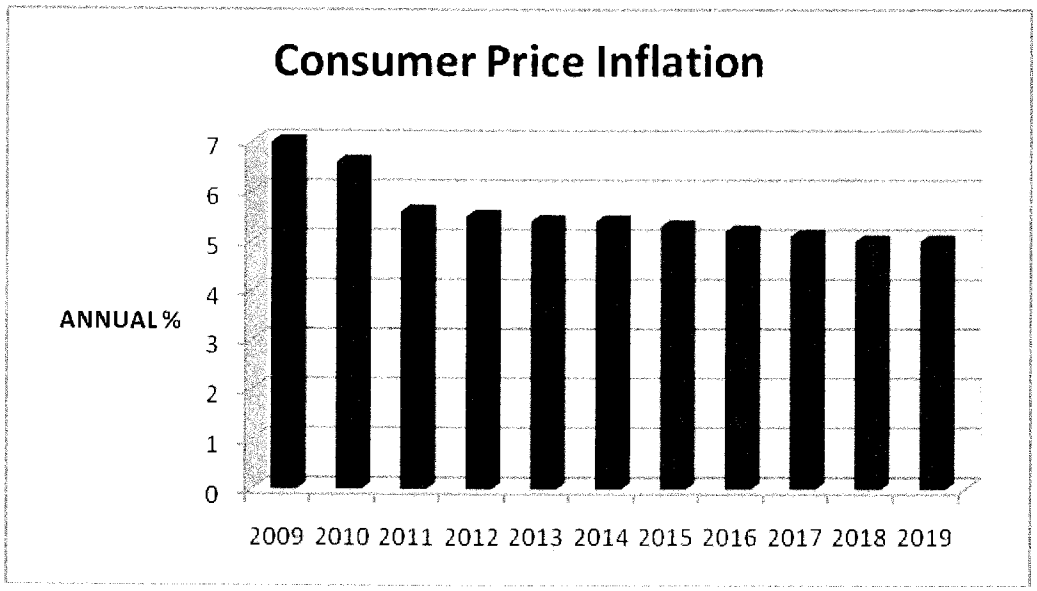

Figure 4: Consumer Price Infation

Using the consumer inflation rates, the security O&M costs for the four prototype airports, Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha are summarized on an annual basis in Figure 5 below. These costs include the annual costs for maintenance, personnel, and training.

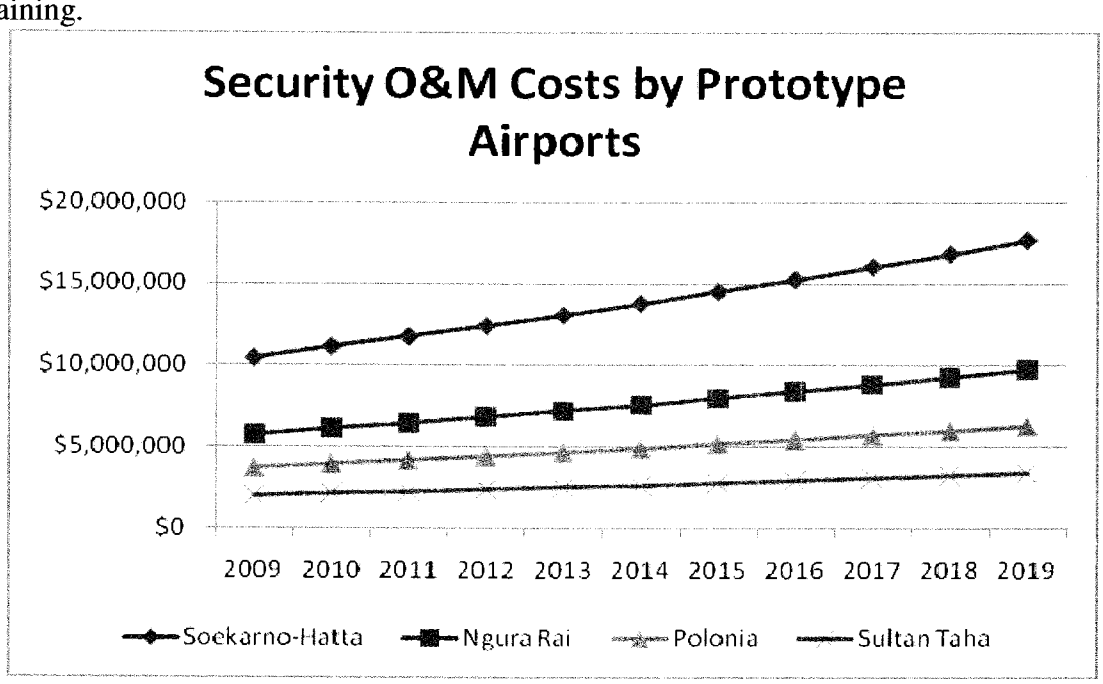

Figure 5: Security Operations & Maintenance Costs by Prototype Airports

Using the consumer inflation rates, the safety O&M costs for the four prototype airports, Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha are summarized on an annual basis in Figure 5 below. These costs include the annual costs for maintenance, personnel, and training.

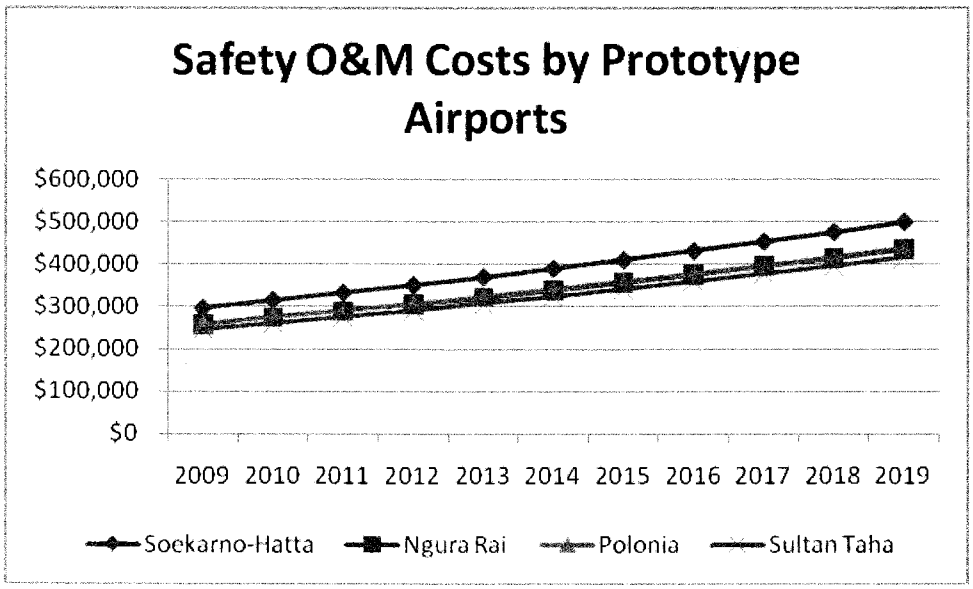

Figure 6: Safety Operations & Maintenance Costs by Prototype Airports

Using the consumer inflation rates, the security and safety O&M costs for the four prototype airports, Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Taha are summarized on an annual basis in Table 2 below. These costs include the annual costs for maintenance, personnel, and training.

Table 2: SECURITY & SAFETY ANNUAL O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Security											
Soekarno-Hatta	$10,454,975	$11,145,003	$11,769,123	$12,416,425	$13,086,912	$13,793,605	$14,524,667	$15,279,949	$16,059,227	$16,862,188	$17,705,297
Ngurah Rai	$5,752,459	$6,132,121	$6,475,520	$6,831,673	$7,200,584	$7,589,415	$7,991,654	$8,407,220	$8,835,988	$9,277,788	$9,741,677
Polonia	$3,735,033	$3,981,545	$4,204,511	$4,435,760	$4,675,291	$4,927,756	$5,188,927	$5,458,752	$5,737,148	$6,024,005	$6,325,206
Sultan Taha	$2,003,414	$2,135,639	$2,255,235	$2,379,273	$2,507,753	$2,643,172	$2,783,260	$2,927,990	$3,077,317	$3,231,183	$3,392,742
Total - Security Costs	$21,945,880	$23,394,308	$24,704,389	$26,063,131	$27,470,540	$28,953,949	$30,488,508	$32,073,911	$33,709,680	$35,395,164	$37,164,922
Safety											
Soekarno-Hatta	$295,066	$314,541	$332,155	$350,423	$369,346	$389,291	$409,923	$431,239	$453,233	$475,894	$499,689
Ngurah Rai	$256,670	$273,610	$288,932	$304,823	$321,284	$338,633	$356,580	$375,123	$394,254	$413,967	$434,665
Polonia	$258,276	$275,323	$290,741	$306,731	$323,295	$340,753	$358,813	$377,471	$396,722	$416,558	$437,386
Sultan Taha	$245,690	$261,905	$276,572	$291,784	$307,540	$324,147	$341,327	$359,076	$377,389	$396,258	$416,071
Total - Safety Costs	$1,055,702	$1,125,378	$1,188,399	$1,253,761	$1,321,465	$1,392,824	$1,466,643	$1,542,909	$1,621,597	$1,702,677	$1,787,811
Security & Safety											
Soekarno-Hatta	$10,750,041	$11,459,544	$12,101,278	$12,766,849	$13,456,258	$14,182,896	$14,934,590	$15,711,189	$16,512,459	$17,338,082	$18,204,986
Ngurah Rai	$6,009,128	$6,405,731	$6,764,452	$7,136,496	$7,521,867	$7,928,048	$8,348,235	$8,782,343	$9,230,242	$9,691,754	$10,176,342
Polonia	$3,993,309	$4,256,867	$4,495,252	$4,742,491	$4,998,585	$5,268,509	$5,547,740	$5,836,222	$6,133,870	$6,440,563	$6,762,591
Sultan Taha	$2,249,103	$2,397,544	$2,531,807	$2,671,056	$2,815,293	$2,967,319	$3,124,587	$3,287,065	$3,454,706	$3,627,441	$3,808,813
Total - Four Airports	$23,001,582	$24,519,686	$25,892,789	$27,316,892	$28,792,004	$30,346,772	$31,955,151	$33,616,819	$35,331,277	$37,097,841	$38,952,733

3.3 SYSTEM AND INVESTMENT REQUIREMENTS FOR OTHER INDONESIA AIRPORTS BY AIRPORT GROUP

The system and investment costs for the other airports in Indonesia are organized into four categories: (1) large international airports with extensive passenger and cargo traffic and multiple domestic and international carrier operations; (2) tourist airports with the bulk of traffic being domestic and international tourists, including a large number of charter operations; (3) medium-sized airports; and (4) small airports with mostly domestic short-haul traffic.

3.3.1 GROUP 1: LARGE INTERNATIONAL AIRPORTS WITH EXTENSIVE AIR TRAFFIC

Soekarno-Hatta International Airport in Jakarta is the only airport that fits Group 1. This airport has considerably more passengers than the next largest airports, Denpasar and Surabaya. The systems requirements for Soekarno-Hatta are given in Task 3 Section 2. The total investment costs are summarized in the figures below.

Group 1 Security Investment Costs

The capital costs for security enhancements for Soekarno-Hatta are $25,012,088. The annual O&M costs for security increase from $10.5 million in 2009 to $17.7 million in 2019 as shown below in Figure 7.

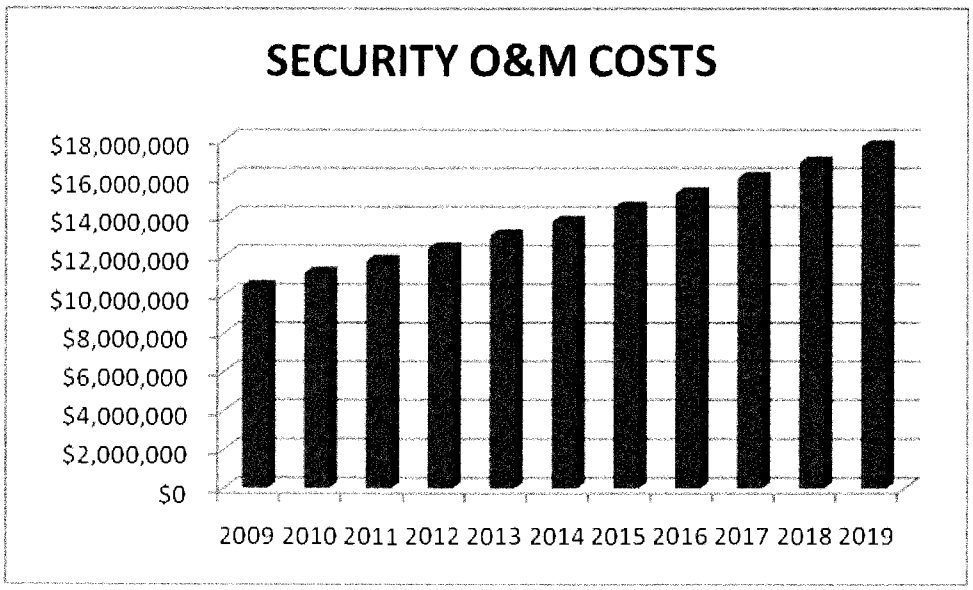

Figure 7: Security Operations & Maintenance Costs

Group 1 Safety Investment Costs

The capital costs for safety enhancements for Soekarno-Hatta are $6,103,096. The annual O&M costs for safety increase from about $300 thousand in 2009 to about $500,000 in 2019 as shown below in Figure 8.

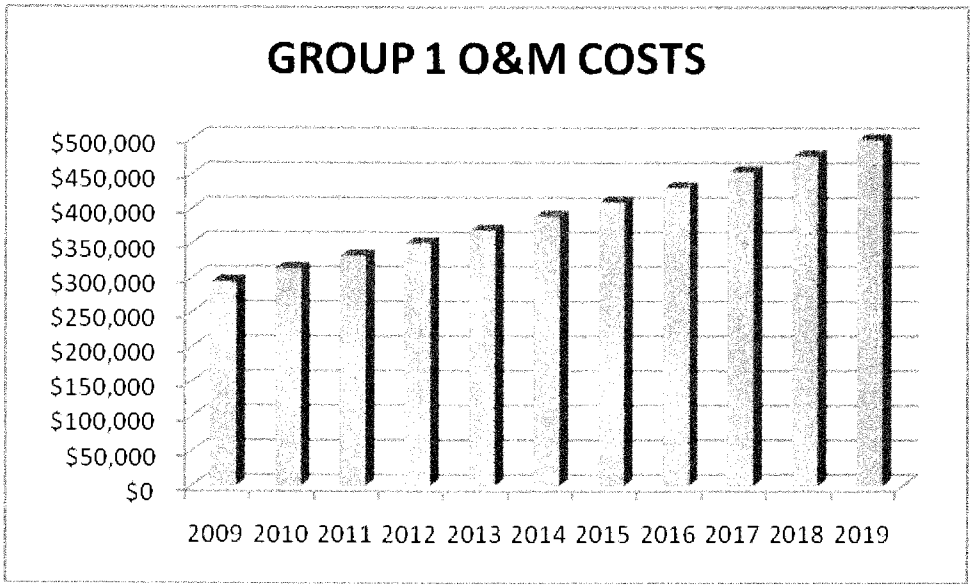

Figure 8: Group 1 Operations & Maintenance Costs

Group 1 Total Security and Safety Investment Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 3.

Table 3: GROUP 1 TOTAL INVESTMENT COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$31,542,401	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$9,282,293	$9,894,924	$10,449,040	$11,023,737	$11,619,019	$12,246,446	$12,895,508	$13,566,074	$14,257,944	$14,970,841	$15,719,383
Training Costs (Annual)	$535,588	$570,937	$602,910	$636,070	$670,417	$706,620	$744,071	$782,762	$822,683	$863,818	$907,008
Maintenance Costs (Annual)	$932,160	$993,683	$1,049,329	$1,107,042	$1,166,822	$1,229,831	$1,295,012	$1,362,352	$1,431,832	$1,503,424	$1,578,595
Total Investment Costs	$42,292,442	$11,459,544	$12,101,278	$12,766,849	$13,456,258	$14,182,896	$14,934,590	$15,711,189	$16,512,459	$17,338,082	$18,204,986

3.3.2 GROUP 2: LARGE TOURIST TYPE AIRPORTS

Denpasar and Surabaya are the only two airports in Group 2. Denpasar and Surabaya are each projected to have approximately 11 million passengers within five years. Denpasar's passengers will be predominantly international while Surabaya's passengers will be predominantly domestic.

Security Investment Costs

The capital costs for security enhancements for Denpasar and Surabaya are $21,899,287. The annual O&M costs for security increase from $11.5 million in 2009 to $19.5 million in 2019 as shown below in Figure 9.

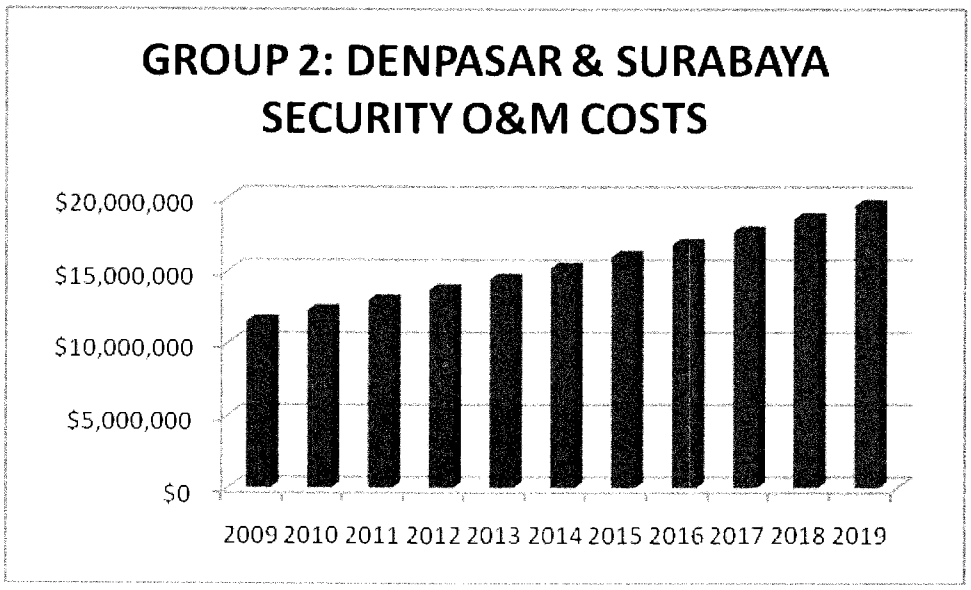

Figure 9: Group 2: Denpasar & Suraya Security Operations & Maintenance Costs

The total investment costs with the initial capital costs and annual maintenance costs, personnel costs, and training costs are summarized below in Table 4.

Table 4: GROUP 2: DENPASAR & SURABAYA SECURITY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$21,899,287	$0	$0	$0	$0	$0	$0	$0	$0		
Personnel Costs (Annual)	$10,259,674	$10,936,812	$11,549,274	$12,184,484	$12,842,446	$13,535,938	$14,253,342	$14,994,516	$15,759,237	$16,547,198	$17,374,558
Training Costs (Annual)	$591,983	$631,054	$666,393	$703,045	$741,009	$781,024	$822,418	$865,184	$909,308	$954,773	$1,002,512
Maintenance Costs (Annual)	$653,260	$696,376	$735,373	$775,818	$817,712	$861,869	$907,548	$954,740	$1,003,432	$1,053,604	$1,106,284
Total Investment Costs	$33,404,204	$12,264,242	$12,951,039	$13,663,346	$14,401,167	$15,178,830	$15,983,308	$16,814,440	$17,671,977	$18,555,575	$19,483,354

Safety Investment Costs

The capital costs for safety enhancements for Denpasar and Surabaya are $6,569,787. The annual O&M costs for safety increase from about $500 thousand in 2009 to about $900,000 in 2019 as shown below in Figure 10.

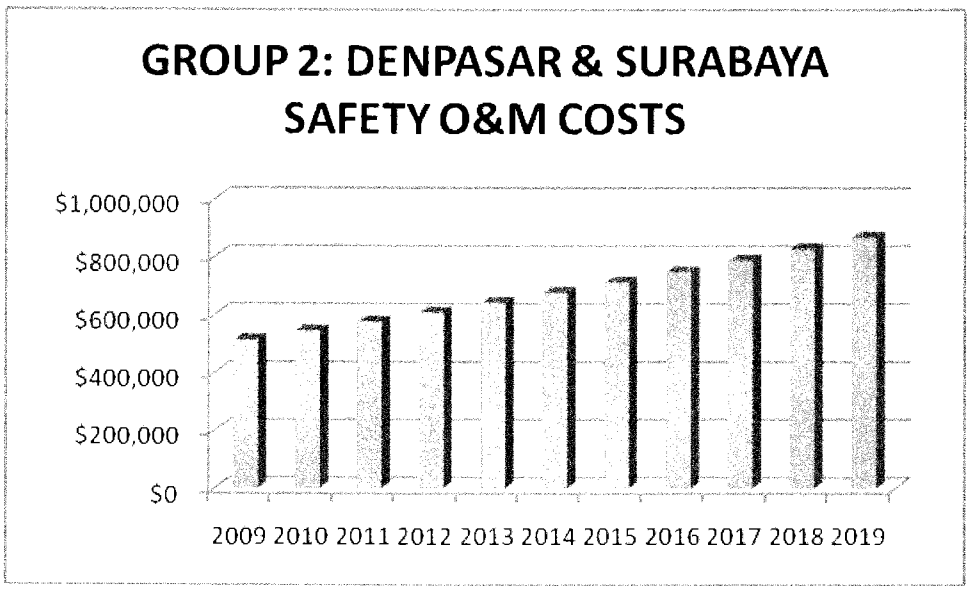

Figure 10: Group 2: Denpasar & Suraya Safety Operations & Maintenance Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 5.

Table 5: DENPASAR & SURABAYA SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$6,569,787	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$406,771	$433,618	$457,901	$483,085	$509,172	$536,667	$565,110	$594,496	$624,816	$656,056	$688,859
Training Costs (Annual)	$23,471	$25,020	$26,421	$27,874	$29,379	$30,966	$32,607	$34,302	$36,052	$37,854	$39,747
Maintenance Costs (Annual)	$83,097	$88,582	$93,542	$98,687	$104,016	$109,633	$115,444	$121,447	$127,640	$134,022	$140,724
Total Investment Costs	$7,083,126	$547,220	$577,864	$609,646	$642,567	$677,266	$713,161	$750,245	$788,508	$827,933	$869,330

Total Security and Safety Investment Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 6.

Table 6: GROUP 2: DENPASAR & SURABAYA SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$28,469,074	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$10,666,445	$11,370,430	$12,007,174	$12,667,569	$13,351,618	$14,072,605	$14,818,453	$15,589,013	$16,384,052	$17,203,255	$18,063,417
Training Costs (Annual)	$615,454	$656,074	$692,814	$730,919	$770,388	$811,989	$855,025	$899,486	$945,360	$992,628	$1,042,259
Maintenance Costs (Annual)	$736,358	$784,957	$828,915	$874,505	$921,729	$971,502	$1,022,991	$1,076,187	$1,131,073	$1,187,626	$1,247,008
Total Investment Costs	$40,487,331	$12,811,461	$13,528,903	$14,272,993	$15,043,734	$15,856,096	$16,696,469	$17,564,686	$18,460,485	$19,383,509	$20,352,684

3.3.3 GROUP 3: MEDIUM-SIZE AIRPORTS

Group 3 includes those airports that are projected to have between 1 and 6 million passengers in the next 5 years. These airports include the following:

- Medan;
- Makasaar;
- Balikpapan;
- Yogyakarta;
- Manado;
- Semarang;
- Pekanbaru;
- Banjarmasin;
- Mataram;
- Pontianak;
- Palembang;
- Padang.

The investment costs for these airports are broken into 2 subgroups – those that are projected to have about 2 to 5 million passengers and those that are projected to have between 1 and 2 million passengers.

The airports in the group with 2 to 5 million passengers have investment costs similar to Medan, which is part of the group. These airports are:

- Medan;
- Makasaar;
- Balikpapan;
- Yogyakarta;
- Manado;
- Semarang;
- Pekanbaru.

The other group has investment costs that are estimated to be less than those of Medan, but greater than those airports in Group 4. These airports are:

- Banjarmasin;
- Mataram;
- Pontianak;
- Palembang;
- Padang.

Security Investment Costs

The capital costs for security enhancements for the Group 3 airports are $67,024,701. The annual O&M costs for security increase from $35 million in 2009 to $60 million in 2019 as shown below in Figure 11.

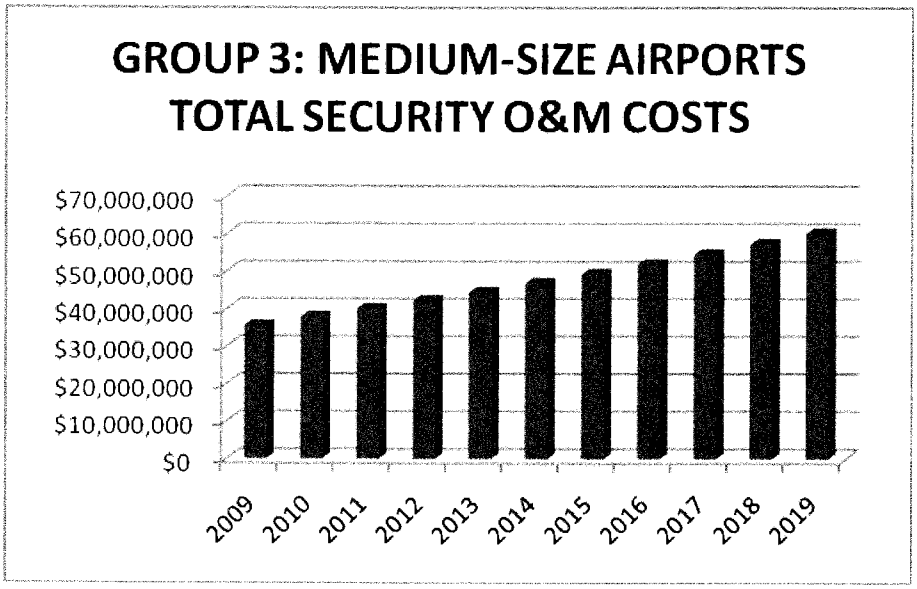

Figure 11: Group 3: Medium-size Airports Total Security Operations & Maintenance Costs

The total security investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 7.

Table 7: MEDIUM-SIZE AIRPORTS (TOTAL) SECURITY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$67,024,701	$0	$0	$0	$0	$0	$0	$0	$0		
Personnel Costs (Annual)	$31,719,679	$33,813,178	$35,706,716	$37,670,585	$39,704,797	$41,848,856	$44,066,845	$46,358,321	$48,722,596	$51,158,726	$53,716,662
Training Costs (Annual)	$1,830,225	$1,951,020	$2,060,278	$2,173,593	$2,290,967	$2,414,679	$2,542,657	$2,674,875	$2,811,294	$2,951,858	$3,099,451
Maintenance Costs (Annual)	$1,932,907	$2,060,478	$2,175,865	$2,295,538	$2,419,497	$2,550,150	$2,685,308	$2,824,943	$2,969,016	$3,117,466	$3,273,340
Total Investment Costs	$102,507,512	$37,824,677	$39,942,859	$42,139,716	$44,415,261	$46,813,685	$49,294,810	$51,858,140	$54,502,905	$57,228,050	$60,089,453

Safety Investment Costs

The capital costs for safety enhancements for the Group 3 airports are $33,465,884. The annual O&M costs for safety increase from about $2.5 million in 2009 to about $4.2 million in 2019 as shown below in Figure 12.

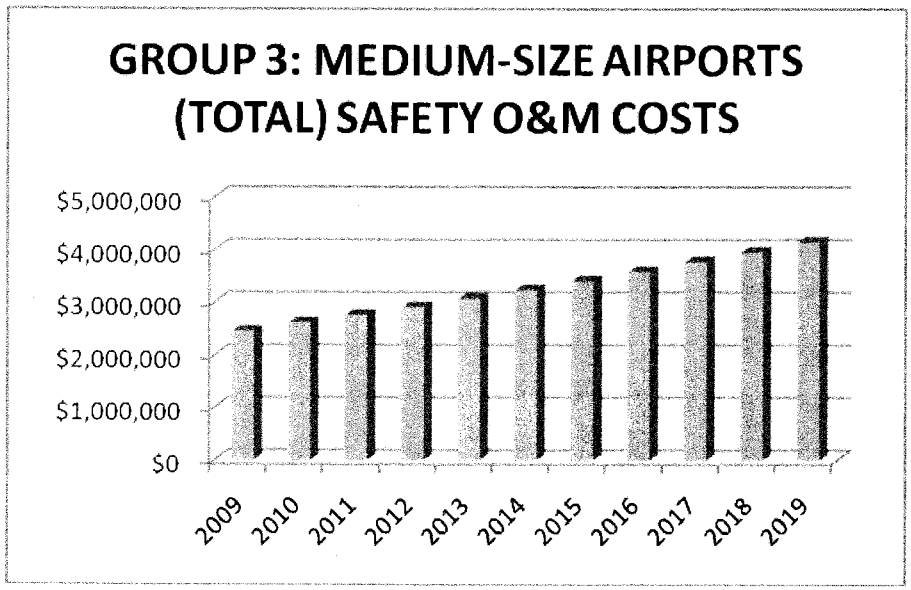

Figure 12: Group 3: Medium-size Airports Total safety Operations & Maintenance Costs

The total safety investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 8.

Table 8: MEDIUM-SIZE AIRPORTS (TOTAL) SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$33,465,884	$0	$0	$0	$0	$0	$0	$0	$0		
Personnel Costs (Annual)	$1,449,122	$1,544,764	$1,631,271	$1,720,991	$1,813,925	$1,911,877	$2,013,206	$2,117,893	$2,225,905	$2,337,201	$2,454,061
Training Costs (Annual)	$83,614	$89,133	$94,124	$99,301	$104,663	$110,315	$116,162	$122,202	$128,435	$134,856	$141,599
Maintenance Costs (Annual)	$920,888	$981,667	$1,036,640	$1,093,655	$1,152,713	$1,214,959	$1,279,352	$1,345,878	$1,414,518	$1,485,244	$1,559,506
Total Investment Costs	$35,919,509	$2,615,564	$2,762,036	$2,913,948	$3,071,301	$3,237,151	$3,408,720	$3,585,973	$3,768,858	$3,957,301	$4,155,166

Total Security and Safety Investment Costs

The capital costs for the security and safety enhancements for the Group 3 airports are $100,490,585. The annual O&M costs for safety increase from about $38 million in 2009 to about $64 million in 2019 as shown below in Figure 13.

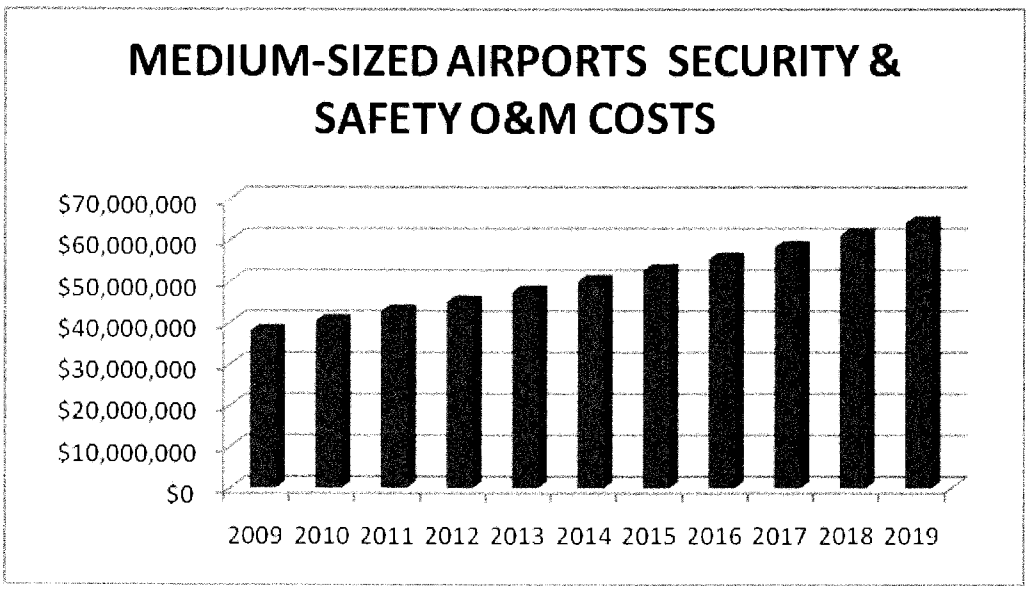

Figure 13: Group 3: Medium-size Airports Total Security Operations & Maintenance Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 9.

Table 9: MEDIUM-SIZED AIRPORTS SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$100,490,585	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$33,168,802	$35,357,943	$37,337,987	$39,391,577	$41,518,722	$43,760,733	$46,080,052	$48,476,214	$50,948,501	$53,495,926	$56,170,722
Training Costs (Annual)	$1,913,840	$2,040,153	$2,154,402	$2,272,894	$2,395,630	$2,524,994	$2,658,819	$2,797,078	$2,939,729	$3,086,715	$3,241,051
Maintenance Costs (Annual)	$2,853,795	$3,042,145	$3,212,505	$3,389,193	$3,572,209	$3,765,109	$3,964,659	$4,170,822	$4,383,534	$4,602,710	$4,832,846
Total Investment Costs	$138,427,021	$40,440,241	$42,704,894	$45,053,663	$47,486,561	$50,050,836	$52,703,530	$55,444,113	$58,271,763	$61,185,351	$64,244,619

3.3.4 GROUP 4: SMALL AIRPORTS

Group 3 includes those airports that are projected to have between 50 thousand and 1 million passengers in the next 5 years. These airports include the following:

- Bandung;
- Jayapura;
- Jambi;
- Palu
- Pangkal Pinang
- Solo
- Banda Aceh
- Kupang
- Kendari
- Biak
- Sorong
- Ambon
- Bandar Lampung
- Palangkaraya
- Samarinda
- Ternate
- Pangkalanbun
- Tanjung Pandan
- Bengkulu
- Tarakan
- Berau
- Wamena
- Merauke
- Maumere
- Gorontalo
- Manokwari
- Ketapang
- Nabire
- Tanjung Pinang

The investment costs for these airports are broken into 2 subgroups – those airports that are projected to have more than 300,000 passengers and those that are projected to have less than 300,000 passengers. The airports in the group with more than 300,000 passengers have investment costs similar to Jambi, which is part of the group. These airports include:

- Bandung
- Jayapura
- Jambi
- Palu
- Pangkal Pinang
- Solo
- Banda Aceh
- Kupang
- Kendari
- Biak

The other group has investment costs that are estimated to be less than those of Jambi. These airports include:

- Sorong
- Ambon
- Bandar Lampung
- Palangkaraya
- Samarinda
- Ternate
- Pangkalanbun
- Tanjung Pandan

- Bengkulu
- Tarakan
  - Berau
  - Wamena
  - Merauke
  - Maumere
- Gorontalo
- Manokwari
- Ketapang
- Nabire
- Tanjung Pinang

Security Investment Costs

The capital costs for security enhancements for the Group 4 airports are $71,254,443. The annual O&M costs for security increase from $43 million in 2009 to $73 million in 2019 as shown below in Figure 14.

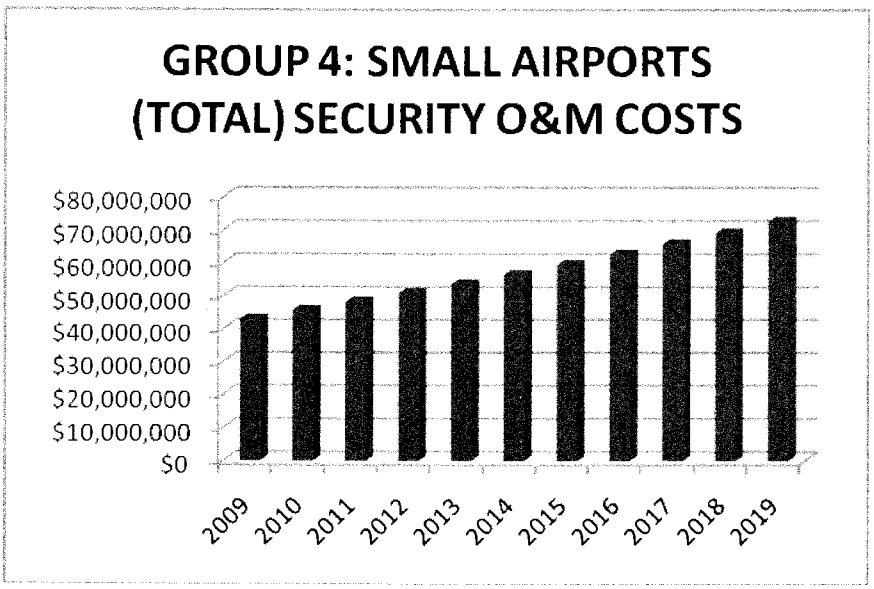

Figure 14: Group 4: Small Airports (Total) Security Operations & Maintenance Costs

The total security investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 10.

Table 10: SMALL AIRPORTS (TOTAL) SECURITY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$71,254,443	$0	$0	$0	$0	$0	$0	$0	$0		
Personnel Costs (Annual)	$38,688,461	$41,241,899	$43,551,446	$45,946,775	$48,427,901	$51,043,008	$53,748,287	$56,543,198	$59,426,901	$62,398,246	$65,518,158
Training Costs (Annual)	$2,232,324	$2,379,658	$2,512,918	$2,651,129	$2,794,290	$2,945,182	$3,101,276	$3,262,543	$3,428,932	$3,600,379	$3,780,398
Maintenance Costs (Annual)	$1,952,266	$2,081,116	$2,197,658	$2,318,530	$2,443,730	$2,575,692	$2,712,203	$2,853,238	$2,998,753	$3,148,691	$3,306,125
Total Investment Costs	$114,127,494	$45,702,673	$48,262,022	$50,916,434	$53,665,921	$56,563,881	$59,561,766	$62,658,978	$65,854,586	$69,147,315	$72,604,681

Safety Investment Costs

The capital costs for safety enhancements for the Group 4 airports are $66,481,114. The annual O&M costs for safety increase from about $5.3 million in 2009 to about $8.9 million in 2019 as shown below in Figure 13.

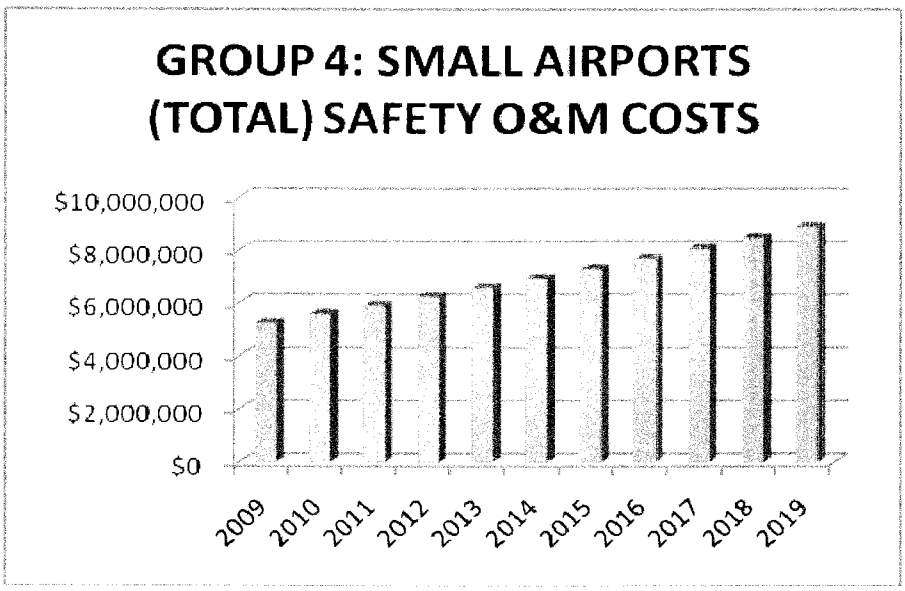

Figure 15: Group 4: Small Airports (Total) Safety Operations & Maintenance Costs

The total safety investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 11.

Table 11: SMALL AIRPORTS (TOTAL) SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$66,481,114	$0	$0	$0	$0	$0	$0	$0	$0		
Personnel Costs (Annual)	$3,264,339	$3,479,785	$3,674,653	$3,876,759	$4,086,104	$4,306,754	$4,535,012	$4,770,832	$5,014,145	$5,264,852	$5,528,095
Training Costs (Annual)	$188,352	$200,784	$212,027	$223,689	$235,768	$248,500	$261,670	$275,277	$289,316	$303,782	$318,971
Maintenance Costs (Annual)	$1,805,072	$1,924,207	$2,031,963	$2,143,721	$2,259,481	$2,381,493	$2,507,713	$2,638,114	$2,772,657	$2,911,290	$3,056,855
Total Investment Costs	$71,738,878	$5,604,776	$5,918,643	$6,244,169	$6,581,354	$6,936,747	$7,304,394	$7,684,223	$8,076,118	$8,479,924	$8,903,921

Total Security and Safety Investment Costs

The capital costs for the security and safety enhancements for the Group 4 airports are $137,735,557. The annual O&M costs for safety increase from about $48 million in 2009 to about $82 million in 2019 as shown below in Figure 16.

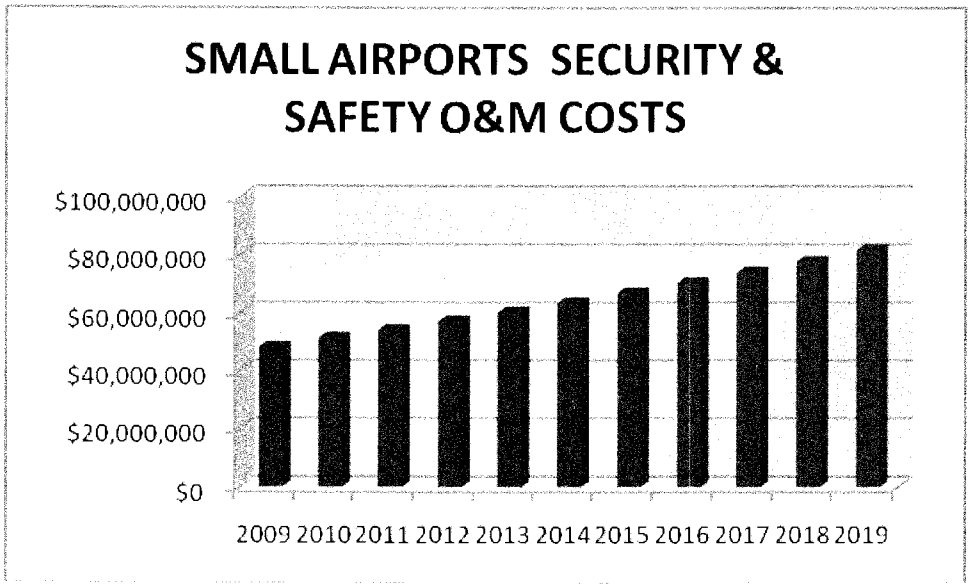

Figure 16: Small Airports Security & Safety Operations & Maintenance Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 12.

Table 12: SMALL AIRPORTS SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$137,735,557	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$41,952,800	$44,721,684	$47,226,099	$49,823,534	$52,514,005	$55,349,761	$58,283,299	$61,314,030	$64,441,046	$67,663,098	$71,046,253
Training Costs (Annual)	$2,420,677	$2,580,441	$2,724,946	$2,874,818	$3,030,058	$3,193,681	$3,362,946	$3,537,820	$3,718,248	$3,904,161	$4,099,369
Maintenance Costs (Annual)	$3,757,339	$4,005,323	$4,229,621	$4,462,250	$4,703,212	$4,957,185	$5,219,916	$5,491,351	$5,771,410	$6,059,981	$6,362,980
Total Investment Costs	$185,866,372	$51,307,449	$54,180,666	$57,160,602	$60,247,275	$63,500,628	$66,866,161	$70,343,201	$73,930,705	$77,627,240	$81,508,602

3.4 TOTAL INDONESIA INVESTMENT REQUIREMENTS

The system and investment costs for the airports in Indonesia can also be organized into the three organizations that operate them: (1) AP-I; (2) AP-II; and (3) DGAC. The investment and financing process will most likely evolve around these three organizations.

3.4.1 AP-I

AP-I includes the following airports:

- Surabaya
- Denpasar
- Makasaar
- Balikpapan
- Yogyakarta
- Manado
- Semarang
- Banjarmasin
- Mataram
- Solo
- Kupang
- Biak
- Ambon

Security Investment Costs

The capital costs for security enhancements for the AP-I airports are $76,217,406. The annual O&M costs for security increase from $41 million in 2009 to $70 million in 2019 as shown below in Figure 17.

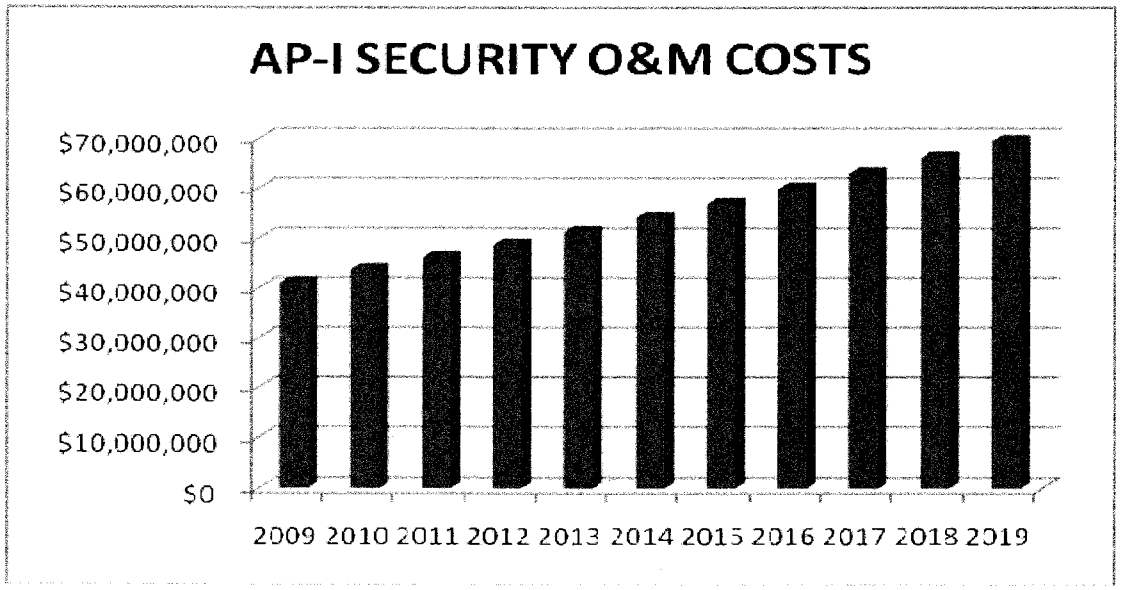

Figure 17: AP-I Security Operations & Maintenance Costs

The total security investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 13.

Table 13: AP-I SECURITY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$76,217,406	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$36,801,494	$39,230,393	$41,427,295	$43,705,796	$46,065,909	$48,553,468	$51,126,802	$53,785,396	$56,528,451	$59,354,874	$62,322,617
Training Costs (Annual)	$2,123,446	$2,263,594	$2,390,355	$2,521,824	$2,658,003	$2,801,535	$2,950,016	$3,103,417	$3,261,692	$3,424,776	$3,596,015
Maintenance Costs (Annual)	$2,202,462	$2,347,825	$2,479,303	$2,615,664	$2,756,910	$2,905,784	$3,059,790	$3,218,899	$3,383,063	$3,552,216	$3,729,827
Total Investment Costs	$117,344,809	$43,841,811	$46,296,953	$48,843,285	$51,480,823	$54,260,787	$57,136,609	$60,107,712	$63,173,206	$66,331,866	$69,648,459

Safety Investment Costs

The capital costs for safety enhancements for the AP-I airports are $38,889,874. The annual O&M costs for safety increase from about $2.9 million in 2009 to about $5 million in 2019 as shown below in Figure 18.

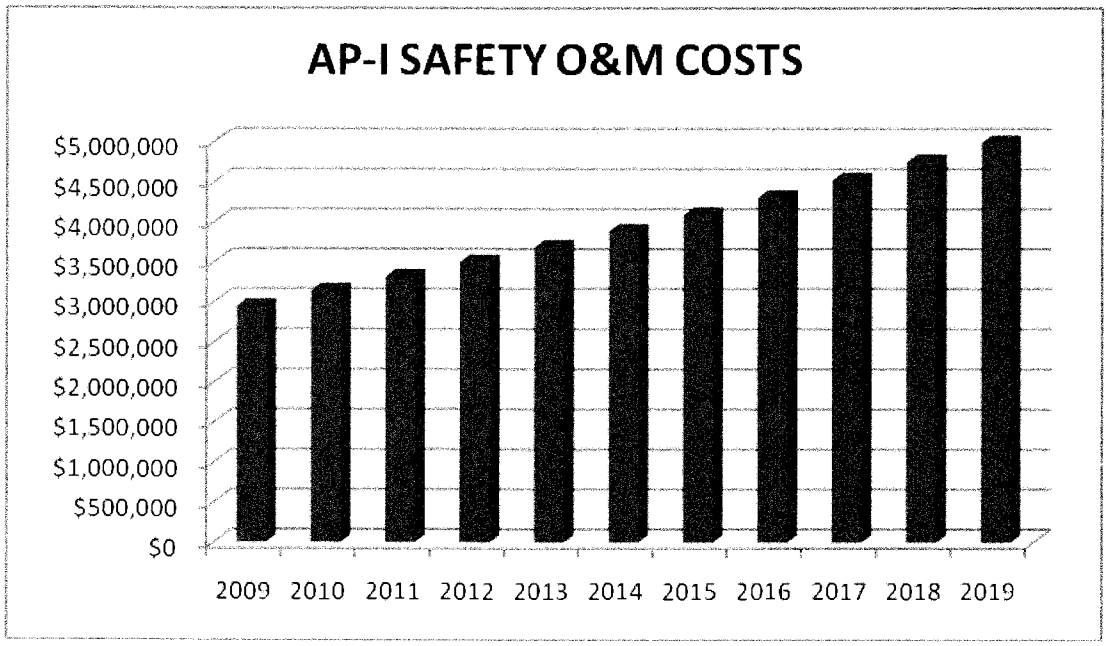

Figure 18: AP-I Safety Operations & Maintenance Costs

The total safety investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 14.

Table 14: AP-I SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$38,889,874	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$1,871,148	$1,994,643	$2,106,343	$2,222,192	$2,342,191	$2,468,669	$2,599,508	$2,734,683	$2,874,152	$3,017,859	$3,168,752
Training Costs (Annual)	$107,965	$115,091	$121,536	$128,220	$135,144	$142,442	$149,992	$157,791	$165,839	$174,130	$182,837
Maintenance Costs (Annual)	$968,368	$1,032,280	$1,090,088	$1,150,043	$1,212,145	$1,277,601	$1,345,313	$1,415,270	$1,487,449	$1,561,821	$1,639,912
Total Investment Costs	$41,837,354	$3,142,014	$3,317,967	$3,500,455	$3,689,480	$3,888,712	$4,094,813	$4,307,744	$4,527,439	$4,753,811	$4,991,501

Total Security and Safety Investment Costs

The capital costs for the security and safety enhancements for the AP-I airports are $115,107,280. The annual O&M costs for safety increase from about $44 million in 2009 to about $75 million in 2019 as shown below in Figure 19.

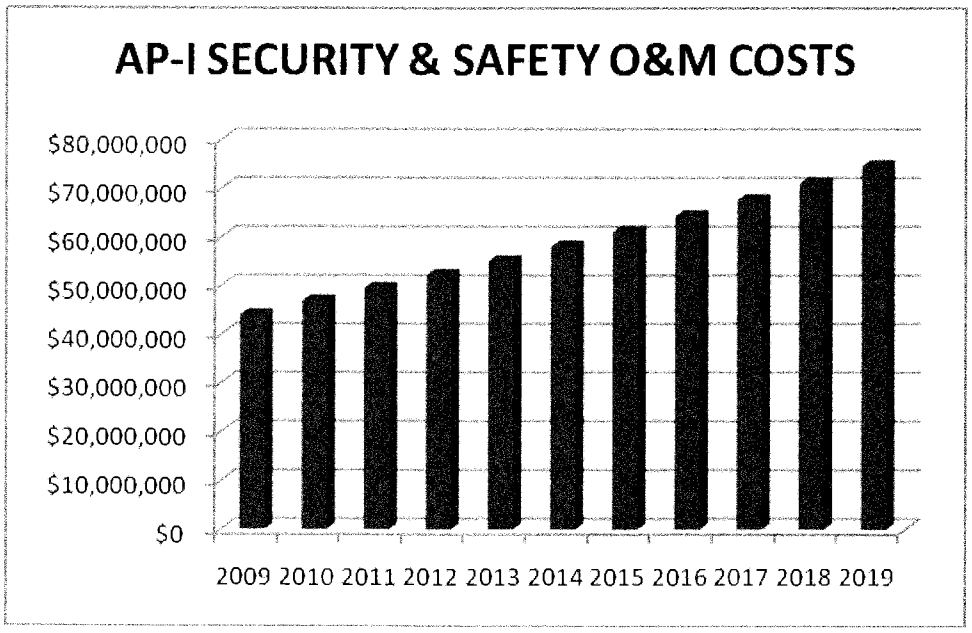

Figure 19: AP-I Security & Safety Operations & Maintenance Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 15.

Table 15: AP-I SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$115,107,280	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$38,672,642	$41,225,036	$43,533,638	$45,927,988	$48,408,100	$51,022,137	$53,726,310	$56,520,079	$59,402,603	$62,372,733	$65,491,369
Training Costs (Annual)	$2,231,411	$2,378,685	$2,511,891	$2,650,045	$2,793,147	$2,943,977	$3,100,008	$3,261,209	$3,427,530	$3,598,907	$3,778,852
Maintenance Costs (Annual)	$3,170,830	$3,380,105	$3,569,391	$3,765,707	$3,969,055	$4,183,384	$4,405,104	$4,634,169	$4,870,512	$5,114,037	$5,369,739
Total Investment Costs	$159,182,163	$46,983,826	$49,614,920	$52,343,740	$55,170,302	$58,149,499	$61,231,422	$64,415,456	$67,700,644	$71,085,677	$74,639,960

3.4.2 AP-II

AP-II includes the following airports:

- Jakarta SH;
- Medan;
- Pekanbaru;
- Pontianak;
- Palembang;
- Padang;
- Bandung;
- Banda Aceh;
- Tanjung Pinang.

Security Investment Costs

The capital costs for security enhancements for the AP-II airports are $58,362,481. The annual O&M costs for security increase from $25 million in 2009 to $42 million in 2019 as shown below in Figure 20.

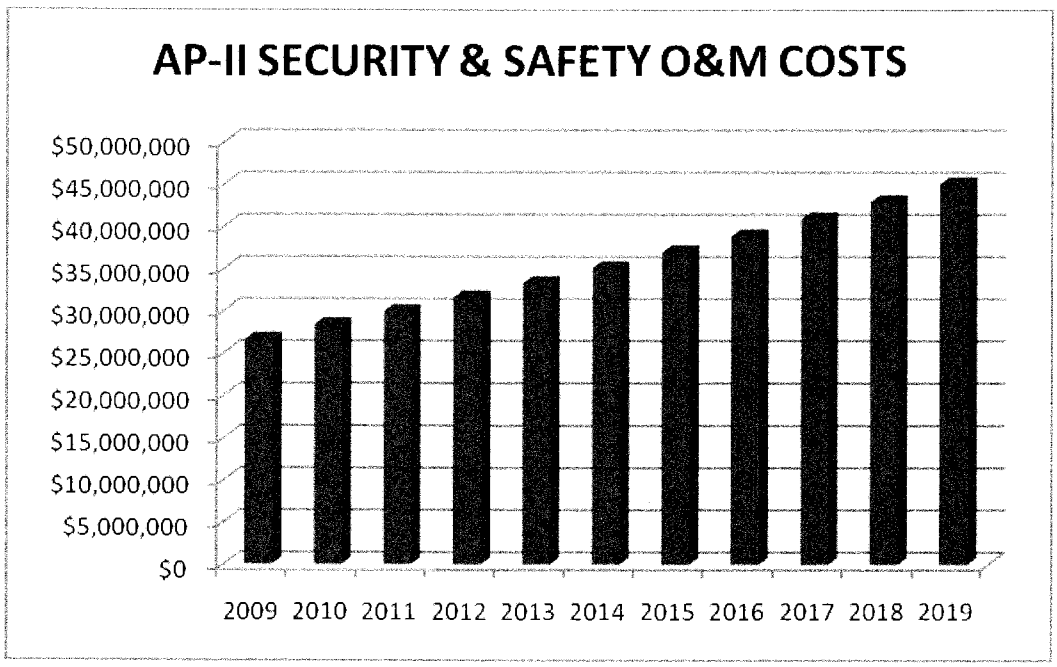

Figure 20: AP-II Security &Safety Operations & Maintenance Costs

The total security investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 16.

Table 16: AP-II SECURITY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$58,362,481	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$22,047,564	$23,502,703	$24,818,855	$26,183,892	$27,597,822	$29,088,104	$30,629,774	$32,222,522	$33,865,870	$35,559,164	$37,337,122
Training Costs (Annual)	$1,272,144	$1,356,106	$1,432,048	$1,510,811	$1,592,394	$1,678,384	$1,767,338	$1,859,240	$1,954,061	$2,051,764	$2,154,352
Maintenance Costs (Annual)	$1,481,382	$1,579,154	$1,667,586	$1,759,304	$1,854,306	$1,954,438	$2,058,024	$2,165,041	$2,275,458	$2,389,231	$2,508,692
Total Investment Costs	$83,163,572	$26,437,963	$27,918,489	$29,454,006	$31,044,522	$32,720,926	$34,455,135	$36,246,802	$38,095,389	$40,000,159	$42,000,167

Safety Investment Costs

The capital costs for safety enhancements for the AP-II airports are $26,936,994. The annual O&M costs for safety increase from about $1.8 million in 2009 to about $3.1 million in 2019 as shown below in Figure 21.

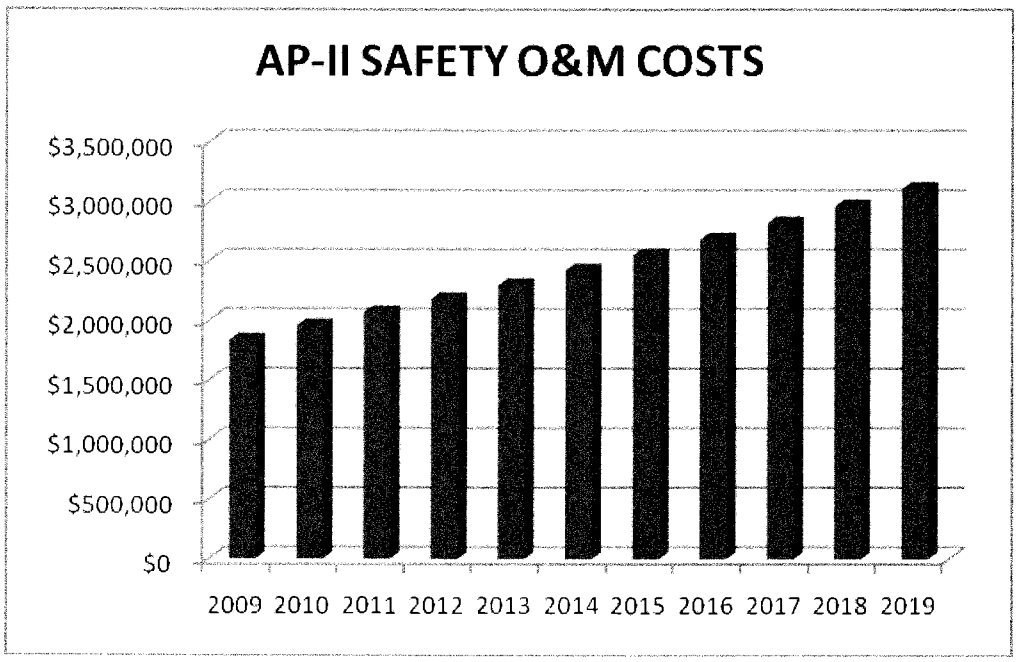

Figure 21: AP-II Safety Operations & Maintenance Costs

The total safety investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 17.

Table 17: AP-II SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$26,936,994	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$1,032,182	$1,100,306	$1,161,923	$1,225,829	$1,292,024	$1,361,793	$1,433,968	$1,508,534	$1,585,469	$1,664,743	$1,747,980
Training Costs (Annual)	$59,557	$63,488	$67,043	$70,730	$74,550	$78,575	$82,740	$87,042	$91,482	$96,056	$100,858
Maintenance Costs (Annual)	$746,088	$795,330	$839,868	$886,061	$933,908	$984,340	$1,036,510	$1,090,408	$1,146,019	$1,203,320	$1,263,486
Total Investment Costs	$28,774,821	$1,959,123	$2,068,834	$2,182,620	$2,300,482	$2,424,708	$2,553,217	$2,685,985	$2,822,970	$2,964,118	$3,112,324

Total Security and Safety Investment Costs

The capital costs for the security and safety enhancements for the AP-II airports are $85,299,475. The annual O&M costs for safety increase from about $44 million in 2009 to about $75 million in 2019 as shown below in Figure 22.

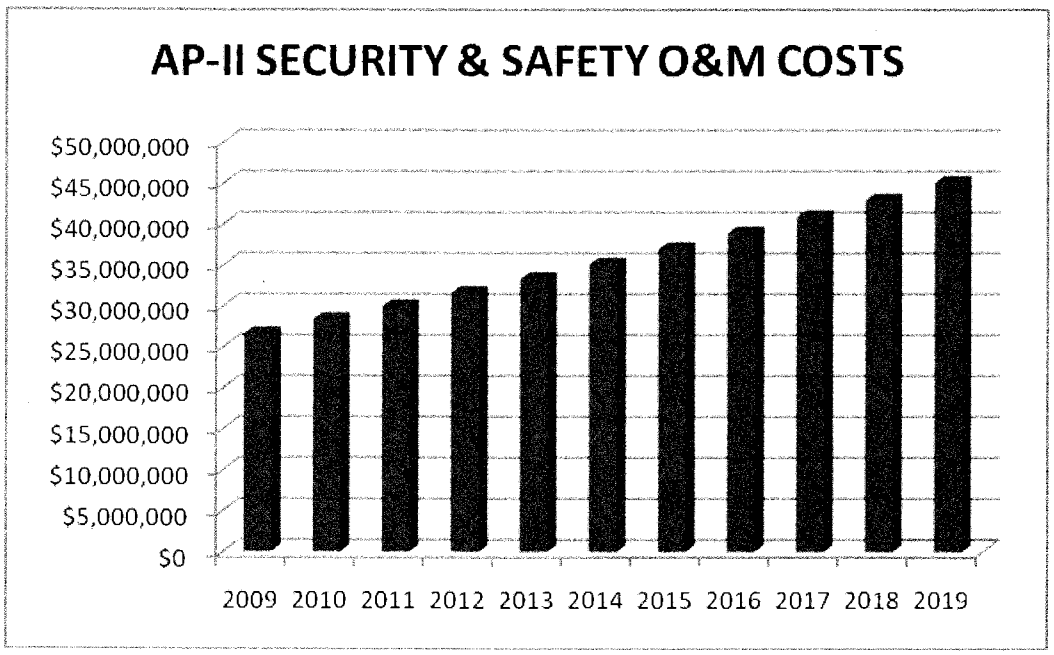

Figure 22: AP-II Security & Safety Operations & Maintenance Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 18.

Table 18: AP-II SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$85,299,475	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$23,079,746	$24,603,009	$25,980,778	$27,409,720	$28,889,845	$30,449,897	$32,063,742	$33,731,056	$35,451,340	$37,223,907	$39,085,102
Training Costs (Annual)	$1,331,701	$1,419,594	$1,499,091	$1,581,541	$1,666,944	$1,756,959	$1,850,078	$1,946,282	$2,045,542	$2,147,819	$2,255,210
Maintenance Costs (Annual)	$2,227,471	$2,374,484	$2,507,455	$2,645,365	$2,788,214	$2,938,778	$3,094,533	$3,255,449	$3,421,477	$3,592,551	$3,772,178
Total Investment Costs	$111,938,392	$28,397,086	$29,987,323	$31,636,626	$33,345,004	$35,145,634	$37,008,353	$38,932,787	$40,918,359	$42,964,277	$45,112,491

3.4.3 DGAC

The larger DGAC airports include the following airports:

- Batam
- Jayapura
- Jambi
- Palu
- Pangkal Pinang
- Kendari
- Sorong
- Bandar Lampung
- Palangkaraya
- Samarinda
- Ternate
- Pangkalanbun
- Tanjung Pandan
- Bengkulu
- Tarakan
- Berau
- Wamena
- Merauke
- Maumere
- Gorontalo
- Manokwari
- Ketapang
- Nabire

Security Investment Costs

The capital costs for security enhancements for the DGAC airports are $50,610,632. The annual O&M costs for security increase from $30.5 million in 2009 to $51.6 million in 2019 as shown below in Figure 23.

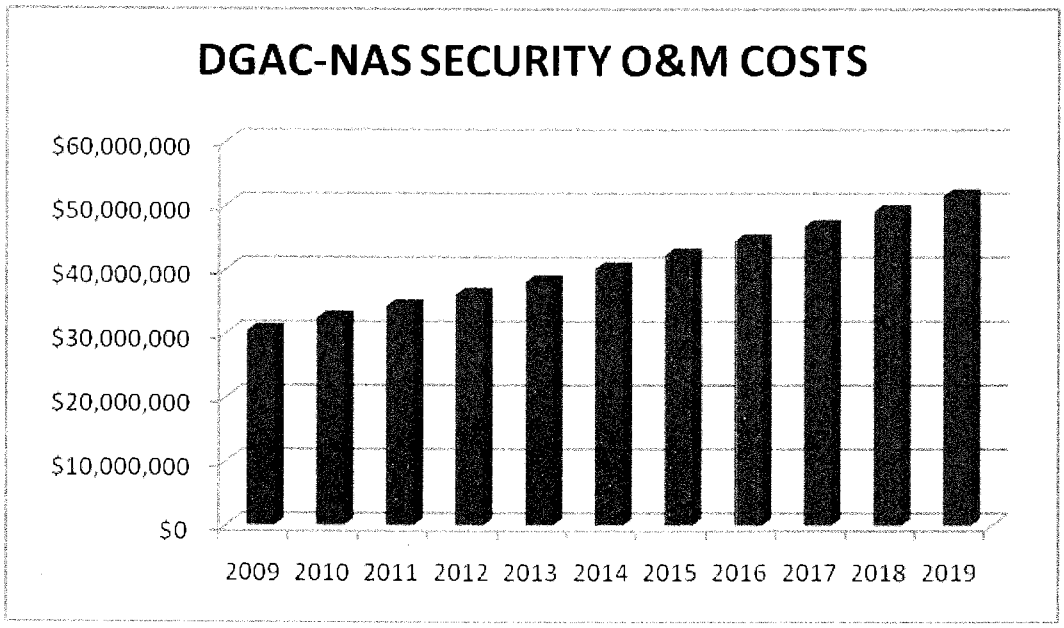

Figure 23: DGAC-NAS Security Operations & Maintenance Costs

The total security investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 19.

Table 19: DGAC-NAS SECURITY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$50,610,632	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$27,479,654	$29,293,312	$30,933,737	$32,635,093	$34,397,388	$36,254,847	$38,176,353	$40,161,524	$42,209,761	$44,320,250	$46,536,262
Training Costs (Annual)	$1,585,576	$1,690,224	$1,784,877	$1,883,045	$1,984,729	$2,091,905	$2,202,776	$2,317,320	$2,435,503	$2,557,278	$2,685,142
Maintenance Costs (Annual)	$1,386,656	$1,478,176	$1,560,954	$1,646,806	$1,735,734	$1,829,463	$1,926,425	$2,026,599	$2,129,955	$2,236,453	$2,348,276
Total Investment Costs	$81,062,519	$32,461,711	$34,279,567	$36,164,943	$38,117,850	$40,176,214	$42,305,554	$44,505,443	$46,775,220	$49,113,981	$51,569,680

Safety Investment Costs

The capital costs for safety enhancements for the DGAC airports are $47,220,231. The annual O&M costs for safety increase from about $3.7 million in 2009 to about $6.3 million in 2019 as shown below in Figure 24.

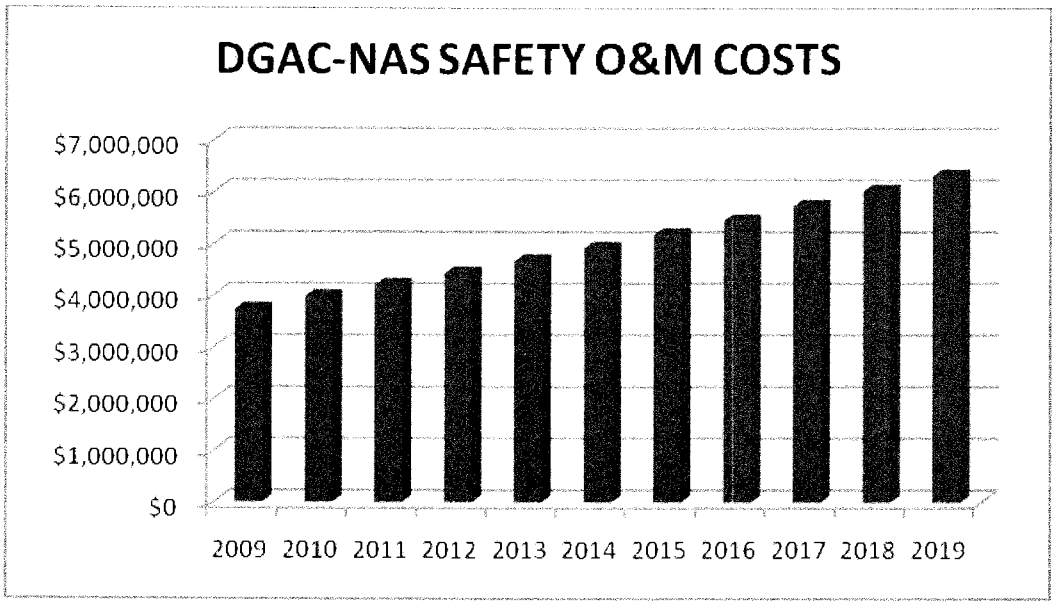

Figure 24: DGAC-NAS Safety Operations & Maintenance Costs

The total safety investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 20.

Table 20: DGAC-NAS SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$47,220,231	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$2,318,596	$2,471,623	$2,610,034	$2,753,586	$2,902,280	$3,059,003	$3,221,130	$3,388,629	$3,561,449	$3,739,521	$3,926,497
Training Costs (Annual)	$133,783	$142,613	$150,599	$158,882	$167,462	$176,504	$185,859	$195,524	$205,496	$215,770	$226,559
Maintenance Costs (Annual)	$1,282,107	$1,366,726	$1,443,263	$1,522,643	$1,604,865	$1,691,528	$1,781,179	$1,873,800	$1,969,364	$2,067,832	$2,171,224
Total Investment Costs	$50,954,717	$3,980,962	$4,203,896	$4,435,110	$4,674,606	$4,927,035	$5,188,168	$5,457,953	$5,736,308	$6,023,124	$6,324,280

Total Security and Safety Investment Costs

The capital costs for the security and safety enhancements for the DGAC airports are $97,830,863. The annual O&M costs for safety increase from about $34.2 million in 2009 to about $57.9 million in 2019 as shown below in Figure 25.

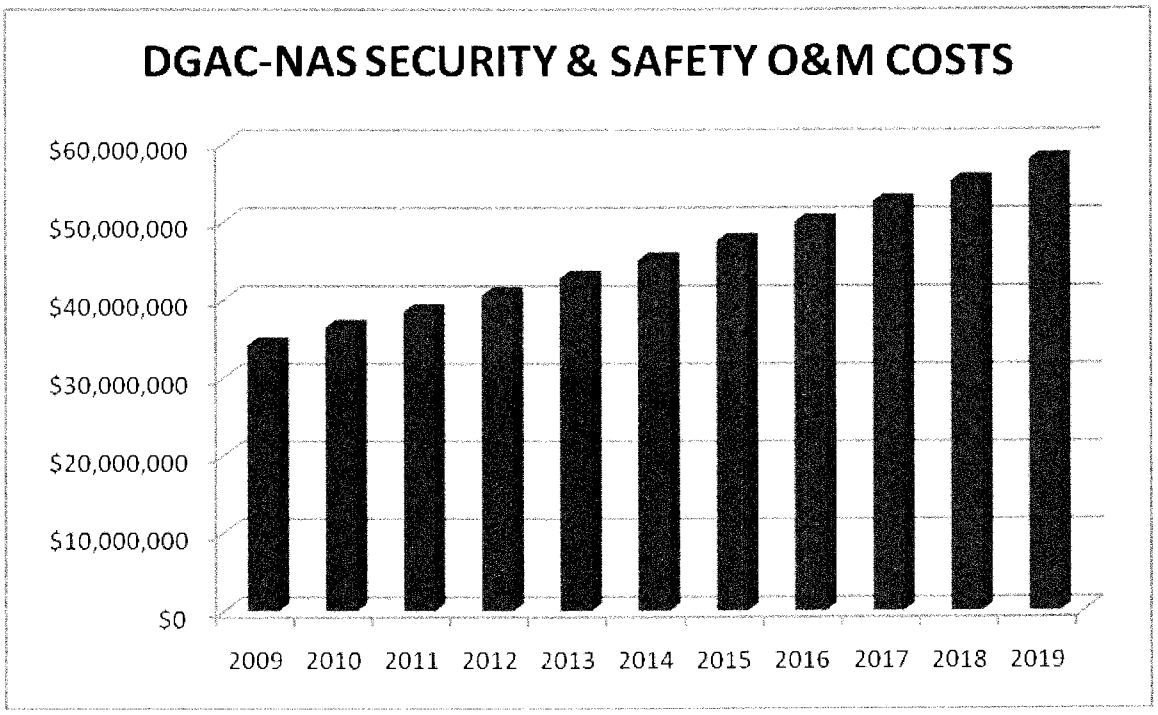

Figure 25: DGAC-NAS Security & Safety Operations & Maintenance Costs

The total investment costs with the initial capital costs, maintenance costs, personnel costs, and training costs identified on an annual basis are summarized below in Table 21.

Table 21: DGAC-NAS SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$97,830,863	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$29,798,250	$31,764,935	$33,543,771	$35,388,679	$37,299,667	$39,313,849	$41,397,483	$43,550,152	$45,771,210	$48,059,771	$50,462,759
Training Costs (Annual)	$1,719,359	$1,832,837	$1,935,476	$2,041,927	$2,152,191	$2,268,409	$2,388,635	$2,512,844	$2,640,999	$2,773,049	$2,911,701
Maintenance Costs (Annual)	$2,668,764	$2,844,902	$3,004,217	$3,169,449	$3,340,599	$3,520,991	$3,707,604	$3,900,399	$4,099,320	$4,304,286	$4,519,500
Total Investment Costs	$132,017,236	$36,442,674	$38,483,463	$40,600,054	$42,792,457	$45,103,250	$47,493,722	$49,963,395	$52,511,528	$55,137,105	$57,893,960

3.5 SUMMARY: INDONESIA AIRPORT INVESTMENT REQUIREMENTS

3.5.1 AIRPORT GROUPS

The total capital investment costs for all the identified airports are summarized and compared by Group in Table 22 and Figure 26 below.

Table 22: Security & Safety Capital Investment Costs - Airport Groups

Group 1	$31,542,401
Group 2	$28,469,074
Group 3	$100,490,585
Group 4	$137,735,557
Total	$298,237,618

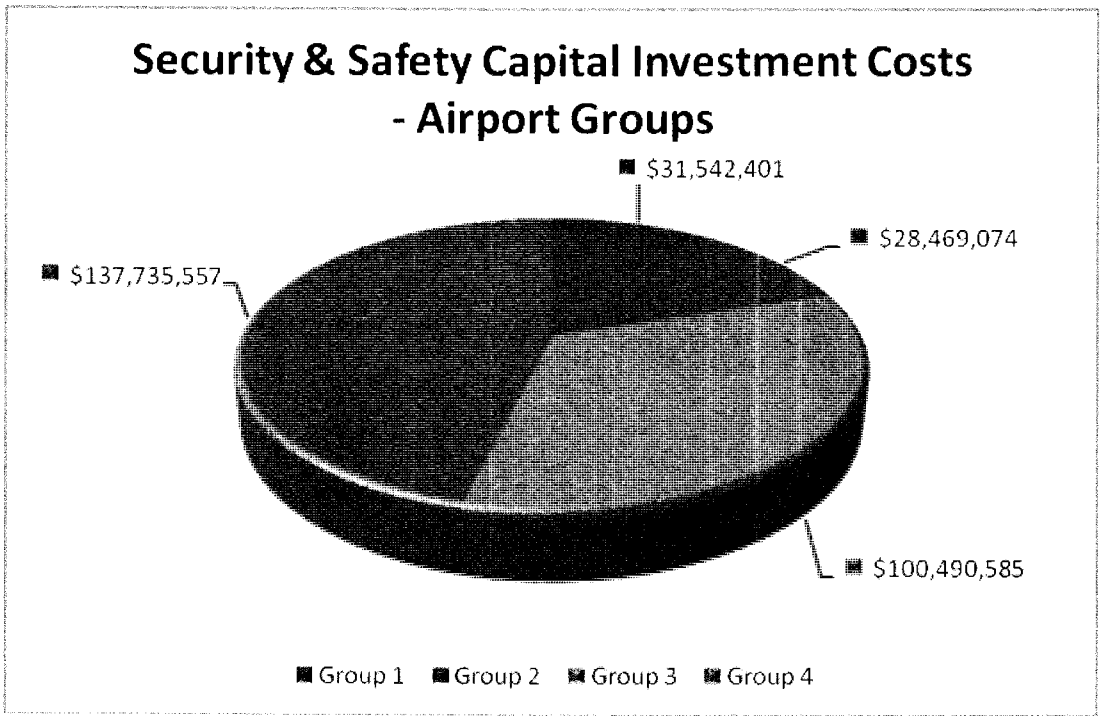

Figure 26: Security & Safety Capital Investment Costs – Airport Group

The total O&M costs for the identified airports are summarized Figure 27 below.

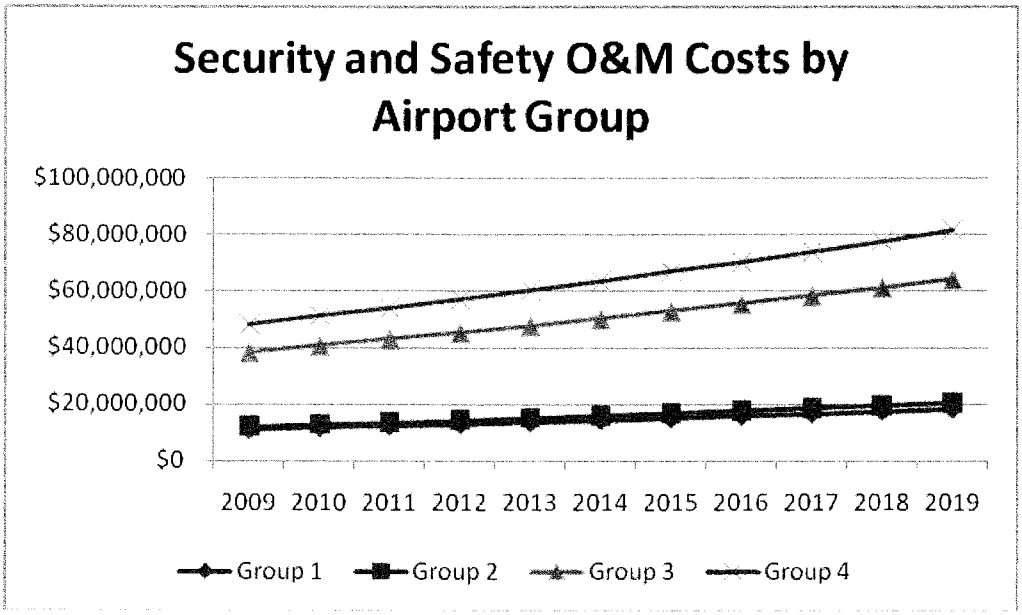

Figure 27: Security and Safety Operations & Maintenance Costs by Airport Group

3.5.2 AIRPORT ORGANIZATIONS

The total capital investment costs for all the identified airports are summarized and compared by Airport Organization in Table 23 and Figure 28 below.

Table 23: Security & Safety Capital Costs - Airport Organizations

AP-I	$115,107,280
AP-II	$85,299,475
DGCA	$97,830,863
Total	$298,237,618

Figure 28: Security & Safety Capital Investment Costs – Airport Organizations

The total O&M costs for the Airport Organizations are summarized Figure 29 below.

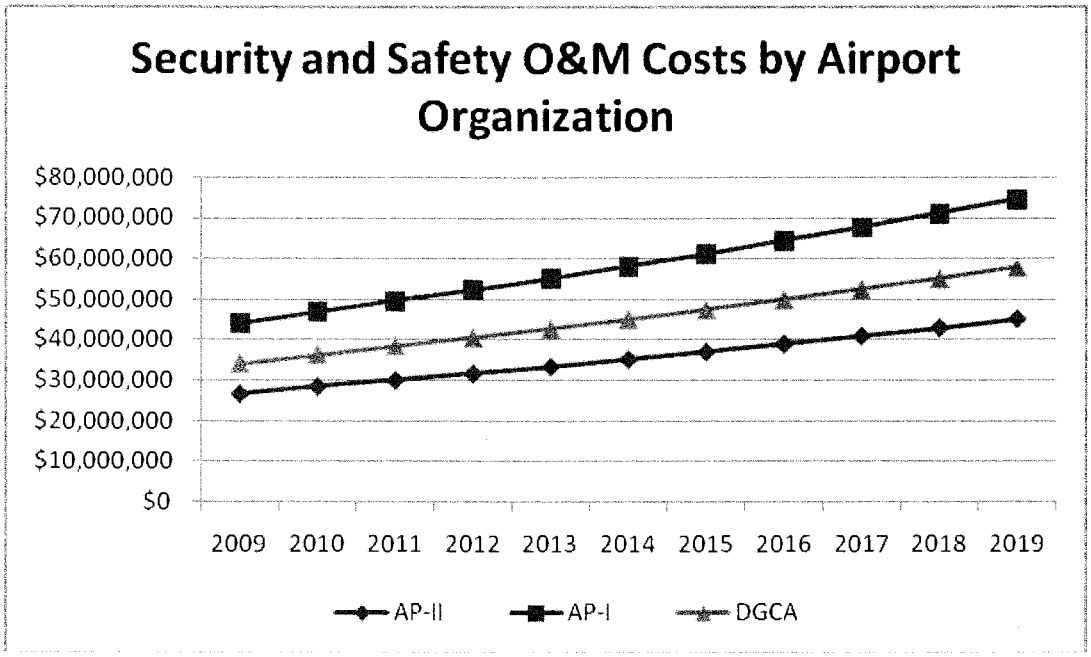

Figure 29: Security and Safety Operations & Maintenance Costs by Airport Organization

The capital costs for the security and safety enhancements for the DGAC airports are $298,237,618. The capital costs and annual O&M costs for the security and safety enhancements are summarized below in Table 24. Although the capital costs are have been shown to be invested in 2009, the actual investments will depend on the prioritization of the investments and the financing plans that are implemented.

Table 24: TOTAL SECURITY & SAFETY PURCHASE, INSTALLATION, AND O&M COSTS FOR IDENTIFIED AIRPORTS

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$298,237,618	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$95,070,339	$101,344,981	$107,020,300	$112,906,417	$119,003,363	$125,429,545	$132,077,311	$138,945,331	$146,031,543	$153,333,120	$160,999,776
Training Costs (Annual)	$5,485,559	$5,847,605	$6,175,071	$6,514,700	$6,866,494	$7,237,285	$7,620,861	$8,017,146	$8,426,020	$8,847,321	$9,289,687
Maintenance Costs (Annual)	$8,279,651	$8,826,108	$9,320,370	$9,832,990	$10,363,972	$10,923,626	$11,502,578	$12,100,712	$12,717,849	$13,353,741	$14,021,428
Total Investment Costs	$407,073,166	$116,018,694	$122,515,741	$129,254,107	$136,233,829	$143,590,456	$151,200,750	$159,063,189	$167,175,411	$175,534,182	$184,310,891

4 ADDITIONAL CONCERNS

There are many actions required at all airports that support safety and security yet are not directly considered as primary elements of safety or security. These actions however must be implemented on a continuous basis in order for the primary elements of safety and security to function properly and without them, safety and security efforts are severely diminished.

For example, a key and integral supporting part of aviation safety is movement area maintenance. The importance of frequent runway cleaning using a sweeper can easily be illustrated: One small bolt passing through a jet engine during the takeoff phase of a flight can easily result in a catastrophic engine failure with all the associated complications. Similarly, the potential impact of multiple engine ingestion of birds during and following takeoff was recently demonstrated in New York when an Airbus lost both engines and had to ditch in the Hudson River. A key aspect of discouraging bird populations in the immediate vicinity of runways is regular mowing of the adjacent grass. This requires tractor, gang mower, riding mower, and grass trimmers.

Likewise, when a Walk Through Metal Detector (WTMD) is not installed or calibrated properly because the maintenance department doesn't have the correct training or even the required equipment, will result in the detector providing a false sense of security. This can easily result in security screeners unknowingly allowing passengers and staff to bring prohibited items into the sterile areas and aboard aircraft. Terrorists and common criminals often perform tests of security checkpoints to determine what level of actual security is implemented there. It would not take an overly intelligent person to quickly determine a WTMD is less sensitive than it should be and what amount of metal can be taken through it without alarm.

ASI strongly recommends that a survey be made of the capability of airports to provided associated actions as described above, and that actions be taken to provide the appropriate training and equipment together with written procedures to implement all necessary supporting elements for safety and security.

5 UNITED STATES SUPPLIERS

The following list of security and safety equipment suppliers is provided as a resource to the Director General Civil Aviation.

5.1 SECURITY EQUIPMENT SUPPLIERS

5.1.1 ACAM (ACCESS CONTROL) SUBSYSTEMS

Sensormatic ACD - now part of Tyco

70 Westview Street,
Lexington, MA 02421
Phone: +1 (781) 768-0200
Fax: +1 (781) 768-0200
URL: http://www.sensormatic.com

InfoGraphic Systems (GE Interlogix)

GE Interlogix, CASI Division World Headquarters
Americas, Caribbean, Asia and the Pacific
791 Park of Commerce Blvd., Suite 100
Boca Raton, Florida 33487 USA
Phone: +1 (322) 725-1120
Fax: +1 (322) 271-4047
E-mail: RS-BCTInfo@ge.com
URL: www.casi-rusco.com

Lenel Systems International, Inc.

Corporate Headquarters
1050 Pittsford-Victor Rd.
Pittsford, NY 14534
Phone: +1 (585) 248-9720
Fax: +1 (585) 248-9185
URL: www.lenel.com

DSX Access Systems Inc.

10731 Rockwall Rd.
Dallas, Texas 75238
Phone: +1 (214) 553-6140
Fax: +1 (214) 553-6147
URL: http://www.dsxinc.com

5.1.2 BIOMETRICS

Identix, Inc. (Fingerprint) - now part of L-1

L-1 Identity Solutions
Corporate Headquarters
177 Broad Street
12th FloorStamford, CT 06901
Telephone: +1 (203) 504-1100
Facsimile: +1 (203) 504-1150
URL: http://www.identix.com

Asia Pacific
Sydney, Australia
Telephone: + 61 2-9513-8868
Facsimile: + 61 2-9513-8888

Recognition Systems, Inc. (Hand Geometry)

Schlage Recognition Systems
1520 Dell Avenue
Campbell, CA 95008 USA
Toll-free: +1 (888) 737-6659
Phone: +1 (408) 341-4100
Fax: +1 (408) 341-4101
E-mail: RSISales@irco.com
URL: http://recognitionsystems.schlage.com/index.php

Retinal Technologies, LLC. (Retinal Scan)

P.O Box 756
Winchester, MA 01890
Phone: +1 (781) 777-1595
E-mail: info@retinaltech.com
URL: http://www.retinaltech.com

Iridian Technologies, Inc.

1245 Church Street, Suite 1
Moorestown, New Jersey, 08057 USA
Phone: 1-866-IRIDIAN or 1-856-222-9090 - inside US
1-856-222-9090 - international
E-Mail:iridian@iridiantech.com
URL: http://www.iriscan.com

Sensory, Inc. (Voiceprint)

California Office
Sensory, Inc.
575 N. Pastoria Ave.
Sunnyvale, CA 94085-2916
Tel: +1 (408) 625-3300
Fax: +1 (408) 625-3350
URL: http://www.sensoryinc.com

Locknetics - now part of Schlage - Ingersol Rand)

IR Electronic Access Control Division
Locknetics
575 Birch Street
Forestville, CT 06010
Phone: +1 (866) 322-1237
Fax: +1 (866) 322-1233
URL: http://www.locknetics.com

5.1.3 CCTV

ADEMCO Group - now part of Honeywell

USA Headquarters
165 Eileen Way,
Syosset NY 11791
Tel.:+1 (800) 645-7568
+1 (516) 921-6704
E-mail: comments@ademco.com
URL: http://www.ademco.com

ADEMCO International
180 Michael Drive,
Syosset NY 11791
Tel: +1 (516) 921-6704
Fax: +1 (516) 496-7454
E-mail: comments@ademco.com

Pelco

USA Headquarters
3500 Pelco Way
Clovis, CA 93612-5699
Phone: +1 (559) 292-1981
Fax: +1 (800) 292-7120
E-mail: sales@pelco.com
URL: www.pelco.com

Vicon Industries Inc.

USA Headquarters
89 Arkay Drive
Hauppauge, NY 11788
Phone: +1 (631) 952-2288, Ext. 264
Fax: +1 (631) 951-2288
E-mail: bmcgowan@vicon-cctv.com
URL: www.vicon-cctv.com

5.1.4 EXPLOSIVE TRACE DETECTION:

Smiths Detection Systems

USA Headquarters
Heimann Systems Corp.
30 Hook Mountain Road
PO Box 410
Pine Brook, NJ 07058 USA
Tel.: +1 (973) 830-2100
Fax: +1 (973) 830-2200
URL: www.smithsdetection.com/

Ion Track Instruments (GE Interlogix)

Ion-Track Headquarters – USA
205 Lowell Street
Wilmington, MA 01887 USA
Phone: +1 (978) 658-3767
Fax: +1 (866) 249-9105
URL: www.iontrack.com

5.1.5 HOLD BAGGAGE SCREENING:

L-3

USA Headquarters
L-3 Communications Security & Detection Systems
10 Commerce Way
Woburn, MA 01801 USA
Tel: +1 (781) 939-3800
Fax: +1 (781) 939-3996
Email: info@dsxray.com
URL: http://www.dsxray.com/index.asp

Smiths Heimann Systems

USA Headquarters
Heimann Systems Corp.
30 Hook Mountain Road
Pine Brook, NJ 07058
Tel.: +1 (973) 830-2100
Fax: +1 (973) 830-2200
URL: www.smithsdetection.com

InVision Technologies - now part of GE

USA Headquarters
7151 Gateway Boulevard
Newark, CA 94560 USA
Tel: +1 (510) 739-2400
Fax: +1 (510) 739-6400
URL: http://www.invision-tech.com

5.1.6 PASSENGERS' ACCESSIBLE BAGGAGE SCREENING X-RAY / CARGO INSPECTION

Rapiscan

USA Headquarters
3232 W. El Segundo Blvd.
Hawthorne,California 90250
USA
Tel: +1 (310) 978-1457
Fax: +1 (310) 675-6647
URL: http://www.rapiscan.com

L-3

USA HeadquartersL-3 Communications Security & Detection Systems
10 Commerce Way
Woburn, MA 01801 USA
Tel: +1 (781) 939.3800
Fax: +1 (781) 939.3996
Email: info@dsxray.com
URL: http://www.dsxray.com/index.asp

Asia: L-3 Communications Singapore Pte Ltd

3 Tampines Grande
07-03 AIA Building
Tampines, Singapore 528 799
Tel: +65 6787 0118

Smiths Heimann Systems

USA Headquarters

Heimann Systems Corp.
30 Hook Mountain Road
Pine Brook, NJ 07058
Tel.: +1 (973) 830-2100
Fax: +1 (973) 830-2200
usa@smiths-heimann.com

Singapore Regional Office
Heimann Systems Pte.Ltd.
3 Toh Tuck Link #04-01
German Districentre
Singapore 596228
Tel.: +65 6 466-1700
Fax: +65 6 469-2506
singapore@smiths-heimann.com

URL: www.**smiths**detection.com/

AS&E – American Science & Engineering

829 Middlesex Turnpike
Billerica MA 01821
Phone: +1 (978) 262-8700
Fax: +1 (978) 262-8804
URL: http://www.as-e.com/

5.1.7 PERIMETER SYSTEMS:

Southwest Microwave, Inc.

9055 South McKemy Street
Tempe, Arizona, 85284-2946
Tel: +1 (480) 783-0201
Fax: +1 (480) 783-0401
URL: http://www.southwestmicrowave.com/index_ssd.html

5.1.8 WALK THROUGH METAL DETECTION:

CEIA-USA LTD.

9177 Dutton Drive
Twinsburg, OH 44087
Tel: +1 (330) 405-3190
Fax: +1 (330) 405-3196
E-Mail: sales@ceia-usa.com; URL: http://www.ceia-usa.com

Smiths Heimann Systems

USA Headquarters
Heimann Systems Corp.
30 Hook Mountain Road
Pine Brook, NJ 07058
Tel.: +1 (973) 830-2100
Fax: +1 (973) 830-2200
E-mail: usa@smiths-heimann.com URL: www.smithsdetection.com

Metorex Security Products, Inc (Also sold By Rapiscan)

USA Headquarters
250 Phillips Blvd.
Ewing, NJ 08618, USA
Toll Free: 1-866-METOREX
Tel.: +1 (609) 406-9000
Fax.: +1 (609) 530-0842
E-mail: sales@metorexsecurity.co
URL: http://www.metor.net

Singapore Regional Office
240 MacPherson Road
06-04 Pines Industrial Bldg,
Singapore 348574
Tel.+65-6743 9892
Fax + 65-6743 9885
E-mail: nimengr@singnet.com.sg

5.1.9 PERIMETER LANDSIDE/AIRSIDE BOUNDARY AND VITAL FACILITY

Fences

Atlantis Products, Inc.
8185 S. Cass Ave.
Darien, IL 60561
Tel: +1 (630) 971-9680
Fax: +1 (630) 971-9860
Email: **info@fence-system.com**

Fiber Optic Sensors

Optellios, Inc.
Robert Wrzesniewski
Key Accounts Manager
Phone: +1 (215) 741-5850
Fax: +1 (215) 741-5851
rwrzesniewski@optellios.com

Microwave and Buried Electromagnetic Cable

Southwest Microwave, Inc.
9055 South McKemy Street
Tempe, Arizona 85284-2946
Tel: +1 (480) 783-0201
Fax: +1 (480) 783-0401
www.southwestmicrowave.com

5.1.10 TERMINAL EQUIPMENT

Radio Equipment

EFJohnson Technologies Corporate Office (Dallas, TX)
1440 Corporate Drive
Irving, TX 75038-2401
Phone: +1 (972) 819-0700
Phone: +1 (800) 328-3911
Fax: +1 (972) 819-0639
URL: http://www.efjohnsontechnologies.com/

Harris Corporation
RF Communications Division
1680 University Avenue
Rochester, New York 14610 U.S.A.
Tel: +1 (585) 244-5830
Fax: +1 (585) 242-4755
Email: RFComm@harris.com

Motorola, Inc.
Asia Pacific Division
230 Victoria Street #12-06/10
Bugis Junction Office Tower
Singapore, 188024
Phone: +65.6796.9600
Fax: +65.6796.7199
http://www.motorola.com/id/products.jsp

Telephone systems

ESI (Estech Systems, Inc.)
3701 E. Plano Parkway
Plano, TX 75074
Phone: +1 (972) 422-9700
Fax: +1 (972) 422-9705
E-mail info@esi-estech.com

5.2 SAFETY EQUIPMENT SUPPLIERS

5.2.1 CHARTS, DOCUMENTATION, MISC.

Jeppesen (Boeing)

55 Inverness Drive East,
Englewood, CO 80112
Phone: +1 (496) 102 5070
Email: email via www.jeppesen.com/company/feedback.jsp?
URL: www.jeppesen.com

Singapore Office:
Odeon Towers #06-01
331 North Bridge Road
Singapore, Singapore - 188720
Tel:+65 6411 5888
Fax :+65 6411 5889

Accuaero viation Documentation Co., L.L.C.

AccuAero LLC
2444 Jane Addams Dr
Schertz, TX 78154 USA
Phone: +1 (210) 945-7337
Fax: +1 (210) 945-0620
Email: customerservice@accuaero.com
URL: www.accuaero.com/index.html

Baldwin Aviation, Inc.

1000 Main Street, Suite 200E
Hilton Head Island, SC 29926
Phone: +1 (888) 222-2112
URL: www.baldwinaviation.com

5.2.2 COMMUNICATIONS CONSOLES

Winsted Corporation

Winsted World Headquarters
10901 Hampshire Ave. South
Minneapolis, MN 55438 USA
Phone: +1 800-447-2257
Fax: +1 952-944-1546
Email: info@winsted.com
URL: www.winsted.com

Integrated Communications, Inc.

Corporate Headquarters
6630 Reese Road
Memphis, Tennessee 38133
Phone: +1 (901) 366-4412
Fax: +1 (901) 365-8404
URL: www.iciwireless.com/console_furniture.htm

Zetron, Inc.

US Headquarters
PO Box 97004
Redmond, WA 98073-9704 USA
Phone: +1 (425) 820-6363
Fax: +1 (425) 820-7031

Australian Contact
Zetron Australasia Pty Ltd.,
PO Box 3045
Stafford Mail Centre,
Stafford QLD 4053
Australia
Phone: +61 7 3856 4888
Fax: +61 7 3356 6877
URL: www.zetron.com

5.2.3 EMERGENCY NOTIFICATION SYSTEMS

W.A.R.N.

National Capital Region:
W.A.R.N. NCR
316 Pennsylvania Ave., SE
Suite 501
Washington, DC 20003
Phone: (615) 451-4446
Fax: (615) 451-4413
URL: www.warncalling.com
Email: NCR@warncalling.com

ADT (Tyco)

Local Contact
Jl. Let.Jen TB. Simatupang No. 150B
Tanjung Barat, Jagakarsa. Jakarta 12530. Indonesia
Phone: +62 21 7801353
Fax: +62 21 7801041 / 7807208
Email: Email: odgwi@tycoint.com
URL: www.adt.com

BRG Precision Products

600 N. River
Derby, KS 67037
Phone: 316-788-2000
Fax: 316-788-7080
Email: sales@brgproducts.com
URL: www.brgwireless.com

5.2.4 INSTRUMENT LANDING SYSTEMS

Teledyne Controls

501 Continental Boulevard
El Segundo, CA 90245
Phone: +1 (310) 765-3600
Fax: +1(310) 765-3605
URL: www.teledyne-controls.com

SELEX Sistemi Integrati Inc

11300 West 89th Street
Overland Park, Kansas 66214, USA

Tel. +1 913 4952614
Fax +1 9134952698
Email: sales@selex-si.com
URL: www.selex-si.com

Northrup Grumman

One Northrop Grumman Avenue
El Segundo, California 90245
Phone: +1 (310) 332-1000
URL: www.northropgrumman.com

5.2.5 AIRFIELD LIGHTING

Flight Light Inc.

2708 47th Ave.
Sacramento, CA 95822-3806
Phone (916) 394-2800
Fax (916) 394-2809
Email: isabel.martin@flightlight.com
URL: www.flightlight.com

Hali-Brite Inc.

Phone: +1 (800) 553-6269
Fax: +1 (218) 546-6854
Email: sales@halibrite.com
URL: www.halibrite.com

Sherwin Industries

Corporate Headquarters
2129 W. Morgan Ave
Milwaukee, WI 53221
Phone: +1 (623) 875-3940
Fax: +1(623) 875-3932
Email: jmccue@sherwinindustries.com
URL: www.sherwinindustries.com

Striplin Airfield and Aviation Services

P.O. Box 101 Hartford, AL 36344
Phone: (344) 588-3170
URL: www.striplinair.com

5.2.6 AIRPORT SYSTEM INTEGRATORS

Raytheon Company

International Business Development

1100 Wilson Blvd., Suite 1600
Arlington, VA 22209
Phone: (703) 284-4369
Fax: (703) 522-5360
URL: www.raytheon.com

Lockheed Martin Corp.

9231 Corporate Blvd., Bldg. 861/5A15
Rockville, MD 20850
Phone: +1 (301) 640-2521
Fax: +1 (301) 640-3508
Email: julian.e.warrick@lmco.com

Lockheed Martin Air Traffic Management
600 Maryland Ave., S.W. Suite 160W
Washington DC 20024
Phone: +1 (202) 554-6989
Fax: +1 (202) 554 7099
Email: roger.stern@lmco.com

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TASK 1 REPORT

US TDA Fiscal Data:

Appropriation No.:	114/51001
Activity No.:	2004-30051A
Reservation No.:	04351388
Grant No.:	GH04351388

1 BACKGROUND

1.1 GOVERNMENT OF INDONESIA INTENTIONS

Indonesia has approximately 163 airports which include from large to very small facilities, of which 24 are currently international airports. PT Angkasa Pura I and PT Anglasa Pura II are two state owned enterprises that manage 23 international airports. The remaining airports are small to very small with light traffic and are managed by the Directorate General of Air Communications (DGAC), Indonesia's authority for civil aviation matters.

During the last six years the Government has implemented a liberal licensing policy which has resulted in the growth of airline market from two licensed air carriers to 21 that operate scheduled flights. In addition, because of competition, fares have decreased and there are numerous package deals available for intra- and inter-island travel. Charter carriers have also increased operations as many more Indonesians are taking advantage of lower air fares. This has resulted in the country's airports becoming very busy and strained to be able to provide passenger services including adequate safety and security.

The safety and security concerns at Indonesia's airports have particularly heightened in the aftermath of the September 11, 2001 terrorist attacks on the United States. Many of Indonesia's remote airports in the Indonesian archipelago offer attractive sites for the germination of terrorist activity bases. Airports could be even more attractive as venues for arms transfer and smuggling unless appropriate safety and security measures are put in place.

In 2000, the International Civil Aviation Organization (ICAO)[1] conducted an audit of Indonesia's safety and security procedures and systems. Later in 2004, ICAO conducted an Aviation Security Audit of Soekarno Hatta International Airport, Jakarta which included an extensive assessment of the security related sections and procedures of the DGAC. In 2005, the US Transportation Security Administration (TSA) performed a security audit of the Ngurah Rai International Airport, Bali which again also focused both on the airport's security and on the ability of the security sections of the DGAC organization to provide appropriate compliance oversight. Despite the fact that Indonesia has attempted to address all of the issues raised in each of these audits, safety and security continue to be concerns at

[1] ICAO consists of 189 Contracting States. Indonesia is one of the 189 Contracting States.

all airports to varying degrees. As a result, the Government of Indonesia has renewed its commitment to improve the safety and security at its airports.

1.2 CONTRACT SCOPE OF WORK

The United States Trade and Development Agency (USTDA) through a grant to the Government of Indonesia funded a technical assistance project for the Government to help identify and remedy the safety and security weaknesses in Indonesian airports. Aerospace Services International, Inc. (ASI) of Chantilly, Virginia, USA was selected by the Government of Indonesia and awarded a contract to perform these functions under the technical assistance grant.

The USTDA funded contract requires an assessment of current security and safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety and security at Indonesian airports. The contract also requires the development of an investment program and a financing plan for the recommended upgrades.

The technical assistance is to be performed at four airports that are representative of Indonesia's many airports nationwide. These airports must include:

1. A large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations such as Jakarta International Airport,
2. A tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations such as Bali International Airport,
3. A medium-sized airport such as Medan International Airport, and
4. A small airport with mostly domestic short-haul traffic which is to be determined in consultation between the Grantee and Contractor

These four representative airports will become pilots for the detailed safety and security audits and assessments, and will form the basis for extrapolating the systems upgrades and investments needed for all airports in the country.

The USTDA funded contract Terms of Reference (TOR) is divided into eight tasks. Task 1 of the contract requires that a detailed assessment be conducted of the existing airport safety and security systems and procedures at the four pilot airports identified by the Grantee (Government of Indonesia, Director General of Air Communications). The four airports chosen by the DGAC are:

- Soekarno Hatta International Airport, Jakarta
- Ngurah Rai International Airport, Denpasar, Bali
- Polonia international Airport, Medan
- Sultan Taha Sysrifudn Airport, Jambi

The assessments are to determine the extent to which the current systems at these four airports are in compliance with prevailing ICAO requirements and international standards of safety and security.

Recommendations for improving the safety and security at Indonesian airports in accordance with the findings in this report will be included in subsequent tasks and related reports in accordance with the contract.

2 PROJECT ACTIVITIES

2.1 COMPLETION OF CERTAIN TASKS

This Draft Report is submitted in accordance with the requirement of USTDA funded contract task 1. ASI will have fully accomplished contract task 1 upon the acceptance of this report by the Director General Air Communications.

2.2 SUMMARY OF ASI TEAM ACTIVITIES DURING ITS IN-COUNTRY VISIT

2.2.1 ASI PROJECT TEAM

For this project, ASI provided a team of aviation safety, aviation security, training, engineering and economic experts who worked together with a team of Indonesian aviation experts to perform the data gathering and safety and security assessments as required by task one of the contract. The initial ASI Team visit in Indonesia tool place from 28 January through 24 February 2006 and consisted of the following personnel:

Billie H. Vincent – ASI President & CEO
John D. ("Jack") Twiggs, CPP – Project Manager & Aviation Security Specialist
Dr. Alvin Cook – International Financial and Economic Specialist
Peter T. Reiss – Aviation Safety Specialist
Leo Boivin – Aviation Security & Training Specialist
Philip J. Hansen – Security Systems Engineer

ASI has an in-country partner, PT. Dacrea Avia, which is a well respected Indonesian aviation consulting company that provided local project team/liaison personnel. The below listed PT. Dacrea Avia personnel traveled with ASI team members and both groups together form the ASI Team referred to throughout this report.

Harry Zakaria Soehardja – PT. Dacrea Avia Principal
Soeparnomo SPd. SSiT – Dacrea Team Leader and Senior Security Officer
Ir. Soemardjono D. – Senior Airport Engineer (Former DGAC Director of Airport Engineer)
Ir. Karno Barkah, MSc. – Mechanical Engineer
Ir. Siswanto – Electrical Engineer
Ir. Doddi Prastuti SE, MBA – Financial Analyst
Joko Prasojo – Quantity Surveyor

During this period, members of the ASI Team met at both the start and the completion of their visit with the Director General and senior staff of the DGAC organization to both obtain necessary information and to keep these officials briefed as to the ASI Team's activities. Additionally, several of the DGAC staff traveled with the ASI Team and were given daily updates as well.

2.2.2 General Data Availability

Many efforts were made prior to, during and after the in-country visit by members of the ASI team to obtain various documents, drawings and other data necessary to fully complete our assessment of the DGAC organization and the four airports and related security operations. Many of the required items were not available or were very outdated and unusable. For example, the team requested for review and did not receive all necessary national laws, decrees and regulations, current layout drawings and operation flow diagrams of the airport terminals, many of the safety and security processes used to perform required functions at each level and by each entity who performs any of these checks, staffing information including numbers and ranking of staff and their assignments, training records and locations and types of safety and security equipment presently in use, working or not.

Additionally, the team requested they be issued access passes for the airports to permit multiple non-escorted entries during the length of their visit. Airport passes were available, however, not for unescorted access to many of the required areas. The lack of required passes prevented the team from performing some of the necessary assessment activities.

The ASI team wishes to thank the Director General and officials of the office of the Director General Air Communications and officials of PT Angkasa Pura I and II as they were most cooperative and provided detailed insight into their operations and procedures for which the ASI Team is most appreciative.

2.2.3 National Laws, Decrees, and Management

Before beginning the airport safety and security assessments, the ASI Team met on several occasions with government of Indonesia (GoI) officials of the Office of the Director General of Air Communications (DGAC), PT Angkasa Pura I, and PT Angkasa Pura II. These meetings permitted the ASI Team to gain knowledge of the Government of Indonesia's laws, decrees and other directives, and civil aviation safety and security airport management and compliance oversight staffing and procedures, and to obtain the National Civil Aviation Security Program (NCASP) and other national level documents of interest that were available.

2.2.4 SELECTION OF AIRPORTS TO BE ASSESSED

After consultation between the ASI Team and officials of the Office of the Director General of Aviation Communication, the below listed four Indonesian airports were chosen by the DGAC officials in accordance with contract requirements. The ASI Team also suggested an overview assessment be performed of the national training center as well. Assessments were conducted by members of the ASI Team at each airport and the national training facility on the dates noted.

- Soekarno Hatta International Airport, Jakarta — 30 January – 9 February 2006
- National Civil Aviation Training Center, Curus — 8 February 2006
- Ngurah Rai International Airport, Denpasar, Bali — 9 – 14 February 2006
- Polonia international Airport, Medan — 14 – 16 February 2006
- Sultan Taha Sysrifudn Airport, Jambi[2] — 17 – 18 February 2006

2.3 PROTOCOLS AND METODOLOGY

2.3.1 SAFETY AND SECURITY ASSESSMENT PROTOCOLS

The ASI Team discussed the protocols to be used with the DGAC officials and reached a consensus of approval on them. The ASI Team suggested and the DGAC officials agreed to apply the same protocols and in the same manner during the assessment of each of the four airports.

2.3.1.1 Safety Protocols

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

1. Standards and Recommended Practices (SARPs) required by ICAO Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations, 4th Edition, applicable as of 1 July 2004

[2] The Sultan Taha Sysrifudn Airport at Jambi does not currently provide international service; however, the ASI Team was advised it has handled international flights in the past and is scheduled to do so again in the near future. Based upon this information and the need for consistency in the assessment protocols, the same international standards and best practices that were applied at the other three airports were also applied at the Jambi Airport.

2. Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO Manual on Certification of Aerodromes" (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001
3. International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

2.3.1.2 Security Protocols

The security protocols agreed to be used include applicable security standards and recommended practices from the following:

1. Standards and Recommended Practices (SARPs) required by ICAO Annex 17 – Security, 7th Edition, applicable as of 1 July 2002
2. Standards and Recommended Practices required by ICAO Annex 17 – Security, 8th Edition, applicable as of 1 July 2006[3]
3. Standards and Recommended Practices required by ICAO Annex 2 – Rules of the Air, as they relate to security
4. Standards and Recommended Practices required by ICAO Annex 6 – Operation of Aircraft, as they relate to security
5. Standards and Recommended Practices required by ICAO Annex 8 – Airworthiness of Aircraft, as they relate to security
6. Standards and Recommended Practices required by ICAO Annex 9 – Facilitation, as they relate to security
7. Standards and Recommended Practices required by ICAO Annex 10 – Aeronautical Telecommunications (Volume IV), as they relate to security
8. Standards and Recommended Practices required by ICAO Annex 11 – Air Traffic Services, as they relate to security
9. Standards and Recommended Practices required by ICAO Annex 13 – Aircraft Accident and Incident Investigation, as they relate to security
10. Standards and Recommended Practices required by ICAO Annex 14 – Aerodromes (Volume I – Aerodrome Design and Operations), as they relate to security

[3] This edition of Annex 17 – Security was not applicable during the ASI Team's on-site visits to the four airports but has an effective date of 1 July 2006. Since this edition has many new requirements, the ASI Team used this edition as well as the then applicable Annex 17 – Security 7th edition in order to present the most accurate and timely assessment possible.

11. Standards and Recommended Practices required by ICAO Annex 18 – The Safe Transport of Dangerous Goods by Air, as they relate to security

12. International Best Practices for Aviation Security at the State's National Level and at the Airports Level

2.3.2 Overall Assessment Methodology

A top-down approach was used in conducting the assessments at the four airports and the national training center. A top-down approach examines first the State's aviation laws, decrees, and regulations, its National Aviation Safety Program and its National Civil Aviation Security Program, and then its national level civil aviation safety and security organization, its structure and management, staffing levels and experience, procedures for ensuring compliance with the State's National Civil Aviation Safety and Security Programs and its compliance enforcement capabilities and activities.

Aviation safety and security measures are expensive and often are seen as non-productive costs by directors of airports. Left to their own direction and an often held lack of true understanding of international safety and security requirements, airport directors will frequently require only the minimum level of aviation safety and security necessary for protection against known common threats such as fires, vehicle accidents, theft and similar level day-to-day issues, and that results in a low level protection of passengers, visitors, employees and property. Requirements and technical guidance for additional safety and security measures must come from sources above the airport level which is typically the State's national government level. These requirements must be clearly defined and explained via written national programs, be maintained up to date with the State's laws and ICAO international aviation safety and security standards, and the issuing source must ensure on a frequent basis that the additional measures are, in fact, being implemented and in the manner required.

2.3.3 Security Assessment Methodology

ICAO Annex 17 – Security has long required specific civil aviation security measures to be developed and implemented at each State's national level to ensure at least a specified minimum level of security is applied in each State and to promote standardization of civil aviation security at all international airports within a State. Some of the most important such actions required are the establishment of national laws that provide a basis and authority for civil aviation security within the State, the establishment of an Appropriate Authority at the national level to provide national level aviation security direction and oversee the implementation of civil aviation security within the State, and the development and implementation by the Appropriate Authority of a National Civil Aviation Security Program (NCASP) that defines the minimum aviation security requirements for the State. Additionally, ICAO standards also require each international airport to develop and implement an Airport Security Program (ASP) that implements the requirements of the State's NCASP (see Figure 1, below). Without these factors in place and operating as

intended by ICAO standards, it would be difficult for the State's airports to have compliance, especially sustained compliance, with ICAO civil aviation security standards.

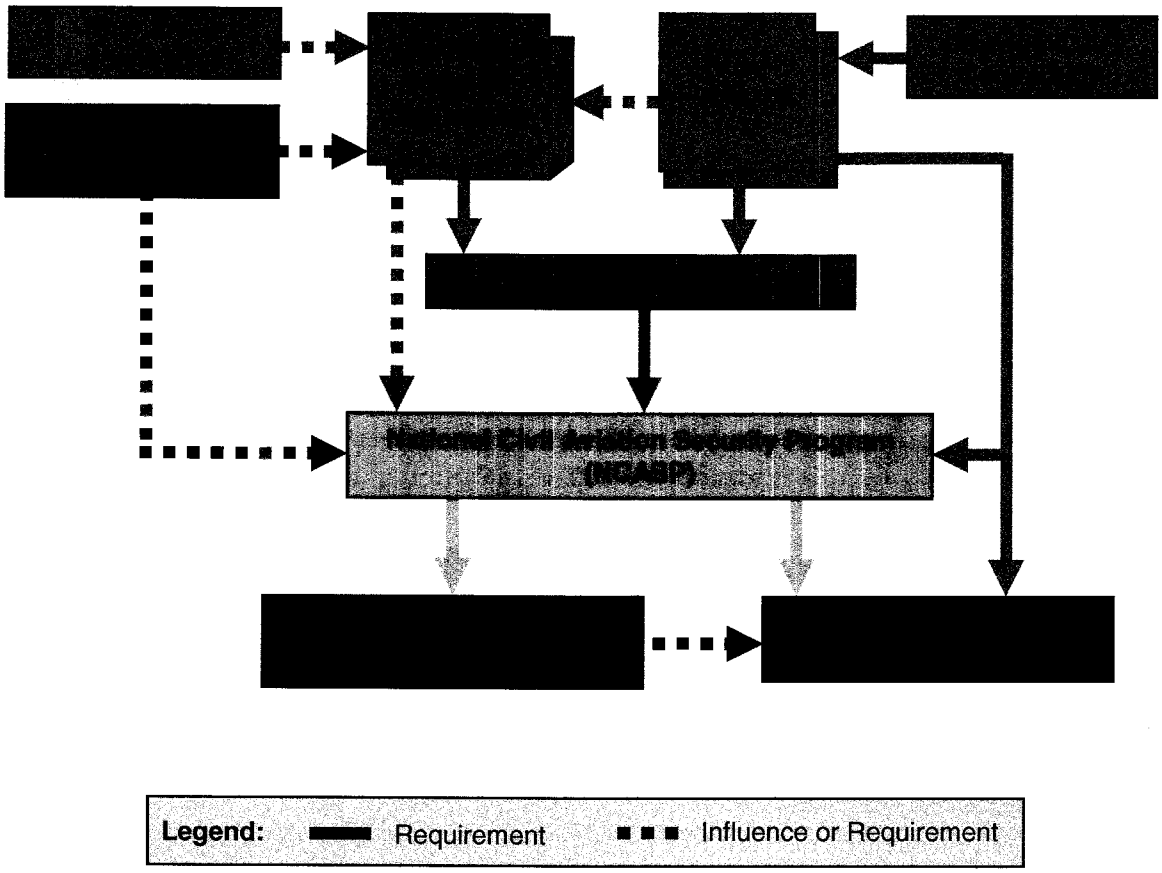

Figure 1: Legal authorities and requirements for national and airport level implementation of ICAO standards and recommended practices.

The above chart traces the origin of security requirements and the legal basis for them from the ICAO Chicago Convention through a State's national laws, to its implementing agency and finally to each international airport[4] in that State. It is with this line of authority that each State is provided the sequence of actions necessary to implement a national civil aviation protection program and then to provide all necessary support to that program. Thus any assessment of an airport's ability to implement aviation security in accordance with ICAO standards and recommend practices must begin at the national level of that State.

[4] As of 1 July 2006, these measures are also required to be applied at domestic airports to the extent practicable in accordance with Annex 17, 8th Edition, Standard 2.1.1.

2.3.4 SAFETY ASSESSMENT METHODOLOGY

Safety assessment is a structured process for the identification of systemic hazards and assessment of the risks associated with each hazard. The *acceptability* of the risks is determined by comparing the assessed level of the risk to *predetermined safety criteria.*

The enactment by ICAO Contracting States of legislation that provides the basis for the development and promulgation of civil aviation regulations, including aerodrome regulations, and the establishment of appropriate authorities at the national level and the airport level is necessary to provide a framework within which standardized airport safety can be realized.

One of the fundamental reasons for establishing the Annexes of the Chicago Convention (1944) was to address a very broad range of safety issues on a standardized world-wide basis. The first edition of Annex 14 – Aerodromes was developed in 1951. The ICAO standards of "the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and certain facilities and technical services normally provided at an aerodrome" are prescribed in the current edition. It is applicable to all airports open to public use in accordance with the requirements of the Chicago Convention.

ICAO requires that a certified aerodrome shall have in operation a safety management system. — *"The intent of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator."*

The Aerodrome Manual is the "core" of an airport certification and operation program. While not included in this Manual, the Air Traffic Control Tower and the aircraft fuel handling protocols and procedures are vital components of the safety *system* of airport operations.

Considering the importance of the safety of an airport system to the citizenry and the national critical infrastructure of a State, the importance to a State of ongoing systemic and integrated compliance with established airport safety protocols cannot be overemphasized.

2.3.5 REPORT CONTENTS

This report presents an accurate and factual assessment in order to provide the Government of Indonesia with its actual security and safety posture and to alert it to areas in which it needs to improve its compliance with ICAO security and safety standards and international best practices. It is not the ASI Team's intention to embarrass the Government of Indonesia or any official by its frank reporting, however, the Team does not want to mislead the Government of Indonesia by presenting a less than truthful and candid assessment.

3 SECURITY ASSESSMENT REPORTS

3.1 INDONESIA AVIATION SECURITY ORGANIZATION STRUCTURE

3.1.1 BACKGROUND

Indonesia's government is organized around a President; an Executive comprised of three Coordinating Ministers, State Ministers, a number of Directors of Departments, Sub Directors of Functions and Heads of Sections; a Unicameral Legislature, and appointed officials plus a Civil Service. The President and the Bicameral Legislature are elected at predetermined intervals.

The Unicameral House of Representatives or Dewan Perwakilan Rakyat (DPR) has 550 seats and members are elected to serve five-year terms. A House of Regional Representatives (Dewan Perwakilan Daerah (DPD) has a constitutionally mandated role that includes providing legislative input to DPR on issues affecting regions. A People's Consultative Assembly (Majelis Permusyawaratan Rakyat (MPR) has a role in inaugurating and impeaching the President and in amending the constitution. The members of the DPR and DPD are popularly-elected. The MPR does not formulate national policy.

3.1.2 APPLICABLE ICAO STANDARDS AND RECOMMENDED PRACTICES

Annex 17 – 8th Edition

Standard 2.1.2

Each Contracting State shall establish an organization and develop and implement regulations, practices and procedures to safeguard civil aviation against acts of unlawful interference.

Standard 2.1.3

Each Contracting State shall ensure that such an organization, such regulations, practices and procedures:

a) protect the safety of passengers, crew, ground personnel and the general public in all matters related to safeguarding against acts of unlawful interference with civil aviation; and

b) are capable of responding rapidly to meet any increased security threat.

Standard 3.1.2

Each Contracting State shall designate and specify to ICAO an appropriate authority within its administration to be responsible for the development, implementation and maintenance of the national civil aviation security programme.

Standard 3.1.4

Each Contracting State shall require the appropriate authority to define and allocate tasks and coordinate activities between the departments, agencies and other organizations of the State, airport and aircraft operators and other entities concerned with or responsible for the implementation of various aspects of the national civil aviation security programme.

Standard 3.1.5

Each Contracting State shall establish a national aviation security committee or similar arrangements for the purpose of coordinating security activities between the departments, agencies and other organizations of the State, airport and aircraft operators and other entities concerned with or responsible for the implementation of various aspects of the national civil aviation security programme.

Standard 3.2.2

Each Contracting State shall ensure that an authority at each airport serving civil aviation is responsible for coordinating the implementation of security controls.

Standard 3.2.3

Each Contracting State shall ensure that an airport security committee at each airport serving civil aviation is established to assist the authority mentioned under 3.2.2 in its role of coordinating the implementation of security controls and procedures as specified in the airport security programme.

Standard 3.4.7

Each Contracting State shall ensure that the management, setting of priorities and organization of the national civil aviation security quality control programme shall be undertaken independently from the entities and persons responsible for the implementation of the measures taken under the national civil aviation security programme. Each Contracting State shall also:

a) ensure that the personnel carrying out security audits, tests, surveys and inspections are trained to appropriate standards for these tasks in accordance with the national civil aviation security programme;

b) ensure that the personnel carrying out security audits, tests, surveys and inspections are afforded the necessary authority to obtain information to carry out these tasks and to enforce corrective actions;

c) supplement the national civil aviation security quality control programme by establishing a confidential reporting system for analysing security information provided by sources such as passengers, crew and ground personnel; and

d) establish a process to record and analyse the results of the national civil aviation security quality control programme, to contribute to the effective development and implementation of the national civil aviation security programme, including identifying the causes and patterns of non-compliance and verifying that corrective actions have been implemented and sustained.

3.1.3 AIR TRANSPORTATION STRUCTURE

Responsibility for the air transportation function falls under the Coordinating Minister of Legal, Political and Security Affairs; the Ministry of Communications and the Director General of Air Communications. Some responsibility for the air transport government structure also falls under the Coordinating Minister for Economic Affairs as is depicted in the chart below; and directly under the President through the Police and Armed Forces.

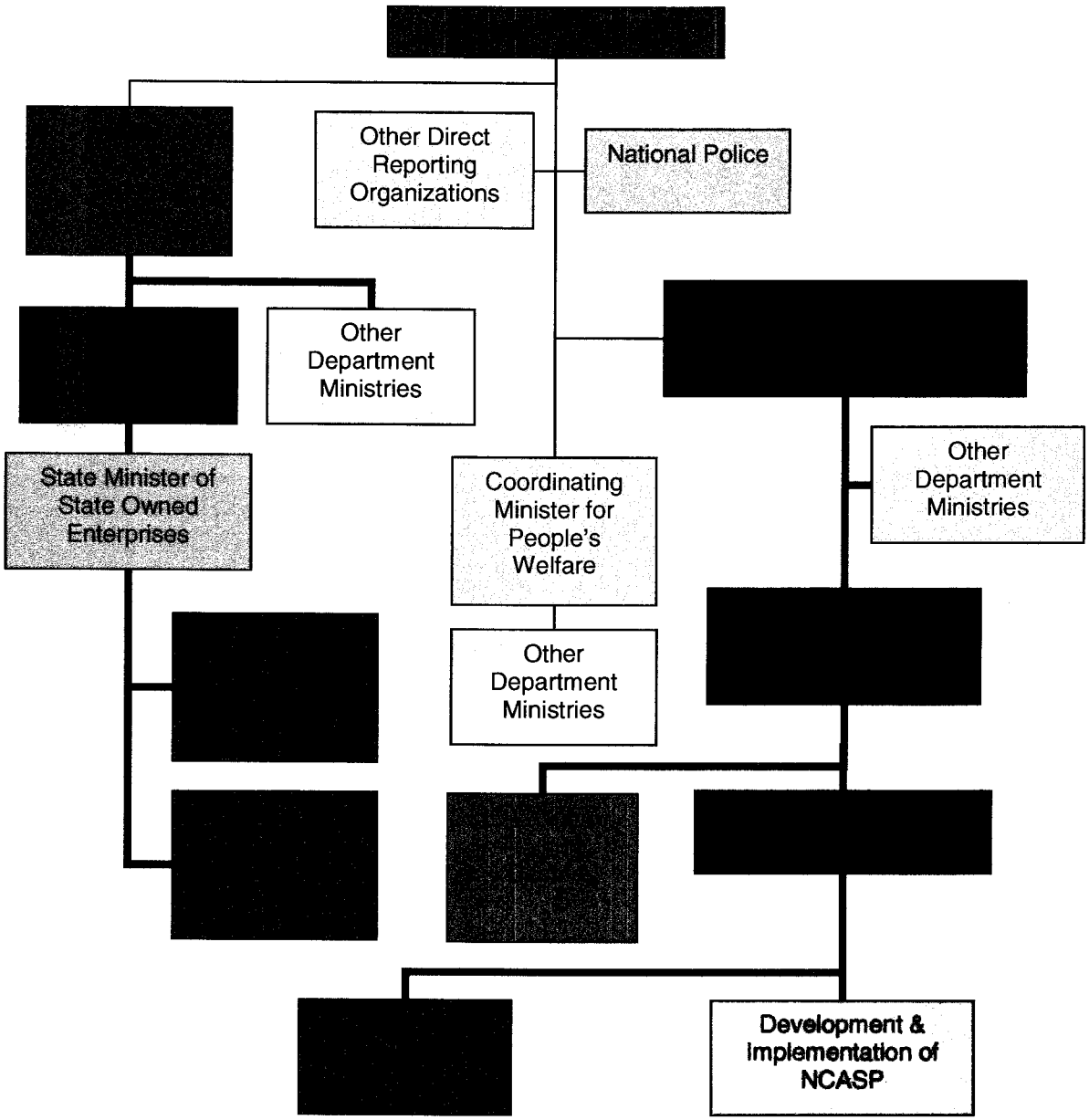

Figure 2: Air Transport Structure Depicting Operation Of Airports Under Two Different Ministers

3.1.4 AIR TRANSPORT STRUCTURE BELOW THE DIRECTOR GENERAL LEVEL

A number of Directors of Offices, Sub-Directors of functions and sections have been established below the DGAC's level. This organizational structure as it relates to security only is depicted in below. It is at these levels that the problems created at the Ministerial organizational level begin to make their appearance from a responsibility and authority standpoint. But, that said, the organizational authority and responsibility problems at the Sub Director and Section level appear to be the result of the distinct diverse authorities at the Ministerial Levels.

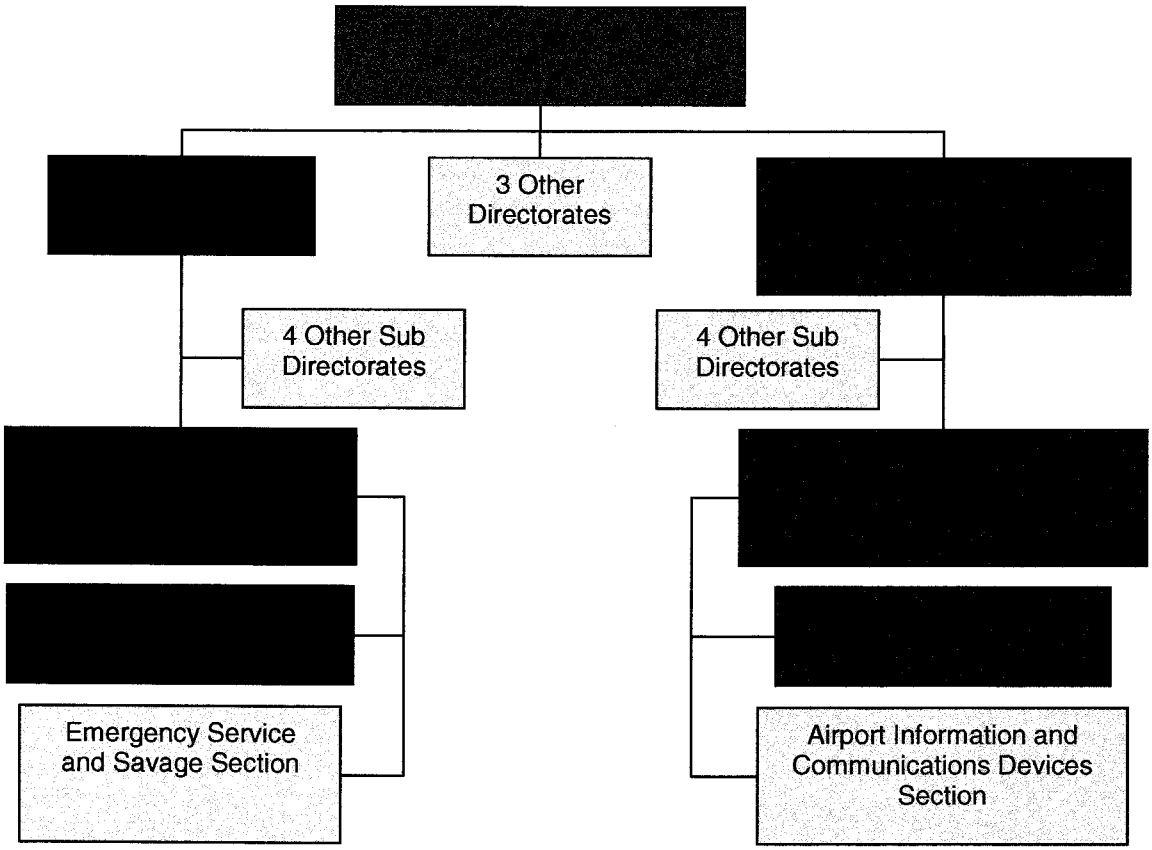

Figure 3: Director General Air Communications Organization as it relates to security

3.1.5 FACTS RELATING TO INDONESIA'S AVIATION GOVERNMENT STRUCTURE

As one might expect from a country the size of Indonesia with its 245 million citizens the government organization is quite large and somewhat complicated. This holds true for the organizations that have responsibility for Indonesia's aviation system.

3.1.6 MINISTERIAL LEVEL AUTHORITIES

The Indonesian Government operates on the basis of Laws, Decrees and Regulations. Each Minister and Official commanding a major Government function (Police, Armed Forces, etc.) has broad authority to issue requirements for their respective portfolios. Unfortunately one Minister or Commanding Official does not always seem to have the authority to compel compliance from another Minister and their subordinate officials and personnel. This problem seems to apply to all Ministries, (but not as much of a problem to the Police and Armed Forces Commanders), and even across Ministers portfolios under the same Coordinating Ministers.

3.1.7 ORGANIZATIONS REPORTING DIRECTLY TO THE PRESIDENT

Complicating the Ministerial level authority issue even further is the fact that three significant elements of the Indonesian Government reports directly to the President. These three units are the Armed Forces, the Police Organization and a Financial Control (Audit) entity. Reportedly this last organizational entity has financial oversight of all other Indonesian Government organizations.

3.1.8 INDONESIA'S AIRPORT ORGANIZATIONAL STRUCTURE

All but one of the international and some domestic Indonesian airports have been assigned to three differing Indonesian organizations that are specifically designed to bring revenue into the Indonesian Government. The majority remain under the Directorate General of Air Communications (DGAC) – an element of the Minister of Communications' organization. Even so, this small number of airports assigned outside of the DGAC organization must also abide by the standards, particularly technical standards, set by the DGAC. As noted above, the difference in the reporting lines of authority for these three organizations introduces a roadblock effectively obstructing adherence.

3.1.8.1 Corporatized Airports

The responsibilities of the Ministerial organizational structure and its authorities, plus the organizational entities reporting to the President, gets even more complicated down at the individual airport level. A total of 23 of Indonesia's airports were removed from the Minister of Communications' financial structure and corporatized under the Coordinating Minister for Economic Affairs and its subordinate Minister of Finance and finally; placed under the Minister of State Owned Enterprises. Thirteen of the 23 airports were assigned to Angkasa Pura I and ten airports under Angkasa Pura II and these two entities report only to the Minister of State Owned Enterprises and not to the Minister of Communications. One additional airport in Batam was placed under the control of the Batam Airport Authority which is under the Batam Industrial Development Authority. Since all but one of the airports removed from the Minister of Communications' financial control

now are operated by AP I and AP II, the ASI Team chose to concentrate on their operations structure.

Angkasa Pura I and II have separate chief executives that are nominated by either the Minister of State Owned Enterprise or the Minister of Communications. The Minister of State Owned Enterprise then determines who is qualified to be considered for the chief executives of Angkasa Pura I and II. The candidates reportedly must have aviation backgrounds and the Minister of State Owned Enterprise and the Minister of Communications will coordinate on the actual CEO selections. This also applies to the President and Board of Directors for Angkasa Pura I & II, i.e. the respective Directors of Operations and Technology, Commercial, Finance, and the Director of Personnel and General Affairs.

Angkasa Pura I and II have financial control over their twenty three airports. The ASI Team was advised that three of the Angkasa Pura I's thirteen airports and two of Angkasa Pura II's ten airports reportedly make a profit each year. These five airports presumably support the other 18 airports financially. The revenues collected by Angkasa Pura I and II are reportedly turned over to the Indonesian General Treasury. An annual budget is developed by both Angkasa Pura I and II and their operations are funded through this budgetary process. The inference given to the ASI Team was that the chief executives and their financial officers in Angkasa Pura I and II had a substantial level of authority in the budgeting and allocation of funds for their respective operations; notwithstanding the fact that the revenues collected from the twenty three Angkasa Pura I and II airports go to the General Fund of the Indonesian Treasury.

3.1.8.2 Directorate General of Air Communications Airports (DGAC)

The remaining 160-plus Indonesian airports, including one small international airport, remain under the direct control of the Directorate General of Air Communications. As noted above, the foregoing notwithstanding, the DGAC must also retain responsibility for the regulatory oversight for safety as well as security for the Angkasa Pura I and II airports and the Batam Industrial Development Authority airport.

The DGAC's financial situation with the 160-plus airports was reportedly more on the traditional government bureaucratic structure. Said another way, all the revenues collected by the Indonesian Government organizations relating to the work of these airports go directly to the Government's general fund. Apparently neither the DGAC nor his superiors in the ministerial structure have any control over the funds collected at the DGAC airports. The DGAC falls under the overall budgetary structure and process and annual operating, capital, and other funds for the 160-plus airports are allocated through this process.

3.1.9 Discussion of Organizational Authority Issues

The ASI Team encountered a number of examples of dysfunctional organizational issues associated with who supposedly have responsibility and authority for specific aviation security functions. A number examples of this problem are included in the succeeding paragraphs.

3.1.10 Cross-Ministerial Authorities

During ASI's data-gathering visit to Indonesia in January/February 2006 it was learned that the Coordinating Minister for Legal, Political and Security Affairs and the subordinate Minister of Communications' decrees and regulations were not necessarily followed by other Coordinating Minister organizations or the three major organizations reporting directly to the President, i.e. the Police, Armed Forces and Financial Control. This discovery came about as a result of ASI's queries regarding the application of the security provisions contained in the Indonesian National Civil Aviation Security Program (NCASP). The ASI Team could not establish that personnel from other Ministries, the Armed Forces and the Police forces were compelled to comply with the Ministry of Communications and subordinate Director General of Communications Decrees, the National Civil Aviation Security Program (NCASP), Orders or and/or Regulations.

3.1.11 Authority for AVSEC at Airports

The organizational structure outlined above results in some unique organizational responsibilities for operational and aviation security functions. In the 160-plus DGAC airports the lines of authority are reasonably well defined. The responsibilities and authorities flow directly from the DGAC. Such is not the case in the corporatized Angkasa Pura I and II airports.

The DGAC has assigned an Airport Administrator as his representative at each of the twenty three Angkasa Pura I and II airports. The assigned responsibilities and authorities of these DGAC Airport Administrators conflict with the responsibilities and authorities of the Angkasa Pura I and II airport executives and their staffs. Specifically, the ASI Team questioned the Angkasa Pura I and II airport security directors about their responsibilities and authority to ensure that the aviation security functions were properly performed. The ASI Team also questioned the DGAC's Airport Administrator regarding their aviation security duties. A substantial amount of conflict and uncertainty about the respective authorities of the DGAC Airport Administrator versus the Angkasa Pura I or II person in charge of security was revealed in these discussions. See graphic depiction of the multiple sources of security direction at some airports in the chart below.

This confusion about responsibilities and authorities between the DGAC and Angkasa Pura airport officials was subsequently confirmed in a review of DGAC Airport Administrator's responsibility and authorities as stipulated in Airport Security Programs (see Angkasa Pura

II Jakarta International Airport ASP dated June 2004). The roles of the DGAC Airport Administrator in aviation security responsibilities and authorities appear to conflict with what the ASI Team was told by Angkasa Pura staff as their responsibility and authority.

It would appear that a large part of the confusion about who is responsible for aviation security, i.e. the DGAC or the Angkasa Pura I or II staff) originated, or is exacerbated, by the ASP documents. This confusion may also be created by a lack of definition of the respective roles of the two primary organizations, i.e. the DGAC and Angkasa Pura I & II. As the ASI Team has not had access to all the respective Indonesian Government documents for these organizations, other than the ASP and some decrees, we have not yet been able to make any assessment of the possible conflicts in roles, responsibilities and authorities at a higher level within the air transport organizational structure. We anticipate being able to see some of the reasons for these conflicts in subsequent reviews of documents later in this project.

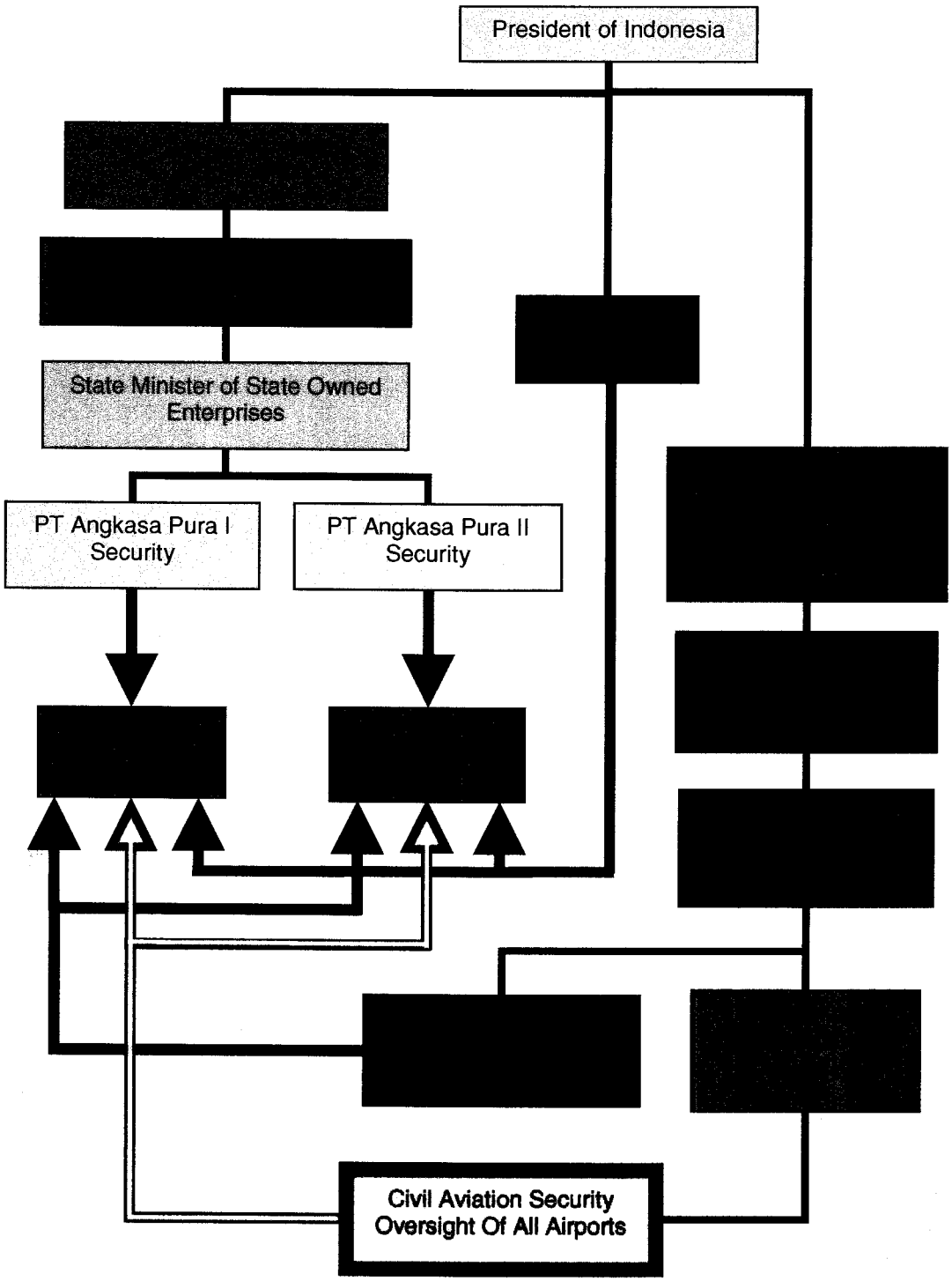

Figure 3: Eighteen of the twenty international airports and some domestic airports are operated by AP I and AP II. Security direction for these airports is often very confusing as it comes from multiple sources according to airport security managers contacted by the ASI Team.

4 NATIONAL LEVEL COMPLIANCE WITH THE CHICAGO CONVENTION

4.1 BACKGROUND

Indonesia formally notified the International Civil Aviation Organization of the United Nations on 27 April 1950 of their acceptance to adhere to requirements of the Chicago Convention. This notification means that the Government of Indonesia has agreed to be bound by the Convention and the standards and recommended practices of all Annexes to the Convention as of that date. The Government of Indonesia reconfirms its commitment to compliance with the Chicago Convention of 1944 and the Annexes to that convention in its various national laws and decrees.

> *An important point to recognize regarding the application and implementation of the Annex 17 standards is that these standards represent the very minimum level of aviation security considered by ICAO and the international community to be essential and therefore compulsory. The standards are not a goal but rather represent only the lowest level of the security protection that is expected to be provided by each State at each international airport and fully supported by the national government.*

4.2 ASSESSMENT STANDARDS

This assessment applies the aviation security requirements of currently applicable ICAO Annexes as of the time this assessment was conducted. Annex 17 – Security, 7th Edition, applicable 1 July 2002 was used as the base standard as it is the current edition at the time of the ASI Team survey.

4.3 OVERALL ASSESSMENT FINDING: *NON COMPLIANT*

Fifty four of fifty five standards and recommended practices evaluated were not in compliance. Indonesia's National Civil Aviation Security Program generally contains requirements relating to most of the 7th edition Annex 17 standards and recommended practices, however; few of them are implemented at either the national level or at the airport level. The DGAC organization's limited security staffing and funding, coupled with the State's fragmented regulations and requirements that only apply in part or not at all to many Indonesian government agencies and corporations, does not permit the DGAC organization to adequately implement and monitor the NCASP. As a direct result of these factors at the national level, aviation security observed at the four airports visited by the ASI Team could only be characterized as inconsistently applied and very inadequate overall. Specific details for each airport are included with the individual assessments of those airports.

4.4 INDIVIDUAL ASSESSMENT FINDINGS

4.4.1 GENERAL PRINCIPLES

4.4.1.1 Standard 2.1.1: Each Contracting State shall have as its primary objective the safety of passengers, crew, ground personnel and the general public in all matters related to safeguarding against acts of unlawful interference with civil aviation.

Finding:

Redacted - Contains sensitive information

4.4.1.2 Standard 2.1.2: Each Contracting State shall establish an organization and develop and implement regulations, practices and procedures to safeguard civil aviation against acts of unlawful interference taking into account the safety, regularity and efficiency of flights.

Finding:

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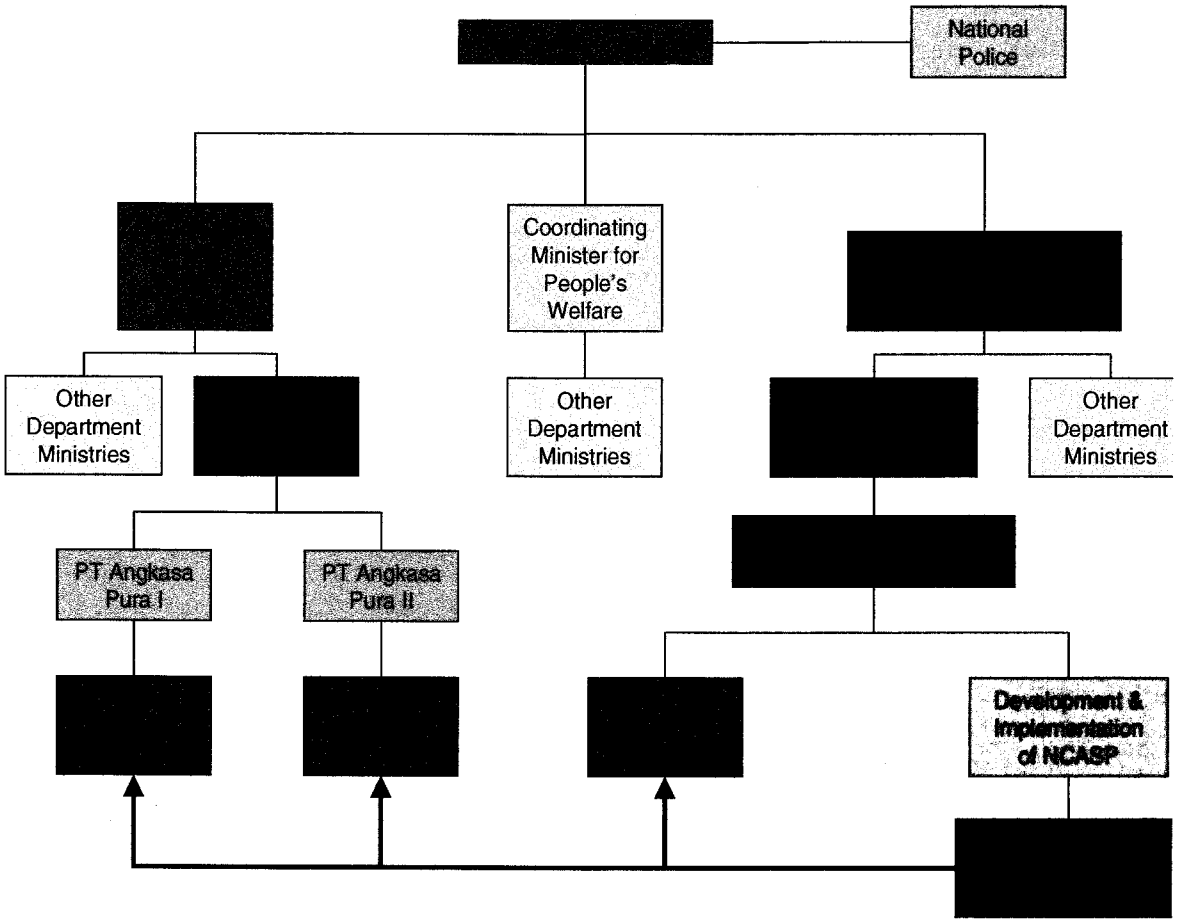


Figure 4: Organization chart of some divisions of the Government of Indonesia relative to aviation security illustrating the lines of authority difficulties.

4.4.1.3 Standard 2.1.3: Each Contracting State shall ensure that principles governing measures designed to safeguard against acts of unlawful interference with international civil aviation are applied to domestic operations to the extent practicable.

Finding:

Redacted - Contains sensitive information

4.4.1.4 Recommendation 2.1.4 Each Contracting State should ensure appropriate protection of aviation security information.

Finding:

Redacted - Contains sensitive information

4.4.1.5 Recommendation 2.2 Each Contracting State should whenever possible arrange for the security controls and procedures to cause a minimum of interference with, or delay to the activities of, civil aviation provided the effectiveness of these controls and procedures is not compromised.

Finding:

Redacted - Contains sensitive information

4.4.1.6 SARPs 2.3.1 through 2.3.8 (International Cooperation). Not Assessed.

4.4.1.7 Recommendation 2.4.1 Each Contracting State should promote research and development of new security equipment which will better achieve civil aviation security objectives.

Finding:

Redacted - Contains sensitive information

4.4.1.8 Recommendation 2.4.2: Not Observed

4.4.2 NATIONAL ORGANIZATION AND APPROPRIATE AUTHORITY

4.4.2.1 Standard 3.1.1 Each Contracting State shall establish and implement a written national civil aviation security programme to safeguard civil aviation operations against acts of unlawful interference, through regulations, practices and procedures which take into account the safety, regularity and efficiency of flights.

Finding:

Redacted - Contains sensitive information

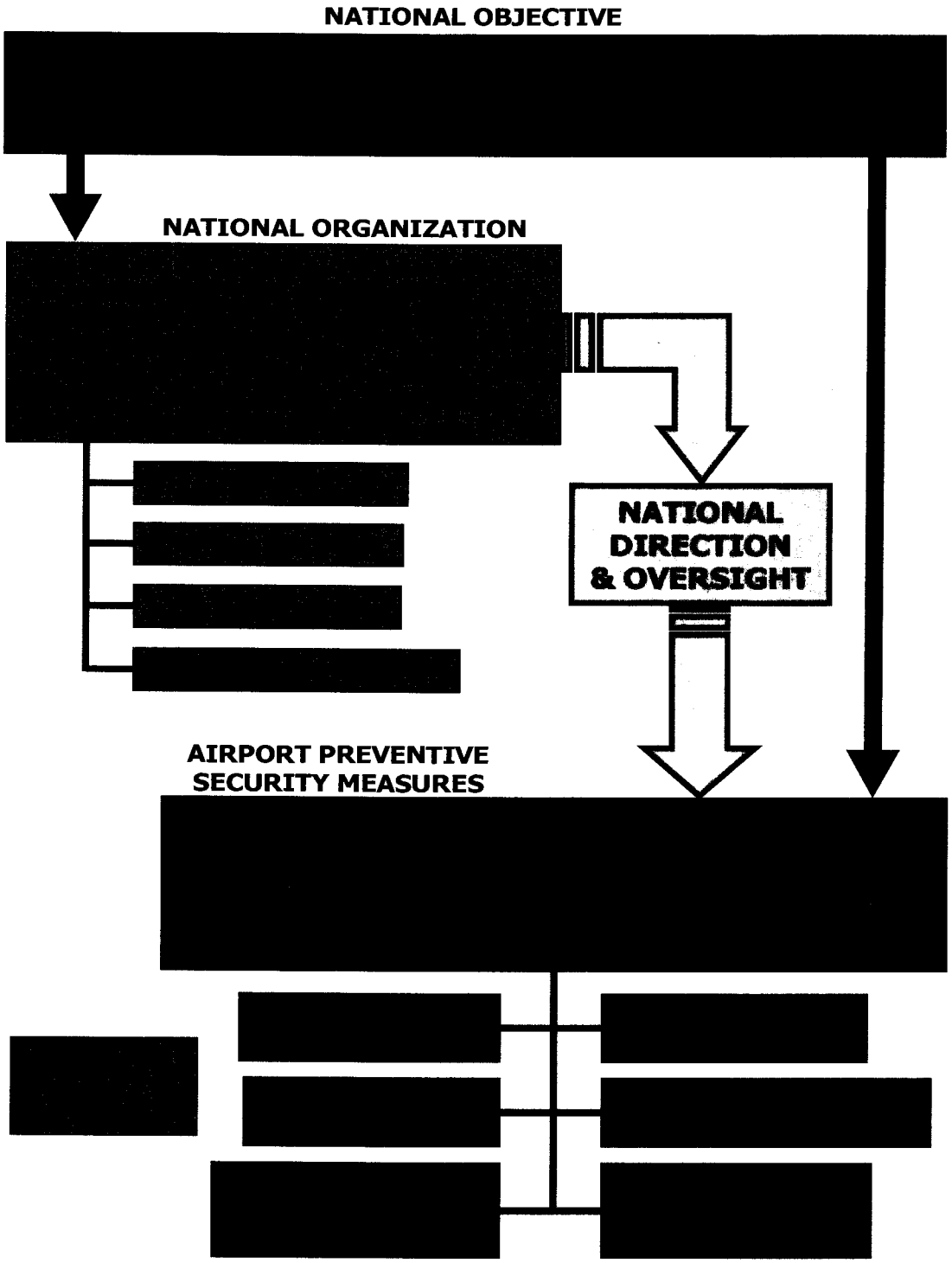


Figure 5: Sequence of requirements for national direction and oversight of civil aviation security requirements at airports.

Redacted - Contains sensitive information

4.4.2.2 Standard 3.1.2 Each Contracting State shall designate and specify to ICAO an appropriate authority within its administration to be responsible for the development, implementation and maintenance of the national civil aviation security programme.

Finding: Compliant. The Office of the DGAC has been designated as the Appropriate Authority for the development, implementation, and maintenance of the NCASP.

4.4.2.3 Standard 3.1.3 Each Contracting State shall establish an organization and develop and implement regulations, practices and procedures, which together provide the security necessary for the operation of aircraft in normal operating conditions and capable of responding rapidly to meet any increased security threat.

Finding:

Redacted - Contains sensitive information

4.4.2.4 Standard 3.1.4 Not Observed.

4.4.2.5 Standard 3.1.5 Each Contracting State shall require the appropriate authority to define and allocate tasks and coordinate activities between the departments, agencies and other organizations of the State, airport and aircraft operators and other entities concerned with or responsible for the implementation of various aspects of the national civil aviation security programme.

Finding:

Redacted - Contains sensitive information

4.4.2.6 Standard 3.1.6 Each Contracting State shall establish a national aviation security committee or similar arrangements for the purpose of coordinating security activities between the departments, agencies and other organizations of the State, airport and aircraft operators and other entities concerned with or responsible for the implementation of various aspects of the national civil aviation security programme.

Finding:

Redacted - Contains sensitive information

4.4.2.7 **Standard 3.1.7 Each Contracting State shall require the appropriate authority to ensure the development and implementation of training programmes to ensure the effectiveness of its national civil aviation security programme. These training programmes shall include training of civil aviation security personnel in human performance.**

Finding:

Redacted - Contains sensitive information

4.4.2.8 **Standard 3.1.8 Each Contracting State shall ensure that the appropriate authority arranges for the supporting resources and facilities required by the aviation security services to be available at each airport serving international civil aviation.**

Finding:

Redacted - Contains sensitive information

4.4.2.9 **Recommendation 3.1.9 Each Contracting State should make available to its airport and aircraft operators operating in its territory and other entities concerned, a written version of the appropriate parts of its national civil aviation security programme.**

Finding:

Redacted - Contains sensitive information

4.4.3 AIRPORT OPERATIONS

Note: While the following Standards and Recommendations refer to Airport Operations, national direction and oversight is required to ensure their implementation and correct interpretation and implementation. The following findings reflect only the compliance at the national level. Individual airport compliance is noted in the assessment for each airport.

4.4.3.1 Standard 3.2.1 Each Contracting State shall require each airport serving international civil aviation to establish and implement a written airport security programme appropriate to meet the requirements of the national aviation security programme.

Finding:

Redacted - Contains sensitive information

4.4.3.2 Standard 3.2.2 Each Contracting State shall arrange for an authority at each airport serving international civil aviation to be responsible for coordinating the implementation of security controls.

Finding:

Redacted - Contains sensitive information

4.4.3.3 Standard 3.2.3 Each Contracting State shall arrange for the establishment of an airport security committee at each airport serving international civil aviation to assist the authority mentioned under 3.2.2 in its role of coordinating the implementation of security controls and procedures as specified in the airport security programme.

Finding:

Redacted - Contains sensitive information

4.4.3.4 Standard 3.2.4 Each Contracting State shall ensure that contingency plans are developed and resources made available to safeguard civil aviation, against acts of unlawful interference. The contingency plans shall be practiced and exercised on a regular basis.

Finding:

Redacted - Contains sensitive information

4.4.3.5 Standard 3.2.5 Each Contracting State shall ensure that authorized and suitably trained personnel are readily available for deployment at its airports serving international civil aviation to assist in dealing with suspected, or actual, cases of unlawful interference with civil aviation.

Finding:

Redacted - Contains sensitive information

4.4.3.6 Standard 3.2.6 Each Contracting State shall ensure that the architectural and infrastructure-related requirements necessary for the optimum implementation of civil aviation security measures are integrated into the design and construction of new facilities and alterations to existing facilities at airports.

Finding:

Redacted - Contains sensitive information

4.4.4 AIRCRAFT OPERATORS

Note: National level compliance assessment findings of Standard 3.3.1 and Recommendations 3.3.2 and 3.3.3 concerning aircraft operators are grouped together as follows:

4.4.4.1 Standard 3.3.1 Each Contracting State shall require operators providing service from that State to establish and implement a written operator security programme appropriate to meet the requirements of the national civil aviation security programme of that State.

Recommendation 3.3.2.— **Each Contracting State should take into account the ICAO model as a basis for operators' security programmes.**

Recommendation 3.3.3.— **Each Contracting State should require operators providing service from that State and participating in code-sharing or other collaborative arrangements with other international operators to notify the appropriate authority of the nature of these arrangements, including the identity of the other operators.**

Finding for 3.3.1 through 3.3.3:

Redacted - Contains sensitive information

4.4.5 QUALITY CONTROL

4.4.5.1 Standard 3.4.1 Each Contracting State shall ensure that the persons implementing security controls are subject to background checks and selection procedures.

Finding:

Redacted - Contains sensitive information

4.4.5.2 Standard 3.4.2 Each Contracting State shall ensure that the persons implementing security controls are appropriately trained and possess all competencies required to perform their duties and that appropriate records are maintained. Relevant standards of

performance shall be established and initial and periodic assessments shall be introduced to maintain those standards.

Finding:

Redacted - Contains sensitive information

4.4.5.3 Standard 3.4.3 Each Contracting State shall ensure that the persons carrying out screening operations are certified according to the requirements of the national civil aviation security programme.

Findings:

Redacted - Contains sensitive information

4.4.5.4 Standard 3.4.4 Each Contracting State shall require the appropriate authority to ensure the development, implementation and maintenance of a national civil aviation security quality control programme to ensure the effectiveness of its national civil aviation security programme.

Finding:

Redacted - Contains sensitive information

4.4.5.5 Standard 3.4.5 Each Contracting State shall arrange for surveys to identify security needs, arrange for inspections of the implementation of security controls and arrange tests of security controls to assess their effectiveness.

Finding:

Redacted - Contains sensitive information

4.4.5.6 Standard 3.4.6 Each Contracting State concerned with an act of unlawful interference shall require its appropriate authority to re-evaluate security controls and procedures and take action necessary to remedy weaknesses so as to prevent recurrence. These actions shall be notified to ICAO.

Finding: Not observed.

4.4.5.7 Recommendation 3.4.7.— Each Contracting State should require that the effectiveness of individual aviation security measures be assessed by considering their role in the overall system performance of aviation security systems.

Finding:

Redacted - Contains sensitive information

4.4.6 PREVENTIVE SECURITY MEASURES

4.4.6.1 Standard 4.1: Objective: Each Contracting State shall establish measures to prevent weapons, explosives or any other dangerous devices which may be used to commit an act of unlawful interference, the carriage or bearing of which is not authorized, from being introduced, by any means whatsoever, on board an aircraft engaged in international civil aviation.

Finding:

Redacted - Contains sensitive information

4.4.7 MEASURES RELATING TO AIRCRAFT

4.4.7.1 Standard 4.2.1 Each Contracting State shall ensure that aircraft security checks of originating aircraft assigned to international flights are performed.

Finding:

Redacted - Contains sensitive information

4.4.7.2 Standard 4.2.2 Each Contracting State shall require measures to be taken in respect of flights under an increased threat to ensure that disembarking passengers do not leave items on board the aircraft at transit stops on its airports.

Finding:

Redacted - Contains sensitive information

4.4.7.3 Standard 4.2.3 Each Contracting State shall require its operators to take adequate measures to ensure that during flight unauthorized persons are prevented from entering the flight crew compartment.

Finding:

Redacted - Contains sensitive information

4.4.8 MEASURES RELATING TO PASSENGERS AND THEIR CABIN BAGGAGE

4.4.8.1 Standard 4.3.1 Each Contracting State shall establish measures to ensure that originating passengers and their cabin baggage are screened prior to boarding an aircraft engaged in international civil aviation operations.

Finding:

Redacted - Contains sensitive information

4.4.8.2 Standard 4.3.2 Each Contracting State shall ensure that transfer and transit passengers and their cabin baggage are subjected to adequate security controls to prevent unauthorized articles from being taken on board aircraft engaged in international civil aviation operations.

Finding:

Redacted - Contains sensitive information

4.4.8.3 Standard 4.3.3 Each Contracting State shall ensure that there is no possibility of mixing or contact between passengers subjected to security control and other persons not subjected to such control after the security screening points at airports serving international civil aviation have been passed; if mixing or contact does take place, the passengers concerned and their cabin baggage shall be re-screened before boarding an aircraft.

Finding:

Redacted - Contains sensitive information

4.4.9 MEASURES RELATING TO HOLD BAGGAGE

4.4.9.1 Standard 4.4.1 Each Contracting State shall establish measures to ensure that hold baggage is subjected to appropriate security controls prior to being loaded into an aircraft engaged in international civil aviation operations.

Finding:

Redacted - Contains sensitive information

4.4.9.2 Standard 4.4.2 Each Contracting State shall establish measures to ensure that hold baggage intended for carriage on passenger flights is protected from unauthorized interference from the point it is checked in, whether at an airport or elsewhere, until it is placed on board an aircraft.

Finding:

Redacted - Contains sensitive information

4.4.9.3 **Standard 4.4.3 Each Contracting State shall establish measures to ensure that operators when providing service from that State do not transport the baggage of passengers who are not on board the aircraft unless that baggage is subjected to appropriate security controls which may include screening.**

Finding:

Redacted - Contains sensitive information

4.4.9.4 **Standard 4.4.4 Each Contracting State shall require the establishment of secure storage areas at airports serving international civil aviation, where mishandled baggage may be held until forwarded, claimed or disposed of in accordance with local laws.**

Finding:

Redacted - Contains sensitive information

4.4.9.5 **Standard 4.4.5 Each Contracting State shall establish measures to ensure that consignments checked in as baggage by courier services for carriage on passenger aircraft engaged in international civil aviation operations are screened.**

Finding: Not Observed.

4.4.9.6 **Standard 4.4.6 Each Contracting State shall ensure that transfer hold baggage is subjected to appropriate security controls to prevent unauthorized articles from being taken on board aircraft engaged in international civil aviation operations.**

Finding:

Redacted - Contains sensitive information

4.4.9.7 Standard 4.4.7 Each Contracting State shall establish measures to ensure that aircraft operators when providing a passenger service from that State transport only hold baggage which is authorized for carriage in accordance with the requirements specified in the national civil aviation security programme.

Finding:

Redacted - Contains sensitive information

4.4.9.8 Standard 4.4.8 From 1 January 2006, each Contracting State shall establish measures to ensure that originating hold baggage intended to be carried in an aircraft engaged in international civil aviation operations is screened prior to being loaded into the aircraft.

Finding:

Redacted - Contains sensitive information

4.4.9.9 Recommendation 4.4.9 Each Contracting State should establish measures to ensure that originating hold baggage intended to be carried in an aircraft engaged in international civil aviation operations is screened prior to being loaded into the aircraft.

Note: This Recommendation is no longer applicable having been replaced by Standard 4.4.8 above.

4.4.9.10 Recommendation 4.4.10 Each Contracting State should take the necessary measures to ensure that unidentified baggage is placed in a protected and isolated area until such time as it is ascertained that it does not contain any explosives or other dangerous device.

Finding:

Redacted - Contains sensitive information

4.4.10 Measures Relating To Cargo, Mail And Other Goods

4.4.10.1 Standard 4.5.1 Each Contracting State shall ensure the implementation of measures at airports serving international civil aviation to protect cargo, baggage, mail, stores and operators' supplies being moved within an airport and intended for carriage on an aircraft to safeguard such aircraft against an act of unlawful interference.

Finding:

Redacted - Contains sensitive information

4.4.10.2 Standard 4.5.2 Each Contracting State shall establish measures to ensure that cargo, courier and express parcels and mail intended for carriage on passenger flights are subjected to appropriate security controls.

Finding:

Redacted - Contains sensitive information

4.4.10.3 Standard 4.5.3 Each Contracting State shall establish measures to ensure that operators do not accept consignments of cargo, courier and express parcels or mail for carriage on passenger flights unless the security of such consignments is accounted for by a regulated agent or such consignments are subjected to other security controls to meet the requirements of 4.5.2.

Finding:

Redacted - Contains sensitive information

4.4.10.4 Standard 4.5.4 Each Contracting State shall establish measures to ensure that catering supplies and operators' stores and supplies intended for carriage on passenger flights are subjected to appropriate security controls.

Finding:

Redacted - Contains sensitive information

4.4.11 Measures Relating To Special Categories Of Passengers

4.4.11.1 Standards 4.6.1 through 4.6.6: Measures relating to special categories of passengers were not observed.

4.4.12 Measures Relating To Access Control

4.4.12.1 Standard 4.7.1 Each Contracting State shall ensure that security restricted areas are established at each airport serving international civil aviation and that procedures and identification systems are implemented in respect of persons and vehicles.

Finding:

Redacted - Contains sensitive information

4.4.12.2 Standard 4.7.2 Each Contracting State shall ensure that appropriate security controls, including background checks on persons other than passengers granted unescorted access to security restricted areas of the airport, are implemented.

Finding:

Redacted - Contains sensitive information

4.4.12.3 Standard 4.7.3 Each Contracting State shall require that measures are implemented to ensure adequate supervision over the movement of persons and vehicles to and from the aircraft in order to prevent unauthorized access to aircraft.

Finding:

Redacted - Contains sensitive information

4.4.12.4 Recommendation 4.7.4 Each Contracting State should ensure that identity documents issued to aircraft crewmembers conform to the relevant specifications set forth in Doc 9303, Machine Readable Travel Documents.

Finding: Not observed.

4.4.12.5 Recommendation 4.7.5 Each Contracting State should ensure that persons other than passengers being granted access to security restricted areas, together with items carried, are screened at random in accordance with risk assessment carried out by the relevant national authorities.

Finding:

Redacted - Contains sensitive information

4.4.12.6 Recommendation 4.7.6 Each Contracting State should ensure that checks specified in 4.7.2 be reapplied on a regular basis to all persons granted unescorted access to security restricted areas.

Finding:

Redacted - Contains sensitive information

4.4.13 Management Of Response To Acts Of Unlawful Interference

Prevention

4.4.13.1 Standard 5.1.1 Each Contracting State shall establish measures to safeguard aircraft when a well-founded suspicion exists that the aircraft may be subject to an act of unlawful interference while on the ground and to provide as much prior notification as possible of the arrival of such aircraft to airport authorities.

Finding:

Redacted - Contains sensitive information

4.4.13.2 Standard 5.1.2 Each Contracting State shall establish procedures, which include notification to the operator, for inspecting aircraft, when a well-founded suspicion exists that the aircraft may be the object of an act of unlawful interference, for concealed weapons, explosives or other dangerous devices.

Finding:

Redacted - Contains sensitive information

4.4.13.3 Standard 5.1.3 Each Contracting State shall ensure that arrangements are made for the investigation and disposal, if necessary, of suspected sabotage devices or other potential hazards at airports serving international civil aviation.

Finding:

Redacted - Contains sensitive information

Response

4.4.13.4 Standard 5.2.1 Each Contracting State shall take adequate measures for the safety of passengers and crew of an aircraft which is subjected to an act of unlawful interference until their journey can be continued.

Finding:

Redacted - Contains sensitive information

4.4.13.5 Standard 5.2.2 through 5.2.7: Not Observed.

4.4.14 Exchange Of Information And Reporting

4.4.14.1 Standard 5.3.1 through 5.3.2: Not Observed.

5 AIRPORT ASSESSMENTS

5.1 BACKGROUND

After the ASI Team conducted a review of Indonesia's national government level civil aviation security structure and their implementation of ICAO standards and international best practices, the ASI Team then conducted individual assessments of each of the four GoI chosen airports. Here again, the first step in the assessment was to review the airport's civil aviation security organizational structure and its Airport Security Program (ASP) document. At the conclusion of this phase of the assessment, the ASI Team then began its review of the individual sections of the airport's security implementation, procedures, staffing, training and equipment and systems, including any additional agencies that might also provide some portion of aviation security there.

Each airport security assessment will be presented in four sections:

PART 1 – AIRPORT PERIMETER, LANDSIDE/AIRSIDE BOUNDARIES AND AIRSIDE RESTRICTED AREAS INCLUDING VITAL FACILITIES BOTH ON AND OFF THE AIRPORT.

PART 2 – PASSENGER TERMINALS INCLUDING PUBLIC AREAS AND PARKING AREAS RELATED TO THE TERMINALS.

PART 3 – AIR CARGO AND AVIATION CATERING FACILITIES AND OPERATIONS.

PART 4 – SECURITY EQUIPMENT AND SYSTEMS.

5.2 SOEKARNO HATTA INTERNATIONAL AIRPORT, JAKARTA

The following assessment of Soekarno Hatta International Airport, Jakarta was conducted 30 January – 9 February 2006 by the ASI Team.

5.2.1 PART 1 - AIRPORT PERIMETER, LANDSIDE/AIRSIDE BOUNDARIES AND AIRSIDE RESTRICTED AREAS INCLUDING VITAL FACILITIES BOTH ON AND OFF THE AIRPORT

5.2.1.1 Assessment ratings[5] for airport perimeter, landside/airside restricted areas

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Overall Access Control Effectiveness:

Redacted - Contains sensitive information

a. Overall ability of installed security countermeasures to prevent overt or covert penetration through the Airport Perimeter in areas more than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

b. Overall ability of installed security countermeasures to prevent covert penetration through the Airport Perimeter in areas less than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

[5] Scale used is Very High, High, Medium, Low and Very Low.

3. Overall Illegal Penetration Capability Assessment:

Redacted - Contains sensitive information

a. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and proceed undetected to aircraft at parking areas and both domestic and International gate areas:

Redacted - Contains sensitive information

b. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and gain undetected access to passenger aircraft at parking and gate areas:

Redacted - Contains sensitive information

5.2.1.2 Applicable ICAO standards and recommended practices

1. **Annex 14 – Aerodromes:** 5.3.21.1 (Apron Floodlighting), 8.4.2 through 8.4.5 (Fencing); 8.5 (Security Lighting)

2. **Annex 17 – Security:**
   A. 7th Edition (applicable 1 July 2002):
   - 4.1 Physical Security Objective
   - 4.3.3 Interference with Screened Passengers
   - 4.4.2 Protection of Hold Baggage
   - 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies
   - 4.5.2 Security Controls of Cargo and Parcels
   - 4.5.4 Security Controls of Catering and Operators' Stores
   - 4.71 Restricted Areas Access Control
   - 4.7.2 Background Checks
   - 4.7.3 Aircraft Access
   - 4.7.5 Employee Screening
   - 4.7.6 Restricted Areas Entry Screening

   B. 8th Edition (applicable 1 July 2006):
   - 4.1 Physical Security Objective
   - 4.2.1 Airside Access
   - 4.2.2 Security Restricted Areas

- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.4.3 Interference with Screened Passengers
- 4.4.4 Protection of Transit Baggage
- 4.5.2 Protection of Hold Baggage
- 4.6.2 Protection of Cargo and Mail
- 4.6.5 Protection of Catering Stores and Supplies

5.2.1.3 Airport perimeter, landside/airside boundaries, airside restricted areas and on and off airport vital facilities

A. Airport boundary delineation method: Fencing, signage

A1. Airside/landside delineation: Fencing, signage

A2. Perimeter barriers in place:

Redacted - Contains sensitive information

A3. ICAO Fence Class Rating:

a. Metal Wire Fence: Sections of the fence line closer to the passenger terminal and in some other areas are rated as ICAO Class C – An anti-intruder fence that offers a degree of resistance to climbing and breaching by an opportunist intruder not having particular skills and using material and breaching items that are readily to hand.

Redacted - Contains sensitive information

b. Other sections of the fence line are rated ICAO Class D – A fence designed with no particular security requirements.

Redacted - Contains sensitive information

A4. Condition:

Redacted - Contains sensitive information

A5. Access Control Signs:

Redacted - Contains sensitive information

A6. Boundary Barrier Effectiveness Example:

Redacted - Contains sensitive information

A7. Obstruction Clearance:

Redacted - Contains sensitive information

A8. Culverts:

Redacted - Contains sensitive information

A9. Cleared areas/patrol roads:

Redacted - Contains sensitive information

B. Perimeter, airside and security restricted area access control points

B1. Perimeter Access Gates:

Redacted - Contains sensitive information

B2. Perimeter Access Gate Construction:

Redacted - Contains sensitive information

B3. Perimeter Emergency Access (Crash) Gate Construction:

Redacted - Contains sensitive information

B4. Access Control Procedures At Guarded Gates:

Redacted - Contains sensitive information

B5. Airport Identification Pass Use:

Redacted - Contains sensitive information

B6. Control of Non Guarded Gates (including Emergency Gates):

Redacted - Contains sensitive information

C. Perimeter & airside surveillance

C1. (Perimeter Intrusion Detection System (PIDS):

Redacted - Contains sensitive information

C2. Perimeter Lighting:

Redacted - Contains sensitive information

C3. CCTV Systems:

Redacted - Contains sensitive information

C4. Security Patrols:

Redacted - Contains sensitive information

D. Aircraft long term (overnight or longer) parking areas security

D1. Area lighting:

Redacted - Contains sensitive information

D2. CCTV coverage:

Redacted - Contains sensitive information

D3. Security Patrols:

Redacted - Contains sensitive information

E. Active ramp gate areas security

E1. Apron Security:

Redacted - Contains sensitive information

E2. Access Control:

Redacted - Contains sensitive information

a. Via Passenger terminals

Redacted - Contains sensitive information

b. Via Cargo Terminals

Redacted - Contains sensitive information

c. Via perimeter gate access points

Redacted - Contains sensitive information

E3. Airport Restricted Area Permit Requirements and Use:

Redacted - Contains sensitive information

E4. Parked Aircraft Security Requirements and Implementation:

Redacted - Contains sensitive information

E5: Control of Deplaning and Enplaning Passengers:

Redacted - Contains sensitive information

E6. Apron Lighting:

Redacted - Contains sensitive information

E7. CCTV System Coverage and Monitoring:

Redacted - Contains sensitive information

E8. Security patrols:

Redacted - Contains sensitive information

F. Vital facilities security (in airside or security restricted areas)

F1. Vital Facility Security Controls:

Redacted - Contains sensitive information

F2. Alarm systems:

Redacted - Contains sensitive information

F3. Area lighting:

Redacted - Contains sensitive information

F4. CCTV coverage:

Redacted - Contains sensitive information

F5. Security patrols:

Redacted - Contains sensitive information

F6. Facilities Visited:

a. Radar Facility.

Redacted - Contains sensitive information

b. Fuel Farm.

Redacted - Contains sensitive information

5.2.2 PART 2 – PASSENGER TERMINALS INCLUDING PUBLIC AREAS AND PARKING AREAS RELATED TO THE TERMINALS

5.2.2.1 Terminal security and passenger screening assessment ratings[6]

1. Compliance with currently applicable ICAO Annex 17 Standards and Recommended Practices:

Redacted - Contains sensitive information

2. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

Redacted - Contains sensitive information

3. Overall ability of concourse passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

Redacted - Contains sensitive information

4. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

Redacted - Contains sensitive information

5. Overall ability to prevent the mixing of arriving and departing passengers:

Redacted - Contains sensitive information

[6] Scale used is Very High, High, Medium, Low and Very Low.

6. Ability to protect hold baggage from acceptance by the air carrier to loading on the aircraft:

Redacted - Contains sensitive information

7. Baggage reconciliation by airlines:

Redacted - Contains sensitive information

8. Landside/parking issues:

Redacted - Contains sensitive information

5.2.2.2 Terminal security and passenger screening

Applicable ICAO Standards and Recommended Practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.2.1 (Access Control)
- 4.2.3 (Identification System and Verification)
- 4.2.5 (Movement To/From Aircraft)
- 4.4.1 (Passenger Screening)
- 4.4.3 (Mixing of Passengers)
- 4.5.1 (Screening of Hold Baggage)
- 4.5.2 (Protection of Hold Baggage)
- 4.5.4 (Transfer Hold Baggage Screening)
- 4.5.5 (Transporting Accepted Hold Baggage)

A. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

A1. Equipment:

Redacted - Contains sensitive information

A2. Personnel:

Redacted - Contains sensitive information

A3. Supervision:

Redacted - Contains sensitive information

A4. Effectiveness:

Redacted - Contains sensitive information

A5. Use of ETD:

Redacted - Contains sensitive information

A6. Lack of Search Area:

Redacted - Contains sensitive information

A7. Control of Hold Baggage:

Redacted - Contains sensitive information

B. Overall ability of concourse passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

B1. Equipment:

Redacted - Contains sensitive information

B2. Personnel:

Redacted - Contains sensitive information

B3. Supervision:

Redacted - Contains sensitive information

B4. Lack of Private Search Areas:

Redacted - Contains sensitive information

B5. Effectiveness:

Redacted - Contains sensitive information

C. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

C1. Unsecured Baggage Conveyer Curtains:

Redacted - Contains sensitive information

C2. Unsecured doors to restricted areas:

Redacted - Contains sensitive information

D. Overall ability to prevent the mixing of arriving and departing passengers:

Redacted - Contains sensitive information

E. Ability to protect hold baggage from acceptance by the air carrier to loading on the aircraft:

Redacted - Contains sensitive information

E1. Access through conveyer belts:

Redacted - Contains sensitive information

E2. Employee ID/access:

Redacted - Contains sensitive information

F. Baggage reconciliation by airlines: ICAO Annex 17 essentially requires that airlines conduct two-way baggage reconciliation. This means that all bags that are loaded on to an aircraft are matched with an accompanying passenger who actually boards the aircraft, and that all bags that are loaded on to the aircraft are authorized for carriage on that aircraft by the air carrier. The authorization for carriage requirement is to preclude an item being loaded on to the aircraft that was surreptitiously inserted into the baggage system, such as the suitcase containing the IED that destroyed Pan Am Flight 103 in December 1988.

Redacted - Contains sensitive information

G. Landside/parking issues:

Redacted - Contains sensitive information

G1. Crowding of public areas outside of the terminal:

Redacted - Contains sensitive information

G2. Parking of unattended vehicles:

Redacted - Contains sensitive information

5.2.3 PART 3 – AIR CARGO AND AVIATION CATERING FACILITIES AND OPERATIONS

5.2.3.1 Air cargo facilities and operations security

Assessment Ratings[7] of Air Cargo Facilities and Operations at This Airport:

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Assessment of the Overall Capability of an Improvised Explosive Device (IED) or Improvised Incendiary Device (IID) being covertly brought aboard a Passenger Aircraft:

Redacted - Contains sensitive information

A. Assessed ability of persons with a publicly available and developed knowledge of air cargo shipment methods and operations to cause an IED or an IID to be placed aboard an aircraft through air cargo:

Redacted - Contains sensitive information

B. Assessed ability of persons with light to medium military or similar training to penetrate the airside perimeter through air cargo terminals and gain undetected access to airside restricted areas:

[7] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

Applicable ICAO Standards and Recommended Practices:

1. **Annex 17 – Security:**
   A. 7th Edition (applicable 1 July 2002):
   - 4.1 Physical Security Objective
   - 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies
   - 4.5.2 Security Controls of Cargo and Parcels
   - 4.71 Restricted Areas Access Control
   - 4.7.2 Background Checks
   - 4.7.3 Aircraft Access
   - 4.7.5 Employee Screening
   - 4.7.6 Restricted Areas Entry Screening

   B. 8th Edition (applicable 1 July 2006):
   - 4.1 Physical Security Objective
   - 4.2.1 Airside Access
   - 4.2.2 Security Restricted Areas
   - 4.2.3 Airport Identification Permits
   - 4.2.4 Background Checks
   - 4.2.5 Aircraft Access
   - 4.2.6 Restricted Areas Entry Screening
   - 4.2.8 Restricted Areas Entry Screening
   - 4.3.4 Protection of Aircraft
   - 4.6.2 Protection of Cargo and Mail

Methodology:

Air cargo security to be effective must be a complete and systematic program that implements certain security measures from the time cargo is first accepted by consigners and regulated agents, through all the intermediary processes such as additional consolations and acceptance into the airport cargo terminals, until the time the cargo is loaded aboard an aircraft. The air cargo security program must be a written document that implements as a minimum, all of the air cargo requirements contained in the NCASP. This type of program, when properly and consistently implemented, will assure the three core principles of air cargo security as contained in the ICAO Security Manual (Doc 8973 Restricted) are fully satisfied. The assessment of air cargo facilities and their operation at this airport are based upon the implementation and compliance of these three principles:

- Aircraft carrying air cargo must operate from within a secure environment;
- All air cargo must be subject to some degree of security control, before being placed on board a passenger-carrying aircraft, with the devotion of maximum effort to the screening of air cargo consignments whose security cannot be

readily determined; and

- A consignment of air cargo once security cleared, must be protected from interference.

Assessment Findings of Individual Security Countermeasures Currently in Place to Protect Air Cargo Operations:

Redacted - Contains sensitive information

5.2.3.2 Aviation catering facilities and operations

Assessment Ratings[8] of Aviation Catering Facilities and Operations at This Airport:

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Assessment of the Overall Capability of an Improvised Explosive Device (IED) or Improvised Incendiary Device (IID) or Weapons being covertly brought aboard a Passenger Aircraft:

Redacted - Contains sensitive information

A. Assessed ability of persons with light to medium military or similar training to cause a weapon or other unlawful device to be placed aboard a passenger aircraft through aviation catering:

Redacted - Contains sensitive information

B. Assessed ability of persons with light to medium military or similar training to penetrate the airside perimeter through aviation catering operations and gain undetected access to airside restricted areas:

[8] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

Applicable ICAO Standards and Recommended Practices:

Annex 17 – Security:

A. 7th Edition (applicable 1 July 2002):

- 4.1 Physical Security Objective
- 4.5.4 Security Controls of Catering and Operators' Stores
- 4.71 Restricted Areas Access Control
- 4.7.2 Background Checks
- 4.7.3 Aircraft Access
- 4.7.5 Employee Screening
- 4.7.6 Restricted Areas Entry Screening

B. 8th Edition (applicable 1 July 2006):

- 4.1 Physical Security Objective
- 4.2.1 Airside Access
- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.6.5 Protection of Catering Stores and Supplies

Methodology:

As with air cargo security, for aviation catering security to be effective it must also be a complete and systematic program. Again, as with air cargo, this program relies heavily upon the catering facility internal security to inspect upon receipt, securely store and then use all catering supplies in a manner contusive to ICAO prescribed security measures. Once again as with air cargo, catering security must have a written security program that implements the measures prescribed in the NCASP and that receives oversight by both local airport security as well as the DGAC organization. The assessment of aviation catering facilities and their operation at this airport are based upon the implementation and compliance of the following three general principles contained in the ICAO Security Manual (Doc 8973 Restricted):

- Security measures must be applied in buildings where catering supplies and stores are prepared, stored and dispatched, to ensure that no device or weapon is introduced into consignments;

- Security measures must be applied during the transportation and delivery of catering supplies and stores to the relevant aircraft to ensure that the consignment remains secure;
- Security measures must be applied by the airline operator on receipt of catering consignments to ensure that all catering supplies or stores loaded on the aircraft are correctly assigned for that flight and have not been tampered with.

Assessment Findings of Individual Security Countermeasures Currently in Place to Protect Aviation Catering Operations:

Redacted - Contains sensitive information

5.2.4 PART 4 – SECURITY EQUIPMENT AND SYSTEMS

5.2.4.1 Airport equipment assessment ratings[9]

1. Compliance with currently applicable ICAO Annex 17 – Security Standards and Recommended Practices:

Redacted - Contains sensitive information

2. Overall ability of installed metal detectors to detect potential, metallic threat objects on persons at checkpoints. *MEDIUM*

Redacted - Contains sensitive information

3. Overall ability of installed security screening equipment to adequately image hold baggage for operator assessment of the presence of explosives and weapons.

Redacted - Contains sensitive information

4. Overall ability of installed security screening equipment to adequately image cabin baggage and accompanying items for operator assessment of the presence of explosives and weapons.

[9] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

5. Overall ability of installed security screening equipment to adequately assist security to detect explosives and weapons being taken into the Aircraft Operating Area and other security restricted areas of the airport through the employee and authorized vehicle checkpoints.

Redacted - Contains sensitive information

6. Overall ability of security screening equipment to detect the entry of explosives and weapons in transfer baggage.

Redacted - Contains sensitive information

7. Overall ability of installed access control system and CCTV system to detect passage of people, weapons or explosives from the public area to sterile departure areas of the passenger terminal.

Redacted - Contains sensitive information

8. Overall ability of currently installed security screening equipment to adequately image explosives and weapons in aircraft cargo.

Redacted - Contains sensitive information

5.2.4.2 Applicable ICAO standards and recommended practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.3 (Passenger and Cabin Baggage)
- 4.4 (Hold Baggage)
- 4.5 (Cargo, Mail and other Goods)
- 4.71 (Access Control)
- 4.7.5 and 4.7.6 (Employee Screening)

5.2.4.3 Equipment assessment introduction

Airport security equipment are important tools to improve the efficiency of the airport security staff and police in protecting air travelers, airport staff, airport facilities, aircraft, tenant property and the general public from Acts of Unlawful Interference. Specialized security equipment is most commonly employed for the inspection of passengers, their accompanying items and checked baggage; inspection of cargo, mail and supplies to be carried aboard aircraft; to aid in the control of persons and vehicles entering the airport secured areas; and for status assessment and detection of unlawful activities on airport property. This section describes and assesses each type of equipment found at the Jakarta International (Soekarno-Hatta) airport.

Key ICAO Requirements from ICAO Annex 17 relating to security equipment are found in Chapter 4, Preventative Security Measures. Citations from Annex 17 are from the Seventh Edition in effect at the time of the ASI team visit and assessment. The new Edition 8 became effective in July 2006. Where substantial changes have been made to the requirements in Edition 8, the new requirement may be also being cited. The overall requirement is:

4.1 Objective: Each Contracting State shall establish measures to prevent weapons, explosives or any other dangerous devices which may be used to commit an act of unlawful interference, the carriage or bearing of which is not authorized, from being introduced, by any means whatsoever, on board an aircraft engaged in international civil aviation.

Additional methodology and security design guidance is provided in the ICAO Security Manual, Doc. 9873 especially Chapter 4 of Part 1, Preventative Security Measures.

A. General - Applies to All Locations

A1. Security Screening Equipment Quantities and Deployment

Redacted - Contains sensitive information

A2. Security Equipment Quantities and Condition

Redacted - Contains sensitive information

A3. Security Equipment Operations Checks, Maintenance and Calibration

Redacted - Contains sensitive information

B. Terminal Entry Checkpoints (TEC)

B1. Terminal Entry Security Measures:

Redacted - Contains sensitive information

B2. Terminal Entry Checkpoint (TEC) Security Equipment:

Redacted - Contains sensitive information

C. Gate or Concourse Entry Checkpoint Equipment:

Passenger, cabin baggage and other accompanying items are subjected to additional inspection before being allowed into pre-board waiting lounges (Sterile Areas). These passenger checkpoints may serve an individual gate or be located in a corridor or entry shared by several aircraft boarding gates.

Redacted - Contains sensitive information

D. Hajj Terminal Checkpoint Equipment:

Redacted - Contains sensitive information

E. Employee and Vehicle Entry Checkpoint Equipment:

Redacted - Contains sensitive information

F. Inspection Equipment for Cargo: Jakarta is the principal air cargo center for Indonesia – it is the nation's capital, principal industrial/transportation center and one of the world's most populous cities (approximately number 12 on most listings). The ASI team visited the cargo areas and cargo terminals operated by JAS Airport Services and Garuda International in the main cargo area as well as the PT Unex International Indonesia facilities in Cargo Area 3 (near the Hajj terminal).

Redacted - Contains sensitive information

G. Access Control and CCTV Equipment:

Redacted - Contains sensitive information

5.3 NGURAH RAI INTERNATIONAL AIRPORT, DENPASAR, BALI

The following assessment of Ngurah Rai International Airport, Denpasar, Bali was conducted 9 – 14 February 2006 by the ASI Team.

5.3.1 PART 1 – AIRPORT PERIMETER, LANDSIDE/AIRSIDE BOUNDARIES AND AIRSIDE RESTRICTED AREAS INCLUDING VITAL FACILITIES BOTH ON AND OFF THE AIRPORT

5.3.1.1 Assessment ratings[10] for airport perimeter, landside/airside restricted areas

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Overall Access Control Effectiveness:

Redacted - Contains sensitive information

A. Overall ability of installed security countermeasures to prevent overt or covert penetration through the Airport Perimeter in areas more than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

B. Overall ability of installed security countermeasures to prevent covert penetration through the Airport Perimeter in areas less than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

3. Overall Illegal Penetration Capability Assessment:

[10] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

A. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and proceed undetected to aircraft at parking areas and both domestic and International gate areas:

Redacted - Contains sensitive information

B. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and gain undetected access to passenger aircraft at parking and gate areas:

Redacted - Contains sensitive information

5.3.1.2 Applicable icao standards and recommended practices

1. **Annex 14 – Aerodromes:** 5.3.21 (Apron Floodlighting), 8.4.2 through 8.4.5 (Fencing); 8.5 (Security Lighting)

2. **Annex 17 – Security:**

   A. 7th Edition (applicable 1 July 2002):
   - 4.1 Physical Security Objective
   - 4.3.3 Interference with Screened Passengers
   - 4.4.2 Protection of Hold Baggage
   - 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies
   - 4.5.2 Security Controls of Cargo and Parcels
   - 4.5.4 Security Controls of Catering and Operators' Stores
   - 4.71 Restricted Areas Access Control
   - 4.7.2 Background Checks
   - 4.7.3 Aircraft Access
   - 4.7.5 Employee Screening
   - 4.7.6 Restricted Areas Entry Screening

   B. 8th Edition (applicable 1 July 2006):
   - 4.1 Physical Security Objective
   - 4.2.1 Airside Access

- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.4.3 Interference with Screened Passengers
- 4.4.4 Protection of Transit Baggage
- 4.5.2 Protection of Hold Baggage
- 4.6.2 Protection of Cargo and Mail
- 4.6.5 Protection of Catering Stores and Supplies

5.3.1.3 Airport perimeter, landside/airside boundaries, airside restricted areas and on and off airport vital facilities

A. Airport boundary and Airside/Landside Security:

A1. Airside/landside delineation method:

Redacted - Contains sensitive information

A2. Perimeter barriers in place:

Redacted - Contains sensitive information

A3. ICAO Fence Class Ratings:

Redacted - Contains sensitive information

A4. Condition:

Redacted - Contains sensitive information

A5. Access Control Signs:

Redacted - Contains sensitive information

A6. Boundary Barrier Effectiveness Example:

Redacted - Contains sensitive information

A7. Obstruction Clearance:

Redacted - Contains sensitive information

A8. Culverts:

Redacted - Contains sensitive information

A9. Cleared areas/patrol roads:

Redacted - Contains sensitive information

B. Perimeter, Airside and Security Restricted Area Access Control Points

B1. Perimeter Access Gates:

Redacted - Contains sensitive information

B2. Perimeter Access Gate Construction:

Redacted - Contains sensitive information

B3. Perimeter Emergency Access (Crash) Gate Construction:

Redacted - Contains sensitive information

B4. Access Control Procedures At Guarded Gates:

Redacted - Contains sensitive information

B5. Airport Identification Pass Use:

Redacted - Contains sensitive information

B6. Control of Non Guarded Gates (including Emergency Gates) and Other Airside Access Points:

Redacted - Contains sensitive information

B7. Public Access To Temple Located On Airside:

Redacted - Contains sensitive information

C. Perimeter & airside surveillance Measures

C1. (Perimeter Intrusion Detection System (PIDS):

Redacted - Contains sensitive information

C2. Perimeter Lighting:

Redacted - Contains sensitive information

C3. CCTV Systems:

Redacted - Contains sensitive information

C4. Security Patrols:

Redacted - Contains sensitive information

C5. Security Control Tower Surveillance:

Redacted - Contains sensitive information

D. Aircraft long term (overnight or longer) parking areas security

D1. Area lighting:

Redacted - Contains sensitive information

D2. CCTV coverage:

Redacted - Contains sensitive information

D3. Security Patrols:

Redacted - Contains sensitive information

E. Active apron gate areas security

E1. Apron Security

Typically the most important and most sought after target for terrorists on an airport is passenger aircraft, especially those either loaded with crew and passengers or in the process on loading. All civil aviation security measures focus first on keeping weapons and explosive devices from being brought aboard aircraft and second keeping unauthorized persons away from aircraft, passengers, crew, employees and other persons at the airport. The following categories of security countermeasures are therefore some of the most important and must work together to maintain an overall effective security posture to meet ICAO standards.

E2. Access Control

Redacted - Contains sensitive information

a. Via Passenger terminals

Redacted - Contains sensitive information

b. Via Cargo Terminals

Redacted - Contains sensitive information

c. Via perimeter gate access points

Redacted - Contains sensitive information

E3. Airport Restricted Area Permit Requirements and Use

Redacted - Contains sensitive information

E4. Parked Aircraft Security Requirements and Implementation

Redacted - Contains sensitive information

E5: Control of Deplaning and Enplaning Passengers on Aprons

Redacted - Contains sensitive information

E6. Apron Lighting

Redacted - Contains sensitive information

E7. CCTV System Coverage and Monitoring

Redacted - Contains sensitive information

a. International CCTV Control Room:

Redacted - Contains sensitive information

b. Domestic CCTV Control Room:

Redacted - Contains sensitive information

E8. Security patrols:

Redacted - Contains sensitive information

F. Vital facilities security (in airside or security restricted areas)

F1. Vital Facility Security Controls:

Redacted - Contains sensitive information

a. Fuel Farm:

Redacted - Contains sensitive information

b. Airport Power Stations:

Redacted - Contains sensitive information

c. Air Traffic Control Tower:

Redacted - Contains sensitive information

5.3.2 PART 2 – PASSENGER TERMINALS INCLUDING PUBLIC AREAS AND PARKING AREAS RELATED TO THE TERMINALS.

5.3.2.1 Terminal security and passenger screening assessment ratings[11]

1. Compliance with currently applicable ICAO Annex 17 Standards and Recommended Practices:

Redacted - Contains sensitive information

2. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

Redacted - Contains sensitive information

3. Overall ability of concourse passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

Redacted - Contains sensitive information

4. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

Redacted - Contains sensitive information

5. Overall ability to prevent the mixing of arriving and departing passengers:

Redacted - Contains sensitive information

[11] Scale used is Very High, High, Medium, Low and Very Low.

6. Ability to protect hold baggage from acceptance by the air carrier to loading on the aircraft:

Redacted - Contains sensitive information

7. Baggage reconciliation by airlines:

Redacted - Contains sensitive information

8. Control of passengers moving to/from aircraft.

Redacted - Contains sensitive information

5.3.2.2 Terminal security and passenger screening

Applicable ICAO Standards And Recommended Practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.2.1 (Access Control)
- 4.2.3 (Identification System and Verification)
- 4.2.5 (Movement To/From Aircraft)
- 4.4.1 (Passenger Screening)
- 4.4.3 (Mixing of Passengers)
- 4.5.1 (Screening of Hold Baggage)
- 4.5.2 (Protection of Hold Baggage)
- 4.5.4 (Transfer Hold Baggage Screening)
- 4.5.5 (Transporting Accepted Hold Baggage)

A. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

A1. Equipment:

Redacted - Contains sensitive information

A2. Personnel:

Redacted - Contains sensitive information

A3. Effectiveness:

Redacted - Contains sensitive information

A4. Lack of Sufficient Search Area:

Redacted - Contains sensitive information

A5. Control of Hold Baggage:

Redacted - Contains sensitive information

B. Overall ability of concourse passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

B1. Equipment:

Redacted - Contains sensitive information

B2. Personnel:

Redacted - Contains sensitive information

B3. Lack of Private Search Areas:

Redacted - Contains sensitive information

B4. Effectiveness:

Redacted - Contains sensitive information

B5. Availability of Knives in Sterile Area:

Redacted - Contains sensitive information

C. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

C1: Access to AOA/Restricted Areas by Employees:

Redacted - Contains sensitive information

C2: Access to Domestic Terminal by Outsiders:

Redacted - Contains sensitive information

C3: Control of Arriving Passengers at Domestic Terminal:

Redacted - Contains sensitive information

F. Baggage reconciliation by airlines:

ICAO Annex 17 essentially requires that airlines conduct two-way baggage reconciliation. This means that all bags that are loaded on to an aircraft are matched with an accompanying passenger who actually boards the aircraft, and that all bags that are loaded on to the aircraft are authorized for carriage on that aircraft by the air carrier. The authorization for carriage requirement is to preclude an item being loaded on to the aircraft that was surreptitiously inserted into the baggage system, such as the suitcase containing the IED that destroyed Pan Am Flight 103 in December 1988.

Redacted - Contains sensitive information

G. Landside/parking:

Redacted - Contains sensitive information

5.3.3 PART 3 – AIR CARGO AND AVIATION CATERING FACILITIES AND OPERATIONS.

5.3.3.1 Air cargo facilities and operations security

Assessment Ratings[12] of Air Cargo Facilities and Operations at This Airport

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Assessment of the Overall Capability of an Improvised Explosive Device (IED) or Improvised Incendiary Device (IID) being covertly brought aboard a Passenger Aircraft:

Redacted - Contains sensitive information

A. Assessed ability of persons with a publicly available and developed knowledge of air cargo shipment methods and operations to cause an IED or an IID to be placed aboard an aircraft through air cargo:

[12] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

B. Assessed ability of persons with light to medium military or similar training to penetrate the airside perimeter through air cargo terminals and gain undetected access to airside restricted areas:

Redacted - Contains sensitive information

Applicable ICAO Standards and Recommended Practices:

1. **Annex 17 – Security:**

A. 7th Edition (applicable 1 July 2002):
- 4.1 Physical Security Objective
- 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies
- 4.5.2 Security Controls of Cargo and Parcels
- 4.71 Restricted Areas Access Control
- 4.7.2 Background Checks
- 4.7.3 Aircraft Access
- 4.7.5 Employee Screening
- 4.7.6 Restricted Areas Entry Screening

B. 8th Edition (applicable 1 July 2006):
- 4.1 Physical Security Objective
- 4.2.1 Airside Access
- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.6.2 Protection of Cargo and Mail

Methodology:

Air cargo security to be effective must be a complete and systematic program that implements certain security measures from the time cargo is first accepted by consigners and regulated agents, through all the intermediary processes such as additional consolidations and acceptance into the airport cargo terminals, until the time the cargo is loaded aboard an aircraft. The air cargo security program must be a written document that implements as a

minimum, all of the air cargo requirements contained in the NCASP. This type of program, when properly and consistently implemented, will assure the three core principles of air cargo security as contained in the ICAO Security Manual (Doc 8973 Restricted) are fully satisfied. The assessment of air cargo facilities and their operation at this airport are based upon the implementation and compliance of these three principles:

- Aircraft carrying air cargo must operate from within a secure environment;
- All air cargo must be subject to some degree of security control, before being placed on board a passenger-carrying aircraft, with the devotion of maximum effort to the screening of air cargo consignments whose security cannot be readily determined; and
- A consignment of air cargo once security cleared, must be protected from interference.

Assessment Findings of Individual Security Countermeasures Currently In Place To Protect Air Cargo Operations:

Redacted - Contains sensitive information

5.3.3.2 Aviation Catering Facilities And Operations Security

Assessment Ratings[13] of Aviation Catering Facilities and Operations at This Airport

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Assessment of the Overall Capability of an Improvised Explosive Device (IED) or Improvised Incendiary Device (IID) or Weapons being covertly brought aboard a Passenger Aircraft:

Redacted - Contains sensitive information

[13] Scale used is Very High, High, Medium, Low and Very Low.

A. Assessed ability of persons with light to medium military or similar training to cause a weapon or other unlawful device to be placed aboard a passenger aircraft through aviation catering:

Redacted - Contains sensitive information

B. Assessed ability of persons with light to medium military or similar training to penetrate the airside perimeter through aviation catering operations and gain undetected access to airside restricted areas:

Redacted - Contains sensitive information

Applicable ICAO Standards And Recommended Practices

1. Annex 17 – Security:

A. 7th Edition (applicable 1 July 2002):

- 4.1 Physical Security Objective
- 4.5.4 Security Controls of Catering and Operators' Stores
- 4.71 Restricted Areas Access Control
- 4.7.2 Background Checks
- 4.7.3 Aircraft Access
- 4.7.5 Employee Screening
- 4.7.6 Restricted Areas Entry Screening

B. 8th Edition (applicable 1 July 2006):

- 4.1 Physical Security Objective
- 4.2.1 Airside Access
- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.6.5 Protection of Catering Stores and Supplies

Methodology:

As with air cargo security, for aviation catering security to be effective it must also be a complete and systematic program. Again, as with air cargo, this program relies heavily upon the catering facility internal security to inspect upon receipt, securely store and then use all catering supplies in a manner contusive to ICAO prescribed security measures. Once again as with air cargo, catering security must have a written security program that implements the measures prescribed in the NCASP and that receives oversight by both local airport security as well as the DGAC organization. The assessment of aviation catering facilities and their operation at this airport are based upon the implementation and compliance of the following three general principles contained in the ICAO Security Manual (Doc 8973 Restricted):

- Security measures must be applied in buildings where catering supplies and stores are prepared, stored and dispatched, to ensure that no device or weapon is introduced into consignments;
- Security measures must be applied during the transportation and delivery of catering supplies and stores to the relevant aircraft to ensure that the consignment remains secure;
- Security measures must be applied by the airline operator on receipt of catering consignments to ensure that all catering supplies or stores loaded on the aircraft are correctly assigned for that flight and have not been tampered with.

Assessment Findings Of Individual Security Countermeasures Currently In Place To Protect Aviation Catering Operations:

Redacted - Contains sensitive information

5.3.4 PART 4 – SECURITY EQUIPMENT AND SYSTEMS.

5.3.4.1 Airport equipment assessment ratings[14]

1. Compliance with currently applicable ICAO Annex 17 – Security Standards and Recommended Practices:

Redacted - Contains sensitive information

2. Overall ability of installed terminal entrance security screening equipment to adequately image baggage and accompanying items for operator assessment of the presence of explosives and weapons.

Redacted - Contains sensitive information

3. Overall ability of installed security screening equipment to adequately image baggage and accompanying items for operator assessment of the presence of explosives and weapons in items carried by passengers into the passenger terminal Sterile Area.

Redacted - Contains sensitive information

4. Overall ability of installed security screening equipment to adequately image baggage and accompanying items for operator assessment of the presence of explosives and weapons in items entering the Aircraft Operating Area and other security restricted areas of the airport through the employee checkpoints.

Redacted - Contains sensitive information

5. Overall ability of security screening equipment to adequately image baggage and accompanying items for operator assessment of the presence of explosives and weapon in transfer baggage.

Redacted - Contains sensitive information

[14] Scale used is Very High, High, Medium, Low and Very Low.

6. Overall ability of installed access control system and CCTV system to detect passage of people, weapons or explosives from the aircraft arrival area to the sterile departure areas of the passenger terminal.

Redacted - Contains sensitive information

7. Overall ability of installed access control system and CCTV system to detect passage of people, weapons or explosives from the public area to sterile departure areas of the passenger terminal.

Redacted - Contains sensitive information

5.3.4.2 Applicable ICAO standards and recommended practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.3 (Passenger and Cabin Baggage)
- 4.4 (Hold Baggage)
- 4.5 (Cargo, Mail and other Goods)
- 4.71 (Access Control)
- 4.7.5 and 4.7.6 (Employee Screening)

5.3.4.3 Equipment assessment introduction

Airport security equipment are important tools to improve the efficiency of the airport security staff and police in protecting air travelers, airport staff, airport facilities, aircraft, tenant property and the general public from acts of unlawful interference. Specialized security equipment is most commonly employed for the inspection of passengers, their accompanying items and checked baggage; inspection of cargo, mail and supplies to be carried aboard aircraft; to aid in the control of persons and vehicles entering the airport secured areas; and for status assessment and detection of unlawful activities on airport property. This section describes and assesses each type of equipment application found at the Ngurah Rai International (Denpassar, Bali) airport.

Key ICAO Requirements from ICAO Annex 17 relating to security equipment are found in Chapter 4, Preventative Security Measures. Citations from Annex 17th are from the Seventh Edition in effect at the time of the ASI team visit. The new Edition 8 will become effective in July 2006. Where substantial changes have been made to

the requirements in Edition 8, the new requirement may be also being cited below the 7th Edition requirement. The overall requirement is:

4.1 Objective
Each Contracting State shall establish measures to prevent weapons, explosives or any other dangerous devices which may be used to commit an act of unlawful interference, the carriage or bearing of which is not authorized, from being introduced, by any means whatsoever, on board an aircraft engaged in international civil aviation.

Additional security design guidance is provided in the ICAO Security Manual, Doc. 9873 especially Chapter 4 of Part 1, Preventative security measures.

Redacted - Contains sensitive information

A. Passenger Terminal Entry Checkpoints (hereinafter entry checkpoints)

A1. Terminal Entry Security Measures:

Redacted - Contains sensitive information

A3. Metal Detection Equipment Condition:

Redacted - Contains sensitive information

B. Passenger and Accompanying Item International Pre-Board Checkpoints

Passenger, cabin baggage and other accompanying items are subjected to additional inspection before being allowed into pre-board waiting lounges (sterile areas). These passenger checkpoints may serve an individual gate or be shared by several aircraft gates.

Redacted - Contains sensitive information

B1. Domestic Passenger and Cabin Baggage Pre-Board Checkpoint

Redacted - Contains sensitive information

C. Employee Entry Checkpoints:

Redacted - Contains sensitive information

D. Checkpoint Screening Equipment Condition and Operational Tests:

Redacted - Contains sensitive information

F. Access Control and CCTV:

Redacted - Contains sensitive information

G. Customs Inspection Equipment:

Redacted - Contains sensitive information

H. Terminal Roadway Vehicle Control:

Redacted - Contains sensitive information

5.4 POLONIA INTERNATIONAL AIRPORT, MEDAN

The following assessment of Polonia International Airport, Medan was conducted 14 – 16 February 2006 by the ASI Team.

5.4.1 PART 1 – AIRPORT PERIMETER, LANDSIDE/AIRSIDE BOUNDARIES AND AIRSIDE RESTRICTED AREAS INCLUDING VITAL FACILITIES BOTH ON AND OFF THE AIRPORT

5.4.1.1 Assessment ratings[15] for airport perimeter, landside/airside restricted areas

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Overall Access Control Effectiveness:

Redacted - Contains sensitive information

a. Overall ability of installed security countermeasures to prevent overt or covert penetration through the Airport Perimeter in areas more than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

b. Overall ability of installed security countermeasures to prevent covert penetration through the Airport Perimeter in areas less than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

3. Overall Illegal Penetration Capability Assessment:

[15] Scales used are Compliant or Non Compliant, and Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

a. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and proceed undetected to aircraft at parking areas and both domestic and International gate areas:

Redacted - Contains sensitive information

b. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and gain undetected access to passenger aircraft at parking and gate areas:

Redacted - Contains sensitive information

5.4.1.2 Applicable ICAO standards and recommended practices

1. **Annex 14 – Aerodromes:** 5.3.21 (Apron Floodlighting), 8.4.2 through 8.4.5 (Fencing); 8.5 (Security Lighting)

2. **Annex 17 – Security:**

A. 7th Edition (applicable 1 July 2002):
- 4.1 Physical Security Objective
- 4.3.3 Interference with Screened Passengers
- 4.4.2 Protection of Hold Baggage
- 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies
- 4.5.2 Security Controls of Cargo and Parcels
- 4.5.4 Security Controls of Catering and Operators' Stores
- 4.71 Restricted Areas Access Control
- 4.7.2 Background Checks
- 4.7.3 Aircraft Access
- 4.7.5 Employee Screening
- 4.7.6 Restricted Areas Entry Screening

B. 8th Edition (applicable 1 July 2006):
- 4.1 Physical Security Objective
- 4.2.1 Airside Access
- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits

- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.4.3 Interference with Screened Passengers
- 4.4.4 Protection of Transit Baggage
- 4.5.2 Protection of Hold Baggage
- 4.6.2 Protection of Cargo and Mail
- 4.6.5 Protection of Catering Stores and Supplies

5.4.1.3 Airport perimeter, landside/airside boundaries, airside restricted areas and on and off airport vital facilities

A. Airport boundary and Airside/Landside Security

A1. Airside/landside delineation method:

Redacted - Contains sensitive information

A2. Perimeter barriers in place:

Redacted - Contains sensitive information

A3. ICAO Fence Class Ratings:

Redacted - Contains sensitive information

A4. Condition:

Redacted - Contains sensitive information

A5. Access Control Signs:

Redacted - Contains sensitive information

A6. Perimeter/Airside Boundary Barrier Effectiveness Example:

Redacted - Contains sensitive information

A7. Obstruction Clearance:

Redacted - Contains sensitive information

A8. Culverts:

Redacted - Contains sensitive information

A9. Cleared areas/patrol roads:

Redacted - Contains sensitive information

B. Perimeter, Airside and Security Restricted Area Access Control Points

B1. Perimeter Access Gates:

Redacted - Contains sensitive information

B2. Perimeter Access Gate Construction:

Redacted - Contains sensitive information

B3. Perimeter Emergency Access (Crash) Gate Construction:

Redacted - Contains sensitive information

B4. Access Control Procedures At Guarded Gates:

Redacted - Contains sensitive information

B5. Airport Identification Pass Use:

Redacted - Contains sensitive information

B6. Control of Non Guarded Gates (including Emergency Gates) and Other Airside and Restricted Area Access Points:

Redacted - Contains sensitive information

C. Perimeter & airside surveillance Measures

C1. (Perimeter Intrusion Detection System (PIDS):

Redacted - Contains sensitive information

C2. Perimeter Lighting:

Redacted - Contains sensitive information

C3. CCTV Systems:

Redacted - Contains sensitive information

C4. Security Patrols:

Redacted - Contains sensitive information

D. Aircraft long term (overnight or longer) parking areas security

D1. Area lighting:

Redacted - Contains sensitive information

D2. CCTV coverage:

Redacted - Contains sensitive information

D3. Security Patrols:

Redacted - Contains sensitive information

E. Active apron gate areas security

E1. Apron Security

Typically the most important and most sort after target for terrorists on an airport are passenger aircraft, especially those either loaded with crew and passengers or in the process on loading. All civil aviation security measures focus first on keeping weapons and explosive devices from being brought aboard aircraft and second keeping unauthorized persons away from aircraft, passengers, crew, employees and other persons at the airport. The following categories of security countermeasures are therefore some of the most important and must work together to maintain an overall effective security posture to meet ICAO standards.

E2. Access Control

Redacted - Contains sensitive information

a. Via Passenger terminals

Redacted - Contains sensitive information

b. Via perimeter gate access points

Redacted - Contains sensitive information

E3. Airport Restricted Area Permit Requirements and Use

Redacted - Contains sensitive information

E4. Parked Aircraft Security Requirements and Implementation

Redacted - Contains sensitive information

E5: Control of Deplaning and Enplaning Passengers on Aprons

Redacted - Contains sensitive information

E6. Apron Lighting

Redacted - Contains sensitive information

E7. CCTV System Coverage and Monitoring

Redacted - Contains sensitive information

E8. Security patrols

Redacted - Contains sensitive information

F. Vital facilities security (in airside or security restricted areas)

F1. Vital Facility Security Controls:

Critical facilities such as the Airport Power Stations, Air Traffic Control Tower (ATCT), Fuel Farm, and other similar facilities important to the continued operation of the airport require additional protection even when located within the airside of the airport.

Redacted - Contains sensitive information

a. Fuel Farm:

Redacted - Contains sensitive information

b. Radar Facilities:

Redacted - Contains sensitive information

c. Air Traffic Control Tower:

Redacted - Contains sensitive information

d. Visual Omni Range (VOR) Facility:

Redacted - Contains sensitive information

5.4.2 PART 2 – PASSENGER TERMINALS INCLUDING PUBLIC AREAS AND PARKING AREAS RELATED TO THE TERMINALS

5.4.2.1 Terminal security and passenger screening assessment ratings[16]

Compliance with currently applicable ICAO Annex 17 Standards and Recommended Practices:

Redacted - Contains sensitive information

1. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

   Redacted - Contains sensitive information

2. Overall ability of concourse passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

   Redacted - Contains sensitive information

3. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

   Redacted - Contains sensitive information

4. Overall ability to prevent the mixing of arriving and departing passengers:

   Redacted - Contains sensitive information

5. Ability to protect hold baggage from acceptance by the air carrier to loading on the aircraft:

[16] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

6. Baggage reconciliation by airlines:

Redacted - Contains sensitive information

5.4.2.2 Terminal security and passenger screening

Applicable ICAO Standards and Recommended Practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.2.1 (Access Control)
- 4.2.3 (Identification System and Verification)
- 4.2.5 (Movement To/From Aircraft)
- 4.4.1 (Passenger Screening)
- 4.4.3 (Mixing of Passengers)
- 4.5.1 (Screening of Hold Baggage)
- 4.5.2 (Protection of Hold Baggage)
- 4.5.4 (Transfer Hold Baggage Screening)
- 4.5.5 (Transporting Accepted Hold Baggage)

A. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

A1. Equipment:

Redacted - Contains sensitive information

A2. Personnel:

Redacted - Contains sensitive information

A3. Supervision:

Redacted - Contains sensitive information

A4. Effectiveness:

Redacted - Contains sensitive information

A5. Lack of Search Area:

Redacted - Contains sensitive information

A6. Control of Baggage into X-ray:

Redacted - Contains sensitive information

A7. Control of Hold Baggage:

Redacted - Contains sensitive information

A8. Ability to Bypass Domestic Terminal Entrance Screening:

Redacted - Contains sensitive information

B. Overall ability of concourse passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

B1. Equipment:

Redacted - Contains sensitive information

B2. Personnel:

Redacted - Contains sensitive information

B3. Supervision:

Redacted - Contains sensitive information

B4. Lack of Private Search Areas:

Redacted - Contains sensitive information

B5. Effectiveness:

Redacted - Contains sensitive information

C. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

C1. Unsecured Baggage Conveyer Curtains:

Redacted - Contains sensitive information

C2. Lack of Screening of Airport Staff in Arrival Areas:

Redacted - Contains sensitive information

E. Ability to protect hold baggage from acceptance by the air carrier to loading on the aircraft:

E1. Access through conveyer belts:

Redacted - Contains sensitive information

F. Baggage reconciliation by airlines: ICAO Annex 17 essentially requires that airlines conduct two-way baggage reconciliation. This means that all bags that are loaded on to an aircraft are matched with an accompanying passenger who actually boards the aircraft, and that all bags that are loaded on to the aircraft are authorized for carriage on that aircraft by the air carrier. The authorization for carriage requirement is to preclude an item being loaded on to the aircraft that was surreptitiously inserted into the baggage system, such as the suitcase containing the IED that destroyed Pan Am Flight 103 in December 1988.

Redacted - Contains sensitive information

5.4.3 PART 3 – AIR CARGO AND AVIATION CATERING FACILITIES AND OPERATIONS

5.4.3.1 Air cargo facilities and operations security

Assessment Ratings[17] of Air Cargo Facilities and Operations At This Airport

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Assessment of the Overall Capability of an Improvised Explosive Device (IED) or Improvised Incendiary Device (IID) being covertly brought aboard a Passenger Aircraft:

Redacted - Contains sensitive information

A. Assessed ability of persons with a publicly available and developed knowledge of air cargo shipment methods and operations to cause an IED or an IID to be placed aboard an aircraft through air cargo:

Redacted - Contains sensitive information

B. Assessed ability of persons with light to medium military or similar training to penetrate the airside perimeter through air cargo terminals and gain undetected access to airside restricted areas:

Redacted - Contains sensitive information

Applicable ICAO Standards and Recommended Practices

1. **Annex 17 – Security:**

   A. 7th Edition (applicable 1 July 2002):
   - 4.1 Physical Security Objective
   - 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies

[17] Scale used is Very High, High, Medium, Low and Very Low.

- 4.5.2 Security Controls of Cargo and Parcels
- 4.71 Restricted Areas Access Control
- 4.7.2 Background Checks
- 4.7.3 Aircraft Access
- 4.7.5 Employee Screening
- 4.7.6 Restricted Areas Entry Screening

B. 8th Edition (applicable 1 July 2006):
- 4.1 Physical Security Objective
- 4.2.1 Airside Access
- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.6.2 Protection of Cargo and Mail

Methodology:

Air cargo security to be effective must be a complete and systematic program that implements certain security measures from the time cargo is first accepted by consigners and regulated agents, through all the intermediary processes such as additional consolations and acceptance into the airport cargo terminals, until the time the cargo is loaded aboard an aircraft. The air cargo security program must be a written document that implements as a minimum, all of the air cargo requirements contained in the NCASP. This type of program, when properly and consistently implemented, will assure the three core principles of air cargo security as contained in the ICAO Security Manual (Doc 8973 Restricted) are fully satisfied. The assessment of air cargo facilities and their operation at this airport are based upon the implementation and compliance of these three principles:

- Aircraft carrying air cargo must operate from within a secure environment;
- All air cargo must be subject to some degree of security control, before being placed on board a passenger-carrying aircraft, with the devotion of maximum effort to the screening of air cargo consignments whose security cannot be readily determined; and
- A consignment of air cargo once security cleared, must be protected from interference.

Assessment Findings Of Individual Security Countermeasures Currently In Place To Protect Air Cargo Operations:

Redacted - Contains sensitive information

5.4.3.2 Aviation catering facilities and operations security

Redacted - Contains sensitive information

5.4.4 PART 4 – SECURITY EQUIPMENT AND SYSTEMS

5.4.4.1 Airport equipment assessment ratings[18]

1. Compliance with currently applicable ICAO Annex 17 – Security Standards and Recommended Practices:

Redacted - Contains sensitive information

2. Overall ability of installed metal detectors to detect metallic, potential threat objects on persons at checkpoints.

Redacted - Contains sensitive information

3. Overall ability of installed security screening equipment to adequately image hold baggage for operator assessment of the presence of explosives and weapons.

Redacted - Contains sensitive information

4. Overall ability of installed security screening equipment to adequately image cabin baggage and accompanying items for operator assessment of the presence of explosives and weapons.

[18] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

5. Overall ability of installed security screening equipment to adequately assist security to detect explosives and weapons being taken into the Aircraft Operating Area and other security restricted areas of the airport through the employee and authorized vehicle checkpoints.

Redacted - Contains sensitive information

6. Overall ability of security screening equipment to detect the entry of explosives and weapons in transfer baggage.

Redacted - Contains sensitive information

7. Overall ability of installed access control system and CCTV system to detect passage of people, weapons or explosives from the public area to sterile departure areas of the passenger terminal.

Redacted - Contains sensitive information

8. Overall ability of currently installed security screening equipment to adequately image explosives and weapons in aircraft cargo.

Redacted - Contains sensitive information

5.4.4.2 Applicable icao standards and recommended practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.3 (Passenger and Cabin Baggage)
- 4.4 (Hold Baggage)
- 4.5 (Cargo, Mail and other Goods)
- 4.71 (Access Control)

- 4.7.5 and 4.7.6 (Employee Screening)

5.4.4.3 Equipment assessment introduction

Airport security equipment are important tools to improve the efficiency of the airport security staff and police in protecting air travelers, airport staff, airport facilities, aircraft, tenant property and the general public from Acts of Unlawful Interference. Specialized security equipment is most commonly employed for the inspection of passengers, their accompanying items and checked baggage; inspection of cargo, mail and supplies to be carried aboard aircraft; to aid in the control of persons and vehicles entering the airport secured areas; and for status assessment and detection of unlawful activities on airport property. This section describes and assesses each type of equipment found at the Polonia International (Medan) airport.

Key ICAO Requirements from ICAO Annex 17 relating to security equipment are found in Chapter 4, Preventative Security Measures. Citations from Annex 17th are from the Seventh Edition in effect at the time of the ASI team visit. The new Edition 8 will become effective in July 2006. Where substantial changes have been made to the requirements in Edition 8, the new requirement may be also be below the 7th Edition requirement. The overall requirement is:

4.1 Objective
Each Contracting State shall establish measures to prevent weapons, explosives or any other dangerous devices which may be used to commit an act of unlawful interference, the carriage or bearing of which is not authorized, from being introduced, by any means whatsoever, on board an aircraft engaged in international civil aviation.

Additional methodology and security design guidance is provided in the ICAO Security Manual, Doc. 9873 especially Chapter 4 of Part 1, Preventative security measures.

A. **Security Screening Equipment Quantities and Deployment:**

Redacted - Contains sensitive information

B. Terminal Entry Checkpoints (TEC)

B1. Terminal Entry Security Measures:

Redacted - Contains sensitive information

C. Pre-Board Checkpoints:

Redacted - Contains sensitive information

D. Closed Circuit Television and Access Control:

Redacted - Contains sensitive information

E. Cargo Security:

Redacted - Contains sensitive information

F. Security Equipment Quantities and Condition:

Redacted - Contains sensitive information

G. Security Equipment Operations and Maintenance Checks and Calibration:

Redacted - Contains sensitive information

H. Customs Inspection Equipment:

Redacted - Contains sensitive information

5.5 SULTAN TAHA SYSRIFUDN AIRPORT, JAMBI

The following assessment of Sultan Taha Sysrifudn Airport, Jambi was conducted 17 – 18 February 2006 by the ASI Team.

5.5.1 PART 1 – AIRPORT PERIMETER, LANDSIDE/AIRSIDE BOUNDARIES AND AIRSIDE RESTRICTED AREAS INCLUDING VITAL FACILITIES BOTH ON AND OFF THE AIRPORT

5.5.1.1 Assessment ratings[19] for airport perimeter, landside/airside restricted areas

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Overall Access Control Effectiveness:

Redacted - Contains sensitive information

A. Overall ability of installed security countermeasures to prevent overt or covert penetration through the Airport Perimeter in areas more than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

B. Overall ability of installed security countermeasures to prevent covert penetration through the Airport Perimeter in areas less than 100 meters either side of the passenger terminal:

Redacted - Contains sensitive information

3. Overall Illegal Penetration Capability Assessment:

[19] Scale used is Very High, High, Medium, Low and Very Low.

Redacted - Contains sensitive information

A. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and proceed undetected to aircraft at parking areas and both domestic and International gate areas:

Redacted - Contains sensitive information

B. Assessed ability of armed persons with light to medium military or similar training to penetrate the Landside/Airside perimeter and gain undetected access to passenger aircraft at parking and gate areas:

Redacted - Contains sensitive information

5.5.1.2 Applicable icao standards and recommended practices

1. **Annex 14 – Aerodromes:** 5.3.21 (Apron Floodlighting), 8.4.2 through 8.4.5 (Fencing); 8.5 (Security Lighting)

2. **Annex 17 – Security:**

   a. 7th Edition (applicable 1 July 2002):
      - 4.1 Physical Security Objective
      - 4.3.3 Interference with Screened Passengers
      - 4.4.2 Protection of Hold Baggage
      - 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies
      - 4.5.2 Security Controls of Cargo and Parcels
      - 4.5.4 Security Controls of Catering and Operators' Stores
      - 4.71 Restricted Areas Access Control
      - 4.7.2 Background Checks
      - 4.7.3 Aircraft Access
      - 4.7.5 Employee Screening
      - 4.7.6 Restricted Areas Entry Screening

   b. 8th Edition (applicable 1 July 2006):
      - 4.1 Physical Security Objective
      - 4.2.1 Airside Access
      - 4.2.2 Security Restricted Areas
      - 4.2.3 Airport Identification Permits

- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.4.3 Interference with Screened Passengers
- 4.4.4 Protection of Transit Baggage
- 4.5.2 Protection of Hold Baggage
- 4.6.2 Protection of Cargo and Mail
- 4.6.5 Protection of Catering Stores and Supplies

5.5.1.3 Airport perimeter, landside/airside boundaries, the airside restricted areas and on and off airport vital facilities

A. Airport boundary and Airside/Landside Security

A1. Airside/landside delineation method:

Redacted - Contains sensitive information

A2. Perimeter barriers in place:

Redacted - Contains sensitive information

A3. ICAO Fence Class Ratings:

Redacted - Contains sensitive information

A4. Condition:

Redacted - Contains sensitive information

A5. Access Control Signs:

Redacted - Contains sensitive information

A6. Perimeter/Airside Boundary Barrier Effectiveness Example:

Redacted - Contains sensitive information

A7. Obstruction Clearance:

Redacted - Contains sensitive information

A8. Culverts:

Redacted - Contains sensitive information

A9. Cleared areas/patrol roads:

Redacted - Contains sensitive information

B. Perimeter, Airside And Security Restricted Area Access Control Points

B1. Perimeter Access Gates:

Redacted - Contains sensitive information

B2. Access Gate Construction:

Redacted - Contains sensitive information

B3. Perimeter Emergency Access (Crash) Gate Construction:

Redacted - Contains sensitive information

B4. Access Control Procedures At Guarded Gates:

Redacted - Contains sensitive information

B5. Airport Identification Pass Use:

Redacted - Contains sensitive information

B6. Control of Non Guarded Gates (including Emergency Gates) and Other Airside and Restricted Area Access Points:

Redacted - Contains sensitive information

C. Perimeter & airside surveillance Measures

C1. (Perimeter Intrusion Detection System (PIDS):

Redacted - Contains sensitive information

C2. Perimeter Lighting:

Redacted - Contains sensitive information

C3. CCTV Systems:

Redacted - Contains sensitive information

C4. Security Patrols:

Redacted - Contains sensitive information

D. Aircraft long term (overnight or longer) parking areas security

D1. Area lighting:

Redacted - Contains sensitive information

D2. CCTV coverage:

Redacted - Contains sensitive information

D3. Security Patrols:

Redacted - Contains sensitive information

E. Active apron gate areas security

E1. Apron Security

Redacted - Contains sensitive information

E2. Access Control

Redacted - Contains sensitive information

a. Via Passenger terminals

Redacted - Contains sensitive information

b. Via perimeter gate access points

Redacted - Contains sensitive information

E3. Airport Restricted Area Permit Requirements and Use

Redacted - Contains sensitive information

E4. Parked Aircraft Security Requirements and Implementation

Redacted - Contains sensitive information

E5: Control of Deplaning and Enplaning Passengers on Aprons

Redacted - Contains sensitive information

E6. Apron Lighting

Redacted - Contains sensitive information

E7. CCTV System Coverage and Monitoring

Redacted - Contains sensitive information

E8. Security patrols

Redacted - Contains sensitive information

F. Vital facilities security (in airside or security restricted areas)

F1. Vital Facility Security Controls:

Critical facilities such as the Airport Power Stations, Air Traffic Control Tower (ATCT), Fuel Farm, and other similar facilities important to the continued operation of the airport require additional protection even when located within the airside of the airport. At this airport some of the above mentioned facilities are located in landside restricted areas, however; the ASI Team visited them and performed an assessment of the security measures in place.

a. **Fuel Farm:**

Redacted - Contains sensitive information

b. **Air Traffic Control Tower (ATCT):**

Redacted - Contains sensitive information

c. **Power House I and II:**

Redacted - Contains sensitive information

d. **Visual Omni Range (VOR) Facility:**

Redacted - Contains sensitive information

5.5.2 PART 2 – PASSENGER TERMINALS INCLUDING PUBLIC AREAS AND PARKING AREAS RELATED TO THE TERMINALS

5.5.2.1 Terminal security and passenger screening assessment ratings[20]

1. Compliance with currently applicable ICAO Annex 17 Standards and Recommended Practices:

Redacted - Contains sensitive information

2. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

Redacted - Contains sensitive information

3. Overall ability of gate passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

Redacted - Contains sensitive information

4. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

Redacted - Contains sensitive information

5. Overall ability to prevent the mixing of arriving and departing passengers:

Redacted - Contains sensitive information

[20] Scale used is Very High, High, Medium, Low and Very Low.

6. Ability to protect hold baggage from acceptance by the air carrier to loading on the aircraft:

Redacted - Contains sensitive information

7. Baggage reconciliation by airlines:

Redacted - Contains sensitive information

8. Control of passengers moving to/from aircraft.

Redacted - Contains sensitive information

5.5.2.2 Terminal security and passenger screening

Applicable ICAO Standards and Recommended Practices

Annex 17 – Security:

- 4.1 (Physical Security Objectives)
- 4.2.1 (Access Control)
- 4.2.3 (Identification System and Verification)
- 4.2.5 (Movement To/From Aircraft)
- 4.4.1 (Passenger Screening)
- 4.4.3 (Mixing of Passengers)
- 4.5.1 (Screening of Hold Baggage)
- 4.5.2 (Protection of Hold Baggage)
- 4.5.4 (Transfer Hold Baggage Screening)
- 4.5.5 (Transporting Accepted Hold Baggage)

A. Overall ability of terminal entrance passenger and hold baggage screening to prevent the introduction of weapons or Improvised Explosive Devices into the check-in area or on to a passenger aircraft:

A1. Equipment:

Redacted - Contains sensitive information

A2. Personnel:

Redacted - Contains sensitive information

A3. Effectiveness:

Redacted - Contains sensitive information

A4. Lack of Sufficient Search Area:

Redacted - Contains sensitive information

A5. Control of Hold Baggage:

Redacted - Contains sensitive information

B. Overall ability of departure gate passenger screening to prevent the introduction of weapons or Improvised Explosive Devices on to a passenger aircraft:

B1. Equipment:

Redacted - Contains sensitive information

B2. Personnel:

Redacted - Contains sensitive information

B3. Lack of Private Search Areas:

Redacted - Contains sensitive information

B4. Effectiveness:

Redacted - Contains sensitive information

C. Overall ability to prevent, deter, or detect the presence of unauthorized persons entering security restricted areas inside or adjacent to the terminal:

C1: Access to AOA/Restricted Areas by Employees:

Redacted - Contains sensitive information

C2: Control of Arriving Passengers at Domestic Terminal:

Redacted - Contains sensitive information

D. Baggage reconciliation by airlines: ICAO Annex 17 essentially requires that airlines conduct two-way baggage reconciliation. This means that all bags that are loaded on to an aircraft are matched with an accompanying passenger who actually boards the aircraft, and that all bags that are loaded on to the aircraft are authorized for carriage on that aircraft by the air carrier. The authorization for carriage requirement is to preclude an item being loaded on to the aircraft that was surreptitiously inserted into the baggage system, such as the suitcase containing the IED that destroyed Pan Am Flight 103 in December 1988.

Redacted - Contains sensitive information

E. Landside/parking:

Redacted - Contains sensitive information

5.5.3 PART 3 – AIR CARGO AND AVIATION CATERING FACILITIES AND OPERATIONS

5.5.3.1 Air cargo facilities and operations security

Assessment Ratings[21] of Air Cargo Facilities and Operations At This Airport:

1. Compliance with the Security Standards and Recommended Practices of the currently applicable ICAO Annex 14 – Aerodromes and 17 – Security:

Redacted - Contains sensitive information

2. Assessment of the Overall Capability of an Improvised Explosive Device (IED) or Improvised Incendiary Device (IID) being covertly brought aboard a Passenger Aircraft:

Redacted - Contains sensitive information

a. Assessed ability of persons with a publicly available and developed knowledge of air cargo shipment methods and operations to cause an IED or an IID to be placed aboard an aircraft through air cargo:

b.

Redacted - Contains sensitive information

c. Assessed ability of persons with light to medium military or similar training to penetrate the airside perimeter through air cargo terminals and gain undetected access to airside restricted areas:

Redacted - Contains sensitive information

Applicable ICAO Standards and Recommended Practices

1. **Annex 17 – Security:**

A. 7th Edition (applicable 1 July 2002):
- 4.1 Physical Security Objective
- 4.5.1 Protection of Cargo, Baggage, Mail, Stores, Operators' Supplies

[21] Scale used is Very High, High, Medium, Low and Very Low.

- 4.5.2 Security Controls of Cargo and Parcels
- 4.71 Restricted Areas Access Control
- 4.7.2 Background Checks
- 4.7.3 Aircraft Access
- 4.7.5 Employee Screening
- 4.7.6 Restricted Areas Entry Screening

B. 8th Edition (applicable 1 July 2006):

- 4.1 Physical Security Objective
- 4.2.1 Airside Access
- 4.2.2 Security Restricted Areas
- 4.2.3 Airport Identification Permits
- 4.2.4 Background Checks
- 4.2.5 Aircraft Access
- 4.2.6 Restricted Areas Entry Screening
- 4.2.8 Restricted Areas Entry Screening
- 4.3.4 Protection of Aircraft
- 4.6.2 Protection of Cargo and Mail

Methodology: Air cargo security to be effective must be a complete and systematic program that implements certain security measures from the time cargo is first accepted by consigners and regulated agents, through all the intermediary processes such as additional consolations and acceptance into the airport cargo terminals, until the time the cargo is loaded aboard an aircraft. The air cargo security program must be a written document that implements as a minimum, all of the air cargo requirements contained in the NCASP. This type of program, when properly and consistently implemented, will assure the three core principles of air cargo security as contained in the ICAO Security Manual (Doc 8973 Restricted) are fully satisfied. The assessment of air cargo facilities and their operation at this airport are based upon the implementation and compliance of these three principles:

- Aircraft carrying air cargo must operate from within a secure environment;
- All air cargo must be subject to some degree of security control, before being placed on board a passenger-carrying aircraft, with the devotion of maximum effort to the screening of air cargo consignments whose security cannot be readily determined; and
- A consignment of air cargo once security cleared, must be protected from interference.

Assessment Findings Of Individual Security Countermeasures Currently In Place To Protect Air Cargo Operations:

Redacted - Contains sensitive information

5.5.3.2 Aviation catering facilities and operations security

This airport does not have a catering facility.

5.5.4 PART 4 – SECURITY EQUIPMENT AND SYSTEMS.

5.5.4.1 Airport security equipment for screening, access control and cctv

Airport Equipment Assessment Ratings[22]

Overall compliance with currently applicable ICAO Annex 17 – Security Standards and Recommended Practices:

Redacted - Contains sensitive information

1. Overall ability of installed metal detectors to detect potential, metallic threat objects on persons at checkpoints.

Redacted - Contains sensitive information

2. Overall ability of installed security screening equipment to adequately image hold baggage for operator assessment of the presence of explosives and weapons.

Redacted - Contains sensitive information

3. Overall ability of installed security screening equipment to adequately image cabin baggage and accompanying items for operator assessment of the presence of explosives and weapons.

Redacted - Contains sensitive information

4. Overall ability of installed security screening equipment to adequately assist security to detect explosives and weapons being taken into the Aircraft Operating Area and

[22] Scale used is Very High, High, Medium, Low and Very Low.

other security restricted areas of the airport through the employee and authorized vehicle checkpoints.

Redacted - Contains sensitive information

5. Overall ability of security screening equipment to detect the entry of explosives and weapons in transfer baggage.

Redacted - Contains sensitive information

6. Overall ability of installed access control system and CCTV system to detect passage of people, weapons or explosives from the public area to sterile departure areas of the passenger terminal.

Redacted - Contains sensitive information

7. Overall ability of currently installed security screening equipment to adequately image explosives and weapons in aircraft cargo.

Redacted - Contains sensitive information

Applicable ICAO Standards and Recommended Practices:

Annex 17 – Security: 4.1 (Physical Security Objectives); 4.3 (Passenger and Cabin Baggage); 4.4 (Hold Baggage) 4.5 (Cargo, Mail and other Goods); 4.71 (Access Control), 4.7.5 and 4.7.6 (Employee Screening)

5.5.4.2 Equipment assessment introduction

Redacted - Contains sensitive information

Airport security equipment are important tools to improve the efficiency of the airport security staff and police in protecting air travelers, airport staff, airport facilities, aircraft, tenant property and the general public from Acts of Unlawful Interference. Specialized security equipment is most commonly employed for the inspection of passengers, their accompanying items and checked baggage; inspection of cargo, mail

and supplies to be carried aboard aircraft; to aid in the control of persons and vehicles entering the airport secured areas; and for status assessment and detection of unlawful activities on airport property. This section describes and assesses each type of equipment found at the Jambi Airport.

Key ICAO Requirements from ICAO Annex 17 relating to security equipment are found in Chapter 4, Preventative Security Measures. Citations from Annex 17th are from the Seventh Edition in effect at the time of the ASI team visit. The new Edition 8 will become effective in July 2006 and has substantial changes requiring additional security measures. The current overall requirement is:

4.1 Objective

Each Contracting State shall establish measures to prevent weapons, explosives or any other dangerous devices which may be used to commit an act of unlawful interference, the carriage or bearing of which is not authorized, from being introduced, by any means whatsoever, on board an aircraft engaged in international civil aviation.

Additional methodology and security design guidance is provided in the ICAO Security Manual, Doc. 9873 especially Chapter 4 of Part 1, Preventative security measures.

A. General:

A1. Security Screening Equipment Quantities and Deployment

Redacted - Contains sensitive information

B. Terminal Entry Checkpoints:

B1. Terminal Entry Security Measures:

Redacted - Contains sensitive information

C. Pre-Board Checkpoint:

Redacted - Contains sensitive information

C2 Other Electronic Security Equipment

Redacted - Contains sensitive information

C3 Security Equipment Quantities and Condition

Redacted - Contains sensitive information

C3 Security Equipment Operations and Maintenance Checks.

Redacted - Contains sensitive information

5.6 NATIONAL CIVIL AVIATION TRAINING CENTER

The following assessment of the National Civil Aviation Training Center was conducted on 8 February 2006 by the ASI Team.

An ASI Team member visited the main National Civil Aviation Training Center and met with Mrs. Hamidah, Head of Training Monitoring. Mrs. Hamidah advised the training center through this location and others throughout Indonesia provide all aviation security training to Indonesian airport security officers. The center does not train persons who are not Indonesian citizens.

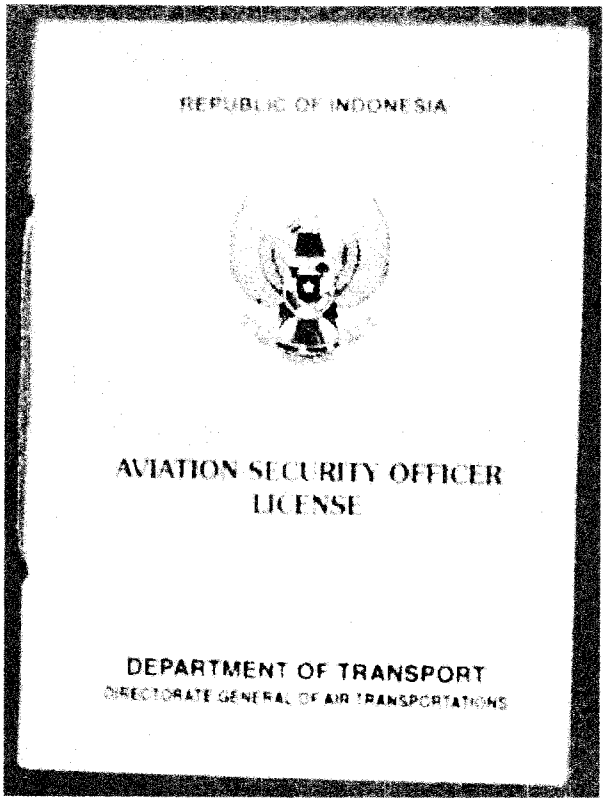
The center is very well equipped and appears well managed. Individual aviation security course curriculums were reviewed. Aviation security courses are developed in-house with input from various subject matter experts such as aviation security inspectors from the DGAC, senior airport security personnel, airline security, and security management personnel from AP I and AP II. As the training center reports to the Ministry of Communications Training Division, all courses are approved by this division and not by the DGAC.

The center is quite large and very nicely outfitted. Students live on campus during their training. In addition to aviation security, the center offers a variety of other aviation related training including air traffic control and pilot training.

All aviation security courses are pass/fail and include both theory and practical training and usually have 20-30 students per class. ICAO courses are sometimes offered by the training center and are taught only by ICAO certified instructors. The center offers the following civil aviation security training courses:

- ✓ **Basic Level:** A five week course for six hours per day. Prerequisites include a high school certificate.
- ✓ **Junior Level:** A five week course for six hours per day. Prerequisites include having obtained basic level training and at least two years actual experience as an airport security officer in Indonesia.
- ✓ **Senior/Supervisor Level:** A five week course for six hours per day. Prerequisites include having obtained junior level training and at least two years actual experience as an airport security officer in Indonesia at the junior level.
- ✓ **Annual AVSEC Refresher:** A two week course for six hours per day for junior and senior level aviation security officers.
- ✓ **Airport Management:** A four to five week course that covers basic management of all airport sections including security.

Aviation security licenses are issued by the DGAC to junior and senior level graduates who successfully pass both a written and a practical test administered by the DGAC staff.


REPUBLIC OF INDONESIA

AVIATION SECURITY OFFICER
LICENSE

DEPARTMENT OF TRANSPORT
DIRECTORATE GENERAL OF AIR TRANSPORTATIONS

Exhibit 5.9.1: Aviation security officer license issued to junior and senior level officers by the DGAC. The license is only issued after successful passing of both written and practical tests.

5.6.1 OVERALL EVALUATION

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1 EXECUTIVE SUMMARY

1.1 THE SCOPE OF THE ASSESSMENTS

The scope of the Technical Assistance in the safety area includes assessment of current safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety at Indonesian airports.

Reviewing the totality of the areas covered in ICAO's Annex 14, it became clear that the areas of focus for the assessment would need to be those areas covered in the aerodrome manuals, as required for airport certification from the operational standpoint. The ICAO ***"Aerodrome Volume I" (Aerodrome Design and Operations)*** and ICAO ***"Manual on Certification of Aerodromes"*** are the fundamental references underlying the Safety Assessments / Needs Surveys. The scope of the ICAO ***"Manual on Certification of Aerodromes"*** (Doc 9774 AN/969) is: "the safety, regularity, and efficiency aspects of aerodrome facilities, services, equipment and operational procedures".

Additionally, due to the critical role of the Air Traffic Control Tower, and the vital importance of aircraft fuel handling protocols and procedures to the safety of aviation, detailed assessments of each are included in the individual airport reports.

1.2 AREAS OF FOCUS AND THE FUNDAMENTAL REFERENCES

The report, focused on the assessments / needs surveys only, is divided into several sections:

- Executive Summary
- Introduction
- Consolidated Findings of Concern from the Four Assessed Airports
- ICAO Annex 14 Compliance – Consolidation of the Four Airports
- Soekarno-Hatta International Airport (WIII) Findings
- Ngurah Rai International Airport (WRRR) Findings
- Polonia International Airport (WIMM) Findings
- Sultan Thana International Airport (WIPA) Findings

The ***Aerodrome Manual*** is the "core" of an airport certification and operation program, and each airport studied by the ASI team has a standardized aerodrome manual. Therefore, the "Consolidated Findings" are presented by integrating together the formats of the aerodrome manuals of the four airports studied.

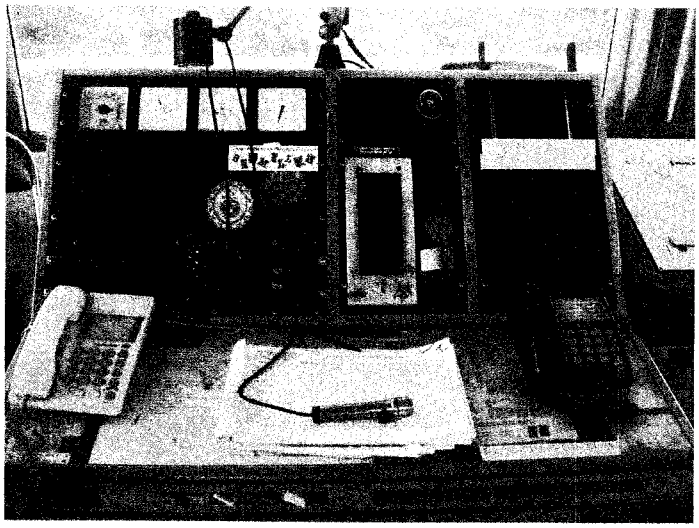
Very clear impressions of the people (from the highest authority to those whom are actively physically involved in the daily operations and maintenance of the aerodrome), were derived from the weeks of assessments and needs surveying of the airports visited and the team's personal observations.

There is a strong and broad-based pride in "their" airport, and a very strong desire to operate to high standards. However, availability of up-to-date equipment, necessary parts to fix equipment ranging from very aging to relatively new, stands squarely in the way of their so doing. This was noted in critical operational areas of airports such as Air Traffic Control Towers, AIS, airport lighting, and in various other areas of operation of an airport. It would appear that the unavailability of critical equipment and parts in a timely manner is the problem behind the problem.

For example, at the Jambi air traffic control tower there is an indicating system for hP, degrees Centigrade, wind direction and speed, which has been inoperative for ten years. At Medan, while most lights are operative, a number of safety-related lighting systems were substantially inoperative. The evident problem is the unavailability of parts. These systems included a REILS system, the flashing light bars just prior to an active runway, as well as the Approach Lighting System (ALS). The REILS critical part was reported to have been on back-order for over three months. 10 of the 15 light bars of the ALS have been inoperative since an aircraft accident that caused their substantial destruction months earlier.

The Denpasar air traffic control tower flight data display is paper strips and a computer record. The Paper Clearance Strips are required because a part ordered from Japan two years ago has not yet been received. The tower Surface Wind Indicator has been inoperative for two years; again, a parts or replacement problem.

At Jambi's air traffic control tower a single operating position exists.



Picture: DJB Tower Console

1.3 ABSENCE OF FULLY RELIABLE PROCEDURES

The apparent absence of fully reliable procedures that absolutely ensure the accomplishment of certain safety-related matters in place at either the national or airport levels (such as currency of instrument approach procedure - and related - charts in AIM Manuals) was noted. For example, in all four of the assessed airport AIS offices there were many outdated Instrument Approach Charts in the manuals, some over 12 years out of date.

At times it was noted that while the interest in high performance is clearly present, frequently an individual (or individuals) did not fully understand the importance of carrying through a policy or procedure, as they were clearly not formatted to understand the *why*, or the *reason behind* the particular policy or practice.

1.4 STAFFING

Another impression is that there are staffing shortages which preclude operating airports at the highest international operating practices. It appeared that often the procedures exist, but there are situations in which there are not enough personnel to fully support the procedures. The professionalism of the personnel was of the highest degree, and a high level of enthusiasm and interest of the staff – ranging from maintenance personnel to air traffic controllers - was most evident.

1.5 LIMITED AVAILABILITY OF PRECISION INSTRUMENT APPROACHES AT THE SMALLER AIRPORTS

It became evident while visiting the four areas of Indonesia, studying the typical weather throughout, and speaking with pilots and others in the region, that the limited availability of precision instrument approaches at the smaller airports is very likely to have a substantial impact on the economy and the people of Indonesia. A considerable increase in the safety, regularity, and efficiency of aviation is generally realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served by airline aircraft.

1.6 AERODROME SAFETY MANAGEMENT SYSTEMS

A significant concern noted is that it does not appear that there is in place at this time an overall proactive Aerodrome Safety Management System.

2 INTRODUCTION

2.1 PROVISIONS IN THE BASIC AVIATION LAWS OF INDONESIA

Included in the section "Consolidated Findings of Concern from the Four Assessed Airports" is a review of provisions in the basic aviation laws of Indonesia for the development and promulgation of aerodrome regulations. Referenced is the existence of an appropriate State entity vested with the necessary authority to ensure compliance with the regulations. This section is an overall report of a *composite* of the four airports, which will eventually form *a basis for* recommendations for consideration of implementation both at the national level and at the airports of Indonesia in general.

The "ICAO Annex 14 Compliance – Consolidation of the Four Airports" section of the Task 1 Assessment Report - Safety provides a report of the assessed compliance of the four pilot airports with applicable Standards and Recommended Practices of Annex 14 – Aerodromes.

The format used is a statement of the assessed degree of compliance with each SARP noted, at each airport. Listing the basis for each determination in the central document would result in a far more lengthy and cumbersome report. Therefore, other than 9.10 – Fencing and 9.11 – Security Lighting – many of the *specific* findings at each airport are listed in four appendices (one for each airport) following the main body of the document.

Due to the critical role of the Air Traffic Control Tower, and the vital importance of aircraft fuel handling protocols and procedures to the safety of aviation, detailed assessments thereof are included, each within the respective attachment.

2.2 SAFETY PROTOCOLS

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

1. Standards and Recommended Practices (SARPs) required by ICAO ***Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations***, 4th Edition, applicable as of 1 July 2004

2. Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001

3. International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

2.3 ADDITIONAL REFERENCED DOCUMENTS

The following additional documents are referenced in the report:

(1) ***Manual of Standards - Part 139 Aerodromes*** (MOS), is made pursuant to Civil Aviation Safety Regulations CASR Part 139, and comprises specifications (Standards) prescribed by the DGAC of the Government of Indonesia

(2) ***Aerodrome Manual*** of Jakarta International Airport Soekarno – Hatta, applicable as of 03 January, 2005

(3) ***Ngurah Rai Airport Aerodrome Manual***, Denpasar, Bali, applicable as of 2005

(4) ***Aerodrome Manual***, PR. Angkasa Pura II Medan International Airport, Polonia, applicable as of Mei, 2005

(5) ***Sultan Thana Airport Aerodrome Manual***, Jambi, applicable as of Agustus, 2005

3 CONSOLIDATED FINDINGS OF CONCERN FROM THE FOUR ASSESSED AIRPORTS

3.1 SCOPE OF THE TECHNICAL ASSISTANCE

The scope of the Technical Assistance in the safety area includes assessment of current safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety at Indonesian airports. The TA's performed at the "four representative airports shall become pilots for the detailed safety ... audits and assessments, and shall form the basis for extrapolating the systems upgrades and investments needed for all airports in the country".

3.2 PRIMARY FOCUS

Reviewing the totality of the areas covered in Annex 14, it became clear that the areas of focus for the assessment would need to be those areas *covered in the aerodrome manuals*, as required for airport certification from the operational standpoint.

3.3 AREAS OF FOCUS FOR THE ASSESSMENTS

As included in the Terms of Reference Task 2 (page 58), "The provisions of ICAO's Annex 14 .... of the Chicago Convention ***Aerodrome Volume I (Aerodrome Design and Operations)*** as well as ICAO Document 9774 (AN/969), the ***Manual on Certification of Aerodromes*** shall be closely followed while accomplishing the above tasks". Therefore, these documents are the fundamental references underlying the Safety Assessments / Needs Surveys. The primary focus of the Safety Assessment / Needs Survey is on the particulars covered in an Aerodrome Manual as outlined in Appendix 1 of ICAO Document 9774 (AN/969), the ***Manual on Certification of Aerodromes***.

3.4 THE SCOPE OF THE ICAO "MANUAL ON CERTIFICATION OF AERODROMES"

The scope of the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) is: **"the safety, regularity, and efficiency aspects of aerodrome facilities, services, equipment and operational procedures."**

3.5 MANUAL ON CERTIFICATION OF AERODROMES, ICAO Doc 9774 AN/969:

GENERAL

Article 15 of the Convention on International Civil Aviation requires that all aerodromes open to public use under the jurisdiction of a Contracting State should provide uniform conditions for the aircraft of all other Contracting States. Furthermore, Articles 28 and 37 oblige each State to provide, in its territory, airports and other air navigation facilities and services in accordance with the Standards and Recommended Practices (SARPS) developed by ICAO. Volume I of Annex 14 to the

Conventions contains SARPs on the subject of aerodrome design and operation. Responsibility for ensuring safety, regularity, and efficiency of aircraft operations at aerodromes under their respective jurisdiction rests with individual States. It is therefore essential that whenever the operation of airports is delegated to an operator, the State retain its overseeing responsibility and ensure that the operator complies with the relevant ICAO SARPs and/or applicable national regulations.

The most effective and transparent means of achieving these objectives are to:

a) *establish a separate safety oversight entity and a well-defined safety oversight mechanism, supported by appropriate legislation, to carry out the functions of certification and safety regulation of aerodromes.*

b) *implement an aerodrome certification procedure whereby a State certifies an aerodrome through the approval/acceptance of the aerodrome manual submitted by the aerodrome operator.*

3.6 INDONESIAN "MANUAL OF STANDARDS – PART 139 AERODROMES"

A description of the basic national regulations as prescribed by Indonesian law and the basis of the Standards required of an aerodrome are summarized in the Introduction of the ***Manual of Standards – Part 139 Aerodromes***, generally referred to as the MOS. **The following paragraphs are extracts from the Introduction of the MOS.**

The document; titled: ***Manual of Standards - Part 139 Aerodrome***, hereafter referred to as the MOS, is made pursuant to Civil Aviation Safety Regulations CASR Part 139. CASR Part 139 sets out the regulatory regime of aerodromes used by aeroplanes conducting air transport operations under CASR Part 121 and Part 135. The regulatory regime provides aerodromes to be certified *or registered.* The *MOS* sets out the *standards and operating procedures* [italics added] for aerodromes used in air transport operations.

Under CASR Part 121, aeroplanes with 30 or fewer passenger seats can also conduct air transport operations from uncertified or unregistered aerodromes, provided certain specified facilities at those aerodromes are to the required standard. Accordingly, some of the standards in this MOS are also relevant to uncertified and unregistered aerodromes.

To complement CASR Part 135, a separate chapter has been provided to specify the standards and procedures for aerodromes intended only for small aeroplanes (those with 9 or fewer passenger seats or in the case of freight operations, not exceeding 5,700 kg MTOW) conducting air transport operations.

In addition to this ***MOS***, specifications and procedures that do not reach the

regulatory level and information of an educational or advisory nature may be issued in the form of Advisory Circulars.

Aerodrome standards will change from time to time to meet identified safety needs, technological changes and changes in International standards and practices. It is recognized that there may be difficulties and limitations in applying new standards to existing aerodrome facilities and installations. This aspect is addressed in some detail in Chapter 2 of the ***MOS***.

Standards are identified by the words "must" or "shall". Appendices and tables form part of the main document and have the same status as the primary text. *This **MOS** may also require standards from other documents to be followed. In this case, the referred standards become part of this MOS* [italics added].

The document hierarchy consists of:

a. the Law of the Republic of Indonesia Number 15 of 1992 on Aviation (Aviation Act);

b. relevant Civil Aviation Safety Regulations (CASRs);

c. the Manual of Standards (MOS): and

d. Advisory Circulars (ACs).

The Aviation Act establishes the broad intent of the government of the Republic of Indonesia with regard to regulation of civil aviation.

CASRs establish the regulatory framework (Regulations) within which all service providers must operate.

The ***MOS*** comprises specifications (Standards) *prescribed by DGAC* [italics added] of uniform application, determined to be necessary for the safety of air navigation. In those parts of the MOS where it is necessary to establish the context of standards to assist in their comprehension, the sense of parent regulations has been reiterated.

In the event of any *perceived disparity of meaning between **MOS** and CASRs, primacy of intent is to be with the CASR* [italics added].

Service providers must document internal actions (Rules) in their own operational manuals, to ensure the maintenance of, and compliance with, standards.

Advisory Circulars (AC) are intended to provide recommendations and guidance to illustrate a means, but *not necessarily the only means* [italics added], of complying with the Indonesian ***Manual of Standards Part 139 - Aerodromes***. An AC may

explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that *service providers will document internal actions in their own operational manuals to put into effect practices drawn from advisory or guidance material* [italics added].

Differences between ICAO Standards and those in MOS [italics added]. Notwithstanding the above, where there is a difference between a standard prescribed in the ICAO standards and one in the MOS, *the MOS standard shall prevail* [italics added].

Differences Published in AIP. Differences from ICAO Standards, Recommended Practices and Procedures are published in AIP Indonesia Gen 1.7.

3.7 MOS DOCUMENTATION CHANGE MANAGEMENT

1. This document is *issued and amended under the authority of the Director General* [italics added].

2. Requests for any change to the content of the MOS may be intimated from:

   a) technical areas within DGAC;
   b) ATS service providers and staff;
   c) aviation industry service providers, such as aerodrome operators or
   d) airlines and their staff; and
   e) interested consultants, auditors and others.

3. The need to change standards in the MOS may be generated by a number of causes. These may be to:

   a) ensure safety;
   b) ensure standardisation;
   c) respond to changed DGAC standards;
   d) respond to ICAO prescription; or
   e) accommodate new initiatives or technologies.

3.8 RELATED DOCUMENTS

These standards should be read in conjunction with:

- ICAO Annex 4 Aeronautical Charts;
- ICAO Annex 14 Aerodromes (Vol.1);
- ICAO Annex 15 Aeronautical Information Services;
- ICAO Doc 9157/AN901: Aerodrome Design Manuals (all parts);
- Federal Aviation Administration (FAA) Advisory Circular 1501 5300 -13 (United States document that has been adopted by the Government of Indonesia)

3.9 AERODROME MANUAL

The aerodrome manuals of the respective airports are based on the CASR 139 and other related documents (many of which are referenced / extracted from in the previous paragraphs).

The Sultan Thana Airport Aerodrome Manual references in the "Forward" the legal basis upon which the Manual is based. The Soekarno – Hatta Airport Aerodrome Manual, Ngurah Rai Airport Aerodrome Manual, and the Polonia Aerodrome Manual specify the respective legal and regulatory basis for the Manual and its contents in each individual Section. Rather than listing here the legal and regulatory basis, we direct attention to the individual listings in each aerodrome manual.

There are two prerequisites for introduction of the aerodrome certification regulatory system as described in paragraph 2.1 of the ICAO ***Manual on Certification of Aerodromes***:

a) The existence of provisions in the basic aviation laws of the State for the development and promulgation of aerodrome regulations.

b) The existence of an appropriate State entity vested with the necessary authority to ensure compliance with the regulations.

Finding: In compliance

Based upon the quoted references above from the introduction of the ICAO ***Manual on Certification of Aerodromes*** and the above referenced Indonesian law, **we conclude that these two prerequisites have been fulfilled.**

Many of the areas assessed and surveyed are specifically referenced in the ICAO publication ***Aerodromes, Volume I Aerodrome Design and Operations***. The detailed findings in most areas observed at the four airports are specifically listed in the individual reports of each specific airport. This section is more of an overall "look at" the *composite* of the four airports, forming *a basis for* eventual recommendations for consideration of implementation both at the national level and at the airports of Indonesia in general.

As the ***Aerodrome Manual*** is the "core" of an airport certification and operation program, and as each airport studied by ASI has a standardized aerodrome manual, this "Consolidated Findings" section of the report will be presented via integrating together the formats of the aerodrome manuals of the four airports studied. Therefore, there will be minor variances from the format of each individual airport's specific aerodrome manual. The Aerodrome Manual is required to be kept up-to-date, with a way of determining the currency of each and every copy of the manual.

Finding: Not in compliance with good practice:

Three of the four airports' Aerodrome Manuals include an "AMENDMENT" page. However, no entries in any of these pages were noted. This would indicate that either the manuals are not being regularly updated, or the emplacement of the revisions is not being recorded on the "AMENDMENT" pages of the manuals.

Please Note: Each Numerical Reference Refers To the Specific Section or Sub-Section in the Aerodrome Manual

3.9.1 PART 1 - GENERAL INFORMATION

Sect 1.1 Purpose and Scope

Finding: In compliance with good practice

Sect 1.2 Legal Requirements

Finding: In compliance with good practice

Sect 1.3 Conditions of Use

Finding: In compliance with good practice

3.9.2 PART 2 - AERODROME SITE DETAILS

Sect 1.4 Aeronautical Information

Finding: Not in compliance with good practice:

Jeppesen Sanderson, Inc., the provider of the Jeppesen Aeronautical Chart Subscription Service would normally receive their information from the Sub-Directorate of the DGAC; it is likely that the DGAC has up-to-date information. However, it appears that this information is either 1) not being entered into the charts included in the **AIP** Publication or 2) the AIS offices are not receiving the up-to-date charts, resulting in out of date charts being in the **AIP** Publication.

Sect 1.6 Obligation of the Aerodrome Operator

Under the CASR Part 139 the operator of a certified aerodrome is to:

- Comply with mandatory standards and practices;
- Employ an adequate number of skilled and qualified staff;
- Operate the aerodrome in accordance with the procedures set out in the Aerodrome Manual;
- No later than November 24, 2005 have established an aerodrome safety management system;
- Permit access to authorized DGAC officers for inspection and testing purposes related to insuring safety at the aerodrome;
- Make required notifications to the DGAG, ATC, and Pilots;
- Conduct special inspections as necessary;
- Remove obstructions on the aerodrome that are likely to be a hazard;
- Erect warning signs if low flying or taxiing aircraft are likely to be hazardous to people or vehicles.

Aerodrome Safety Management System

It was reported that in January, 2005, a meeting of airport managers of all airports managed by AP II was called, and that each airport manager signed a document regarding the development of an Aerodrome Safety Management System. It was further reported that this system (with an included System Action Implementation Plan) is to be developed by June of 2006.

As defined by ICAO in the ***Manual on Certification of Aerodromes*** (ICAO Doc 9774 AN/969), an aerodrome safety management system is a system for the management of safety at aerodromes including the organizational structure, responsibilities, procedures, processes and provisions for the implementation of aerodrome safety policies by an aerodrome operator, which provides for the control of safety at, and the safe use of, the aerodrome.

Sub-Sect 1.6.4 Safety Management System

No later than November 24, 2005 shall have established an aerodrome safety management system;

Finding: Not in compliance with good practice:

- A Safety Management System (SMS) is indicated in several of the Aerodrome Manuals. However, in some Aerodrome Manuals there is no list indicating General Organizational Structure, nor a list of any individuals involved.

- It does not appear that there is an overall Aerodrome Safety Management System in place at this time, nor an active formal Safety

Management System (SMS) at any of the four airports visited.

Inquiry indicated that there is planned to be a Safety Management System in place by June of 2006. Areas to be addressed are said to include risk assessment and risk management.

3.9.3 PART 3 - AERODROME DIMENSIONS AND RELATED INFORMATION

International best practices for aviation safety require currency of all information of a nature critical to the safety of navigation. This includes geographical coordinates.

Finding: Not in compliance with good practice:

Geographical Coordinates published in the Aerodrome Manuals appear to be out of date; substantially so in some cases. The coordinates involved include runway physical characteristics, Aerodrome Reference Point (ARP), coordinates and elevation of the obstacles impacting a circling approach, radio navigation and landing aid, aircraft stands, and gates.

3.9.4 PART 4 - AERODROME OPERATING PROCEDURES

Sect 4.1 Aerodrome Reporting

Finding: Not in compliance with good practice:

- ILS Instrument Approach Charts available in the AIP: Jeppesen Sanderson, Inc., the provider of the Jeppesen Aeronautical Chart Subscription Service would normally receive their information from the Sub Directorate of the DGAC. It is likely that the DGAC has up-to-date information. However, it appears that this information is either 1) not being entered into the charts included in the AIS Publication or 2) the AIS offices are not receiving the up-to-date charts.

- It was noted that in some AIS offices the Display Wall Charts and the charts displayed on the counter under the glass are non-current, and there are many outdated Jeppesen Instrument Approach Charts in the manuals.

- The ASI team noted the status of currency of the instrument approach charts at the AIS offices and in the AIP Manuals at each of the AIS offices. It would appear that there is no fully reliable procedure in place at either the national or airport levels that absolutely ensures the currency of instrument approach procedure and related charts. If there *is* such a procedure in place, there is no mechanism in place for absolutely ensuring the currency of the charts in the above referenced locations.

- While there are clearly *some* mechanisms in place (the purpose of which is the

revising as necessary of the instrument approach charts themselves), they appear to be somewhat fragmented and sporadic.

Sub-Sect 4.1.10 Aerodrome Unit Facilities

International best practices for aviation safety require redundancy of communication capability into and out of an AIS Office.

Finding: Not in compliance with good practice:

At one airport the ASI Team noted that there is no internet capability into the AIS Office, and no facsimile machine as a back-up for possible computer difficulties.

Sect 4.2 Access to Movement Area

Sub-Sect 4.2.4 Access Controls

International best practices for aviation safety and security require an organized, structured mechanism for issuance of airside driving permits and vehicle permits.

Finding: Not in compliance with good practice:

At one airport visited, the standard requiring vehicle permits and stickers exists, but the mechanism is not yet in place. No stickers are presently required.

Sect 4.3 Aerodrome Emergency Plans

International best practices for aviation safety require inclusions of formalized contingency Memorandums of Understanding (MOU) between airports and local hospitals.

Finding: Not in compliance with good practice:

The ASI team could not confirm the existence of MOU's between all four airports visited and the local hospitals.

Finding: Not in compliance with good practice:

Noted was the absence of "table top" exercises *preceding* the full exercise. As was stated at one of the airports visited, "Before another full-scale exercise, we need smaller-scale exercises of individual groups, such as medical, bomb threat, and security to test their capabilities and determine their limitations, then to join together in a major coordinated exercise, to learn our full inter-organizational capabilities and limitations."

Finding: Not in compliance with good practice:

Noted at two airports was the fact that an "off airport" crash or other such emergency would be extremely difficult to respond to adequately due to the equipment needed, such as life rafts and powerboats. A ditching or a crash into the sea would be particularly challenging.

Finding: Not in compliance with good practice:

It was noted that in one case an Aerodrome Emergency Plan has existed since 1995. However, no revisions were noted, nor provided for in an "AMENDMENT RECORD".

Finding: Not in compliance with good practice:

The Airport Emergency Plan is meant to be a "living document". Clearly there have been numerous changes (such as personnel in individual positions in both the airport administration and non-airport agencies and organizations) and respective telephone numbers since 1995.

Finding: Not in compliance with good practice:

Potential radio communication problems were broadly evident. Noted numerous times was a need of substantial increase in the number of mobile units, the supply of batteries, chargers, and spare parts. While the present situation may appear to suffice on a daily basis, it could become extremely problematic in a crisis situation. Secondly, during day-to-day operations, lack of necessary equipment can severely limit the effectiveness and capability of the force.

Finding: Not in compliance with good practice:

In a hijacking, the only communication capability appears to be unscrambled VHF.

Finding: Not in compliance with good practice:

At times during major exercises, problems were found to exist. Corrective measures were determined in post exercise meetings.

Finding: Not in compliance with good practice:

Surprise exercises could not be verified in order to determine the more likely various response times in response to an actual emergency.

Finding: Not in compliance with good practice:

While major full exercises, partial exercises, and "table top" exercises were referenced in the Aerodrome Manual, at one airport no such inclusion could be found in the Aerodrome Emergency Plan.

Finding: Not in compliance with good practice:

It appeared that the Airport Emergency Operation Committee (EOC) often is not utilized to the extent that it could be. The EOC is potentially a most valuable resource. At one airport we were advised that no such committee exists.

Finding: Not in compliance with good practice:

At a smaller airport the ASI team was advised that there is neither an Airport Emergency Operations Centre nor a Command Post: During the response to a recent major aircraft accident, the RFF Chief's small office and a multi-purpose room in a nearby building were used. At another airport the security vehicle was the hastily improvised mobile command post. This clearly did not provide any form of operational communications console, nor really workable quarters for the crisis management team.

Sub-Sect 4.3.8

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and their availability on immediate notice. The known location and availability of the telephone numbers and facsimile numbers must be confirmed.

Finding: Not in compliance with good practice:

The known location and currency of 24-hour contact numbers of listed staff could not be confirmed nor their availability on immediate notice.

Sect 4.4 Rescue and Firefighting Service (RFFS)

Finding: Not in compliance with good practice:

- At one airport the contingency plans for temporary reduction in RFFS assessed category are: "will be immediately repaired".
- At another airport the ASI team was advised that there are no mitigating procedures for temporary reduction in RFFS assessed category, as there is no outside support available.

Sect 4.5 Aerodrome Inspection

Radios - Availability & Usage

Finding: Not in compliance with good practice:

- Radio equipment shortage is a problem in the area of aerodrome inspection. At one airport, the department has a total of three: One for the chief, one for the staff, and one for the office. Thus, in the event of a malfunctioning unit, there is no standby / reserve unit available. The radios are a key and critical safety and operational asset for personnel, particularly in an even slightly abnormal situation.

- Radio equipment shortage is a problem that was evident in various operational areas at more than one airport visited.

Recommendation: Procurement of needed mobile units, the supply of batteries, chargers, and spare parts.

Sect 4.6 Visual Aids, Electrical Systems, Lights

Finding: Not in compliance with good practice:

At one airport visited, while most lights that were within the capability of the maintenance personnel to maintain were operative, no lighted signs were in evidence, and a number of safety-related lighting systems were substantially inoperative. The evident problem is unavailability of parts. These systems included a REILS system, the flashing light bars just prior to an active runway, and the Approach Lighting System (ALS). The REILS critical part was reported to have been on back-order for over three months, and 10 of the 15 light bars of the ALS have been inoperative since an aircraft accident that caused their substantial destruction months earlier.

Sect 4.7 Movement Area Maintenance

Finding: Not in compliance with good practice:

- Friction Testing equipment, while specified in the Aerodrome Manuals, was not available at most of the airports that the ASI Team visited.

- Observation and discussion indicated that there is a rather urgent need for new maintenance equipment at smaller airports. For example, at one airport visited, airport staff stated, "Needed is a new runway sweeper and a friction tester, and a small roller to efficiently and expeditiously fix the broken parts of the runway surface as they develop." It was reported that the runway sweeper is broken, and due to its age (20 years) and condition, replacement, rather than repair, is needed.

Sect 4.8 Aerodrome Works Safety

Finding: The four airports assessed were in compliance with good practice.

Sect 4.9 Aircraft Parking Control

Finding: The four airports assessed were in compliance with good practice.

Sect 4.10 Apron Safety Management

Finding: The four airports assessed were in compliance with good practice.

Sect 4.11 Airside Vehicle Control

Sub-Sect 4.11.4 Application of Procedure

Finding: Not in compliance with good practice:

A number of problems with the cellular telephones for operational use were reported. Inquiry indicated that there is a shortage of the original high quality batteries.

Finding: Not in compliance with good practice:

At one airport, no airside driver training program is in use, and confirmation by police that the individual has a license is sufficient, and no speed limit is specified.

- At an airport, while personal observation indicated orderly and safe traffic flow and compliance with procedures, specific written details (other than in the Aerodrome Manual) and records were not available.

Sect 4.12 Wildlife Hazard Management

Finding: The four airports assessed were in compliance with good practice.

Sect 4.13 Obstacle Control

Finding: The four airports assessed were generally in compliance with good practice.

Sect 4.14 Disabled Aircraft Removal

Finding: Not in compliance with good practice:

At most of the airports visited, there was not a large crane with heavy-lift capability for aircraft removal. One airport did indicate that there are written arrangements with a local supplier.

One of the airports listed eleven (11) cranes. However, it appears there are not any in inventory. There are no listed suppliers with whom arrangements for availability have been made. Indonesia is a vast country, with isolated airports across the entire archipelago. In the event of an accident, lack of immediate availability of cranes with heavy-lift capability could cause shutdown of the airport for a time period that could result in considerable economic loss to the surrounding communities. The ASI team would suspect that this is the situation in many, if not most, of the airports throughout the country. The airport is in so many respects the community's lifeline to the outside world.

Sect 4.15 Handling of Hazardous Materials (Hazmat)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the handling of aviation fuel.

Handling of aviation fuel:

A detailed description for each airport is included in the four ATTACHMENTS.

Finding: The four airports assessed were in compliance with good practice.

Sect 4.16 Low Visibility Operation

As Low Visibility Operations are not conducted at any of the four airports assessed, this area is not relevant.

Sect 4.17 Protection of Radar & Navigation Aids

Finding: Not in compliance with good practice:

In one airport visited, it was noted, while assessing the routing of the main electrical feed lines, the two main cables are in one trench. We believe that this method of routing inbound main electrical supply cables could well be the situation at many of the smaller airports throughout the country.

3.9.5 PART 5 - AERODROME ADMINISTRATION

Sect 5.1 Staff Contact List

Sub-Sect 5.1.1 Staff Contact List and Organizational Structure

Finding: Not in compliance with good practice:

A concern is the currency of the names and contact numbers listed for airport personnel, particularly those in higher management positions. Several questions are open for resolution:

When was the list last updated? Has it been updated?

Are the contact numbers listed manned on a 24-hour basis?

Are there 24-hour contact numbers for each key individual available and accessible on immediate notice for use in the event of an emergency during off hours? If so, where are the numbers to be found?

Sub-Sect 5.1.4 Aerodrome Manual Revision and Update Team

Finding: Not in compliance with good practice:

In two of the Aerodrome Manuals of airports visited, mention is made of this team and Aerodrome Manual review for possible updating every six months. The absence of entries into the "RECORDS OF AMENDMENTS…" pages would indicate that this might not be happening.

3.10 AIR TRAFFIC CONTROL TOWERS

A needs survey / assessment of the air traffic control towers of each of the four airports was conducted. Findings are based upon observation, staff interviews, review of various records, and detailed examination of equipment.

The professionalism of the personnel was of the highest degree, and a high level of enthusiasm and interest of the controllers was most evident.

The areas noted to be of concern are in the area of staffing and, most particularly, equipment.
Individual airport findings are listed in the findings reports of each of the four individual airports. Following is a summary of these concerns:

3.10.1 STAFFING

Establishment

Finding: Not in compliance with good practice:

- In one airport it appears that there are not (at times) sufficient qualified staff to provide optimal air traffic control services.
- At a second airport there appears to be a shortage of staff, as it was reported that two units frequently operate extended shifts resulting in shortened rest periods.

Watch Rosters

Finding: Not in compliance with good practice:

- At one airport air traffic controller rostering limitations may be being compromised during the time period 1900 to 2100.
- At another airport watch rosters are reported to be published once each month. However, due to an apparent shortage of controllers, the individual controller reportedly only knows his/her actual schedule one day in advance.

3.10.2 EQUIPMENT

Communications

Finding: Not in compliance with good practice:

- At three airports, anti-blocking systems (e.g., CONTRAN: http://www.aatl.net/publications/contran.htm) availability could not be confirmed.
- At one airport headsets are not provided to the controllers. This is a problem in that the communications are not perfectly readable ("5 x 5"), as there are problems with the speakers – their readability is only "3 x 3" [fair] due to the quality, condition, or age of the radio speakers.
- At one airport the back-up communications capability is available on only one frequency.
- Finding: Not in compliance with good practice:
- At two airports the controllers were unfamiliar with the concept of "impounding" tapes.

- At one airport there are probably no contingencies available for when the air and ground traffic control communications recording system is unavailable. Therefore, when the primary recording system is inoperative, a recording of communications is very probably not occurring.

- At another airport, controllers appear to receive minimal training on emergency procedures and in handling emergencies.

3.10.3 INFORMATION SYSTEMS

Finding: Not in compliance with good practice:

- At a major airport the flight data display is by a combination of paper strips and a computer record. The Paper Clearance Strips are necessary because a part ordered from Japan two years ago has not yet been received and installed. At another airport flight data display is by paper strips only.

- At one airport the tower Surface Wind Indicator has been inoperative for two years. Evidently a replacement unit was requested two years ago and has not yet been made available.

- At another airport there is an indicating system for hP, degrees Centigrade, wind direction and speed. However, this equipment has been inoperative for ten years.

Serviceability Indicators

Finding: Not in compliance with good practice:

- At one airport the serviceability of essential aids and lighting is determined by binoculars. An advanced display unit exists, but it does not always work.

- At another airport the serviceability of essential aids and lighting is determined by binoculars. A display unit exists, but it is inoperative.

3.10.4 ACCOMMODATION

Operational Positions

Finding: Not in compliance with good practice:

- At one airport operational equipment does not appear to be laid out ergonomically. The space appears to be (and was reported to be) very limited. Operating positions appeared to be (and were reported to be) very cramped and not of a sufficient number.

- At one airport a single operating position exists.

Visual Control Room

Finding: Not in compliance with good practice:

- At one large airport a problem noted is that there is no break room available, nor is there a pria for women. The only break facility available are the three couches in the control room. As there are nine female controllers, we would suggest this is a relevant issue.

- Another airport does not allow for an unobstructed view from the control room. There is a door and other structural components at the rear of the control cab. The view is severely obstructed between approximately 250° M and 270° M.

- At one airport, screens are used in an attempt to minimize problems from reflections. However, in this particular control room they interfere with the controllers' view.

4 ANNEX 14 FINDINGS – PILOT AIRPORTS AERODROMES – VOLUME 1 – AERODROME DESIGN AND OPERATIONS

4.1 CHAPTER 1. GENERAL

Introductory Note — This Annex contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and certain facilities and technical services normally provided at an aerodrome.

Safety Management System - A system for the management of safety at aerodromes, including the organizational structure, responsibilities, procedures, processes and provisions for the implementation of aerodrome safety policies by an aerodrome operator, which provides for control of safety at, and the safe use of, the aerodrome.

4.1.1 SECTION 1.2 APPLICABILITY OF ANNEX 14 STANDARDS AND RECOMMENDED PRACTICES

The interpretation of some of the specifications in the Annex expressly requires the exercising of discretion, the taking of a decision or the performance of a function by the appropriate authority. In other specifications, the expression appropriate authority does not actually appear although its inclusion is implied. In both cases, the responsibility for whatever determination or action is necessary shall rest with the State having jurisdiction over the aerodrome.

4.1.2 SECTION 1.3 COMMON REFERENCE SYSTEMS UTILIZED IN ANNEX 14

Finding: In compliance

4.1.3 SECTION 1.4 CERTIFICATION OF AERODROMES

ASI Team note: A fundamental principle of ICAO's safety philosophy is that each State have a separate safety oversight entity and a well-defined safety oversight mechanism. Required is the support of appropriate legislation, necessary funding, and sufficient personnel who have been appropriately well trained to ensure compliance with the international best practices for aviation safety at the State's national level and at the airport level.

Finding: Not in compliance with good practice:

While clear intention is indicated by the detailed nature of the approved Aerodrome Manuals and the general adherence to these manuals noted, there is a very limited staff of trained safety inspectors in the DGAC.

ICAO Recommendation 1.4.2.— *States should certify aerodromes open to public use in accordance with these specifications as well as other relevant ICAO specifications through an appropriate regulatory framework.*

Finding: In compliance.

Each of the four airports assessed had been certified.

Standard 1.4.3 The regulatory framework shall include the establishment of criteria for the certification of aerodromes.

Note.— Guidance on a regulatory framework is given in the Manual on Certification of Aerodromes.

Finding: In compliance.

National regulations exist.

ICAO Recommendation 1.4.4.— *A certified aerodrome should have in operation a safety management system.*

Note.— The intent of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator. Guidance on an aerodrome safety management system is given in the ***Manual on Certification of Aerodromes.***

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR - There does not appear to be a formal safety management system in operation at the airports assessed.

Standard 1.4.5 As part of the certification process, States shall ensure that an aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a safety management system, is submitted by the applicant for approval/acceptance prior to granting the aerodrome certificate.

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR - Each airport assessed has an aerodrome manual. However, a formal safety management system does not appear to exist.

There is at each of the four airports assessed a clear interest in safety on the part of the personnel. However, a safety committee, an overall safety culture with

safety as an overall concept, does not appear to exist. Nor does a formal safety management system, either local or national.

Standard 1.4.6 As of 24 November 2005, a certified aerodrome shall have in operation a safety management system.

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR - A formal safety management system could not be verified and does not appear to exist.

4.1.4 SECTION 1.5 AIRPORT DESIGN

Standard 1.5.1 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR - ASI Team interviews with AP I and AP II management revealed that the DGAC's staff had been involved somewhat with future planning but not specifically with security related issues. The involvement was mostly after the fact review of some of the master planning only.

4.1.5 SECTION 1.6 REFERENCE CODE

4.2 CHAPTER 2. AERODROME DATA

4.2.1 SECTION 2.1 AERONAUTICAL DATA

Standard 2.1.1 Determination and reporting of aerodrome related aeronautical data shall be in accordance with the accuracy and integrity requirements set forth in Tables 1 to 5 contained in Appendix 5 while taking into account the established quality system procedures. Accuracy requirements for aeronautical data are based upon a 95 per cent confidence level and in that respect, three types of positional data shall be identified: surveyed points (e.g. runway threshold), calculated points (mathematical calculations from the known surveyed points of points in space, fixes) and declared points (e.g. flight information region boundary points).

Finding: Non Compliance: Geographical coordinates shown in the Aerodrome Manuals and posted on the gate identification signs appear to be out of date.

Standard 2.1.2 Contracting States shall ensure that integrity of aeronautical data is maintained throughout the data process from survey/origin to the next intended user. Aeronautical data integrity requirements shall be based upon the potential

risk resulting from the corruption of data and upon the use to which the data item is put.

Consequently, the following classification and data integrity level shall apply:

a) *critical data, integrity level 1.* □*10-8*: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

b) *essential data, integrity level 1.* □*10-5*: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and

c) *routine data, integrity level 1.* □*10-3*: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR - Aircrews expect the coordinates posted on the parking gate identification signs to be current, and therefore often use them for the "IP'ing" (Initial Positioning) referencing of their en-route navigation equipment. The ASI Team believes that such posted non-current gate coordinates do present a routine data, integrity level 1 compromise of flight safety.

Standard 2.1.5 Geographical coordinates indicating latitude and longitude shall be determined and reported to the aeronautical information services authority in terms of the World Geodetic System — 1984 (WGS-84) geodetic reference datum, identifying those geographical coordinates which have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the requirements in Appendix 5, Table A5-1.

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR - As it is noted that the Jeppesen Sanderson, Inc. instrument approach charts for Soekarno-Hatta International Airport, Ngurah Rai International Airport, and Polonia International Airport include updated coordinates on their current issue charts, the ASI Team would believe that the updated coordinates are available from the Indonesian government.

Standard 2.1.6 The order of accuracy of the field work shall be such that the resulting operational navigation data for the phases of flight will be within the maximum deviations, with respect to an appropriate reference frame, as indicated in tables contained in Appendix 5.

Finding: Non Compliance:

WIII, WIPA, WIMM, WRRR As the coordinates posted on many of the parking gate identification signs do not appear to be current, the ASI Team would question the compliance with this Standard.

4.2.2 SECTION 2.2 AERODROME REFERENCE POINT

Standard 2.2.1 An aerodrome reference point shall be established for an aerodrome.

Finding: In compliance

Standard 2.2.2 The aerodrome reference point shall be located near the initial or planned geometric centre of the aerodrome and shall normally remain where first established.

Finding: In compliance

Standard 2.2.3 The position of the aerodrome reference point shall be measured and reported to the aeronautical information services authority in degrees, minutes and seconds.

4.2.3 SECTION 2.3 AERODROME AND RUNWAY ELEVATIONS

Finding: In compliance: WIII, WIPA, WIMM, WRRR

4.2.4 SECTION 2.4 AERODROME REFERENCE TEMPERATURE

Standard 2.4.1 An aerodrome reference temperature shall be determined for an aerodrome in degrees Celsius.

Finding: In compliance: WIII, WIPA, WIMM, WRRR

4.2.5 SECTION 2.5 AERODROME DIMENSIONS AND RELATED INFORMATION

Standard 2.5.1 The following data shall be measured or described, as appropriate, for each facility provided on an aerodrome:

Finding: In compliance:

Standard 2.5.2 The geographical coordinates of each threshold shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds.

Finding: In compliance: WIII, WIPA, WIMM

Finding: Non Compliance:

WRRR. Provided for in the Aerodrome Manual – 3.2.14.1 – but not entered.

Standard 2.5.4 The geographical coordinates of each aircraft stand shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds.

Finding: Non Compliance:

As the coordinates posted on many of the parking gate identification signs do not appear to be current, the ASI Team would question the compliance with this Standard.

4.2.6 SECTION 2.6 STRENGTH OF PAVEMENTS

Standard 2.6.1 The bearing strength of a pavement shall be determined.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 2.6.5 For the purposes of determining the ACN, the behavior of a pavement shall be classified as equivalent to a rigid or flexible construction.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.2.7 SECTION 2.7 PRE-FLIGHT ALTIMETER CHECK LOCATION

Standard 2.7.1 One or more pre-flight altimeter check locations shall be established for an aerodrome.

Finding: Non Compliance:

WIII, WRRR, WIMM, WIPA. Not provided in the Aerodrome Manual. Perhaps due to 2.7.2 Note 2.

2.7.2 ICAO Recommendation. — *A pre-flight check location should be located on apron.*

Finding: Non Compliance:

WIII, WRRR, WIMM, WIPA. - Perhaps due to Note 2.

Note 2.— Normally an entire apron can serve as a satisfactory altimeter check location.

4.2.8 SECTION 2.8 DECLARED DISTANCES

The following distances shall be calculated to the nearest metre or foot for a runway intended for use by international commercial air transport:

a) take-off run available;

b) take-off distance available;

c) accelerate-stop distance available; and

d) landing distance available.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.2.9 SECTION 2.9 CONDITION OF THE MOVEMENT AREA AND RELATED FACILITIES

Standard 2.9.1 Information on the condition of the movement area and the operational status of related facilities shall be provided to the appropriate aeronautical information service units, and similar information of operational significance to the air traffic services units, to enable those units to provide the necessary information to arriving and departing aircraft. The information shall be kept up to date and changes in conditions reported without delay.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 2.9.2 The condition of the movement area and the operational status of related facilities shall be monitored and reports on matters of operational significance or affecting aircraft performance given, particularly in respect of the following:

a) construction or maintenance work;

b) rough or broken surfaces on a runway, a taxiway or an apron;

g) other temporary hazards, including parked aircraft;

h) failure or irregular operation of part or all of the aerodrome visual aids; and

i) failure of the normal or secondary power supply.

Finding: In compliance: WIII, WRRR, WIMM, WIPA, *except*:

Non Compliance: WIMM: regarding:

h) failure or irregular operation of part or all of the aerodrome visual aids. Ten of the fifteen light bars of the ALS are inoperative, resulting from damage sustained in the 05 September, 2005 Mandala Air 091accident. At the time of the ASI Team's visit (16 February) these light bars were still inoperative.

ICAO Recommendation 2.9.3 — *To facilitate compliance with 2.9.1 and 2.9.2 inspections of the movement area should be carried out each day at least once where the code number is 1 or 2 and at least twice where the code number is 3 or 4.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA

Standard 2.9.6 A runway or portion thereof shall be determined as being slippery when wet when the measurements specified in 10.2.3 show that the runway surface friction characteristics as measured by a continuous friction measuring device are below the minimum friction level specified by the State.

Finding: Compliance could not be verified:

WIII, WRRR, WIMM, WIPA, as could not verify the existence of a continuous friction measuring device.

Standard 2.9.7 Information on the minimum friction level specified by the State for reporting slippery runway conditions and the type of friction measuring device used shall be made available.

Finding: Compliance could not be verified:

WIII, WRRR, WIMM, WIPA, as could not verify the existence of a continuous friction measuring device.

4.2.10 SECTION 2.10 DISABLED AIRCRAFT REMOVAL

ICAO Recommendation 2.10.1 — *The telephone/telex number(s)of the office of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area should be made available, on request, to aircraft operators.*

Finding: In compliance:

WIII, WRRR, WIMM. Policies & procedures included in Aerodrome Manuals, Section 4.14.

WIPA Aerodrome Manual includes two brief paragraphs under: 4.14. DISABLED OF HAZARDOUS MATERIALS.

ICAO Recommendation 2.10.2 -- *Information concerning the capability to remove an aircraft disabled on or adjacent to the movement area should be made available.*

Note.— The capability to remove a disabled aircraft may be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.

Compliance listed at WIII (A.M.3.2.12), WRRR (A.M. 3.2.18), and WIMM (A.M. 3.2.14)

Finding: Compliance could not be verified: WIPA.

4.2.11 SECTION 2.11 RESCUE AND FIRE FIGHTING

ICAO Note.— See 9.2 for information on rescue and fire fighting services.

Standard 2.11.1 Information concerning the level of protection provided at an aerodrome for aircraft rescue and fire fighting purposes shall be made available.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 2.11.2 — *The level of protection normally available at an aerodrome should be expressed in terms of the category of the rescue and fire fighting services as described in 9.2 and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 2.11.3 Significant changes in the level of protection normally available at an aerodrome for rescue and fire fighting shall be notified to the appropriate air traffic services units and aeronautical information units to enable those units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.

ICAO Note.— A significant change in the level of protection is considered to be a change in the category of the rescue and fire fighting service from the category normally available at the aerodrome, resulting from a change in availability of extinguishing agents, equipment to deliver the agents or personnel to operate the equipment, etc.

Finding: In compliance:

WIII: If Category is temporarily reduced, then can call upon the two substations to mitigate and hold the Category at 9.

WRRR reported close coordination with in-town fire brigades.

Finding: Compliance could not be confirmed: WIMM, WIPA.

4.2.12 SECTION 2.12 VISUAL APPROACH SLOPE INDICATOR SYSTEMS

The following information concerning a visual approach slope indicator system installation shall be made available:

a) associated runway designation number;

b) type of system according to 5.3.5.2. For an AT-VASIS, PAPI or APAPI installation, the side of the runway on which the lights are installed, i.e. left or right, shall be given;

c) where the axis of the system is not parallel to the runway centre line, the angle of displacement and the direction of displacement, i.e. left or right shall be indicated;

d) nominal approach slope angle(s). For a T-VASIS or an AT-VASIS this shall be according to the formula in Figure 5-17 and for a PAPI and an APAPI□angle 2, respectively as in Figure□2 and (A + B). □this shall be angle (B + C) 5-19; and

e) minimum eye height(s) over the threshold of the on-slope signal(s). For a T-VASIS or an AT-VASIS this shall be the lowest height at which only the wing bar(s) are visible; however, the additional heights at which the wing bar(s) plus one, two or three fly down light units come into view may also be reported if such information would be of benefit to aircraft using the approach. For a PAPI this shall be the setting angle of the third unit from the runway minus 2′, i.e. angle B minus 2′, and for an APAPI this shall be the setting angle of the unit farther from the runway minus 2′, i.e. angle A minus 2′.

Compliance noted in these areas limited. Generally included are minimal; references to type, setting angle, location of boxes, and number of boxes.

4.2.13 SECTION 2.13 COORDINATION BETWEEN AERONAUTICAL INFORMATION SERVICES AND AERODROME AUTHORITIES

Standard 2.13.1 To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and aerodrome authorities responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay:

a) information on aerodrome conditions (ref. 2.9, 2.10, 2.11 and 2.12);

b) the operational status of associated facilities, services and navigation aids within their area of responsibility;

c) any other information considered to be of operational significance.

Finding: In general compliance: at WIII, WRRR, and WIPA.

Finding: Non Compliance: WIMM: regarding:

- the operational status of associated facilities, services and navigation aids within their area of responsibility;
- any other information considered to be of operational significance:

Several REILS (RWY 23) were noted to be inoperative.
10 of 15 light bars of the HIALS are inoperative. NOTAMed as *"APPROACH LIGHT OPR WITH CONFIGURATION MALS (MEDIIUM APPROACH LIGHTING SYSTEM)".*
A-0201/06 06-12-05

Standard 2.13.2 Before introducing changes to the air navigation system, due account shall be taken by the services responsible for such changes of the time needed by the aeronautical information service for the preparation, production, and issue of relevant material for promulgation. To ensure timely provision of the information to the aeronautical information service, close coordination between those services concerned is therefore required.

Finding: Compliance with this standard was not assessed.

Standard 2.13.3 Of a particular importance are changes to aeronautical information that affect charts and/or computer-based navigation systems which qualify to be notified by the aeronautical information regulation and control (AIRAC) system, as specified in Annex 15, Chapter 6 and Appendix 4. The predetermined, internationally agreed AIRAC effective dates in addition to 14 days postage time shall be observed by the responsible aerodrome services when submitting the raw information/data to aeronautical information services.

Finding: Compliance with this Standard was not assessed.

Standard 2.13.4 The aerodrome services responsible for the provision of raw aeronautical information/data to the aeronautical information services shall do that while taking into account accuracy and integrity requirements for aeronautical data as specified in Appendix 5 to this Annex.

Finding: Compliance questioned due to the evident non-current nature of coordinates as referenced in 2.1.

4.3 CHAPTER 3. PHYSICAL CHARACTERISTICS

4.3.1 SECTION 3.1 RUNWAYS

Finding: Compliance with this Section was not assessed.

4.3.2 SECTION 3.2 RUNWAY SHOULDERS

Finding: Compliance with this Section was not assessed.

4.3.3 SECTION 3.3 RUNWAY TURN PADS

ICAO Recommendation 3.3.2 -- *Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is A, B, or C, a runway turn pad should be provided to facilitate a 180-degree turn of aeroplanes.*

Finding: In compliance: WIII, WRRR, and WIMM.

Finding: None Compliance:

WIPA; runway turn pad does not exist.

4.3.4 SECTION 3.4 - SECTION 3.12

Finding: Compliance with these Sections was not assessed.

4.3.5 SECTION 3.13 APRONS

General

ICAO Recommendation 3.13.1 — *Aprons should be provided where necessary to permit the on- and off-loading of passengers, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic.*

Finding: In compliance: WIII, WRRR, WIMM, and WIPA.

4.3.6 SECTION 3.14 ISOLATED AIRCRAFT PARKING POSITION

Finding: In compliance: WIII, WRRR, and WIMM.

4.4 CHAPTER 4. OBSTACLE RESTRICTION AND REMOVAL

Note 1.— The objectives of the specifications in this chapter are to define the airspace around aerodromes to be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes.

This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace.

It was noted that the Aerodrome Manuals of WIII, WRRR, and WIMM include extensive policy and procedures for the monitoring and control of obstacles, both on and off the airport.

It was noted that the Aerodrome Manual of WIPA includes policy and procedures for the monitoring and control of obstacles, both on and off the airport.

WRRR: Specific detailed written procedures (other than in the Aerodrome Manual) and records were not available. However, interviews and personal observations indicate that WRRR is in compliance.

WIMM: Close coordination with the local community appears to alleviate off-airport problems.

WIPA: Close cooperation with the local community appears to alleviate off-airport problems.

WIII, WRRR, WIMM, and WIPA appear to be in compliance.

4.5 CHAPTER 5. VISUAL AIDS FOR NAVIGATION

4.5.1 SECTION 5.1 INDICATORS AND SIGNALLING DEVICES

Sub-Sect 5.1.1 Wind direction indicators

Application

Standard 5.1.1.1 An aerodrome shall be equipped with at least one wind direction indicator.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Location

Standard 5.1.1.2 A wind direction indicator shall be located so as to be visible from aircraft in flight or on the movement area and in such a way as to be free from the effects of air disturbances caused by nearby objects.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Characteristics

ICAO Recommendation 5.1.1.3 — *The wind direction indicator should be in the form of a truncated cone made of fabric and should have a length of not less than 3.6 m and a diameter, at the larger end, of not less than 0.9 m. It should be constructed so that it gives a clear indication of the direction of the surface wind and a general indication of the wind speed. The colour or colours should be so selected as to make the wind direction indicator clearly visible and understandable from a height of at least 300 m, having regard to background. Where practicable, a single colour, preferably white or orange, should be used. Where a combination of two colours is required to give adequate conspicuity against changing backgrounds, they should preferably be orange and white, red and white, or black and white, and should be arranged in five alternate bands, the first and last bands being the darker colour.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 5.1.1.5 — *Provision should be made for illuminating at least one wind indicator at an aerodrome intended for use at night.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.1.2. Landing direction indicator

Finding: Compliance with this Section was not assessed.

Sub-Sect 5.1.3 Signalling lamp

Application

Standard 5.1.3.1 A signalling lamp shall be provided at a controlled aerodrome in the aerodrome control tower.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.5.2 SECTION 5.2 MARKINGS

Sub-Sect 5.2.1 General

Colour and conspicuity

Standard 5.2.1.4 Runway markings shall be white.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 5.2.1.5 Taxiway markings, runway turn pad markings and aircraft stand markings shall be yellow.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 5.2.1.6 Apron safety lines shall be of a conspicuous colour which shall contrast with that used for aircraft stand markings.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.2.2 Runway designation marking

Application

Standard 5.2.2.1 A runway designation marking shall be provided at the thresholds of a paved runway.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Location

Standard 5.2.2.3 A runway designation marking shall be located at a threshold as shown in Figure 5-2 as appropriate.

ICAO Note.— If the runway threshold is displaced from the extremity of the runway, a sign showing the designation of the runway may be provided for aeroplanes taking off.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Characteristics

Standard 5.2.2.4 A runway designation marking shall consist of a two-digit number and on parallel runways shall be supplemented with a letter.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.2.3 Runway centre line marking

Application

Standard 5.2.3.1 A runway centre line marking shall be provided on a paved runway.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Location

Standard 5.2.3.2 A runway centre line marking shall be located along the centre line of the runway between the runway designation markings as shown in Figure 5-2, except when interrupted in compliance with 5.2.1.1.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.2.4 Threshold marking

Application

Standard 5.2.4.1 A threshold marking shall be provided at the threshold of a paved instrument runway, and of a paved non-instrument runway where the code number is 3 or 4 and the runway is intended for use by international commercial air transport.

Finding: In compliance.

Location

Sub-Sect 5.2.5 Aiming point marking

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Application

Standard 5.2.5.2 An aiming point marking shall be provided at each approach end of a paved instrument runway where the code number is 2, 3 or 4.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 5.2.5.3 — *An aiming point marking should be provided at each approach end of:*

a) a paved non-instrument runway where the code number is 3 or 4,

b) a paved instrument runway where the code number is 1, when additional conspicuity of the aiming point is desirable.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.2.6 Touchdown zone marking

Compliance with this Standard was not assessed.

Sub-Sect 5.2.7 Runway side stripe marking

Application

Standard 5.2.7.1 A runway side stripe marking shall be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain.

Compliance with this Standard was not assessed.

ICAO Recommendation 5.2.7.2 — *A runway side stripe marking should be provided on a precision approach runway irrespective of the contrast between the runway edges and the shoulders or the surrounding terrain.*

Location

Sub-Sect 5.2.8 Taxiway centre line marking

Application

Standard 5.2.8.1 Taxiway centre line marking shall be provided on a paved taxiway, de-icing/anti-icing facility and apron where the code number is 3 or 4 in such a way as to provide continuous guidance between the runway centre line and aircraft stands.

Sub-Sect 5.2.9 – 5.2.11

Compliance with these Standards was not assessed.

Sub-Sect 5.2.12 VOR aerodrome check-point marking

Application

Standard 5.2.12.1 When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking and sign.

WIII: Not applicable (Aerodrome Manual 3.2.4).

WRRR: Referenced in Aerodrome Manual (3.2.12) but location not stated.

WIMM: Not applicable (Aerodrome Manual 3.2.7).

WIPA: Not applicable (Aerodrome Manual 3.2.1.11).

Sub-Sect 5.2.13 Aircraft stand markings

Application

ICAO Recommendation 5.2.13.1 — *Aircraft stand markings should be provided for designated parking positions on a paved apron and on a de-icing/anti-icing facility.*

Finding: In compliance where applicable.

Location

Characteristics

ICAO Recommendation 5.2.13.3 — *Aircraft stand markings should include such elements as stand identification, lead-in line, turn bar, turning line, alignment bar, stop line and leadout line, as are required by the parking configuration and tocomplement other parking aids.*

Finding: In compliance where applicable.

Sub-Sect 5.2.14 Apron Safety Lines

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.2.15 - 5.2.17

Compliance with these Standards was not assessed.

4.5.3 SECTION 5.3 LIGHTS

Sub-Sect 5.3.1 General

Elevated approach lights

Surface lights

Standard 5.3.1.8 Light fixtures inset in the surface of runways, stopways, taxiways and aprons shall be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the lights themselves.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 5.3.1.11 Where a high-intensity lighting system is provided, a suitable intensity control shall be incorporated to allow for adjustment of the light intensity to meet the prevailing conditions. Separate intensity controls or other suitable methods shall be provided to ensure that the following systems, when installed, can be operated at compatible intensities:

- approach lighting system;
- runway edge lights;
- runway threshold lights;
- runway end lights;
- runway centre line lights;
- runway touchdown zone lights; and
- taxiway centre line lights.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.2

Compliance with these Recommendations was not assessed.

Sub-Sect 5.3.3 Aeronautical beacons

Application

Standard 5.3.3.1 Where operationally necessary an aerodrome beacon or an identification beacon shall be provided at each aerodrome intended for use at night.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.4 Approach lighting systems

ICAO Note.— It is intended that existing lighting systems not conforming to the specifications in 5.3.4.21, 5.3.4.39, 5.3.9.10, 5.3.10.10, 5.3.10.11, 5.3.11.5, 5.3.12.8, 5.3.13.6 and 5.3.16.8 be replaced not later than 1 January 2005.

Application

Standard 5.3.4.1 *Application*

A.— Non-instrument runway

ICAO Recommendation.— *Where physically practicable, a simple approach lighting system as specified in 5.3.4.2 to 5.3.4.9 should be provided to serve a non-instrument runway where the code number is 3 or 4 and intended for use at night, except when the runway is used only in conditions of good visibility, and sufficient guidance is provided by other visual aids.*
Note.— A simple approach lighting system can also provide visual guidance by day.

Finding:

- WRRR not applicable.
- Non Compliance: WIMM - RWY 23.
- In compliance: WIPA - RWY 31.

B.— Non-precision approach runway

Where physically practicable, a simple approach lighting system as specified in 5.3.4.2 to 5.3.4.9 shall be provided to serve a non-precision approach runway, except when the runway is used only in conditions of good visibility or sufficient guidance is provided by other visual aids.

ICAO Note.— It is advisable to give consideration to the installation of a precision approach category I lighting system or to the addition of a runway lead-in lighting system.

Finding:

- In compliance: WIII
- In compliance: WRRR - RWY 27
- Non Compliance:

  WRRR - RWY 09 due geographical limitations
- Non Compliance:

WIMM - RWY 05 due condition of ALS.

- Non Compliance:

  WIPA - RWY 13

C.— Precision approach runway category

Where physically practicable, a precision approach category I lighting system as specified in 5.3.4.10 to 5.3.4.21 shall be provided to serve a precision approach runway category I.

Finding:

- In compliance: WIII - RWY 07R, RWY 25L, and RWY 25R.
- Non Compliance:

  WIII - RWY 07L due SALS.
- In compliance: WRRR
- Non Compliance:

  WIMM - RWY 05 due condition of ALS.
- WIPA - not applicable.

D — Precision approach runway categories II

A precision approach category II and III lighting system as specified in 5.3.4.22 to 5.3.4.39 shall be provided to serve a precision approach runway category II or III.

Not applicable at any of the airports studied.

Simple approach lighting system Location

Standard 5.3.4.2 A simple approach lighting system shall consist of a row of lights on the extended centre line of the runway extending, whenever possible, over a distance of not less than 420 m from the threshold with a row of lights forming a crossbar 18 m or 30 m in length at a distance of 300 m from the threshold.

Finding:

- In compliance: where applicable – WIII
- Non Compliance:

  WIMM - RWY 05 due condition of ALS.

Characteristics

Standard 5.3.4.7 The lights of a simple approach lighting system shall be fixed lights and the colour of the lights shall be such as to ensure that the system is readily distinguishable from other aeronautical ground lights, and from extraneous lighting if present. Each centre line light shall consist of either:

a) a single source; or

b) a barrette at least 3 m in length.

Finding:

- In compliance: WIII.
- WRRR not applicable
- Non Compliance:

  WIMM - RWY 05 due condition of ALS.
- In compliance: WIPA

Precision approach category I lighting system

Location

Standard 5.3.4.10 A precision approach category I lighting system shall consist of a row of lights on the extended centre line of the runway extending, wherever possible, over a distance of 900 m from the runway threshold with a row of lights forming a crossbar 30 m in length at a distance of 300 m from the runway threshold.

ICAO Note.— The installation of an approach lighting system of less than 900 m in length may result in operational limitations on the use of the runway. See Attachment A, Section 11.

Compliance with this Standard was not assessed.

Characteristics

Standard 5.3.4.14

Compliance with this Standard was not assessed.

Precision approach category II and III lighting system

This subject not applicable.

Sub-Sect 5.3.5 Visual approach slope indicator systems

Application

Standard 5.3.5.1 A visual approach slope indicator system shall be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by nonvisual aids, where one or more of the following conditions exist:

a) the runway is used by turbojet or other aeroplanes with similar approach guidance requirements;

b) the pilot of any type of aeroplane may have difficulty in judging the approach due to:

   1) inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day or in the absence of sufficient extraneous lights in the approach area by night, or

   2) misleading information such as is produced by deceptive surrounding terrain or runway slopes;

c) the presence of objects in the approach area may involve serious hazard if an aeroplane descends below the normal approach path, particularly if there are no non-visual or other visual aids to give warning of such objects;

d) physical conditions at either end of the runway present a serious hazard in the event of an aeroplane undershooting or overrunning the runway; and

e) terrain or prevalent meteorological conditions are such that the aeroplane may be subjected to unusual turbulence during approach.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standards 5.3.5.2 – 5.3.5.12

Compliance with these Standards was not assessed.

PAPI and APAPI

Description

Standard 5.3.5.23 The PAPI system shall consist of a wing bar of 4 sharp transition multi-lamp (or paired single lamp) units equally spaced. The system shall be located on the left side of the runway unless it is physically impracticable to do so.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Characteristics of the light units

Standard 5.3.5.28 The system shall be suitable for both day and night operations.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.6

Compliance with these Recommendations was not assessed.

Sub-Sect 5.3.7 Runway lead-in lighting systems

Not applicable at any of the airports studied.

Sub-Sect 5.3.8 Runway threshold identification lights

Application

ICAO Recommendation 5.3.8.1 — *Runway threshold identification lights should be installed:*
a) at the threshold of a non-precision approach runway when additional threshold conspicuity is necessary or where it is not practicable to provide other approach lighting aids; and

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

b) where a runway threshold is permanently displaced from the runway extremity or temporarily displaced from the normal position and additional threshold conspicuity is necessary.

Compliance with this RP was not assessed.

Location

Standard 5.3.8.2 Runway threshold identification lights shall be located symmetrically about the runway centre line, in line with the threshold and approximately 10 m outside each line of runway edge lights.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.9 Runway edge lights

Application

Standard 5.3.9.1 Runway edge lights shall be provided for a runway intended for use at night or for a precision approach runway intended for use by day or night.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Location

Standard 5.3.9.3 Runway edge lights shall be placed along the full length of the runway and shall be in two parallel rows equidistant from the centre line.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 5.3.9.4 Runway edge lights shall be placed along the edges of the area declared for use as the runway or outside the edges of the area at a distance of not more than 3 m.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.10 Runway threshold lights

Application

Standard 5.3.10.1 Runway threshold lights shall be provided for a runway equipped with runway edge lights except on a non-instrument or non-precision approach runway where the threshold is displaced and wing bar lights are provided.

Location of runway threshold lights

Standard 5.3.10.2 When a threshold is at the extremity of a runway, the threshold lights shall be placed in a row at right angles to the runway axis as near to the extremity of the runway as possible and, in any case, not more than 3 m outside the extremity.

Finding: In compliance where applicable: WIII, WRRR, WIPA.

Standard 5.3.10.4 Threshold lighting shall consist of:

a) on a non-instrument or non-precision approach runway, at least six lights;

b) on a precision approach runway category I, at least the number of lights that would be required if the lights were uniformly spaced at intervals of 3 m between the rows of runway edge lights; and

c) on a precision approach runway category II or III, lights uniformly spaced between the rows of runway edge lights at intervals of not more than 3 m.

In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Application of wing bar lights

Standards 5.3.10.6 – 5.3.10.11

Compliance with this section was not assessed.

Sub-Sect 5.3.11 Runway end lights

Standard 5.3.11.1 Runway end lights shall be provided for a runway equipped with runway edge lights.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Location

Standard 5.3.11.2 Runway end lights shall be placed on a line at right angles to the runway axis as near to the end of the runway as possible and, in any case, not more than 3 m outside the end.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 5.3.11.3 — *Runway end lighting should consist of at least six lights.*

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Characteristics

Standard 5.3.11.4 Runway end lights shall be fixed unidirectional lights showing red in the direction of the runway.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.12 Runway centre line lights

Application

Standard 5.3.12.1 Runway centre line lights shall be provided on a precision approach runway category II or III.

Not applicable at any of the airports studied.

ICAO Recommendation 5.3.12.2 — *Runway centre line lights should be provided on a precision approach runway category I, particularly when the runway is used by aircraft with high landing speeds or where the width between the runway edge lights is greater than 50 m.*

Finding:

- In compliance: WIII
- Non Compliance: WRRR; do not exist.

Not applicable at: WIMM, WIPA.

Standard 5.3.12.3 Runway centre line lights shall be provided on a runway intended to be used for take-off with an operating minimum below an RVR of the order of 400 m.

Not applicable at any of the airports studied.

Location

Standard 5.3.12.5 Runway centre line lights shall be located along the centre line of the runway, except that the lights may be uniformly offset to the same side of the runway centre line by not more than 60 cm where it is not practicable to locate them along the centre line.

Finding:

- In compliance: WIII
- Not applicable at: WIMM, WIPA.

Sub-Sect 5.3.13 Runway touchdown zone lights

Not applicable at any of the airports studied.

Sub-Sect 5.3.14 Rapid exit taxiway indicator lights

Not applicable at any of the airports studied.

5.3.15 Stopway lights

Application

Standard 5.3.15.1 Stopway lights shall be provided for a stopway intended for use at night.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

Standard 5.3.15.3 Stopway lights shall be fixed unidirectional lights showing red in the direction of the runway.

Sub-Sect 5.3.16 Taxiway centre line lights

Application

Standard 5.3.16.1 Taxiway centre line lights shall be provided on an exit taxiway, taxiway, de-icing/anti-icing facility and apron intended for use in runway visual range conditions less than a value of 350 m in such a manner as to provide continuous guidance between the runway centre line and aircraft stands, except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance.

Not applicable at any of the airports studied.

Figure 5-24. Taxiway lighting

Sub-Sect 5.3.17

Standard 5.3.17 Taxiway edge lights

Characteristics

Standard 5.3.17.7 Taxiway edge lights shall be fixed lights showing blue.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

Compliance with these Standards was not assessed.

Sub-Sect 5.3.18 Runway turn pad lights

Application

Standard 5.3.18.1 Runway turn pad lights shall be provided for continuous guidance on a runway turn pad intended for use in runway visual range conditions less than a value of 350 m, to enable an aeroplane to complete a 180-degree turn and align with the runway centre line.

Not applicable at any of the airports studied.

Characteristics

Standard 5.3.18.6 Runway turn pad lights shall be unidirectional fixed lights showing green with beam dimensions such that the light is visible only from aeroplanes on or approaching the runway turn pad.

Not applicable at any of the airports studied.

Sub-Sect 5.3.19 Stop bars

Application

ICAO Note 1.— The provision of stop bars requires their control either manually or automatically by air traffic services.

Standard 5.3.19.1 A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than a value of 350 m, except where…:

Not applicable at any of the airports studied.

Standard 5.3.19.2 A stop bar shall be provided at every runway holding position, serving a runway when it is intended that the runway will be used in runway visual range conditions of values between 350 m and 550 m, except where:

Not applicable at any of the airports studied.

Location

Standard 5.3.19.5 Stop bars shall be located across the taxiway at the point where it is desired that traffic stop.

Not applicable at any of the airports studied.

Characteristics

Standard 5.3.19.6 Stop bars shall consist of lights spaced at intervals of 3 m across the taxiway, showing red in the intended direction(s) of approach to the intersection or runway-holding position.

Not applicable at any of the airports studied.

Sub-Sect 5.3.20 Intermediate holding position lights

Application

Standard 5.3.20.1 Except where a stop bar has been installed, intermediate holding position lights shall be provided at an intermediate holding position intended for use in runway visual range conditions less than a value of 350 m.

Not applicable at any of the airports studied.

Characteristics

Standard 5.3.20.4 Intermediate holding position lights shall consist of three fixed unidirectional lights showing yellow in the direction of approach to the intermediate holding position with a light distribution similar to taxiway centre line lights if provided.

Not applicable at any of the airports studied.

Sub-Sect 5.3.21 De-icing/anti-icing facility exit lights

Not applicable at any of the airports studied.

Sub-Sect 5.3.22 Runway guard lights

ICAO Note.— The purpose of runway guard lights is to warn pilots, and drivers of vehicles when they are operating on taxiways, that they are about to enter an active runway

Compliance with this RP was not assessed.

Sub-Sect 5.3.23 Apron floodlighting

ICAO Recommendation 5.3.23.1 — *Apron floodlighting should be provided on an apron, on a de-icing/anti-icing facility and on a designated isolated aircraft parking position intended to be used at night.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Location

ICAO Recommendation 5.3.23.2 — *Apron floodlights should be located so as to provide adequate illumination on all apron service areas, with a minimum of glare to pilots of aircraft in flight and on the ground, aerodrome and apron controllers, and personnel on the apron. The arrangement and aiming of floodlights should be such that an aircraft stand receives light from two or more directions to minimize shadows.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Characteristics

Standard 5.3.23.3 The spectral distribution of apron floodlights shall be such that the colours used for aircraft marking connected with routine servicing, and for surface and obstacle marking, can be correctly identified.

Compliance with this Standard was not assessed.

Sub-Sect 5.3.24 Visual docking guidance system

Application

Standard 5.3.24.1 A visual docking guidance system shall be provided when it is intended to indicate, by a visual aid, the precise positioning of an aircraft on an aircraft stand and other alternative means, such as marshallers, are not practicable.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

ICAO Note.— The factors to be considered in evaluating the need for a visual docking guidance system are in particular: the number and type(s) of aircraft using the aircraft stand, weather conditions, space available on the apron and the precision required for manoeuvring into the parking position due to aircraft servicing installation, passenger loading bridges, etc

Characteristics

Standard 5.3.24.3 The system shall provide both azimuth and stopping guidance.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Standard 5.3.24.5 The azimuth guidance unit and the stopping position indicator shall be of a design such that:

a) a clear indication of malfunction of either or both is available to the pilot; and

b) they can be turned off.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Standard 5.3.24.7 The accuracy of the system shall be adequate for the type of loading bridge and fixed aircraft servicing installations with which it is to be used.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Standard 5.3.24.9 If selective operation is required to prepare the system for use by a particular type of aircraft, then the system shall provide an identification of the selected aircraft type to both the pilot and the system operator as a means of ensuring that the system has been set properly.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Stopping position indicator - Location

Standard 5.3.24.14 The stopping position indicator shall be located in conjunction with, or sufficiently close to, the azimuth guidance unit so that a pilot can observe both the azimuth and stop signals without turning the head.

Compliance with this Standard was not assessed.

Standard 5.3.24.15 The stopping position indicator shall be usable at least by the pilot occupying the left seat.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.3.25 Aircraft stand manoeuvring guidance lights

Application

ICAO Recommendation 5.3.25.1 — *Aircraft stand manoeuvring guidance lights should be provided to facilitate the positioning of an aircraft on an aircraft stand on a paved apron or*

Compliance with this RP was not assessed.

Location

Standard 5.3.25.2 Aircraft stand manoeuvring guidance lights shall be collocated with the aircraft stand markings.

Compliance with this Standard was not assessed.

Characteristics

Standard 5.3.25.3 Aircraft stand manoeuvring guidance lights, other than those indicating a stop position, shall be fixed yellow lights, visible throughout the segments within which they are intended to provide guidance.

Compliance with this Standard was not assessed.

Sub-Sect 5.3.26 Road-holding position light

Compliance with this Standard was not assessed.

4.5.4 SECTION 5.4 SIGNS

Sub-Sect 5.4.1 General

Application

Standard 5.4.1.1 Signs shall be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of 9.8.1.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Characteristics

Standard 5.4.1.3 Signs shall be frangible. Those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and the engine pods of jet aircraft. The installed height of the sign shall not exceed the dimension shown in the appropriate column of Table 5-4.

Compliance with this Standard was not assessed.

Standard 5.4.1.5 The only signs on the movement area utilizing red shall be mandatory instruction signs.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Standard 5.4.1.7 Signs shall be illuminated in accordance with the provisions of Appendix 4 when intended for use:

a) in runway visual range conditions less than a value of 800 m; or
b) at night in association with instrument runways; or
c) at night in association with non-instrument runways where the code number is 3 or 4.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.4.2 Mandatory instruction signs

Application

Standard 5.4.2.1 A mandatory instruction sign shall be provided to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorized by the aerodrome control tower.

Compliance with this Standard was not assessed.

Standard 5.4.2.2 Mandatory instruction signs shall include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and NO ENTRY signs.

Compliance with this Standard was not assessed.

Characteristics

Standard 5.4.2.12 A mandatory instruction sign shall consist of an inscription in white on a red background.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.4.3 Information signs

Application

Standard 5.4.3.1 An information sign shall be provided where there is an operational need to identify by a sign, a specific location, or routing (direction or destination) information.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

Characteristics

Standard 5.4.3.25 An information sign other than a location sign shall consist of an inscription in black on a yellow background.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 5.4.3.26 A location sign shall consist of an inscription in yellow on a black background and where it is a stand-alone sign shall have a yellow border.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.4.4 VOR aerodrome check-point sign

Not applicable at any of the airports studied.

Application

Standard 5.4.4.1 When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking and sign.

Not applicable at any of the airports studied.

Sub-Sect 5.4.5 Aerodrome identification sign

Application

ICAO Recommendation 5.4.5.1 — *An aerodrome identification sign should be provided at an aerodrome where there is insufficient alternative means of visual identification.*

Not applicable at any of the airports studied.

Standard 5.4.5.3 The aerodrome identification sign shall consist of the name of the aerodrome.

Not applicable at any of the airports studied.

Sub-Sect 5.4.7 Road-holding position sign

Standard 5.4.7.1 A road-holding position sign shall be provided at all road entrances to a runway.

Compliance with this Standard was not assessed.

4.5.5 SECTION 5.5 MARKERS

Sub-Sect 5.5.1 General

Standard 5.5.1 Markers shall be frangible. Those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Sub-Sect 5.5.2 Unpaved runway edge markers

Application

ICAO Recommendation 5.5.2.1 — *Markers should be provided when the extent of an unpaved runway is not clearly indicated by the appearance of its surface compared with that of the surrounding ground.*

Not applicable at any of the airports studied.

Sub-Sect 5.5.3 Stopway edge markers

Application

ICAO Recommendation 5.5.3.1 — *Stopway edge markers should be provided when the extent of a stopway is not clearly indicated by its appearance compared with that of the surrounding ground.*

Compliance with this RP was not assessed.

Sub-Sect 5.5.4 Edge markers for snow-covered runways

Not applicable at any of the airports studied.

Sub-Sect 5.5.5 Taxiway edge markers

Not applicable at any of the airports studied.

Sub-Sect 5.5.6 – 5.5.7

Compliance with these Standards was not assessed.

Sub-Sect 5.5.8 Boundary markers

Application

Standard 5.5.8.1 Boundary markers shall be provided at an aerodrome where the landing area has no runway.

Not applicable at any of the airports studied.

4.6 CHAPTER 6. VISUAL AIDS FOR DENOTING OBSTACLES

4.6.1 SECTION 6.1 OBJECTS TO BE MARKED AND/OR LIGHTED

ICAO Note.— The marking and/or lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.

Compliance with Recommendations 6.1.1 through 6.1.5 was not assessed.

Standard 6.1.6 Vehicles and other mobile objects, excluding aircraft, on the movement area of an aerodrome are obstacles and shall be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted, except that aircraft servicing equipment and vehicles used only on aprons may be exempt.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.6.2 SECTION 6.2 MARKING OF OBJECTS

General

Standard 6.2.1 All fixed objects to be marked shall, whenever practicable, be coloured, but if this is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size or colour need not be otherwise marked.

Compliance with this Standard was not assessed.

Standard 6.2.2 All mobile objects to be marked shall be coloured or display flags.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Use of colours

ICAO Recommendation 6.2.3 — *An object should be coloured to show a chequered pattern if it has essentially unbroken surfaces and its projection on any vertical plane equals or exceeds 4.5 m in both dimensions.*

Compliance with this Recommendation was not assessed.

Use of markers

Standard 6.2.7 Markers displayed on or adjacent to objects shall be located in conspicuous positions so as to retain the general definition of the object and shall be recognizable in clear weather from a distance of at least 1 000 m for an object to be viewed from the air and 300 m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object.

Compliance with this Standard was not assessed.

4.6.3 SECTION 6.3 LIGHTING OF OBJECTS

Compliance with these Standards was not assessed.

4.7 CHAPTER 7. VISUAL AIDS FOR DENOTING RESTRICTED USE AREAS

4.7.1 SECTION 7.1 CLOSED RUNWAYS AND TAXIWAYS, OR PARTS THEREOF

Application

Standard 7.1.1 A closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

4.7.2 SECTION 7.2 NON-LOAD-BEARING SURFACES

Application

Standard 7.2.1 Shoulders for taxiways, runway turn pads, holding bays and aprons and other non-load bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft shall have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

4.7.3 SECTION 7.3 PRE-THRESHOLD AREA

Application

ICAO Recommendation 7.3.1 — *When the surface before a threshold is paved and exceeds 60 m in length and is not suitable for normal use by aircraft, the entire length before the threshold should be marked with a chevron marking.*

Compliance with this RP was not assessed.

4.7.4 SECTION 7.4 UNSERVICEABLE AREAS

Application

Standard 7.4.1 Unserviceability markers shall be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a movement area used at night, unserviceability lights shall be used.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

ICAO Note.— Unserviceability markers and lights are used for such purposes as warning pilots of a hole in a taxiway or apron pavement or outlining a portion of pavement, such as on an apron, that is under repair. They are not suitable for use when a portion of a runway becomes unserviceable, nor on a taxiway when a major portion of the width becomes unserviceable. In such instances, the runway or taxiway is normally closed.

Finding: In compliance where applicable: WIII, WRRR, WIMM, WIPA.

4.8 CHAPTER 8. ELECTRICAL SYSTEMS

4.8.1 SECTION 8.1 ELECTRICAL POWER SUPPLY SYSTEMS FOR AIR NAVIGATION FACILITIES

Standard 8.1.1 Adequate primary power supply shall be available at aerodromes for the safe functioning of air navigation facilities.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 8.1.2 The design and provision of electrical power systems for aerodrome visual and radio navigation aids shall be such that an equipment failure will not leave the pilot with inadequate visual and non-visual guidance or misleading information.

Compliance with this Standard was not assessed.

ICAO Recommendation 8.1.3 — *Electric power supply connections to those facilities for which secondary power is required should be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 8.1.4 — *The time interval between failure of the primary source of power and the complete restoration of the services required by **8.1.10** should be as short as practicable, except that for visual aids associated with non-precision, precision approach or take-off runways the requirements of **Table 8-1** for maximum switch-over times should apply.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Visual aids

Application

Standard 8.1.6 For a precision approach runway, a secondary power supply capable of meeting the requirements of Table 8-1 for the appropriate category of precision approach runway shall be provided. Electric power supply connections to those facilities for which secondary power is required shall be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 8.1.7 For a runway meant for take-off in runway visual range conditions less than a value of 800 m, a secondary power supply capable of meeting the relevant requirements of Table 8-1 shall be provided.

Not applicable at any of the airports studied.

ICAO Recommendation 8.1.8 — *At an aerodrome where the primary runway is a non-precision approach runway, a secondary power supply capable of meeting the requirements of Table 8-1 should be provided except that a secondary power supply for visual aids need not be provided for more than one non-precision approach runway.*

Not applicable at: WIII, WRRR, WIMM

Finding: In compliance: WIPA

ICAO Recommendation 8.1.9 — *At an aerodrome where the primary runway is a non-instrument runway, a secondary power supply capable of meeting the requirements of 8.1.4 should be provided, except that a secondary power supply for visual aids need not be provided when an emergency lighting system in accordance with the specification of 5.3.2 is provided and capable of being deployed in 15 minutes.*

Not applicable at: WIII, WRRR, WIMM

Finding: In compliance: WIPA

ICAO Recommendation 8.1.10 — *The following aerodrome facilities should be provided with a secondary power supply capable of supplying power when there is a failure of the primary power supply:*

a) the signalling lamp and the minimum lighting necessary to enable air traffic services personnel to carry out their duties;

Note.— The requirement for minimum lighting may be met by other than electrical means.

b) all obstacle lights which, in the opinion of the appropriate authority, are essential to ensure the safe operation of aircraft;

c) approach, runway and taxiway lighting as specified in 8.1.6 to 8.1.9;

d) meteorological equipment;

e) essential security lighting, if provided in accordance with 9.11;

f) essential equipment and facilities for the aerodrome responding emergency agencies;

g) floodlighting on a designated isolated aircraft parking position if provided in accordance with 5.3.23.1; and

h) illumination of apron areas over which passengers may walk.

Note.— Specifications for secondary power supply for radio navigation aids and ground elements of communications systems are given in Annex 10, Volume I, Chapter 2.

Precise compliance with this RP was not fully assessed.

Finding: Where assessed, in compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 8.1.11 — *Requirements for a secondary power supply should be met by either of the following:*

- *independent public power, which is a source of power supplying the aerodrome service **from a substation** other than the normal substation through a transmission line following a route different from the normal power supply route and such that the possibility of a simultaneous failure of the normal and independent public power supplies is extremely remote; or*
- *standby power unit(s), which are engine generators, batteries, etc., from which electric power can be obtained.*

*ICAO Note.— Guidance on electrical systems is included in the **Aerodrome Design Manual**, Part 5.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.8.2 SECTION 8.2 SYSTEM DESIGN

Standard 8.2.1 For a runway meant for use in runway visual range conditions less than a value of 550 m, the electrical systems for the power supply, lighting and control of the lighting systems included in Table 8-1 shall be so designed that an equipment failure will not leave the pilot with inadequate visual guidance or misleading information.

Not applicable at any of the airports studied.

Standard 8.2.2 Where the secondary power supply of an aerodrome is provided by the use of duplicate feeders, such supplies shall be physically and electrically separate so as to ensure the required level of availability and independence.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

Standard 8.2.3 Where a runway forming part of a standard taxiroute is provided with runway lighting and taxiway lighting, the lighting systems shall be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

Compliance with this Standard was not assessed.

4.8.3 SECTION 8.3 MONITORING

Standard 8.3.2 Where lighting systems are used for aircraft control purposes, such systems shall be monitored automatically so as to provide an indication of any fault which may affect the control functions. This information shall be automatically relayed to the air traffic service unit.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Finding: Non Compliance:

WIPA; the serviceability of essential aids and lighting is determined by binoculars. A display unit exists, but it is inoperative.

4.9 CHAPTER 9. AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

4.9.1 SECTION 9.1 AERODROME EMERGENCY PLANNING

General

Aerodrome emergency planning is the process of preparing an aerodrome to cope with an emergency occurring at the aerodrome ***or in its vicinity.***

The ***objective*** *of aerodrome emergency planning is to minimize the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations.*

The aerodrome emergency plan sets forth the procedures for coordinating the response of different aerodrome agencies (or services) and of those agencies in the surrounding community that could be of assistance in responding to the emergency.

Guidance material to assist the appropriate authority in establishing aerodrome emergency planning is given in the ***Airport Services Manual****, Part 7.*

Standard 9.1.1 An aerodrome emergency plan shall be established at an aerodrome, commensurate with the aircraft operations and other activities conducted at the aerodrome.

Finding: Non Compliance:

WIII: AIRPORT EMERGENCY PLAN – 1995

WIII does have an Airport Emergency Plan,

- However, no revisions noted in the AMENDMENT RECORD.
- The Airport Emergency Plan is meant to be a "living document".
- Clearly there have been numerous changes (such as personnel in individual positions (in both the airport administration and non-airport agencies and organizations) and respective telephone numbers since 1995.
- Any such changes are not reflected in revisions entered into the AMENDMENT RECORD.

Finding: Non Compliance:

WRRR: AIRPORT EMERGENCY PLAN – 2003

WRRR does have an Airport Emergency Plan,

- However, no revisions were noted, nor provided for in the "AMENDMENT RECORD".
- The Airport Emergency Plan is meant to be a "living document".
- Clearly there have been numerous changes in both the airport administration and non-airport agencies and organizations since 1995, such as personnel in individual positions and respective telephone numbers.
- This is not reflected in revisions entered into an AMENDMENT RECORD.

Finding: Non Compliance:

Compliance at WIMM could not be verified. While the AEP is referenced in the Aerodrome Manual (Sect. 4.3), it was not noted.

Finding: Non Compliance:

Compliance at WIPA could not be verified. While the AEP is addressed in the Aerodrome Manual (Sect. 4.3), the reference is of such a limited degree that the ASI Team believes that this reference does not provide the degree of guidance intended in this Standard.

Standard 9.1.2 The aerodrome emergency plan shall provide for the coordination of the actions to be taken in an emergency occurring at an aerodrome or in its vicinity.

ICAO Note.— Examples of emergencies are: aircraft emergencies, sabotage including bomb threats, unlawfully seized aircraft, dangerous goods occurrences, building fires and natural disasters.

Finding:

- In compliance: WIII, WRRR

- Compliance could not be verified:

  WIMM: While the AEP is referenced in the Aerodrome Manual (Sect. 4.3), it was not noted.

- Compliance could not be verified:

  WIPA: While the AEP is addressed in the Aerodrome Manual (Sect. 4.3), the reference is of such limited degree that the ASI Team believes that it does not provide the degree of guidance intended in this Standard.

Standard 9.1.3 The plan shall coordinate the response or participation of all existing agencies which, in the opinion of the appropriate authority, could be of assistance in responding to an emergency.

ICAO Note.— Examples of agencies are:

- *on the aerodrome: air traffic control unit, rescue and fire fighting services, aerodrome administration, medical and ambulance services, aircraft operators, security services, and police;*
- *off the aerodrome: fire departments, police, medical and ambulance services, hospitals, military, and harbour patrol or coast guard.*

Finding:

- In compliance: WIII, WRRR
- Compliance could not be verified:

  WIMM: While the AEP is referenced in the Aerodrome Manual (Sect. 4.3), it was not noted.

- Compliance could not be verified:

  WIPA: While the AEP is addressed in the Aerodrome Manual (Sect. 4.3), the reference is of such limited degree that the ASI Team believes it does not provide the degree of guidance intended in this Standard.

ICAO Recommendation 9.1.4 — *The plan should provide for cooperation and coordination with the rescue coordination centre, as necessary.*

Finding:

- In compliance: WIII, WRRR
- Compliance could not be verified:

  WIMM and WIPA

ICAO Recommendation 9.1.5 — *The aerodrome emergency plan document should include at least the following:*

a) types of emergencies planned for;

b) agencies involved in the plan;

c) responsibility and role of each agency, the emergency operations centre and the command post, for each type of emergency;

d) information on names and telephone numbers of offices or people to be contacted in the case of a particular emergency;

e) a grid map of the aerodrome and its immediate vicinity.

Finding:

- In compliance: WIII, except as noted in 9.1.1
- In compliance: WRRR, except as noted in 9.1.1
- Compliance could not be verified:

  WIMM - while referenced in the Aerodrome Manual (Sect 4.3.7.) the procedures were not noted.

- Compliance could not be verified:

  WIPA - While the AEP and this specific area are addressed in the Aerodrome Manual (Sect. 4.3), the references are of such a limited degree, that the ASI Team believes the references do not provide the degree of guidance intended in this Recommended Practice.

Standard 9.1.6 The plan shall observe Human Factors principles to ensure optimum response by all existing agencies participating in emergency operations.

*ICAO Note.— Guidance material on Human Factors principles can be found in the **Human Factors Training Manual.***

Finding: Compliance could not be confirmed:

WIII, WRRR, WIMM, WIPA

Emergency operations centre and command post

ICAO Recommendation 9.1.7 — *A fixed emergency operations centre and a mobile command post should be available for use during an emergency.*

Finding: In compliance: WIII

- **Finding:** Non Compliance:

  WRRR; while WRRR does have a fixed emergency operations centre, they do not have a real mobile command post.

- **Finding:** Non Compliance:

  WIMM: no EOC. During the Mandela Air 1091 accident, the fire chief's small office and a multi-purpose room in a nearby building were used as an improvised EOC. This precluded availability of both a dedicated communications console set-up and pre-organized logistical support systems.

- **Finding:** Non Compliance:

  WIPA: no EOC. During the November, 2004 accident, the facility used for an EOC / command post was an AVSEC vehicle. This precluded availability of both a dedicated communications console set-up and pre-organized logistical support systems.

ICAO Recommendation 9.1.8 — *The emergency operations centre should be a part of the aerodrome facilities and should be responsible for the overall coordination and general direction of the response to an emergency.*

Finding:

- In compliance: WIII, WRRR

- Non Compliance:

  WIMM, WIPA: as no EOC.

ICAO Recommendation 9.1.9 — *The command post should be a facility capable of being moved rapidly to the site of an emergency, when required, and should undertake the local coordination of those agencies responding to the emergency.*

Finding:

- In compliance: WIII

- Non Compliance:

  WRRR, WIMM, WIPA; none have a mobile command post.

ICAO Recommendation 9.1.10 — *A person should be assigned to assume control of the emergency operations centre and, when appropriate, another person the command post.*

Finding:

- In compliance: WIII, WRRR
- Non Compliance:

  WIMM, WIPA: as neither have an EOC.

Communication system

ICAO Recommendation 9.1.11 — *Adequate communication systems linking the command post and the emergency operations centre with each other and with the participating agencies should be provided in accordance with the plan and consistent with the particular requirements of the aerodrome.*

Finding: Non Compliance: WIII:

While communications equipment in the form of two telephones, fax capability, and radio availability were noted in the EOC, the console is inoperative.

Finding:

- Compliance could not be verified:

  WRRR
- Non Compliance:

  WIMM, WIPA: as no EOC nor command post exist.

Aerodrome emergency exercise

Standard 9.1.12 The plan shall contain procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness.

ICAO Note.— The plan includes all participating agencies and associated equipment.

Finding:

- In compliance: WIII
- Non Compliance:

WRRR: While referenced in the Aerodrome Manual, no such inclusion could be found in the Aerodrome Emergency Plan.

- Non Compliance:

  WIMM: While there has been a full scale exercise, a major accident, and semi-annual table top exercises, records of formal review and subsequent resultant action were not noted.

- Compliance could not be verified:

  WIPA: While the AEP and this specific area are addressed in the Aerodrome Manual (Sect. 4.3.3), only a one time training exercise per two years is mentioned. This singular reference, the ASI Team believes, does not provide the degree testing and review intended in this Standard.

Standard 9.1.13 The plan shall be tested by conducting:

a) a full-scale aerodrome emergency exercise at intervals not exceeding two years; and

b) partial emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale aerodrome emergency exercise have been corrected; and reviewed thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency.

ICAO Note.— The purpose of a full-scale exercise is to ensure the adequacy of the plan to cope with different types of emergencies. The purpose of a partial exercise is to ensure the adequacy of the response to individual participating agencies and components of the plan, such as the communications system.

Finding:

- Compliance could not be confirmed:

  WIII: While *technical* compliance was noted, numerous findings and recommendations should be noted in the detailed WIII Findings Report (Section 4.3).

- Compliance could not be confirmed: WRRR.

- Compliance could not be confirmed: WIMM:

  - The last major drill occurred in 2003. The next was planned for late 2005 but was replaced with the Mandala Air accident.

- Table top exercises occurred only once every six months.

- Compliance could not be confirmed:

  WIPA: The aircraft accident of November, 2004 may have replaced a full-scale exercise. One may be scheduled for sometime later this year. Compliance with the remainder of this Standard could not be confirmed.

Emergencies in difficult environments

Standard 9.1.14 The plan shall include the ready availability of and coordination with appropriate specialist rescue services to be able to respond to emergencies where an aerodrome is located close to water and/or swampy areas and where a significant portion of approach or departure operations takes place over these areas.

Finding: Effective compliance with this standard could not be verified at any of the four airports assessed.

ICAO Recommendation 9.1.15 — *At those aerodromes located close to water and/or swampy areas, or difficult terrain, the aerodrome emergency plan should include the establishment, testing and assessment at regular intervals of a pre-determined response for the specialist rescue services.*

Finding: Non Compliance. Effective compliance with this RP could not be verified at any of the four airports assessed.

4.9.2 SECTION 9.2 RESCUE AND FIRE FIGHTING

General

The principal objective of a rescue and fire fighting service is to save lives. For this reason, the provision of means of dealing with an aircraft accident or incident occurring at, or in the immediate vicinity of, an aerodrome

*This **must** assume at all times the possibility of, and need for, extinguishing a fire which may occur either immediately following an aircraft accident or incident, or at any time during rescue operations.*

The most important factors bearing on effective rescue in a survivable aircraft accident are: the training received, the effectiveness of the equipment and the speed with which personnel and equipment designated for rescue and fire fighting purposes can be put into use.

Application

Standard 9.2.1 Rescue and fire fighting equipment and services shall be provided at an aerodrome.
ICAO Note.— Public or private organizations, suitably located and equipped, may be designated to provide the rescue and fire fighting service. It is intended that the fire station housing these organizations be normally located on the aerodrome, although an off-aerodrome location is not precluded provided the response time can be met.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.2.2 Where an aerodrome is located close to water/ swampy areas, or difficult terrain, and where a significant portion of approach or departure operations takes place over these areas, specialist rescue services and fire fighting equipment appropriate to the hazard and risk shall be available.

Finding:

- In compliance: WIII
- Compliance reported, but could not be confirmed:

  WRRR. - Two rescue boats reported to be on site.
- Not applicable: WIMM, WIPA

ICAO Note 2.— The objective is to plan and deploy the necessary life-saving flotation equipment as expeditiously as possible in a number commensurate with the largest aeroplane normally using the aerodrome.

Level of protection to be provided

Standard 9.2.3 The level of protection provided at an aerodrome for rescue and fire fighting shall be appropriate to the aerodrome category determined using the principles in 9.2.5 and 9.2.6, except that, where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months, the level of protection provided shall be not less than one category below the determined category.

ICAO Note.— Either a take-off or a landing constitutes a movement.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 9.2.4 — *From 1 January 2005, the level of protection provided at an aerodrome for rescue and fire fighting should be equal to the aerodrome category determined using the principles in 9.2.5 and 9.2.6.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.2.5 The aerodrome category shall be determined from Table 9-1 and shall be based on the longest aeroplanes normally using the aerodrome and their fuselage width.

ICAO Note.— To categorize the aeroplanes using the aerodrome, first evaluate their overall length and second, their fuselage width.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.2.6 If, after selecting the category appropriate to the longest aeroplane's overall length, that aeroplane's fuselage width is greater than the maximum width in Table 9-1, column 3 for that category, then the category for that aeroplane shall actually be one category higher.

ICAO Note.— Guidance on categorizing aerodromes for rescue and fire fighting purposes and on providing rescue and fire fighting equipment and services is given in Attachment A, Section 17 and in the Airport Services Manual, *Part 1.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.2.7 During anticipated periods of reduced activity, the level of protection available shall be no less than that needed for the highest category of aeroplane planned to use the aerodrome during that time irrespective of the number of movements.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Extinguishing agents

ICAO Recommendation 9.2.8 — *Both principal and complementary agents should normally be provided at an aerodrome.*

ICAO Note.— Descriptions of the agents may be found in the Airport Services Manual, *Part 1.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 9.2.9 — *The principal extinguishing agent should be:*

a) a foam meeting the minimum performance level A; or

b) a foam meeting the minimum performance level B; or

c) a combination of these agents;
except that the principal extinguishing agent for aerodromes in categories 1 to 3 should preferably meet the minimum performance level B.

ICAO Note.— Information on the required physical properties and fire extinguishing performance criteria needed for a foam to achieve an acceptable performance level A or B rating is given in the Airport Services Manual, *Part 1.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 9.2.10 — *The complementary extinguishing agent should be a dry chemical powder suitable for extinguishing hydrocarbon fires.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.2.11 The amounts of water for foam production and the complementary agents to be provided on the rescue and fire fighting vehicles shall be in accordance with the aerodrome category determined under 9.2.3, 9.2.4, 9.2.5, 9.2.6 and Table 9-2, except that these amounts may be modified as follows:

a) for aerodrome categories 1 and 2 up to 100 per cent of the water may be replaced by complementary agent; or

b) for aerodrome categories 3 to 10 when a foam meeting performance level A is used, up to 30 per cent of the water may be replaced by complementary agent.

For the purpose of agent substitution, the following equivalents shall be used:

ICAO Note 1.— The amounts of water specified for foam production are predicated on an application rate of 8.2 L/min/m2 for a foam meeting performance level A, and 5.5 L/min/m2 for a foam meeting performance level B.

ICAO Note 2.— When any other complementary agent is used, the substitution ratios need to be checked.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.2.12 The quantity of foam concentrates separately provided on vehicles for foam production shall be in proportion to the quantity of water provided and the foam concentrate selected.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 9.2.19 — *A reserve supply of foam concentrate and complementary agent, equivalent to 200 per cent of the quantities of these agents to be provided in the rescue and fire fighting vehicles, should be maintained on the aerodrome for vehicle replenishment purposes. Where a major delay in the replenishment of this supply is anticipated, the amount of reserve supply should be increased.*

Compliance with this RP was not assessed.

Rescue equipment

ICAO Recommendation 9.2.20 — *Rescue equipment commensurate with the level of aircraft operations should be provided on the rescue and fire fighting vehicle(s).*

Finding: In compliance: WIII, WRRR, WIMM, WIPA

Response time

Standard 9.2.21 The operational objective of the rescue and fire fighting service shall be to achieve a response time not exceeding three minutes to any point of each operational runway, in optimum visibility and surface conditions.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

ICAO Recommendation 9.2.22 — *The operational objective of the rescue and fire fighting service should be to achieve a response time not exceeding two minutes to any point of each operational runway, in optimum visibility and surface conditions.*

Finding: In compliance: WIII.

ICAO Recommendation 9.2.23 — *The operational objective of the rescue and fire fighting service should be to achieve a response time not exceeding three minutes to any other part of the movement area in optimum visibility and surface conditions.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA

*ICAO Note 1.— **Response time is considered to be** the time between the initial call to the rescue and fire fighting service, and the time when the first responding vehicle(s) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table 9-2.*

ICAO Recommendation 9.2.24 — *Any other vehicles required to deliver the amounts of extinguishing agents specified in Table 9-2 should arrive no more than one minute after the first responding vehicle(s) so as to provide continuous agent application.*

Compliance with this Recommendation was not assessed.

ICAO Recommendation 9.2.25 — *A system of preventive maintenance of rescue and fire fighting vehicles should be employed to ensure effectiveness of the equipment and compliance with the specified response time throughout the life of the vehicle.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Emergency access roads

Compliance with these Recommendations was not assessed.

Fire stations

ICAO Recommendation 9.2.29 — *All rescue and fire fighting vehicles should normally be housed in a fire station. Satellite fire stations should be provided whenever the response time cannot be achieved from a single fire station.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 9.2.30 — *The fire station should be located so that the access for rescue and fire fighting vehicles into the runway area is direct and clear, requiring a minimum number of turns.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Communication and alerting systems

ICAO Recommendation 9.2.31 — *A discrete communication system should be provided linking a fire station with the control tower, any other fire station on the aerodrome and the rescue and fire fighting vehicles.*

Compliance with this RP was not assessed.

ICAO Recommendation 9.2.32 — *An alerting system for rescue and fire fighting personnel, capable of being operated from that station, should be provided at a fire station, any other fire station on the aerodrome and the aerodrome control tower.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Number of rescue and fire fighting vehicles

ICAO Recommendation 9.2.33 — *The minimum number of rescue and fire fighting vehicles provided at an aerodrome should be in accordance with the following tabulation:*

Aerodrome Rescue and fire category fighting vehicles

1) *1*
2) *1*
3) *1*
4) *1*
5) *1*
6) *2*
7) *2*
8) *3*
9) *3*
10) *3*

ICAO Note.— Guidance on minimum characteristics of rescue and fire fighting vehicles is given in the ***Airport Services Manual****, Part 1.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Personnel

Standard 9.2.34 All rescue and fire fighting personnel shall be properly trained to perform their duties in an efficient manner and shall participate in live fire drills commensurate with the types of aircraft and type of rescue and fire fighting equipment in use at the aerodrome, including pressure-fed fuel fires.

Finding: In compliance: WIII, WRRR, WIMM, WIPA, except live fire drills could not be confirmed at WIMM.

Standard 9.2.35 The rescue and fire fighting personnel training programme shall include training in human performance, including team coordination.

Compliance with this Standard was not assessed.

ICAO Recommendation 9.2.36 — *During flight operations, sufficient trained personnel should be detailed and be readily available to ride the rescue and fire fighting vehicles and to operate the equipment at maximum capacity. These trained personnel should be deployed in a way that ensures that minimum response times can be achieved and that continuous agent application at the appropriate rate can be fully maintained. Consideration should also be given for*

personnel to use hand lines, ladders and other rescue and fire fighting equipment normally associated with aircraft rescue and fire fighting operations.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

ICAO Recommendation 9.2.37 — *In determining the number of personnel required to provide for rescue, consideration should be given to the types of aircraft using the aerodrome.*

Standard 9.2.38 All responding rescue and fire fighting personnel shall be provided with protective clothing and respiratory equipment to enable them to perform their duties in an effective manner.

Finding:

- In compliance: WIII, WRRR
- Compliance not confirmed:

  WIMM, WIPA

4.9.3 SECTION 9.3 DISABLED AIRCRAFT REMOVAL

ICAO Recommendation 9.3.1 — *A plan for the removal of an aircraft disabled on, or adjacent to, the movement area should be established for an aerodrome, and a coordinator designated to implement the plan, when necessary.*

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 9.3.2 — *The disabled aircraft removal plan should be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things:*

a) a list of equipment and personnel on, or in the vicinity of, the aerodrome which would be available for such purpose; and

b) arrangements for the rapid receipt of aircraft recovery equipment kits available from other aerodromes.

Finding:

- Non Compliance:

  WIII - Due to the absence of a large crane with heavy-lift capability for aircraft removal. The ASI Team could not confirm that there is an arrangement for immediate access to one from a nearby off-airport

supplier.

- In compliance: WRRR.
- Non Compliance:

  WIMM – Due to the absence of a crane. It appears that there are not any in inventory. No suppliers are shown with whom arrangements for availability have been made.

- Non Compliance:

  WIPA - While compliance is intended, there appears to be no plan of specific immediate action in place for assured access to cranes and other heavy equipment necessary for life-saving purposes.

4.9.4 SECTION 9.4 BIRD HAZARD REDUCTION

Standard 9.4.1 The bird strike hazard on, or in the vicinity of, an aerodrome shall be assessed through:

a) the establishment of a national procedure for recording and reporting bird strikes to aircraft; and

b) the collection of information from aircraft operators, airport personnel, etc. on the presence of birds on or around the aerodrome constituting a potential hazard to aircraft operations.

Finding: In compliance: WIII, WRRR, WIMM, WIPA..

Standard 9.4.3 When a bird strike hazard is identified at an aerodrome, the appropriate authority shall take action to decrease the number of birds constituting a potential hazard to aircraft operations by adopting measures for discouraging their presence on, or in the vicinity of, an aerodrome.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.4.4 The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any such other source attracting bird activity on, or in the vicinity of, an aerodrome unless an appropriate aeronautical study indicates that they are unlikely to create conditions conducive to a bird hazard problem.

ICAO Note.— Due consideration needs to be given to airport operators' concerns related to land developments close to the airport boundary that may attract birds/wildlife.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.9.5 SECTION 9.5 APRON MANAGEMENT SERVICE

ICAO Recommendation 9.5.1 — *When warranted by the volume of traffic and operating conditions, an appropriate apron management service should be provided on an apron by an aerodrome ATS unit, by another aerodrome operating authority, or by a cooperative combination of these, in order to:*

a) regulate movement with the objective of preventing collisions between aircraft, and between aircraft and obstacles;

b) regulate entry of aircraft into, and coordinate exit of aircraft from, the apron with the aerodrome control tower; and

c) ensure safe and expeditious movement of vehicles and appropriate regulation of other activities.

Finding:

- In compliance: WIII, WRRR, WIMM
- Non Compliance:

  WIPA - Due to the physical layout of the ramp structures, really good visibility is prevented. Hence, effective monitoring and control of ramp traffic, both vehicular and aircraft is, in many areas, prevented.

ICAO Recommendation 9.5.2 — *When the aerodrome control tower does not participate in the apron management service, procedures should be established to facilitate the orderly transition of aircraft between the apron management unit and the aerodrome control tower.*

Standard 9.5.3 An apron management service shall be provided with radiotelephony communications facilities.

Finding: In compliance where applicable.

Standard 9.5.7 An aircraft stand shall be visually monitored to ensure that the recommended clearance distances are provided to an aircraft using the stand.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.9.6 SECTION 9.6 GROUND SERVICING OF AIRCRAFT

Standard 9.6.1 Fire extinguishing equipment suitable for at least initial intervention in the event of a fuel fire and personnel trained in its use shall be readily available during the ground servicing of an aircraft, and there shall be a means of quickly summoning the rescue and fire fighting service in the event of a fire or major fuel spill.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.6.2 When aircraft refuelling operations take place while passengers are embarking, on board or disembarking, ground equipment shall be positioned so as to allow:

a) the use of a sufficient number of exits for expeditious evacuation; and

b) a ready escape route from each of the exits to be used in an emergency.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.9.7 SECTION 9.7 AERODROME VEHICLE OPERATIONS

Standard 9.7.1 A vehicle shall be operated:

a) on a manoeuvring area only as authorized by the aerodrome control tower; and

b) on an apron only as authorized by the appropriate designated authority.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.7.2 The driver of a vehicle on the movement area shall comply with all mandatory instructions conveyed by markings and signs unless otherwise authorized by:

a) the aerodrome control tower when on the manoeuvring area; or

b) the appropriate designated authority when on the apron.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 9.7.3 The driver of a vehicle on the movement area shall comply with all mandatory instructions conveyed by lights.

Compliance with this Standard was not assessed.

Standard 9.7.4 The driver of a vehicle on the movement area shall be appropriately trained for the tasks to be performed and shall comply with the instructions issued by:

a) the aerodrome control tower, when on the manoeuvring area; and

b) the appropriate designated authority, when on the apron.

Finding:

- In compliance: WIII, WIMM
- Not in compliance:

  WRRR - While personal observation indicated orderly and safe traffic flow and compliance with procedures, specific written details (other than in the Aerodrome Manual) and records were not available.

  WIPA - Formal training and specific airport licensing could not be confirmed. However, when on the manoeuvring area, enforcement of compliance with instructions issued by the aerodrome control tower appeared to be in place.

Standard 9.7.5 The driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome control tower before entering the manoeuvring area and with the appropriate designated authority before entering the apron. The driver shall maintain a continuous listening watch on the assigned frequency when on the movement area.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.9.8 SECTION 9.8 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEMS

Application

Standard 9.8.1 A surface movement guidance and control system shall be provided at an aerodrome.

A surface movement guidance and control system, other than radiotelephony communications with ramp control (at airports which have a ramp control), ground control, and tower does not exist at the four airports studied.

4.9.9 SECTION 9.9 SITING OF EQUIPMENT AND INSTALLATIONS ON OPERATIONAL AREAS

While compliance with this section was not assessed, no obvious situations of non-compliance were noted.

4.9.10 SECTION 9.10 FENCING

Application

ICAO Recommendation 9.10.1 — *A fence or other suitable barrier should be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.*

Compliance *generally* noted: WIII. However, there are various unauthorized openings in the fence (particularly on the north airport perimeter) through which animals the size of goats could pass with ease. Tended goat herds were observed by the ASI Team on the airside of the fence.

Finding:

- In compliance: WRRR
- Non Compliance:

  WIMM - There are many areas of the perimeter/airside boundary that the ASI Team was advised are not fenced leaving the airside open to entry by persons and animals without resistance. Most of these areas are across the runway from the passenger terminals and in areas not accessible by patrol road or other means.
- Compliance partially noted: WIPA: Not all areas effectively secured.

Standard 9.10.2 As of 23 November 2006, a fence of other suitable barrier shall be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

Please note 9.10.1

ICAO Recommendation 9.10.3 — *A fence or other suitable barrier should be provided on an aerodrome to deter the inadvertent or premeditated access of an unauthorized person onto a non-public area of the aerodrome.*

Finding:

- Non Compliance: WIII

  In fencing in areas other than relatively close to the terminals. Much of the remaining fence is in various states of disrepair and in need of maintenance. Many sections of the fence have been

damaged and have openings large enough for persons to enter easily through the fence line.

- Non Compliance: WRRR

  - Due: perimeter physical barriers in use at this airport are various types of metal wire, barbed wire only and wood slat fence. The fence height varies from about one meter to approximately 3 meters. Some of the fence sections have barbed wire above and others do not. Additionally, the airport is bounded on most of two sides by the sea all of which is fenced.

  - The entire fence line was generally in good condition and appeared to have routine maintenance and repair. Only those sections of the fence line that were heavily overgrown were not inspected.

  - Some sections of the fence line, including the wood slat fence, have dwellings and other buildings constructed directly on or against the fence on the landside leaving the security value of the fence in these locations as very questionable.

  - The ASI Team discovered a recent large perimeter fence repair to a wood slat section. There was a locally used foot path directly behind the repaired section on the landside and evidence of a recently used foot path starting at the repaired section on the airside. Discussions with one of the airport security guards confirmed that local villagers use the path and sometimes break the wood fence to facilitate their illegal access and that this is a continuing problem.

- Non Compliance: WIMM:

  Some sections of the perimeter/airside fence line have dwellings and other buildings constructed directly on or against the fence on the landside. Villagers living around the fence line have cut sections of the fence out in order to illegally enter the restricted airside of the airport. In one location, a security guard has been posted to keep village children off of the runway, but not out of the restricted airside area where they are allowed to play everyday.

- Non Compliance: WIPA:

  - Perimeter physical barriers in use at this airport are various types of metal wire fabric and bar or slat fence which is sometimes atop a short

masonry wall. The fence height varies from about one meter to approximately two meters. Only some of the fence sections have barbed wire above.

- There are many areas of the perimeter/airside boundary that the ASI Team was advised used to be fenced but is no longer, leaving the airside open to entry by persons and animals without resistance. Most of these areas are across the runway from the passenger terminals and in areas not accessible by patrol road.

- Perimeter physical barriers in use at this airport are various types of metal wire fabric and bar or slat fence which is sometimes atop a short masonry wall. The fence height varies from about one meter to approximately two meters. Only some of the fence sections have barbed wire above.

- There are many areas of the perimeter/airside boundary that the ASI Team was advised used to be fenced but is no longer, leaving the airside open to entry by persons and animals without resistance. Most of these areas are across the runway from the passenger terminals and in areas not accessible by patrol road.

- The ASI Team observed numerous examples of villagers and other persons illegally in the airside of the airport. The non maintained fencing, actual lack of fencing in many areas, lack of security signage and the lack of will to keep these persons from the airside leaves the perimeter/airside boundary completely worthless as a security measure.

ICAO Note 1.— This is intended to include the barring of sewers, ducts, tunnels, etc., where necessary to prevent access.

Finding:

- In compliance: WIII, WRRR

- Non Compliance:

  WIMM: The only culvert observed on the perimeter/airside boundary had a heavy grate installed across it that would prevent a person from entering, however, there was no perimeter/airside fence in the area leaving the value of the grate as zero.

- Non-applicable: WIPA

ICAO Note 2.— Special measures may be required to prevent the access of an unauthorized person to runways or taxiways which overpass public roads.

Finding:

- In compliance: WIII
- Not applicable: WRRR, WIMM, WIPA

Standard 9.10.4 As of 23 November 2006, a fence or other suitable barrier shall be provided on an aerodrome to deter the inadvertent or premeditated access of an unauthorized person onto a non-public area of the aerodrome.

Please note 9.10.3

ICAO Note 1.— This is intended to include the barring of sewers, ducts, tunnels, etc., where necessary to prevent access.

Please note 9.10.3

ICAO Note 2.— Special measures may be required to prevent the access of an unauthorized person to runways or taxiways which overpass public roads.

Please note 9.10.3

ICAO Recommendation 9.10.5 — *Suitable means of protection should be provided to deter the inadvertent or premeditated access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the aerodrome.*

Finding:

Non Compliance: WIII:

- Critical facilities such as the ATC Radar, the Fuel Farm and others require additional protection even when located within the Airside of the airport.
- The Radar Facility was adequately fenced however the ASI Team found the gate found open and unattended. Access control of the Fuel Farm appeared to be adequate although the fence surrounding the area was not well maintained and kept clear of bushes and other growth.
- Alarm systems are not installed or not operational.

- Some facilities had specific lighting for their area that provided some degree of security and others had only convenience lighting.
- CCTV coverage not operational.
- Airside facilities are visited by security patrols on a random basis.

Non Compliance: WIMM:

Critical facilities such as the Airport Power Stations, Air Traffic Control Tower (ATCT), Fuel Farm, and other similar facilities important to the continued operation of the airport require additional protection even when located within the airside of the airport. At Polonia International Airport all of the above mentioned facilities except the ATCT are located in landside restricted areas, however; the ASI Team visited them and performed an assessment of the security measures in place.

- **Fuel Farm:** The fuel farm is located within its own security compound on the southeast side of the airport but not within the airside. The facility is fenced and lighted and **the entry gate is guarded by private security**. Entry into the facility requires only advising the guard you have business with the administrative office or similar. Airport security does not regularly patrol or monitor this facility.

- **Radar Facilities:** The Polonia International Airport has two radar facilities located in landside restricted areas. One facility is located just to the southeast of the passenger terminals and ATCT and is protected to a low degree by a two meter fence line. Access to the facility is not difficult as it is located adjacent to public areas and the facility gate and entrance door is not always closed. The second radar facility is not located on the airport proper. This facility is fenced with a substantial fence topped with barbed wire (ICAO class C). The facility is normally occupied by one or more technicians although like the other radar facility, the building door is often left open. The ASI Team was able to enter this facility and walk around without seeing anyone for over three minutes which would have been ample time to put the facility out of service.

- **Air Traffic Control Tower:** The ATCT is collocated with the Fire and Rescue Station within the airside restricted area. Entrance to the ATCT is via a door located just within the right hand fire equipment bay as seen in exhibit F# below. The bay door is normally open, as is the interior door that provides direct access to the ATCT interior including the cab. While some protection is provided by the ATCT being located inside the airside

restricted area, the ATCT should not rely solely upon this security level for protection.

- **Visual Omni Range (VOR) Facility:** The VOR is located off the airport adjacent to public and residential property. The facility is fenced with a moderate type of fencing serving mainly to delineate the property boundary. The ASI Team was advised that the only alarm system for the facility monitors the operation of the VOR and not the security of the facility.

Finding: Non Compliance:

WIPA: While the following ground installations and facilities essential for the safety of civil aviation are not actually located off the aerodrome, their importance to the safety, regularity, and efficiency of civil aviation is such that 9.10.5 concerns should be referenced.

- **Fuel Farm:** The fuel farm is located within its own security compound on the northeast side of the airport but not within the airside. The facility is fenced and lighted, however, the entry gate was found to be open and unguarded. Airport security does not regularly patrol or monitor this facility.

- **Air Traffic Control Tower (ATCT):** The ATCT is collocated within the airside restricted area to the far southeast of the passenger terminal. The facility does not have an operational fence around it and does not have a security alarm system. The ATCT operators do have a portable radio that could be used to summon airport security if necessary.

- **Power House I and II:** Power house I is located in a landside restricted area located just northeast of the passenger terminal. The power house does not have any operational security alarms and is not on the airport security patrol route. Power house II is located in an airside restricted area southeast of the ATCT. The fence around this facility is in very poor condition and does not provide any security protection at all. As with the other power house, the facility does not have a security alarm and is not normally checked by airport security patrols.

- **Visual Omni Range (VOR) Facility:** The VOR is located on the airport and within the airside on the southeast side of the ATCT. The facility relies upon the often poor or even nonexistent airside perimeter fencing for its security protection. The ASI Team was advised that the only alarm system for the facility monitors the operation of the VOR and not the security of the facility.

Standard 9.10.6 As of 23 November 2006, suitable means of protection shall be provided to deter the inadvertent or premeditated access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the aerodrome.

Please note Standard 9.10.5

Location

ICAO Recommendation 9.10.7 — *The fence or barrier should be located so as to separate the movement area and other facilities or zones on the aerodrome vital to the safe operation of aircraft from areas open to public access.*

Standard 9.10.8 As of 23 November 2006, the fence or barrier shall be located so as to separate the movement area and other facilities or zones on the aerodrome vital to the safe operation of aircraft from areas open to public access.

Please note Standard 9.10.7

ICAO Recommendation 9.10.9 — *When greater security is thought necessary, a cleared area should be provided on both sides of the fence or barrier to facilitate the work of patrols and to make trespassing more difficult. Consideration should be given to the provision of a perimeter road inside the aerodrome fencing for the use of both maintenance personnel and security patrols.*

Finding:

Non Compliance: WIII:

- Some sections of the fence have dwellings and other buildings constructed directly on or against the fence on the landside leaving the security value of the fence in these locations at zero.

- **Obstruction Clearance:** Most of the fence line nearest the passenger terminal was clear of obstruction and growth. Some sections of the remaining fence line have a clear zone on the Airside. Much of the fence line has been overgrown by plants, bushes and trees causing its use as a security countermeasure to be greatly diminished and making it difficult for security patrols to be able to determine if a person or persons are hiding in the brush. When a fence is overgrown as portions of this fence line are, it also makes it very difficult to maintain the actual fence fabric.

- **Cleared areas/patrol roads:** Not all sections of the fence line have a patrol road close enough to permit adequate surveillance of the fence (see

above comment as well). Some sections have an excellent Airside perimeter road that is patrolled at random times daily by Airport Security.

Finding: Non Compliance: WRRR:

- **Obstruction Clearance:** Most of the fence line was clear of obstruction and growth. Some sections of the fence line on the north and northeast side of the airport next to a public roadway and in several other small areas have been overgrown by plants, bushes and trees causing its use as a security countermeasure to be greatly diminished and making it difficult for security patrols to be able to determine if a person or persons are hiding in the brush. When a fence is overgrown as portions of this fence line are, it also makes it very difficult to maintain the actual fence fabric.

- **Cleared areas/patrol roads:** Most sections of the fence line have an excellent airside perimeter road close enough to permit adequate surveillance of the fence, however; a few sections of the fence line are too far from the patrol road to permit adequate surveillance (also see A7 comment above as well). Most of the perimeter fence line has adequately cleared areas of varying widths on the airside.

Finding: Non Compliance: WIMM:

- **Obstruction Clearance:** Most of the fence line was not clear of obstruction and growth. Some sections of the fence line on the southeast side of the airport have been overgrown by plants, bushes and trees causing its use as a security countermeasure to be greatly diminished and making it difficult for security patrols to be able to determine if a person or persons are hiding in the brush. When a fence is overgrown as bad as portions of this fence line are, it also makes it very difficult to maintain the actual fence fabric.

- **Cleared areas/patrol roads:** Only the southeast sections of the fence line (passenger side of runway) have an airside perimeter road. Often the patrol road is not close enough to permit adequate surveillance of the fence.

- Non Compliance: WIPA: **Obstruction Clearance:** Most of the fence line was not clear of obstruction and growth. Some sections of the fence line directly adjacent to the passenger terminal have been overgrown by plants, bushes and trees causing its use as a security countermeasure to be greatly diminished and making it difficult for security patrols to be able to determine if a person or persons are hiding in the brush. When a fence is overgrown as bad as portions of this fence line are, it also makes it very difficult to maintain the actual fence fabric.

- **Cleared areas/patrol roads:** Only the north sides and runway ends of the airport fence line (passenger side of runway) have an airside perimeter road that is currently usable. Airport drawings show a patrol road completely around the general airport perimeter, however, the ASI Team was advised that the road on some of the areas on the south side was not passable. Often the patrol road that is available is not close enough to permit adequate surveillance of the fence.

4.9.11 SECTION 9.11 SECURITY LIGHTING

ICAO Recommendation.— *At an aerodrome where it is deemed desirable for security reasons, a fence or other barrier provided for the protection of international civil aviation and its facilities should be illuminated at a minimum essential level. Consideration should be given to locating lights so that the ground area on both sides of the fence or barrier, particularly at access points, is illuminated.*

Finding:

Non Compliance:

WIII: Tall stand lighting equipment was observed in some locations around the Airport Perimeter, but not the entire perimeter. Lighting was not present at locations with local housing built directly on and adjacent to the perimeter fence. A night time check of lighting revealed that approximately twenty five percent of perimeter lighting was not working.

Non Compliance:

WRRR: Lighting was observed at or on fence sections in various locations around the airport perimeter, but not the entire perimeter. Lighting was also present on some of the fence line at locations with local housing built directly on and adjacent to the perimeter fence. The lighting fixtures were about the same height as the fence making them easy to disable. A night time check of this lighting was not made available to the ASI Team, however; security personnel advised that "most" of the lights did normally work.

Non Compliance:

WIMM: The only security lighting observed on the perimeter/airside boundary was at the passenger terminal areas and guarded gates.

Non Compliance:

WIPA: The only security lighting observed on the perimeter/airside boundary was at the passenger terminal apron areas.

4.10 CHAPTER 10. AERODROME MAINTENANCE

4.10.1 SECTION 10.1 GENERAL

ICAO Recommendation 10.1.1 — *A maintenance programme, including preventive maintenance where appropriate, should be established at an aerodrome to maintain facilities in a condition which does not impair the safety, regularity or efficiency of air navigation.*
Note 1.— Preventive maintenance is programmed maintenance work done in order to prevent a failure or degradation of facilities.
Note 2.— "Facilities" are intended to include such items as pavements, visual aids, fencing, drainage systems and buildings.

Finding:

- In compliance: WIII, WRRR, WIPA.
- Non compliance:
- WIMM - While compliance in some areas was noted, it appeared that there is a very limited rostering of personnel.
- WIMM - Noted were broken circuitry, broken lighting units, and an essentially unusable ALS. These omissions create a substantial degradation of the safety.

4.10.2 SECTION 10.2 PAVEMENTS

Standard 10.2.1 The surface of pavements (runways, taxiways, aprons and adjacent areas) shall be kept clear of any loose stones or other objects that might cause damage to aircraft structures or engines, or impair the operation of aircraft systems.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 10.2.2 The surface of a runway shall be maintained in a condition such as to prevent formation of harmful irregularities.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 10.2.3 Measurements of the friction characteristics of a runway surface shall be made periodically with a continuous friction measuring device using self-wetting features.

Finding: Compliance could not be verified:

WIII, WRRR, WIMM, WIPA - as could not verify the existence of a continuous friction measuring device.

Standard 10.2.4 Corrective maintenance action shall be taken when the friction characteristics for either the entire runway or a portion thereof are below a minimum friction level specified by the State.

ICAO Note.— A portion of runway in the order of 100 m long maybe considered significant for maintenance or reporting action.

Finding: Compliance could not be verified:

WIII, WRRR, WIMM, WIPA - as could not verify the existence of a continuous friction measuring device. However, each airport studied has an established program for rubber removal.

ICAO Recommendation 10.2.5 — *Corrective maintenance action should be considered when the friction characteristics for either the entire runway or a portion thereof are below a maintenance planning level specified by the State.*

Finding: Compliance could not be verified:

WIII, WRRR, WIMM, WIPA - as could not verify the existence of a continuous friction measuring device. However, each airport studied has an established program for rubber removal.

ICAO Recommendation 10.2.6 — *When there is reason to believe that the drainage characteristics of a runway, or portions thereof, are poor due to slopes or depressions, then the runway friction characteristics should be assessed under natural or simulated conditions that are representative of local rain and corrective maintenance action should be taken as necessary.*

Finding: Compliance could not be verified.

The ASI Team could not verify the existence of a continuous friction measuring device at WIII, WRRR, WIMM, WIPA.

ICAO Recommendation 10.2.7 — *When a taxiway is used by turbine-engined aeroplanes, the surface of the taxiway shoulders should be maintained so as to be*

free of any loose stones or other objects that could be ingested by the aeroplane engines.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

Standard 10.2.8 The surface of a paved runway shall be maintained in a condition so as to provide good friction characteristics and low rolling resistance. Snow, slush, ice, standing water, mud, dust, sand, oil, rubber deposits and other contaminants shall be removed as rapidly and completely as possible to minimize accumulation.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

4.10.3 SECTION 10.3 RUNWAY PAVEMENT OVERLAYS

Compliance with this Section was not assessed.

4.10.4 SECTION 10.4 VISUAL AIDS

ICAO Note.— These specifications are intended to define the maintenance performance level objectives. They are not intended to define whether the lighting system is operationally out of service.

Standard 10.4.1 A light shall be deemed to be unserviceable when the main beam average intensity is less than 50 per cent of the value specified in the appropriate figure in Appendix 2

Standard 10.4.2 A system of preventive maintenance of visual aids shall be employed to ensure lighting and marking system reliability.
ICAO Note.— Guidance on preventive maintenance of visual aids is given in the Airport Services Manual, *Part 9.*

Finding:

- In compliance: WIII, WRRR, WIMM.
- Non Compliance:

  WIPA - While there is an ongoing maintenance program in existence, noted were broken circuitry, broken lighting units, and an essentially ineffective ALS.

ICAO Recommendation 10.4.3 — *The system of preventive maintenance employed for a precision approach runway category II or III should include at least the following checks:*

a) visual inspection and in-field measurement of the intensity, beam spread and orientation of lights included in the approach and runway lighting systems;

b) control and measurement of the electrical characteristics of each circuitry included in the approach and runway lighting systems; and

c) control of the correct functioning of light intensity settings used by air traffic control.

Not applicable at any of the airports studied.

Standard 10.4.7 The system of preventive maintenance employed for a precision approach runway category II or III shall have as its objective that, during any period of category II or III operations, all approach and runway lights are serviceable, and that in any event at least:

a) 95 per cent of the lights are serviceable in each of the following particular significant elements:

1) precision approach category II and III lighting system, the inner 450 m;

2) runway centre line lights;

3) runway threshold lights; and

4) runway edge lights;

b) 90 per cent of the lights are serviceable in the touchdown zone lights;

c) 85 per cent of the lights are serviceable in the approach lighting system beyond 450 m; and

d) 75 per cent of the lights are serviceable in the runway end lights.

In order to provide continuity of guidance, the allowable percentage of unserviceable lights shall not be permitted in such a way as to alter the basic pattern of the lighting system.

Additionally, an unserviceable light shall not be permitted adjacent to another unserviceable light, except in a barrette or a crossbar where two adjacent unserviceable lights may be permitted.

Not applicable at any of the airports studied.

Standard 10.4.8 The system of preventive maintenance employed for a stop bar provided at a runway-holding position used in conjunction with a runway intended for operations in runway visual range conditions less than a value of 350 m shall have the following objectives:

Not applicable at any of the airports studied.

APPENDIX 1. COLOURS FOR AERONAUTICAL GROUND LIGHTS, MARKINGS, SIGNS AND PANELS

Compliance with this Section was not assessed.

APPENDIX 2. AERONAUTICAL GROUND LIGHT CHARACTERISTICS

Compliance with this Section was not assessed.

APPENDIX 3. MANDATORY INSTRUCTION MARKINGS AND INFORMATION MARKINGS

Compliance with this Section was not assessed.

APPENDIX 4. REQUIREMENTS CONCERNING DESIGN OF TAXIING GUIDANCE SIGNS

Compliance with this Section was not assessed.

APPENDIX 5. AERONAUTICAL DATA QUALITY REQUIREMENTS

Please note earlier references to latitude and longitude SARPS.

Elevation/altitude/height:

Compliance with this Section was not assessed.

Table A5-5. Length/Distance/Dimension

Compliance with this Section was not assessed.

APPENDIX 6. LOCATION OF LIGHTS ON OBSTACLES

Compliance with this Section was not assessed.

5 ATTACHMENT A: GUIDANCE MATERIAL SUPPLEMENTARY TO ANNEX 14, VOLUME I

Compliance with Section 1 – 6 was not assessed.

5.1 SECTION 7. DETERMINATION OF FRICTION CHARACTERISTICS OF WET PAVED RUNWAYS

Please note earlier references to continuous friction measuring devices.

7.1 The friction of a wet paved runway should be measured to:

a) verify the friction characteristics of new or resurfaced paved runways when wet (Chapter 3, 3.1.24);

b) assess periodically the slipperiness of paved runways when wet (Chapter 10, 10.2.3);

c) determine the effect on friction when drainage characteristics are poor (Chapter 10, 10.2.6); and

d) determine the friction of paved runways that become slippery under unusual conditions (Chapter 2, 2.9.8).

Please note earlier references to continuous friction measuring devices.

7.2 Compliance with 7.2 was not assessed.

7.3 Friction tests of existing surface conditions should be taken periodically in order to identify runways with low friction when wet. A State should define what minimum friction level it considers acceptable before a runway is classified as slippery when wet and publish this value in the State's aeronautical information publication (AIP). When the friction of a runway is found to be below this reported value, then such information should be promulgated by NOTAM. The State should also establish a maintenance planning level, below which, appropriate corrective maintenance action should be initiated to improve the friction.

Please note earlier references to continuous friction measuring devices.

7.4 For uniformity and to permit comparison with other runways, friction tests of existing, new or resurfaced runways should be made with a continuous friction measuring device provided with a smooth tread tire. The device should have a capability of using self-wetting features to enable measurements of the friction characteristics of the surface to be made at a water depth of at least 1 mm.

Please note earlier references to continuous friction measuring devices.

7.2 Compliance with **7.5 – 7.9** was not assessed.

7.10 The friction values given [in this section] are absolute values and are intended to be applied without any tolerance.

5.2 SECTION 8. STRIPS

Compliance with this Section was not assessed.

5.3 SECTION 9. RUNWAY END SAFETY AREAS

Compliance with this Section was not assessed.

5.4 SECTION 10. LOCATION OF THRESHOLD

Compliance with this Section was not assessed.

5.5 SECTION 11. APPROACH LIGHTING SYSTEMS

Compliance with this Section was not assessed.

5.6 SECTION 12. PRIORITY OF INSTALLATION OF VISUAL APPROACH SLOPE INDICATOR SYSTEMS

GM 12.1 It has been found impracticable to develop guidance material that will permit a completely objective analysis to be made of which runway on an aerodrome should receive first priority for the installation of a visual approach slope indicator system. However, factors that must be considered when making such a decision are:

a) frequency of use;

b) seriousness of the hazard;

c) presence of other visual and non-visual aids;

d) type of aeroplanes using the runway; and

e) frequency and type of adverse weather conditions under which the runway will be used.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

GM 12.2 With respect to the seriousness of the hazard, the order given in the application specifications for a visual approach slope indicator system, 5.3.5.1 b) to e) of Chapter 5 may be used as a general guide. These may be summarized as:

a) inadequate visual guidance because of:

1) approaches over water or featureless terrain, or absence of sufficient extraneous light in the approach area by night;

2) deceptive surrounding terrain;

b) serious hazard in approach;

c) serious hazard if aeroplanes undershoot or overrun; and

d) unusual turbulence.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

GM 12.3 The presence of other visual or non-visual aids is a very important factor. Runways equipped with ILS or MLS would generally receive the lowest priority for a visual approach slope indicator system installation. It must be remembered, though, that visual approach slope indicator systems are visual approach aids in their own right and can supplement electronic aids. When serious hazards exist and/or a substantial number of aeroplanes not equipped for ILS or MLS use a runway, priority might be given to installing a visual approach slope indicator on this runway.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

GM 12.4 Priority should be given to runways used by turbojet aeroplanes.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

5.7 SECTION 13. LIGHTING OF UNSERVICEABLE AREAS

Where a temporarily unserviceable area exists, it may be marked with fixed-red lights

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

5.8 SECTION 14. RAPID EXIT TAXIWAY INDICATOR LIGHTS

Compliance with this Section was not assessed.

5.9 SECTION 15. INTENSITY CONTROL OF APPROACH AND RUNWAY LIGHTS

Compliance with this Section was not assessed.

5.10 SECTION 16. SIGNAL AREA

Compliance with this Section was not assessed.

5.11 SECTION 17. RESCUE AND FIRE FIGHTING SERVICES

5.11.1 17.1 ADMINISTRATION

GM 17.1.1 The rescue and fire fighting service at an aerodrome should be under the administrative control of the aerodrome management, which should also be responsible for ensuring that the service provided is organized, equipped, staffed, trained and operated in such a manner as to fulfill its proper functions.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

GM 17.1.2 In drawing up the detailed plan for the conduct of search and rescue operations in accordance with 4.2.1 of Annex 12, the aerodrome management should coordinate its plans with the relevant rescue coordination centres to ensure that the respective limits of their responsibilities for an aircraft accident within the vicinity of an aerodrome are clearly delineated.

Finding:

- In compliance: WIII, WRRR
- Compliance could not be verified:

  WIMM, WIPA

GM 17.1.3 Coordination between the rescue and fire fighting service at an aerodrome and public protective agencies, such as local fire brigade, police force, coast guard and hospitals, should be achieved by prior agreement for assistance in dealing with an aircraft accident.

Finding:

- In compliance: WIII, WRRR
- Compliance could not be verified:

  WIMM, as while the AEP is referenced in the Aerodrome Manual (Sect. 4.3), it was not noted.

- Compliance could not be verified:

WIPA - While the AEP is addressed in the Aerodrome Manual (Sect. 4.3), the reference is of such limited degree that the ASI Team believes it does not provide the degree of guidance intended in this section.

GM 17.1.4 A grid map of the aerodrome and it's immediate vicinity should be provided for the use of the aerodrome services concerned. Information concerning topography, access roads and location of water supplies should be indicated. This map should be conspicuously posted in the control tower and fire station, and available on the rescue and fire fighting vehicles and such other supporting vehicles required to respond to an aircraft accident or incident. Copies should also be distributed to public protective agencies as desirable.

Finding: In compliance: WIII, WRRR, WIMM, WIPA.

GM 17.1.5 Coordinated instructions should be drawn up detailing the responsibilities of all concerned and the action to be taken in dealing with emergencies. The appropriate authority should ensure that such instructions are promulgated and observed.

Finding:

- In compliance: WIII, WRRR
- Compliance could not be verified:

  WIMM - As while the AEP is referenced in the Aerodrome Manual (Sect. 4.3), it was not noted.

- Compliance could not be verified:

  WIPA - While the AEP is addressed in the Aerodrome Manual (Sect. 4.3), the reference is of such limited degree that the ASI Team believes it does not provide the degree of guidance intended in this section.

5.11.2 M 17.2 TRAINING

The training curriculum should include initial and recurrent instruction in at least the following areas:

a) airport familiarization;
b) aircraft familiarization;
c) rescue and fire fighting personnel safety;
d) emergency communications systems on the aerodrome, including aircraft fire related alarms;

e) use of the fire hoses, nozzles, turrets and other appliances required for compliance with Chapter 9, 9.2;
f) application of the types of extinguishing agents required for compliance with Chapter 9, 9.2;
g) emergency aircraft evacuation assistance;
h) fire fighting operations;
i) adaptation and use of structural rescue and fire fighting equipment for aircraft rescue and fire fighting;
j) dangerous goods;
k) familiarization with fire fighters' duties under the aerodrome emergency plan; and
l) protective clothing and respiratory protection.

Finding: In compliance: WIII, WRRR, WIMM, WIPA,

Except live fire drills could not be confirmed: WIMM.

5.11.3 GM 17.3 LEVEL OF PROTECTION TO BE PROVIDED

17.3.1 In accordance with Chapter 9, 9.2 aerodromes should be categorized for rescue and fire fighting purposes and the level of protection provided should be appropriate to the aerodrome category.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

17.3.2 However, Chapter 9, 9.2.3 permits a lower level of protection to be provided for a limited period where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months. It is important to note that the concession included in 9.2.3 is applicable only where there is a wide range of difference between the dimensions of the aeroplanes included in reaching 700 movements.

Not applied at any of the airports studied.

5.11.4 GM 17.4 RESCUE EQUIPMENT FOR DIFFICULT ENVIRONMENTS

17.4.1 Suitable rescue equipment and services should be available at an aerodrome where the area to be covered by the service includes water, swampy areas or other difficult environment that cannot be fully served by conventional wheeled vehicles. This is particularly important where a significant portion of approach/departure operations takes place over these areas.

Finding:

- In compliance: WIII
- Compliance reported, but could not be confirmed:

  WRRR: Two rescue boats reported to be on site.

- Not applicable: WIMM, WIPA

GM 17.4.2 The rescue equipment should be carried on boats or other vehicles such as helicopters and amphibious or air cushion vehicles, capable of operating in the area concerned. The vehicles should be so located that they can be brought into action quickly to respond to the areas covered by the service.

Finding:

- In compliance: WIII
- Compliance reported, but could not be confirmed:

  WRRR: Two rescue boats reported to be on site.

- Not applicable: WIMM, WIPA

GM 17.4.3 At an aerodrome bordering the water, the boats or other vehicles should preferably be located on the aerodrome, and convenient launching or docking sites provided. If these vehicles are located off the aerodrome, they should preferably be under the control of the aerodrome rescue and fire fighting service or, if this is not practicable, under the control of another competent public or private organization working in close coordination with the aerodrome rescue and fire fighting service (such as police, military services, harbour patrol or coast guard).

Finding:

- In compliance: WIII
- Compliance reported, but could not be confirmed:

  WRRR: Two rescue boats reported to be on site.

- Not applicable: WIMM, WIPA

GM 17.4.4 Boats or other vehicles should have as high a speed as practicable so as to reach an accident site in minimum time. To reduce the possibility of injury during rescue operations, water jet-driven boats are preferred to water propeller-driven boats unless the propellers of the latter boats are ducted.

Vehicles used in this service should be equipped with life rafts and life preservers related to the requirements of the larger aircraft normally using the aerodrome, with two-way radio communication, and with floodlights for night operations. If aircraft operations during periods of low visibility are expected, it may be necessary to provide guidance for the responding emergency vehicles.

Finding:

- Compliance was not confirmed:

  WIII, WRRR

- Not applicable: WIMM, WIPA

GM 17.4.5 The personnel designated to operate the equipment should be adequately trained and drilled for rescue services in the appropriate environment.

Finding:

- In compliance: WIII
- Compliance reported, but could not be confirmed:

  WRRR: Two rescue boats reported to be on site.

- Not applicable: WIMM, WIPA

5.11.5 GM 17.5 FACILITIES

GM 17.5.1 The provision of special telephone, two-way radio communication and general alarm systems for the rescue and fire fighting service is desirable to ensure the dependable transmission of essential emergency and routine information. Consistent with the individual requirements of each aerodrome, these facilities serve the following purposes:

a) direct communication between the activating authority and the aerodrome fire station in order to ensure the prompt alerting and dispatch of rescue and fire fighting vehicles and personnel in the event of an aircraft accident or incident;
b) emergency signals to ensure the immediate summoning of designated personnel not on standby duty;

c) as necessary, summoning essential related services on or off the aerodrome; and
d) maintaining communication by means of two-way radio with the rescue and fire fighting vehicles in attendance at an aircraft accident or incident.

Finding: In compliance: WIII, WRRR, WIMM, WIPA

GM 17.5.2 The availability of ambulance and medical facilities for the removal and after-care of casualties arising from an aircraft accident should receive the careful consideration of the appropriate authority and should form part of the overall emergency plan established to deal with such emergencies.

Findings:

- In compliance: WIII
- Compliance could not be fully confirmed:

  WRRR, WIMM, WIPA - As Memorandums of Understanding or formalized agreements with the local hospitals regarding a sudden need for their facilities in the event of a catastrophic accident could not be confirmed. The existence of actual plans in place at local medical facilities could not be confirmed.

5.12 SECTION 18. OPERATORS OF VEHICLES

GM 18.1 The authorities responsible for the operation of vehicles on the movement area should ensure that the operators are properly qualified. This may include, as appropriate to the driver's function, knowledge of:
a) the geography of the aerodrome;
b) aerodrome signs, markings and lights;
c) radiotelephone operating procedures;
d) terms and phrases used in aerodrome control including the ICAO spelling alphabet;
e) rules of air traffic services as they relate to ground operations;
f) airport rules and procedures; and
g) specialist functions as required, for example, in rescue and fire fighting.

Findings:

- In compliance: WIII, WRRR, WIMM
- Non Compliance: WIPA

GM 18.2 The operator should be able to demonstrate competency, as appropriate, in:

a) the operation or use of vehicle transmit/receive equipment;
b) understanding and complying with air traffic control and local procedures;
c) vehicle navigation on the aerodrome; and
d) special skills required for the particular function.

In addition, as required for any specialist function, the operator should be the holder of a State driver's licence, a State radio operator's licence or other licences.

Findings:

- In compliance: WIII, WRRR, WIPA
- Non Compliance:

  WIMM, as, while the standard requiring vehicle permits and stickers exists, the mechanism is not yet in place. No stickers are presently required.

GM 18.3 The above should be applied as is appropriate to the function to be performed by the operator and it is not necessary that all operators be trained to the same level, for example, operators whose functions are restricted to the apron.

GM 18.4 If special procedures apply for operations in low visibility conditions, it is desirable to verify an operator's knowledge of the procedures through periodic checks.

Findings:

- In compliance: WIII, WRRR, WIMM
- Non Compliance:

  WIPA

5.13 SECTION 19. THE ACN-PCN METHOD OF REPORTING PAVEMENT STRENGTH

Findings: In compliance: WIII, WRRR, WIMM, WIPA

6 ATTACHMENT B: SOEKARNO HATTA INTERNATIONAL AIRPORT (WIII) FINDINGS

6.1 SAFETY PROTOCOLS

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

- ✓ Standards and Recommended Practices (SARPs) required by ICAO ***Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations***, 4th Edition, applicable as of 1 July 2004
- ✓ Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001
- ✓ International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

6.2 ADDITIONAL REFERENCED DOCUMENTS

The following additional documents are referenced in the report:

Manual of Standards - Part 139 Aerodromes (MOS), is made pursuant to Civil Aviation Safety Regulations CASR Part 139, and comprises specifications (Standards) prescribed by the DGAC of the Government of Indonesia

Aerodrome Manual of Jakarta International Airport Soekarno – Hatta, applicable as of 03 January, 2005

6.3 AIR TRAFFIC CONTROL TOWER

6.3.1 STAFFING

Licensing

Finding: In compliance with good practice:

- Staff operate with licenses.
- Staff are required to have medicals.
- Staff receive competency checks every six months.

Establishment

Finding: Not in compliance with good practice:

- Number of controllers: 25
- Number of support staff: 4

It appears that there are not (at times) sufficient qualified controllers to provide optimal air traffic control services However, it is reported that there are seven more controllers in training at this time.

Watch Rosters

Finding: Not in compliance with good practice:

- Watch rosters are published every five days.
- Rostering limitations may be being compromised during the time period 1900 to 2100.

Management Functions & Responsibilities

Finding: In compliance with good practice:

- Key staff are identified.
- Positions, responsibilities, functions, and accountabilities are in writing and are accessible.

6.3.2 EQUIPMENT

Communications

Finding: Not in compliance with good practice:

Anti-blocking systems (e.g., CONTRAN) availability could not be confirmed.

Finding: In compliance with good practice:

- Published frequencies are available.
- Headsets are provided and serviceable.
- Communications are "perfectly readable" ("5 x 5").
- Back-up communications capability is available.
- Controllers are trained for contingency communications procedures.
- Fixed telephone lines with telephones are available.
- Voice recording facilities are available.
- Voice recordings are kept for three months.
- Controllers know how to "impound" tapes.

- Contingencies are available for when the system is unavailable; this contingency is reported to be included in exercises every six months.
- Emergency staff are alerted by a direct telephone line and by crash bells.
- Controllers receive training on emergency procedures and in handling emergencies.
- Checklists are available for emergencies.
- The airfield crash map is available and immediately accessible.

Information Systems

Finding: In compliance with good practice:

- MET display is displayed and received regularly (each 30 minutes?) from AIS.
- Surface wind indication is provided both in direction and velocity.

Serviceability Indicators

Finding: In compliance with good practice:

- The serviceability of essential aids and lighting is by monitors and an aerodrome ground lighting indicator.

- Controllers' response to unservicabilities is to contact engineering.

Aerodrome Ground Lighting Indicator

Finding: In compliance with good practice:

There is a fully serviceable aerodrome ground lighting indicator.

Visual Signaling

Finding: In compliance with good practice:

- A light gun (hanging from the ceiling) is available.
- Staff have had training in its use.
- Spare bulbs are available.
- ATIS is available and serviceable.

6.3.3 ACCOMMODATION

Operational Positions

Finding: In compliance with good practice:

- Operational equipment is laid out with some consideration for ergonomics.
- There appear to be sufficient operating positions.

Visual Control Room

Finding: In compliance with good practice:

- The view allows an unobstructed view from the control room.
- Reflections are kept to a minimum.
- Visual Display Unites (VDU's) are sited to minimize reflection interference.
- Binoculars are provided.
- The tower is accessed via a combination of an elevator and a stairway.
- A tower log is provided.
- The staff are trained for encountering and handling emergency situations.

6.4 AERODROME MANUAL:

Please Note: Each numerical reference refers to the specific section or sub-section in the Aerodrome Manual

It is noted that the intent is for the Aerodrome Manual to be a "living document", i.e., capable of being updated / revised page-by-page or section-by-section as appropriate. It is further noted that the bottom line of Page 3 includes a date.

Finding: Not in compliance with good practice:

- What are the number and dates of AMENDMENTS issued since publication of the **Aerodrome Manual**? Have there been any?

- As certain pages (e.g., 5.1.1 – Page 134) are very likely subject to frequent and important updating, it can be of critical importance to be using the most current information (name and telephone numbers) existing. This is particularly relevent in the event of an emergency, as in the list of contact persons (4.3.8). No method of determining the currency of each page could be found.

6.4.1 PART 1 - GENERAL INFORMATION

Sect 1.2 Aerodrome Certificate Number:

Adm. OC/001/2005

Sect 1.4 Aeronautical Information

Sect 1.5 Recording Aircraft Movements

Finding: In compliance with good practice

Records were noted

Finding: In compliance with good practice

Sect 1.6 Aerodrome Safety Management System

It was reported that in January, 2005, a meeting of airport managers of all airports managed by AP II was called, and that each airport manager signed a document regarding the development of an aerodrome safety management system.

An ICAO safety expert from Singapore is to develop this system.

It was described as a Safety Management System Program with a System Action Implementation Plan, with several stages, including:

A. Forward by June of 2006
B. Brief explanation of reason for accident, and the consequences thereof, including resultant costs.

Finding: Not in compliance with good practice:

It does not appear that there is in place at this time an overall Aerodrome Safety Management System.

6.4.2 PART 2 - AERODROME SITE DETAILS

Sect 2.1 Aerodrome Plan

Sect 2.1.2 Wind Direction Indicators

Finding: In compliance with good practice

Four wind direction indicators were noted – all in good working order.

6.4.3 PART 3 - AERODROME DIMENSIONS AND RELATED INFORMATION

Sect 3.1 Jakarta International Airport Soekarno-Hatta (WIII)

Sect 3.2 Belly landing area appeared to be as noted

Finding: In compliance with good practice

Sect 3.2.7 Geographical coordinates of each aircraft stand

Finding: Not in compliance with good practice:

Table 6. Most of these co-ordinates are outdated. When were they last updated?

Sect 3.2.12 AD Category 9 verified

Finding: In compliance with good practice:

Sect 3.2.13 Fueling Facilities

Procedures, equipment, scheduling, and management of aircraft fuel handling, including the routing and protection from the delivery source to the fuel farm and on to the aircraft, the filtration system, and the testing procedures were observed and reviewed.

The procedures for assuring settling in the receiver tanks, the water draw-off checks, the filtration systems, the testing of the fuel for debris, for clarity, the conductivity checks, the sampling and retention of samples, and all associated record keeping were noted. Records indicated a tight adherence to required procedure.

While a detailed inspection of on-site available firefighting equipment was not accomplished, firefighting equipment was very much in evidence.

No fuel leaks, nor seepages, nor pools of fuel were in evidence. No indication of any escaping fuel was seen.

Finding: In compliance with good practice

Sect 3.2.17 Surface Movement Guidance and Control System & Marking

Reviewed and verified.

Finding: In compliance with good practice

Sect 3.2.19 Radio Navigation and Landing Aid

Finding: Not in compliance with good practice:

Table 8:

DVOR/DME	CKG	Coordinates Listed:	06°11'18.82"S 106°31'37.53"E
DVOR/DME	DKI	Coordinates Listed:	05°57'40.317"S 107°02'07.879"E
DVOR/DME	IMU	Coordinates Listed:	06°18'17.05"S 108°20'23.05"E

Numerous other co-ordinates listed also appear to be out of date.

6.4.4 PART 4 - AERODROME OPERATING PROCEDURES

Sect 4.1 Aerodrome Reporting

Met with Mr. Scamet Pujiono, the Director of the building in which the AIS Unit (Briefing Office) is located.

Following an introductory walk through of the ATC facility, a Standard Weather Forecast Packet for the local area was received.

The ICAO AREA E SIG WX Forecast Chart, the five wind / temperature charts of FL 18.5 through FL 390, the forecast weather for the area stations, and the Satellite Photograph of the Area were received.

A NOTAM Packet was requested and the current DAILY PRE-FLIGHT INFORMATION BULLETIN was received.

Finding: In compliance with good practice

Sect 4.1.2 Standard Briefing Package to Flight Crew

A standard briefing for an international flight was requested and provided. Appropriate NOTAMS (Feb 04, 2006, 0038) and weather briefings (20060204 0204Z) appeared to be current and standard.

Finding: In compliance with good practice

Standard ICAO FLIGHT PLAN form for Soekarno-Hatta available and received.

Finding: In compliance with good practice, except:

Finding: Not in compliance with good practice

Many of the following are out of date:

- ILS Instrument Approach Charts available in the AIP in the AIS Office are dated as follows:

- ILS 07R – 03 OCT 02 ILS 07L- 03 OCT 02
- ILS 25L – 7th edition ILS 25R – 7th edition

- Current Jeppesen Instrument Approach Charts are dated as follows:

- ILS 07R – 22 OCT 04 ILS 07L - 22 OCT 04
- ILS 25L – 24 SEP 04 ILS 25R – 24 SEP 04

- As Jeppesen would likely receive their information from the Sub Directorate of the DGAC, it is likely that the DGAC has up-to-date information. However, it would appear that this information is either 1) not being entered into the charts included in the AIS Publication, or 2) the AIS offices are not receiving the up-to-date charts.

Sect 4.1.4

Mr. Pujiono advised that all Aerodrome AIS Officers hold a valid certificate of competency issued by the DGAC, and that every year a re-qualification and competency check is required of each holder in order that the holder be certificated to continue as an Aerodrome AIS Officer.

Finding: In compliance with good practice

Mr. Pujiono stated that all NOTAMS are stored in the City Headquarters.

Finding: In compliance with good practice

Sect 4.1.6

Mr. Pujiono advised that all reports are passed from the ATS Coordinator to his chief every 24 hours.

Finding: In compliance with good practice

Sect 4.1.9

Mr. Pujiono stated that there are presently 22 Senior License Holders and one Junior License Holder.

Finding: In compliance with good practice

Sect 4.2 Access to Movement Area

Sect 4.2.2

Each of the 12 motor vehicles checked had current permits (including Airport Vehicle Pass [sticker] issued by AMC) affixed to the windscreen, and appeared to be in good serviceable condition.

Finding: In compliance with good practice

The only exception was the tires on two of the "tugs", which were worn to an extent that no tread remained.

Sect 4.2.4 Access Controls

Passes are normally issued with a duration of one year.

The application when filed is sent to the Administrator (Regulator), and if "OK'ed" it is then sent to the Operations Branch, then to the Airside for approval, and on to the AMC for a vehicle safety check.

Finding: In compliance with good practice

Sect 4.2.5 List of Documents Checked

The vehicle inspection includes 26 items for GSE or mobil, and 16 for a motorcycle.
The procedure and forms were reviewed. The vehicle inspection form reviewed was for a mobil inspected and authorized on 25-01-2006.

Passes for the cargo area are reported as 1065 for vehicle and 312 for motorcycles.

Finding: In compliance with good practice

Sect 4.3 Aerodrome Emergency Plans

Finding: Not in compliance with good practice:

- Unable to determine if there are MOU's (Memorandums of Understanding) with the local hospitals.
- Are there formalized agreements regarding a sudden need for the medical facilities in the event of a catastrophic accident?
- Do the local medical facilities have actual plans in place for such a contingency?

AIRPORT EMERGENCY EXERCISES:

Scheduling of the exercises is as follows:

- A partial exercise takes place every four months.

- A "major full scale" exercise is scheduled every two years. The last one was in September of 2004, and the next one is planned for November of 2006.

- Exercises are to include fire application & extinguishing, bomb threat, hijacking, crash, sabotage, and fuel spills.

- The Airport Emergency Exercise of 20 September, 2004 was reviewed and discussed in detail, stage by stage. As described and discussed, it appeared to have been a rather well-developed and comprehensive exercise.

Finding: In compliance with good practice, except:

Finding: Not in compliance with good practice:

- There appears to be a potential problem in response time from hospitals to the accident site (on *or* off- airport), due to the distance from hospital to the airport. Downtown Jakarta's distance combined with potential road problems due to heavy incident-associated traffic could create an extremely long lapse time between an incident and potential emergency medical support. Further, in a weather-related accident, the low-lying roadway (as one approaches the airport entrance from the city), could easily be flooded, rendering it impassable to emergency vehicles. In the area of KM 24, the water level appears to be at best around 30 cm. below the pavement level.

- From a facilitation standpoint: It was reported that not infrequently heavy rains result in extensive road flooding in the above noted area, closing off access to the airport for hours at a time. It was noted, however, that some mitigating road construction is occurring.

- It would appear that while some areas of radio communication were successful, there is need of substantial increase in capability in other areas:

  - In a hijacking, the only communication capability appears to be unscrambled VHF. No provisions for hard line capability between the aircraft and the command post were noted. Sufficient on-hand telephone line wire with appropriate jacks to connect the aircraft's external power receptacle ground radio panel to the command post were also absent.

  - There appears to be a significant undersupply of mobile units (handy-talkies - EDACS 300P) for day-to-day operations. While the *system capability* is good, there appears to be a severe problem regarding the supply of batteries, chargers, and spare parts. It was reported repeatedly that while there are approximately 310 units available, there are only about 200 in good condition. There is a need of approximately 600 units total in order to provide complete communication capability. While this present situation may appear to suffice on a daily basis, it could become extremely problematic in a crisis situation. Secondly, during the day-to-day operation, it can severely limit the effectiveness and capability of the force.

POST – EXERCISE EVALUATION:

The substantial value of the exercise is clearly indicated in the valuable discussions that the ASI team had. Following are several observations regarding the exercise as reported.

Finding: Not in compliance with good practice:

There was concern expressed that the VIP meetings and associated protocol were not complete or well organized.

While the protocol aspects are clearly of importance, the question arises: How key is this to the actual determination of the organizations' real preparedness for handling a major emergency at the airport? An actual emergency will likely give virtually no notification – it may well suddenly happen. Therefore, receiving early notification affords all an extra opportunity to suddenly complete preparation for the "emergency". Is this thereby really going to give a true indication of real preparedness?

On the other hand, extensive preparation time – ideally several months – is optimal for preparation for a major exercise. So, there is a balance to be struck.

Communication appeared to be an ongoing and multi-faceted problem:

In the bomb threat phase:

- The police response was delayed due to late receiving of the bomb threat message;
- ATC did not receive the message in a timely way;
- The Administrator did not receive the information from the staff, due to a busy telephone line.

Communication is almost ALWAYS a key problem. Backup procedure and management oversight to insure that each procedure is operationally available did not appear to be in evidence.

Sect 4.3.6 Airport Emergency Plan Review

Conclusions & Recommendations:

Finding: Not in compliance with good practice:

While the following Jakarta Airport follow-up meeting's conclusions and recommendations are clear indications of very good plan review and study, have they since been mitigated? Have appropriate procedures since been emplaced?

a. Coordination and communication involving instances of bomb threat and other technical things still disorganized.

b. "Who needs what" isn't organized correctly.

c. Implementation of procedures still not good; coordination mechanism is needed to integrate together input from AP2, the affected airline, and police in case of a real emergency.

d. Still have assessor team for recommendation of bomb threat, etc.

Suggestion: Correct a, b, & c

Finding: Not in compliance with good practice:

Major exercises are implemented to discover existing problems such as those listed above.

The ASI Team's questions:

- Have the corrective measures actually been emplaced?
- Is the needed additional equipment now in place and available?
- Are the procedures revised, published, and incorporated into recurrent training?
- Is the management oversight now in place?

There was reported to be a problem with many vehicles stopped on the highway bridge (close to the catering building), watching the exercise.

Airport Emergency Operations Centre: Location in the RFFS Building

Command Post: Location .....

Finding: Not in compliance with good practice:

A general concern expressed was the need for a response to a bomb threat within ten-minutes with the necessary equipment on hand. It might be to the advantage of the airport to buy its own equipment and then loan it to the police upon their request. The airport could then control the location and immediate availability of the equipment.

Sect 4.3.8

Finding: Not in compliance with good practice:

- Are there **24-hour** contact numbers for each of these individuals available and accessible on immediate notice? If so, where are the numbers to be found? Are there current 24-hour facsimile numbers available?

- Emergency Operations Centre (EOC):

- The size of the EOC is very good. Size: approximately 11 m x 5.3 m & 4.5 m x 4.5 m (approximately 78.5 m²).
- Communications: two telephones and fax capability and radio availability
- Console: inoperative.

Finding: In compliance with good practice

MOBILE COMMAND POST:
Size: Approximately 2.25m x 6.5 m (approximately 15 m²).

Finding: In compliance with good practice

Sect 4.4 Rescue and Firefighting Service (RFFS)

A meeting was held with Mr.Sutrisano, the Chief of the Main RFFS Facility.

Sect 4.4.4

Mr.Sutrisano advised that while the assessed category for the aerodrome is Category 9, the category capability is now Category 10, due to the availability of 30,000 liters of foam / chemical now held by the RFFS. (24.000 liter required to maintained category 9.)

RFFS Assessed Category is 9. (Advised upgrading to Category 10 due requirements for Airbus Industries A-380).

Finding: In compliance with good practice

Sect 4.4.5

Reduction of Category: If Category is temporarily reduced, airport can call upon the two airport RFFS substations to mitigate and hold the category at 9.

Finding: In compliance with good practice

Sect 4.4.6

Inventory: A review of the available on-station equipment indicated that the equipment listed in 4.4.6 is present.

Morita truck – 10,000 ltr. capacity – 29 ton

Detailed explanations of a number of the units in inventory were delivered,

including the 20-ton air bag lifts, the bomb trailer, and aircraft recovery equipment.

Finding: In compliance with good practice

Sect 4.4.7 Standard Operating Procedures (SOP)

Equipment is available as shown in Aerodrome Manual.

Discussion indicated the existence of SOP's.

Finding: In compliance with good practice

Sect 4.4.8 RFFS Training Requirements & Records

Review of records satisfactory.

Records of Multi-Vehicle Live Fire Drills for all four groups for 13 Apr, 25 August, and 20 and 22 Dec, 2005 were presented on request, as was a sample of "every day drills" curriculum, and "one week / every week drills" curriculum.

There is a total of 189 persons in the RFFS.

Finding: In compliance with good practice

Sect 4.4.9 Human Resources RFFS

Review of records satisfactory – 189 total persons

Sect 4.4.11 Response Time

Review of records satisfactory (12 MEI, 2005)

Finding: In compliance with good practice

Sect 4.4.13 Foam Quality Tests

Review of records satisfactory (01 September, 2005)

Finding: In compliance with good practice

Sect 4.5 Aerodrome Inspection

Examined numerous areas of the ramp and the aircraft movement area:

- All painted lines, all fueling pit warning markings noted were in good order, many appearing to have been recently painted.
- No loose stones, no potholes, no indication of unchecked erosion noted anywhere on the aircraft movement area.
- All areas of the airside of the airport noted were clean, well cared for, and free of any trash, garbage, or debris.

Finding: In compliance with good practice

Sect 4.5.4

All serviceability inspection records reviewed were satisfactory.

Finding: In compliance with good practice

Sect 4.5.6

Annual Safety Inspection – Inspected in February, 2005. Submitted 28 March, 2005.

Finding: In compliance with good practice

Sect 4.5.8

List of Standard Operating Procedures (SOP)

Specified in detail in the ***Standard Operating Procedures Manual.***

Finding: In compliance with good practice

Sect 4.6 Visual Aids, Electrical System, Lights

Sect 4.6.4

Precautions Against System Failure:

- Standby fixed position generators plus one 425 KVA portable unit.
- Changeover time of approximately five seconds to standby power.
- All critical lighting has split or interleaved electrical power for redundancy

of power, as well as backup capability from the generator sets.

Finding: In compliance with good practice:

Sect 4.6.6

Serviceability Inspections - Frequency & Times

Accompanied staff on night serviceability inspection of the airport lighting facilities:

- All taxiway and runway lights were checked. Only lights noted to be inoperative were three taxiway lights and a number of centerline lights on RWY 7L / 25R. A system is available, and was utilized to replace centerline lights with a temporary centerline light assembly as needed.
- All lighted mandatory instruction signs and lighted information signs noted were serviceable and in good working order. Grass was cut from in front of all signs noted.
- Four wind socks, adequately lighted, appeared to be in good working order.
- Inspections of a number of logbooks, checklists, and trigger list indicated that detailed records are kept as required.(07-02-2006)

Finding: In compliance with good practice

Sect 4.6.10

Maintenance levels for electronic and electrical facilities

Reviewed RENCANA KERJA PEMELIHARAAN – Period 2006 – 2007 (Action Plan for Maintenance Schedule).

Finding: In compliance with good practice

4.6.10.7 List of Personnel Visual Aid

DAFTAR NAMA PEGAWAI DINAS TEKNIK LISTRIK VISUAL AID – February, 2006 reviewed.

(Movement Area & Runway Inspection Personnel Schedule for February, 2006 reviewed).

A total staff of 14. This total was reported to be an adequate number, but meeting only the minimum required to fulfill task requirements. Reviewed personnel schedule for February, 2006.

Finding: In compliance with good practice

Sect 4.7 Movement Area Maintenance

Sect 4.7.4

Standard Operating Procedures (SOP):

Procedures are specified in detail in ***Standard Procedures of Operation and Maintenance***, issued by the Directorate of Operations & Engineering, April 2005.

Finding: In compliance with good practice

Sect 4.7.5

All ramp and aircraft movement surfaces noted were clean and well swept. FOD (debris) was not found in any aircraft movement area.

4.7.5.1 Records of Inspections were reviewed.

4.7.5.4 Roster of Personnel:

Number & Qualifications: Sufficient to perform required maintenance.

(Movement Area & Runway Inspection Personnel Schedule for February, 2006 reviewed).

4.7.5.5 List of Maintenance Equipment:

- Verified.
- Believed to be sufficient to perform required maintenance.

Finding: In compliance with good practice

Sect 4.8 Aerodrome Works Safety

Sect 4.8.9

Each vehicle noted utilized warning beacons, lights, and VHF air band transceiver as was appropriate.

Finding: In compliance with good practice

Sect 4.9 Aircraft Parking Control

4.9.5.4 Parking in Emergencies

Isolated Parking Location: About 200 meters north of the main RFFS station.

Finding: In compliance with good practice

Sect 4.9.6

Aircraft Docking Guidance Systems (ADGS):

- 38 ADGS's
- Very well organized procedurally.

Finding: In compliance with good practice

Sect 4.9.7

Procedures of Start-Up & Push Back Of Aircraft

All push backs and start-ups noted were standard and in accordance with procedures as written.

Finding: In compliance with good practice

Sect 4.9.8

Procedures for Handling Oversize Aircraft:

Prior arrangements required

Finding: In compliance with good practice

Sect 4.9.9

Airline Operator / Ground Handling Agent Radio:

Frequencies noted are available as listed

Finding: In compliance with good practice

Sect 4.10 Apron Safety Management

Each aircraft observed while parked (Terminal 2D - Gates 31 > 71) had a large (50 Kg?) fire extinguisher on a wheeled cart immediately available (parked within 20 m of aircraft nose-wheel). When aircraft were pushed back, fire extinguishers were wheeled out to remain in immediate vicinity of the aircraft until engine start accomplished.

Each of the three units checked were fully pressurized and had current service tags.

Finding: In compliance with good practice

4.10.4 Application of Procedures:

Each vehicle noted that was traveling on the movement areas, was in compliance with the requirements of the checkered flag / lights and the use of two-way radio communication as appropriate.

Ramp fueling procedures of various aircraft noted. In all cases, the aircraft were properly grounded and the underground fuel access pit, when opened for fueling, was properly marked with a "stand-up" warning flag. All standard fueling procedures appeared to be followed.

Finding: In compliance with good practice

Sect 4.11 Airside Vehicle Control

PENGG UNAAN PAS BULANAN & TAHUNAN 2005:

Initially, a Pas Bulalal (three-month pass) is issued, followed by the issuance of a second three-month pass, and if all is as should be, then a Pas Tahunan (Annual) pass is issued. Thereby, the issuance of annual passes is the most tightly controlled, both numerically and selectively.

An application procedure is required for an airside driving license, including the filing and processing of FORMULIR PERMOHONAN PAS BANDARA.

There are three categories:
- TIM A – Driver License – Airside
- GSE TIM B – Station Bus to 5-ton
- TIM C – motorcycle

Theoretical:

- A ground school of two hours duration (39 slides) is conducted. This covers general airport driving safety, speed limits, and airport familiarity, etc.
- Training is available twice per week – on Tuesdays and Thursdays.
- A "proctored" two-part 30-minute exam consisting of 24 questions is given.

Practical:

- A road test must be successfully accomplished, with a report sent to the administration.

The entire process for an individual whose driving license was issued on 06 February, 2006 was followed. The process was exactly as prescribed in the Aerodrome Manual.

A total of 1749 driving licenses are currently valid, issued by AMC.

Passes for driving on the apron are reported as 1128, and on the service road, 355.

Enforcement mechanism is in place.

Finding: In compliance with good practice

Sect 4.12 Wildlife Hazard Management

4.12.3.1 Bird Hazards:

The bird strike reporting form was reviewed.

4.12.4 Monitoring Bird and Wild Animal Activity

The 2005 "DAILY ACTIVITY BIRD STRIKE MOBILE DETERRENT" forms of May, June, July, and November were reviewed.

4.12.5 Bird Control

Two items of bird control equipment are present:

- A mobile unit.
- A remotely operated sound generator located near the threshold of RWY 07L.

The primary means of wildlife reduction is the mobile (4-WD vehicle) with roof mounted four-way speakers. The audio unit is powered by a portable Honda generator mounted within the vehicle. When activated, an extremely

loud sequential series of audio signals is triggered. First, a series of high-pitched siren tones, then a series of fast and short siren tones, then a series of shotgun blasts, followed by the cries of predatory birds.

The second (fixed) unit is the remote sound operated sound generator located near the threshold of RWY 07L).

Finding: In compliance with good practice

4.12.6 Grass Management System

All grass areas near the runways noted were cut at the prescribed length.

Finding: In compliance with good practice

4.12.7 Environmental Management

No rubbish dumps were noted on the aerodrome.

Finding: In compliance with good practice

4.12.8 Procedures

Animals noted in the movement area were: ducks located near the perimeter fence north of the access road, north of RWY 7L, several goats in a tended herd, and occasional white egrets in the area of the drainage ditch north of RWY 7L.

The procedures appeared to be successful.

Finding: In compliance with good practice

Sect 4.13 Obstacle Control

Procedures for obstacle monitoring and control (both on and off airport) were reviewed.

Finding: In compliance with good practice

4.13.8 Roster of Personnel

The Aerodrome Manual states three (3) Obstacle Control Surveyors and five (5) Assistant Obstacle Control Surveyors.

The DAFTAR PETUGAS OBSTACLE DINAS TEKNIK LANDASAN &

JALAN indicates one Surveyor and three Assistant Surveyors.

Discussion indicated, however, that there are sufficient personnel.

Finding: In compliance with good practice

Sect 4.14 Disabled Aircraft Removal

4.14.7 List of Aircraft Salvage Equipment

The inventory of equipment appeared to match the published list (Table 22).

Finding: In compliance with good practice, except:

Finding: Not in compliance with good practice:

Noted was the absence of a large crane with heavy-lift capability for aircraft removal. Is there an arrangement for immediate access to one from a nearby off-airport supplier?

4.14.8 RFFS Equipment

The inventory of equipment appeared to match the published list (Table 23).

A very helpful and complete explanation and demonstration of the use and function of the Air Bags was provided, as well as an extensive tour and review of all RFFS equipment, both at the Main Fire Station and at a Sub-Station.

The procedure for when dangerous cargo is determined to be on board is to advise the police and request their help.

Finding: In compliance with good practice

Sect 4.15 Handling of Hazardous Material (HAZMAT)

4.15.3.1 Aviation Fuel: Please see 3.2.13.

Sect 4.16 Low Visibility Operation

Not applicable

Sect 4.17 Protection of Radar & Navigational Aids

4.17.8 Personnel Requirements:

Discussion indicated that there are sufficient personnel to perform the tasks as needed.

Finding: In compliance with good practice

Discussion indicated that there is sufficient equipment to perform the tasks as

needed.

Finding: In compliance with good practice

6.4.5 PART 5 - AERODROME ADMINISTRATION

Sect 5.1. Organization Structure

Sect 5.1.1 Staff Contact List and Aerodrome Organization

Finding: Not in compliance with good practice:

- Are the names and numbers listed in Table 25 100 % current?
- When was the list last updated?
- Are the contact numbers listed manned on a 24-hour basis?
- Are there **24-hour** contact numbers for each of these individuals for use in the event of an-off duty time emergency available and accessible on immediate notice? If so, where are the numbers to be found?
- Are there current 24-hour facsimile numbers available?

Sect 5.1.2 Organizational Structure

Chart is shown in the Aerodrome Manual, page 135 – 5.1.2

Finding: In compliance with good practice

Sect 5.1.3 Non-Standard Items & Exemptions

Referenced in the Aerodrome Manual, but not confirmed.

7 ATTACHMENT C: NGURAH RAI INTERNATIONAL AIRPORT (WRRR) FINDINGS

7.1 SAFETY PROTOCOLS

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

- ✓ Standards and Recommended Practices (SARPs) required by ICAO Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations, 4th Edition, applicable as of 1 July 2004
- ✓ Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO Manual on Certification of Aerodromes" (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001
- ✓ International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

7.2 ADDITIONAL REFERENCED DOCUMENTS

The following additional documents are referenced in the report:

Manual of Standards - Part 139 Aerodromes" (MOS), is made pursuant to Civil Aviation Safety Regulations CASR Part 139, and comprises specifications (Standards) prescribed by the DGAC of the Government of Indonesia

Ngurah Rai Airport Aerodrome Manual, Denpasar, Bali, applicable as of 2005

7.3 AIR TRAFFIC CONTROL TOWER

7.3.1 STAFFING

Licensing

Finding: In compliance with good practice:

- Staff operates with licenses.
- Staff are required to have medicals (medical examination once each year).
- Staff receive competency checks every twelve months. Included is a written examination and an exercise.

Establishment

Finding: Not in compliance with good practice:

- Number of controllers: 24
- Number of support staff: none reported
- There appears to be a shortage of controllers as it was reported that two units frequently operate extended shifts resulting in shortened rest periods.

Watch Rosters

Finding: Not in compliance with good practice:

Watch rosters are reported to be published once each month. However, due to an apparent shortage of controllers, the individual controller reportedly only knows his/her actual schedule one day in advance. (Highly questionable practice from the Human Factors standpoint.)

Rostering limitations: There are four groups covering three shifts (morning, afternoon, and evening: 0700 – 1400, 1400 – 1900, and 1900 – 0700. This, theoretically, permits one group to be off duty each day. No controller is to work more than eight night shifts in a month.

Management Functions & Responsibilities

Finding: In compliance with good practice:

- Key staff are identified. The group leader and the supervisors are identified every day.

- Positions, responsibilities, functions, and accountabilities are in writing, but reportedly are accessible to supervisors only. It was stated that this information is reported to Quality Assurance.

7.3.2 EQUIPMENT

Communications

Finding: Not in compliance with good practice:

Availability of anti-blocking systems (e.g., CONTRAN) could not be confirmed.

Finding: In compliance with good practice:

- Published frequencies (Delivery, Ground 1, Ground 2, and Tower) are available, with a secondary standby capability.
- Headsets are provided and serviceable.
- Communications are 'perfectly readable' ("5 x 5").
- Back-up communications capability is available.
- Tower: Primary: 118.1 Secondary: 118.5
- Controllers are trained for contingency communications procedures. It was reported that there is a simulator for use in contingency exercises.
- Controllers are trained in aircraft no-RT procedures.
- Fixed telephone lines with telephones are available.
- Voice recording facilities (digital and tape) are available.
- Voice recordings are kept for three months.
- Controllers know how to "impound" tapes.
- Contingencies available for when the system is unavailable are two recordings (one analog and one digital).
- Emergency staff are alerted (in accordance with the AEP Delivery of Emergency Message protocols) by direct switch, activating a telephone line to the RFFS and a siren.
- Controllers receive training on emergency procedures and in handling emergencies. Annual simulator emergency training in which interagency cooperation and coordination is included.
- Checklists are available for emergencies. A flow chart in the AEP is utilized in cooperation with the airport administration.
- The airfield crash map is available and immediately accessible in the tower on a solid backing.

Information Systems

Finding: Not in compliance with good practice:

- Flight data display is by paper strips and a computer record. The Paper Clearance Strips are necessary because a part ordered from Japan two years ago has not yet been received and installed.

- Surface wind information is received from IAS. The tower Surface Wind Indicator has been inoperative for two years.

Finding: In compliance with good practice:

- MET (Meteorology) display is obtained from a television screen which is updated every 30 minutes.

- Pressure setting is available to each position via its own individual indicator.

Serviceability Indicators

Finding: In compliance with good practice:

- The serviceability of essential aids and lighting is indicated by a monitor in the tower control room. Each system has its own backup. The tower indicator is a repeat of the master indicator in the control room. Automatic changeover occurs if there is a system failure.

- This information is communicated to engineers by the unit in the control room by alarms (both lights and an aural signal), with backup from the tower controllers.

- Controllers' response to unserviceabilities is to telephone the technicians and the shift supervisor. When necessitated, a NOTAM is published in accordance with the SOP's.

Aerodrome Ground Lighting Indicator

Finding: In compliance with good practice:

There is a fully serviceable aerodrome ground lighting indicator in the form of a computer screen display with individual controls, and continual monitoring in the CCR room, as well.

Visual Signaling

Finding: In compliance with good practice:

- A light gun (hanging from the ceiling) is available.
- Staff have received training in its use.
- Spare bulbs are available.

ATIS is available and serviceable. Toska ATIS version 4.0 NT with aural monitor on 126.2.

7.3.3 ACCOMMODATION

Operational Positions

Finding: In compliance with good practice:

- Operational equipment is laid out with some consideration for ergonomics.
- Chairs are replaced every six months.
- There appear to be sufficient operating positions.

Visual Control Room

Finding: Not in compliance with good practice:

A problem noted is that there is no break room available, nor is there a woman's pria. The only break facility is the three couches in the control room. As there are nine female controllers, we would suggest that this is a relevant issue.

Finding: In compliance with good practice:

- The view from the visual control room, 25 m. above the ramp, allows an uninhibited view from the control room, with the exception of Apron "D". A CCTV system is in use which provides visual observation capability for Apron "D".

- Reflections are kept to a minimum. Screens were added two years ago.

- VDU's are sited to minimize reflection interference.

- Binoculars are provided.

- The tower is accessed via a combination of an elevator and a stairway. There is as well an emergency exit door to escape ropes. Annual emergency training in their use takes place.

- A tower log is provided.

- The staff are trained (annually) for encountering and handling emergency situations.

7.4 FUELING FACILITIES

Fuel Filtering and Testing Procedures:

Fuel is brought via ship from the refinery to Benoa, then to the airport fuel farm via an 8-km. underground pipeline using a ship tanker pump for propulsion.

Checking and testing of the fuel: on board the tanker the fuel is tested for density, purity, visual appearance (including suspension of water and impurities), and electrical conductivity. If all checks are satisfactory, then the fuel is pumped to the storage tank.

The ship-board checks are as follows:

Continuously (once each 5 minutes of pumping) for the first 30 minutes; then every 30 minutes throughout the next three hours; then each hour until completion of pumping.

Filtering is accomplished on board the ship, then through a second filter on arrival at the farm, followed by a second strainer through a third micro-filter and through a fourth filter separator (for water and suspended impurities) prior to entry into the storage tank.

Following arrival of the fuel at the storage tank, the fuel is required to undergo a settling time of three hours per one-meter of height of the product in the tank. A sample is drawn from the bottom of the tank, and a quality control check is accomplished. If this check is satisfactory, then the fuel is pumped to the delivery tank.

Once in the delivery tank, a daily QC check of appearance, freedom from water and any other impurities (with a sample of the fuel recorded and retained) is accomplished. Compensation is accomplished from the upper, middle, and lower levels of the tank.

Upon satisfactory completion of the check, the fuel may be pumped through underground pipes via the filter separator and the filter monitor to the hydro pit at the ramp, through the pumper truck filter / separator, and into the aircraft. Before delivery to the aircraft, a final check of the filter monitor is accomplished, in the form of a visual check of the appearance to determine the clarity and absence of any foreign object suspension. Water detection tests are accomplished, and a one–liter sample is retained for 24 hours. The filter separator on the truck is as well visually checked and the record initialed.

Secondly, the fuel can be pumped from the delivery tanks into tanker trucks for delivery to the aircraft. In this case, the fuel is allowed to settle for 10 – 15 minutes before departure from the farm. A visual check is again accomplished, looking for clarity, the absence of contaminant suspension or the presence of water.

Upon arrival of the truck at the aircraft, at the time of refueling, a sample is taken, checked for water, dirt, and appearance, and the sample is kept for 24 hours.

Written records of the various checks were reviewed.

While a detailed inspection of on-site available firefighting equipment was not accomplished, firefighting equipment was very much in evidence.

No fuel leaks, nor seepages, nor pools of fuel were in evidence. No indication of any escaping fuel was seen.

Finding: In compliance with good practice

7.5 AERODROME MANUAL:

Please Note: Each numerical reference refers to the specific section or sub-section in the Aerodrome Manual.

It is noted that the intent is for the Aerodrome Manual to be a "living document", i.e., capable of being updated / revised page-by-page or section-by-section as appropriate.

Finding: Not in compliance with good practice:

- What are the number and dates of AMENDMENTS issued since publication of the Aerodrome Manual? Have there been any?
- As certain pages (e.g., 5.1.1 – Page 5-1 to Page 5-11) are very likely subject to frequent and important updating, it is of critical importance to be using the most current information (name and telephone numbers) existing. This is particularly so in the event of an emergency, as is the list of contact persons (5.1.4 on page 5-3, 5.1.15 on page 5-8, and 5.1.16 on page 5-9).
- No means to verify the currency of *each* page in *each* copy of the manual were noted.

7.5.1 PART 1 - GENERAL INFORMATION

Sect 1.2

1.2.2 Aerodrome Certificate Number

ADM.OC/011/2005 DATE 1 AUGUST 2005

Sect 1.6 Aerodrome Safety Management System

1.6.4 Safety Management System.

Finding: Not in compliance with good practice:

Page 5-1 indicated a Section 5.2 Safety Management System (SMS). However, there is no list indicating General Organizational Structure nor any of the individuals involved.

Inquiry indicated that there is planned to be a Safety Management System in place by June of 2006. Areas to be addressed are said to include risk assessment and risk management.

7.5.2 PART 2 - AERODROME SITE DETAILS

Sect 2.2 The Aerodrome Boundary Plan

2.2.1 Fencing

Perimeter physical barriers in use at this airport are various types of metal wire, barbed wire only and wood slat fence. The fence height varies from about one meter to approximately 3 meters. Some of the fence sections have barbed wire above and others do not. Additionally, the airport is bounded on most of two sides by the sea all of which is fenced.

The entire fence line was generally in good condition and appeared to have routine maintenance and repair. Only those sections of the fence line that were heavily overgrown were not inspected.

Finding: Not in compliance with good practice:

- Some sections of the fence line, including the wood slat fence, have dwellings and other buildings constructed directly on or against the fence on the landside leaving the security value of the fence in these locations as very questionable.

- The ASI Team discovered a recent large perimeter fence repair to a wood slat section. There was a locally used foot path directly behind the repaired section on the landside and evidence of a recently used foot path starting at the repaired section on the airside. Discussions with one of the airport security guards confirmed that local villagers

use the path and sometimes break the wood fence to facilitate their illegal access and that this is a continuing problem.

- The fencing on the pier on which the approach lights and SFL for RWY 27 appears to be adequate to keep out essentially all animal life. However, a person could easily scale the fencing that is protecting the "over-water" area of the lighting facility. There is an intermittently manned guard house and locked gate protecting the facility from the main road.

7.5.3 PART 3 - PARTICULARS OF THE AERODROME REQUIRED TO BE REPORTED TO THE AERONAUTICAL INFORMATION SERVICE

Sect 3.2 Aerodrome Dimensions and Related Information

3.2.12.5.3 Middle Marker - Location

Finding: Not in compliance with good practice:

The respective geographical coordinates appear to be non-current. All other co-ordinates listed should also be updated, including those posted on the ramp gate signs.

3.2.15.1 Significant obstacles in the approach & takeoff areas: None

3.2.15.3 In the vicinity of the aerodrome: Temple Telaga Waja

3.2.19 RFFS

3.2.19.1 Level: Category 9

7.5.4 PART 4 - PARTICULARS OF THE AERODROME OPERATING PROCEDURES AND SAFETY MEASURES

Sect 4.1 Aerodrome Reporting

Sub-Sect 4.1.2 Responsibilities

Standard Briefing Package to Flight Crew: Requested and received.

Meteorological: Requested and received

DNS (Daily Notam Bulletins): Requested and received

Face To Face Crew Brief: Requested and received

All above were of standard content and quality.

Standard ICAO FLIGHT PLAN form for Denpasar Airport available and received.

Finding: In compliance with good practice

Display Wall Charts:

Finding: Not in compliance with good practice:

The charts displayed on the counter under the glass are quite non-current:

- Jeppesen Low Altitude Enroute Chart of Australasia – Nov, 1997
- High Altitude Enroute Chart – August, 1997
- FIR Information Australasia – 11July, 1996
- International Air Routes – 02 March, 2000

Finding: Not in compliance with good practice:

- Jeppesen Instrument Approach Charts in manuals:
  - Four books. Instrument approach charts are non-current.
  - Examples: Oshima, Japan 1990
    - Petropavlovsk (12-1) 22 APR 88
    - Singapore (11-1) 31 MAY 91
    - Surabaya (11-1) 22 DEC 95
    - Jakarta (11-1) 09 MAY 97 Current = 22 OCT 04
- AIP Indonesia (DGAC) – Denpasar Airport:
  - Aerodrome Chart – ICAO - WRRR – AD 2.24.-1
    No date indicated
  - WRRR AD 2.24 – 10A NDB – RWY 09
    No date indicated
  - WRRRAD 2.24-10A NDB - RWY 09
    03 OCT 02

[AIP aeronautical information publishing Vol II AD Intnl.]

Finding: In compliance with good practice:

The wall charts "status board" and AIS information were large enough to easily read, and designed so as to be capable of updating as appropriate.

Sub-Sect 4.1.9 Aerodrome AIS Officer Personnel Data

12 Persons: Two senior and 10 junior

Finding: Not in compliance with good practice:

It appeared that there might be a staffing situation that, in any high demand situation, would be insufficient to provide timely and thorough briefing services.

Sub-Sect 4.1.10 AIS BO Supervisor (H24)

Finding: Not in compliance with good practice:

Is there a current telephone contact number?

Sect 4.2 Access to Movement Area

Sub-Sect 4.2.4

Procedures noted in Aerodrome Manual.

Sect 4.3 Aerodrome Emergency Plans

Sub-Sect 4.3.1 Purpose

Finding: Not in compliance with good practice:

- Plan exists. However, no revisions noted, nor provided for in an "AMENDMENT RECORD".
- The Airport Emergency Plan is meant to be a "living document".
- Clearly there have been numerous changes (such as personnel in individual positions in both the airport administration and non-airport agencies and organizations) and respective telephone numbers since 1995.
- This is not noted in revisions entered into an AMENDMENT RECORD.
- Mobile command post could not be verified.

Coordination with the Rescue Coordination Centre noted.
Emergency operations centre and command post EOC exists.

Finding: In compliance with good practice

Sub-Sect 4.3.2 Responsibilities

Finding: Not in compliance with good practice:

- Are there MOU's (Memorandums of Understanding) with the local hospitals?
- Are there formalized agreements regarding a sudden need for their facilities in the event of a catastrophic accident?
- Do the local medical facilities have actual plans in place for such a contingency?

4.3.2.1 Flight Accidents Rescue & Recovery Team (FARR Team)

Provided for

Finding: In compliance with good practice

Sub-Sect 4.3.4 Plans for Dealing With:

4.3.4.1 Malfunction of Aircraft In Flight

Provided for

Finding: In compliance with good practice

4.3.4.2 Structural Fire

Provided for

Finding: In compliance with good practice

4.3.4.3 Sabotage

Provided for

Finding: In compliance with good practice

4.3.4.4 Unlawful Seizure of Aircraft

Provided for

Finding: In compliance with good practice

4.3.4.5 Incidents during the Emergency and After the Emergency

Provided for

Finding: In compliance with good practice

Sub-Sect 4.3.5 Details of Tests for Facilities and Equipments

4.3.5.1 Acceleration & Top Speed Of Vehicles Once A Month Records:

Finding: Not in compliance with good practice:

Reported to be done but no records kept.

4.3.5.2 Engine Test for Rescue Boat Once A Week Records:

Finding: Not in compliance with good practice:

Reported to be done but no records kept.

4.3.5.3 Discharge Rate Test of Water Tender Vehicle Every Day Records:

Finding: Not in compliance with good practice:

Reported to be done but no records kept.

4.3.5.4 Radio Devices 3 Times a Day Records:

Finding: Not in compliance with good practice:

Reported to be done but no records kept.

4.3.5.5 Salvage Equipment Test Once A Week Records:

Finding: Not in compliance with good practice:

Reported to be done but no records kept.

4.3.5.6 Crash Alarm 3 Times a Day Records:

Finding: Not in compliance with good practice:

Reported to be done but no records kept.

4.3.7 Details of exercises to test emergency plan and its frequencies:

- Aerodrome
- Energency Exercises

Finding: Not in compliance with good practice:

While referenced in the Aerodrome Manual, no such inclusion could be found in the Aerodrome Emergency Plan.

4.3.7.2

- When was the last major full exercise?
- What was the scenario?
- What were the results?

4.3.7.3

- When was the last partial exercise?
- What was the scenario?
- What were the results?

4.3.7.3.1

- When was the last tabletop exercise?
- What was the scenario?
- What were the results?

AIRPORT EMERGENCY OPERATIONS CENTRE:

Located upstairs in the RFFS Building. The size is approximately 10 m x 10 m = 100 m².

The layout consists of a large room, two smaller room and a pria. The size, layout, and furniture appeared to be very adequate.

Finding: In compliance with good practice

Command Post:

Location

Finding: Not in compliance with good practice:

- No hard telephone line communication capability to communicate with airport security was noted. In a hijacking, the only communication capability appears to be unscrambled VHF.

- Additionally, no hard telephone line capability between the aircraft and the command post was noted. Nor was capability including sufficient on-hand telephone line wire with appropriate jacks to connect the external power receptacle ground radio panel to the command post.

Sect 4.4 Rescue and Firefighting Service (RFFS)

Sub-Sect 4.4.4 RFFS Assessed Category

Reported as Category 9.

Finding: In compliance with good practice

Sub-Sect 4.4.5 Reduction of Category: Mitigating Procedure

Reported close coordination with in-town fire brigades

Finding: In compliance with good practice

Sub-Sect 4.4.6 Inventory: Facilities & Equipment:

4.4.6.1 Foam Tender Vehicles

Five large Komoda (Ziegler) / Simon Blaster Saro

Finding: In compliance with good practice

4.4.6.2 Rescue Car with Dry Powder

Two

Finding: In compliance with good practice

4.4.6.3 Ambulance Vehicles

Three

Finding: In compliance with good practice

4.4.6.4 Rescue Boats

Two

Finding: In compliance with good practice

4.4.6.5 Personnel Requirements:

- 88 (22 x 4) – Not including a staff of 4
- Training Requirements & Records:
- "Data Personil Dinas PKP – PK 2006" reviewed, listing all personal training records since date of hire.
- "DATA PEMILIK LICENCE DAN RATING" reviewed
- "KEGIATAN LATIHAN PKP – PK – BULAN / TAHUN: JANUARI 2006" reviewed
- "JADWAL KEGIATAN ANGGOTA PKP – PK" reviewed

Finding: In compliance with good practice

4.4.6.6 Foam Tender Vehicles - 6

- Foam Quantity: 4,900 L. with 49,000 L. of water
- Dry Chemical Powder Quantity: 1,400 Kg.
- Two unit rescue car.

Finding: In compliance with good practice

4.4.6.7 Standard Operating Procedures:

- Forms (Form A 2 B) and procedures for regular inspection and maintenance of each inventoried vehicle exist.
- Maritime: Two rescue boats reported
- Live Fire Drills:
  - ✓ Monthly – a small exercise

- ✓ Quarterly – a partial exercise
- ✓ Full exercise every two years

Finding: In compliance with good practice

Sub-Sect 4.4.10 Respond Time

Fire Station > Runway End:

"KONDISI UNJUK KERJA ...RASIONAL" [Respond Times] report of 06 February, 2006 reviewed – 98.13 % / respond time 2.06 minutes.

Finding: In compliance with good practice

Sub-Sect 4.4.11 Foam Quality Tests:

"HASIL UJI KUALITAS FOAM KONSENTRAT YANG ADAD ALAM KENDARAAN" of February, 2006 reviewed.

Finding: In compliance with good practice

Sect 4.5 Aerodrome Inspection

Sub-Sect 4.5.4 Procedure & Frequency of Inspection

4.5.4.1.1 Twice Routine Daily Serviceability Inspections

Movement Area & OLS appeared to be carried out as required.

Forms and records were reviewed, among them:

- "LAPORAN HARIAN PEMANTAUAN KONDISI DAERAH AIR SIDE" [Construction Work – Airside]
- "LAPORAN HARIAN PEMANTAUAN/INSPEKSI MOVEMENT AREA" [FOD Inspection – Movement Area]
- "CHECKLIST KEGIATAN INSPEKSI AMC TELEDAP FOREIGN OBJECT DAMAGE (FOD)" randomly selected for 30 Dec, 2005
- "DINAS OPERASI SISI-UDARA CHECK LIST PENGAWASAN APRON & SEKITARNYA" [Apron Stand Inspection – Stands 1 – 38] and Aviobridge Inspection].

Finding: In compliance with good practice

Sub-Sect 4.5.5 Monthly Technical Inspections

Finding: Not in compliance with good practice:

Records were not available.

Sub-Sect 4.5.6 Annual Safety Inspections

Finding: Not in compliance with good practice:

Records were not available.

4.5.6.4 Review Of The Status And Adequacy Of This Manual

Reported as being done every six months.

4.5.9.2 Airside Vehicle Control Handbook

Verified the existence of this handbook.

Roster of Personnel: Number & Qualifications:

Four: Engineering (1)
Diploma (2)
Technical high school (2)

Only recurrent training reported to be done in Jakarta at the Jakarta Public Works Department Training Facility

Finding: In compliance with good practice

Sect 4.6 Visual Aids, Electrical Systems, Lights

Sub-Sect 4.6.3

4.6.3.2 Precautions against System Failure:

Finding: Not in compliance with good practice:

Routing Of Main Feed Lines – Two main cables are in one trench. While there *is* the backup generator capability, any damage to the trench (intentional or accidental), could result in significant disruption.

Sub-Sect 4.6.4 Procedure for Inspection & Maintenance Of Aeronautical Lights

An evening aerodrome movement area light inspection is performed.

An ASI team member accompanied the night inspection crew on an inspection. All runway lights, approach lights, SFL, REILS, PAPI, and wind sock lights were observed to be operative.

Only movement area lights observed to be inoperative were two taxiway lights.

Finding: In compliance with good practice

4.6.4.4 Arrangement for secondary power supply:

- Two generators of 1000 KVA each
- Mobile Generating Set (55 KVA)

Finding: In compliance with good practice

4.6.4.3.4 Time to start and assume full load reported as 7 seconds.

Finding: In compliance with good practice

Sect 4.7 Maintenance of the Movement Area

Random forms (e.g., "PEMERIKSAAN GENANGAN AIR PADA FASILITAS LANDASAN, TAXIWAY DAN APRON" [Standing Water], and LAPORAN PEMERIKSAAN KERUSAKAN ALAT PROBUSKI FASILITAS LANDASAN DAN TATA LINGKUNGAN" [Construction Needs and Solutions Report] were reviewed.

There were no observed potholes, loose gravel, nor FOD items on any of the movement area.

Finding: In compliance with good practice

4.7.4.5 Friction Testing

Finding: Not in compliance with good practice:

4.7.4.5.1 What is specific equipment used?

4.7.4.6 Water Depth Measurement

Finding: In compliance with good practice

4.7.4.6.1 What is specific equipment used? Measured by sight.

Finding: In compliance with good practice

4.7.5.2

4.7.5.2.2 Marking Lines Repainting: All lines noted were clearly visible.

Finding: In compliance with good practice

4.7.5.4 Roster of Personnel: Number & Qualifications

According to "DATA PERSONIL DIVISI PKP-PK DENGAN DIKLAT" there are a total of 184 personnel, of which 24 are D-3, 131 are Senior, and 29 are Junior.

Further personnel qualification details are in the "DAFTAR FORMASI PERSONIL DIVISI PKP-PK STKP DAN RATING".

Finding: In compliance with good practice

Sect 4.8 Aerodrome Works - Safety

Sub-Sect 4.8.6 Method of Working Plan (MOWP)

ATC is advised of Weekly Airport Construction planning by the "JADWAL HARIAH / PEMANTAUAN LANDASAN" [Weekly Airport Construction].

Finding: In compliance with good practice

Sub-Sect 4.8.9 Marking & Identification of Vehicles and Plant

- Reflectors were noted to be on the ramp bicycles.
- Vehicles on the movement area at night were observed to be appropriately lighted and radio communication was maintained.
- Ramp personnel were noted to be wearing orange safety vests at night.

Finding: In compliance with good practice

Sect 4.9 Apron Management

Sub-Sect 4.9.4 Arrangement between ATC & Apron Management

4.9.4.1 Bay number utilization plan (developed daily) is the coordination reference.

Finding: In compliance with good practice

Sub-Sect 4.9.6 Apron Utility

Bay number utilization plan is developed for each day.

A total of 38 parking stands, of which nine can handle both wide-body and narrow-body aircraft. Four can handle medium and narrow-body aircraft, and 25 can handle only narrow-body aircraft.

Finding: In compliance with good practice

Sub-Sect 4.9.7 Arrangement for initiating engine start and ensuring clearance of aircraft pushback

Very close coordination between Apron Control Tower, the aircraft, ground handler, fuelers, and air-bridge operation.

Finding: In compliance with good practice

Sub-Sect 4.9.10 Visual Docking Guidance Systems (VDGS)

Marshalling of aircraft into the take-over point for the VDGS observed to be industry standard. All VDGS appeared to be in normal working order.

Personnel:

- 39 total, with availability of ten per shift.
- Three are in the control area apron control area.
- Seven are air-bridge handlers.

Finding: In compliance with good practice

4.9.15.2 Marshallers / Marshalling Licenses:

Cross-qualification with VDGS

Parking in Emergencies

Isolated Parking Location: Taxiway # 7

Finding: In compliance with good practice

Sect 4.10 Apron Safety Management

4.10.3.2 Protection from Jet Blast

Application of Procedures: Observed many push-backs of aircraft.
In every case observed, very close adherence to procedures was noted.

Finding: In compliance with good practice

4.10.5 Apron Sweeping & Cleaning

The apron was noted to be completely clear of any FOD items.

Finding: In compliance with good practice

Sect 4.11 Airside Vehicle Control

Finding: Not in compliance with good practice:

While personal observation indicated orderly and safe traffic flow and compliance with procedures, specific written details (other than in the Aerodrome Manual) and records were not available.

Sect 4.12 Wildlife Hazard Management

Procedures For:

- Wildlife Monitoring and Hazard Assessment
- Wildlife Hazard Notification
- Wildlife Reduction Methods

It was reported that there are no written procedures. However, procedures are clearly written in the Aerodrome Manual. It appears that these procedures are actually followed.

Finding: In compliance with good practice

4.12.4. Monitoring Bird and Wild Animal Activity

Security personnel accomplish the checks for birds as part of their normal duties.

Finding: In compliance with good practice

4.12.5: Implementation of wildlife control programs:

Advised that there is a mobile car that is used by the security personnel to create noise to disperse birds.

Finding: In compliance with good practice

4.12.7 Environmental Management

No rubbish dumps were noted on the aerodrome.

Finding: In compliance with good practice

Sect 4.13 Obstacle Control

Finding: Not in compliance with good practice:

Specific detailed written procedures (other than in the Aerodrome Manual) and records were not available.

Sect 4.14 Disabled Aircraft Removal

4.14.8 Obtaining Of Supporting Aircraft Salvage Equipment:

Reported to be still available.

Procedure When Dangerous Cargo Is Determined To Be On Board:
API will request the police or other authority to handle the cargo.

Finding: In compliance with good practice

Sect 4.15 Handling of Hazardous Material (Hazmat)

4.15.3.1 Aviation Fuel: Please see 3.2.13.

Sect 4.16 Low Visibility Operation

No procedure requirement applicable to low visibility operations.

Sect 4.17 Protection Of Radar & Navigation Aids

Responsibilities, policies, and procedures provided for in the Aerodrome Manual.

Finding: In compliance with good practice

Please note: (As noted in 4.6.3.2 Precautions Against System Failure):

Finding: Not in compliance with good practice:

- Routing Of Main Feed Lines – Two main cables are in one trench. While there is the backup generator capability, any damage to the trench (intentional or accidental), could result in significant disruption.
- Personnel and contact information listed (5.1.18). Are these names and contact numbers current?

7.5.5 PART 5 - AERODROME ADMINISTRATION

Sect 5.1 Aerodrome Organization

Sub-Sect 5.1.1 General Organization Structure Contact List

Finding: Not in compliance with good practice:

- Are the names and numbers listed 100 % current? When was the list last updated?
- Are the contact numbers listed manned on a 24-hour basis?
- Are there **24-hour** contact numbers for each of these individuals for use in the event of an-off duty time emergency available and accessible on immediate notice? If so, where are the numbers to be found? Are there current 24-hour facsimile numbers available?

8 ATTACHMENT D: POLONIA INTERNATIONAL AIRPORT (WIMM) FINDINGS

8.1 SAFETY PROTOCOLS

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

- ✓ Standards and Recommended Practices (SARPs) required by ICAO ***Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations***, 4th Edition, applicable as of 1 July 2004
- ✓ Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001
- ✓ International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

8.2 ADDITIONAL REFERENCED DOCUMENTS

The following additional documents are referenced in the report:

Manual of Standards - Part 139 Aerodromes (MOS), is made pursuant to Civil Aviation Safety Regulations CASR Part 139, and comprises specifications (Standards) prescribed by the DGAC of the Government of Indonesia

Aerodrome Manual, PR. Angkasa Pura II Medan International Airport, Polonia, applicable as of Mei, 2005

8.3 AIR TRAFFIC CONTROL TOWER

8.3.1 STAFFING

Licensing

Finding: In compliance with good practice:

- All staff operates with licenses. All are senior controllers.
- Staff are required to have a medicals examination every year.
- Staff receive competency checks every six months.

Establishment

Finding: Appears to be in compliance with good practice:

- Number of controllers: 67
- Number of support staff: 0
- Are there sufficient qualified staff to provide safe air traffic control services? Unknown.

Watch Rosters

Finding: In compliance with good practice:

- Watch rosters are published every 15 days (schedule changes)
- Rostering limitations: 3 people / shift 3 shifts.
- Hours: Morning shift: 6 hours maximum on duty. Afternoon shift: 6 hours maximum on duty. Night shift: 12 hours maximum on duty.

Management Functions & Responsibilities

Finding: In compliance with good practice:

- Key staff are identified.
- Positions, responsibilities, functions, and accountabilities are in writing and accessible.

8.3.2 EQUIPMENT

Communications

Finding: Not in compliance with good practice:

- Headsets are not provided.
- Communications are not 'perfectly readable' ("5 x 5"). There are problems with the speakers – "3 x 3".
- Back-up communications capability is available on only one frequency. Can use other units, however. (119.7 – approach?)
- Voice recording facilities are available, but could not determine for how long they are retained.
- Controllers were unfamiliar with the concept of "impounding" tapes.

- It would appear that no contingencies are available for when the recording system is unavailable. Therefore, tapes are probably not recorded and held.
- Controllers appear to receive minimal training on emergency procedures and in handling emergencies.
- Availability of anti-blocking systems (e.g., CONTRAN) could not be confirmed.

Finding: In compliance with good practice:

- Published frequencies are available.
- Controllers are trained for contingency communications procedures.
- Controllers are trained in aircraft no-RT procedures.
- Fixed telephone lines with telephones are available.
- Emergency staff are alerted by telephone and a warning device.
- Checklists are available for emergencies. (SKEP 14 LU.004/11/2003 – AP II)
- The airfield crash map is displayed and immediately available.

Information Systems

Finding: Not in compliance with good practice:

Flight data display is by paper strips.

Finding: In compliance with good practice:

- MET display is by computer and telex – updated every 30 minutes.
- Surface wind indication is by a separate unit 100 meters in front of tower.
- Pressure setting is received from MET.

Serviceability Indicators

Finding: Not in compliance with good practice:

The serviceability of essential aids and lighting is determined by binoculars. A beautiful display unit exists, but it does not always work.

Finding: In compliance with good practice:

- The serviceability of essential aids and lighting is communicated to engineers by telephone.

- Controllers' response to unserviceabilities is to call the electrical technicians.

Aerodrome Ground Lighting Indicator

Finding: Not in compliance with good practice:

Unable to verify that there is a fully serviceable aerodrome ground lighting indicator.

Visual Signaling

Finding: In compliance with good practice:

- A light gun (hanging from the ceiling) is available.
- Staff have had training in its use.
- Spare bulbs are available.
- ATIS is available (126.8) and serviceable.

8.3.3 ACCOMMODATION

Operational Positions

Finding: Not in compliance with good practice:

- Operational equipment does not appear to be laid out ergonomically.
- The space appears to be (and was reported to be) very limited.
- Operating positions appeared to be (and were reported to be) very cramped and not a sufficient number thereof.

Visual Control Room

Finding: Not in compliance with good practice:

- Obstructions prevent an uninhibited view from the control room. There is a door and other structural components at the rear of the control cab.
- The view is severely obstructed between about 250° M and 270° M.
- Screens are used in an attempt to minimize problems from reflections. However, they interfere with the view.

Finding: In compliance with good practice:

- VDU's are sited to the extent possible under the circumstances to minimize reflection interference.

- Binoculars are provided.
- The tower is accessed via a stairway. There are provisions for escape in the event of fire.
- A tower log is provided.
- The staff are trained for encountering and handling emergency situations.

8.4 FUELING FACILITIES

The aircraft fuel is transported the 32 km. from shipside at Lubukpakan to the airport fuel farm via truck. 34 truckloads (14, 16, 18, and 21 KL) arrive per day.

Following ten minutes of settling and a visual check for clarity, brilliance, and water contamination, the fuel is discharged into the 2,400 KL receiver tanks.

The fuel then must settle in the receiver tank for ten minutes per foot of height of product in the tank, and then undergo a quality control check the next morning before being pumped through the water filter into the delivery tank.

Before the operation starts each morning, a QC visual check and serawater detector in done on all trucks and tanks. Measurement of the specific gravity, and a visual check for a clear and bright appearance and freedom from water contamination, and a colourimetric check are accomplished. Samples are taken and retained for 24 hours. Written record is made and filed of each result.

The fuel is then pumped from the delivery tank through a 23-piece filter, before proceeding through the differential pump to the trucks for delivery to the aircraft. Final filtration then takes place as the fuel is pumped into the aircraft.

Once per three months, the following checks are performed and reported to headquarters:

- Gravimetric
- Colourimetric
- Pressure differences in gates
- Quality of filter condition
- Quality of the fuel product itself

Daily and quarterly records were reviewed and noted.

While a detailed inspection of on-site available firefighting equipment was not accomplished, firefighting equipment was very much in evidence. No fuel leaks, nor seepages, nor pools of fuel were in evidence. No indication of any escaping fuel was seen.

Finding: In compliance with good practice

8.5 AERODROME MANUAL:

Please Note: Each numerical reference refers to the specific section or sub-section in the Aerodrome Manual Sub-Section numbers, while not all included in the Polonia Aerodrome Manual, are based upon those customarily in use in the Aerodrome Manuals of the larger airports assessed.

It is noted that the intent is for the Aerodrome Manual to be a "living document", i.e., capable of being updated and revised page-by-page or section-by-section as appropriate.

Finding: Not in compliance with good practice:

- What are the number and dates of AMENDMENTS issued since publication of the ***Aerodrome Manual***? Have there been any?
- As certain pages (e.g., 5.1.1 – Page 122) are very likely subject to frequent and important updating, it is of critical importance that the most current information, such as name and telephone numbers is updated frequently. This is particularly so in the event of an off-hour emergency. No method of determining the currency of each page could be found.

8.5.1 PART 1 - GENERAL INFORMATION

Sect 1.2

1.2 Aerodrome Certificate Number: Adm. OC / 007 /2005

Sect 1.6 Aerodrome Safety Management System

8.5.2 PART 2 - AERODROME SITE DETAILS

Sect 2.1 Aerodrome Plan

Sub-Sect 2.1.2 Wind Direction Indicators

Operational

Finding: In compliance with good practice

8.5.3 PART 3 - AERODROME DIMENSIONS AND RELATED INFORMATION

Sect 3.2 Aerodrome Dimensions and Related Information

Sub-Sect 3.2.1 Runway Physical Characteristics

Finding: Not in compliance with good practice:

Table 2: Threshold Coordinates: When were these last updated?
They appear to be non-current.

Sub-Sect 3.2.10 Geographical co-ordinates of each aircraft stand

Finding: Not in compliance with good practice:

When were these coordinates last updated?
They appear to be non-current.

Sub-Sect 3.2.20 Radio Navigation and Landing Aid

Finding: Not in compliance with good practice:

Table 12: When were these coordinates last updated?
They appear to be non-current.

3.2.21.1.1 A VFR routing for helicopter traffic was applied for six months ago. Approval has not yet been received from the head office in Jakarta.

3.2.21.1.2 Significant Point:

Finding: Not in compliance with good practice:

When were these coordinates last updated?
They appear to be non-current.

8.5.4 PART 4 - AERODROME REPORTING PROCEDURES

Sect 4.1 Aerodrome Reporting

Sub-Sect 4.1.2 Responsibilities

4.1.2.1 Standard Briefing Package to Flight Crew:

Requested and received.

Meteorological Briefing Package:

Requested and received

4.1.4.3 DNS (Daily Notam Bulletins): Requested and received

Face To Face Crew Brief: Requested and received
All above were of standard content and quality.
Standard ICAO FLIGHT PLAN form for Polonia Airport available and received.

Finding: In compliance with good practice.

Finding: Not in compliance with good practice:

No dates are printed on the instrument approach charts and aerodrome information charts (e.g., AD 2-1)for WIMM provided by AIP Indonesia in the AIP Manual available in the AIS office.

4.1.10 Aerodrome AIS Officer Personnel Data:

- Six
- Four Supervisors and two AIS COM
- Five hold D3 Diplomatical from CATC;
- One is junior – D2 – (2nd degree from CATC)

Finding: In compliance with good practice

4.1.10 AIS supervisor

Finding: Not in compliance with good practice:

(h24) – The ASI team was unable to determine if this is a current telephone number.

One computer is for NOTAMS and PIB (Public Information Bulletins).

Finding: Not in compliance with good practice:

- There is no internet capability into the AIS Office.
- There is no facsimile machine for the AIS office.

Sect 4.2 Access to Movement Area

Sub-Sect 4.2.4 Access Controls

Finding: Not in compliance with good practice:

The standard requiring vehicle permits and stickers exists, but the procedures are not yet in place. No stickers are presently required. It was

reported that these procedures should be in place within one to two months.

Sub-Sect 4.2.5 List of documents checked

Finding: Not in compliance with good practice:

The standard requiring vehicle inspections exists, but the procedures are not yet in place. No vehicular inspections are presently required. It was reported that these procedures should be in place within one to two months.

Sect 4.3 Aerodrome Emergency Plans

Finding: Not in compliance with good practice:

Aerodrome Emergency Plan: While the AEP is referenced in the Aerodrome Manual (Sect. 4.3), it was not noted.

Finding: Not in compliance with good practice:

Airport Emergency Operation Committee (EOC): Advised that no such committee exists.

4.3.2.1 Finding: Not in compliance with good practice:

- Are there MOU's (Memorandums of Understanding) with the local hospitals?
- Are there formalized agreements regarding a sudden need for their facilities in the event of a catastrophic accident?
- Do the local medical facilities have actual plans in place for such a contingency?

Sub-Sect 4.3.5 Airport Emergency Exercises:

Major Full:

Finding: In compliance with good practice

Major Full: Last held in 2003; the next one was planned for late 2005, but replaced with the Mandala Air accident.

Partial Exercise:

Finding: Not in compliance with good practice:

Table top *only* is held every six months. Not a complete substitute for a qualifying "partial exercise". A "table top", while unquestionably of real value, is a recommended *additional* (extra) exercise.

Actual Emergency Scenario: 05 September, 2005 Mandala Air 091 Accident.

Airport Emergency Operations Centre:

Finding: Not in compliance with good practice

Airport Emergency Operations Centre: None

Command Post:

Finding: Not in compliance with good practice:

Command Post: None. During the response to the Mandala Air accident, the RFFS Chief's small office and a multi-purpose room in a nearby building were used.

4.3.7.1 RFFS Alarm & Radio Communication Tests: Daily in the mornings

Finding: In compliance with good practice

4.3.7.2 Aerodrome Control Tower Alarm & Radio Comm. Test: Daily in the mornings

Finding: In compliance with good practice

Sub-Sect 4.3.8

Finding: Not in compliance with good practice:

Are there **24-hour** contact numbers for each of these individuals available and accessible on immediate notice? If so, where are the numbers to be found? Are there current 24-hour facsimile numbers available?

Sect 4.4 Rescue and Firefighting Service (RFFS)

Sub-Sect 4.4.4 RFFS Assessed Category

Eight

Finding: In compliance with good practice

Sub-Sect 4.4.5

Reduction of Category: If category is temporarily reduced, what are the mitigating procedures?

Finding: Not in compliance with good practice:

None given other than "will be immediately repaired".

Sub-Sect 4.4.6 Inventory

List of Facilities & Equipment:

Listed in "LAPORAN BULANAN DINAS PKP-PK" Lampiran IX Halaman 1 – 01 February, 2006

Other facilities:

- Foam Quantity: 4,100 l. in three vehicles
- Dry Chemical Powder: 1,000 Kg. in three vehicles

Finding: In compliance with good practice

Sub-Sect 4.4.8 Training Requirements

Specified in Aerodrome Manual

Four stages:

- Basic,
- Junior,
- Senior, and
- Advanced.

Finding: In compliance with good practice

Finding: Not in compliance with good practice:

Live Fire Drills: None recorded

4.4.9 Human Resources RFFD (Sect 3.2.14): 65

Staff:

- 6 Advanced
- 45 Senior
- 14 Junior
- 00 Basic

Finding: In compliance with good practice

4.4.10 Respond Time - Fire Station > Runway End:

RWY 05: 02:48

RWY 23: Less than 02:48

Finding: In compliance with good practice

Foam Quality Tests: By DGAC each six months (last 05 October)
Entered in book-copy Monthly Report.

Finding: In compliance with good practice

Sect 4.5 Aerodrome Inspection

4.5.4.1 Operations Officers' Logbook & Trigger List

Logbook noted; findings entered by hand. e.g., 11 September, 2005 Chief reads the findings.

Finding: In compliance with good practice

4.5.4.2 Radios - Availability & Usage

Finding: Not in compliance with good practice

The department has only three radios, which provide no form of backup redundancy in the event of a unit failure.

Sub-Sect 4.5.5 Monthly Technical Inspections:

The ASI team member was advised that these are carried out each three months based on the condition of the facilities.

Runway and taxiway shoulder inspections conducted once every two weeks.

Finding: In compliance with good practice

Sub-Sect 4.5.6 Annual Safety Inspections:

Reported that the new edition (Oct, 2005) of the ***Standards of Operation and Maintenance*** recently arrived, and the office is presently preparing new forms to correspond with the new manual and procedures.

Finding: In compliance with good practice

Sub-Sect 4.5.9: Roster of Personnel:

Number & Qualifications:

- Six, of which three are Senior and three are Junior
- Monthly schedules reviewed.

Finding: In compliance with good practice

Sect 4.6 Visual Aids, Electrical System, Lights

Sub-Sect 4.6.4 Precautions against System Failure:

Substantial interleaved circuitry exists for the protection of partial power failures of essential lighting.

Backup power is supplied by three fixed generators and two portable generators.

Finding: In compliance with good practice

Sub-Sect 4.6.5 Electrical Power Backup Systems:

Fixed Generators: 1000 Kva and 750 Kva
Mobile Generators: 50 Kva and 15 Kva

Noting the ages (1979, 1980, and 2003) of the standby generator sets versus their condition, it is clear that they are very carefully maintained.

Plus remote auto-start capability for the radars (one located on the airport

and one 8 km distant) and the VOR (13 km distant).

The on-field radar's power is backed up by the on-field generators.
The off-field radar's power is backed up by a 50 Kva generator, with 10-second auto changeover.

The VOR's power is backed up by a 15 Kva generator, with 10 second auto changeover.

Finding: In compliance with good practice

Sub-Sect 4.6.7 Pre-start inspection forms noted for AVK 435 and Mobile 150

Finding: In compliance with good practice

4.6.10.6. Roster of Personnel: 26

Operationally function in four shifts of five people each (six in one case), with one Senior Engineer / group.

(or)

One to 19 per shift, and six move on standby for maintenance as is needed.

Finding: Not in compliance with good practice:

Concern was expressed that the broad range of responsibility (two full buildings, two power houses, the terminals, the movement area lighting systems, and the operations building, remote navigational aids [radar and VOR] etc) creates a need for more personnel.

Qualification: Electrical Technician Training, mostly at the CATC and some at the CATC branch in Medan.

Listed in "DAFTAR TEKNISI DINAS TEKNIK LISTRIK"

Finding: In compliance with good practice

Most of the lights physically located on the movement area were operational. Clearly, those lights which could be maintained by the staff were being maintained to the extent that was within their capability.

Finding: In compliance with good practice, except:

Finding: Not in compliance with good practice:

- No lighted signs were in evidence, and a number of safety-related lighting systems were substantially inoperative. The evident problem is unavailability of parts.

  REILS: Many inoperative (six of 20 – RWY 05) due to a defective cable that was reportedly ordered from Jakarta three months earlier. Cable is still not available for installation.

- Flashing light system – RWY 05 – four of nine inoperative,

- ALS (Approach Lighting System) is substantially inoperative. Ten of the 15 light bars are inoperative, and clearly have been so since the 05 September accident. Parts are not available at Polonia.

- The ASI Team would suggest that the inoperability of these lights contribute to a "skewed" sight picture presented to pilots on their final approach to Polonia. This creates a significant reduction in the redundancies that are so important to the safety, regularity, and efficiency of aviation.

Sect 4.7 Movement Area Maintenance

As Aerodrome Inspection and Movement Area Maintenance are administratively and logistically integrated together, references will at times be made back to Aerodrome Inspection (Section 4.5).

4.7.5.1 Please see 4.5

4.7.5.4 Roster of personnel: Eight, of which six are inspectors.

It appeared that this roster would provide sufficient personnel if the only work performed was inspections.

Finding: Not in compliance with good practice:

The scope of the work to be performed appears to be such that a substantially larger rostering (perhaps 12 total) is needed.

This conclusion is based upon both specific observations at the airport and interviews with staff.

4.7.5.5 Items as listed on "DAFTAR INVENTARIS PERALATAN", February 2006

Finding: Not in compliance with good practice:

- Observation and discussion indicated that there is a rather urgent need for some new maintenance equipment.

- Needed is a friction tester, a new runway sweeper, and a small roller to efficiently and expeditiously fix the broken parts of the runway surface as they develop. It was reported that the runway sweeper is broken, and due to its age (20 years) and condition, replacement, rather than repair, is necessary.

Sect 4.8 Aerodrome Works Safety

Sub-Sect 4.8.6 Method of Working Plan (MOWP)

Procedures discussed: If only of a short time limited impact (e.g., a taxiway closed for maintenance for 30 minutes), then coordination with the Tower is accomplished by telephone.

If the closure would be longer (e.g., for several days) then the full advance planning and notification and NOTAM processes are carried out.

Finding: In compliance with good practice

Sub-Sect 4.8.9

VHF Air Band transceivers were noted to be used as appropriate in the movement area.

Finding: In compliance with good practice

Sect 4.9 Aircraft Parking Control

4.9.5.3 Parking in Emergencies

Isolated Parking Location: Apron D

Parked Aircraft Heading: North

Scheduled airlines have their own marshallers.

Functions of the Polonia Marshallers' Office:

- Marshalling non-scheduled airline flights

- Airport movement control
- Location parking (gate numbers)

Finding: In compliance with good practice

Sub-Sect 4.9.6 Procedures of Start-Up & Push Back of Aircraft

Fire extinguisher availability during pushback is standard. However, availability is not required for newer aircraft due to the in-engine fire extinguishing capabilities.

Finding: In compliance with good practice

Sub-Sect 4.9.7 Procedures For Handling Oversize Aircraft

Prior advice is required to the General Manager for assessment of runway, taxiway, and apron clearances requirements.

Finding: In compliance with good practice

Sub-Sect 4.9.9 Airline Operator / Ground Handling Agent Radio

Frequencies Availability – Listed in Table 24

Finding: In compliance with good practice

Sub-Sect 4.9.10 Roster of Personnel:

15 persons are certificated for marshalling.

Training consists of a one time theory and practical training program, followed by a refresher every two years.

Finding: In compliance with good practice

Sect 4.10 Apron Safety Management

Sub-Sect 4.10.2

All fire extinguishers (Halon 1211) noted on the ramp were current in dates and normally charged.

Finding: In compliance with good practice

Sub-Sect 4.10.6

Arrangement for reporting incidents on apron

Finding: In compliance with good practice

4.10.6.1 Reporting form "LAPORAN INSIDEN D. APRON" (Doc # 01.03.03.BOB)

Finding: In compliance with good practice

4.10.6.2 Reporting aircraft incident on apron

Reporting form APORAN INSIDEN D. APRON" (Doc # 01.03.03.BOB), 08/01/94

Finding: In compliance with good practice

Sect 4.11 Airside Vehicle Control

Sub-Sect 4.11.2 Airside Driving License

Training: A 7-day theoretical and practical class. Subject matter includes air side regulations, driving, signage, and parking locations.

Copy of procedures provided to each airside driver: Airside Safety Regulations (from BAB II – Laws of Driving).

Testing Required: A 27-question examination; questions taken from Airside Safety Regulations. Passing grade = 77 %
3 cm of test results were available

Enforcement mechanism: By "Follow Me" cars.

- First infraction: ID card is punched;
- Second infraction: ID card is again punched;
- Third infraction: ID card is taken back

Finding: In compliance with good practice

Sub-Sect 4.11.4 Application of Procedure

Finding: Not in compliance with good practice:

- A number of problems with the cellular telephones for operational use

at Polonia were reported. Inquiry indicated that there is a shortage of the original, high quality batteries. As the use of cellular telephones is a primary means of operational communications at Polonia, the problem of unreliability of battery power could be a significant operational and safety interference in the event of any major emergency.

- Visibility of the ramp areas is clearly limited by its physical layout and protruding structures. Capability to both monitor and control vehicular and aircraft traffic is thereby severely compromised.

Sect 4.12 Wildlife Hazard Management

Sub-Sect 4.12.4 Procedures for:

- Wildlife monitoring and hazard assessment
- Wildlife hazard notification
- Wildlife reduction methods

The procedures for handling these problems are included in the Aerodrome Manual.

However, the impression given is that this is not considered to be a frequent problem at Polonia Airport, and when an animal or birds are observed in the movement area, the standard procedure is to request a RFFS vehicle or a security vehicle to chase the offender off.

Finding: In compliance with good practice

Sub-Sect 4.12.7 Environmental Management

No rubbish dumps were noted on the aerodrome.

Finding: In compliance with good practice

Sect 4.13 Obstacle Control

Sub-Sect 4.13.4 Administration of Obstacle Control

Procedures: On airport: Must be approved by the Obstacle Control Surveyor.

Off Airport: Reported to be successful and non-problematic, particularly

due to close cooperation with the local community.

Pre-project coordination with the airport takes place. Additionally, the petitioner must process an application through the Regional Office of the Department of Communications for the construction of any tower, antenna, or buildings that may infringe upon an approach or departure path.

Prior to start of construction, the petitioner must obtain the approval from the Regional Office of the Department of Communications

Finally, following construction, an inspection is conducted by AP 2 to assure compliance with Doc 14.03.01.02 (Inspoksi Obstacle).

Finding: In compliance with good practice

Sub-Sect 4.13.9 Roster of Personnel:

3

It was reported that all three have had special training in this area at CATSO.

One Obstacle Control Surveyor and two Assistant Obstacle Control Surveyors

Finding: In compliance with good practice

Sect 4.14 Disabled Aircraft Removal

Sub-Sect 4.14.4 Immediate Operational Considerations and Actions

Specified in the Aerodrome Manual

Finding: In compliance with good practice

Sub-Sect 4.14.7 List of Aircraft Salvage Equipment

Finding: Not in compliance with good practice:

List reviewed. Item No. 5: Crane. The list indicated eleven (11) cranes. However, it appears there are not any in inventory. No suppliers are shown with whom arrangements for availability have been made.

In the event that hazardous material is determined to be on board, the procedure is to call security for handling it.

Finding: In compliance with good practice

Sect 4.15 Hazmat (Hazardous Material)

4.15.3.1 Aviation Fuel: Please see 3.2.13.

Sect 4.16 Low Visibility Operation

Sect 4.17 Protection of Radar & Navigation Aids

4.17.2 Protection and routing of power cables

Power cables (100 m.) are one meter underground.

Physical protection: The VOR is 2-meter-high fence-protected; the radar is fence- protected with a security post and guard -- 24-hour coverage.

Warning signs posted at both VOR and radar sites.

Finding: In compliance with good practice

4.17.7 Roster of Personnel: 18 (6 Expert and 12 Skilled)

- Qualifications: All Expert; hold Certificates of Competency
- Listed in "Data Pegawai Teknik Electrolika Penerbangan Yang Memiliki Skp Dan Rating".

Finding: In compliance with good practice

8.5.5 PART 5 - AERODROME ADMINISTRATION

Sect 5.1 Staff Contact List

Contact numbers are listed in Table 31.

Finding: Not in compliance with good practice:

- Are these numbers manned on a 24-hour basis? If not, are off-duty numbers available for use in the event of an off-duty time emergency?
- Are the names and numbers listed 100 % current? When was the list last updated?
- A procedure to keep these lists current *and* an ongoing record of determining currency were not noted.

Sub-Sect 5.1.2 Organizational Structure

Diagrammed on page 123.

Sub-Sect 5.1.3 Airport Committees

Airport Safety Committee (Airport management/CIQ/Air Boss/Airlines)

The Airport Safety Committee was established after the Mandala Air crash. Plans are to hold meetings every three months. There has been one meeting thus far.

The meeting minutes are sent to Jakarta.

5.1.3.1 Airline Operator Committee

Finding: Not in compliance with good practice:

AOC is supposed to meet quarterly, but evidently often don't. The meeting minutes are sent to Jakarta.

5.1.3.2 Airport Emergency Plan Committee

Finding: Not in compliance with good practice:

Some different members – no formal meeting schedule exists.

5.1.3.3 Bird Strike Prevention Group

Not available as the problem of bird strikes is not considered to be a problem at Polonia.

Sub-Sect 5.1.4 Aerodrome Manual Revision & Update Team

The DGAC model is used. Any modifications must be reported to the DGAC.

The manual is changed maybe four times per year. Recommendations come from various sources. The final decision is made by the airport manager. There is no specific committee.

The Aerodrome Manual is issued by the DGAC and is to be followed by all airports.

Any change and update must be formally notified to the DGAC; reportedly very few modifications and/or changes are done by the local airports.

Sub-Sect 5.1.5 Distribution of Manual & Plans

There is a formal list: 5.1.5.1 Table 32.

Sub-Sect 5.1.6 Plan of Distribution

As per Table 32

Sect 5.2 Non-Standard Items & Exemptions

Sub-Sect 5.2.1 Non-Standard Items: None

5.2.1 Exemptions:

Any Existing: As listed in 5.2.2

Finding: Not in compliance with good practice:

There is no specific Safety Officer / Official. The function is performed by Operations. All safety issues are addressed in either the Aerodrome Manual or the Emergency Plan.

9 ATTACHMENT E: JAMBI AIRPORT (WIPA) – FINDINGS

9.1 SAFETY PROTOCOLS

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

- ✓ Standards and Recommended Practices (SARPs) required by ICAO ***Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations***, 4th Edition, applicable as of 1 July 2004
- ✓ Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001
- ✓ International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

9.2 ADDITIONAL REFERENCED DOCUMENTS

The following additional documents are referenced in the report:

- ✓ ***Manual of Standards - Part 139 Aerodromes*** (MOS), is made pursuant to Civil Aviation Safety Regulations CASR Part 139, and comprises specifications (Standards) prescribed by the DGAC of the Government of Indonesia
- ✓ ***Sultan Thana Airport Aerodrome Manual***, Jambi, applicable as of Agustus, 2005

9.3 AIR TRAFFIC CONTROL TOWER

9.3.1 STAFFING

Licensing

Finding: In compliance with good practice:

- All staff operates with licenses. All are senior controllers
- Staff are required to have a medicals examination every year.
- Staff receive competency checks every six months.

Establishment

Finding: In compliance with good practice:

- Number of controllers: 11
- Number of support staff: 1
- Appears that there are sufficient qualified staff to provide safe air traffic control services.

Watch Rosters

Finding: In compliance with good practice:

- There is a fixed duty rotation of two days on and one day off.
- Rostering limitations are complied with.

Management Functions & Responsibilities

Finding: In compliance with good practice:

- Key staff are identified (the tower chief).
- Positions, responsibilities, functions, and accountabilities are in writing and accessible in the form of an ATC manual of procedures. The ICAO ATM (Doc 44 – 14th Edition, 2001) is available.

9.3.2 EQUIPMENT

Communications

Finding: Not in compliance with good practice:

- Headsets are not provided. Speaker phone only.
- Back-up communications capability is available (via a backup transceiver DITTEL FSG71M) on only one frequency. Therefore, there is no capability to circumvent a "stuck microphone" problem.
- Anti-blocking systems (e.g., CONTRAN) are not available.

Finding: In compliance with good practice:

- Published frequency is available. 118.4 is utilized for both ground control and tower control. There are no approach or radar frequencies.
- Communications are normally 'perfectly readable' ("5 x 5").

- Controllers are trained for contingency communications procedures.
- Controllers are trained in aircraft no-RT procedures (to use emergency procedures included in ICAO Doc 44).
- Fixed telephone lines with telephones are available.
- Voice recording facilities are available (CD).
- Voice recordings are kept for one year.
- Controllers were somewhat familiar with the concept of "impounding" tapes.
- Emergency staff are alerted by telephone, radio, and the crash bell, plus three signals on a loud horn.
- Controllers receive training on emergency procedures and in handling emergencies.
- Checklists are available for emergencies.
- The airfield crash map is displayed and is immediately available.

Finding: Not in compliance with good practice:

No contingencies are available for when the radio communications recording system is unavailable.

Information Systems

Finding: Not in compliance with good practice:

There is an indicating system for hP, degrees Centigrade, wind direction, and wind speed. However, this equipment has been inoperative for ten years. We would suggest that accurate information on wind direction and speed is extremely critical to a landing aircraft. Therefore, as these conditions can rapidly change, it is in the interest of flight safety (and flight operations legality), that we suggest this unit should be replaced at the earliest possible time with a new "state of the art" unit.

Finding: In compliance with good practice:

- Flight data display is by paper strips
- MET display is updated every 30 minutes.
- Surface wind indication is provided by MET.
- Pressure setting is received from MET.

Serviceability Indicators

Finding: Not in compliance with good practice:

The serviceability of essential aids and lighting is determined by binoculars. A display unit exists, but it is inoperative. In view of the fact that there are both flight safety and legal implications to initiating an approach or landing without certain aerodrome lighting, we most strongly recommend that this unit be replaced at the earliest possible time with a new "state of the art" unit.

Finding: In compliance with good practice:

- This information is communicated to engineers by telephone.
- Controllers' response to unserviceabilities is to call the electrical technicians.

Aerodrome Ground Lighting Indicator

Finding: In compliance with good practice:

There is a serviceable aerodrome ground lighting control unit.

Visual Signaling

Finding: In compliance with good practice:

- A light gun (hanging from the ceiling) is available.
- Staff have had training in its use.
- Spare bulbs are available.

Finding: Not in compliance with good practice:

ATIS is not available.

9.3.3 ACCOMMODATION

Operational Positions

Finding: Not in compliance with good practice:

- A single operating position exists.
- Operational equipment clearly is not laid out ergonomically.
- The space appears to be (and was reported to be) very limited.

Visual Control Room

Finding: In compliance with good practice

- The view allows an uninhibited view from the control room.
- "Film" is used to minimize problems from reflections.
- As there are no VDU's there is no reflection interference.
- Binoculars are provided.
- A tower log is provided.
- The staff are trained for encountering and handling emergency situations.

Finding: Not in compliance with good practice:

The tower is accessed via a stairway. There are no alternate provisions for escape in the event of fire.

9.4 FUELING FACILITIES

The aircraft fuel is transported from Palembang to the airport fuel farm a 10-hour trip via 1.6 KL. tanker truck.

Following ten minutes of settling and a visual check for clarity, brilliance, and water contamination, the fuel is discharged through a fuel filter into the two 100 KL. receiver (holding) tanks.

The fuel then must settle in the receiver tank for fifteen minutes per foot of height of product in the tank (total height 2.6 m.), and then undergo a quality control check the next morning before being pumped through the water filter into the delivery tanks (two 100 LK each).

Filtering routings are: Pump > strainer > filter > water separator.

Before the operation starts each morning, a QC visual check is done on all trucks and tanks. A visual check for a clear and bright appearance and freedom from water contamination are accomplished. Reviewed and noted the dates of random Shell Water Detection units. All noted were up-to-date (e.g., Exp 07/06).

Samples are taken and retained for 24 hours. Written record is made and filed of each result.

The fuel is then pumped from the delivery tank through a filter, before proceeding through the differential pump to the trucks for delivery to the aircraft. Final filtration then takes place as the fuel is pumped into the aircraft.

During the rainy season extra purity checks are accomplished as deemed advisable.

Daily and quarterly records were reviewed and noted.

While a detailed inspection of on-site available firefighting equipment was not accomplished, firefighting equipment was very much in evidence.

No fuel leaks, nor seepages, nor pools of fuel were in evidence. No indication of any escaping fuel was seen.

Finding: In compliance with good practice

9.5 AERODROME MANUAL:

Please note: each numerical reference refers to the specific section or sub-section in the Aerodrome Manual. Sub-Section numbers, while not all included in the Sultan Thana Airport Aerodrome Manual , are based upon those customarily in use in the Aerodrome Manuals of the larger airports assessed.

Finding: Not in compliance with good practice:

- As an ***Aerodrome Manual*** is a "living document", (i.e., capable of being updated / revised page-by-page or section-by-section as appropriate), it is of critical importance that each person and each organization utilizing the manual use the most current information available. A common mechanism for this is to have an AMENDMENT page located in the initial area of the manual. This page normally consists of several columns, as follows: Revision Number, Date of Amendment, Date Entered, Entered By, and Remarks.

- As certain pages are very likely subject to frequent and important updating, it is of critical importance to be using the most current information (name and telephone numbers) existing. This is particularly so in the event of an emergency.

In ICAO manuals, as each page of the manual is revised and replaced, the *effective date* of the replacement page is entered on each specific replacement page. Thereby, in corroboration with the "Record of Revisions" page and appropriate entries, the currency of *each* page in *each* copy of the manual can be verified.

9.5.1 PART 1 - GENERAL INFORMATION

Sect 1.2

Sub-Sect 1.2.1 Aerodrome Certificate Number:

Adm. OC / 007 /2005

Sect 1.6 Aerodrome Safety Management System

Finding: Not in compliance with good practice:

While the Aerodrome Manual references an Aerodrome Safety System, and Appendix 8 includes conditions for Safety Inspection Personnel and an undated completed Inspection Check Sheet, existence of an active, formal Safety Management System could not be confirmed.

9.5.2 PART 2 - AERODROME SITE DETAILS

Sect 2.1 Aerodrome Plan

Sub-Sect 2.1.2 Wind Direction Indicators

Operational

Finding: In compliance with good practice

9.5.3 PART 3 - AERODROME DIMENSIONS AND RELATED INFORMATION

Sub-Sect 3.1.5 Aerodrome Reference Point (ARP)

Finding: Not in compliance with good practice:

When were these coordinates last updated?
They appear to be non-current.

3.2.1.12 Coordinate Of Threshold

Finding: Not in compliance with good practice:

When were these coordinates last updated?
They appear to be non-current.

3.2.1.13 Coordinate And Elevation Of The Obstacle Around Of Circling And Aerodrome Area

Finding: Not in compliance with good practice:

When were these coordinates last updated?
They appear to be non-current.

9.5.4 PART 4 - AERODROME OPERATING PROCEDURES

Sect 4.1 Aerodrome Reporting

Sub-Sect 4.1.2 Responsibilities

Meteorological information: Requested and received

DNS (Daily Notam Bulletins): None

Face To Face Crew Brief: Requested and received

Standard ICAO FLIGHT PLAN for Sultan Thana Airport available and received.

Finding: In compliance with good practice, except:

Finding: Not in compliance with good practice:

Many of the following appear to be non-current:

AIP's: 7th Edition:

- VOL II AIP AMDT 05: 30 Apr, 2004
- VOL III AIP AMDT 03: 12 June, 2003 (Domestic Aerodromes)
- VOL IV AIP – A.D. for LIGHT AIRCRAFT – 18TH Edition – 2003 (Current >
- 22 January, 2004)

- Display Information / Wall Charts:

- IFR 03 Mar, 1994
- ONC 11 Jul, 1983

- WIPA Charts (under glass on counter):

o 7th Edition
- 10-7 Garuda 18 May, 1994
- 13-7 VOR/DME RWY 13 21 July, 1995
- 16-7 NDB 13 05 Feb, 1993

- FLIGHT DATA INFORMATION AUG, 1997

Finding: Not in compliance with good practice:

Meteorological Office:

The meteorological office (STASIUN METEOROLOGI JAMBI) is of "showcase quality".

It is an excellent facility and very well equipped.

Equipment:

- Two telephone lines / facsimile / SSB (MIL) / internet connection /
- JNTRA net connection (CMSS – Central Message Switching System)
- CMSS Message Extraction.

MET reports are issued each hour. The facility is open 24 hours each day.

There are 17 total personnel. There are four shifts with three persons per shift, including one forecaster, one observer, and one for the upper area.

The personnel are clearly very proud of their facility and their equipment, and we would suggest, with very good reason.

Finding: In compliance with good practice

4.1.10 Aerodrome AIS Officer Personnel Data: Six

Four with AT Serrais License

Six months of training at CATC in Jakarta

Day schedule only due to no scheduled flights in at night (except delayed).

Finding: In compliance with good practice, except:

Finding: Not in compliance with good practice:

A review of the equipment available to the personnel at the AIS indicated no facsimile machine as a back-up for possible computer difficulties.

Sect 4.2 Access to Movement Area

Sub-Sect 4.2.3

Roads and perimeter fencing is listed in "LAPORAN FASILITAS JALAN HALAMAN PAGAR", December, 2005 (dated 06 January, 2006).

Sub-Sect 4.2.4 Access controls

Requirements for acquiring an airport pass:

- Must be an employee at the airport;
- Receipt by the airport administration from the police of a criminal records check;
- Verification letter from the police indicating that the applicant has a valid driver's license;
- Completion of the airport process for the airport driving pass;
- Completion of the procedure for acquiring an airport ID card.

Requirements for acquiring an Airport Vehicle Pass (Sticker):

Compliance with 4.2.5

Finding: In compliance with good practice

Sub-Sect 4.2.5 List of documents checked

As listed in the Aerodrome Manual

Finding: In compliance with good practice

Sect 4.3 Aerodrome Emergency Plans

Finding: Not in compliance with good practice:

Airport Emergency Operation Committee (EOC): Advised that no such committee exists.

4.3.5.1 Finding: Not in compliance with good practice:

- While reference is made to three hospitals in the area (and again in 4.3.2.6), the question remains: Are there formal MOU's (Memorandums of Understanding) in place with these hospitals?
- Has assurance been received in writing that these hospitals have developed and have in place the emergency plans necessary to assure capability to respond rapidly and efficiently in an actual crash situation?

Sub-Sect 4.3.5 Airport Emergency Exercises:

Major Full: Last held in November, 2004. The scenario was an aircraft crash.

Participants included all airport facilities and personnel, the police, and medical.

Finding: In compliance with good practice

Airport Emergency Operations Centre:

Finding: Not in compliance with good practice:

There is no Airport Emergency Operations Centre

Command Post:

Finding: Not in compliance with good practice:

There is no Command Post: During the November, 2004 exercise an AVSEC vehicle was used as a command post.

4.3.7.1 RFFS Alarm & Radio Communication Tests: Daily

Finding: In compliance with good practice

4.3.7.2 Aerodrome Control Tower Alarm & Radio Comm.Test: Daily

Finding: In compliance with good practice

Sect 4.4 Rescue and Firefighting Service (RFFS)

Sub-Sect 4.4.4 RFFS Assessed Category: Six

Finding: In compliance with good practice

Sub-Sect 4.4.5 Reduction of Category:

If category is temporarily reduced, what are the mitigating procedures?

Finding: Not in compliance with good practice:

None as there is no outside support available.

Sub-Sect 4.4.6 Inventory:

List of Facilities & Equipment:

Listed in 'LAPORAN KONDISI KENDARAAN PKP-PK" Halaman II - 06 January, 2006

Other facilities:

- Foam Quantity: 1,400 l. in vehicle (plus spare of 1,200 l.)
- Dry Chemical Powder: 900 Kg. in two vehicles of 450 Kg. each (plus spare of 1,600 Kg).

Finding: In compliance with good practice

Sub-Sect 4.4.7 Standard Operating Procedures:

Finding: Not in compliance with good practice:

Off-Aerodrome Accident:
- Land: No standard operating procedures listed
- Maritime: No standard operating procedures listed.

Sub-Sect 4.4.8 Training Requirements

Live Fire Drills: Annual. Last held in December, 2004

Finding: In compliance with good practice

Sub-Sect 4.4.9 (4.4.7)Human Resources RFFD: 21

Staff: 11 - Senior
06 - Junior
02 - Basic
02 - None

Finding: In compliance with good practice

4.4.10 Respond Time - Fire Station to Runway End:

RWY 31: 02:06

RWY 13: Less than 02:06

Finding: In compliance with good practice

Foam Quality Tests:

- No test equipment
- No DGAC visits to Jambi
- Jambi RFFD does their own tests by spraying foam and timing.

Sect 4.5 Aerodrome Inspection

Sub-Sect 4.5.2 Daily Serviceability Inspections - Movement Area & OLS

RWY 13 / 31: After each scheduled flight
Taxiway / ramp: Day – once / hour
Night - every two hours

Finding: In compliance with good practice

4.5.4.1: Operations Officers' Logbook & Trigger List: Reviewed & noted

Finding: In compliance with good practice

4.5.4.2 Radios - Availability & Usage

Radios ("handy-talkies") were noted as being used in vehicles operating on the movement area to coordinate with the tower.

Finding: In compliance with good practice

Sub-Sect 4.5.5 Monthly Technical Inspections

December, 2005 PR. 103/...1../ST-2006 (Monthly Report) issued on 6 January, 2006, received.

Finding: In compliance with good practice

Sub-Sect 4.5.6 Annual Safety Inspections:

Finding: Not in compliance with good practice:

No confirmation of an annual safety inspection having been accomplished.

Sub-Sect4.5.9 Roster of Personnel: Number & Qualifications:

Four, of which one is Senior and three are Junior
Listed in "Data Pegawara Negeri Sipil UPT Dictorate Jenderal Perhubungan Udara" (Directory of Technical Personnel Under the DG of the Aerodrome).

Finding: In compliance with good practice

Sect 4.6 Visual Aids, Electrical System, Lights

Sub-Sect 4.6.4 Precautions against System Failure:

Finding: Not in compliance with good practice:

Routing of Main Feed Lines: From the PLN (National Power Company) via one 197 Kw. power line. Therefore there is no back-up redundancy for coverage of cutting (intentional or non-intentional) of the power line.

Sub-Sect 4.6.5 Electrical Power Backup Systems:

Fixed Generators:	One 250 Kva Two 125 Kva
Mobile Generators:	Two 15 Kva

Runway Lighting, PAPI, HIRL, and Taxiway Lighting protected by the 250 Kva generator, with an automatic changeover time of seven seconds.

Finding: In compliance with good practice

Sub-Sect 4.6.6 Serviceability Inspections:

Accomplished once each day. Logbooks reviewed and noted.

"Laporan Hasil Pemotongan Rumput" (Grass mowing monthly report for December, 2005 (dated 06 January, 2006) reviewed and noted.

Monthly inspection reports for all three generating sets for December, 2005 (dated 06 January, 2006) reviewed and noted.

Finding: In compliance with good practice

Sub-Sect 4.6.9 Inventory of Airport Lighting Facilities

Approach Lighting System:
- PRecs Approach Lights (PAS); 100 m. in length
- Sequenced flashers
- No runway centerline lights
- Control tower beacon.

4.6.10.6. Roster of Personnel:

22 Persons, of which five are Senior and 17 are Junior
Listed in "Data Pegawara Negeri Sipil UPT Dictorate Jenderal Perhubungan Udara" (Directory of Technical Personnel Under the DG of the Aerodrome).

Finding: In compliance with good practice

Sect 4.7 Movement Area Maintenance

As Aerodrome Inspection and Movement Area Maintenance are administratively and logistically integrated together, references may at times be made back to Aerodrome Inspection (Section 4.5).

4.7.4.2 Rubber Deposit Cleaning On Touchdown Zone:

Once per year based upon requirements.

Finding: In compliance with good practice

4.7.4.4 Runway, Taxiway, & Apron Surface Cleaning:

Once per week

Finding: In compliance with good practice

4.7.4.5 Finding: Not in compliance with good practice:

Friction Testing: Has never been done. No friction testing equipment is available.

4.7.4.6 Water Depth Measurement

4.7.4.6.1 What Is Specific Equipment Used? Measured By Sight

Finding: In compliance with good practice

Sub-Sect 4.7.5 Maintenance Level

4.7.5.2.2 Marking Lines Repainting:

Done once each three months.

Finding: In compliance with good practice

4.7.5.4 Roster of Personnel:

84 of which 20 are Senior and 64 are Junior

DATA PEGAWARI

Finding: In compliance with good practice

4.7.5.5 List of Maintenance Equipment

As listed in "DAFTAR PEMAKAIAN BBM DAN PELUMAS ALAT-ALAT BESAR" (Monthly Report for December 2005, dated 06 January, 2006)

Finding: In compliance with good practice

Sect 4.8 Aerodrome Works Safety

Sub-Sect 4.8.6 Method of Working Plan (MOWP)

Procedures discussed: If only of a short time limited impact (e.g., a taxiway closed for maintenance for 30 minutes), then coordination with the Tower is accomplished by telephone.

If the closure would be longer (e.g., for several days) then the full advance planning and notification and NOTAM processes are carried out.

Finding: In compliance with good practice

Sub-Sect 4.8.9 Marking and Identification of Vehicles and Machinery

VHF Air Band Receivers (Availability & Use): Observed and noted use as appropriate.

As backup, light signals from the tower, flashing of the runway lights is utilized.

Finding: In compliance with good practice

Sect 4.9 Aircraft Parking Control

4.9.5.4 Parking in Emergencies

Isolated Parking Location is at the West Area.

Finding: In compliance with good practice

Sub-Sect 4.9.6 Procedures of Start-Up & Push Back of Aircraft

No pushback; aircraft park so as to be able to turn out and depart from their parked position.

Finding: In compliance with good practice: While not an ideal situation (space limits preclude a good parallel taxiway situation in front of the terminal), each start-up and push-back observed was very smoothly accomplished.

Sub-Sect 4.9.8 Procedures for Handling Oversize Aircraft

The largest aircraft that are handled are the B-737-200 and the B-737-500.

Sub-Sect 4.9.9 Airline Operator / Ground Handling

Ground handling is handled by the airline.

4.9.10 Marshalling is done by the airline in coordination with Mr. Tujistan.

Non-scheduled flights are marshaled by Mr. Tujistan.

Marshallers are licensed, having had three months of training at Jakarta at the Merpati Training Center.

Finding: In compliance with good practice

Sect 4.10 Apron Safety Management

Sub-Sect 4.10.2

All fire extinguishers (Halon 1211) noted on the ramp were current in dates and normally charged.

Finding: In compliance with good practice

Sub-Sect 4.10.6 Arrangement for Reporting Incidents on Apron

Incidents are reported directly to the Airport Director.

Finding: In compliance with good practice, except that there is no form.

4.10.6.2 Reporting aircraft incident on apron

Security and RFFS are contacted, and then the incident is reported to the Airport Director.

Reporting form APORAN INSIDEN D. APRON" (Doc # 01.03.03.BOB), 08/01/94

Finding: In compliance with good practice

Sect 4.11 Airside Vehicle Control

Sub-Sect 4.11.4 Application of Procedure

Finding: Not in compliance with good practice:

- No training program in use
- Confirmation by police that the individual has a license is sufficient.
- No speed limit is specified.

Sub-Sect 4.11.5 Enforcement:

Police are advised of offences and appropriate action is taken.

Finding: In compliance with good practice

Sect 4.12 Wildlife Hazard Management

Sub-Sect 4.12.3.1 Animal Hazards

Dependent upon the seasonal population of wild animals any problem can normally be handled by monitoring.

Procedures are that when the problem does exist, the airport administration reports the situation to the police, who then handle it. The most common problem is dogs. *When necessary*, the police will shoot persistently problematic dogs.

Sub-Sect 4.12.4 Bird Hazards

It is reported that the airport is far from the bird communities, so the problem is minimal.

While bird strikes occur normally about twice each year, the birds are transient -- flying through from other areas.

Bird strikes are reported by letter to the DGAC.

Finding: In compliance with good practice

Sub-Sect 4.12.7 Environmental Management

No rubbish dumps were noted on the aerodrome.

Finding: In compliance with good practice

Sect 4.13 Obstacle Control

Sub-Sect 4.13.4 Administration of Obstacle Control

Procedures:

On airport: Must be approved by the Airport Director.

Off Airport: Reported to be successful and non-problematic, primarily due to close cooperation with the local community.

Pre-project coordination with the airport takes place. If all is satisfactory, then permission is conditionally given.

If permission is declined, and a structure is built, then the airport reports the situation to the DGAC and the provincial government (PANDA). PANDA has the ultimate authority to issue (and enforce) a stop work order and require dismantling of the structure.

Finding: In compliance with good practice

Sub-Sect 4.13.8 Roster of Personnel:

1 Mr. Tukijan

Sect 4.14 Disabled Aircraft Removal

Sub-Sect 4.14.4 Procedure

Finding: Not in compliance with good practice:

- Reported to be in the Aerodrome Emergency Plan.
- However, the only reference to specifics is a single sentence in 4.3.2.7.
- It appears that paragraph 4.14 (on page 28) of the Aerodrome Manual would prevail.

Finding: Not in compliance with good practice:

Should an aircraft crash on or in the vicinity of the aerodrome, there appears to be no specific plan of immediate action "in place" for assured

access to cranes and other heavy equipment necessary for life-saving purposes.

Sub-Sect 4.14.7 List of Aircraft Salvage Equipment

Finding: Not in compliance with good practice:

- Reported to have listed items. (CHECH A. M. APP.) In form UMUM Page H?

- Crane. The list indicated eleven (11). However, it appears there are not any in inventory. No suppliers are shown with whom arrangements for availability have been made.

  In the event that hazardous material is determined to be on board, the procedure is to call security for handling it.

Sect 4.15 Hazardous Materials (HAZMAT)

Sub-Sect 4.15.3 Aviation Fuel: Please see 3.2.1

Sect 4.16 Low Visibility Operation

Sect 4.17 Protection of Radar & Navigation Aids

The Nav Aids associated with Sultan Thana Aerodrome are an NDB, a DVOR, a DME, and a RCMS, as per "DIRECTORATE JENDERAL PERHUBUNGAN UDARA" (Monthly Report for December 2005, dated 06 January, 2006).

The radio communications equipment associated with Sultan Thana Aerodrome are listed in "DIRECTORATE JENDERAL PERHUBUNGAN UDARA" (Monthly Report for December 2005, dated 06 January, 2006).

4.17.2 The VOR is within the airport boundary.

There are reported to be two transmitters (one primary and one backup).

Finding: In compliance with good practice

4.17.5. Maintenance Works Affecting Radar and Navigation Aid

The tower is advised, who in turn advise the Communications Center of Jambi, who in turn advise the Briefing Office for appropriate NOTAM issuance.

Finding: In compliance with good practice

4.17.7 Roster of Personnel: Three

- One is Senior with the Diploma Level 4
- Two are Junior with the Diploma Level 3

Finding: In compliance with good practice

9.5.5 PART 5 - AERODROME ADMINISTRATION

Sect 5.1 Staff Contact List

Sub-Sect 5.1.2 Organizational Structure

Finding: Not in compliance with good practice:

- The chart on page 59 indicates the structure. Are the names listed 100 % current? When was the list last updated?
- What contact numbers are available for use in the event of an-off duty time emergency?
- Are the contact numbers listed manned on a 24-hour basis?
- Are there **24-hour** contact numbers for each of these individuals for use in the event of an-off duty time emergency (e.g., a catastrophic night-time, weather-related crash on the runway of a corporate jet) available and accessible on immediate notice?
- If so, where are the numbers to be found?
- Are there current 24-hour facsimile numbers available?

5.1.3.3 Bird Strike Prevention Group

Not available as the problem of bird strikes is not considered a problem at Jambi.

Sect 5.2 Non-Standard Items & Exemptions

Sub-Sect 5.2.1 Non-Standard Items: None

Finding: Not in compliance with good practice:

There is no specific Safety Officer / Official. The function is performed by Operations. All safety issues are addressed in either the Aerodrome Manual or the Emergency Plan.

Sect 7.4 Airport Safety Committee

Finding: Not in compliance with good practice:

As listed in the Aerodrome Manual, the Airport Safety Committee is tasked with *"maintaining peace and order and to protect flights from civil disturbances"*. Their mandate does not include any operational safety areas.

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TASK 2 REPORT

PROPOSED AIRPORT SAFETY AND SECURITY SYSTEM PLAN FOR INDONESIA

US TDA Fiscal Data:
Appropriation No.: 114/51001
Activity No.: 2004-30051A
Reservation No.: 04351388
Grant No.: GH04351388

BACKGROUND

GOVERNMENT OF INDONESIA INTENTIONS

Indonesia has approximately 163 airports which include from large to very small facilities, of which 24 are currently international airports. PT Angkasa Pura I and PT Anglasa Pura II are two state owned enterprises that manage 25 international airports. The remaining airports are small to very small with light traffic and are managed by the Directorate General of Air Communications (DGAC), Indonesia's authority for civil aviation matters.

During the last six years the Government has implemented a liberal licensing policy which has resulted in the growth of airline market from two licensed air carriers to 21 that operate scheduled flights. In addition, because of competition, fares have decreased and there are numerous package deals available for intra- and inter-island travel. Charter carriers have also increased operations as many more Indonesians are taking advantage of lower air fares. This has resulted in the country's airports becoming very busy and strained to be able to provide passenger services including adequate safety and security.

The safety and security concerns at Indonesia's airports have particularly heightened in the aftermath of the September 11, 2001 terrorist attacks on the United States. Many of Indonesia's remote airports in the Indonesian archipelago offer attractive sites for the germination of terrorist activity bases. Airports could be even more attractive as venues for arms transfer and smuggling unless appropriate safety and security measures are put in place.

In 2000, the International Civil Aviation Organization (ICAO)[1] conducted an audit of Indonesia's safety and security procedures and systems. Later in 2004, ICAO conducted an Aviation Security Audit of Soekarno Hatta International Airport, Jakarta which included an extensive assessment of the security related sections and procedures of the DGAC. In 2005, the US Transportation Security Administration (TSA) performed a security audit of the Ngurah Rai International Airport, Bali which again also focused both on the airport's security

[1] ICAO consists of 189 Contracting States. Indonesia is one of the 189 Contracting States.

and on the ability of the security sections of the DGAC organization to provide appropriate compliance oversight. Despite the fact that Indonesia has attempted to address all of the issues raised in each of these audits, safety and security continue to be concerns at all airports to varying degrees. As a result, the Government of Indonesia has renewed its commitment to improve the safety and security at its airports.

CONTRACT SCOPE OF WORK

The United States Trade and Development Agency (USTDA) through a grant to the Government of Indonesia funded a technical assistance project for the Government to help identify and remedy the safety and security weaknesses in Indonesian airports. Aerospace Services International, Inc. (ASI) of Chantilly, Virginia, USA was selected by the Government of Indonesia and awarded a contract to perform these functions under the technical assistance grant.

The USTDA funded contract requires an assessment of current security and safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety and security at Indonesian airports. The contract also requires the development of an investment program and a financing plan for the recommended upgrades.

The technical assistance is to be performed at four airports that are representative of Indonesia's many airports nationwide. These airports must include:

1. A large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations such as Jakarta International Airport,
2. A tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations such as Bali International Airport,
3. A medium-sized airport such as Medan International Airport, and
4. A small airport with mostly domestic short-haul traffic which is to be determined in consultation between the Grantee and Contractor

These four representative airports will become pilots for the detailed safety and security audits and assessments, and will form the basis for extrapolating the systems upgrades and investments needed for all airports in the country.

The USTDA funded contract Terms of Reference (TOR) is divided into eight tasks. Task 1 of the contract requires that a detailed assessment be conducted of the existing airport safety and security systems and procedures at the four pilot airports identified by the Grantee (Government of Indonesia, Director General of Air Communications). The four airports chosen by the DGAC are:

- Soekarno Hatta International Airport, Jakarta
- Ngurah Rai International Airport, Denpasar, Bali
- Polonia international Airport, Medan
- Sultan Taha Sysrifudn Airport, Jambi

The assessments are to determine the extent to which the current systems at these four airports are in compliance with prevailing ICAO requirements and international standards of safety and security.

Recommendations for improving the safety and security at Indonesian airports in accordance with the findings in this report will be included in subsequent tasks and related reports in accordance with the contract.

PROJECT ACTIVITIES

COMPLETION OF CERTAIN TASKS

This Report is submitted in accordance with the requirement of USTDA funded contract task 2. ASI has fully accomplished contract task 2 by the acceptance of this report by the Director General Air Communications.

METHODOLOGY OF RECOMMENDATIONS

METHODOLOGY

The Terms of Reference for this contract only requires that ASI report the measures necessary to upgrade the four airports visited to current international standards. During the performance of this project, the ASI Team has uncovered a number of issues that we feel directly and adversely affect the aviation security posture of all of Indonesia's airports. For this reason we have chosen to expand our report beyond the contract requirements and have included many other sections in this report that we hope will be of greater benefit.

PROTOCOLS

The ASI Team used the same protocols for elements of this report as was used to initially evaluate the four airports chosen by the Director General Air Communications. Those protocols are repeated below for clarity.

1.1.1 SAFETY PROTOCOLS

The safety protocols agreed to be used include applicable safety standards and recommended practices from the following:

1. Standards and Recommended Practices (SARPs) required by ICAO Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations, 4th Edition, applicable as of 1 July 2004

2. Standards and Recommended Practices required by ICAO Annex 14 – as presented in the ICAO Manual on Certification of Aerodromes" (Doc 9774 AN/969) 1st Edition, applicable as of 1 July 2001

3. International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

1.1.2 SECURITY PROTOCOLS

The security protocols agreed to be used include applicable security standards and recommended practices from the following:

1. Standards and Recommended Practices required by ICAO Annex 17 – Security, 8th Edition, applicable as of 1 July 2006

2. Standards and Recommended Practices required by ICAO Annex 2 – Rules of the Air, as they relate to security

3. Standards and Recommended Practices required by ICAO Annex 6 – Operation of Aircraft, as they relate to security

4. Standards and Recommended Practices required by ICAO Annex 8 – Airworthiness of Aircraft, as they relate to security

5. Standards and Recommended Practices required by ICAO Annex 9 – Facilitation, as they relate to security

6. Standards and Recommended Practices required by ICAO Annex 10 – Aeronautical Telecommunications (Volume IV), as they relate to security

7. Standards and Recommended Practices required by ICAO Annex 11 – Air Traffic Services, as they relate to security

8. Standards and Recommended Practices required by ICAO Annex 13 – Aircraft Accident and Incident Investigation, as they relate to security

9. Standards and Recommended Practices required by ICAO Annex 14 – Aerodromes (Volume I – Aerodrome Design and Operations), as they relate to security

10. Standards and Recommended Practices required by ICAO Annex 18 – The Safe Transport of Dangerous Goods by Air, as they relate to security

11. International Best Practices for Aviation Security at the State's National Level and at the Airports Level

RECOMMENDATIONS FOR UPGRADING SAFETY AND SECURITY AT INDONESIA'S AIRPORTS

INTRODUCTION

Some of the below sections have been repeated from the Task 1 Report to aid the reader of this report in understanding and following the methodology used by the ASI Team in arriving at the recommendations contained herein.

NATIONAL CIVIL AVIATION LAWS

Realistic compliance throughout the country with civil aviation laws, regulations and national goals requires that those who must implement and comply with the laws, regulations and national goals understand clearly what is required and by whom. In order to be effective the laws should be clear, current and appropriate to the threat environment. The present legal system that controls Indonesia's civil aviation including its security is severely segmented as noted in the following sections.

The Indonesian Aviation Act of 1992 mentions the word security no less than 14 times – sometimes in the context of national security but mostly regarding aviation security. Article 3 of the Act addresses the Objective of Indonesian Aviation in the context:

> ". . . to conduct safe, *secure*, fast, smooth, orderly, regular, comfort and regular travel . . .".

Article 20 states:

> "Each air navigation facility and/or supporting equipment of aviation shall comply with the requirements for aviation safety and *security*."

Article 24 states:

> "The prevention and disposition of acts that may cause disturbances against aviation *security* and flight safety, including those that may have an adverse impact on national security and state defense, shall be regulated by Government Regulations."

Article 25 (2) states:

> "The designation of locations, design, engineering and construction of airports including the surrounding areas shall consider aviation *security* and safety, and the environmental preservation of the airport areas."

Article 28 states:

> "It is prohibited to be at an airport, to construct (a) building, *or to engage in any other activities in or near an airport that may endanger the aviation security* and safety."

Note: The italicized portions of the Articles quoted above are added to emphasize the security portion of the article.

Articles 64 and 66 of the 1992 Aviation Act sets forth penalties for failure to comply with Articles 20 and 66.

1.1.3 AIR TRANSPORTATION STRUCTURE

Responsibility for the air transportation function falls under the Coordinating Minister of Legal, Political and Security Affairs; the Ministry of Communications and the Director General of Air Communications. Some responsibility for the air transport government structure also falls under the Coordinating Minister for Economic Affairs as is depicted in the chart below; and directly under the President through the Police and Armed Forces.

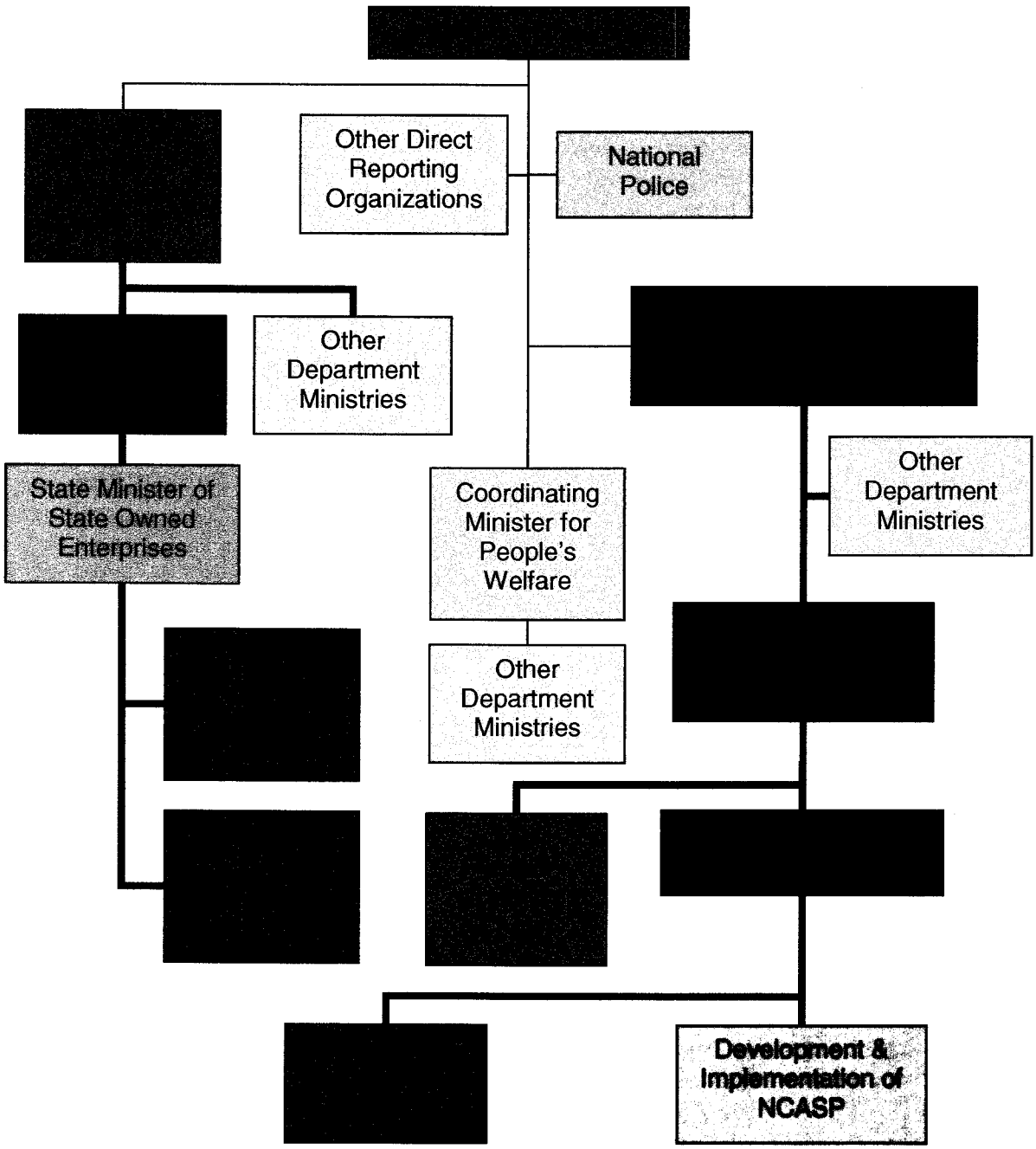

Figure 1: Air Transport Structure Depicting Operation Of Airports Under Two Different Ministers

1.1.3.1 Air Transport Structure Below The Director General Level

A number of Directors of Offices, Sub-Directors of functions and sections have been established below the DGAC's level. This organizational structure as it relates to security only is depicted in Figure 2 below. It is at these levels that the problems created at the Ministerial organizational level begin to make their appearance from a responsibility and authority standpoint. But, that said, the organizational authority and responsibility problems at the Sub Director and Section level appear to be the result of the distinct diverse authorities at the Ministerial Levels.

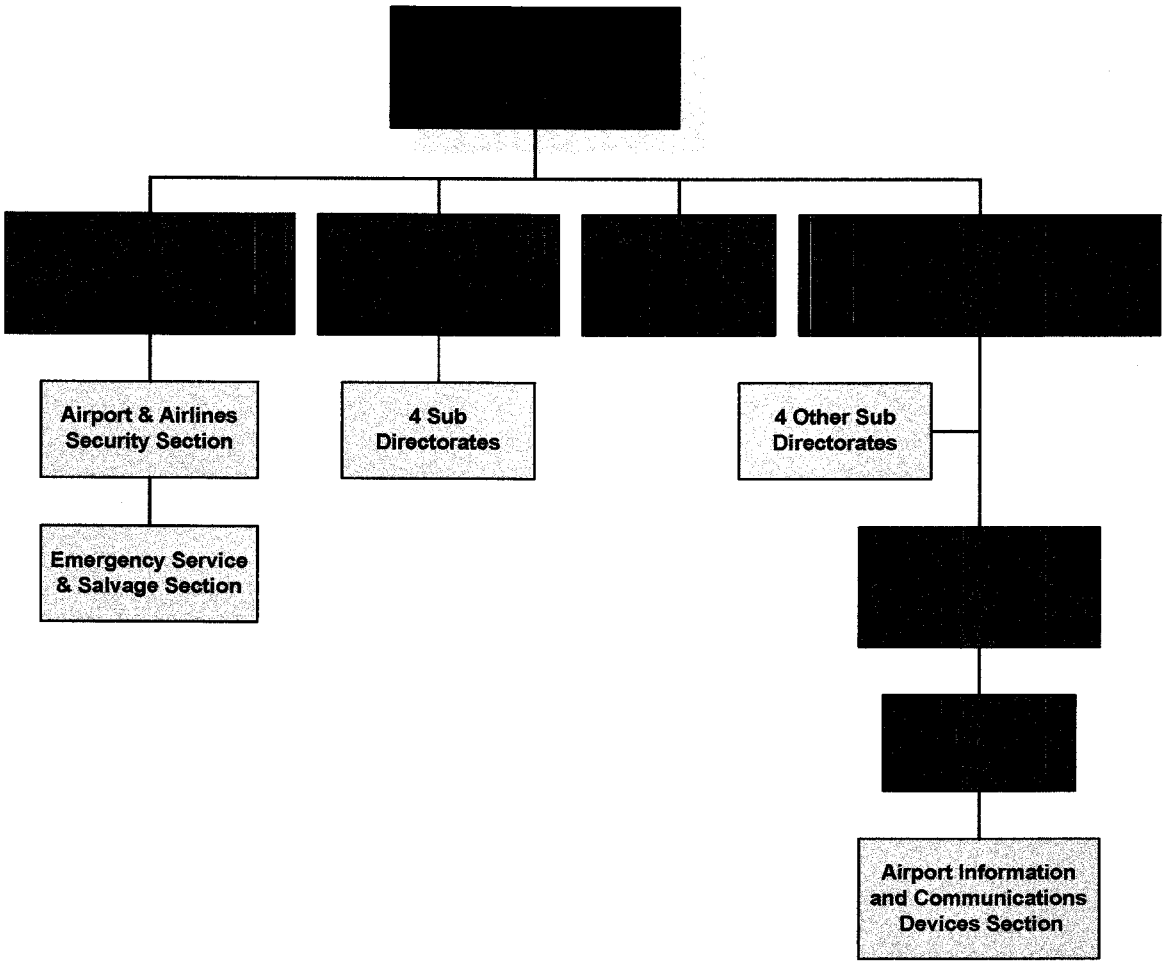

Figure 2: Director General Air Communications Organization as it relates to security

1.1.3.2 Facts Relating to Indonesia's Aviation Government Structure

As one might expect from a country the size of Indonesia with its 245 million citizens the government organization is quite large and somewhat complicated. This holds true for the organizations that have responsibility for Indonesia's aviation system.

1.1.3.3 Ministerial Level Authorities

The Indonesian Government operates on the basis of Laws, Decrees and Regulations. Each Minister and Official commanding a major Government function (Police, Armed Forces, etc.) has broad authority to issue requirements for their respective portfolios. Unfortunately one Minister or Commanding Official does not always seem to have the authority to compel compliance from another Minister and their subordinate officials and personnel. This problem seems to apply to all Ministries, (but not as much of a problem to the Police and Armed Forces Commanders), and even across Ministers portfolios under the same Coordinating Ministers.

1.1.3.4 Organizations Reporting Directly to the President

Complicating the Ministerial level authority issue even further is the fact that three significant elements of the Indonesian Government reports directly to the President. These three units are the Armed Forces, the Police Organization and a Financial Control (Audit) entity. Reportedly this last organizational entity has financial oversight of all other Indonesian Government organizations.

1.1.4 REVIEW OF CURRENT LEGAL STRUCTURE

The ASI Team understands the Indonesian legal structure for aviation as follows:

The President, supported by the Ministers in his cabinet, prepares a draft of an Act (actually the draft may originate in the subordinate organizations),

The draft Act is then sent to the House of Representatives.

Under most democratic systems the implementation and enforcement of an Act then becomes the responsibility of the Ministries and their subordinate elements. In this instance if it was an Act having to do with aviation the implanting officials would be under the Coordinating Ministry of Legal, Political and Security Affairs. The Subordinate Ministry of Communications would be the ministry directly involved in the issuance of a Regulation, Order or Decree to implement the any new Act having to do with aviation; and the Director General of Air Communications along with its subordinate Directorates would be the implementing organizations. As explained to the ASI Team the Ministry of Communications would then issue a regulation that had been developed by its subordinate Directorates.

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1.1.5 INDONESIA'S AIRPORT ORGANIZATIONAL STRUCTURE

All but one of the international and some domestic Indonesian airports have been assigned to three differing Indonesian organizations that are specifically designed to bring revenue into the Indonesian Government. The majority remain under the Directorate General of Air Communications (DGAC) – an element of the Minister of Communications' organization. Even so, this small number of airports (13 under PT-I and 12 PT-II) assigned outside of the DGAC organization must also abide by the standards, particularly technical standards, set by the DGAC.

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1.1.5.1 Corporatized Airports

The responsibilities of the Ministerial organizational structure and its authorities, plus the organizational entities reporting to the President, gets even more complicated down at the individual airport level. A total of 25 of Indonesia's airports were removed from the Minister of Communications' financial structure and corporatized under the Coordinating Minister for Economic Affairs and its subordinate Minister of Finance and finally; placed under the Minister of State Owned Enterprises. Thirteen of the 25 airports were assigned to Angkasa Pura I and twelve airports are now under Angkasa Pura II and these two entities report only to the Minister of State Owned Enterprises and not to the Minister of Communications. One additional airport in Batam was placed under the control of the Batam Airport Authority which is under the Batam Industrial Development Authority. Since all but one of the airports removed from the Minister of Communications' financial control now are operated by AP I and AP II, the ASI Team chose to concentrate on their operations structure.

Angkasa Pura I and II have separate chief executives that are nominated by either the Minister of State Owned Enterprise or the Minister of Communications. The Minister of State Owned Enterprise then determines who is qualified to be considered for the chief executives of Angkasa Pura I and II. The candidates reportedly must have aviation backgrounds and the Minister of State Owned Enterprise and the Minister of Communications will coordinate on the actual CEO selections. This also applies to the President and Board of Directors for Angkasa Pura I & II, i.e. the respective Directors of Operations and Technology, Commercial, Finance, and the Director of Personnel and General Affairs.

Angkasa Pura I and II have financial control over their twenty five airports. The ASI Team was advised that three of the Angkasa Pura I's thirteen airports and two of Angkasa Pura II's twelve airports reportedly make a profit each year. These five airports presumably support the other 20 airports financially. The revenues collected by Angkasa Pura I and II are reportedly turned over to the Indonesian General Treasury. An annual budget is developed by both Angkasa Pura I and II and their operations are funded through this budgetary process. The inference given to the ASI Team was that the chief executives and their financial officers in Angkasa Pura I and II had a substantial level of authority in the

budgeting and allocation of funds for their respective operations; notwithstanding the fact that the revenues collected from the twenty three Angkasa Pura I and II airports go to the General Fund of the Indonesian Treasury.

1.1.5.2 Directorate General of Air Communications Airports (DGAC)

The remaining 160-plus Indonesian airports, including one small international airport, remain under the direct control of the Directorate General of Air Communications. As noted above, the foregoing notwithstanding, the DGAC must also retain responsibility for the regulatory oversight for safety as well as security for the Angkasa Pura I and II airports and the Batam Industrial Development Authority airport.

The DGAC's financial situation with the 160-plus airports was reportedly more on the traditional government bureaucratic structure. Said another way, all the revenues collected by the Indonesian Government organizations relating to the work of these airports go directly to the Government's general fund. Apparently neither the DGAC nor his superiors in the ministerial structure have any control over the funds collected at the DGAC airports. The DGAC falls under the overall budgetary structure and process and annual operating, capital, and other funds for the 160-plus airports are allocated through this process.

1.1.6 Discussion of Organizational Authority Issues

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1.1.7 Cross-Ministerial Authorities

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1.1.8 Authority for AVSEC at Airports

The organizational structure outlined in this document and in ASI's earlier Task 1 Report results in some unique organizational responsibilities for operational and aviation security functions. In the 160-plus DGAC airports the lines of authority are reasonably well defined. The responsibilities and authorities flow directly from the DGAC.

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RECOMMENDATIONS

1.1.9 VITAL NATIONAL DIRECTIVE

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1.1.10 SINGLE AUTHORITY FOR AVIATION SECURITY WITHIN THE DGAC

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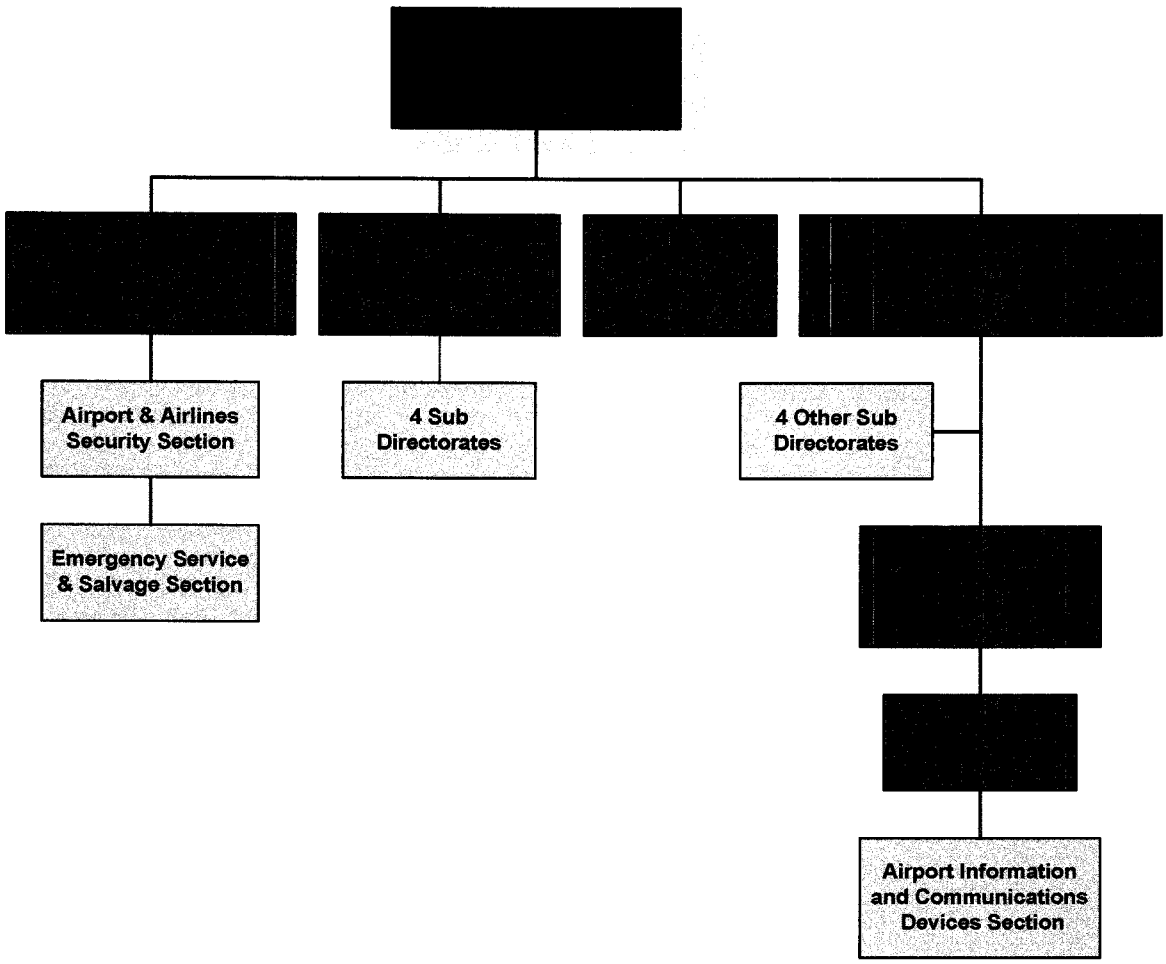

Figure 3: Director General Air Communications Organization as it relates to security

1.1.11 CORPORATIZED AIRPORTS

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1.1.12 OTHER GOVERNMENT AGENCIES

Redacted - Contains sensitive information

1.1.13 COMPLIANCE ENFORCEMENT AUTHORITY

The ASI Team has spent a good deal of time discussing and thinking about this problem and what to recommend as a solution. In one sense this problem is analogous to the United States' aviation security situation in the late 1980s and 1990s. Two U.S. Presidential Commissions reviewed the state of U.S. Aviation Security in the early 1990s and again in the mid-1990s. Both found that the U.S. aviation security systems was seriously flawed and needed to be fixed. Moreover, these Presidential Commissions noted that the U.S. Government lacked the "political will" to address the problem. The powers that the U.S. airlines possessed over the U.S. aviation security system at that time were predominant and the U.S. politicians were reluctant to address the problem; or were ignorant of the seriousness of the extent of the vulnerabilities of the U.S. aviation security system,. This and other problems in the U.S. eventually led to the failure of the U.S. aviation security system to catch any of the 19 hijackers on September 11, 2001.

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CRITICAL NATIONAL APPROPRIATE AUTHORITY REORGANIZATION

1.1.14 RESPONSIBILITIES AND FUNCTIONS

The following recommendations for responsibilities and functions for the different elements of the aviation security organization are not intended to be exhaustive. Other options may be taken, and may, in fact be more appropriate depending on what is done with regard to the previous recommendations.

1.1.14.1 National Civil Aviation Direction

Redacted - Contains sensitive information

1.1.14.2 National Civil Aviation Security Committee

Redacted - Contains sensitive information

1.1.14.3 National Civil Aviation Security Program (NCASP)

Redacted - Contains sensitive information

1.1.14.4 National Civil Aviation Security Oversight

Redacted - Contains sensitive information

1.1.14.5 Civil Aviation Security Element

Redacted - Contains sensitive information

1.1.14.6 Organizational Reporting Level

Redacted - Contains sensitive information

1.1.14.7 Functions and Responsibilities

Redacted - Contains sensitive information

1.1.14.8 Special Experience and Training

Redacted - Contains sensitive information

Persons occupying supervisory or management positions should have had similar qualifying experience and should have had, or should attend after selection, advanced courses in aviation security and related subjects. Some such courses are:

New and Emerging Threats
Threat Analysis/Vulnerability Assessment/Risk Mitigation

Integrating AVSEC in Airport Design
Civil Aviation Security Quality Control Element

1.1.14.9 Organizational Reporting Level

In order to remain "independent" the QC element must report to a level above the Directorate of Aviation Security. We arrive at this conclusion by reasoning that the Directorate of Aviation Security is the element that is directly ". . . responsible for the implementation of the measures taken under the national civil aviation security programme . . .".

Based on this reasoning it is our opinion that the Civil Aviation Security Quality Control organization should report directly to the DGAC. Alternatively the QCO could report to the Deputy DGAC. An argument can be made that the DGAC is also ". . . responsible for the implementation of the measures taken under the national civil aviation security programme . . .". However, the organizational element to whom the new Civil Aviation Security Quality Control organization reports to has to be reasonable and it should remain within the overall CAA organization.

Reporting to the DGAC would make the head of the new QCO organizationally equal to the new Directorate of Aviation Security. While there may be a difference in rank or pay scale this reporting structure would give the new QCO head the independence to make reports to the DGAC that can be adverse to the Directorate of Aviation Security. This independence in reporting on aviation security system performance was one of the objectives of the framers of this new ICAO Annex 17 Quality Control requirement.

1.1.14.10 Program Functions and Responsibilities

The Aviation Security Quality Control Program must (according to Annex 17, paragraph 3.4) as a minimum:

- ensure that the persons implementing security controls are subject to background checks and selection procedures;
- ensure that the persons implementing security controls possess all competencies required to perform their duties and are appropriately trained;
- establish relevant standards of performance;
- ensure that the persons carrying out screening operations are certified;
- determine compliance with and validate the effectiveness of its national civil aviation security programme.

In addition to the foregoing the Indonesia is required to:

- ensure that the implementation of security measures is regularly subjected to verification of compliance;
- arrange for security audits, tests, surveys and inspections, to be conducted on a regular basis to verify compliance;
- ensure that the personnel carrying out security audits, tests, surveys and inspections are trained to appropriate standard;

- ensure that the personnel carrying out security audits, tests, surveys and inspections are afforded the necessary authority;
- establishing a confidential reporting system for analyzing security information provided by sources such as passengers, crew, ground personnel;
- establish a process to record and analyze the results of the national civil aviation security quality control programme.

1.1.14.11 Compliance Enforcement Authority

As noted above, Annex 17, Sub paragraph 3.4.7 in part requires that Indonesia shall:

> " ...ensure that the personnel carrying out security audits, tests, surveys and inspections are afforded the necessary authority..."

1.1.14.12 Special Experience and Training

As noted above, Annex 17, Sub paragraph 3.4.7 in part requires that Indonesia shall:

> "... ensure that the personnel carrying out security audits, tests, surveys and inspections are trained to appropriate standard..."

AVIATION SECURITY AT AIRPORTS

AIRPORT PREVENTATIVE SECURITY REQUIREMENTS

All airports serving international commercial flights must comply with the standards and recommended practices of ICAO Annex 17 (Security). Additionally, those airports serving only domestic commercial flights should provide the same level of security and therefore should comply with the same standards.

The following security requirements are derived from ICAO Annex 17, eighth edition, applicable 1 July 2006 and the recommendations are derived from ICAO Annex 17, ICAO Doc 8973/6 (Restricted), *Security Manual for Safeguarding Civil Aviation Against Acts of Unlawful Interference*. Each topic below contains as applicable:

- The requirement/recommendation
- The best method to achieve compliance with the requirement or recommendation
- Any equipment that would best assist in achieving compliance
- The necessary staffing to achieve compliance
- The necessary training to achieve compliance
- The procedures and plans necessary to achieve compliance

Where possible, alternative methods to achieve the required security protection has been listed.

1.1.15 PERIMETER AND AIR SIDE AREAS

1.1.15.1 Requirement

Redacted - Contains sensitive information

1.1.15.2 Best Methods To Achieve Compliance

Redacted - Contains sensitive information

1.1.15.3 Staffing

Redacted - Contains sensitive information

1.1.15.4 Training

Redacted - Contains sensitive information

1.1.15.5 Procedures and Plans

Redacted - Contains sensitive information

1.1.16 PASSENGER TERMINAL AND RELATED AREAS

The following airport terminal security requirements are derived from ICAO Annex 17 and the recommendations are derived from ICAO Annex 17, ICAO Doc 8973/6 (Restricted), *Security Manual for Safeguarding Civil Aviation Against Acts of Unlawful Interference.* These security requirements and recommendations only address countermeasures against acts of unlawful interference as described in ICAO Annex 17. Numerous other security requirements and recommendations are not addressed here for Customs, immigration, and criminal issues that airports are also responsible for providing. All issues concerning hold baggage screening and hold baggage areas are addressed in Section 3.2.4.3.3. Each topic in the below section contains:

- The requirement/recommendation
- The best method to achieve compliance with the requirement or recommendation
- Any equipment that would best assist in achieving compliance
- The necessary staffing to achieve compliance
- The necessary training to achieve compliance
- The procedures and plans necessary to achieve compliance

1.1.16.1 Access Control

1.1.16.1.1 Requirement

Redacted - Contains sensitive information

1.1.16.1.2 Best Methods To Achieve Compliance

Redacted - Contains sensitive information

1.1.16.1.3 Staffing

Redacted - Contains sensitive information

1.1.16.1.4 Training

Redacted - Contains sensitive information

1.1.16.1.5 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.2 Screening

1.1.16.2.1 Requirement

All passengers and any baggage or item they are carrying must be screened before being allowed access to the sterile area. All other authorized persons requiring access to the sterile area should be screened to the same standard with the exception that a State may wish to carry out the screening on a random basis depending on the assessed risk (ICAO Annex 17, Chapter 4.4).

1.1.16.2.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.2.3 Staffing

Redacted - Contains sensitive information

1.1.16.2.4 Training

Redacted - Contains sensitive information

1.1.16.2.5 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.3 Policing

1.1.16.3.1 Recommendation

Redacted - Contains sensitive information

1.1.16.3.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.3.3 Equipment

Redacted - Contains sensitive information

1.1.16.3.4 Staffing

Redacted - Contains sensitive information

1.1.16.3.5 Training

Redacted - Contains sensitive information

1.1.16.3.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.4 Surveillance

1.1.16.4.1 Recommendation

Redacted - Contains sensitive information

1.1.16.4.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.4.3 Equipment

Redacted - Contains sensitive information

1.1.16.4.4 Staffing

Redacted - Contains sensitive information

1.1.16.4.5 Training

Redacted - Contains sensitive information

1.1.16.4.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.5 Search

1.1.16.5.1 Recommendation

Redacted - Contains sensitive information

1.1.16.5.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.5.3 Equipment

Redacted - Contains sensitive information

1.1.16.5.4 Staffing

Redacted - Contains sensitive information

1.1.16.5.5 Training

Redacted - Contains sensitive information

1.1.16.5.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.6 Public Awareness

1.1.16.6.1 Recommendation

Redacted - Contains sensitive information

1.1.16.6.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.6.3 Equipment:

Redacted - Contains sensitive information

1.1.16.6.4 Staffing:

Redacted - Contains sensitive information

1.1.16.6.5 Training:

Redacted - Contains sensitive information

1.1.16.6.6 Procedures and Plans:

Redacted - Contains sensitive information

1.1.16.7 Parking

1.1.16.7.1 Recommendation

Redacted - Contains sensitive information

1.1.16.7.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.7.3 Equipment

Redacted - Contains sensitive information

1.1.16.7.4 Staffing

Redacted - Contains sensitive information

1.1.16.7.5 Training

Redacted - Contains sensitive information

1.1.16.7.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.8 Public Observation Areas

1.1.16.8.1 Recommendation

Redacted - Contains sensitive information

1.1.16.8.2 Best Method to Achieve Compliance t

Redacted - Contains sensitive information

1.1.16.8.3 Equipment

Redacted - Contains sensitive information

1.1.16.8.4 Staffing

Redacted - Contains sensitive information

1.1.16.8.5 Training

Redacted - Contains sensitive information

1.1.16.8.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.9 Public Observation of Security

1.1.16.9.1 Recommendation

Redacted - Contains sensitive information

1.1.16.9.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.9.3 Equipment

Redacted - Contains sensitive information

1.1.16.9.4 Staffing

Redacted - Contains sensitive information

1.1.16.9.5 Training

Redacted - Contains sensitive information

1.1.16.9.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.10 Search of Restricted Areas Prior to Use

1.1.16.10.1 Recommendation

Redacted - Contains sensitive information

1.1.16.10.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.10.3 Equipment

Redacted - Contains sensitive information

1.1.16.10.4 Staffing

Redacted - Contains sensitive information

1.1.16.10.5 Training

Redacted - Contains sensitive information

1.1.16.10.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.11 Passenger Identification

1.1.16.11.1 Recommendation

Redacted - Contains sensitive information

1.1.16.11.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.11.3 Equipment

Redacted - Contains sensitive information

1.1.16.11.4 Staffing

Redacted - Contains sensitive information

1.1.16.11.5 Training

Redacted - Contains sensitive information

1.1.16.11.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.12 Public Access to Gate Areas

1.1.16.12.1 Recommendation

Redacted - Contains sensitive information

1.1.16.12.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.12.3 Equipment:

Redacted - Contains sensitive information

1.1.16.12.4 Staffing:

Redacted - Contains sensitive information

1.1.16.12.5 Training:

Redacted - Contains sensitive information

1.1.16.12.6 Procedures and Plans:

Redacted - Contains sensitive information

1.1.16.13 Segregation of Arriving and Departing Passengers

1.1.16.13.1 Recommendation

Redacted - Contains sensitive information

1.1.16.13.2 Best Method to Achieve Compliance t

Redacted - Contains sensitive information

1.1.16.13.3 Equipment:

Redacted - Contains sensitive information

1.1.16.13.4 Staffing

Redacted - Contains sensitive information

1.1.16.13.5 Training

Redacted - Contains sensitive information

1.1.16.13.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.14 Unidentified Baggage

1.1.16.14.1 Recommendation

Redacted - Contains sensitive information

1.1.16.14.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.14.3 Equipment

Redacted - Contains sensitive information

1.1.16.14.4 Staffing

Redacted - Contains sensitive information

1.1.16.14.5 Training

Redacted - Contains sensitive information

1.1.16.14.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.15 Baggage Screening and Baggage Area Security

1.1.16.15.1 Requirements and Recommendations

Redacted - Contains sensitive information

1.1.16.16 Screening of Hold Baggage

1.1.16.16.1 Requirement

Redacted - Contains sensitive information

1.1.16.16.2 Best Methods to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.16.3 Staffing

Redacted - Contains sensitive information

1.1.16.16.4 Training

Redacted - Contains sensitive information

1.1.16.16.5 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.17 Protection of Hold Baggage

1.1.16.17.1 Requirement

Redacted - Contains sensitive information

1.1.16.17.2 Best Methods to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.17.3 Equipment

Redacted - Contains sensitive information

1.1.16.17.4 Staffing

Redacted - Contains sensitive information

1.1.16.17.5 Training

Redacted - Contains sensitive information

1.1.16.17.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.18 Screening of Transfer Hold Baggage

1.1.16.18.1 Requirement

Redacted - Contains sensitive information

1.1.16.18.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.18.3 Equipment

Redacted - Contains sensitive information

1.1.16.18.4 Staffing

Redacted - Contains sensitive information

1.1.16.18.5 Training

Redacted - Contains sensitive information

1.1.16.18.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.19 Protection of Baggage Conveyer Systems

1.1.16.19.1 Recommendation

Redacted - Contains sensitive information

1.1.16.19.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.19.3 Equipment

Redacted - Contains sensitive information

1.1.16.19.4 Staffing

Redacted - Contains sensitive information

1.1.16.19.5 Training

Redacted - Contains sensitive information

1.1.16.19.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.20 Security Controls for Mishandled/Delayed Hold Baggage

1.1.16.20.1 Recommendation

Redacted - Contains sensitive information

1.1.16.20.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.20.3 Equipment

Redacted - Contains sensitive information

1.1.16.20.4 Staffing

Redacted - Contains sensitive information

1.1.16.20.5 Training

Redacted - Contains sensitive information

1.1.16.20.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.16.21 Off-Airport Acceptance of Hold Baggage

1.1.16.21.1 Recommendation

Redacted - Contains sensitive information

1.1.16.21.2 Best Method to Achieve Compliance

Redacted - Contains sensitive information

1.1.16.21.3 Equipment

Redacted - Contains sensitive information

1.1.16.21.4 Staffing

Redacted - Contains sensitive information

1.1.16.21.5 Training

Redacted - Contains sensitive information

1.1.16.21.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.17 CARGO TERMINAL

1.1.17.1 Requirements

ICAO developed and presented in ICAO doc 8973 (restricted), specific security procedures that represent both a practical and a cost effective approach. Their approach requires compliance with three core principles:

- Aircraft carrying air cargo must operate from within a secure environment.
- In this context, the term "secure environment" encompasses the point from which public cargo is accepted, all of the areas where that cargo is then handled or transported on the airport, to the area where the cargo is finally placed aboard an aircraft and all of the airport facilities that the aircraft uses to park once loaded, and then taxi and take off. The reverse is true for aircraft bringing air cargo to the airport.
- All air cargo must be subject to some degree of security control, before being placed on board a passenger-carrying aircraft, with the devotion of maximum effort to the screening of air cargo consignments whose security cannot be readily determined.

- The "some degree of security control" refers to any of a variety of measures that will positively ensure that the subject cargo does not contain explosives, incendiaries, or dangerous goods.
- A consignment of air cargo once security cleared must be protected from interference.

1.1.17.2 Best Methods To Achieve Compliance

1.1.17.2.1 Secure Environment

Redacted - Contains sensitive information

1.1.17.2.2 Security Control

Redacted - Contains sensitive information

1.1.17.2.3 Protection From Interference

Redacted - Contains sensitive information

1.1.17.3 Staffing

Redacted - Contains sensitive information

1.1.17.4 Training

Redacted - Contains sensitive information

1.1.17.5 Procedures and Plans

Redacted - Contains sensitive information

1.1.18 CATERING FACILITIES

Catering consignments and supplies can provide a ready means to intentionally introduce on board an aircraft prohibited items including such items as weapons and explosives. Protection against such acts requires security processes starting with the catering facility and

the supplies it receives and ends with the delivery of the consignments to an aircraft and includes all of the intermediate steps between these activities.

1.1.18.1 Requirements

ICAO provides three general principles that are necessary to achieve an effective degree of security for catering operations[2]:

- Security measures must be applied in buildings where catering supplies and stores are prepared, stored and dispatched, to ensure that no device or weapon is introduced into consignments;
- Security measures must be applied during the transportation and delivery of catering supplies and stores to the relevant aircraft to ensure that the consignment remains secure;
- Security measures must be applied by the airline operator on receipt of catering consignments to ensure that all catering supplies or stores loaded on the aircraft are correctly assigned for that flight and have not been tampered with.

1.1.18.2 Best Methods To Achieve Compliance

Redacted - Contains sensitive information

1.1.18.3 Systems and Equipment

Redacted - Contains sensitive information

1.1.18.4 Staffing

Redacted - Contains sensitive information

1.1.18.5 Training

Redacted - Contains sensitive information

[2] Reference ICAO Doc 8973/6 (restricted), page I-4-29.

1.1.18.6 Procedures and Plans

Redacted - Contains sensitive information

1.1.19 VITAL FACILITIES (ON AND OFF AIRPORT)

ICAO defines a vulnerable or vital facility as any facility on or connected with an airport, which, if damaged or destroyed, would seriously impair the functioning of the airport[3]. Such facilities include but are not limited to:

Control towers
Communications facilities
Radio navigation aides
Power transformers
Primary and secondary power supplies
Fuel installations

1.1.19.1 Requirements

Each facility considered vital to airport operation, safety and security should be continuously monitored by airport security operations. Both manned and unmanned vital facilities should have strict control access procedures. Unescorted access to vital facilities should be issued on a strict need only basis to limit overall access.

1.1.19.2 Best Methods To Achieve

Redacted - Contains sensitive information

1.1.19.3 Systems and Equipment

Redacted - Contains sensitive information

1.1.19.4 Staffing

Redacted - Contains sensitive information

[3] ICAO doc 8973/6 (restricted), paragraph 4.12.60.

1.1.19.5 Training

Redacted - Contains sensitive information

1.1.19.6 Procedures and Plans

Redacted - Contains sensitive information

AVIATION SECURITY TRAINING

1.1.20 INITIAL ASSESSMENT

In February 2006 an ASI Team member visited the National Civil Aviation Training Center and learned that aviation security courses are developed in-house with input from various subject matter experts, such as aviation security inspectors from the DGAC, senior airport security personnel, airline security, and security management personnel from AP I and AP II. The training center reports to the Ministry of Communications Training Division; all courses are approved by this division and not by the DGAC.

All aviation security courses are pass/fail and include both theory and practical training and usually have 20-30 students per class. ICAO courses are sometimes offered by the training center and are taught only by ICAO certified instructors. The center offers the following civil aviation security training courses:

- Basic Level: A five week course for six hours per day. Prerequisites include a high school certificate.
- Junior Level: A five week course for six hours per day. Prerequisites include having obtained basic level training and at least two years actual experience as an airport security officer in Indonesia.
- Senior/Supervisor Level: A five week course for six hours per day. Prerequisites include having obtained junior level training and at least two years actual experience as an airport security officer in Indonesia at the junior level.
- Annual AVSEC Refresher: A two week course for six hours per day for junior and senior level aviation security officers.
- Airport Management: A four to five week course that covers basic management of all airport sections including security.

Aviation security licenses are issued by the DGAC to junior and senior level graduates who successfully pass both a written and a practical test administered by the DGAC staff.

ASI Team comments included:

Redacted - Contains sensitive information

1.1.21 General Recommendations

1.1.21.1 National Civil Aviation Security Training Program

Redacted - Contains sensitive information

1.1.21.2 Security Course Instructors

Redacted - Contains sensitive information

1.1.22 Recommended Civil Aviation Security Courses

Redacted - Contains sensitive information

1.1.23 Priority Of Training Programs

Redacted - Contains sensitive information

1.1.24 Application/Delivery Of Recommended Training Courses To Airports

1.1.24.1 ICAO Requirements

ICAO Annex 17 Section 2.2, Applicability, states:

> *2.2.1 Each Contracting State shall apply the Standards and shall endeavour to apply the Recommended Practices contained in Annex 17 to international civil aviation operations.*

> *2.2.2 Each Contracting State shall ensure that measures designed to safeguard against acts of unlawful interference are applied to domestic operations to the extent practicable, based upon a security risk assessment carried out by the relevant national authorities.*

It is ICAO's clear intention that all Contracting States apply the same civil aviation security standards, practices, and procedures to all airports, international and domestic. However, Standard 2.2.2 allows Contracting States to apply different civil aviation security standards to international and domestic airports if the Contracting State conducts a security risk assessment that rationalizes to the Appropriate Authority that different, or lesser, security measures are justified at domestic airports due to a reduced level of risk.

Redacted - Contains sensitive information

1.1.24.2 Recommended Civil Aviation Security Courses By Category Of Airport

ASI cannot make recommendations concerning the application of civil aviation security training courses at different types of airports in Indonesia. However, considering that Indonesian airports do not have most of the training courses and facilities needed, there must be decisions made as to which courses to apply first.

For the purpose of this study, airports were assessed in four categories:

Category 1. Large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations

Category 2. Tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations

Category 3. Medium-sized airport

Category 4. Small airport with mostly domestic short-haul traffic

Redacted - Contains sensitive information

AVIATION SECURITY EQUIPMENT AND SYSTEMS

1.1.25 PERIMETER SYSTEMS AND EQUIPMENT

Redacted - Contains sensitive information

1.1.25.1 Fencing

Redacted - Contains sensitive information

Figure 4:

1.1.25.2 Perimeter Sensors

Redacted - Contains sensitive information

1.1.25.3 Perimeter Closed Circuit Television

Redacted - Contains sensitive information

1.1.25.4 Vehicle Barriers And Gates

Redacted - Contains sensitive information

1.1.26 SCREENING EQUIPMENT

Redacted - Contains sensitive information

1.1.26.1 Terminal Checkpoint Screening Equipment

Redacted - Contains sensitive information

1.1.26.2 Hold Baggage Screening

Redacted - Contains sensitive information

1.1.26.3 Explosive Trace Detection

Redacted - Contains sensitive information

1.1.26.4 Cargo Scanning and Facility Security Equipment

Redacted - Contains sensitive information

1.1.27 Terminal And Critical Facility Access Control

Redacted - Contains sensitive information

1.1.28 Terminal and Critical Facility CCTV Surveillance and Assessment

Redacted - Contains sensitive information

SPECIFIC SYSTEMS AND EQUIPMENT UPGRADES FOR FOUR ASSESSED AIRPORTS

Each of the four airports visited during the data collection phase of this project had training, procedural, and equipment issues that prevented the airport from fully complying with ICAO Annex 17 requirements. Each airport is addressed below and the major issues at each are identified with recommended solutions or actions. This list is not comprehensive as there may be other issues not observed or identified. The team members had limited access to the airports and were not able to perform standardized testing to validate the effectiveness of security functions.

In the previous sections equipment based upon "new state of the art technology" was described. The focus of this section is upon the equipment needed to efficiently correct deficiencies identified during the ASI Team survey described in the Task 1 report.

GENERAL CONDITIONS AT INDONESIAN AIRPORTS TERMINAL ENTRANCE CHECKPOINTS

Redacted - Contains sensitive information

1.1.29 RECOMMENDATIONS

Redacted - Contains sensitive information

SOEKARNO HATTA INTERNATIONAL AIRPORT, JAKARTA

1.1.30 PERIMETER, LANDSIDE/AIR SIDE BOUNDARIES AND AIRSIDE RESTRICTED AREAS INCLUDING VITAL FACILITIES BOTH ON AND OFF THE AIRPORT

Redacted - Contains sensitive information

Recommendations

Redacted - Contains sensitive information

1.1.30.1 Vital Facilities

Redacted - Contains sensitive information

1.1.30.1.1 Fuel Farm

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31 PASSENGER TERMINALS

1.1.31.1 Terminal Entrance Screening Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.2 Baggage Reconciliation Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.3 Screening Supervision and Passenger Control

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.4 Screening Effectiveness Software

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.5 Explosive Trace Detection Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.6 Physical Search Area Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.7 Equipment and Procedures to Facilitate Passenger Searches

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.8 Terminal Passenger Management, Access Control and CCTV

Redacted - Contains sensitive information

1.1.31.8.1 Access Control and CCTV Equipment

Redacted - Contains sensitive information

1.1.31.9 Departing Passengers

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.10 Equipment and Procedures to Prevent Unauthorized Access to Baggage Areas

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.31.11 Equipment and Procedures for Unsecured Doors and Access Points

Redacted - Contains sensitive information

Recommendations:

- Doors to restricted areas should be monitored and controlled by an automated access control system (ACAM) and under surveillance by a CCTV camera to permit event recording and assessment of ACAM reported events.
- Where ACAM/CCTV control is not feasible, doors to restricted areas, not monitored and controlled by an automated access control system, should be secured when not attended by an airport guard.
- All doors providing access to the ramp/AOA near the passenger gates should be secured to prevent passengers from having access to the ramp and airplanes. In addition to a security concern, this is also a significant safety concern. There are many ways of doing this, from an expensive automated access control system to simple door locks and keys or individual cipher locks on doors. Regardless of which method is used by the airport to fix this problem, it should be done immediately.

1.1.31.12 Employee Identification and Access Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.32 LANDSIDE CROWD AND PARKING CONTROL

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

Recommendations (Continued):

Redacted - Contains sensitive information

1.1.33 CARGO TERMINALS

Soekarno Hatta is the major international airport in Indonesia, ranked by the ACI as 30th largest airport worldwide for passenger traffic. It is the largest Indonesian airport for cargo traffic also with airport cargo terminals located in the main cargo area and in the new cargo area 3 near the Hajj terminal. All of the cargo facilities are operated by airlines or by independent cargo terminal operators.

Redacted - Contains sensitive information

4.6.1 Each Contracting State shall ensure that security controls are applied to cargo and mail, prior to their being loaded into an aircraft engaged in commercial air transport operations.

4.6.2 Each Contracting State shall ensure that cargo and mail to be carried on a commercial aircraft is protected from unauthorized interference from the point security controls are applied until departure of the aircraft.

Redacted - Contains sensitive information

1.1.34 CATERING

Redacted - Contains sensitive information

NGURAH RAI INTERNATIONAL AIRPORT, DENPASAR, BALI

1.1.35 Perimeter, Landside/Air Side Boundaries And Airside Restricted Areas Including Vital Facilities Both On And Off The Airport

Redacted - Contains sensitive information

1.1.35.1 Vital Facilities

Redacted - Contains sensitive information

1.1.35.1.1 Fuel Farm

Redacted - Contains sensitive information

1.1.35.1.2 Airport Power Stations

Redacted - Contains sensitive information

1.1.35.1.3 Air Traffic Control Tower

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36 PASSENGER TERMINAL

1.1.36.1 Terminal Entrance Screening Equipment and Procedures

Redacted - Contains sensitive information

1.1.36.2 Screening Supervision and Passenger Control

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36.3 Screening Effectiveness Software

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36.4 Explosive Trace Detection Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36.5 Physical Search Area Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information)

1.1.36.6 Procedures to Facilitate Passenger Searches

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.36.7 Hold Baggage Control Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36.8 Baggage Reconciliation Procedures

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.36.9 Terminal Passenger Management, Access Control and CCTV

Redacted - Contains sensitive information

1.1.36.10 International Terminal Security Control Center (ITSCC)

Redacted - Contains sensitive information

1.1.36.11 Domestic CCTV Control Room:

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36.12 Access to AOA/Restricted Areas

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.36.13 Access to Terminal Without Screening

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.36.14 Baggage Areas

Redacted - Contains sensitive information

1.1.36.15 Control of Domestic Arriving Passengers on the AOA

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.37 CARGO TERMINALS

Redacted - Contains sensitive information

1.1.38 CATERING

Redacted - Contains sensitive information

POLONIA INTERNATIONAL AIRPORT, MEDAN

The Polonia International Airport is located near the center of Medan. This location and related short runway and difficult departure path has been related to several crashes. As a result a new airport, Kuala Namu International Airport (KNIA) is under construction as its replacement. KNIA is expected to open in 2009 and eventually become Indonesia's second largest airport.

Figure 5: The in-city location of Polonia International Airport complicates security measures due to the adjacent homes and their residents use of airport paths.

Redacted - Contains sensitive information

1.1.39 Perimeter, Landside/Airside Boundary, And Air Side Restricted Areas Including Vital Facilities Both On And Off The Airport Access

Redacted - Contains sensitive information

1.1.39.1 Vital Facilities

Redacted - Contains sensitive information

1.1.39.1.1 Fuel Farm

Redacted - Contains sensitive information

1.1.39.1.2 Radar Facilities

Redacted - Contains sensitive information

1.1.39.1.3 Air Traffic Control Tower

Redacted - Contains sensitive information

1.1.39.1.4 Visual Omni Range (VOR) Facility

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40 PASSENGER TERMINAL

1.1.40.1 Terminal Entrance Screening Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40.2 Screening Supervision and Passenger Control

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40.3 Screening Effectiveness Software

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40.4 Explosive Trace Detection Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40.5 Physical Search Area Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40.6 Procedures to Facilitate Passenger Searches

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.40.7 Hold Baggage Control Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.40.8 Control of Hold Baggage Entering the X-ray in the Domestic Terminal

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.40.9 Terminal Access Bypassing the Screening Checkpoint

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.40.10 Separation Of Screened And Unscreened Passengers In International Departures

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.40.11 Use of Available Explosive Vapor Detectors at Final Passenger Screening Checkpoints

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.41 CARGO TERMINALS

1.1.41.1 Assessment Findings Of Individual Security Countermeasures Currently In Place To Protect Air Cargo Operations

Redacted - Contains sensitive information

1.1.42 CATERING

Redacted - Contains sensitive information

SULTAN TAHA SYSRIFUDN AIRPORT, JAMBI

This is a small domestic airport with much simpler facilities and equipment than found at the three other airports visited.

1.1.43 Perimeter, Landside/Airside Boundaries And Air Side Restricted Areas Including Vital Facilities Both On And Off The Airport

Redacted - Contains sensitive information

1.1.43.1 Obstruction Clearance

Redacted - Contains sensitive information

1.1.43.2 Culverts

Redacted - Contains sensitive information

1.1.43.3 Cleared Areas/Patrol Roads

Redacted - Contains sensitive information

1.1.43.4 Perimeter, Airside And Security Restricted Area Access Control Points

Redacted - Contains sensitive information

1.1.43.5 Airport Identification Pass Use

Redacted - Contains sensitive information

1.1.43.6 Area Lighting

Redacted - Contains sensitive information

1.1.43.7 Vital Facilities

Vital facilities such as the Airport Power Stations, Air Traffic Control Tower (ATCT), Fuel Farm, and other similar facilities important to the continued operation of the airport require additional protection even when located within the airside of the airport.

Redacted - Contains sensitive information

1.1.43.7.1 Fuel Farm

Redacted - Contains sensitive information

1.1.43.7.2 Air Traffic Control Tower (ATCT)

Redacted - Contains sensitive information

1.1.43.7.3 Power House I and II

Redacted - Contains sensitive information

1.1.43.7.4 Visual Omni Range (VOR) Facility

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44 PASSENGER TERMINAL

1.1.44.1 Terminal Entrance Screening Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.2 Screening Supervision and Passenger Control

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.3 Screening Effectiveness Software

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.4 Explosive Trace Detection Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.5 Physical Search Area Equipment and Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.6 Procedures to Facilitate Passenger Searches

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.44.7 Access to the AOA from the Terminal

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.44.8 Control of Arriving Passengers on the AOA

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.9 Landside Parking Control

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.10 Application of Checkpoint Security Procedures

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.11 Hold Baggage Screening

Redacted - Contains sensitive information

Recommendations:

Redacted - Contains sensitive information

1.1.44.12 Baggage Reconciliation Procedures

Redacted - Contains sensitive information

Recommendation:

Redacted - Contains sensitive information

1.1.44.13 Baggage Areas

Redacted - Contains sensitive information

1.1.45 CARGO TERMINALS

Redacted - Contains sensitive information

1.1.46 CATERING

Redacted - Contains sensitive information

EQUIPMENT AND SYSTEMS REQUIREMENTS LISTS FOR THE SECURITY UPGRADE OF FOUR VISITED AIRPORTS

Tables listing equipment and systems additions and upgrades required to meet deficiencies in ICAO security compliance at each of the four visited airports are provided. The lists identify specific equipment and systems including system hardware and software improvements identified during the ASI Team visits to the four Airports; Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Thaha.

INTRODUCTION

This section describes the equipment, facility and system updates and additions needed to address deficiencies in ICAO security compliance noted in this Task 2 Report based upon the on-site assessment performed for the Task 1 report, discussions during the Task 1 presentation, as well as subsequent communications with Indonesian officials. Equipment, facilities and systems that were observed to be satisfactory for their purpose are not included herein as the ASI Team anticipates that the responsible authorities have ensured that such items have been maintained in proper working order.

For each of the visited airports a Table is provided showing the description quantities and anticipated schedule for installation and commissioning in preparation for initial operation of the security system improvements. The lists identify specific security equipment and systems including system hardware and software improvements identified during the ASI team visits to the four airports; Soekarno-Hatta, Table 1; Ngurah Rai, Table 2; Polonia, Table 3; and Sultan Thaha, Table 4.

TABLE LINE ITEM DESCRIPTION

For reader convenience due to the brevity of the equipment class names in the tables, an expanded description of each line item and the basis for each category of improvement is provided in the following paragraphs.

1.1.47 PERIMETER AND AIRSIDE

Redacted - Contains sensitive information

1.1.47.1 Perimeter Gate

Redacted - Contains sensitive information

1.1.47.2 CCTV On Existing Pole (Refurbish)

Redacted - Contains sensitive information

1.1.47.3 CCTV On New Pole

Redacted - Contains sensitive information

1.1.47.4 Lighting On Pole Shared With CCTV

Redacted - Contains sensitive information

1.1.47.5 Replace Perimeter Alarm - CCTV Console

Redacted - Contains sensitive information

1.1.47.6 Perimeter Cabling

Redacted - Contains sensitive information

1.1.47.7 Radio Communications (existing base antenna)

Redacted - Contains sensitive information

1.1.47.8 Telephone System Upgrade

Redacted - Contains sensitive information

1.1.48 TERMINAL

1.1.48.1 Entry Checkpoint

Redacted - Contains sensitive information

1.1.48.2 Upgrade X-ray Software/hardware for TIP

Redacted - Contains sensitive information

1.1.48.3 Add ETD

Redacted - Contains sensitive information

1.1.48.4 Add Hand Search Stations

Redacted - Contains sensitive information

1.1.48.5 New AT Baggage X-ray with TIP

Redacted - Contains sensitive information

1.1.49 PASSENGER CHECKPOINT

1.1.49.1 Upgrade X-ray Software/hardware for TIP

Redacted - Contains sensitive information

1.1.49.2 Add ETD

Redacted - Contains sensitive information

1.1.49.3 Add Hand Search Stations

Redacted - Contains sensitive information

1.1.49.4 New Cabin Baggage X-ray with TIP

Redacted - Contains sensitive information

1.1.50 ACAM SUBSYSTEM

1.1.50.1 Add controls to existing doors (CR/KP, sensors and locking means)

Redacted - Contains sensitive information

1.1.50.2 Add New Doors With Controls (CR/KP, sensors and locking means)

Redacted - Contains sensitive information

1.1.50.3 New Consoles (3 Bay) With Operator Equipment

Redacted - Contains sensitive information

1.1.50.4 Central Computer With Software

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1.1.50.5 Typical Cable Conduit Per Door

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To deploy the systems identified in the above sections, the investment scale will be approximately $33.16 million. This investment scale is based on the initial costs of the security equipment and systems, but does not include the ongoing operational costs of the equipment and systems. These initial costs represent the investment required at the airports of Jakarta, Medan, Bali, and Jambi to cover the purchase and installation of the security equipment and systems, as well as the initial maintenance contracts.

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TASK 2 SAFETY REPORT

PROPOSED AIRPORT SAFETY AND SECURITY SYSTEM PLAN FOR INDONESIA

1 INTRODUCTION

1.1 GOVERNMENT OF INDONESIA INTENTIONS

Indonesia has approximately 163 airports which include from large to very small facilities, of which 24 are currently international airports. PT Angkasa Pura I and PT Anglasa Pura II are two state owned enterprises that manage 25 international airports. The remaining airports are small to very small with light traffic and are managed by the Directorate General of Air Communications (DGAC), Indonesia's authority for civil aviation matters.

During the last six years the Government has implemented a liberal licensing policy which has resulted in the growth of airline market from two licensed air carriers to 21 that operate scheduled flights. In addition, because of competition, fares have decreased and there are numerous package deals available for intra- and inter-island travel. Charter carriers have also increased operations as many more Indonesians are taking advantage of lower air fares. This has resulted in the country's airports becoming very busy and strained to be able to provide passenger services including adequate safety and security.

The safety and security concerns at Indonesia's airports have particularly heightened in the aftermath of the September 11, 2001 terrorist attacks on the United States. Many of Indonesia's remote airports in the Indonesian archipelago offer attractive sites for the germination of terrorist activity bases. Airports could be even more attractive as venues for arms transfer and smuggling unless appropriate safety and security measures are put in place.

In 2000, the International Civil Aviation Organization (ICAO) [1] conducted an audit of Indonesia's safety and security procedures and systems. Later in 2004, ICAO conducted an Aviation Security Audit of Soekarno Hatta International Airport, Jakarta which included an extensive assessment of the security related sections and procedures of the DGAC. In 2005, the US Transportation Security Administration (TSA) performed a security audit of the Ngurah Rai International Airport, Bali which again also focused both on the airport's security and on the ability of the security sections of the DGAC organization to provide appropriate compliance oversight. Despite the fact that Indonesia has attempted to address all of the issues raised in each of these audits, safety and security continue to be concerns at all airports to varying degrees. As

[1] ICAO consists of 189 Contracting States. Indonesia is one of the 189 Contracting States.

a result, the Government of Indonesia has renewed its commitment to improve the safety and security at its airports.

1.2 CONTRACT SCOPE OF WORK

The United States Trade and Development Agency (USTDA) through a grant to the Government of Indonesia funded a technical assistance project for the Government to help identify and remedy the safety and security weaknesses in Indonesian airports. Aerospace Services International, Inc. (ASI) of Chantilly, Virginia, USA was selected by the Government of Indonesia and awarded a contract to perform these functions under the technical assistance grant.

The USTDA funded contract requires an assessment of current security and safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety and security at Indonesian airports. The contract also requires the development of an investment program and a financing plan for the recommended upgrades.

The technical assistance is to be performed at four airports that are representative of Indonesia's many airports nationwide. These airports must include:

1. A large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations such as Jakarta International Airport,
2. A tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations such as Bali International Airport,
3. A medium-sized airport such as Medan International Airport, and
4. A small airport with mostly domestic short-haul traffic which is to be determined in consultation between the Grantee and Contractor

These four representative airports will become pilots for the detailed safety and security audits and assessments, and will form the basis for extrapolating the systems upgrades and investments needed for all airports in the country.

The USTDA funded contract Terms of Reference (TOR) is divided into eight tasks. Task 1 of the contract requires that a detailed assessment be conducted of the existing airport safety and security systems and procedures at the four pilot airports identified by the Grantee (Government of Indonesia, Director General of Air Communications). The four airports chosen by the DGAC are:

- Soekarno Hatta International Airport, Jakarta
- Ngurah Rai International Airport, Denpasar, Bali
- Polonia international Airport, Medan
- Sultan Taha Sysrifudn Airport, Jambi

The assessments are to determine the extent to which the current systems at these four airports are in compliance with prevailing ICAO requirements and international standards of safety and security.

Recommendations for improving the safety and security at Indonesian airports in accordance with the findings in this report will be included in subsequent tasks and related reports in accordance with the contract.

2 METHODOLOGY OF RECOMMENDATIONS

2.1 THE SCOPE OF THE RECOMMENDATIONS

The scope of the Technical Assistance in the safety area includes recommendations in the areas of current safety systems and procedures, identified deficiencies, Safety Management Systems, and associated recommendations of a program for the upgrade of safety at Indonesian airports.

In reviewing the totality of the areas covered in ICAO's Annex 14, it became clear that the areas of focus for the assessment would need to be those areas that are covered in the aerodrome manuals, as required for airport certification from the operational standpoint. The ICAO ***"Aerodrome Volume I" (Aerodrome Design and Operations)*** and ICAO ***"Manual on Certification of Aerodromes"*** are the fundamental references underlying the Safety Assessments / Needs Surveys. The scope of the ICAO ***"Manual on Certification of Aerodromes"*** (Doc 9774 AN/969) is: "the safety, regularity, and efficiency aspects of aerodrome facilities, services, equipment and operational procedures". The ***Aerodrome Manual*** is the core of an airport certification and operation program. Each airport studied by the ASI team has a standardized aerodrome manual.

Therefore, many of the recommendations follow the formats of these manuals, most specifically following the format in **Appendix 1** of the ICAO ***"Manual on Certification of Aerodromes"*** (Doc 9774 AN/969). The Appendix is a schedule of aerodrome certification particulars to be included in an aerodrome manual.

Additionally, due to their vital importance to aviation safety, detailed assessments of the Air Traffic Control Tower, and the aircraft fuel handling protocols and procedures were accomplished. Resultant recommendations are included.

The recommendations are based upon findings of concern at the four airports assessed. These recommendations are presented for consideration of implementation both at the national level and at the airports of Indonesia in general.

2.2 SAFETY PROTOCOLS

The safety protocols used as a basis for the recommendations include applicable safety standards and recommended practices from the following:

1. Standards and Recommended Practices (SARPs) contained in ICAO ***Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations***, 4th Edition, applicable as of 1 July, 2004.

2. Standards and Recommended Practices of ICAO Annex 14 – as presented in the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) 1st Edition, applicable as of 1 July, 2001.

3. ICAO ***Safety Management Manual (SMM)***, Doc 9859 AN/460 of ICAO

4. Introduction to ***Safety Management Systems (SMS) for Airport Operators*** – AC 150/5200-37, February 28, 2007

5. International Best Practices for Aviation Safety at the State's National Level and at the Airports Level

2.3 ADDITIONAL REFERENCED DOCUMENTS

The following additional documents are referenced in the report:

1. ***Manual of Standards - Part 139 Aerodromes*** (MOS), is made pursuant to Civil Aviation Safety Regulations CASR Part 139, and comprises specifications (Standards) prescribed by the DGAC of the Government of Indonesia

2. ***Aerodrome Manual*** of Jakarta International Airport Soekarno – Hatta, applicable as of 03 January, 2005

3. ***Ngurah Rai Airport Aerodrome Manual***, Denpasar, Bali, applicable as of 2005

4. ***Aerodrome Manual***, PR. Angkasa Pura II Medan International Airport, Polonia, applicable as of Mei, 2005

5. ***Sultan Thana Airport Aerodrome Manual***, Jambi, applicable as of Agustus, 2005

2.4 SCOPE OF THE TECHNICAL ASSISTANCE

The scope of the Technical Assistance in the safety area includes assessment of current safety systems and procedures, identification of deficiencies, and the recommendation of a program for the upgrade of safety at Indonesian airports. The TA's performed at the "four representative airports shall become pilots for the detailed safety … audits and assessments, and shall form the basis for extrapolating the systems upgrades and investments needed for all airports in the country".

2.5 MANUAL ON CERTIFICATION OF AERODROMES, ICAO DOC 9774 AN/969

2.5.1 GENERAL

Article 15 of the Convention on International Civil Aviation requires that all aerodromes open to public use under the jurisdiction of a Contracting State should provide uniform conditions for the aircraft of all other Contracting States. Furthermore, Articles 28 and 37 oblige each State to provide, in its territory, airports and other air navigation facilities and services in accordance with the Standards.

2.5.2 SCOPE

The scope of the ICAO ***Manual on Certification of Aerodromes*** (Doc 9774 AN/969) is: **"the safety, regularity, and efficiency aspects of aerodrome facilities, services, equipment and operational procedures."**

3 AVIATION INFRASTRUCTURE SYSTEM AND TRAINING REQUIREMENTS FOR UPGRADING SAFETY AND SECURITY AT INDONESIA'S AIRPORTS

3.1 NATIONAL CIVIL AVIATION SAFETY LAWS

3.1.1 REVIEW OF CURRENT LEGAL STRUCTURE

3.1.1.1 Indonesian "Manual Of Standards – Part 139 Aerodromes"

A description of the basic national regulations as prescribed by Indonesian law and the basis of the Standards required of an aerodrome are summarized in the Introduction of the ***Manual of Standards – Part 139 Aerodromes***, generally referred to as the MOS. **The following paragraphs are extracts from the Introduction of the MOS.**

The document; titled: ***Manual of Standards - Part 139 Aerodrome***, hereafter referred to as the MOS, is made pursuant to Civil Aviation Safety Regulations CASR Part 139. CASR Part 139 sets out the regulatory regime of aerodromes used by aeroplanes conducting air transport operations under CASR Part 121 and Part 135. The regulatory regime provides aerodromes to be certified *or registered.* The *MOS* sets out the *standards and operating procedures* [italics added] for aerodromes used in air transport operations.

Under CASR Part 121, aeroplanes with 30 or fewer passenger seats can also conduct air transport operations from uncertified or unregistered aerodromes, provided certain specified facilities at those aerodromes are to the required standard. Accordingly, some of the standards in this MOS are also relevant to uncertified and unregistered aerodromes.

To complement CASR Part 135, a separate chapter has been provided to specify the standards and procedures for aerodromes intended only for small aeroplanes (those with 9 or fewer passenger seats or in the case of freight operations, not exceeding 5,700 kg MTOW) conducting air transport operations.

In addition to this ***MOS***, specifications and procedures that do not reach the regulatory level and information of an educational or advisory nature may be issued in the form of Advisory Circulars.

Aerodrome standards will change from time to time to meet identified safety needs, technological changes and changes in International standards and practices. It is recognized that there may be difficulties and limitations in applying new standards to

existing aerodrome facilities and installations. This aspect is addressed in some detail in Chapter 2 of the ***MOS***.

Standards are identified by the words "must" or "shall". Appendices and tables form part of the main document and have the same status as the primary text. *This **MOS** may also require standards from other documents to be followed. In this case, the referred standards become part of this MOS* [italics added].

The document hierarchy consists of:

a) the Law of the Republic of Indonesia Number 15 of 1992 on Aviation (Aviation Act);

b) relevant Civil Aviation Safety Regulations (CASRs);

c) the Manual of Standards (MOS): and

d) Advisory Circulars (ACs).

The Aviation Act establishes the broad intent of the government of the Republic of Indonesia with regard to regulation of civil aviation.

CASRs establish the regulatory framework (Regulations) within which all service providers must operate.

The ***MOS*** comprises specifications (Standards) *prescribed by DGAC* [italics added] of uniform application, determined to be necessary for the safety of air navigation. In those parts of the MOS where it is necessary to establish the context of standards to assist in their comprehension, the sense of parent regulations has been reiterated.

In the event of any *perceived disparity of meaning between **MOS** and CASRs, primacy of intent is to be with the CASR* [italics added].

Service providers must document internal actions (Rules) in their own operational manuals, to ensure the maintenance of, and compliance with, standards.

Advisory Circulars (AC) are intended to provide recommendations and guidance to illustrate a means, but *not necessarily the only means* [italics added], of complying with the Indonesian ***Manual of Standards Part 139 - Aerodromes***. An AC may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that *service providers will document internal actions in their own operational manuals to put into effect practices drawn from advisory or guidance material* [italics added].

Differences between ICAO Standards and those in MOS [italics added]. Notwithstanding the above, where there is a difference between a standard prescribed in the ICAO standards and one in the MOS, *the MOS standard shall prevail* [italics

added].

Differences Published in AIP. Differences from ICAO Standards, Recommended Practices and Procedures are published in AIP Indonesia Gen 1.7.

3.1.1.2 MOS Documentation Change Management

1. This document is *issued and amended under the authority of the Director General* [italics added].

2. Requests for any change to the content of the MOS may be intimated from:

a. technical areas within DGAC;

b. ATS service providers and staff;

c. aviation industry service providers, such as aerodrome operators or

d. airlines and their staff; and

e. interested consultants, auditors and others.

3. The need to change standards in the MOS may be generated by a number of causes. These may be to:

a. ensure safety;

b. ensure standardisation;

c. respond to changed DGAC standards;

d. respond to ICAO prescription; or

e. accommodate new initiatives or technologies.

3.1.1.3 Related Documents

These standards should be read in conjunction with:

- ICAO Annex 4 Aeronautical Charts;
- ICAO Annex 14 Aerodromes (Vol.1);
- ICAO Annex 15 Aeronautical Information Services;
- ICAO Doc 9157/AN901: Aerodrome Design Manuals (all parts);
- Federal Aviation Administration (FAA) Advisory Circular 1501 5300 -13 (United States document that has been adopted by the Government of Indonesia)

3.1.1.4 Aerodrome Manual

The aerodrome manuals of the respective airports are based on the CASR 139 and other related documents (many of which are referenced / extracted from in the previous paragraphs).

The Sultan Thana Airport Aerodrome Manual references in the "Forward" the legal basis upon which the Manual is based. The Soekarno – Hatta Airport Aerodrome Manual, Ngurah Rai Airport Aerodrome Manual, and the Polonia Aerodrome Manual specify the respective legal and regulatory basis for the Manual and its contents in each individual Section. Rather than listing here the legal and regulatory basis, we direct attention to the individual listings in each aerodrome manual.

There are two prerequisites for introduction of the aerodrome certification regulatory system as described in paragraph 2.1 of the ICAO ***Manual on Certification of Aerodromes***:

a) The existence of provisions in the basic aviation laws of the State for the development and promulgation of aerodrome regulations.

b) The existence of an appropriate State entity vested with the necessary authority to ensure compliance with the regulations.

Based upon the quoted references above from the introduction of the ICAO ***Manual on Certification of Aerodromes*** and the above referenced Indonesian law, **we conclude that these two prerequisites have been fulfilled.**

While the prerequisites have been fulfilled, the manner of application, the authorities, and enforcement of the Standards and Recommended Practices is clearly divided between two separate Ministries within the Government of Indonesia.

3.1.2 CONSEQUENCES OF CURRENT LEGAL STRUCTURE

While the prerequisites have been fulfilled, the manner of application, the authorities, and enforcement of the Standards and Recommended Practices is clearly divided between two separate Ministries within the Government of Indonesia.

The current legal structure is, we believe, in large part responsible for the apparent absence of fully reliable procedures that was frequently encountered. This apparent absence of procedures – procedures that *absolutely ensure* the accomplishment of certain safety-related matters --at either the national or airport levels (such as currency of instrument approach procedure - and related - charts in AIM Manuals) is of major concern. For example, in all four of the assessed airport AIS offices there were many outdated Instrument Approach Charts in the manuals, some over 12 years out of date.

At times it was noted that while the interest in high performance is clearly present, frequently an individual (or individuals) did not fully understand the importance of carrying through a policy or procedure, as they were clearly not formatted to understand the *why*, or the *reason behind* the particular policy or practice.

The ASI team believes that the suggested changes in the legal structure in combination with SMS training of all personnel could significantly improve these two situations.

It appears that there is a broad spectrum of staffing shortages which preclude operating airports at the highest international operating practices. It appeared that often the procedures exist, but there are situations in which there are not enough personnel to fully support the procedures. The professionalism of the personnel was of the highest degree, and a high level of enthusiasm and interest of the staff – ranging from maintenance personnel to air traffic controllers - was most evident. The fractured system of the current legal structure makes a nation-wide Standard for staffing of positions according to airport size and number of operations very difficult to implement.

3.1.3 VITAL NATIONAL DIRECTIVE

3.1.3.1.1 Single Authority For Aviation Safety

The ASI team believes it to be essential that there be one single overall authority for aviation safety, with the exception of aircraft accident investigation, which should be the responsibility of a separate, independent National Transportation Safety Board.

3.1.3.1.2 Compliance Enforcement Authority

The ASI Team believes that the division of authority between two authorities precludes effective Compliance Enforcement Authority.

3.2 NATIONAL GOVERNMENT REQUIREMENTS

3.2.1 CURRENT AIR TRANSPORTATION SAFETY STRUCTURE

Responsibility for the air transportation function falls under the Coordinating Minister of Legal, Political and Security Affairs; the Ministry of Communications and the Director General of Air Communications. Some responsibility for the air transport government structure also falls under the Coordinating Minister for Economic Affairs as is depicted in the chart below; and directly under the President through the Police and Armed Forces.

3.2.2 CRITICAL NATIONAL APPROPRIATE AUTHORITY REORGANIZATION

3.2.2.1 Responsibilities and Functions

3.2.2.1.1 National Civil Aviation Direction

While the State may not be actually operating all aerodromes within its borders, it is still, as the signatory to the Chicago Convention, responsible for the implementation of all ICAO SARPs. The State can fulfill these obligations by requiring (via legislative and regulatory provisions) that all aerodrome operators implement systematic safety management practices and procedures.

Further, the State must establish the appropriate oversight mechanisms to ensure compliance by the aerodrome operators. In a situation where the State is providing both the regulatory function and the aerodrome operation, it is essential that there be two separate entities: One entity being responsible for safety oversight, the second entity being the service delivery, or operation of the aerodrome.

The State needs to support the concepts --- industry-wide – of Safety Management Systems. A safety management system (SMS) is far more proactive than a safety programme. An SMS proactively addresses safety – to prevent mishaps by proactively addressing the conditions that lead to a mishap; to develop, implement, and support an ongoing safety culture, or organizational safety mindset. The ICAO definition of a ***safety management system*** is "an organized approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures".

3.2.2.1.2 National Civil Aviation Safety Committee

3.2.2.1.3 National Civil Aviation Safety Program (NCASP)

The *safety program* of the State for aerodromes needs to have two completely separate components. One component is a safety regulatory and oversight function. This is the direct responsibility of the State. The second component is safety management. The safety management component should be implemented through the safety management system(s) (SMS) of the aerodrome operator(s).

The ICAO definition of a ***safety programme*** is "an integrated set of regulations and activities aimed at improving safety".

3.2.2.1.4 National Civil Aviation Safety Oversight

The nature of the role of the State should ideally be partly active and partly passive. When an aerodrome operator maintains a solid "safety culture" and operates an organized highly effective safety management system, the State can be generally passive in that a high degree of responsibility is carried by the operator. If, however, an effective SMS does not exist, then it is necessary for the State to maintain a very active role, closely supervising all of the aerodrome operator's safety-related activities.

3.2.2.2 Civil Aviation Safety Element

3.2.2.2.1 Organizational Reporting Level

The Civil Aviation Safety Element must have direct access to the highest government level, to assure the availability of resources required to maintain best industry-standard proactive safety management concepts, and to fulfill, among other functions and responsibilities in the current legal structure, those listed below.

3.2.2.2.2 Functions and Responsibilities

"1.4.5 States shall require that individual operators, maintenance organizations, air traffic service providers and certified aerodrome operators implement ***SMS*** accepted by the State. As a minimum, such SMS shall:

a) Identify safety hazards;

b) Ensure that remedial actions necessary to mitigate the risks/hazards are implemented; and

c) Provide for continuous monitoring and regular assessment of the safety level achieved.

1.4.6 An organization's SMS accepted by the State shall also clearly define lines of safety accountability, including a direct accountability for safety on the part of senior management."

ICAO Safety Management Manual (SMM),
Doc 9859 AN/460 of ICAO

ASI Team Note:

- Appendix 5 of the ICAO *Manual on Certification of Aerodromes* (ICAO Doc 9774 AN/969) provides an Organizational Structure of a typical Aerodrome Safety and Standards Directorate.

- ICAO provides specialized guidance material for the fulfillment of the SARPs, including the Safety Management Manual (SMM). This manual includes a conceptual framework for managing safety and establishing a safety management system as well as some of the systemic processes and activities used to meet the objectives of the State's safety programme.

An example of an area that clearly needs greater emphasis:

3.2.2.2.3 Currency of Instrument Approach Charts:

General Requirements:

An area of safety that particularly needs to be addressed is the ability to determine the currency of individual instrument approach charts that are subject to data changes, therefore resulting in necessary updating of pages.

There evidently is no real system in place for determining individual page currency as described above in, for example, the Aerodrome Manuals used at airports in Indonesia and issued (by either government or industry) in Indonesia.

Further, there evidently is not a universally used system in place for indicating the date of issue or date of effectiveness of individual instrument approach pages issued in Indonesia.

Recommendations:

Systems and Equipment:

Aeronautical Instrument Approach Charts should have the date on the top center of each side of each chart. This practice is standard on the charts published by Jeppesen Sanderson, Inc., the provider of the Jeppesen Aeronautical Chart Subscription Service, We strongly recommend that, in the interest of aviation safety, this practice be introduced into all aeronautically-related manuals in Indonesia.

Training and Procedures:

ICAO Annexes, for example ***Aerodromes, Volume 1, Aerodromes, Aerodrome Design and Operations***, have in the bottom right corner of each page, the effective date of that particular page, and, in many cases, the Amendment Number

(e.g., 24/11/05 No. 7). We recommend that, in the interest of aviation safety, this practice be introduced into all aeronautically-related manuals in Indonesia.

3.2.2.2.4 General Staffing Requirements (3.2.2.2.4)

ASI Team note: A fundamental principle of ICAO's safety philosophy is that each State shall have a separate safety oversight entity and a well-defined safety oversight mechanism. Required is the support of appropriate legislation, necessary funding, and sufficient personnel who have been appropriately well trained to ensure compliance with the international best practices for aviation safety at the State's national level and at the airport level.

While clear intention is indicated by the detailed nature of the approved Aerodrome Manuals and the general adherence to these manuals noted, there is a very limited staff of trained safety inspectors in the DGAC.

Recommendation:

Staffing:

A substantial increase in the number of trained safety inspectors in the DGAC.

3.2.2.2.5 Special Experience and Training (3.2.2.2.5)

Incorporation of Security into Facility Design:

General Requirements:

Standard 1.5.1 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

Aerodrome Volume I (Aerodrome Design and Operations)

Recommendations:

Training and Procedures:

- Early and proactive involvement of the DGAC's infrastructure-related requirement trained staff in the initial planning of construction of new facilities as well as alterations to existing facilities at the aerodromes is necessary.

- If not already specifically trained in these areas, the staff may have specific training needs in these areas.

3.2.2.3 Civil Aviation Safety Quality Control Element (3.2.2.3)

3.2.3 CRITICAL NATIONAL CIVIL AVIATION SAFETY ORGANIZATION ACTIONS

3.2.3.1 Compliance with ICAO Chicago Convention

Article 15 of the Convention on International Civil Aviation requires that all aerodromes open to public use under the jurisdiction of a Contracting State should provide uniform conditions for the aircraft of all other Contracting States. Furthermore, Articles 28 and 37 oblige each State to provide, in its territory, airports and other air navigation facilities and services in accordance with the Standards and Recommended Practices (SARPS) developed by ICAO. Volume I of Annex 14 to the Conventions contains SARPs on the subject of aerodrome design and operation. Responsibility for ensuring safety, regularity, and efficiency of aircraft operations at aerodromes under their respective jurisdiction rests with individual States. It is therefore essential that whenever the operation of airports is delegated to an operator, the State retain its overseeing responsibility and ensure that the operator complies with the relevant ICAO SARPs and/or applicable national regulations.

The most effective and transparent means of achieving these objectives are to:

a) *establish a separate safety oversight entity and a well-defined safety oversight mechanism, supported by appropriate legislation, to carry out the functions of certification and safety regulation of aerodromes.*

b) *implement an aerodrome certification procedure whereby a State certifies an aerodrome through the approval/acceptance of the aerodrome manual submitted by the aerodrome operator.*

3.2.3.2 Compliance Inspections and Enforcement

3.2.3.2.1 General Requirements

ASI Team note: A fundamental principle of ICAO's safety philosophy is that each State have a separate safety oversight entity and a well-defined safety oversight mechanism. Required is the support of appropriate legislation, necessary funding, and sufficient personnel who have been appropriately well trained to ensure compliance with the international best practices for aviation safety at the State's national level and at the airport level.

While clear intention is indicated by the detailed nature of the approved Aerodrome Manuals and the general adherence to these manuals noted, there is a very limited staff of trained safety inspectors in the DGAC.

3.2.3.2.2 Staffing

A substantial increase in the number of trained safety inspectors in the DGAC.

3.2.3.2.3 Training and Procedures

Industry standard training for safety inspectors.

3.2.4 AVIATION SAFETY AT AIRPORTS

3.2.4.1.1 Airport Design

3.2.4.1.2 General Requirements

Standard 1.5.1 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

Aerodrome Volume I (Aerodrome Design and Operations)

3.2.4.1.3 Staffing

Early and proactive involvement of the DGAC's infrastructure-related requirement trained staff in the initial planning of construction of new facilities and alterations to existing facilities at the aerodromes is necessary.

3.2.4.1.4 Training and Procedures

If not already specifically trained in these areas, the staff will have specific training needs.

The next three sections of the report:

- Part 3 – Report to AIS
- Part 4 - Operating Procedures and Safety Measures
- Part 5 – Aerodrome Administration and Safety Management System

follow the format of **Appendix 1** of the ICAO ***"Manual on Certification of Aerodromes"*** (Doc 9774 AN/969). As earlier mentioned, the Appendix is a schedule of aerodrome certification particulars to be included in an aerodrome manual. Part 1 and Part 2 issues are addressed either earlier in this report or in conjunction with issues addressed in Part 3 to Part 5.

3.2.4.1.5 Part 3 – Report to AIS (3.2.4.3.2)

Geographical Coordinates

General Requirements:

ICAO Standard: "The geographical coordinates of each aircraft stand shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds".

ASI Team Note:

- The coordinates posted on many of the parking gate identification signs at the airports assessed do not appear to be current.
- Aircrews expect the coordinates posted on the parking gate identification signs to be current, and therefore often use them for the "IP'ing" (Initial Positioning) referencing of their en-route navigation equipment
- As it is noted that the Jeppesen Sanderson, Inc. instrument approach charts for Soekarno-Hatta International Airport, Ngurah Rai International Airport, and Polonia International Airport include updated coordinates on their current issue charts, the ASI Team would believe that the updated coordinates are available from the Indonesian government.

Recommendation:

Training and Procedures:

Development of a reliable system for updating of geographical coordinates displayed on the airside of gates.

General Requirements:

Standard 2.1.5 Geographical coordinates indicating latitude and longitude shall be determined and reported to the aeronautical information services authority in terms of the World Geodetic System — 1984 (WGS-84) geodetic reference datum, identifying those geographical coordinates which have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the requirements in Appendix 5, Table A5-1, and

Standard 2.1.6 The order of accuracy of the field work shall be such that the resulting operational navigation data for the phases of flight will be within the maximum deviations, with respect to an appropriate reference frame, as indicated in tables contained in Appendix 5.

ASI Team Note:

It is noted that the Jeppesen Sanderson, Inc. instrument approach charts for Soekarno-Hatta International Airport, Ngurah Rai International Airport, and Polonia International Airport all include updated coordinates on their current issue charts. Therefore, the ASI Team would believe that the updated coordinates are available from the Indonesian government.

Recommendation:

Staffing:

Sufficient trained staff to ensure fulfillment of the procedures listed below

Training and Procedures:

Development of reliable procedures to update all airport geographical coordinates and enter them into aeronautical publications, and additionally develop procedures to ensure that these are done on a regular and timely basis.

3.2.4.1.6 Part 4 – Operating Procedures And Safety Measures(3.2.4.3.3)

Sect 4.1 Aerodrome Reporting

Coordination Between Aeronautical Information Services And Aerodrome Authorities

General Requirements:

Standard 2.13.1 "To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and aerodrome authorities responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay:

a) information on aerodrome conditions (ref. 2.9, 2.10, 2.11 and 2.12);

b) the operational status of associated facilities, services and navigation aids within their area of responsibility;

c) any other information considered to be of operational significance."

ICAO Annex 14 Aerodromes Volume 1

ASI Team Note:

Numerous components of runway approach lighting systems were found to be inoperative or unreliable, and not always accurately notamed.

Recommendations:

Training and Procedures:

Development of procedures to ensure:

- The reporting of inoperative or unreliable visual or navigational components
- Timely administrative processing of such reports.
- Replacement of inoperative or unreliable visual or navigational aids
- Post installation inspection for serviceability

Instrument Chart Currency in the AIP

General Requirements:

Instrument Flight and Approach Charts in the AIP (Aeronautical Information Publication) Manuals in the AIS (Aeronautical Information Service) need to be up to date. In the interest of flight safety, all maps, charts, and information sheets must be current.

Display Wall Charts and charts displayed on the counters under glass should be current.

It would appear that there is no fully reliable procedure in place at either the national or airport levels that absolutely ensures the currency of available instrument approach procedure and related charts. If there *is* such a procedure in place, there is no mechanism in place for absolutely ensuring the currency of the charts in the above referenced locations.

Recommendation: Applicable to all airports:

Systems and Equipment:

It is essential that all charts and pages of aeronautical data be current. Every chart and every page of aeronautical data must have a date of either 1) publication date or 2) effective date, printed on the chart. These charts are in the following areas of the AIS:

- The AIP (Aeronautical Information Publication) Manuals
- Aeronautical charts displayed on the walls
- Aeronautical charts under glass on the counters

Included in the AIP Manuals:

- All charts in the AIP (Aeronautical Information Publication) Manuals
- All pages of aeronautical data in the AIP Manuals

Charts displayed on the walls and under glass on the counter are very useful for daily references and communications with flight crews during briefings. However, they should be up-to-date editions.

Training and Procedures:

Absolutely ensure the currency of the charts in the above referenced locations, either through an organization within the government or by a chart subscription service *such as* Jeppesen Sanderson, Inc., the provider of the Jeppesen Aeronautical Chart Subscription Service. While individual airlines provide this service to a certain extent, it is imperative that 100 % availability of *current* maps and charts in all AIP Manuals and all AIS facilities is assured.

Continuous Friction Measuring Device

General Requirements:

ICAO recommends, and best industry practice dictates, that a continuous friction measuring device be available at airports in order to determine the runway surface friction characteristics of slippery runways.

Recommendations:

Systems and Equipment:

While the continuous friction measuring device is generally utilized in conjunction with icy runways, the torrential downpours of the region warrant consideration of the availability of a continuous friction measuring device at the largest airports of Indonesia.

Aerodrome Unit Facilities

General Requirements:

International best practices for aviation safety require redundancy of communication capability into and out of an AIS Office.

Recommendations:

Systems and Equipment:

Internet capability into the AIS Offices and facsimile machine back-up for possible computer-related difficulties should be provided for the AIS Offices at each airport in Indonesia.

Sect 4.2 Access to Movement Area

Airside Permits

General Requirements

International best practices for aviation safety and security require an organized, structured mechanism for issuance of airside driving permits and airside vehicle permits.

Recommendation:

Staffing:

Sufficient staffing to accomplish the procedures stated below

Training and Procedures:

An organized, structured mechanism for issuance of airside driving permits (including vetting, training, licensing, and personal training and compliance histories), and vehicle permits (including safety inspection protocols).

Sect 4.3 Aerodrome Emergency Plans

General Requirements

An Airport Emergency Plan is meant to be a "living document". As such, it needs to be reviewed by all concerned on a regular schedule, to review and prepare for possible inclusion recommendations from various sources.

Recommendation:

Training and Procedures:

- All personnel at the airport should be considered as a resource for input into the plan. Often a person who has the most mundane or basic job, may see the same basic problem day after day, that can, in an emergency, suddenly become a major obstacle, and that person can provide valuable mitigating insight.

- A mechanism should be available for submission of suggestions from all involved sources. Perhaps even so basic as "suggestion boxes" in appropriate locations.

- Training in "safety culture" for all personnel at the aerodrome.

Aerodrome Emergency Plan Manual Currency

General Requirements:

A utilized means of determination of the currency of each copy of the Aerodrome Emergency Plan Manual and every page in each manual is essential.

Recommendation:

Training and Procedures:

A date of issue (or effective date) should be on *each* page of *each* manual, as ICAO does with the Annexes.

AEP Manual Determination of Currency – Amendment Record

General Requirements:

Each copy of the Aerodrome Emergency Plan should also be capable of determination of currency via an "AMENDMENT RECORD".

Recommendation:

Training and Procedures:

Development and implementation of revision process and requirement of use of "AMENDMENT RECORD" as appropriate

AEP Manual Currency – Personnel Listings

General Requirements:

The Airport Emergency Plan is meant to be a "living document". Currency of the listings such as names of personnel in individual positions in both the airport administration and non-airport agencies and organizations and respective telephone numbers is essential.

Recommendation:

Training and Procedures:

Development and implementation of regular scheduled telephone contact list update and revision process.

Memorandums of Understanding (MOU's)

General Requirements:

International best practices for aviation safety require inclusions of formalized contingency Memorandums of Understanding (MOU) between airports and local hospitals and other medical facilities.

Recommendation:

Training and Procedures:

Development of formalized MOU's and contingency plans between airports and local medical facilities, particularly hospitals. These MOU's should specifically state the needs and expectations of services provided by each organization, and the capabilities of each organization to provide services.

For example:

- Who will provide transportation of injured persons from an accident site to local medical facilities?
- What is the capacity and expected capability of each medical facility?
- What type of injuries would require transport to a major distant hospital?
- How will this transport be provided?
- How will expenses be covered?

Exercises – Frequency

General Requirements:

- Major full exercises, partial exercises, and "table top" exercises, while perhaps referenced in the Aerodrome Manual, must be a part of the Aerodrome Emergency Plan.
- Noted was the absence of "table top" exercises preceding the full exercises. As was stated at one of the airports visited, "Before another full-scale exercise, we need smaller-scale exercises of individual groups, such as medical, bomb threat, and security to test their capabilities and determine their limitations, then to join together in a major coordinated exercise, to learn our full inter-organizational capabilities and limitations." A major value of conducting an exercise is that any significant deficiencies - particularly in personnel response,

the emergency plans and procedures, or the emergency equipment and communications - will become evident. Thus they can be corrected before, rather than during, an actual emergency.

Recommendation:

Training and Procedures:

- National emphasis on the importance of regular exercises.
- Procedures developed at the national level to ensure that such exercises take place on the frequencies required by ICAO Standards.
- Increased frequency of scheduled and non-scheduled table-top exercises.

Exercises – Corrective Measures

General Requirements:

At times during exercises problems are found to exist. Corrective measures are generally determined in post exercise meetings.

Recommendation:

Training and Procedures:

Mechanisms by which such corrective measures are incorporated into procedures and plans.

Exercises – Surprise

General Requirements:

Surprise exercises are of great importance in determining the more likely various realistic response times in response to an actual emergency.

Recommendation:

Training and Procedures:

Enactment of surprise exercises.

Radio Communications Equipment

General Requirements:

Successful and reliable radio communications, both on a day-to-day basis and in

emergencies, is essential. Lack thereof could become extremely problematic in a crisis situation. Secondly, during day-to-day operations, lack of necessary equipment can severely limit the effectiveness and capability of the force.

Recommendation:

Systems and Equipment:

Procurement and availability of a substantial increase in the number of mobile units, the supply of batteries, chargers, and spare parts, particularly at the smaller airports of the country.

Radio Communications Equipment - Secure Communication

General Requirements:

In a hijacking on the ground or other such emergency, either scrambled or some other form of secure radio communication is essential for involved response personnel.

Recommendation:

Systems and Equipment:

Procurement of needed equipment for scrambled communication capabilities.

Radio Communications Equipment – "Hard Wire"

General Requirements:

"Hard wire" capability to directly connect an aircraft parked in the emergency parking location to the command post and the emergency operations center is essential in order to provide discreet communication capability.

Recommendation:

Systems and Equipment:

Availability of sufficient wire and the appropriate jacks to connect the external power receptacle ground radio panel of the aircraft to the command post and the EOC.

Airport Emergency Operations Committee (AEOC)

General Requirements:

An Airport Emergency Operation Committee (AEOC) often is not utilized to the extent that it could be. The EOC is potentially a most valuable resource. Each airport in Indonesia should have such a committee.

Recommendation:

Training and Procedures:

National support for the regular utilization of Airport Emergency Operation Committees, with an education program of the value of the EOC.

Emergency Operations Centre and Command Post

General Requirements:

Smaller airports, as well as the larger airports, should have both an Airport Emergency Operations Centre and a Command Post. A hastily requisitioned vacant office and an airport emergency operations vehicle simply do not provide any form of operational communications console, nor really workable quarters for the crisis management team.

Recommendation:

Training and Procedures:

National support in the creation of Airport Emergency Operations Centres and Command Posts – a critical element of the infrastructure of any airport that serves airline aircraft.

Key Staff Contact Availability

General Requirements:

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and capability of simultaneous immediate notification. The known location and availability of the telephone numbers and facsimile numbers must be confirmed. Needed reliable and rapid notification to all concerned individuals with rapid capability for situational updates is a consistent problem in emergency response.

Recommendation:

Training and Procedures:

Development and implementation of regular scheduled telephone contact list update and revision process, as well as incorporation into Aerodrome Manuals

(and use of) "RECORD OF REVISIONS" pages.

Every 60 or 90 days an inquiry could be sent around to all airport and tenant organizations requesting any updates needed. This could be handled by the Aerodrome Manual Revision and Update Team.

Emergency Call List Activation Enhancements

General Requirements:

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system).

Recommendation:

Systems and Equipment:

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system for the use of the public) exists. This system has the capability to pre-select different call lists for different forms of emergencies. A person in the controlling entity (e.g., a dispatch emergency center) can push a button to activate auto-calling of all individuals on the specific tailored list. The system then rolls through the list, presenting a brief dictated message transmission to every individual listed. Everybody on the specific list receives the same message. The activating individual can select precisely who gets what type of message notification depending on the nature of the emergency(s).

Such inter-connect ability of all airport emergency centers, national and local law enforcement agencies, and civil emergency response units would likely be of enormous value in the event of future national emergencies such as tsunami events. The system can be set to have a particular list that calls every telephone in a particular area, on a particular street, or in a particular community. It is also, obviously, capable of being programmed to call any specific group of citizens (elderly, etc).

An example of such a system is manufactured by DCC: GeoCast and The Communicator. Geocast is a web-based tool that allows for a geographic population to be notified. The Communicator notifies individuals that are pre loaded into a database. These individuals can be organized into teams as mentioned above, and notified by a variety of ways including telephone, fax, page, and e-mail. Information is available at http://www.dccusa.com/ and at http://www.dccusa.com/communicator.asp

A critical aspect in the operation of an inter-island capability as described here, is the development of a common and agreed to communication systems language for notifications. Language and wording that all teams and all departments on all

islands would clearly understand.

Sect 4.4 Rescue and Firefighting Service (RFFS)

Maritime Rescue and Response Equipment

General Requirements:

Due to the proximity of many of Indonesia's airports to bodies of water, maritime rescue and response equipment should be available to the RFFS. An "off airport" crash or other such emergency would be extremely difficult to respond to adequately without equipment such as life rafts, jet skiis, and powerboats. A ditching or a crash into the sea would be particularly challenging.

Recommendation:

Systems and Equipment:

Procurement of maritime rescue equipment, such as boats and jet-ski rescue vehicles

Training and Procedures:

- Advance determination of availability from governmental and other resources of helicopter rescue craft.
- Detailed MUO's with such organizations regarding expectations, capabilities, and provisions for emergency activation.

RFFS Category

General Requirements:

Effective contingency plans for mitigating temporary reduction in RFFS assessed category is essential.

Recommendation:

Training and Procedures:

National support in the development and implementation of mitigating procedures for temporary reduction in category.

Sect 4.5 Aerodrome Inspection

Radios - Availability & Usage

General Requirements:

Adequate radio equipment (units, chargers, spare parts, etc.) to ensure sufficient reserve/standby units for personnel, are a key safety and operational asset, particularly in an even slightly abnormal situation.

Recommendation:

Systems and Equipment:

Procurement of adequate mobile units, the supply of batteries, chargers, and spare parts to provide sufficient reserve/standby units.

Sect 4.6 Visual Aids, Electrical Systems, Lights

Numerous components of runway approach lighting systems were found to be inoperative or unreliable during the assessments.

Critical Flight Safety Aerodrome Systems

General Requirements:

A most important and critical night landing aid is the safety-related lighting systems, such as Approach Lighting Systems (ALS) and Runway End Identification Lights (REILS) at aerodromes. Best international practices cannot possibly be maintained at an aerodrome where the unavailability of parts for repair precludes their *full* operational capability. Parts for critical flight safety aerodrome systems *must* be available when needed.

Recommendation:

Systems and Equipment:

An available inventory of sufficient spare parts and equipment as necessary to ensure capability of maintaining all safety-related lighting systems at *full* operational capability to at least a 99 % reliability factor. This would include wiring, lighting units, bulbs, and control mechanisms, and other required components.

Training and Procedures:

Nation-wide review and upgrade of existing procedures for financing and procurement of aviation-safety critical equipment and parts, and implementation of "critical response" capability of support in this area, including contracted

vendor availability to ensure implementation of "critical response" capability of support in this area

Development of procedures to ensure:

- The reporting of inoperative or unreliable visual or navigational components
- Timely administrative processing of such reports
- Replacement of inoperative or unreliable visual or navigational aids
- Post installation inspection for serviceability

Sect 4.7 Movement Area Maintenance

General Requirements:

Movement areas must be well maintained. Good condition and operable ground maintenance equipment (such as runway sweepers and small rollers) is an essential element ensuring aviation and ramp vehicle safety.

The annual funds outlay saved by substantially delaying the purchase or upgrade of ground maintenance equipment can very easily be consumed in one FOD item passing through a jet engine.

Recommendation:

Systems and Equipment:

Allocation of substantially increased funding for airport maintenance equipment.

Sect 4.8 Aerodrome Works Safety

The four airports assessed were in compliance with good practice.

Sect 4.9 Aircraft Parking Control

The four airports assessed were in compliance with good practice.

Sect 4.10 Apron Safety Management

The four airports assessed were in compliance with good practice.

Sect 4.11 Airside Vehicle Control

Ramp Area Communications Equipment

General Requirements:

At airports where the use of cellular telephones is a primary means of operational communications (such as at some smaller airports), reliability of the equipment is essential to avoid significant loss of operational and safety performance capability. 100% reliability requires sufficient cell 'phones, batteries, spare parts, and chargers to provide reserve/standby units.

Recommendation:

Systems and Equipment:

Procurement of needed cellular telephone equipment (at airports whereat they are a primary form of operational communication) is essential. Adequate supplies of all components including batteries, chargers, and spare parts are required. Alternately, sufficient mobile radio communication units (with a capability for secure communication during emergencies) for these airports should be acquired.

Training and Procedures:

- As referenced in 4.2 (Access to Movement Area), a formal training program for ramp safety is required of operators of vehicles on the air side.
- An organized, structured mechanism for issuance of airside driving permits (including vetting, training, licensing, and personal training and compliance histories), and vehicle permits (including safety inspection protocols).

Sect 4.12 Wildlife Hazard Management

The four airports assessed were in compliance with good practice.

Sect 4.13 Obstacle Control

The four airports assessed were in compliance with good practice.

Sect 4.14 Disabled Aircraft Removal

Large Cranes with Heavy Lift Capability

General Requirements:

Indonesia is a vast country, with isolated airports across the entire archipelago. In the event of an accident, lack of immediate availability of cranes with heavy-lift

capability could cause shutdown of the airport for a time period that could result in considerable economic loss to the surrounding communities. The ASI team would suspect that this is the situation in many, if not most, of the airports throughout the country. The airport is, in many respects, the community's primary lifeline to the outside world.

Large cranes with heavy-lift capability for aircraft removal should be available, either on-airport or through a local organization. At those airports that are depending on a local supplier there must be standing written reliable arrangements in effect.

Recommendation:

Systems and Equipment:

Availability of a large crane on the airport, or contracted guarantee of availability on very short notice from an outside vendor. Reliability of *actual* availability and full operable condition of equipment must be periodically verified.

Sect 4.15 Handling of Hazardous Materials (Hazmat)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the handling of aviation fuel.

Sect 4.16 Low Visibility Operation

As Low Visibility Operations are not conducted at any of the four airports assessed, this area is not relevant.

Sect 4.17 Protection of Radar & Navigation Aids

Protection of main electrical feed lines

General Requirements:

Radar & Navigation Aids should have each main electrical feed line in a separate trench as any damage to the trench (intentional or accidental), could result in significant disruption.

Recommendation:

Systems and Equipment:

Each airport assessed has backup generator capability. However, not all main feed lines were in separate trenches. All airports, radar, and navigation aids

should have two main feed lines, each in its own trench, to provide redundancy for protection in the event that a main feed line is disrupted either intentionally or unintentially.

3.2.4.1.7 Part 5 – Aerodrome Administration and Safety Management System

Sect 5.1 Staff Contact List

Sub-Sect 5.1.1 Staff Contact List and Organizational Structure

General Requirements:

The airport assessments conducted showed that while each airport complied with the requirements of listings of names and positions of key personnel, the lists were generally several years out of currency, as were included telephone numbers. Emergencies can occur (including at the smaller airports) during off-hours. For example, an unscheduled night emergency landing during inclement weather conditions with a resultant runway over-run. Therefore, capability of immediate contact of key personnel at any time is essential.

Recommendations:

Training and Procedures:

- A mechanism to ensure that the staff contact lists are updated on a regular basis (perhaps every 90 days). Even a simple procedure of sending around specific contact lists to all departments and organizations for checking a box for verifications or to fill a space for corrections would likely work.

- There must be 24-hour contact numbers for each key individual (or the individual's fully authorized spokesman with full decision-making authority) to ensure communication availability and accessibility on immediate notice for use in the event of an emergency during off hours.

- Telephone numbers must be readily available to those whom would be expected to make the call. The list should be provided to local police and national emergency authorities.

- Please note comments in Section 4.3 under "Key Staff Contact Availability - Systems and Equipment"

Sub-Sect 5.1.4 Aerodrome Manual Revision and Update Team

Aerodrome Manual Currency

General Requirements:

The Aerodrome Manual is required to be kept up-to-date, with a way of determining the currency of each and every copy of the manual.

The Aerodrome Manuals of three of the four airports assessed include an "AMENDMENT" page. However, no entries in any of these pages were noted. This would indicate that either the manuals are not being regularly updated, or the emplacement of the revisions is not being recorded on the "AMENDMENT" pages of the manuals.

Recommendation:

Training and Procedures:

- Development of a mechanism for input from all airport staff regarding relevant procedure changes, and holding of regularly scheduled meetings for consideration of changes and updates.
- Amendments entered as appropriate, with notation on the "AMENDMENT" pages.
- Entering of the date of issuance of each amended or updated page on that page.

Sub-Sect 5.1.5 Airport Committees

General Requirements:

While there clearly are Airport Committees in existence, particularly at the larger airports, the committees do not seem to be utilized to nearly the degree that such a valuable resource warrants, particularly in the Safety or the Security area.

Airport Safety Committees are an integral component of a SMS.

Recommendation:

Training and Procedures:

The establishment and activation of Airport Safety Committees at all airports, with regularly scheduled meetings and associated follow-up.

3.2.4.2 Aerodrome Safety Management Systems (SMS) (3.2.4.4)

"**Safety** is the state in which the risk of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management."

***ICAO Safety Management Manual (SMM)**, Doc 9859 AN/460 of ICAO*

Safety: "The condition where risks are managed to acceptable levels"

Flight 2010 – The strategic plan of Transport Canada Civil Aviation (TCCA)

3.2.4.2.1 ICAO SMS Requirements:

Standard 1.4.6 As of 24 November, 2005, a certified aerodrome shall have in operation a safety management system.

ICAO ***Annex 14 – Aerodromes – Volume 1, Aerodrome Design and Operations***, 4th Edition, applicable as of 1 July 2004

3.2.4.2.2 Safety Management:

What is "safety management"? "Safety management involves hazard identification and the closing of any gaps in the defenses of the system."

ICAO Safety Management Manual (SMM)

3.2.4.2.3 Safety Management System (SMS)

General Requirements:

While safety and a safety management system may be costly at first, they soon pay off. The payoff can easily be many times the total cost of all investments.

Safety Management System:

A system for the management of safety at aerodromes, including the organizational structure, responsibilities, procedures, processes and provisions for the implementation of aerodrome safety policies by an aerodrome operator, which provides for control of safety at, and the safe use of, the aerodrome.

The *intent* of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator.

"As a minimum, [an aerodrome] SMS shall:

a) identify safety hazards

b) ensure that remedial actions necessary to mitigate the risks/hazards are implemented; and

c) provide for continuous monitoring and regular assessment of the safety level achieved."

ICAO Safety Management Manual (SMM)

"SMS requires the support of senior management. SMS also requires that Top Management in the organization, one with the authority to adequately control resources, be assigned SMS responsibilities."

"Introduction to Safety Management Systems (SMS) for Airport Operators", Advisory Circular issued by an ICAO member State February, 2007

Recommendation:

Training and Procedures:

- Development of an overall Aerodrome Safety Management System, and an active formal Safety Management System (SMS) at each airport.

- A SMS requires the support of senior management. Successful SMS's require resources commensurate with the recognition of the importance of the SMS as a critically important business element of the organization.

3.2.4.2.4 SMS Outline

The ICAO ***Manual on Certification of Aerodromes*** provides an outline for an aerodrome SMS. The essential features being:

- The safety policy
- The structure or organization of the SMS
- SMS strategy and planning
- SMS implementation
- A system for the implementation of, and action on, critical safety areas which require a higher level of safety management integrity (safety measures programme)
- Measures for safety promotion and accident prevention and a system for risk control
- The internal safety audit and review system

- The system for documenting safety-related facilities, operational, and maintenance records
- Staff training and competency
- The incorporation and enforcement of safety-related clauses in contracts

Brief descriptions of each are included in Appendix 1, Part 5 of the ICAO ***Manual on Certification of Aerodromes***.

3.2.4.2.5 Development and Operation of a SMS (3.2.4.4.5)

ICAO has developed a 10-step process to develop and operate a SMS. Following are the 10 steps with a brief summary of each. Detailed guidance material on each of the steps is contained in the ICAO ***Safety Management Manual (SMM)***, Chapter 12.

Step 1: Planning

An initial review of the aerodrome's various capabilities that would support the development and implementation of a SMS. Most aerodromes have certain safety measures in place. Developing a SMS builds upon these, and constructs a *systems approach*, through which to develop proactive, or preventative safety policies, procedures, and practices.

A Safety Assessment should be performed to determine specific circumstances and conditions

Safety performance indicators and safety targets should be defined by the aerodrome's management.

A Safety Strategy should be developed, with possible consideration of a phased approach.

A detailed plan considering safety objectives, safety strategy, safety management processes and activities, resource implications, and timelines should be developed.

Step 2: Senior Management's Commitment to Safety

A SMS *must* start at the senior management level. The importance of senior management's true commitment to safety, and a safety culture, cannot be over-emphasized. This commitment must be communicated – through stated policy, objectives, and actions – to all employees.

A safety policy statement should be issued by top management, presenting clearly the concept that a safety culture is a very significant and important part of the business philosophy and policy of the organization.

Safety objectives must be carefully set and clearly documented and communicated. Realistic safety performance targets should be set and stated.

Step 3: Organization

An early requirement is the appointment of a Safety Manager (SM). This should be expected to be a full-time position, with direct access to at least the organization's Senior Director of Operations (or equivalent).

A systems approach to safety management should be incorporated into the organizational structure, including safety communications systems between all departments.

Statements of safety responsibility and accountabilities of all departments and positions therein should be properly documented.

At many aerodromes there is already, hopefully, a safety committee. However, these may well not have the stature and resources that are needed in a full SMS. The committee should include senior managers from all departments as well as the SM.

A most critical aspect of the development and effective operation of a good SMS is training and competency in the safety area. This ranges from trained, competent, and licensed safety personnel in all critical safety-related positions, to a general education program of safety culture and operation for *all* staff in all positions. A fundamental of aviation security is that "the eyes and ears of every person on (or off) the airport who has had security training is a security asset". The same fundamental applies to safety. *Every* person with safety awareness is a valuable safety resource.

Step 4: Hazard Identification

Hazard identification ranges from the recognizing of the most obvious hazards to the learned ability to identify potential hazards from long term observation of processes and procedures. A most critical key to effective and successful hazard in identification is the incorporation of a non-punitive or "just" safety culture. In this environment individuals not only see potential hazards or are involved in mishaps or accidents, but willingly report them. They *must* know that, unless negligent or reckless actions were involved, they can report an incident or accident without fear of reprisal. *Only* this way can we really learn all of the facts that led up to the incident or accident, and thereby incorporate into our normal processes and procedures true accident preventive measures. If individuals operate in an environment of fear, they will attempt to hide, to cover up, many hazards that are *priceless* in development of a really fundamentally safe operation.

Step 5: Risk Management

There are three essential elements of risk management:

- Hazard identification
- Risk assessment, and
- Risk mitigation

How likely is there to be an occurrence? What is the severity of the consequences in the event of an occurrence?

Step 6: Investigative Capability

State investigative organizations tend to focus their incident/accident investigations on the "What happened? Who was at fault?" aspects. We need to investigate far beyond those parameters; we must determine *why* what happened, happened.

Ultimately, far more important to the safety of an organization and those whom it serves is *why* an occurrence happened, rather than *what* happened. What were the contributory factors? What were "the links of the accident chain"? An accident is virtually always the result of a chain of events. Were this chain of events to have been broken at any point, the accident would almost certainly not have happened. Only by proceeding through these historically extra steps can we *really* learn from the occurrence, and apply measures to preclude recurrences.

Step 7: Safety Analysis Capability

The integrated problem solving process: The process of organizing and evaluating facts objectively. *All* sides of *all* aspects of the situation are evaluated, which is fundamentally different from the adversarial procedures in most courts. Consensus is generally the result. From these processes often come the education of the industry that can really positively impact on safety records and operations.

Step 8: Safety Promotion and Training

Training of all personnel in safety principles is a *most* important investment in the future long-term viability of an aerodrome. Top management's support of such training really is a clear indication of their commitment to the SMS, and thereby to the long term health of the organization.

New employees need basic introductory training. More seasoned employees need updating on new findings, new procedures, and new equipment. The safety education should never stop. It is critically important that everyone understand the value of the training. This requires highly qualified teachers – people who are not only subject matter experts, but who also know how to present the material in an interesting and dynamic and interactive manner. A participatory exchange, where the instructor presents material and the participants can and do share the value of their own

experiences will generally produce the best possible results. Each participant in the class should, at the end of the day, know and feel that this is "*our*" program, the lives and safety of *our* customers, *our* fellow employees, and *our*selves are at stake here. All personnel should "own" the program (SMS).

Any personnel of organizations that provide services to the airport should have introductory SMS training, before being allowed to operate on the air-side (much as they must successfully complete ramp safety training).

Step 9: Safety Management Documentation and Information Management

A very important aspect of an SMS is proper, thorough, and credible documentation. This will include the basis of recommendations upon which procedures are based, objectives of the SMS, measures to control risks, and will likely be a part of the basis of the organizations Safety Management Manual (SMM).

The SMM includes the principles of safety philosophy of the organization and guidance for an organized, coherent, integrated SMS. It is a means for management to communicate the SMS to all involved, and provides an ongoing (and hopefully "living"; i.e., updated, and evolving as needed) reference for all employees and associates.

Step 10: Safety Oversight and Safety Performance Monitoring

Safety oversight and safety performance monitoring provide the capability to assess the success of the first nine steps.

Safety oversight is generally monitoring, on either a regular or continuous basis, of an organization's operations. It should cover all aspects of the operations, and is often a State function. Activities include inspections, tracking safety performance, imposing sanctions where necessary, etc.

Safety performance monitoring is generally an organizational function. Tools may include "in-house" inspections, determining employees' safety views, safety studies, and – very importantly – communicating safety results back to all personnel.

As mentioned above, considerably more detailed guidance material on each of these 10 steps is contained in the ICAO ***Safety Management Manual (SMM),*** Chapter 12. Very specific references for the complete development of a SMS, as well as very extensive background material, are in the ***Safety Management Manual (SMM).***

3.2.4.2.6 SMS Guidance Material

Guidance material for application of a SMS to aerodrome operations is provided in the ICAO *Safety Management Manual (SMM),* Chapter 18.

3.2.4.2.7 SMS Training

- There is presently available an Advisory Circular from the FAA: ***Introduction to Safety Management Systems (SMS) for Airport Operators*** – AC 150/5200-37, February 28, 2007. The US Office of Airport and Safety Standards provides it over the Internet at www.faa.gov .

- The Mitre Corporation in the United States is producing a paper describing SMS benefits, the ICAO requirements, and its use at airports. It is expected to be available in the very near future.

- As of September of 2008 an SMS user guidebook for airport operators is to be available. It is to include detailed practical information and guidance for the implementation of an airport SMS.

- The US FAA will be offering courses on SMS in the Airport Safety and Operations Schools (ASOS).

3.2.4.3 Air Traffic Control Towers (ATCT) (3.2.4.5)

As indicated in the Phase 1 Report, a needs survey/assessment of the air traffic control towers of each of the four airports was conducted. Findings are based upon observation, staff interviews, review of various records, and detailed examination of equipment and accommodation.

The areas noted to be of concern are in staffing and, most particularly, equipment and accommodation.

3.2.4.3.1 Staffing – Establishment

Watch Rosters

General Requirements:

Best international practices and established human factors require that there be sufficient staff to provide optimal air traffic control services. At all times that the control tower is in operation (including non-scheduled, unexpected situationally dictated hours) sufficient staffing coverage must be maintained. Human Factors recognizes the importance of regular, known work schedules in the personal lives of air traffic controllers. The stresses that result from erratic, unpredictable scheduling are well known as an inescapable compromise on a controller's performance and well-being over the long term.

There must be sufficient controllers on the roster to ensure that all staff have reliable advance knowledge of their work schedules. Ideally, the schedules should be built far enough in advance that the controllers actually know their schedules at least 30 days in advance.

"Last day" changes in schedule should be kept to an absolute minimum.

Controllers should have the opportunity to indicate shift and scheduling preferences.

It is particularly important that rostering limits are not compromised during hours of peak traffic activity.

Operating extended shifts should be only practiced on very rare occasion, and should not be a matter of normal practice. An absolute maximum of 10 hours should apply, with a normal maximum of 8 hours.

Recommendation:

Staffing:

Increased staffing as needed to maintain optimum coverage as described above.

3.2.4.3.2 Equipment (3.2.4.5.2)

Communications

Anti-Blocking Systems

General Requirements:

(e.g., CONTRAN: http://www.aatl.net/publications/contran.htm) should be available at any air traffic control tower to preclude deliberate or accidental blocking of ATC communications.

Recommendation:

Systems and Equipment:

Procurement of state-of-the-art anti-blocking systems for all ATCT's.

ATC System Communications

General Requirements:

Perhaps the most essential single element of communication capability is a highly reliable (with back up) means of communicating "tower-to-tower", and between the ATCT's and air traffic control centers, and national emergency centers of government. This partly for air traffic control coordination, but additionally as a reliable back-up emergency communication system for use during any emergency, be it a natural disaster or other human initiated emergency - local, regional, or national.

Recommendations:

Systems and Equipment:

Above described communication systems.

Training and Procedures:

Carefully developed and tested equipment and procedures, training in their use by ATCO's (Air Traffic Control Operators), and testing of the communication system on a regular basis.

Speakers and Headsets

General Requirements:

- A critical component of safe air traffic control operations is high quality communication equipment. Good quality speakers and headsets (preferably with boom mikes) are essential for each position in a control tower.

- Back-up communication capability for all primary frequencies (ground control, tower, approach control and departure control [where applicable]) is essential to providing safe, reliable traffic control.

Recommendations:

Systems and Equipment:

- Procurement of state-of-the-art headsets and speakers for all ATCTs.

- Procurement of state-of-the art back-up communications equipment for each ATCT for the primary frequencies.

- Procurement of state-of-the-art equipment for all ATCT's as needed to provide optimum state-of-the art traffic control and tower-ground vehicle communications capability.

Impounding of Recordings

General Requirements:

A very important tool for aircraft accident/incident investigation is impounding the recordings of the communications between the air traffic control facility and the aircraft(s), vehicle involved. As this can be a most important record, ATCT personnel should be familiar with the procedures of protecting the recording. Additionally, there should be some form of back-up system to ensure continual recording in the event that the primary recording system is inoperative.

Recommendations:

Systems and Equipment:

Procurement of back-up recording systems for all air traffic facilities in Indonesia. Equipping control towers with appropriate back-up communications recording systems.

Training and Procedures:

Training of ATCT personnel in the process of impounding recordings. A very simple procedure is involved, and the training period would likely be less than 40 minutes.

Emergency Procedures

General Requirements:

All ATCT personnel must be fully trained in, and familiar with, emergency procedures and the handling of emergencies.

Recommendation:

Training and Procedures:

Frequent emergency procedure drills and exercises.

3.2.4.3.3 Information Systems (3.2.4.5.3)

Flight Data Display

General Requirements:

Standardized, modern flight data display equipment is essential at ATCT's and air traffic control facilities. Operational and accurate meteorological reporting systems in control towers are key components of flight safety.

Recommendation:

Systems and Equipment:

Procure and install state-of-the art computer flight data display and meteorological reporting systems in control towers.

Serviceability Indicators

General Requirements:

Lighting of taxiways, runways, approach lighting systems, obstruction lights, etc., are key components of flight and ground safety, as are serviceability units which can automatically indicate to the ATCT personnel the actual functioning of these lights. Binoculars, while necessary and helpful, are not sufficient.

Recommendation:

Systems and Equipment:

Procure and install state-of-the art light serviceability display units in control towers.

Monitoring of Navigational Aids

General Requirements:

Capability of continual monitoring of all navigation aids (VOR's, DME's, ILS's, and other approach aids), with immediate notification of failure, serviceability, or degradation of signal accuracy or reliability is an essential component of flight safety.

Recommendation:

Systems and Equipment:

Verify that this monitoring capability exists at all navigation aids throughout Indonesia. Procure and install necessary equipment, including that required to assure notification of failure of the *monitoring* equipment.

3.2.4.3.4 Accommodation (3.2.4.5.4)

Operational Positions

General Requirements:

Extensive research has conclusively proven the importance of ergonomic considerations in ATCT design and operation. Each ATCT should have provision for sufficient ATCO (Air Traffic Control Operator) positions of ergonomic size. Equipment and data indicators should be positioned so that they are clearly readable from each position. These matters can have significant impact on flight safety.

Recommendation:

Systems and Equipment:

Architectural technical review of control tower control rooms, with both structural and human factors considerations. Renovation of tower control rooms that do not meet good practice requirements are necessary.

Visual Control Room

General Requirements:

- Facilities to provide for the comfort of ATCO's is a key aspect of Human Factors. Such facilities include, for example, break facilities located away from the operational area of the visual control room and prias for women in ATCT's staffed by one or more female controllers.

- Air and ground safety considerations dictate that there is an essentially unobstructed view from the visual control room. Doors and other such large components should not obstruct the view.

- Screens used to minimize problems from reflections should not interfere with the controllers' view.

Recommendation:

Systems and Equipment:

Architectural technical review of control tower control rooms, with both structural and human factors considerations. Renovation of tower control rooms that does not meet good practice requirements is necessary.

3.2.4.4 Fuel Handling Protocols And Procedures

Fuel handling protocols and procedures at the four airports assessed were in compliance with good practice.

3.2.4.5 Limited Availability of Precision Instrument Approaches at the Smaller Airports

3.2.4.5.1 General Information And Requirements

Considering the weather in this part of the world and its historical impact on flight operations in the region, the limited availability of precision instrument approaches at the smaller airports is very likely to have an ongoing substantial impact on the economy and the people of Indonesia. A considerable increase in the safety, regularity, and efficiency of aviation is generally realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served by airline aircraft.

The processes required for establishing an instrument approach are multi-faceted. However, the availability of Global Positioning System (GPS) technologies simplifies matters considerably, in that the ground-based infrastructure required in many other instrument approach procedures is not required.

In one ICAO member State a central national office was created to consolidate the development of all instrument procedures from a single location. This office is the National Flight Procedures Office (NFPO). Probably in part due to this efficient system, more than 500 new GPS-based standard instrument approaches are commissioned annually in that State.

The steps generally required in establishing an instrument approach include:

- A determination of need
- An update of the Particulars of the Aerodrome Site
  - General airport layout
  - Airport lighting
  - Weather reporting capability
  - Communication capabilities

  - Environmental considerations
- Coordination between Flight Procedures Development, Flight Standards, Airways Facilities, Air Traffic, Airports, and the individual airport
- Development of a team including the above entities to accomplish a full assessment of the project
- Processing through the Flight Procedures Development Office
- Feasibility study to answer questions, such as:
  - Is the proposed procedure based on an existing navigational aid?
  - Are Airspace changes required?
  - Capability of approach light system (ALS) installation
  - Obstruction and terrain evaluation
  - Runway suitability
  - Potential impact on existing or proposed IFR or VFR operations at the particular airport or other airports in the immediate area
- Development of the layout of the procedure
- Development of minimums
- Coordination with the controlling air traffic facility
- Finalization of the design of the procedure, considering airspace and safety issues
- Flight inspection and flight test of the procedure
- Approval of the procedure
- Charting of the procedure
- Publication of the procedure
- Distribution of charts

Typical costs associated with installation in one ICAO member State are as follows:

Procedure development:	US$6,000 - $12,000
Initial flight checks:	$3,000 - $ 5,000
Recurrent flight checks	$2,000 - $ 3,000

These costs are influenced by the type of the procedure, its complexity, the availability of navigational aids, surrounding terrain and obstacles, and the extent of survey and aerodrome particulars study required.

Studies conducted by the Aircraft Owners and Pilots Association were a primary reference for this section.

Recommendation:

Systems and Equipment:

The ASI team suggests that there would be considerable increase in the safety, regularity, and efficiency of aviation realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served, or planned to be served, by airline aircraft throughout Indonesia.

Therefore, the ASI team recommends the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served, or planned to be served, by airline aircraft throughout Indonesia.

3.2.4.6 Civil Aviation Training Centers

While the ASI team visited only one CATC, it is suggested that the following recommendations are applied to all CATC's where applicable, including the CATC's in Curug, Surabaya, Medan, and Mahasa, and the additional training facilities at Jayapura and Palenbang.

3.2.4.6.1 Safety Management Systems Training

General Requirements:

The success of any performance-based Safety Management System is largely based on the full understanding and commitment of all in both the governmental safety structures and senior management at the airports, and full senior management accountability in both domains. Therefore, courses are needed for all personnel in both the national civil aviation safety structure and in the complete structure of the aerodrome personnel – from the Managing Director to the ramp personnel.

The ASI team is of the understanding that there is a 10-day Company Aviation Safety Officer (CASO) course conducted by the airlines.

Recommendations:

Systems and Equipment:

The CATC should have ICAO SMS Manuals for use in the training programs and each student attending the course.

Staffing:

Trained and experienced Subject Matter Experts to train instructors for SMS courses.

Training and Procedures:

Every person involved in the mid or upper level of administration at the CATC should complete a training program in SMS.

Every person who instructs at the CATC should have completed a training program in SMS.

It is imperative that the CASO course include extensive SMS training in its curriculum.

3.2.4.6.2 Human Factors Training

The ASI team is of the understanding that there are two Human Factors courses taught at the CATC:

- Managers – a 5-day course
- Technical – a 10-day course

General Requirements:

Broad-based availability of this most critical subject matter to both government and industry personnel involved in aviation operations.

Recommendations:

Systems and Equipment:

Provision of the physical resources necessary to assure broad-based availability of this most critical subject matter to both government and industry personnel involved in aviation operations.

Staffing:

Provision of the qualified instructors and training resources necessary to assure broad-based availability of this most critical subject matter to both government and industry personnel involved in aviation operations.

Training and Procedures:

Provision of the educational resources necessary to assure broad-based availability of this most critical subject matter to both government and industry personnel involved in aviation operations.

3.2.4.6.3 CATC Instructor Staff

General Requirements:

The quality of the product of any training program in any field is largely measured by *the benefit derived* by the graduating students from the course in which they participated. This benefit includes both their learning experience and their ability to apply the material in the field over a period of years. The quality of the course experience is perhaps most influenced by the experience levels, knowledge, and skills of the trainers.

Recommendations:

Staffing:

Sufficient resources from the national government to provide the instructor staff with an ongoing high degree of knowledge and skills. This requires opportunity for continuing education for all instructor staff.

Pay and benefits for the training staff should be at a level that will attract and retain personnel with high experience levels, interest, and excellent teaching skills.

Training and Procedures:

New technology generally requires the sharing of OJT courses conducted by manufacturers in other countries. This includes manufacturer training in the installation, operation, and maintenance of the equipment. Resources must be provided to ensure that either qualified CATC trainers are sent to these courses or that the manufacturer provide, on a continuing basis, appropriately trained instructors.

3.2.4.6.4 Aviation English Language Proficiency Training

General Requirements:

By March 2008, pilots and air traffic controllers worldwide involved in international air navigation will be required to meet the minimum aviation English language proficiency level required for Level 4 - Operational – Certification. This mandate is in the form of an ICAO (International Civil Aviation Organization) Standard. It did not appear that the CATC has yet been provided with the resources needed to fulfill this mandated safety requirement.

Recommendations:

Systems and Equipment:

- Classroom space for the Aviation English language training program
- Provision of facilities for AEL proficiency testing
- Provision of the software for the AEL training.

Staffing:

Provision of qualified AEL teaching staff

3.2.4.6.5 Trainee Certification

Two kinds of certificates are issued:

One is course completion, or graduation. This is issued by the CATC. The DGAC is *sometimes* involved, e.g., in the teaching of regulations, as the Training Center cannot provide the Subject Matter Experts (SME's). Airport supervisors may teach a course, but they have to be course instructor certified in order to teach.

Second is a certificate of competency issued by the DGAC.

Recommendation:

Training and Procedures:

Closer coordination between the CATC and the DGAC in training and certification matters.

3.2.4.6.6 Rescue and Firefighting Service (RFFS) Training

The ASI Team understands that the technical matter instruction and theoretical instruction is now done at API 1 and API 2 airports. However, the Team understands that some RFFS training is accomplished at the CATC's. It appears that minimal (if any) exercise equipment, safety clothing, and breathing equipment are available at the CATC's.

General Requirements:

- Availability of sufficient exercise equipment for trainees.
- Availability of sufficient safety clothing, and breathing equipment for trainees to become thoroughly familiar with and comfortable in the wearing and use of the equipment.

Recommendations:

Systems and Equipment:

- Acquiring of exercise equipment for the RFFS course trainees
- Acquiring of safety clothing and breathing equipment for the RFFS course trainees

3.2.5 AVIATION SAFETY TRAINING REQUIREMENTS

Please see Appendix # 1.

3.2.5.1 DG Organization Oversight and Course Approval

3.2.5.1.1 Governmental Oversight

Approval of the curriculum design at the CATC is by the CATC in coordination with the DGAC.

The certificate is signed by the DGAC and the head of the CATC.

It appears that there are now many administrative blockings due to the present organizational structure. The Head of Transportation (air, land, sea, etc) is under the Minister of Communications office.

Recommendation:

Staffing:

Administrative transfer of the CATC from the Ministry of Communications back to the DGAC. This would very likely provide a better flow through of information.

4 EQUIPMENT PROCUREMENT RECOMMENDATIONS

4.1 INTRODUCTION

The primary areas of determined equipment procurement needs were found to be in the aerodrome operating areas, air traffic control towers, runway precision approaches, and the Civil Aviation Training Centre.

The aerodrome operating chapter follows the format of the "Schedule of the Aerodrome Certification Regulations – Particulars to be Included in an Aerodrome Manual" (Appendix 1 of the ICAO ***"Manual on Certification of Aerodromes"*** - Doc 9774 AN/969). This is a continuum of the format of the Task 1 Report – Volume 2 – Safety.

Part 5 – Aerodrome Administration and Safety Management System addresses the very broad need for the ***ICAO Safety Management Manual (SMM).***

Air Traffic Control Towers lists the equipment needs of the ATCT's assessed.

Precision Instrument Approaches addresses the need of increased such capability at more of the airports in Indonesia.

The equipment procurement needs of the CATC are the final subject.

4.2 PART 4 - AERODROME OPERATING PROCEDURES

4.2.1 SECT 4.1 AERODROME REPORTING

4.2.1.1 Continuous Friction Measuring Device

ICAO recommends, and best industry practice dictates, that a continuous friction measuring device be available at airports in order to determine the runway surface friction characteristics of slippery runways.

Recommendation: Applicable to large airports:

While the continuous friction measuring device is generally utilized in conjunction with icy runways, the torrential downpours of the region warrant consideration of the availability of a continuous friction measuring device at the larger airports of Indonesia.

4.2.1.2 Instrument Charts in the AIS (Aerodrome Information Service) Offices

Recommendation: Applicable to all airports:

It is essential that all charts and pages of aeronautical data be current. Every chart and every page of aeronautical data must have a date of either 1) publication or 2) effective date printed on the chart. These charts are in the following areas of the AIS:

- The AIP (Aeronautical Information Publication) Manuals
- Aeronautical charts displayed on the walls
- Aeronautical charts under glass on the counters

Included in the AIP Manuals:

- All charts in the AIP (Aeronautical Information Publication) Manuals
- All pages of aeronautical data in the AIP Manuals

Charts displayed on the walls and under glass on the counter are very useful for daily references and communications with flight crews during briefings. However, they should be up-to-date editions.

4.2.1.3 Aerodrome Unit Facilities

Recommendation: Applicable to all airports:

International best practices for aviation safety require redundancy of communication capabilities into and out of an AIS Office. Internet capability into the AIS Offices and facsimile machine back-up for possible computer-related difficulties should be provided for the AIS Offices at each airport in Indonesia.

4.2.2 SECT 4.2 ACCESS TO THE AERODROME MOVEMENT AREA

Findings not relevant to equipment procurement issues.

4.2.3 SECT 4.3 AERODROME EMERGENCY PLANS

4.2.3.1 Radio Communications Equipment

Successful and reliable radio communications, both on a day-to-day basis and in emergencies, is essential. Lack thereof could become extremely problematic in a crisis situation. Secondly, during day-to-day operations, lack of necessary equipment can severely limit the effectiveness and capability of the force.

Recommendation: Applicable to all airports:

Procurement and availability of a substantial increase in the number of **mobile units,**

the supply of batteries, chargers, and spare parts, particularly at the smaller airports of the country.

Needed is a solid and highly reliable maintenance contract with a rapid turn-around time and a 10 % reserve (extra) fully operable inventory of portable units, plus associated batteries, charges, and spare parts. In the event that a solid and highly reliable maintenance contract is not available an 18 % overage is required. A large international airport such as Soekarno-Hatta could likely halve these numbers, whereas a smaller airport needs the larger reserve (as, for example, 18 % of five units is essentially one reserve unit.).

In a hijacking on the ground or other such emergency, either scrambled or some other form of secure radio communication is essential for involved response personnel. This capability is particularly important at a larger airport.

Recommendation: Applicable to large airports:

Procurement of needed equipment for **scrambled communication capabilities**.

Smaller airports could have an MOU (Memorandum of Understanding) with each other in the region, wherein a set could be shared as necessary. Commonality with the normal system of operating the units would be essential.

4.2.3.2 Hard Wire Capability

"**Hard wire**" capability to directly connect an aircraft parked in the emergency parking location to the command post and the emergency operations center is essential in order to provide discreet communication capability.

Recommendation: Applicable to all airports:

Availability of sufficient wire and the appropriate jacks to connect the external power receptacle ground radio panel of the aircraft to the command post and the EOC. Cost is minimal.

4.2.3.3 Emergency Operations Centre and Command Post: Applicable to all airports

All airports should have both a fully operational Airport Emergency Operations Centre and a Command Post.

Recommendation: Required equipment includes at least a good communication console with capability of numerous inbound telephone lines, sufficient working room, DSL internet capability, a computer with monitor, and a fascimile machine. Larger airports should have a mobile command post with secure communications capability. Cell phone capability for all participants may fulfill the secure communication requirements, especially at smaller airports.

4.2.3.4 Key Staff Contact Availability

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and capability of simultaneous immediate notification. The known location and availability of the telephone numbers and facsimile numbers must be confirmed. Needed reliable and rapid notification to all concerned individuals with rapid capability for situational updates is a consistent problem in emergency response.

Recommendation: Applicable to all airports:

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system for the use of the public) exists. This system has the capability to pre-select different call lists for different forms of emergencies. A person in the controlling entity (e.g., a dispatch emergency center) can push a button to activate auto-calling of all individuals on the specific tailored list. The system then rolls through the list, presenting a brief dictated message transmission to every individual listed. Everybody on the specific list receives the same message. The activating individual can select precisely who gets what type of message notification depending on the nature of the emergency(s).

An example of such a system is manufactured by DCC: GeoCast and The Communicator. Geocast is a web-based tool that allows for a geographic population to be notified. The Communicator notifies individuals that are pre loaded into a database. These individuals can be organized into teams as mentioned above, and notified by a variety of ways including telephone, fax, page, and e-mail. Information is available

- at http://www.dccusa.com/ and
- at http://www.dccusa.com/communicator.asp

4.2.4 SECT 4.4 RESCUE AND FIREFIGHTING SERVICE (RFFS)

4.2.4.1 Maritime Rescue and Response Equipment

Due to the proximity of many of Indonesia's airports to bodies of water, maritime rescue and response equipment should be available to the RFFS. An "off airport" crash or other such emergency would be extremely difficult to respond to adequately without such equipment, such as life rafts, jet skiis, and powerboats. A ditching or a crash into the sea would be particularly challenging.

Recommendation: Applicable to all airports that are located in close proximity to large bodies of water or large swamps:

The procurement of maritime rescue equipment, such as boats and jet-ski rescue vehicles. Smaller airports may need two or three of each; larger airports perhaps four or five.

4.2.5 SECT 4.5 AERODROME INSPECTION

4.2.5.1 Radios - Availability & Usage

Adequate radio equipment (units, chargers, spare parts, etc.) to ensure sufficient reserve/standby units for personnel, are a key safety and operational asset, particularly in an even slightly abnormal situation.

Recommendation: Applicable to all airports:

Procurement and availability of a substantial increase in the number of mobile units, the supply of batteries, chargers, and spare parts, particularly at the smaller airports of the country.

Needed is a solid and highly reliable maintenance contract with a rapid turn-around time and a 10 % reserve (extra) fully operable inventory of portable units, plus associated batteries, charges, and spare parts. In the event that a solid and highly reliable maintenance contract is not available an 18 % overage is required. A large international airport such as Soekarno-Hatta could likely halve these numbers, whereas a smaller airport needs the larger reserve (as, for example, 18 % of five units is essentially one reserve unit.).

4.2.6 SECT 4.6 VISUAL AIDS, ELECTRICAL SYSTEMS, LIGHTS

4.2.6.1 Critical Flight Safety Aerodrome Systems

A most important and critical night landing aid is the safety-related lighting systems, such as Approach Lighting Systems (ALS) and Runway End Identification Lights (REILS) at aerodromes. Best international practices cannot possibly be maintained at an aerodrome where the unavailability of parts for repair precludes their *full* operational capability. Parts for critical flight safety aerodrome systems *must* be available when needed.

Recommendation: Applicable to all airports:

An available inventory of sufficient spare parts and equipment as necessary to ensure capability of maintaining all safety-related lighting systems at *full* operational capability to at least a 99 % reliability factor. This would include wiring, lighting units, bulbs, and control mechanisms, and other required components.

Assured vendor availability to ensure implementation of "critical response" capability of support in this area.

4.2.7 SECT 4.7 MOVEMENT AREA MAINTENANCE

Friction testing capability should exist at all airports.

Recommendation

The following is an absolute minimum recommended equipment list for primary airport Movement Area Maintenance for a small airport. Clearly, the larger airports will need increased numbers of many of the listed items.

Good condition and operable ground maintenance equipment:

4 – 6 m^3 capacity Bucket Loader	$175,000 - $250,000
5 – 10 m^3 capacity Dump Truck	50,000 - $100,000
Manlift Platform*	15,000
Runway Sweeper	313,000
5 m. mower	1,500
Riding 1.4 m. mower	7,000
Brush Hog	3,000
Tar Kettle	18,000
Forklift	18,000
Water Pump – 2"	600
1 Ton Roller	4,800
1 Ton "Low-Boy" Utility Trailer	1,900
Tractor	55,000
MIG Welder	3,000
Portable Generator	1,500
Rack Truck	14,000
Vacuum Truck	40,000
Steam Pressure Washer	3,000
Grass Trimmers (3)	500 each
	$725,000 - $850,000

* Low-lift tractor-style forklift – large tires – man-lift – multiple uses, such as repair of high-mast lights, etc.

4.2.8 SECT 4.8 AERODROME WORKS – SAFETY

Related equipment procurement issues included in other Sections.

4.2.9 SECT 4.9 APRON MANAGEMENT

Related equipment procurement issues included in other Sections.

4.2.10 SECT 4.10 APRON SAFETY MANAGEMENT

Related equipment procurement issues included in other Sections.

4.2.11 SECT 4.11 AIRSIDE VEHICLE CONTROL

Recommendation: Applicable to all airports:

Procurement of needed **cellular telephone equipment** (at airports whereat they are a primary form of operational communication). Adequate supplies of all components including batteries, chargers, and spare parts are required. Alternately, sufficient mobile radio communication units (with a capability for secure communication during emergencies) for these airports should be acquired.

Needed is a solid and highly reliable maintenance contract with a rapid turn-around time and a 10 % reserve (extra) fully operable inventory of portable units, plus associated batteries, charges, and spare parts. In the event that a solid and highly reliable maintenance contract is not available an 18 % overage is required. A large international airport such as Soekarno-Hatta could likely halve these numbers, whereas a smaller airport needs the larger reserve (as, for example, 18 % of five units is essentially one reserve unit.).

4.2.12 SECT 4.12 WILDLIFE HAZARD MANAGEMENT

Related equipment procurement issues included in other Sections.

4.2.13 SECT 4.13 OBSTACLE CONTROL

Related equipment procurement issues included in other Sections.

4.2.14 SECT 4.14 DISABLED AIRCRAFT REMOVAL

Recommendation: Applicable to all airports:

A large **crane with heavy-lift capability** for aircraft removal should be available, either on-airport or through a local organization. At those airports that are depending on a local supplier there must be standing written arrangements in effect, guaranteeing availability on very short notice.

4.2.15 SECT 4.15 HANDLING OF HAZARDOUS MATERIALS (HAZMAT)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the

handling of aviation fuel.

4.2.16 SECT 4.16 LOW VISIBILITY OPERATION

As Low Visibility Operations are not conducted at any of the four airports assessed, this area is not relevant.

4.2.17 SECT 4.17 PROTECTION OF RADAR & NAVIGATION AIDS

Radar & Navigation Aids should have each main electrical feed line in a separate trench as any damage to the trench (intentional or accidental), could result in significant disruption.

Recommendation: Applicable to all airports:

Each airport assessed has backup generator capability. However, not all main feed lines were in separate trenches. All airports, radar, and navigation aids should have two main feed lines, each in its own trench, to provide redundancy for protection in the event that a main feed line is disrupted either intentionally or unintentially.

4.3 PART 5 – AERODROME ADMINISTRATION AND SAFETY MANAGEMENT SYSTEM

4.3.1 AERODROME SAFETY MANAGEMENT SYSTEMS (SMS)

There will be a need for a very substantial number (ultimately hundreds) of copies of the ***ICAO Safety Management Manual (SMM)***, *Doc 9859 AN/460* of ICAO. These will be needed for essentially all personnel involved in aviation administration and/or operations. While this item is located here in the Aerodrome Administration/SMS area, it will apply throughout aviation-related government organizations as well.

4.4 AIR TRAFFIC CONTROL TOWERS (ATCT)

4.4.1 STAFFING – EQUIPMENT

4.4.1.1 Communications

4.4.1.1.1 Anti-blocking systems

Anti-blocking systems should be available at any air traffic control tower to preclude deliberate or accidental blocking of ATC communications. *For example*, CONTRAN: http://www.aatl.net/publications/contran.htm).

Recommendation: Applicable to all ATCT controlled airports:

Procurement of state-of-the-art anti-blocking systems for all ATCT's.

4.4.1.1.2 ATC Communication systems

Perhaps the most essential single element of communication capability is a highly reliable (with back up) means of communicating "tower-to-tower", and between the ATCT's and air traffic control centers, and national emergency centers of government. This partly for air traffic control coordination, but additionally as a reliable back-up emergency communication system for use during any emergency, be it a natural disaster or other human initiated emergency – local, regional, or national.

Recommendation: Applicable to all ATCT controlled airports:

Above described communication systems, with carefully developed and tested equipment and procedures, training in their use by ATCO's (Air Traffic Control Operators), and testing of the communication system on a regular basis.

4.4.1.1.3 Speakers and Headsets

A critical component of safe air traffic control operations is high quality communication equipment. Good quality speakers and headsets (preferably with boom mikes) are essential for each position in a control tower.

Recommendations: Applicable to all ATCT controlled airports:

- Procurement of state-of-the-art headsets with boom microphones
- Communication equipment for all ATCT's as needed to provide optimum state-of-the art traffic control and tower-ground vehicle communications capability.

4.4.1.1.4 Back-up Communication Systems

Procurement of state-of-the art back-up communications equipment for each ATCT for the primary frequencies, including ground control, tower, approach control and departure control [where applicable].

4.4.1.1.5 Impounding of Recordings

A very important tool for aircraft accident/incident investigation is impounding the recordings of the communications between the air traffic control facility and the aircraft(s), vehicle involved. As this can be a most important record, there should be some form of back-up system to ensure continual recording in the event that the primary recording system is inoperative.

Recommendation: Applicable to all ATCT controlled airports:

Procurement of back-up recording systems for all air traffic facilities (including, but not limited to ATCT's) in Indonesia.

4.4.2 INFORMATION SYSTEMS

4.4.2.1 Flight Data Display Equipment

Standardized, modern flight data display equipment is essential at ATCT's and air traffic control facilities. Operational and accurate meteorological reporting systems in control towers are key components of flight safety.

Recommendations: Applicable to all ATCT controlled airports:

Procure and install state-of-the art computer flight data display and meteorological reporting systems in control towers.

4.4.2.2 Serviceability Indicators

Lighting of taxiways, runways, approach lighting systems, obstruction lights, etc., are key components of flight and ground safety, as are serviceability units which can automatically indicate to the ATCT personnel the actual functioning of these lights. Binoculars, while necessary and helpful, are not sufficient.

Recommendations: Applicable to all ATCT controlled airports:

Procure and install state-of-the art light serviceability display units in control towers.

4.4.2.3 Monitoring of Navigational Aids

Capability of continual monitoring of all navigation aids (VOR's, DME's, ILS's, and other approach aids), with immediate notification of failure, serviceability, or degradation of signal accuracy or reliability is an essential component of flight safety.

Recommendations: Applicable to all navigation aids, both on and off airports:

Verify that this monitoring capability exists at all navigation aids throughout Indonesia. Acquire and install where does not exist.

4.4.3 ACCOMMODATION

4.4.3.1 Operational Positions

Extensive research has conclusively proven the importance of ergonomic considerations in ATCT design and operation. Each ATCT should have provision for sufficient ATCO (Air Traffic Control Operator) positions of ergonomic size. Equipment and data indicators should be positioned so that they are clearly readable from each position. These matters can have significant impact on flight

Recommendations: Applicable to all ATCT controlled airports:

Architectural technical review of control tower control rooms, with both structural and human factors considerations. Renovation of tower control rooms that do not meet good practice requirements are necessary.

4.4.3.2 Visual Control Room

Facilities to provide for the comfort of ATCO's is a key aspect of Human Factors. Such facilities include, for example, break facilities located away from the operational area of the visual control room and prias for women in ATCT's staffed by one or more female controllers.

Air and ground safety considerations dictate that there is an essentially unobstructed view from the visual control room. Doors and other such large components should not obstruct the view.

Screens used to minimize problems from reflections should not interfere with the controllers' view.

Recommendations: Applicable to all ATCT controlled airports:

Architectural technical review of control tower control rooms, with both structural and human factors considerations. Renovation of tower control rooms that do not meet good practice requirements are necessary.

4.5 LIMITED AVAILABILITY OF PRECISION INSTRUMENT APPROACHES AT THE SMALLER AIRPORTS

Considering the weather in this part of the world and its historical impact on flight operations in the region, the limited availability of precision instrument approaches at the smaller airports is very likely to have an ongoing substantial impact on the economy and the people of Indonesia. A considerable increase in the safety, regularity, and efficiency of aviation is generally realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served by airline aircraft.

The processes required for establishing an instrument approach are multi-faceted. However, the availability of Global Positioning System (GPS) technologies simplifies matters considerably, in that the ground-based infrastructure required in many other instrument approach procedures is not required.

In one ICAO member State a central national office was created to consolidate the development of all instrument procedures from a single location. This office is the National Flight Procedures

Office (NFPO). Probably in part due to this efficient system, more than 500 new GPS-based standard instrument approaches are commissioned annually in that State.

Typical costs associated with installation in one ICAO member State are as follows:

Procedure development:	US$6,000 - $12,000
Initial flight checks:	$3,000 - $ 5,000
Recurrent flight checks	$2,000 - $ 3,000

These costs are influenced by the type of the procedure, its complexity, the availability of navigational aids, surrounding terrain and obstacles, and the extent of survey and aerodrome particulars study required.

Studies conducted by the Aircraft Owners and Pilots Association were a primary reference for this section.

Recommendations: Applicable to all airline served airports:

4.5.1 SYSTEMS AND EQUIPMENT

The ASI team suggests that there would be considerable increase in the safety, regularity, and efficiency of aviation realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served, or planned to be served, by airline aircraft throughout Indonesia.

Therefore, the ASI team recommends the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served, or planned to be served, by airline aircraft throughout Indonesia.

4.5.2 CIVIL AVIATION TRAINING CENTRE

4.5.2.1 ICAO Safety Management System (SMS) Manuals

The CATC needs ICAO SMS Manuals (ICAO Doc 9859 AN/460) for use in the training programs and for each student attending the course.

Recommendation: An agreement with ICAO providing for SMS Manuals as necessary.

4.5.2.2 Aviation English Language Proficiency Training

By March 2008, pilots and air traffic controllers involved in international air navigation worldwide will be required to meet the minimum aviation English language proficiency level required for Level 4 - Operational – Certification. This mandate is in the form of an ICAO

(International Civil Aviation Organization) Standard. It did not appear that the CATC has yet been provided with the resources needed to fulfill this mandated safety requirement.

Recommendations:

- Classroom space for the Aviation English language training program
- Provision of facilities for AEL proficiency testing
- Provision of the software for the AEL training.

4.5.2.3 Rescue and Firefighting Service (RFFS) Training

The ASI Team understands that the technical matter instruction and theoretical instruction is now done at API 1 and API 2 airports. However, the Team understands that some RFFS training is accomplished at the CATC's. It appears that minimal (if any) exercise equipment, safety clothing, and breathing equipment are available at the CATC's.

Recommendations:

- Acquiring of exercise equipment for the RFFS course trainees
- Acquiring of safety clothing and breathing equipment for the RFFS course trainees

5 AVIATION SAFETY TRAINING REQUIREMENTS

5.1 INITIAL ASSESSMENT

In March, 2007 an ASI Team member visited the National Civil Aviation Training Center at Curug, and learned that aviation safety courses are developed in-house with input from various outside Subject Matter Experts (SME's) such as airport supervisors in specialized areas. SME's have to be course instructor certified before they can teach a course.

The DGAC is *sometimes* involved, e.g., in the teaching of regulations. The CATC reports to the Ministry of Communications Training Division; all courses are approved by this division and not by the DGAC.

Approval of the curriculum design is by the CATC with *some* coordination with the DGAC.

The ASI team is of the understanding that there are two Human Factors courses taught at the CATC:

- Managers – a 5-day course
- Technical – a 10-day course

The ASI team was advised that there is a 10-day Company Aviation Safety Officer (CASO) course conducted by the airlines.

The CATC offers a course in airport operation management training.

Absence of a course in Safety Management Systems (SMS) was noted.

Two kinds of course certificates are issued. One is course completion, or graduation.
This is issued by the CATC. The DGAC is, again, minimally involved.
The second is a certificate of competency issued by the DGAC. The certificate is signed by the DGAC and the head of the CATC.

It appears that there are now many administrative blockings due to the present organizational structure. The Head of Transportation (air, land, sea, etc) is under the Minister of Communications office.

5.2 GENERAL RECOMMENDATIONS

5.2.1 NATIONAL CIVIL AVIATION SAFETY TRAINING PROGRAM

While the ASI team visited only one CATC, it is suggested that the following recommendations are applied to all CATC's where applicable, including the CATC's in Curug, Surabaya, Medan, and Mahasa, and the additional training facilities at Jayapura and Palenbang.

- Much closer coordination between the CATC and the DGAC in training and certification matters.

- Administrative transfer of the CATC from the Ministry of Communications back to the DGAC. This would very likely provide a better flow through of information.

- Development of a course specifically covering the suggested "add-on" items referenced (in the Aerodrome Manual format) in association with the Airport Operation Management Training Course. This course should be designed for attendance by all personnel in national government and elsewhere with decision-making authority regarding resource allocation for airports. Additionally, those at the DGAC involved in the general administration or operation of the airports across Indonesia should attend. The ASI Team believes that this exposure would substantially enhance their understanding, and thereby their ability to support, the ongoing corrections of deficiencies found in during the assessments of the airport administrations and operations.

5.2.1.1 Safety Management Systems

- The State needs to support the concepts --- industry-wide – of Safety Management Systems. A Safety Management System (SMS) is far more proactive than a safety programme.

- The success of any performance-based Safety Management System is largely based on the full understanding and commitment of all in both the governmental safety structures and senior management at the airports, and full senior management accountability in both domains. Therefore, courses are needed for all personnel in *both* the national civil aviation safety structure and in the complete structure of the aerodrome personnel – from the Managing Director to the ramp personnel.

- Every person involved in the mid or upper level of administration at the CATC should complete a training program in Safety Management Systems (SMS).

- Requisites to ensure broad-based availability of this most critical subject matter to both government and industry personnel involved in aviation operations:

  - Provision of the physical resources necessary

  - Provision of the qualified instructors and training resources

- The CATC should have ICAO SMS Manuals for use in the training programs and for each student attending the course.

- Trained and experienced Subject Matter Experts to train instructors for SMS courses.

- Successful SMS's require resources commensurate with the recognition of the importance of the SMS as a critically important business element of an aviation organization, including aviation training organizations.

- A course for training in "safety culture" for all personnel at aerodromes. This subject would also be a key part of any SMS training course.

- Provision of the educational resources necessary to assure broad-based availability of Human Factors Training (a most important subject matter) to both government and industry personnel involved in aviation operations.

By March 2008, pilots and air traffic controllers worldwide involved in international air navigation will be required to meet the minimum aviation English language proficiency level required for Level 4 - Operational – Certification. This mandate is in the form of an ICAO (International Civil Aviation Organization) Standard. It did not appear that the CATC has yet been provided with the resources needed to fulfill this mandated safety requirement. The ASI Team suggests the following measures be incorporated at the CATC's:

- Classroom space for the Aviation English Language training program

- Provision of facilities for AEL proficiency testing

- Provision of the software for the AEL training.

- Provision of qualified AEL teaching staff

5.2.2 SAFETY COURSE INSTRUCTORS

- The quality of the product of any training program in any field is largely measured by the benefit derived by the graduating students from the course in which they participated. This benefit includes both their learning experience and their ability to apply the material in the field over a period of years. The quality of the course experience is perhaps most influenced by the experience levels, knowledge, and skills of the trainers.

- All instructors in civil aviation safety courses should not only have ICAO instructor qualifications but should have actual experience performing civil aviation safety tasks.

- Every person who instructs at the CATC should have completed a training program in SMS.

- Sufficient resources are needed from the national government to provide the instructor staff with an ongoing high degree of knowledge and skills. This requires opportunity for continuing education for all instructor staff.

- New technology generally requires the sharing of OJT courses conducted by manufacturers in other countries. This includes manufacturer training in the installation, operation, and maintenance of the equipment. Resources must be provided to ensure that either qualified CATC trainers are sent to these courses or that the manufacturer provide, on a continuing basis, appropriately trained instructors.

- Pay and benefits for the training staff should be at a level that will attract and retain personnel with high experience levels, interest, and excellent teaching skills.

5.3 RECOMMENDED CIVIL AVIATION SAFETY COURSES

5.3.1 INCORPORATION OF SECURITY INTO FACILITY DESIGN

ICAO Standard 1.5.1 states that architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome. Early and proactive involvement of the DGAC's infrastructure-related requirement trained staff in the initial planning of construction of new facilities as well as alterations to existing facilities at the aerodromes is necessary.

If not already specifically trained in these areas, the staff would have specific training needs in these areas. A course including the principles of incorporating security into airport and building design would provide the needed training.

A general reference book for such a course would be *Building Security, Handbook for Architectural Planning and Design*, by Barbara Nadel, published by McGraw-Hill, 2004.

5.3.2 AIRPORT OPERATION MANAGEMENT TRAINING

The CATC offers a course in airport operation management training.
The curriculum is as follows:

1. Airport management from air transport aspect.
2. Organization of emergency response.
3. Basic knowledge of people behavior.
4. Operational assessment.
5. Coordination among instances.
6. International aviation organization.
7. Standard of operational services.
8. System of passenger, goods, personnel flow.
9. Aviation basic law and regulation.
10. Excellent service.

The ASI Team recommends inclusion of a number of supplemental topics in this course. They are listed in accordance with the format of Part 4 and Part 5 of the Aerodrome Manual, following the format of the Task 1 and Task 2 Safety Reports.

Details of the Part 4 subjects proposed course are provided in Appendix 1A.

5.3.3 AERODROME SAFETY MANAGEMENT SYSTEMS (SMS)

An SMS course would include studies of the major components of a Safety Management System. The primary reference should be the ICAO ***Safety Management Manual (SMM)***, Doc 9859 AN/460 of ICAO. A second valuable reference is the ***Introduction to Safety Management Systems (SMS) for Airport Operators*** – AC 150/5200-37, February 28, 2007.

Details of the proposed course are provided in Appendix 1.

5.3.4 IMPOUNDING RECORDINGS

Training of ATCT personnel in the process of impounding recordings. A very simple procedure is involved, and the training period would likely be less than 40 minutes.

5.3.5 SAFETY CULTURE AT AERODROMES

A course for training in "safety culture" for all personnel at aerodromes. This subject would also be a key part of any SMS training course. Curriculum material for this subject is available in the ICAO ***Safety Management Manual (SMM)***, Doc 9859 AN/460.

5.3.6 HUMAN FACTORS TRAINING

The ASI team is of the understanding that there are two Human Factors courses taught at the CATC:

- Managers – a 5-day course
- Technical – a 10-day course

Accommodations need to be made to provide broad-based availability of this most critical subject matter to both government and industry personnel involved in aviation operations.

5.3.7 COMPANY AVIATION SAFETY OFFICER

The CASO – Company Aviation Safety Officer – course which is conducted by the airlines – 10 days of class – should include extensive SMS training in its curriculum.

5.3.8 AVIATION ENGLISH LANGUAGE PROFICIENCY TRAINING

The course should enable participants to meet the minimum Aviation English Language proficiency level required for Level 4 - Operational – Certification.

Primary participants will be pilots and air traffic controllers. An example of such a course is the Aviation English course developed jointly by IATA and Berlitz Languages, Inc.

5.4 PRIORITY OF TRAINING PROGRAMS

The above program of 8 different courses on aviation safety would be a complex project to deliver. Although the application of all 8 courses at every airport in Indonesia would be the ideal, it will not be feasible in the near future. Certain courses are also more important in increasing aerodrome safety than others. The following chart shows the recommended priority for administering the full range of suggested civil aviation safety courses, the level/location of delivery/application of the course, and comments on why that priority is recommended.

Priority	Course	Location of Training	Justification
1	Aerodrome Safety Management Systems (SMS)	National Aviation Training Center and Airports	ICAO requirement
2	Airport Operation Management Training Additional Items	National Aviation Training Center and Airports	The ASI Team believes that this exposure would substantially enhance their understanding, and thereby their ability to support, the

Priority	Course	Location of Training	Justification
			ongoing corrections of deficiencies noted.
3	Human Factors Training	National Aviation Training Center and Airports	HF is recognized world-wide to be a most critical subject matter to both government and industry personnel involved in aviation operations.
4	Impounding Recordings	Airport Air Traffic Control Towers	ATC communications recordings are a critical part of incident and accident investigation. The course could easily be a 0:40 video
5	Aviation English Language Proficiency Training	National Aviation Training Center	ICAO requirement
6	Incorporation of Security into Facility Design	National Aviation Training Center	Consideration of Incorporation of Security into Facility Design is an ICAO Standard
7	Company Aviation Safety Officer	National Aviation Training Center	The importance of building SMS into the course curriculum.
8	Safety Culture at Aerodromes	National Aviation Training Center	While this is a very important subject it is placed as # 8 due to its expected inclusion in the SMS curriculum.

5.5 APPLICATION/DELIVERY OF RECOMMENDED TRAINING COURSES TO AIRPORTS ICAO REQUIREMENTS

5.5.1 ICAO REQUIREMENTS

ICAO Annex 14 – ***Aerodromes – Volume 1, Aerodrome Design and Operations, 4th Edition***, applicable as of 1 July 2004, Standard 1.4.6, states: As of 24 November, 2005, a certified aerodrome shall have in operation a safety management system.

Articles 28 and 37 oblige each State to provide, in its territory, airports and other air navigation facilities and services in accordance with the SARPS developed by ICAO. Volume I of Annex 14 to the Convention contains SARPS on the subject of airport design and operation.

5.5.2 Recommended Civil Aviation Security Courses By Category Of Airport

ASI cannot make recommendations concerning the application of civil aviation safety training courses at different types of airports in Indonesia. However, considering that Indonesian airports do not have most of the training courses and facilities needed, there must be decisions made as to which courses to apply first.

For the purpose of this study, airports were assessed in four categories:

Category 1. Large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations

Category 2. Tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations

Category 3. Medium-sized airport

Category 4. Small airport with mostly domestic short-haul traffic

The eight safety courses listed herein are of such broad application that their relevance applies to all air carrier served airports in Indonesia regardless of aerodrome size.

6 SPECIFIC SYSTEMS AND EQUIPMENT UPGRADES FOR FOUR ASSESSED AIRPORTS

6.1 SOEKARNA-HATTA INTERNATIONAL AIRPORT - (WIII)

6.1.1 INTRODUCTION

"Aerodrome Operating" follows the format of the "Schedule of the Aerodrome Certification Regulations – Particulars to be Included in an Aerodrome Manual" (Appendix 1 of the ICAO ***"Manual on Certification of Aerodromes"*** - Doc 9774 AN/969). This is a continuum of the format of the Task 1 Report – Volume 2 – Safety.

Part 5 – Aerodrome Administration and Safety Management System includes the very broad need for the ***ICAO Safety Management Manual (SMM).***

Air Traffic Control Towers lists the equipment needs of the ATCT.

6.1.2 PARTICULARS TO BE INCLUDED IN AN AERODROME MANUAL

6.1.2.1 Part 1 – General

Findings not relevant to equipment procurement issues.

6.1.2.2 Part 2 - Particulars Of The Aerodrome Site

Findings not relevant to equipment procurement issues.

6.1.2.3 Part 3 – Report To AIS

Findings not relevant to equipment procurement issues.

6.1.2.4 Part 4 - Aerodrome Operating Procedures

6.1.2.4.1 Sect 4.1 Aerodrome Reporting

Continuous Friction Measuring Device

ICAO recommends, and best industry practice dictates, that a continuous friction measuring device be available at airports in order to determine the runway surface friction characteristics of slippery runways.

Recommendation

While the continuous friction measuring device is generally utilized in conjunction with icy runways, the torrential downpours of the region warrant consideration of the

availability of **ONE** continuous friction measuring device at the larger airports of Indonesia.

Instrument Charts in the AIS (Aerodrome Information Service) Offices

Recommendation:

It is essential that all charts and pages of aeronautical data be current. Every chart and every page of aeronautical data must have a date of either 1) publication or 2) effective date printed on the chart. These charts are in the following areas of the AIS:

- The AIP (Aeronautical Information Publication) Manuals
- Aeronautical charts displayed on the walls
- Aeronautical charts under glass on the counters

Included in the AIP Manuals:

- All charts in the AIP (Aeronautical Information Publication) Manuals
- All pages of aeronautical data in the AIP Manuals

Charts displayed on the walls and under glass on the counter are very useful for daily references and communications with flight crews during briefings. However, they should be up-to-date editions. **ONE OF EACH DISPLAYED CHARTS AND ONE SET OF UP-TO-DATE AIP MANUALS**

6.1.2.4.2 Sect 4.2 Access to the Aerodrome Movement Area

Findings not relevant to equipment procurement issues.

6.1.2.4.3 Sect 4.3 Aerodrome Emergency Plans

Scrambled Communication Capabilities

Some form of scrambled communication capability is needed, particularly as the forms of threat escalate in today's world, to facilitate a degree of privacy for key operations personnel during a major crisis.

Recommendation

Procurement of needed equipment for scrambled communication capabilities. **SIX TO EIGHT UNITS**

Commonality with the normal system of operating the units would be necessary.

Hard Wire Capability

"**Hard wire**" capability to directly connect an aircraft parked in the emergency parking location to the command post and the emergency operations center is essential in order to provide discreet communication capability.

Recommendation

Availability of sufficient wire and the appropriate jacks to connect the external power receptacle ground radio panel of the aircraft to the command post and the EOC. Cost is minimal. **ONE SET TO CD POST AND ONE SET TO EOC**

Emergency Operations Centre and Command Post

All airports should have both a fully operational Airport Emergency Operations Centre and a Command Post.

Recommendation

Required equipment includes at least a good communication console with capability of numerous inbound telephone lines, sufficient working room, DSL internet capability, a computer with monitor, and a fascimile machine. The EOC communications console needs replacement, with the communications capabilities as listed. **ONE COMM. CONSOLE FOR EOC AND ONE COMM. CONSOLE FOR CP**

The airport has a very good mobile command post. However, it should have secure communication capability with the EOC. Cell phone capability for all participants may partially fulfill the secure communication requirements.

Bomb Threat Response Equipment

Soekarno-Hatta has a bomb trailer. However, other bomb threat response equipment is not owned by the airport, and must be borrowed from a nearby police agency. This at times can create considerable difficulty in immediate bomb threat response capability.

Recommendation:

Acquisition by the airport of their own bomb threat equipment for personnel. **SEVERAL SETS**

Key Staff Contact Availability

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and capability of simultaneous immediate notification. The known location and availability of the telephone numbers and facsimile numbers must be confirmed. Needed reliable and rapid notification to all concerned individuals with rapid capability for situational updates is a consistent problem in emergency response.

Recommendation

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system for the use of the public) exists. This system has the capability to pre-select different call lists for different forms of emergencies. A

person in the controlling entity (e.g., a dispatch emergency center) can push a button to activate auto-calling of all individuals on the specific tailored list. The system then rolls through the list, presenting a brief dictated message transmission to every individual listed. Everybody on the specific list receives the same message. The activating individual can select precisely who gets what type of message notification depending on the nature of the emergency(s).

An example of such a system is manufactured by DCC: GeoCast and The Communicator. Geocast is a web-based tool that allows for a geographic population to be notified. The Communicator notifies individuals who are pre-loaded into a database. These individuals can be organized into teams as mentioned above, and notified by a variety of ways including telephone, fax, page, and e-mail. Information is available:

- at http://www.dccusa.com/ and
- at http://www.dccusa.com/communicator.asp.

Tying this capability into the area civil defense notifications centers could be a massive life-saver in the event of an incoming natural disaster such as an approaching tsunami.

ONE MASTER SYSTEM COULD PROBABLY COVER THE ENTIRE COUNTRY (US$40,000?)

6.1.2.4.4 Sect 4.5 Aerodrome Inspection

Findings not relevant to equipment procurement issues.

6.1.2.4.5 Sect 4.6 Visual Aids, Electrical Systems, Lights

Findings not relevant to equipment procurement issues.

6.1.2.4.6 Sect 4.7 Movement Area Maintenance

Findings not relevant to equipment procurement issues.

6.1.2.4.7 Sect 4.8 Aerodrome Works – Safety

Findings not relevant to equipment procurement issues.

6.1.2.4.8 Sect 4.9 Apron Management

Findings not relevant to equipment procurement issues.

6.1.2.4.9 Sect 4.10 Apron Safety Management

Findings not relevant to equipment procurement issues.

6.1.2.4.10 Sect 4.11 Airside Vehicle Control

Findings not relevant to equipment procurement issues.

6.1.2.4.11 Sect 4.12 Wildlife Hazard Management

Findings not relevant to equipment procurement issues.

6.1.2.4.12 Sect 4.13 Obstacle Control

Findings not relevant to equipment procurement issues.

6.1.2.4.13 Sect 4.14 Disabled Aircraft Removal

Crane with Heavy-lift Capability

Recommendation

A **(ONE)** large crane with heavy-lift capability for aircraft removal should be available, either on-airport or through a local organization. If depending on a local supplier there must be standing written arrangements in effect, guaranteeing availability on very short notice. The existence of such an agreement could not be confirmed.

6.1.2.4.14 Sect 4.15 Handling of Hazardous Materials (Hazmat)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the handling of aviation fuel.

6.1.2.4.15 Sect 4.16 Low Visibility Operation

As Low Visibility Operations are not conducted at Soekarno-Hatta International Airport, this area is not relevant.

6.1.2.4.16 Sect 4.17 Protection of Radar & Navigation Aids

Radar & Navigation Aids should have each main electrical feed line in a separate trench as any damage to the trench (intentional or accidental), could result in significant disruption.

Recommendation

The airport has backup generator capability. However, the airport, radar, and navigation aids should each have two main feed lines, each in its own trench, to

provide redundancy for protection in the event that a main feed line is disrupted either intentionally or unintentially. **(DIRECT BURIAL WIRE AND CONNECTORS FOR EACH AID = 3 to 4)**

6.1.2.5 Part 5 – Aerodrome Administration And Safety Management System

6.1.2.5.1 Aerodrome Safety Management Systems (SMS)

There will be a need for **a very substantial number** of copies of the ***ICAO Safety Management Manual (SMM)***, *Doc 9859 AN/460* of ICAO. These will be needed for essentially all personnel involved in aviation administration and/or operations. While this item is located here in the Aerodrome Administration/SMS area, it will apply throughout aviation-related government organizations as well.

6.1.3 AIR TRAFFIC CONTROL TOWERS (ATCT)

6.1.3.1 Equipment

6.1.3.1.1 Communications

Anti-blocking Systems

Anti-blocking systems should be available at the Soekarna-Hatta air traffic control tower to preclude deliberate or accidental blocking of ATC communications. *For example*, CONTRAN: http://www.aatl.net/publications/contran.htm).

Recommendation

Procurement of state-of-the-art anti-blocking systems for the ATCT frequencies.
ONE MASTER SYSTEM

ATC Communication systems

Perhaps the most essential single element of communication capability is a highly reliable (with back up) means of communicating "tower-to-tower", and between the ATCT's and air traffic control centers, and national emergency centers of government. This partly for air traffic control coordination, but additionally as a reliable back-up emergency communication system for use during any emergency, be it a natural disaster or a human initiated emergency – local, regional, or national.

Recommendation

Applicable to all ATCT controlled airports including Soekarno-Hatta

Above described communication systems, with carefully developed and tested equipment and procedures, training in their use by ATCO's (Air Traffic Control

Operators), and testing of the communication system on a regular basis. **ONE MASTER SYSTEM COULD LIKELY COVER THE ENTIRE COUNTRY**

6.1.4 FUEL HANDLING PROTOCOLS AND PROCEDURES

Fuel handling protocols and procedures were in compliance with good practice.

Findings not relevant to equipment procurement issues.

6.2 NGURAH RAI INTERNATONAL AIRPORT - (WRRR)

6.2.1 INTRODUCTION

The primary areas of determined equipment procurement needs were found to be in the aerodrome operating areas and air traffic control towers, and precision instrument approaches.

"Aerodrome Operating" follows the format of the "Schedule of the Aerodrome Certification Regulations – Particulars to be Included in an Aerodrome Manual" (Appendix 1 of the ICAO ***"Manual on Certification of Aerodromes"*** - Doc 9774 AN/969). This is a continuum of the format of the Task 1 Report – Volume 2 – Safety.

Part 5 – Aerodrome Administration and Safety Management System includes the very broad need for the ***ICAO Safety Management Manual (SMM).***

Air Traffic Control Towers lists the equipment needs of the Ngurah Rai Air Traffic Control Tower

Precision Instrument Approaches addresses the need for a precision instrument approach capability for Runway 9.

6.2.2 PARTICULARS TO BE INCLUDED IN AN AERODROME MANUAL

6.2.2.1 Part 1 – General

Findings not relevant to equipment procurement issues.

6.2.2.2 Part 2 -- Particulars Of The Aerodrome Site

Findings not relevant to equipment procurement issues.

6.2.2.3 Part 3 – Report To AIS

Findings not relevant to equipment procurement issues.

6.2.2.4 Part 4 - Aerodrome Operating Procedures

6.2.2.4.1 Sect 4.1 Aerodrome Reporting

Continuous Friction Measuring Device

ICAO recommends, and best industry practice dictates, that a continuous friction measuring device be available at airports in order to determine the runway surface friction characteristics of slippery runways.

Recommendation

While the continuous friction measuring device is generally utilized in conjunction with icy runways, the torrential downpours of the region warrant consideration of the availability of **ONE** continuous friction measuring device at the Ngurah Rai.

Instrument Charts in the AIS (Aerodrome Information Service) Offices

Instrument Flight and Approach Charts in the AIP (Aeronautical Information Publication) Manuals in the AIS (Aeronautical Information Service) need to be up to date. In the interest of flight safety, all maps, charts, and information sheets must be current.

Display Wall Charts and charts displayed on the counters under glass should be current.

It would appear that there is no fully reliable procedure in place at either the national or airport levels that absolutely ensures the currency of available instrument approach procedure and related charts. If there *is* such a procedure in place, there is no mechanism in place for absolutely ensuring the currency of the charts in the above referenced locations.

Recommendation

It is essential that all charts and pages of aeronautical data be current. Every chart and every page of aeronautical data must have a date of either 1) publication or 2) effective date printed on the chart. These charts are in the following areas of the AIS:

- The AIP (Aeronautical Information Publication) Manuals
- Aeronautical charts displayed on the walls
- Aeronautical charts under glass on the counters

Included in the AIP Manuals:

- All charts in the AIP (Aeronautical Information Publication) Manuals
- All pages of aeronautical data in the AIP Manuals

Charts displayed on the walls and under glass on the counter are very useful for daily references and communications with flight crews during briefings. However, they should be up-to-date editions. **ONE OF EACH DISPLAYED CHARTS AND ONE SET OF UP-TO-DATE AIP MANUALS**

Aerodrome Unit Facilities

Redundancy of Communication Capability

International best practices for aviation safety require redundancy of communication capabilities into and out of an AIS Office.

Recommendation

Internet capability **(ONE COMPUTER, ONE MONITOR,ONE ROUTER)** into the AIS Offices and **ONE** facsimile machine back-up for possible computer-related difficulties should be provided for the AIS Offices.

6.2.2.4.2 Sect 4.2 Access to the Aerodrome Movement Area

Findings not relevant to equipment procurement issues.

6.2.2.4.3 Sect 4.3 Aerodrome Emergency Plans

Radio Communications Equipment

Scrambled Communication Capabilities

In a hijacking on the ground or other such emergency, either scrambled or some other form of secure radio communication is essential for involved response personnel. This capability is particularly important at a larger airport.

Recommendation

Procurement of needed equipment for scrambled communication capabilities. **SIX TO EIGHT UNITS**

Commonality with the normal system of operating the units would be necessary.

Hard Wire Capability

"**Hard wire**" capability to directly connect an aircraft parked in the emergency parking location to the command post and the emergency operations center is essential in order to provide discreet communication capability.

Recommendation

Availability of sufficient wire and the appropriate jacks to connect the external power receptacle ground radio panel of the aircraft to the command post and the EOC. Cost is minimal. **ONE SET TO CD POST AND ONE SET TO EOC**

Emergency Operations Centre and Command Post

Existence of a Mobile Command Post could not be verified.

Recommendation

Larger airports should have **ONE** mobile command post with secure communications capability to security and other operational personnel. Cell phone capability for all participants *may* fulfill the secure communication requirements.

Key Staff Contact Availability

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and capability of simultaneous immediate notification. The known location and availability of the telephone numbers and facsimile numbers must be confirmed. Needed reliable and rapid notification to all concerned individuals with rapid capability for situational updates is a consistent problem in emergency response.

Recommendation

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system for the use of the public) exists. This system has the capability to pre-select different call lists for different forms of emergencies. A person in the controlling entity (e.g., a dispatch emergency center) can push a button to activate auto-calling of all individuals on the specific tailored list. The system then rolls through the list, presenting a brief dictated message transmission to every individual listed. Everybody on the specific list receives the same message. The activating individual can select precisely who gets what type of message notification depending on the nature of the emergency(s).

An example of such a system is manufactured by DCC: GeoCast and The Communicator. Geocast is a web-based tool that allows for a geographic population to be notified. The Communicator notifies individuals that are pre loaded into a database. These individuals can be organized into teams as mentioned above, and notified by a variety of ways including telephone, fax, page, and e-mail. Information is available at http://www.dccusa.com/ and at http://www.dccusa.com/communicator.asp

Tying this capability into the area civil defense notifications centers could be a massive life-saver in the event of an incoming natural disaster such as an approaching tsunami.

ONE MASTER SYSTEM COULD PROBABLY COVER THE ENTIRE COUNTRY (US$40,000?)

6.2.2.4.4 Sect 4.4 Rescue and Firefighting Service (RFFS)

Findings not relevant to equipment procurement issues.

6.2.2.4.5 Sect 4.5 Aerodrome Inspection

Findings not relevant to equipment procurement issues.

6.2.2.4.6 Sect 4.6 Visual Aids, Electrical Systems, Lights

Findings not relevant to equipment procurement issues.

6.2.2.4.7 Sect 4.7 Movement Area Maintenance

Findings not relevant to equipment procurement issues.

6.2.2.4.8 Sect 4.8 Aerodrome Works – Safety

Findings not relevant to equipment procurement issues.

6.2.2.4.9 Sect 4.9 Apron Management

Findings not relevant to equipment procurement issues.

6.2.2.4.10 Sect 4.10 Apron Safety Management

Findings not relevant to equipment procurement issues.

6.2.2.4.11 Sect 4.11 Airside Vehicle Control

Findings not relevant to equipment procurement issues.

6.2.2.4.12 Sect 4.12 Wildlife Hazard Management

Findings not relevant to equipment procurement issues.

6.2.2.4.13 Sect 4.13 Obstacle Control

Findings not relevant to equipment procurement issues.

6.2.2.4.14 Sect 4.14 Disabled Aircraft Removal

Findings not relevant to equipment procurement issues.

6.2.2.4.15 Sect 4.15 Handling of Hazardous Materials (Hazmat)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the handling of aviation fuel.

6.2.2.4.16 Sect 4.16 Low Visibility Operation

As Low Visibility Operations are not conducted at Ngurah Ria International Airport, this area is not relevant.

6.2.2.4.17 Sect 4.17 Protection of Radar & Navigation Aids

Radar & Navigation Aids should have each main electrical feed line in a separate trench as any damage to the trench (intentional or accidental), could result in significant disruption.

Recommendation

Ngurah Rai has backup generator capability. However, not all main feed lines were in separate trenches. All airports, radar, and navigation aids should have two main feed lines, each in its own trench, to provide redundancy for protection in the event that a main feed line is disrupted either intentionally or unintentially. **(DIRECT BURIAL WIRE AND CONNECTORS FOR EACH AID = 3 to 4)**

6.2.2.5 Part 5 – Aerodrome Administration And Safety Management System

6.2.2.5.1 Aerodrome Safety Management Systems (SMS)

There will be a need for **a substantial number of** copies of the ***ICAO Safety Management Manual (SMM)***, *Doc 9859 AN/460* of ICAO. These will be needed for essentially all personnel involved in aviation administration and/or operations. While this item is located here in the Aerodrome Administration/SMS area, it will apply throughout aviation-related government organizations as well.

6.2.3 AIR TRAFFIC CONTROL TOWERS (ATCT)

6.2.3.1 Equipment

6.2.3.1.1 Communications

Anti-blocking systems

Anti-blocking systems should be available at the Ngurah Rai air traffic control tower to preclude deliberate or accidental blocking of ATC communications. *For example*, CONTRAN: http://www.aatl.net/publications/contran.htm).

Recommendation

Procurement of state-of-the-art anti-blocking systems for all key frequencies for Ngurah Rai Tower. **ONE MASTER SYSTEM**

Communication systems

Perhaps the most essential single element of communication capability is a highly reliable (with back up) means of communicating "tower-to-tower", and between the ATCT's and air traffic control centers, and national emergency centers of government. This partly for air traffic control coordination, but additionally as a

reliable back-up emergency communication system for use during any emergency, be it a natural disaster or a human initiated emergency – local, regional, or national.

Recommendation

Above described communication systems, with carefully developed and tested equipment and procedures, training in their use by ATCO's (Air Traffic Control Operators), and testing of the communication system on a regular basis. **ONE MASTER SYSTEM COULD LIKELY COVER THE ENTIRE COUNTRY**

Information Systems

Flight Data Display Equipment

Standardized, modern flight data display equipment is essential at ATCT's and air traffic control facilities. Flight data display in the tower is by paper strips and a computer record. Paper Clearance Strips are required because a part ordered from Japan two years ago has not yet been received and installed.

Operational and accurate meteorological reporting systems in control towers are key components of flight safety. MET display is obtained from a television screen which is updated every 30 minutes. Surface wind information is received from IAS. These delayed reports are necessary due to the tower Surface Wind Indicator having been inoperative for two years.

Recommendations

Procure and install **ONE** state-of-the art computer flight data display and **ONE** meteorological reporting systems in Ngurah Rai Tower.

6.2.3.1.2 Accommodation

Visual Control Room

Facilities to provide for the comfort of ATCO's is a key aspect of Human Factors. Such facilities include, for example, break facilities located away from the operational area of the visual control room and prias for women in ATCT's staffed by one or more female controllers. A problem noted in the tower is that there is no break room available. The only break facility is the three couches in the control room. Nor is there a ladies' room. As there are nine female controllers, we would suggest that this is a relevant issue.

Recommendations

Architectural technical review of the control tower, with both structural and human factors considerations. Renovation of tower facilities that do not meet good practice requirements, such as mentioned above, are necessary. **ONE RENOVATION PROJECT**

6.2.4 FUEL HANDLING PROTOCOLS AND PROCEDURES

Fuel handling protocols and procedures were in compliance with good practice.

Findings not relevant to equipment procurement issues.

6.2.5 PRECISION INSTRUMENT APPROACHES

Considering the weather in this part of the world and its historical impact on flight operations in the region, the limited availability of precision instrument approaches at the smaller airports is very likely to have an ongoing substantial impact on the economy and the people of Indonesia. A considerable increase in the safety, regularity, and efficiency of aviation is generally realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served by airline aircraft.

The processes required for establishing an instrument approach are multi-faceted. However, the availability of Global Positioning System (GPS) technologies simplifies matters considerably, in that the ground-based infrastructure required in many other instrument approach procedures is not required.

In one ICAO member State a central national office was created to consolidate the development of all instrument procedures from a single location. This office is the National Flight Procedures Office (NFPO). Probably in part due to this efficient system, more than 500 new GPS-based standard instrument approaches are commissioned annually in that State.

Typical costs associated with installation in one ICAO member State are as follows:

Procedure development:	US$6,000 - $12,000
Initial flight checks:	$3,000 - $ 5,000
Recurrent flight checks	$2,000 - $ 3,000

These costs are influenced by the type of the procedure, its complexity, the availability of navigational aids, surrounding terrain and obstacles, and the extent of survey and aerodrome particulars study required.

Studies conducted by the Aircraft Owners and Pilots Association were a primary reference for this section.

Recommendations

The ASI team suggests that there would be considerable increase in the safety, regularity, and efficiency of aviation realized by the installation and certification of precision instrument approach equipment for Runway 9.

Therefore, the ASI team recommends, if not already accomplished, a feasibility study for the installation and certification of **ONE** precision approach system with associated lighting system for Runway 9. It is recognized, however, that there may be water depth issues that would preclude the installation of an approach lighting system for Runway 9.

6.3 POLONIA INTERNATONAL AIRPORT – (WIMM)

6.3.1 INTRODUCTION

The primary areas of determined equipment procurement needs were found to be in the aerodrome operating areas, air traffic control tower, and precision instrument approaches.

The aerodrome operating chapter follows the format of the "Schedule of the Aerodrome Certification Regulations – Particulars to be Included in an Aerodrome Manual" (Appendix 1 of the ICAO ***"Manual on Certification of Aerodromes"*** - Doc 9774 AN/969). This is a continuum of the format of the Task 1 Report – Volume 2 – Safety.

Part 5 – Aerodrome Administration and Safety Management System addresses the very broad need for the ***ICAO Safety Management Manual (SMM).***

Air Traffic Control Towers lists the equipment needs of Polonia Tower.

Precision Instrument Approaches addresses the need for precision instrument approach capability for Runway 23.

6.3.2 PARTICULARS TO BE INCLUDED IN AN AERODROME MANUAL

6.3.2.1 Part 1 – General

Findings not relevant to equipment procurement issues.

6.3.2.2 Part 2 -- Particulars Of The Aerodrome Site

Findings not relevant to equipment procurement issues.

6.3.2.3 Part 3 – Report To AIS

Findings not relevant to equipment procurement issues.

6.3.2.4 Part 4 -- Aerodrome Operating Procedures

6.3.2.4.1 Sect 4.1 Aerodrome Reporting

Instrument Charts in the AIS (Aerodrome Information Service) Offices

Instrument Flight and Approach Charts in the AIP (Aeronautical Information Publication) Manuals in the AIS (Aeronautical Information Service) need to be up to date. In the interest of flight safety, all maps, charts, and information sheets must be current.

Display Wall Charts and charts displayed on the counters under glass should be current.

It would appear that there is no fully reliable procedure in place at either the national or airport levels that absolutely ensures the currency of available instrument approach procedure and related charts. If there *is* such a procedure in place, there is no mechanism in place for absolutely ensuring the currency of the charts in the above referenced locations.

No dates are printed on the instrument approach charts and aerodrome information charts (e.g., AD 2-1)for WIMM provided by AIP Indonesia in the AIP Manual available in the AIS office.

Many of the available instrument approach charts and aerodrome information charts were clearly out of date – many years in a number of cases.

Recommendation

It is essential that all charts and pages of aeronautical data be current. Every chart and every page of aeronautical data must have a date of either 1) publication or 2) effective date printed on the chart. These charts are in the following areas of the AIS:

- The AIP (Aeronautical Information Publication) Manuals
- Aeronautical charts displayed on the walls
- Aeronautical charts under glass on the counters

Included in the AIP Manuals:

- All charts in the AIP (Aeronautical Information Publication) Manuals
- All pages of aeronautical data in the AIP Manuals

Charts displayed on the walls and under glass on the counter are very useful for daily references and communications with flight crews during briefings. However, they should be up-to-date editions. **ONE OF EACH DISPLAYED CHARTS AND ONE SET OF UP-TO-DATE AIP MANUALS**

Aerodrome Unit Facilities

- There is no internet capability into the AIS Office.
- There is no facsimile machine for the AIS office.

International best practices for aviation safety require redundancy of communication capabilities into and out of an AIS Office.

Recommendation

Internet capability **(ONE COMPUTER, ONE MONITOR,ONE ROUTER)** into the AIS Office and **ONE** facsimile machine back-up for possible computer-related difficulties should be provided for the AIS Office.

6.3.2.4.2 Sect 4.2 Access to the Aerodrome Movement Area

Findings not relevant to equipment procurement issues.

6.3.2.4.3 Sect 4.3 Aerodrome Emergency Plans

Radio Communications Equipment

Successful and reliable radio communications, both on a day-to-day basis and in emergencies, is essential. Lack thereof could become extremely problematic in a crisis situation. Secondly, during day-to-day operations, lack of necessary equipment can severely limit the effectiveness and capability of the force.

Recommendation:

Procurement and availability of a substantial increase in the number of mobile units, the supply of batteries, chargers, and spare parts. **PROBABLY 8 to 10 OF EACH**

Needed is a solid and highly reliable maintenance contract with a rapid turn-around time and a 10 % reserve (extra) fully operable inventory of portable units, plus associated batteries, charges, and spare parts. In the event that a solid and highly reliable maintenance contract is not available an 18 % overage is required.

Hard Wire Capability

"Hard wire" capability to directly connect an aircraft parked in the emergency parking location to the command post and the emergency operations center is essential in order to provide discreet communication capability.

Recommendation

Availability of sufficient wire and the appropriate jacks to connect the external power receptacle ground radio panel of the aircraft to the command post and the EOC. Cost is minimal. **ONE SET TO CD POST AND ONE SET TO EOC**

Emergency Operations Centre and Command Post

All airports should have both a fully operational Airport Emergency Operations Centre and a Command Post.

Command Post: None. During the response to the Mandala Air accident, the RFFS

Chief's small office and a multi-purpose room in a nearby building were used.

Recommendation

Polonia International Airport needs both **ONE** Emergency Operations Centre and **ONE** Command Post. Required equipment includes at least **ONE FOR EACH (2)** good communication console with capability of numerous inbound telephone lines, sufficient working room, DSL internet capability, **ONE FOR EACH (2)** computer with monitor, and **ONE FOR EACH (2)** facsimile machine.

Key Staff Contact Availability

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and capability of simultaneous immediate notification. The known location and availability of the telephone numbers and facsimile numbers must be confirmed. Needed reliable and rapid notification to all concerned individuals with rapid capability for situational updates is a consistent problem in emergency response.

Recommendation

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system for the use of the public) exists. This system has the capability to pre-select different call lists for different forms of emergencies. A person in the controlling entity (e.g., a dispatch emergency center) can push a button to activate auto-calling of all individuals on the specific tailored list. The system then rolls through the list, presenting a brief dictated message transmission to every individual listed. Everybody on the specific list receives the same message. The activating individual can select precisely who gets what type of message notification depending on the nature of the emergency(s).

An example of such a system is manufactured by DCC: GeoCast and The Communicator. Geocast is a web-based tool that allows for a geographic population to be notified. The Communicator notifies individuals that are pre loaded into a database. These individuals can be organized into teams as mentioned above, and notified by a variety of ways including telephone, fax, page, and e-mail. Information is available

- at http://www.dccusa.com/ and
- at http://www.dccusa.com/communicator.asp.

Particularly for the more isolated areas of Indonesia, tying this capability into the area civil defense notifications centers could be a massive life-saver in the event of an incoming natural disaster such as an approaching tsunami. **ONE MASTER SYSTEM COULD PROBABLY COVER THE ENTIRE COUNTRY (US$40,000?)**

6.3.2.4.4 Sect 4.4 Rescue and Firefighting Service (RFFS)

Findings not relevant to equipment procurement issues.

6.3.2.4.5 Sect 4.5 Aerodrome Inspection

Radios - Availability & Usage

Adequate radio equipment (units, chargers, spare parts, etc.) to ensure sufficient reserve/standby units for personnel, are a key safety and operational asset, particularly in an even slightly abnormal situation.

The department has only three radios, which provide no form of backup redundancy in the event of a unit failure.

Recommendation

Procurement and availability of a substantial increase in the number of mobile units, the supply of batteries, chargers, and spare parts.

Needed is a solid and highly reliable maintenance contract with a rapid turn-around time and a 10 % reserve (extra) fully operable inventory of portable units, plus associated batteries, charges, and spare parts. In the event that a solid and highly reliable maintenance contract is not available an 18 % overage is required. **10 OF EACH**

6.3.2.4.6 Sect 4.6 Visual Aids, Electrical Systems, Lights

Critical Flight Safety Aerodrome Systems

A most important and critical night landing aid is the safety-related lighting systems, such as Approach Lighting Systems (ALS) and Runway End Identification Lights (REILS) at aerodromes. Best international practices cannot possibly be maintained at an aerodrome where the unavailability of parts for repair precludes their *full* operational capability. Parts for critical flight safety aerodrome systems *must* be available when needed.

Finding: Not in compliance with good practice:

- No lighted signs were in evidence, and a number of safety-related lighting systems were substantially inoperative. The evident problem is unavailability of parts.

- REILS: Many inoperative (six of 20 – RWY 05) due to a defective cable that was reportedly ordered from Jakarta three months earlier. Cable is still not available for installation.

- Flashing light system – RWY 05 – four of nine inoperative, ALS (Approach Lighting System) is substantially inoperative. Ten of the 15 light bars are inoperative, and clearly have been so since the 05 September accident. Parts are not available at Polonia.

The ASI Team would suggest that the inoperability of these lights contribute to a "skewed" sight picture presented to pilots on their final approach to Polonia. This creates a significant reduction in the redundancies that are so important to the safety, regularity, and efficiency of aviation.

Recommendation

An available inventory of sufficient spare parts and equipment as necessary to ensure capability of maintaining all safety-related lighting systems at *full* operational capability to at least a 99 % reliability factor. This would include wiring, lighting units, bulbs, and control mechanisms, and other required components. **THIS IS A SUBJECTIVE CALL NUMBER-WISE**

Assured vendor availability to ensure implementation of "critical response" capability of support in this area.

6.3.2.4.7 Sect 4.7 Movement Area Maintenance

Finding: Not in compliance with good practice:

- Observation and discussion indicated that there is an urgent need for some new maintenance equipment.

- Needed is **ONE** friction tester, **ONE** new runway sweeper, and **ONE** small roller to efficiently and expeditiously fix the broken parts of the runway surface as they develop. It was reported that the runway sweeper is broken, and due to its age (20 years) and condition, replacement, rather than repair, is necessary.

Recommendation:

Allocation of substantially increased funding for airport maintenance equipment

Good condition and operable ground maintenance equipment and an inventory of necessary spare parts.

The following is an absolute minimum recommended equipment list for primary airport Movement Area Maintenance for a small airport. Clearly, the larger airports such as Polonia will need increased numbers of many of the listed items.

Good condition and operable ground maintenance equipment and an inventory of necessary spare parts:

4 to 6 m^3 capacity Bucket Loader	$175,000 - $250,000

5 to 10 m³ capacity Dump Truck	50,000 - $100,000
Manlift Platform*	15,000
Runway Sweeper	313,000
5 m. mower	1,500
Riding 1.4 m. mower	7,000
Brush Hog	3,000
Tar Kettle	18,000
Forklift	18,000
Water Pump – 2"	600
1 Ton Roller	4,800
1 Ton "Low-Boy" Utility Trailer	1,900
Tractor	55,000
MIG Welder	3,000
Portable Generator	1,500
Rack Truck	14,000
Vacuum Truck	40,000
Steam Pressure Washer	3,000
Grass Trimmers (3)	500 each
	$725,000 - $850,000

* Low-lift tractor-style forklift – large tires – man-lift – multiple uses, such as repair of high-mast lights, etc.

6.3.2.4.8 Sect 4.8 Aerodrome Works – Safety

Findings not relevant to equipment procurement issues.

6.3.2.4.9 Sect 4.9 Apron Management

Findings not relevant to equipment procurement issues.

6.3.2.4.10 Sect 4.10 Apron Safety Management

Findings not relevant to equipment procurement issues.

6.3.2.4.11 Sect 4.11 Airside Vehicle Control

Application of Procedure

Cellular Telephone Equipment

Finding: Not in compliance with good practice:

A number of problems with the cellular telephones for operational use at Polonia were reported. Inquiry indicated that there is a shortage of the original, high quality batteries. As the use of cellular telephones is a primary means of operational

communications at Polonia, the problem of unreliability of battery power could be a significant operational and safety interference in the event of any major emergency.

Recommendation

Procurement of needed cellular telephone equipment. Adequate supplies of all components including batteries, chargers, and spare parts are required. Alternately, sufficient mobile radio communication units (with a capability for secure communication during emergencies) for these airports should be acquired.

Needed is a solid and highly reliable maintenance contract with a rapid turn-around time and a 10 % reserve (extra) fully operable inventory of portable units, plus associated batteries, charges, and spare parts. In the event that a solid and highly reliable maintenance contract is not available an 18 % overage is required. **AT LEAST 10 OF EACH**

Ramp Visibility

Visibility of the ramp areas from the Control Tower is substantially limited by the ramp's physical layout and protruding structures – in a highly congested ground traffic area. Capability to both monitor and control vehicular and aircraft traffic is thereby severely compromised.

Recommendation

Construction of **ONE** ramp traffic control tower.

6.3.2.4.12 Sect 4.12 Wildlife Hazard Management

Findings not relevant to equipment procurement issues.

6.3.2.4.13 Sect 4.13 Obstacle Control

Findings not relevant to equipment procurement issues.

6.3.2.4.14 Sect 4.14 Disabled Aircraft Removal

Heavy Lift Crane Availability

The airport's equipment list indicated eleven (11) cranes. However, it appears there are not any in inventory. No suppliers are shown with whom arrangements for availability have been made.

Recommendation:

ONE large crane with heavy-lift capability for aircraft removal should be available, either on-airport or through a local organization. If dependent upon a local supplier there must be standing written arrangements in effect, guaranteeing availability on very short notice.

6.3.2.4.15 Sect 4.15 Handling of Hazardous Materials (Hazmat)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the handling of aviation fuel.

6.3.2.4.16 Sect 4.16 Low Visibility Operation

As Low Visibility Operations are not conducted at Polonia international Airport, this area is not relevant.

6.3.2.4.17 Sect 4.17 Protection of Radar & Navigation Aids

Radar & Navigation Aids should have each main electrical feed line in a separate trench as any damage to the trench (intentional or accidental), could result in significant disruption.

Recommendation

Polonia has broad backup generator capability. However, not all main feed lines were in separate trenches. All airports, radar, and navigation aids should have two main feed lines, each in its own trench, to provide redundancy for protection in the event that a main feed line is disrupted either intentionally or unintentially. **(DIRECT BURIAL WIRE AND CONNECTORS FOR EACH AID = 3 to 4)**

6.3.2.5 Part 5 – Aerodrome Administration And Safety Management System

6.3.2.5.1 Aerodrome Safety Management Systems (SMS)

There will be a need for **a substantial number** of copies of the ***ICAO Safety Management Manual (SMM)***, *Doc 9859 AN/460* of ICAO . These will be needed for essentially all personnel involved in aviation administration and/or operations. While this item is located here in the Aerodrome Administration/SMS area, it will apply throughout aviation-related government organizations as well.

6.3.3 AIR TRAFFIC CONTROL TOWERS (ATCT)

6.3.3.1 Equipment

6.3.3.1.1 Communications

Anti-blocking systems

Anti-blocking systems should be available at the Polonia air traffic control tower to preclude deliberate or accidental blocking of ATC communications. *For example*, CONTRAN: http://www.aatl.net/publications/contran.htm).

Recommendation

Procurement of state-of-the-art anti-blocking systems for all critical frequencies. **ONE MASTER SYSTEM**

ATC Communication systems:

Perhaps the most essential single element of communication capability is a highly reliable (with back up) means of communicating "tower-to-tower", and between ATCT's and air traffic control centers, and national emergency centers of government. This partly for air traffic control coordination, but additionally as a reliable back-up emergency communication system for use during any emergency, be it a natural disaster or a human initiated emergency – local, regional, or national.

Recommendation

Above described communication systems, with carefully developed and tested equipment and procedures, training in their use by ATCO's (Air Traffic Control Operators), and testing of the communication system on a regular basis. **ONE MASTER SYSTEM COULD LIKELY COVER THE ENTIRE COUNTRY**

Speakers and Headsets

A critical component of safe air traffic control operations is high quality communication equipment. Good quality speakers and headsets (preferably with boom mikes) are essential for each position. **THREE or FOUR OF EACH**

Recommendations

- Procurement of state-of-the-art headsets with boom microphones
- Communication equipment as needed to provide optimum state-of-the art traffic control and tower-ground vehicle communications capability.

Back-up Communication Systems

Back-up communications equipment is available for only one frequency.

Recommendations

Back-up communications equipment for ground control, tower, approach control and departure control. **ONE MASTER UNIT**

Impounding of Recordings

A very important tool for aircraft accident/incident investigation is impounding the recordings of the communications between the air traffic control facility and the aircraft(s), vehicle involved. As this can be a most important record, there should be some form of back-up system to ensure continual recording in the event that the primary recording system is inoperative.

Recommendation

Procurement of back-up recording systems for the Polonia Air Traffic Control Tower, and appropriate training (approximately 0:40 per person) in impounding tapes for all controllers. **ONE MASTER UNIT**

6.3.3.1.2 Information Systems

Flight Data Display Equipment

Standardized, modern flight data display equipment is essential at ATCT's and air traffic control facilities. Operational and accurate meteorological reporting systems in control towers are key components of flight safety.

Recommendations

Procure and install **ONE** state-of-the art computer flight data display and **ONE** meteorological reporting systems.

Serviceability Indicators

Lighting of taxiways, runways, approach lighting systems, obstruction lights, etc., are key components of flight and ground safety, as are serviceability units which can automatically indicate to the ATCT personnel the actual functioning of these lights. Binoculars, while necessary and helpful, are not sufficient. Polonia does have a display unit; it does not always work.

Recommendations

Procure and install **ONE** state-of-the art light serviceability display unit.

Monitoring of Navigational Aids

Capability of continual monitoring of all navigation aids (VOR's, DME's, ILS's, and other approach aids), with immediate notification of failure, serviceability, or degradation of signal accuracy or reliability is an essential component of flight safety.

Recommendations

Applicable to all navigation aids, both on and off airport:

Verify that this monitoring capability exists at all navigation aids associated with Polonia Airport. Acquire and install **ONE** on each navigation aid where the capability does not exist.

6.3.3.1.3 Accommodation

Operational Positions

Extensive research has conclusively proven the importance of ergonomic considerations in ATCT design and operation. Each ATCT should have provision for sufficient ATCO (Air Traffic Control Operator) positions of ergonomic size. Equipment and data indicators should be positioned so that they are clearly readable from each position. These matters can have significant impact on flight safety.

In Polonia Tower:

- Operational equipment does not appear to be laid out ergonomically.
- The space appears to be (and was reported to be) very limited.
- Operating positions appeared to be (and were reported to be) very cramped and not a sufficient number thereof.

Recommendations

Architectural technical review of the control room, with both structural and human factors considerations. Renovation of tower control room to facilitate ergonomic layout of operational equipment, create more space, and increase the number of operating positions. **ONE RENOVATION PROJECT**

Visual Control Room

- Obstructions prevent an uninhibited view from the control room. There is a door and other structural components at the rear of the control cab.
- The view is severely obstructed between about 250° M and 270° M.
- Screens are used in an attempt to minimize problems from reflections. However, they interfere with the view.

Air and ground safety considerations dictate that there is an essentially unobstructed view from the visual control room. Doors and other such large components should not obstruct the view.

Screens used to minimize problems from reflections should not interfere with the controllers' view.

Recommendations:

Architectural technical review of the control tower room, with both structural and human factors considerations. Renovation of the tower control room to meet good practice requirements. **ONE RENOVATION PROJECT**

6.3.4 FUEL HANDLING PROTOCOLS AND PROCEDURES

Fuel handling protocols and procedures were in compliance with good practice.

Findings not relevant to equipment procurement issues.

6.3.5 PRECISION INSTRUMENT APPROACH

Considering the weather in this part of the world and its historical impact on flight operations in the region, the limited availability of precision instrument approaches at the smaller airports is very likely to have an ongoing substantial impact on the economy and the people of Indonesia. A considerable increase in the safety, regularity, and efficiency of aviation is generally realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served by airline aircraft.

The processes required for establishing an instrument approach are multi-faceted. However, the availability of Global Positioning System (GPS) technologies simplifies matters considerably, in that the ground-based infrastructure required in many other instrument approach procedures is not required.

In one ICAO member State a central national office was created to consolidate the development of all instrument procedures from a single location. This office is the National Flight Procedures Office (NFPO). Probably in part due to this efficient system, more than 500 new GPS-based standard instrument approaches are commissioned annually in that State.

Typical costs associated with installation in one ICAO member State are as follows:

Procedure development:	US$6,000 - $12,000
Initial flight checks:	$3,000 - $ 5,000
Recurrent flight checks	$2,000 - $ 3,000

These costs are influenced by the type of the procedure, its complexity, the availability of navigational aids, surrounding terrain and obstacles, and the extent of survey and aerodrome particulars study required.

Studies conducted by the Aircraft Owners and Pilots Association were a primary reference for this section.

Recommendations

The ASI team suggests that there would be considerable increase in the safety, regularity, and efficiency of aviation realized by the installation and certification of precision instrument approach equipment for Runway 23.

Therefore, the ASI team recommends installation and certification of **ONE** precision approach with related approach lighting systems for Runway 23.

6.4 SULTAN THANA AIRPORT – (WIPA)

6.4.1 INTRODUCTION

The primary areas of determined equipment procurement needs were found to be in the aerodrome operating areas, air traffic control towers, and precision instrument approaches.

The aerodrome operating chapter follows the format of the "Schedule of the Aerodrome Certification Regulations – Particulars to be Included in an Aerodrome Manual" (Appendix 1 of the ICAO ***"Manual on Certification of Aerodromes"*** - Doc 9774 AN/969). This is a continuum of the format of the Task 1 Report – Volume 2 – Safety.

Part 5 – Aerodrome Administration and Safety Management System addresses the very broad need for the ***ICAO Safety Management Manual (SMM).***

Air Traffic Control Towers lists the equipment needs of Sultan Thana Tower.

Precision Instrument Approaches addresses the need for a precision instrument approach capability at Sultan Thana Airport.

6.4.2 PARTICULARS TO BE INCLUDED IN AN AERODROME MANUAL

6.4.2.1 Part 1 – General

Findings not relevant to equipment procurement issues.

6.4.2.2 Part 2 -- Particulars Of The Aerodrome Site

Findings not relevant to equipment procurement issues.

6.4.2.3 Part 3 – Report To AIS

Findings not relevant to equipment procurement issues.

6.4.2.4 Part 4 -- Aerodrome Operating Procedures

6.4.2.4.1 Sect 4.1 Aerodrome Reporting

Instrument Charts in the AIS (Aerodrome Information Service) Offices

Instrument Flight and Approach Charts in the AIP (Aeronautical Information Publication) Manuals in the AIS (Aeronautical Information Service) need to be up to date. In the interest of flight safety, all maps, charts, and information sheets must be current.

Display Wall Charts and charts displayed on the counters under glass should be current.

It would appear that there is no fully reliable procedure in place at either the national or airport levels that absolutely ensures the currency of available instrument approach procedure and related charts. If there *is* such a procedure in place, there is no mechanism in place for absolutely ensuring the currency of the charts in the above referenced locations.

No dates are printed on the instrument approach charts and aerodrome information charts (e.g., AD 2-1)for WIMM provided by AIP Indonesia in the AIP Manual available in the AIS office.

Many of the available instrument approach charts and aerodrome information charts were clearly out of date – many years in a number of cases.

Recommendation

It is essential that all charts and pages of aeronautical data be current. Every chart and every page of aeronautical data must have a date of either 1) publication or 2) effective date printed on the chart. These charts are in the following areas of the AIS:

- The AIP (Aeronautical Information Publication) Manuals
- Aeronautical charts displayed on the walls
- Aeronautical charts under glass on the counters

Included in the AIP Manuals:

- All charts in the AIP (Aeronautical Information Publication) Manuals
- All pages of aeronautical data in the AIP Manuals

Charts displayed on the walls and under glass on the counter are very useful for daily references and communications with flight crews during briefings. However, they should be up-to-date editions. **ONE OF EACH DISPLAYED CHARTS AND ONE SET OF UP-TO-DATE AIP MANUALS**

Aerodrome Unit Facilities

Redundancy of Communication Capabilities

International best practices for aviation safety require redundancy of communication capabilities into and out of an AIS Office.

A review of the equipment available to the personnel at the AIS indicated no facsimile machine as a back-up for possible computer difficulties.

Recommendation

ONE facsimile machine back-up for possible computer-related difficulties should be provided for the AIS Office.

6.4.2.4.2 Sect 4.2 Access to the Aerodrome Movement Area

Findings not relevant to equipment procurement issues.

6.4.2.4.3 Sect 4.3 Aerodrome Emergency Plans

Radio Communications Equipment

Hard Wire Communications Capability

"**Hard wire**" capability to directly connect an aircraft parked in the emergency parking location to the command post and the emergency operations center is essential in order to provide discreet communication capability.

Recommendation

Availability of sufficient wire and the appropriate jacks to connect the external power receptacle ground radio panel of the aircraft to the command post and the EOC. Cost is minimal. **ONE SET TO CD POST AND ONE SET TO EOC**

Emergency Operations Centre and Command Post

Airports should have both a fully operational Airport Emergency Operations Centre and a Command Post.

- There is no Airport Emergency Operations Centre at Sultan Thana Airport
- There is no Command Post at Sultan Thana Airport

Recommendation

- Establishment of **ONE** Airport Emergency Operations Centre
- Establishment of **ONE** Command Post
- Required equipment includes at least **ONE FOR EACH (2)** good communication console with capability of numerous inbound telephone lines, sufficient working room, DSL internet capability, **ONE FOR EACH (2)** computer with **ONE FOR EACH (2)** monitor, and **ONE FOR EACH (2)** fascimile machine. Larger airports should have a mobile command post with secure communications capability. Cell phone capability for all participants *may* fulfill the secure communication requirements.

Key Staff Contact Availability

International best practices for aviation safety require the immediate availability of **24-hour** contact numbers of listed staff, and capability of simultaneous immediate notification. The known location and availability of the telephone numbers and facsimile numbers must be confirmed. Needed reliable and rapid notification to all concerned individuals with rapid capability for situational updates is a consistent problem in emergency response.

Recommendation

A capability to interconnect an emergency call list through a "911" type of system (an emergency communications system for the use of the public) exists. This system has the capability to pre-select different call lists for different forms of emergencies. A person in the controlling entity (e.g., a dispatch emergency center) can push a button to activate auto-calling of all individuals on the specific tailored list. The system then rolls through the list, presenting a brief dictated message transmission to every individual listed. Everybody on the specific list receives the same message. The activating individual can select precisely who gets what type of message notification depending on the nature of the emergency(s).

An example of such a system is manufactured by DCC: GeoCast and The Communicator. Geocast is a web-based tool that allows for a geographic population to be notified. The Communicator notifies individuals that are pre loaded into a database. These individuals can be organized into teams as mentioned above, and notified by a variety of ways including telephone, fax, page, and e-mail. Information is available:

- at http://www.dccusa.com/ and
- at http://www.dccusa.com/communicator.asp .

ONE MASTER SYSTEM COULD PROBABLY COVER THE ENTIRE COUNTRY (US$40,000?)

6.4.2.4.4 Sect 4.4 Rescue and Firefighting Service (RFFS)

Findings not relevant to equipment procurement issues.

6.4.2.4.5 Sect 4.5 Aerodrome Inspection

Findings not relevant to equipment procurement issues.

6.4.2.4.6 Sect 4.6 Visual Aids, Electrical Systems, Lights

Findings not relevant to equipment procurement issues.

6.4.2.4.7 Sect 4.7 Movement Area Maintenance

Friction testing capability should exist at all airports.

Recommendation

The following is an absolute minimum recommended equipment list for primary airport Movement Area Maintenance for an airport the size of Sultan Thana.

Good condition and operable ground maintenance equipment:

4 – 6 m³ capacity Bucket Loader	$175,000 - $250,000
5 – 10 m³ capacity Dump Truck	50,000 - $100,000
Manlift Platform*	15,000
Runway Sweeper	313,000
5 m. mower	1,500
Riding 1.4 m. mower	7,000
Brush Hog	3,000
Tar Kettle	18,000
Forklift	18,000
Water Pump – 2"	600
1 Ton Roller	4,800
1 Ton "Low-Boy" Utility Trailer	1,900
Tractor	55,000
MIG Welder	3,000
Portable Generator	1,500
Rack Truck	14,000
Vacuum Truck	40,000
Steam Pressure Washer	3,000
Grass Trimmers (3)	500 each
	$725,000 - $850,000

* Low-lift tractor-style forklift – large tires – man-lift – multiple uses, such as repair of high-mast lights, etc.

6.4.2.4.8 Sect 4.8 Aerodrome Works – Safety

Findings not relevant to equipment procurement issues.

6.4.2.4.9 Sect 4.9 Apron Management

Findings not relevant to equipment procurement issues.

6.4.2.4.10 Sect 4.10 Apron Safety Management

Findings not relevant to equipment procurement issues.

6.4.2.4.11 Sect 4.11 Airside Vehicle Control

Findings not relevant to equipment procurement issues.

6.4.2.4.12 Sect 4.12 Wildlife Hazard Management

Findings not relevant to equipment procurement issues.

6.4.2.4.13 Sect 4.13 Obstacle Control

Findings not relevant to equipment procurement issues.

6.4.2.4.14 Sect 4.14 Disabled Aircraft Removal

Heavy Lift Crane Availability

It appears there are not any in inventory. No suppliers are shown with whom arrangements for availability have been made.

Recommendation

ONE large crane with heavy-lift capability for aircraft removal should be available, either on-airport or through a local organization. At those airports that are depending on a local supplier there must be standing written arrangements in effect, guaranteeing availability on very short notice.

6.4.2.4.15 Sect 4.15 Handling of Hazardous Materials (Hazmat)

As HAZMAT was not in ASI's mandate, this section was not assessed other than as relates to the handling of aviation fuel.

6.4.2.4.16 Sect 4.16 Low Visibility Operation

As Low Visibility Operations are not conducted at Sultan Thana Airport, this area is not relevant.

6.4.2.4.17 Sect 4.17 Protection of Radar & Navigation Aids

Radar & Navigation Aids should have each main electrical feed line in a separate trench as any damage to the trench (intentional or accidental), could result in significant disruption. There should be two separate lines.

Routing of Main Feed Lines: From the PLN (National Power Company) is via one 197 KW. power line. Therefore there is no back-up redundancy for coverage of cutting (intentional or non-intentional) of the power line.

Recommendation

Sultan Thana has backup generator capability. However, all airports, radar, and navigation aids should have two main feed lines, each in its own trench, to provide redundancy for protection in the event that a main feed line is disrupted either intentionally or unintentially. **(DIRECT BURIAL WIRE AND CONNECTORS FOR EACH AID = 3 to 4)**

6.4.2.5 Part 5 – Aerodrome Administration And Safety Management System

6.4.2.5.1 Aerodrome Safety Management Systems (SMS)

There will be a need for **a substantial number** of copies of the ***ICAO Safety Management Manual (SMM)***, *Doc 9859 AN/460* of ICAO. These will be needed for essentially all personnel involved in aviation administration and/or operations. While this item is located here in the Aerodrome Administration/SMS area, it will apply throughout aviation-related government organizations as well.

6.4.3 AIR TRAFFIC CONTROL TOWERS (ATCT)

6.4.3.1 Equipment

6.4.3.1.1 Communications

Anti-blocking systems

Anti-blocking systems should be available at the Sultan Thana air traffic control tower to preclude deliberate or accidental blocking of ATC communications. *For example*, CONTRAN: http://www.aatl.net/publications/contran.htm).

Recommendation

Procurement of state-of-the-art anti-blocking systems for all primary frequencies.
ONE MASTER SYSTEM

ATC Communication systems

Perhaps the most essential single element of communication capability is a highly reliable (with back up) means of communicating "tower-to-tower", and between the ATCT's and air traffic control centers, and national emergency centers of government. This partly for air traffic control coordination, but additionally as a reliable back-up emergency communication system for use during any emergency, be it a natural disaster or human initiated emergency – local, regional, or national.

Recommendation

Above described communication systems, with carefully developed and tested equipment and procedures, training in their use by ATCO's (Air Traffic Control Operators), and testing of the communication system on a regular basis. **ONE MASTER SYSTEM COULD LIKELY COVER THE ENTIRE COUNTRY**

Speakers and Headsets

A critical component of safe air traffic control operations is high quality communication equipment. Good quality speakers and headsets (preferably with boom mikes) are essential for each position in a control tower.

Recommendations

- Procurement of state-of-the-art headsets with boom microphones **TWO or THREE OF EACH**
- Communication equipment as needed to provide optimum state-of-the art traffic control and tower-ground vehicle communications capability.

Back-up Communication Systems

Procurement of state-of-the art back-up communications equipment for each of the primary frequencies, including ground control, tower, approach control and departure control.

Back-up communications capability is available (via a backup transceiver DITTEL FSG71M) on only one frequency. Therefore, there is no capability to circumvent a "stuck microphone" problem.

Recommendation

Back-up communications equipment for ground control, tower, approach control and departure control. **ONE MASTER UNIT**

6.4.3.1.2 Information Systems

Flight Data Display Equipment

Standardized, modern flight data display equipment is essential at ATCT's and air traffic control facilities. Operational and accurate meteorological reporting systems in control towers are key components of flight safety.

There is an indicating system for hP, degrees Centigrade, wind direction, and wind speed. However, this equipment has been inoperative for ten years.

Recommendations

We would suggest that accurate information on wind direction and speed is extremely critical to a landing aircraft. Therefore, as these conditions can rapidly change, it is in the interest of flight safety (and flight operations legality), that this unit should be replaced at the earliest possible time with **ONE** new "state of the art" unit.

Serviceability Indicators

Lighting of taxiways, runways, approach lighting systems, obstruction lights, etc., are key components of flight and ground safety, as are serviceability units which can automatically indicate to the ATCT personnel the actual functioning (or failure) of these lights. Binoculars, while necessary and helpful, are not sufficient.

The serviceability of essential aids and lighting is determined by binoculars. A display unit exists, but it is inoperative.

Recommendations

In view of the fact that there are both flight safety and legal implications to initiating an approach or landing without certain aerodrome lighting, we most strongly recommend that this unit be replaced at the earliest possible time with **ONE** new "state of the art" unit.

Monitoring of Navigational Aids

Capability of continual monitoring of all navigation aids (VOR's, DME's, ILS's, and other approach aids), with immediate notification of failure, serviceability, or degradation of signal accuracy or reliability is an essential component of flight safety.

Recommendations

Verify that this monitoring capability exists at all navigation aids at, or associated with, Sultan Thana Airport. Acquire and install **ONE** on each navigational aid where this capability does not exist.

6.4.3.1.3 Accommodation

Operational Positions

Extensive research has conclusively proven the importance of ergonomic considerations in ATCT design and operation. Each ATCT should have provision for sufficient ATCO (Air Traffic Control Operator) positions of ergonomic size. Equipment and data indicators should be positioned so that they are clearly safety.

- A single operating position exists.
- Operational equipment clearly is not laid out ergonomically.
- The space appears to be (and was reported to be) very limited.

Recommendations

Architectural technical review of the control room, with both structural and human factors considerations. Renovation of tower control room to increase the number of operating positions, create more space, and facilitate ergonomic layout of operational equipment. **ONE RENOVATION PROJECT**

Visual Control Room

Facilities to provide for the safety and comfort of ATCO's is a key aspect of Human Factors. Such facilities include a secondary escape route for use in the event of a fire.

The tower is accessed via a stairway. There are no alternate provisions for escape in the event of fire.

Recommendations

Architectural technical review of control tower control rooms, with both structural and human factors considerations. Renovation of the control tower to provide an escape route *other than* via the main stairway. **ONE RENOVATION PROJECT**

6.4.4 FUEL HANDLING PROTOCOLS AND PROCEDURES

Fuel handling protocols and procedures were in compliance with good practice.

Findings not relevant to equipment procurement issues.

6.4.5 PRECISION INSTRUMENT APPROACHES

Considering the weather in this part of the world and its historical impact on flight operations in the region, the limited availability of precision instrument approaches at the smaller airports is very likely to have an ongoing substantial impact on the economy and the people of Indonesia. A considerable increase in the safety, regularity, and efficiency of aviation is generally realized by the installation and certification of ILS (or equivalent) approach equipment for each runway at each airport served by airline aircraft.

The processes required for establishing an instrument approach are multi-faceted. However, the availability of Global Positioning System (GPS) technologies simplifies matters considerably, in that the ground-based infrastructure required in many other instrument approach procedures is not required.

In one ICAO member State a central national office was created to consolidate the development of all instrument procedures from a single location. This office is the National Flight Procedures

Office (NFPO). Probably in part due to this efficient system, more than 500 new GPS-based standard instrument approaches are commissioned annually in that State.

Typical costs associated with installation in one ICAO member State are as follows:

Procedure development:	US$6,000 - $12,000
Initial flight checks:	$3,000 - $ 5,000
Recurrent flight checks	$2,000 - $ 3,000

These costs are influenced by the type of the procedure, its complexity, the availability of navigational aids, surrounding terrain and obstacles, and the extent of survey and aerodrome particulars study required.

Studies conducted by the Aircraft Owners and Pilots Association were a primary reference for this section.

Recommendations

The ASI team suggests that there would be considerable increase in the safety, regularity, and efficiency of aviation realized by the installation and certification of precision instrument approaches for the runways at Sultan Thana Airport.

Therefore, the ASI team recommends the installation and certification of **ONE** precision instrument approaches for each of the two runways at Sultan Thana Airport.

7 EQUIPMENT AND SYSTEMS REQUIREMENTS LISTS FOR THE SAFETY UPGRADE OF FOUR VISITED AIRPORTS

Lists of equipment and systems additions and upgrades required to meet deficiencies in ICAO safety compliance at each of the four visited airports are provided in Tables 1, 2, 3 and 4. The lists identify specific equipment and systems including system hardware and software improvements identified during the ASI Team visits to the four Airports; Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Thaha.

7.1 INTRODUCTION

This section describes the equipment, facility and system updates and additions needed to address deficiencies in ICAO safety compliance noted in this Task 2 Report based upon the on-site assessment performed for the Task 1 report, discussions during the Task 1 presentation, as well as subsequent communications with Indonesian officials. Equipment, facilities and systems that were observed to be satisfactory for their purpose are not included herein as the ASI Team anticipates that the responsible authorities have ensured that such items have been maintained in proper working order.

For each of the visited airports a Table? is provided showing the description quantities and anticipated schedule for installation and commissioning in preparation for initial operation of the security system improvements. The lists identify specific equipment and systems including system hardware and software improvements identified during the asi team visits to the four airports; Soekarno-Hatta - Table 1; Ngurah Rai - Table 2; Polonia - Table 3; and Sultan Thaha - Table 4.

Tables listing equipment and systems additions and upgrades required to meet deficiencies in ICAO security compliance at each of the four visited airports are provided. The lists identify specific equipment and systems including system hardware and software improvements identified during the ASI Team visits to the four Airports; Soekarno-Hatta, Ngurah Rai, Polonia, and Sultan Thaha.

7.2 TABLE LINE ITEM DESCRIPTION

For reader convenience due to the brevity of the equipment class names in the tables, an expanded description of each line item and the basis for each category of improvement is provided in the following paragraphs.

7.2.1 CHARTS, DOCUMENTS AND MISCELLANEOUS

Aeronautical charts, such as airport approach and regional airway (including wall charts); Aviation Information Publications (AIP); and operational and emergency publications supporting ATC, operations and emergency preparedness at each airport. This will require updating of information and dating for newly published revisions.

7.2.2 COMMUNICATIONS CONSOLES (EOC AND CP)

Provision or updating of communications consoles at the Emergency Operations Center and Command Post.

7.2.3 SCRAMBLED COMMUNICATIONS UNITS (1 BASE AND 8 MOBILES)

Encrypted radio communications system for use in threat situations or other events where message interception must be prevented.

7.2.4 AIS INTERNET TERMINAL EQUIPMENT

Internet terminals (computer, ISP service, printers, etc.) needed to exchange data and e-mails.

7.2.5 EMERGENCY PUBLIC NOTIFICATION SYSTEM (911)

An emergency call system that allows direct access to emergency services (Police, Fire, Medical, etc.) by calling a common number (such as 911) from any telephone.

7.2.6 EQUIPMENT FOR AIRCRAFT REMOVAL UPDATE W/PROVISION FOR CRANE SERVICE

Equipment for the prompt removal of damaged aircraft and restoration of airfield operations.

7.2.7 DIRECT BURIAL FEEDS TO NAVIGATION & RADAR AIDS

An additional emergency power connection to each critical facility, including radar, ATC tower, navigation aids, and airfield lighting system. The additional power connection shall be capable of maintaining full operation in the event of damage (accidental or intentional) to the main power feed.

7.2.8 AIRFIELD LIGHTING AND SIGNAGE

Provide, repair or replace defective airfield lighting including establishment of a stock of reserve components to enable prompt replacement of defective lamps, controls or connections.

7.2.9 ANTI BLOCKING COMMUNICATIONS SYSTEM

Provision of ATC ground radios that detect COM channel usage to prevent inadvertent or malicious transmission on a channel that is in use so as to preclude lost messages and "stuck mike" incidents.

7.2.10 ATC Information Systems Repair And Upgrade

Repair, replacement and provision of spares for ATC communications.

7.2.11 ATCT Master Communications System

Provision of communications (leased line) for "tower to tower" and AIS communications throughout Indonesia.

7.2.12 ATCO Accommodations

Rest facilities for ATC personnel at airports where insufficient or none are presently available.

7.2.13 Precision Approach Instrumentation And Lighting

Addition of an Instrument Landing System (Category 1) with localizer and glide slope beams at airports without such capability. Includes a Simple approach lighting system.

Note that by the use of a Global Positioning System (GPS), flight approaches under moderately adverse conditions (approximate minimums 500 ft. (150 meters) altitude and 1 mile (1.6 km) horizontal visibility) may be permitted. Development of basic GPS approaches is less costly than installation of an ILS system, however the performance (minimums) of a basic GPS approach are similar to that of a non-precision approach.

Additional GPS performance can be provided by the use of a Augmentation system such as Ground Based Augmentation System (GBAS). The addition of a GBAS system at an airport is as costly as the addition of a single ILS approach and the increased precision is only available to aircraft equipped to receive the correction signals from the ground system.

7.2.14 Movement Area Maintenance Equipment Update

The provision of additional movement area maintenance equipment as described in the Safety recommendations.

7.2.15 Cellular Radio Units And Supplies

Provision of a limited number of cellular radio units for non critical airport use, such as maintenance activities.

Table 1 - Soekarno-Hatta (Jakarta)
Recommended Equipment, Facilities And Systems Updates

ITEM	DESCRIPTION	QTY	UNIT	SCHEDULE (WEEKS TO ACCOMPLISH) PROCUREMENT & INSTALLATION	COMMISSIONING	COMMENTS & REFERENCES
						Paragraphs
1.0	**Jakarta WIII**					
1.1	Charts, documents and miscellaneous	1	lot	6	1	
1.2	Communications Consoles (EOC and CP)	2	lot	16	2	6.1.2.4.3.
1.3	AIS Internet Terminal Equipment	1	lot	16	4	
1.4	Emergency Public Notification System (911)	1	each	26	4	serves all Indonesian airports
1.5	Equipment for aircraft removal update w/provision for crane service	1	each	39	4	6.1.2.4.13.
1.6	Direct burial feeds to Navigation & Radar Aids	10000	meters	26	4	6.1.2.4.16
1.7	Anti blocking communications system	1	each	16	4	6.1.3.1.1
1.8	ATCT master communications system	1	each	6	1	serves all Indonesian airports
1.9	Movement Area Maintenance	1	lot	6	1	6.4.2.4.7
1.10	Cellular radio units and supplies	1	lot	6	1	6.3.2.4.7

Table 2- Ngurah Rai (Bali)
Recommended Equipment, Facilities And Systems Updates

ITEM	DESCRIPTION	QTY	UNIT	SCHEDULE (WEEKS TO ACCOMPISH) PROCUREMENT & INSTALLATION	COMMISSIONING	COMMENTS & REFERENCES
						Paragraphs
1.0	**Ngurah Rai (WRRR)**					
1.1	Charts, documents and miscellaneous	1	lot	6	1	
1.2	Communications Consoles (EOC and CP)	2	lot	16	2	6.2.2.4.3.
1.3	Scrambled Communications Units (1base and 8 portables)	1	lot	16	1	
1.4	AIS Internet Terminal Equipment	1	lot	16	4	
1.5	Emergency Public Notification System	1	each	26	4	serves all Indonesian airports
1.6	Equipment for aircraft removal update w/provision for crane service	1	each	39	4	6.1.2.4.13.
1.7	Direct burial feeds to Navigation & Radar Aids	6000	meters	26	4	6.2.2.4.17
1.8	Anti blocking communications system	1	each	16	4	6.2.3.1.1
1.9	ATCT master communications system	1	shared	6	1	serves all Indonesian airports
1.10	ATCO accomodations	1	lot	6	1	6.2.3.1.2
1.11	Precision Approach Instrumentation and lighting	1	approach	39	4	Runway 9 6.2.5
1.12	Movement Area Maintenance	1	lot	6	1	6.4.2.4.7
1.13	Cellular radio units and supplies	1	lot	3	1	6.3.2.4.7

Table 3 - Polonia (Medan)
Recommended Equipment, Facilities And Systems Updates

ITEM	DESCRIPTION	QTY	UNIT	SCHEDULE (WEEKS TO ACCOMPLISH) PROCUREMENT & INSTALLATION	COMMISSIONING	COMMENTS & REFERENCES
	Polonia (WIMM)					Paragraphs
1.0	Charts, documents and miscellaneous	1	lot	6	1	
1.1	Communications Consoles (EOC and CP)	2	lot	16	2	6.3.2.4.1.
1.2	Scrambled Communications Units (1base and 8 mobiles)	1	lot	16	4	6.3.2.4.3.
1.3	AIS Internet Terminal Equipment	1	lot	16	4	6.3.2.4.1.
1.4	Emergency Public Notification System (911)	1	shared	26	4	serves all Indonesian airports
1.5	Equipment for aircraft removal update w/provision for crane service	1	each	39	4	6.3.2.4.14
1.6	Direct burial feeds to Navigation & Radar Aids	4000	meters	26	4	6.3.2.4.17
1.7	Airfield lighting and signage	1	lot	39	4	6.3.2.4.6.
1.8	Anti blocking communications system	1	each	16	4	6.3.3.1.1
1.9	ATC Information Systems repair and upgrade	1	lot	39	4	
1.10	ATCT master communications system	1	shared	6	1	serves all Indonesian airports
1.11	ATCO accomodations	1	lot	6	1	6.2.3.1.2
1.12	Precision Approach Instrumentation and lighting	1	approach	39	4	Runway 23 6.3.5
1.13	Movement Area Maintenance	1	lot	16	4	6.3.2.4.7
1.14	Cellular radio units and supplies	1	lot	6	1	6.3.2.4.7

Table 4 - Sultan Thaha (Jambi)
Recommended Equipment, Facilities And Systems Updates

ITEM	DESCRIPTION	QTY	UNIT	SCHEDULE (WEEKS TO ACCOMPLISH) PROCUREMENT & INSTALLATION	COMMISSIONING	COMMENTS & REFERENCES
						Paragraphs
1.0	**Jambi (WIPA)**					
1.1	Charts, documents and miscellaneous	1	lot	6	1	6.4.2.4.1
1.2	Communications Consoles (EOC and CP)	2	lot	16	2	6.4.2.4.1
1.3	AIS Internet Terminal Equipment	1	lot	16	4	6.4.2.4.3
1.4	Emergency Public Notification System (911)	1	shared	26	4	serves all Indonesian airports
1.5	Equipment for aircraft removal update w/provision for crane service	1	each	39	4	6.3.2.4.14
1.6	Direct burial feeds to Navigation & Radar Aids	2500	meters	26	4	6.4.2.4.17
1.7	Airfield lighting and signage	1	lot	39	4	6.3.2.4.6.
1.8	Anti blocking communications system	1	each	16	4	6.4.3.1.1
1.9	ATC Information Systems repair and upgrade	1	lot	39	4	6.4.3.1.2
1.10	ATCT master communications system	1	shared	6	1	serves all Indonesian airports
	ATCO accommodations	1	lot	6	1	6.4.3.1.3
2.0	Precision Approach Instrumentation and lighting	1	approach	39	4	Runway 23 6.4.5
	Movement Area Maintenance	1	lot	16	4	6.4.2.4.7
2.1	Cellular radio units and supplies	1	lot	6	1	6.3.2.4.7

APPENDIX 1 - COURSE MATERIAL SPECIFIC TO MATTERS ADDRESSED IN PART 4 OF THE AERODROME MANUAL

Course material supplemental to the existing Airport Operation Management Training course curriculum – Part 4 of the Aerodrome Manual

1 PART 4 OF THE AERODROME MANUAL

1.1 SECT 4.1 AERODROME REPORTING

The importance to aviation safety of a reliable system for updating of geographical coordinates published and those displayed on the airside of gates.

1.2 SECT 4.2 ACCESS TO MOVEMENT AREA

- The need for ground facility and in-flight information as a support ingredient of flight safety. This information must be available to aerodrome authorities responsible for aerodrome services, to report to the responsible aeronautical information services unit, with a minimum of delay.

- The importance to aviation safety of procedures to ensure:
  - The reporting of inoperative or unreliable visual or navigational components
  - Timely administrative processing of such reports.
  - Replacement of inoperative or unreliable visual or navigational aids
  - Post installation inspection for serviceability

- The importance of absolutely ensuring the currency of the charts in the AIP's and in the AIS's. It is imperative that 100 % availability of *current* maps and charts in all AIP Manuals and all AIS facilities is assured

- The need for redundancy of communication capability into and out of an AIS Office.

- The value to aviation safety and security of an organized, structured mechanism for issuance of airside driving permits (including vetting, training, licensing, and personal training and compliance histories), and vehicle permits (including safety inspection protocols).

1.3 SECT 4.3 AERODROME EMERGENCY PLANS

- An Airport Emergency Plan as a "living document".

- All personnel at the airport should be considered as a resource for input into the plan
- A utilized means of determination of the currency of each copy of the Aerodrome Emergency Plan Manual and every page in each manual.
- Currency of the listings such as names of personnel in individual positions in both the airport administration and non-airport agencies and organizations and respective telephone numbers.
- Formalized contingency Memorandums of Understanding (MOU) between airports and local hospitals and other medical facilities.
- "Table top" exercises preceding large exercises
- A major value of conducting an exercise is that any significant deficiencies - particularly in personnel response – can be determined
- Mechanisms by which such corrective measures are incorporated into procedures and plans
- Airport Emergency Operations Committees
- Regular utilization of Airport Emergency Operation Committees
- The value of an AEOC
- Airport Emergency Operations Centres and Command Posts
- A critical element of the infrastructure of any airport that serves airline aircraft is implementation of regular scheduled telephone contact list update and revision process, as well as incorporation into Aerodrome Manuals.

1.4 SECT 4.4 RESCUE AND FIREFIGHTING SERVICE (RFFS)

Importance of development and implementation of mitigating procedures for temporary reduction in category.

1.5 SECT 4.5 AERODROME INSPECTION

Procurement of adequate mobile units, the supply of batteries, chargers, and spare parts to provide sufficient reserve/standby units.

1.6 SECT 4.6 VISUAL AIDS, ELECTRICAL SYSTEMS, LIGHTS

A most important and critical night landing aid is the safety-related lighting systems, such as Approach Lighting Systems (ALS) and Runway End Identification Lights (REILS) at aerodromes. Best international practices cannot possibly be maintained at an aerodrome where the unavailability of parts for repair precludes their full operational capability. Parts for critical flight safety aerodrome systems must be available when needed.

An available inventory of sufficient spare parts and equipment as necessary to ensure capability of maintaining all safety-related lighting systems at full operational capability to at least a 99 % reliability factor.

1.7 SECT 4.7 MOVEMENT AREA MAINTENANCE

Movement areas must be well maintained. Good condition and operable ground maintenance equipment (such as runway sweepers and small rollers) is an essential element ensuring aviation and ramp vehicle safety.

1.8 SECT 4.8 TO 4.10

No training issues noted

1.9 SECT 4.11 AIRSIDE VEHICLE CONTROL

Procurement of needed cellular telephone equipment (at airports whereat they are a primary form of operational communication) is essential. Adequate supplies of all components including batteries, chargers, and spare parts are required. Alternately, sufficient mobile radio communication units (with a capability for secure communication during emergencies) for these airports should be acquired.

As referenced in 4.2 (Access to Movement Area), a formal training program for ramp safety is required of operators of vehicles on the air side.

An organized, structured mechanism for issuance of airside driving permits (including vetting, training, licensing, and personal training and compliance histories), and vehicle permits (including safety inspection protocols).

2 AERODROME SAFETY MANAGEMENT SYSTEMS (SMS)

An SMS course would include studies of the following subjects:

- Safety policy
- Structure or organization of the SMS
- SMS strategy and planning
- SMS implementation
- A system for the implementation of, and action on, critical safety areas which require a higher level of safety management integrity (safety measures program)
- Measures for safety promotion and accident prevention and a system of risk control
- Internal safety audit and review system
- System for documenting all safety-related airport facilities and records
- Staff training and competency
- Incorporation and enforcement of safety-related clauses in contracts from the ICAO Manual on Certification of Aerodromes

TASKS 3-6 REPORT

PROPOSED AIRPORT SAFETY AND SECURITY SYSTEM PLAN FOR INDONESIA

US TDA Fiscal Data:
Appropriation No.: 114/51001
Activity No.: 2004-30051A
Reservation No.: 04351388
Grant No.: GH04351388

1 BACKGROUND

1.1 GOVERNMENT OF INDONESIA INTENTIONS

Indonesia has approximately 163 airports which include large to very small facilities, of which 24 are currently international airports. PT Angkasa Pura I and PT Anglasa Pura II are two state owned enterprises that manage 25 international airports. The remaining airports are small to very small with light traffic and are managed by the Directorate General of Air Communications (DGAC), Indonesia's authority for civil aviation matters.

During the last six years the Government has implemented a liberal licensing policy which has resulted in the growth of airline market from two licensed air carriers to 21 that operate scheduled flights. In addition, because of competition, fares have decreased and there are numerous package deals available for intra- and inter-island travel. The result has been marked increase in passenger services that has strained the reports capacity to provide adequate security, safety and passenger facilitation. This has resulted in the country's airports becoming very busy and strained to be able to provide passenger services including adequate safety and security.

The safety and security concerns at Indonesia's airports have particularly heightened in the aftermath of the September 11, 2001 terrorist attacks on the United States. Many of Indonesia's remote airports in the Indonesian archipelago offer attractive sites for the germination of terrorist activity bases. Airports could be even more attractive as venues for arms transfer and smuggling unless appropriate safety and security measures are put in place.

In 2000, the International Civil Aviation Organization (ICAO)[1] conducted an audit of Indonesia's safety and security procedures and systems. Later in 2004, ICAO conducted an Aviation Security Audit of Soekarno Hatta International Airport, Jakarta which included an extensive assessment of the security related sections and procedures of the DGAC. In 2005, the US Transportation Security Administration (TSA) performed a security audit of the Ngurah Rai International Airport, Bali which again also focused both on the airport's security and on the

[1] ICAO consists of 189 Contracting States. Indonesia is one of the 189 Contracting States.

ability of the security sections of the DGAC organization to provide appropriate compliance oversight. Despite the fact that Indonesia has attempted to address all of the issues raised in each of these audits, safety and security continue to be concerns at all airports to varying degrees. As a result, the Government of Indonesia has renewed its commitment to improve the safety and security at its airports.

1.2 CONTRACT SCOPE OF WORK

The United States Trade and Development Agency (USTDA) through a grant to the Government of Indonesia funded a technical assistance project for the Government to help identify and remedy the safety and security weaknesses in Indonesian airports. Aerospace Services International, Inc. (ASI) of Chantilly, Virginia, USA was selected by the Government of Indonesia and awarded a contract to perform these functions under the technical assistance grant.

The USTDA funded contract requires an assessment of current security and safety systems and procedures, identification of deficiencies, and recommendation of a program for the upgrade of safety and security at Indonesian airports. The contract also requires the development of an investment program and a financing plan for the recommended upgrades.

The technical assistance is to be performed at four airports that are representative of Indonesia's many airports nationwide. These airports must include:

1. A large international airport with extensive passenger and cargo traffic and multiple domestic and international carrier operations such as Jakarta International Airport,
2. A tourist airport with the bulk of traffic being domestic and international tourists, including a large number of charter operations such as Bali International Airport,
3. A medium-sized airport such as Medan International Airport, and
4. A small airport with mostly domestic short-haul traffic which is to be determined in consultation between the Grantee and Contractor

These four representative airports will become pilots for the detailed safety and security audits and assessments, and will form the basis for extrapolating the systems upgrades and investments needed for all airports in the country.

The USTDA funded contract Terms of Reference (TOR) is divided into eight tasks.

Task 1 of the contract required that a detailed assessment be conducted of the existing airport safety and security systems and procedures at the four pilot airports identified by the Grantee (Government of Indonesia, Director General of Air Communications). The four airports chosen by the DGAC are:

- Soekarno Hatta International Airport, Jakarta
- Ngurah Rai International Airport, Denpasar, Bali
- Polonia international Airport, Medan
- Sultan Taha Sysrifudn Airport, Jambi

The assessments determined the extent to which the current systems at these four airports are in compliance with prevailing ICAO requirements and international standards of safety and security.

Task 2 required the development of specific aviation infrastructure system and training requirements for upgrading safety and security at Indonesia's airports.

Reports for task 1 and task 2 have been previously published, and delivered to and accepted by the Director General of Air Communications.

The recommendations for improving the safety and security at Indonesian airports in accordance with the findings in the tasks 1 and 2 reports are further discussed in this report in accordance with the contract. In task 3, we have developed engineering cost estimates and an investment plan for the recommended improvements. In task 4, we have assessed the environmental implications of the proposed recommendations. In task 5, we have provided an economic and financial analysis of the proposed investment plan, and in task 6, we have developed and provided an airport safety and security upgrade financing plan.

2 PROJECT ACTIVITIES

2.1 COMPLETION OF CERTAIN TASKS

This Report is submitted in accordance with the requirement of USTDA funded contract tasks 3-6. ASI will have fully accomplished contract tasks 3-6 upon the acceptance of this report by the Director General Air Communications.

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1. INTRODUCTION

Based on its determination of the requirements for the equipment and systems to upgrade airport safety and security systems in Indonesia, ASI has developed estimates of engineering costs for four airports of differing sizes. These estimated costs include capital costs, and annual operation and maintenance (O&M) costs for the various systems and equipment. These estimated O&M costs also include personnel and training requirements costs.

Safety and security costs have been estimated for each of the airports: Soekarno-Hatta, Ngura Rai, Polonia, and Sultan Taha. Based on these cost estimates, ASI has developed an initial investment plan. The investment plan includes capital investment requirements, O&M costs, and a time-phasing of the investments.

2. SOEKARNO-HATTA INTERNATIONAL AIRPORT IN JAKARTA

2.1 CAPITAL COSTS FOR SECURITY

The total capital investment costs for the recommended security improvements at Soekarno-Hatta are approximately $23.4 million. These costs include the purchase and installation of the security equipment and systems. The breakout of the total is given in the table below.

Table 1: Total Capital Investment Costs for Security at Soekarno-Hatta

Area Security	
Perimeter System Repair and Upgrade	$2,442,543
Terminal System Repair and Upgrade	$11,103,900
Cargo System Repair and Upgrade	$1,250,740
Catering Integrated ACAM CCTV Systems	$668,120
Total Installation Labor & Materials	$15,465,303
Mobilization	$250,000
Engineering Preparation	$1,546,530
Spares	$1,518,405
Warranty Period	$1,546,530
Subtotal	$20,326,768
Contingency	$3,049,015
GRAND TOTAL	**$23,375,783**

The specific components of the security investment costs are provided in the tables below
.

Table 2: Soekarno-Hatta Perimeter and Airside Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Perimeter and Airside									
Perimeter Fence	9,358	meters	$100	$935,750	1	9357.50	$5	$46,788	$982,538
Fence Sensors	1,970	each	$20	$39,400	1	985.00	$5	$4,925	$44,325
CCTV on existing pole (refurbish)	47	each	$2,500	$117,500	8	376.00	$5	$1,880	$119,380
CCTV on new pole	50	each	$5,000	$250,000	12	600.00	$5	$3,000	$253,000
Lighting on pole shared with CCTV	70	each	$1,500	$105,000	6	420.00	$5	$2,100	$107,100
Replace Perimeter Alarm - CCTV Console	9	each	$50,000	$450,000	240	2160.00	$5	$10,800	$460,800
Perimeter cabling	23,640	meters	$10	$236,400	1	23640.00	$5	$118,200	$354,600
Radio Communications (existing base antenna)	1	lot	$100,000	$100,000	80	80.00	$5	$400	$100,400
Telephone system upgrade	1	lot	$20,000	$20,000	80	80.00	$5	$400	$20,400
Total Perimeter System Repair and Upgrade									$2,442,543

Table 3: Soekarno-Hatta Passengers Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Entry Checkpoint relocate X-ray (2005) to bag room	9	each	$5,000	$45,000	100	900.00	$5	$4,500	$49,500
Upgrade X-ray Software/hardware for TIP	9	each	$20,000	$180,000	16	144.00	$5	$720	$180,720
Add ETD	20	each	$60,000	$1,200,000	2	40.00	$5	$200	$1,200,200
Add hand search stations	20	each	$2,000	$40,000	2	40.00	$5	$200	$40,200
New AT Baggage X-ray with TIP	12	each	$200,000	$2,400,000	16	192.00	$5	$960	$2,400,960
PASSENGER CHECKPOINT									
Upgrade X-ray Software/hardware for TIP	22	each	$20,000	$440,000	16	352.00	$5	$1,760	$441,760
Add ETD	30	each	$60,000	$1,800,000	2	60.00	$5	$300	$1,800,300
Add hand search stations	30	each	$2,000	$60,000	2	60.00	$5	$300	$60,300
New cabin baggage X-ray with TIP	8	each	$55,000	$440,000	8	64.00	$5	$320	$440,320
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	200	each	$1,000	$200,000	8	1600.00	$5	$8,000	$208,000
Add new doors with controls (CR/KP)	50	each	$2,000	$100,000	16	800.00	$5	$4,000	$104,000
New Consoles (3 bay) with operator equipment	6	each	$50,000	$300,000	240	1440.00	$5	$7,200	$307,200
Central computer with software	4	each	$75,000	$300,000	16	64.00	$5	$320	$300,320
typical cable conduit per door	250	lot	$1,500	$375,000	4	1000.00	$5	$5,000	$380,000
CCTV system in terminals									
New indoor cameras (ceiling, pendant or wall mount)	300	each	$1,500	$450,000	8	2400.00	$5	$12,000	$462,000
New outdoor cameras (ceiling, pendant or wall mount)	150	each	$2,000	$300,000	16	2400.00	$5	$12,000	$312,000
Digital recorder (per 8 cameras)	80	lot	$10,000	$800,000	4	320.00	$5	$1,600	$801,600
Operator stations	6	lot	$100,000	$600,000	40	240.00	$5	$1,200	$601,200
Matrix with ACAM link	2	each	$100,000	$200,000	16	32.00	$5	$160	$200,160
typical cable conduit per new camera	450	each	$1,500	$675,000	8	3600.00	$5	$18,000	$693,000
Radio Communications	2	lot	$40,000	$80,000	8	16.00	$5	$80	$80,080
Telephone system upgrade	2	lot	$20,000	$40,000	8	16.00	$5	$80	$40,080
Total Terminal System Repair and Upgrade									$11,103,900

Table 4: Soekarno-Hatta Cargo Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Cargo Inspection X-ray	3	each	$200,000	$600,000	16	48.00	$5	$240	$600,240
Add ETD	10	each	$60,000	$600,000	2	20.00	$5	$100	$600,100
Add hand search stations	10	each	$5,000	$50,000	8	80.00	$5	$400	$50,400
Total Cargo System Repair and Upgrade									$1,250,740

Table 5: Soekarno-Hatta Catering Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	40	each	$1,000	$40,000	8	320.00	$5	$1,600	$41,600
Add new doors with controls (CR/KP)	10	each	$2,000	$20,000	16	160.00	$5	$800	$20,800
New Consoles (1bay) with operator equipment	2	each	$25,000	$50,000	240	480.00	$5	$2,400	$52,400
Central computer with software	2	each	$30,000	$60,000	16	32.00	$5	$160	$60,160
typical cable conduit per door	50	lot	$1,500	$75,000	4	200.00	$5	$1,000	$76,000
CCTV system in catering (two independent facilities)									
New indoor cameras (ceiling, pendant or wall mount)	50	each	$1,500	$75,000	8	400.00	$5	$2,000	$77,000
New outdoor cameras (ceiling, pendant or wall mount)	20	each	$2,000	$40,000	16	320.00	$5	$1,600	$41,600
Digital recorder (per 8 cameras)	10	lot	$10,000	$100,000	4	40.00	$5	$200	$100,200
Operator stations	2	lot	$20,000	$40,000	40	80.00	$5	$400	$40,400
Matrix with ACAM link	2	each	$25,000	$50,000	16	32.00	$5	$160	$50,160
typical cable conduit per new camera	70	each	$1,500	$105,000	8	560.00	$5	$2,800	$107,800
Total Catering Integrated ACAM CCTV Systems									$668,120

2.2 MAINTENANCE, PERSONNEL, AND TRAINING COSTS FOR SECURITY

The annual maintenance, personnel, and training costs for the recommended security improvements at Soekarno-Hatta are approximately $12.4 million. The breakdown of the total is given in the table below.

Table 6: Soekarno-Hatta Security Personnel and Maintenance Annual Costs

Personnel (annual)	$11,098,560
Training (Annual)	$640,387
Maintenance (Annual)	$706,793
Total	$12,445,740

The annual maintenance, personnel, and training costs for the security improvements to each of the security components are given in detail in the tables below.

Table 7: Soekarno-Hatta Annual Perimeter and Airside Security Operations and Maintenance Costs

	Number of Items	Unit Cost	Installation Costs	Total Cost
Number of Gates	6	$40,000	$1,200	$241,200
Perimeter Fence	9,358	$100	$46,788	$982,538
Fence Sensors	1,970	$20	$4,925	$44,325
CCTV on existing pole (refurbish)	47	$2,500	$1,880	$119,380
CCTV on new pole	50	$5,000	$3,000	$253,000
Lighting on pole shared with CCTV	70	$1,500	$2,100	$107,100
Replace Perimeter Alarm - CCTV Console	9	$50,000	$10,800	$460,800
Perimeter cabling	23,640	$10	$118,200	$354,600
Radio Communications (existing base antenna)	1	$100,000	$400	$100,400
Telephone system upgrade	1	$20,000	$400	$20,400
Total Perimeter System Repair and Upgrade				$2,683,743
Annual Expenses				
Personnel	108.0	$10,560		$1,140,480
Personnel Training	108.0	$609		$65,806
Maintenance				$120,768

Table 8: Soekarno-Hatta Annual Terminal Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Entry Checkpoint relocate X-ray (2005) to bag room	9	$5,000	$4,500	$49,500
Upgrade X-ray Software/hardware for TIP	9	$20,000	$720	$180,720
Add ETD	20	$60,000	$200	$1,200,200
Add hand search stations	20	$2,000	$200	$40,200
New AT Baggage X-ray with TIP	12	$200,000	$960	$2,400,960
PASSENGER CHECKPOINT				
Upgrade X-ray Software/hardware for TIP	22	$20,000	$1,760	$441,760
Add ETD	30	$60,000	$300	$1,800,300
Add hand search stations	30	$2,000	$300	$60,300
New cabin baggage X-ray with TIP	8	$55,000	$320	$440,320
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	200	$1,000	$8,000	$208,000
Add new doors with controls (CR/KP)	50	$2,000	$4,000	$104,000
New Consoles (3 bay) with operator equipment	6	$50,000	$7,200	$307,200
Central computer with software	4	$75,000	$320	$300,320
typical cable conduit per door	250	$1,500	$5,000	$380,000
CCTV system in terminals				
New indoor cameras (ceiling, pendant or wall mount)	300	$1,500	$12,000	$462,000
New outdoor cameras (ceiling, pendant or wall mount)	150	$2,000	$12,000	$312,000
Digital recorder (per 8 cameras)	80	$10,000	$1,600	$801,600
Operator stations	6	$100,000	$1,200	$601,200
Matrix with ACAM link	2	$100,000	$160	$200,160
typical cable conduit per new camera	450	$1,500	$18,000	$693,000
Radio Communications	2	$40,000	$80	$80,080
Telephone system upgrade	2	$20,000	$80	$40,080
Total Terminal System Repair and Upgrade				$11,103,900
Personnel (annual)				
Terminal Entry	288	$10,560		$3,041,280
Passenger Checkpoint	207	$10,560		$2,185,920
ACAM & CCTV System Support	72	$10,560		$760,320
Employee Checkpoints	41	$10,560		$427,680
Door Control	5	$10,560		$52,800
Patrols	20	$10,560		$211,200
Total	633			$6,679,200
Training (Annual)	633	$609		$385,390
Maintenance (Annual)				$499,676

Table 9: Soekarno-Hatta Annual Cargo Security Operations and Maintenance Costs

	Number of Items	Unit Cost	Installation Costs	Total Cost
Cargo Inspection X-ray	3	$200,000	$240	$600,240
Add ETD	10	$60,000	$100	$600,100
Add hand search stations	10	$5,000	$400	$50,400
Total Capital Costs				$1,250,740
Personnel Costs (Annual)	117	$10,560		$1,235,520
Training Costs (Annual)				$71,290
Maintenance Costs (Annual)				$56,283

Table 10: Soekarno-Hatta Catering Annual Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	40	$1,000	$1,600	$41,600
Add new doors with controls (CR/KP)	10	$2,000	$800	$20,800
New Consoles (1bay) with operator equipment	2	$25,000	$2,400	$52,400
Central computer with software	2	$30,000	$160	$60,160
typical cable conduit per door	50	$1,500	$1,000	$76,000
CCTV system in catering (two independent facilities)				
New indoor cameras (ceiling, pendant or wall mount)	50	$1,500	$2,000	$77,000
New outdoor cameras (ceiling, pendant or wall mount)	20	$2,000	$1,600	$41,600
Digital recorder (per 8 cameras)	10	$10,000	$200	$100,200
Operator stations	2	$20,000	$400	$40,400
Matrix with ACAM link	2	$25,000	$160	$50,160
typical cable conduit per new camera	70	$1,500	$2,800	$107,800
Total Catering Integrated ACAM CCTV Systems				$668,120
Personnel Costs (Annual)	63	$10,560		$665,280
Training Costs (Annual)	63	$609		$38,387
Maintenance Costs (Annual)				$30,065

2.3 SAFETY PURCHASE AND INSTALLATION COSTS

The purchase and installation costs required for the recommended improvements to safety are approximately $3.9 million for Soekarno-Hatta. The breakdown of these costs is given in the table below.

Table 11: Soekarno-Hatta Safety Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Charts, documents and miscellaneous	1	lot	$25,000	$25,000	400	400	$5	$2,000	$27,000
Emergency Communications and Consoles (EOC and CP) and Bomb Threat Response Equipment	1	lot	$25,000	$25,000	40	40	$5	$200	$25,200
Emergency Public Notification System	1	each	$40,000	$40,000	80	80	$5	$400	$40,400
Equipment for aircraft removal update w/provision for crane service	1	lot	$500,000	$500,000	120	120	$5	$600	$500,600
Direct burial feeds to Navigation & Radar Aids	10,000	meters	$300	$3,000,000	1	10,000	$5	$50,000	$3,050,000
Anti blocking communications system	1	each	$50,000	$50,000	8	8	$5	$40	$50,040
ATCT master communications system	1	each (shared)	$250,000	$250,000	200	200	$5	$1,000	$251,000
				$3,890,000				$54,240	$3,944,240

2.4 SAFETY MAINTENANCE AND OPERATIONS COSTS

Annual maintenance, personnel, and training costs for the recommended safety improvements at Soekarno-Hatta are approximately $12.7 million. These costs are summarized in the tables below.

Table 12: Soekarno-Hatta Security and Safety Personnel and Maintenance Annual Costs

Personnel (annual)	$11,193,600
Training (Annual)	$645,871
Maintenance (Annual)	$884,283
Total	$12,723,754

Table 13: Soekarno-Hatta Annual Safety Operations and Maintenance Costs

	Number of Items	Unit Cost	Installation Costs	Total Cost
Charts, documents and miscellaneous	1	$25,000	$2,000	$27,000
Emergency Communications and Consoles (EOC and CP) and Bomb Threat Response Equipment	1	$25,000	$200	$25,200
Emergency Public Notification System	1	$40,000	$400	$40,400
Equipment for aircraft removal update w/provision for crane service	1	$500,000	$600	$500,600
Direct burial feeds to Navigation & Radar Aids	10,000	$300	$50,000	$3,050,000
Anti blocking communications system	1	$50,000	$40	$50,040
ATCT master communications system	1	$250,000	$1,000	$251,000
Total Capital Costs				**$3,944,240**
Personnel Costs (Annual)	9	$10,560		$95,040
Training Costs (Annual)				$5,484
Maintenance Costs (Annual)				$177,491

2.5 TOTAL SAFETY AND SECURITY INVESTMENT COSTS

Total capital investment costs for the recommended improvements to security and safety are summarized in the two charts below. The table provides an indication of the total investment cost requirements from 2009 to 2019 for Soekarno-Hatta. These costs include capital costs plus personnel, maintenance, and training costs.

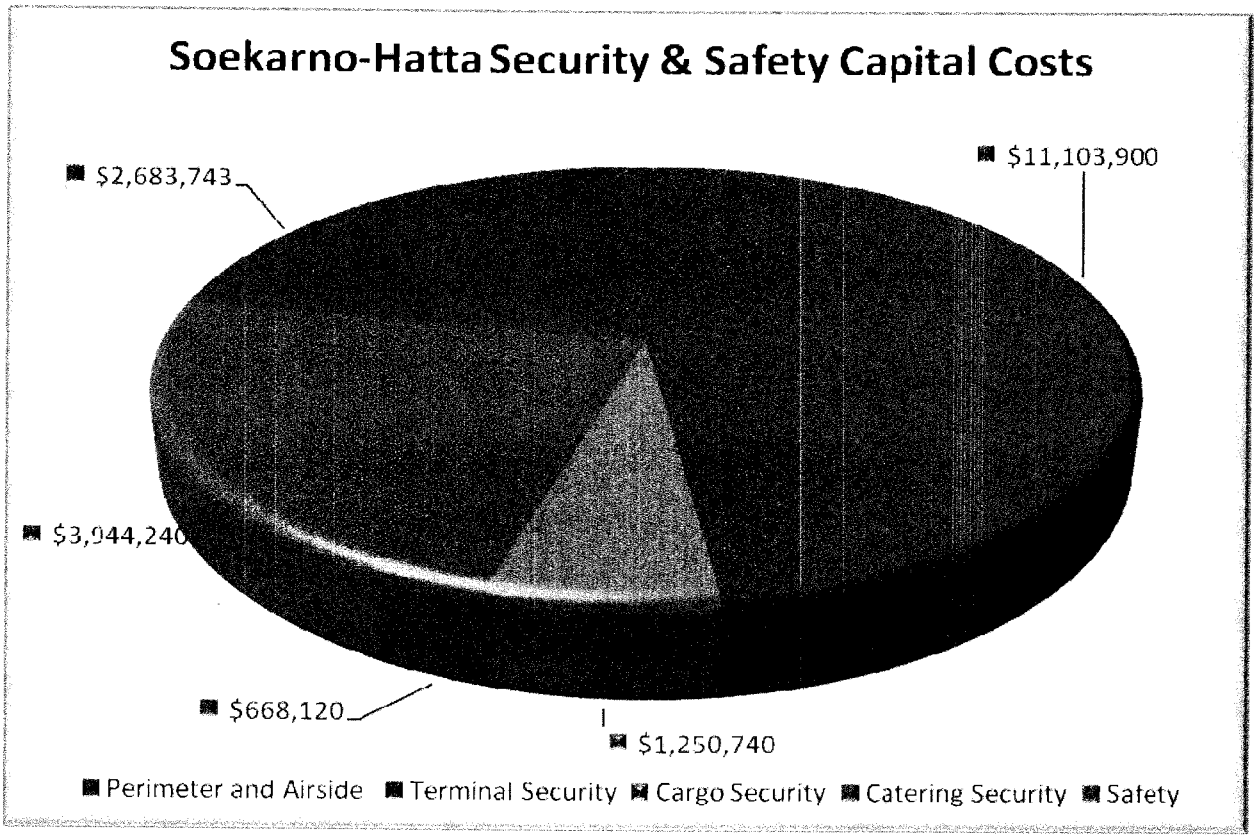

Figure 1: Soekarno-Hatta Security and Safety Capital Costs

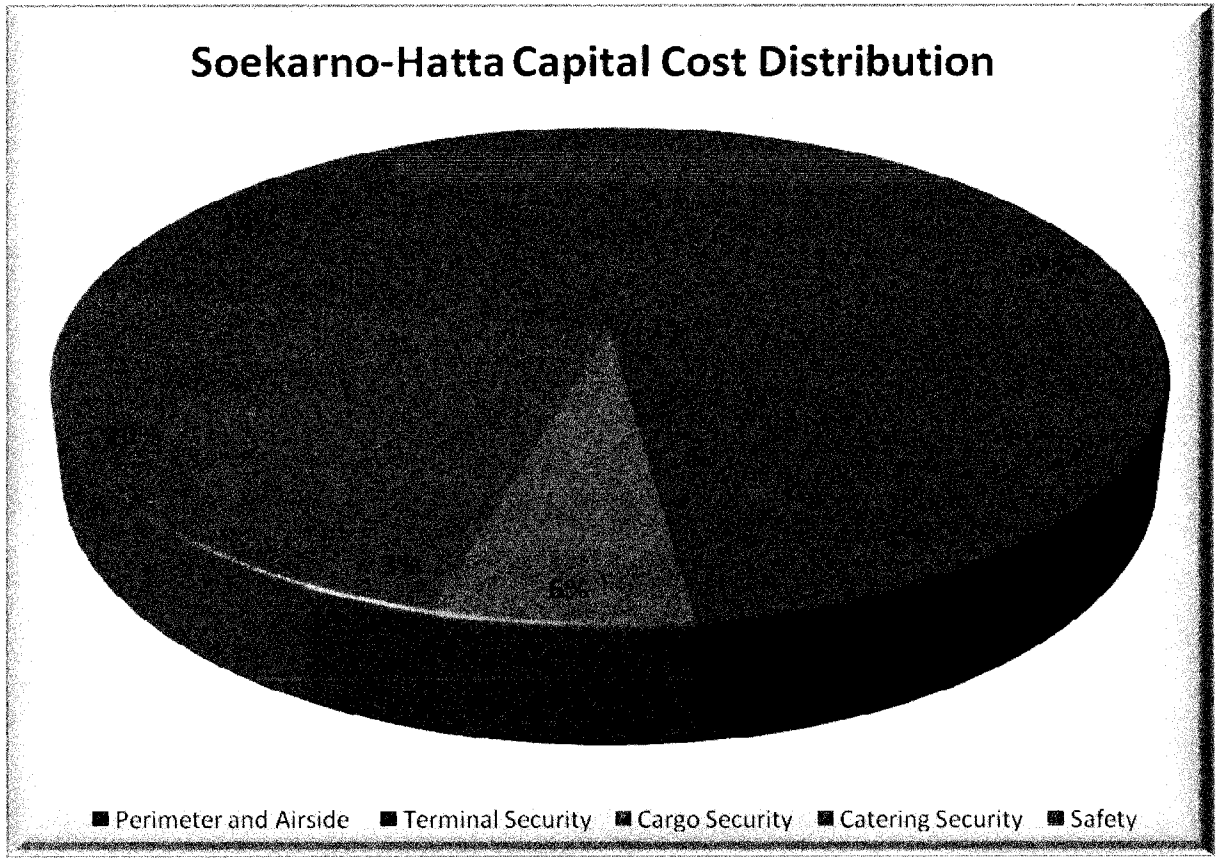

Figure 2: Soekarno-Hatta Capital Costs Distribution

Table 14: Soekarno-Hatta Total Investment Costs

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$19,650,743										
Personnel Costs (Annual)	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520	$9,815,520
Training Costs (Annual)	$566,356	$566,356	$566,356	$566,356	$566,356	$566,356	$566,356	$566,356	$566,356	$566,356	$566,356
Maintenance Costs (Annual)	$884,283	$884,283	$884,283	$884,283	$884,283	$884,283	$884,283	$884,283	$884,283	$884,283	$884,283
Total Investment Costs	$30,916,901	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159

3. NGURA RAI INTERNATIONAL AIRPORT IN BALI

3.1 CAPITAL COSTS FOR SECURITY

The total capital investment costs for the recommended security improvements at Ngura Rai are approximately $10.2 million. These costs include the purchase and installation of the security equipment and systems. The breakout of the total is given in the table below.

Table 15: Total Capital Investment Costs for Security at Ngura Rai

Area Security	
Perimeter System Repair and Upgrade	$1,202,238
Terminal System Repair and Upgrade	$4,359,400
Cargo System Repair and Upgrade	$660,360
Catering Integrated ACAM CCTV Systems	$441,000
Total Installation Labor & Materials	$6,662,998
Mobilization	$250,000
Engineering Preparation	$666,300
Spares	$652,935
Warranty Period	$666,300
Subtotal	$8,898,532
Contingency	$1,334,780
GRAND TOTAL	**$10,233,312**

The specific components of the security investment costs are provided in the tables below.

Table 16: Ngura Rai Perimeter and Airside Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Perimeter Fence Mayor	4,703	meters	$100	$470,250	1	4,703	$5	$23,513	$493,763
Fence Sensors	990	each	$20	$19,800	1	495	$5	$2,475	$22,275
CCTV on existing pole (refurbish)	0	each	$2,500	$0	8	0	$5	$0	$0
CCTV on new pole	50	each	$5,000	$250,000	12	600	$5	$3,000	$253,000
Lighting on pole shared with CCTV	20	each	$1,500	$30,000	6	120	$5	$600	$30,600
Replace Perimeter Alarm - CCTV Console	3	each	$50,000	$150,000	240	720	$5	$3,600	$153,600
Perimeter cabling	11,880	meters	$10	$118,800	1	11,880	$5	$59,400	$178,200
Radio Communications (existing base antenna)	1	lot	$50,000	$50,000	80	80	$5	$400	$50,400
Telephone system upgrade	1	lot	$20,000	$20,000	80	80	$5	$400	$20,400
Total Perimeter System Repair and Upgrade									$1,202,238

Table 17: Ngura Rai Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Entry Checkpoint relocate X-ray (2005) to bag room	4	each	$5,000	$20,000	100	400	$5	$2,000	$22,000
Upgrade X-ray Software/hardware for TIP	4	each	$20,000	$80,000	16	64	$5	$320	$80,320
Add ETD	6	each	$60,000	$360,000	2	12	$5	$60	$360,060
Add hand search stations	6	each	$2,000	$12,000	2	12	$5	$60	$12,060
New AT Baggage X-ray with TIP	2	each	$300,000	$600,000	16	32	$5	$160	$600,160
							$5		
PASSENGER CHECKPOINT									
Upgrade X-ray Software/hardware for TIP	8	each	$20,000	$160,000	16	128	$5	$640	$160,640
Add ETD	13	each	$60,000	$780,000	2	26	$5	$130	$780,130
Add hand search stations	13	each	$2,000	$26,000	2	26	$5	$130	$26,130
New cabin baggage X-ray with TIP	5	each	$55,000	$275,000	8	40	$5	$200	$275,200
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	100	each	$1,000	$100,000	8	800	$5	$4,000	$104,000
Add new doors with controls (CR/KP)	20	each	$2,000	$40,000	16	320	$5	$1,600	$41,600
New Consoles (3 bay) with operator equipment	2	each	$50,000	$100,000	240	480	$5	$2,400	$102,400
Central computer with software	2	each	$75,000	$150,000	16	32	$5	$160	$150,160
typical cable conduit per door	120	lot	$1,500	$180,000	4	480	$5	$2,400	$182,400
CCTV system in terminals									
New indoor cameras (ceiling, pendant or wall mount)	120	each	$1,500	$180,000	8	960	$5	$4,800	$184,800
New outdoor cameras (ceiling, pendant or wall mount)	50	each	$2,000	$100,000	16	800	$5	$4,000	$104,000
Digital recorder (per 8 cameras)	45	lot	$10,000	$450,000	4	180	$5	$900	$450,900
Operator stations	2	lot	$100,000	$200,000	40	80	$5	$400	$200,400
Matrix with ACAM link	2	each	$100,000	$200,000	16	32	$5	$160	$200,160
typical cable conduit per new camera	170	each	$1,500	$255,000	8	1,360	$5	$6,800	$261,800
Radio Communications	1	lot	$40,000	$40,000	8	8	$5	$40	$40,040
Telephone system upgrade	1	lot	$20,000	$20,000	8	8	$5	$40	$20,040
Total Terminal System Repair and Upgrade									$4,359,400

Table 18: Ngura Rai Cargo Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Cargo Inspection X-ray	2	each	$200,000	$400,000	16	32	$5	$160	$400,160
Add ETD	4	each	$60,000	$240,000	2	8	$5	$40	$240,040
Add hand search stations	4	each	$5,000	$20,000	8	32	$5	$160	$20,160
Total Cargo System Repair and Upgrade									$660,360

Table 19: Ngura Rai Catering Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	20	each	$1,000	$20,000	8	160	$5	$800	$20,800
Add new doors with controls (CR/KP)	5	each	$2,000	$10,000	16	80	$5	$400	$10,400
New Consoles (1bay) with operator equipment	2	each	$25,000	$50,000	240	480	$5	$2,400	$52,400
Central computer with software	2	each	$30,000	$60,000	16	32	$5	$160	$60,160
typical cable conduit per door	25	lot	$1,500	$37,500	4	100	$5	$500	$38,000
CCTV system in catering (two independent facilities)									
New indoor cameras (ceiling, pendant or wall mount)	30	each	$1,500	$45,000	8	240	$5	$1,200	$46,200
New outdoor cameras (ceiling, pendant or wall mount)	10	each	$2,000	$20,000	16	160	$5	$800	$20,800
Digital recorder (per 8 cameras)	4	lot	$10,000	$40,000	4	16	$5	$80	$40,080
Operator stations	2	lot	$20,000	$40,000	40	80	$5	$400	$40,400
Matrix with ACAM link	2	each	$25,000	$50,000	16	32	$5	$160	$50,160
typical cable conduit per new camera	40	each	$1,500	$60,000	8	320	$5	$1,600	$61,600
Total Catering Integrated ACAM CCTV Systems									$441,000

3.2 MAINTENANCE, PERSONNEL, AND TRAINING COSTS FOR SECURITY

The annual maintenance, personnel, and training costs for the recommended security improvements at Ngura Rai are approximately $5.4 million. The breakdown of the total is given in the table below.

Table 20: Ngura Rai Security Personnel and Maintenance Annual Costs

Personnel (annual)	$4,794,240
Training (Annual)	$276,628
Maintenance (Annual)	$305,262
Total	$5,376,130

The annual maintenance, personnel, and training costs for the security improvements to each of the security components are given in detail in the tables below.

Table 21: Ngura Rai Annual Perimeter and Airside Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Number of Gates	3	$40,000	$600.00	$120,600
Perimeter Fence	4,703	$100	$23,513	$493,763
Fence Sensors	990	$20	$2,475	$22,275
CCTV on existing pole (refurbish)	0	$2,500	$0	$0
CCTV on new pole	50	$5,000	$3,000	$253,000
Lighting on pole shared with CCTV	20	$1,500	$600	$30,600
Replace Perimeter Alarm - CCTV Console	3	$50,000	$3,600	$153,600
Perimeter cabling	11,880	$10	$59,400	$178,200
Radio Communications (existing base antenna)	1	$100,000	$400	$50,400
Telephone system upgrade	1	$20,000	$400	$20,400
Total Perimeter System Repair and Upgrade				$1,322,838
Personnel	54.0	$10,560		$570,240
Personnel Training	54.0	$609		$32,903
Maintenance				$59,528

Table 22: Ngura Rai Annual Terminal Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Entry Checkpoint relocate X-ray (2005) to bag room	4	$5,000	$2,000	$22,000
Upgrade X-ray Software/hardware for TIP	4	$20,000	$320	$80,320
Add ETD	6	$60,000	$60	$360,060
Add hand search stations	6	$2,000	$60	$12,060
New AT Baggage X-ray with TIP	2	$200,000	$160	$600,160
PASSENGER CHECKPOINT				
Upgrade X-ray Software/hardware for TIP	8	$20,000	$640	$160,640
Add ETD	13	$60,000	$130	$780,130
Add hand search stations	13	$2,000	$130	$26,130
New cabin baggage X-ray with TIP	5	$55,000	$200	$275,200
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	100	$1,000	$4,000	$104,000
Add new doors with controls (CR/KP)	20	$2,000	$1,600	$41,600
New Consoles (3 bay) with operator equipment	2	$50,000	$2,400	$102,400
Central computer with software	2	$75,000	$160	$150,160
typical cable conduit per door	120	$1,500	$2,400	$182,400
CCTV system in terminals				
New indoor cameras (ceiling, pendant or wall mount)	120	$1,500	$4,800	$184,800
New outdoor cameras (ceiling, pendant or wall mount)	50	$2,000	$4,000	$104,000
Digital recorder (per 8 cameras)	45	$10,000	$900	$450,900
Operator stations	2	$100,000	$400	$200,400
Matrix with ACAM link	2	$100,000	$160	$200,160
typical cable conduit per new camera	170	$1,500	$6,800	$261,800
Radio Communications	1	$40,000	$40	$40,040
Telephone system upgrade	1	$20,000	$40	$20,040
Total Terminal System Repair and Upgrade				$4,359,400
Personnel (annual)				
Terminal Entry	72	$10,560		$760,320
Passenger Checkpoint	103.5	$10,560		$1,092,960
ACAM & CCTV System Support	72	$10,560		$760,320
Employee Checkpoints	18	$10,560		$190,080
Door Control	2	$10,560		$21,120
Patrols	20	$10,560		$211,200
Total	287.5			$3,036,000
Training	287.5	$609		$175,177
Maintenance				$196,173

Table 23: Ngura Rai Annual Cargo Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Cargo Inspection X-ray	2	$200,000	$160	$400,160
Add ETD	4	$60,000	$40	$240,040
Add hand search stations	4	$5,000	$160	$20,160
Total Capital Costs				$660,360
Personnel Costs (Annual)	54	$10,560		$570,240
Training Costs (Annual)				$32,903
Maintenance Costs (Annual)				$29,716

Table 24: Ngura Rai Catering Annual Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	20	$1,000	$800	$20,800
Add new doors with controls (CR/KP)	5	$2,000	$400	$10,400
New Consoles (1bay) with operator equipment	2	$25,000	$2,400	$52,400
Central computer with software	2	$30,000	$160	$60,160
typical cable conduit per door	25	$1,500	$500	$38,000
CCTV system in catering (two independent facilities)				
New indoor cameras (ceiling, pendant or wall mount)	30	$1,500	$1,200	$46,200
New outdoor cameras (ceiling, pendant or wall mount)	10	$2,000	$800	$20,800
Digital recorder (per 8 cameras)	4	$10,000	$80	$40,080
Operator stations	2	$20,000	$400	$40,400
Matrix with ACAM link	2	$25,000	$160	$50,160
typical cable conduit per new camera	40	$1,500	$1,600	$61,600
Total Catering Integrated ACAM CCTV Systems				$441,000
Personnel Costs (Annual)	59	$10,560		$617,760
Training Costs (Annual)	59	$609		$35,645
Maintenance Costs (Annual)				$19,845

3.3 Safety Purchase and Installation Costs

The purchase and installation costs required for the improvements to safety are approximately $1.9 million for Ngura Rai. The breakdown of these costs is given in the table below.

Table 25: Ngurah Rai Safety Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Ngurah Rai (WRRR)									
Charts, documents and miscellaneous	1	lot	$25,000	$25,000	300	300	$5	$1,500	$26,500
Emergency Communications and Consoles (EOC and CP)	2	lot	$25,000	$50,000	40	80	$5	$400	$50,400
Scrambled Communications Units (1base and 8 portables)	1	lot	$40,000	$40,000	40	40	$5	$200	$40,200
AIS Internet Terminal Equipment	1	lot	$25,000	$25,000	80	80	$5	$400	$25,400
Emergency Public Notification System	1	each	$40,000	$40,000	40	40	$5	$200	$40,200
Direct burial feeds to Navigation & Radar Aids	6,000	meters	$100	$600,000	1	6,000	$5	$30,000	$630,000
Anti blocking communications system	1	each	$50,000	$50,000	40	40	$5	$200	$50,200
ATCT master communications system	1	shared	shared		100	100	$5		
ATCO accommodations	1	lot	$50,000	$50,000	100	100	$5	$500	$50,500
Precision Approach Instrumentation and lighting	1	approach	$1,000,000	$1,000,000	120	120	$5	$600	$1,000,600
				$1,880,000				$34,000	$1,914,000

3.4 SAFETY MAINTENANCE AND OPERATIONS COSTS

Annual maintenance, personnel, and training costs for the recommended safety improvements at Ngura Rai are approximately $0.24 million. These costs are summarized in the table below.

Table 26: Ngura Rai Annual Safety Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Charts, documents and miscellaneous	1	$25,000	$1,500	$26,500
Emergency Communications and Consoles (EOC and CP)	2	$25,000	$400	$50,400
Scrambled Communications Units (1base and 8 portables)	1	$40,000	$200	$40,200
AIS Internet Terminal Equipment	1	$25,000	$400	$25,400
Emergency Public Notification System	1	$40,000	$200	$40,200
Direct burial feeds to Navigation & Radar Aids	6,000	$100	$30,000	$630,000
Anti blocking communications system	1	$50,000	$200	$50,200
ATCT master communications system	1	shared		
ATCO accommodations	1	$50,000	$500	$50,500
Precision Approach Instrumentation and lighting	1	$1,000,000	$600	$1,000,600
Total Capital Costs				$862,900
Personnel Costs (Annual)	18	$10,560		$190,080
Training Costs (Annual)				$10,968
Maintenance Costs (Annual)				$38,831

The total annual maintenance, personnel, and training costs for the recommended security and safety improvements are approximately $5.6 million as shown in the table below.

Table 27: Ngura Rai Security and Safety Personnel and Maintenance Annual Costs

Personnel (annual)	$4,984,320
Training (Annual)	$287,595
Maintenance (Annual)	$344,092
Total	$5,616,008

3.5 TOTAL SAFETY AND SECURITY INVESTMENT COSTS

Total capital investment costs for the recommended improvements to security and safety are summarized in the two charts below. The table provides an indication of the total investment cost requirements from 2009 to 2019 for Ngura Rai. These costs include capital costs plus personnel, maintenance, and training costs.

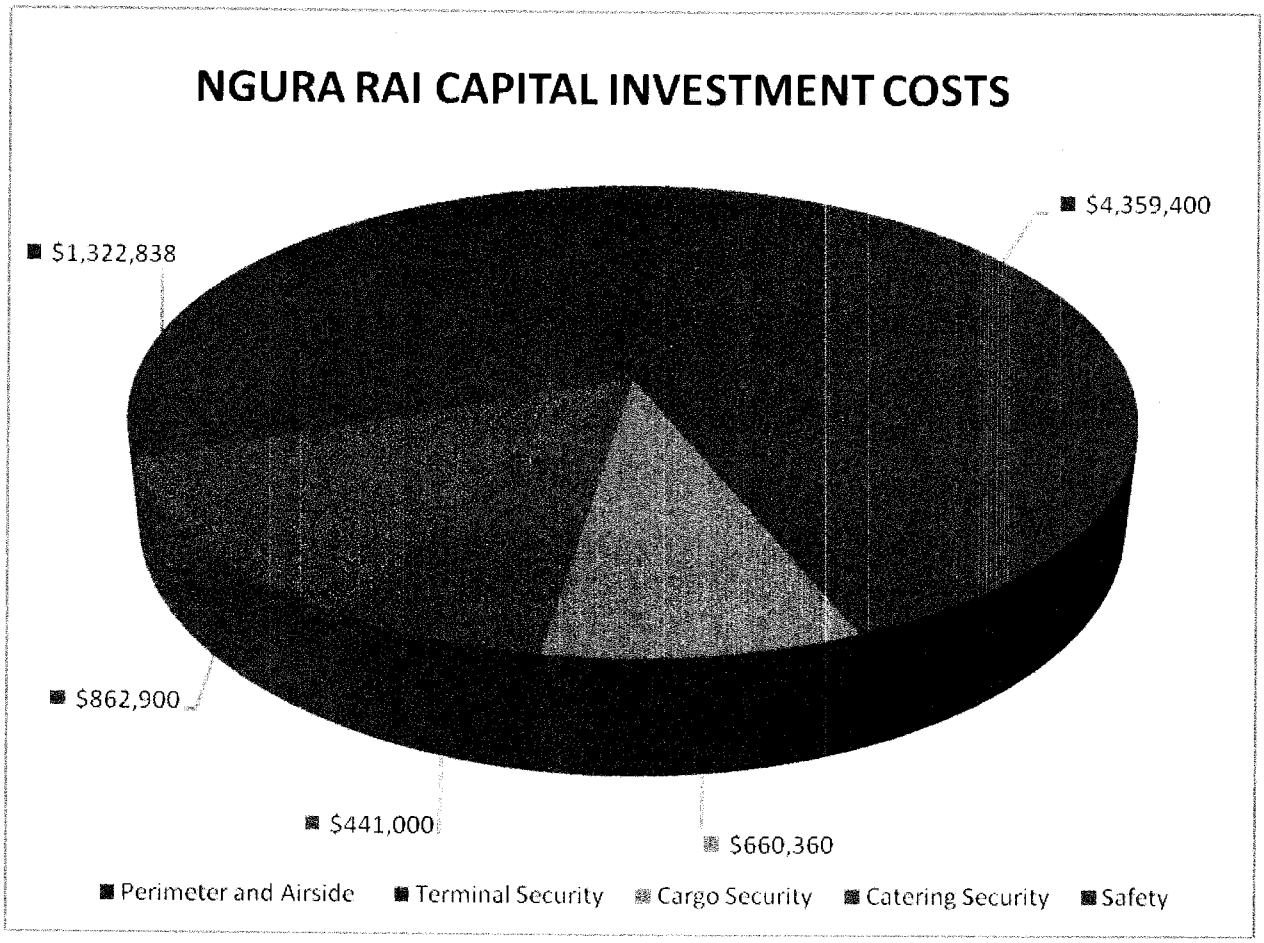

Figure 3: Ngura Rai Capital Investment Costs

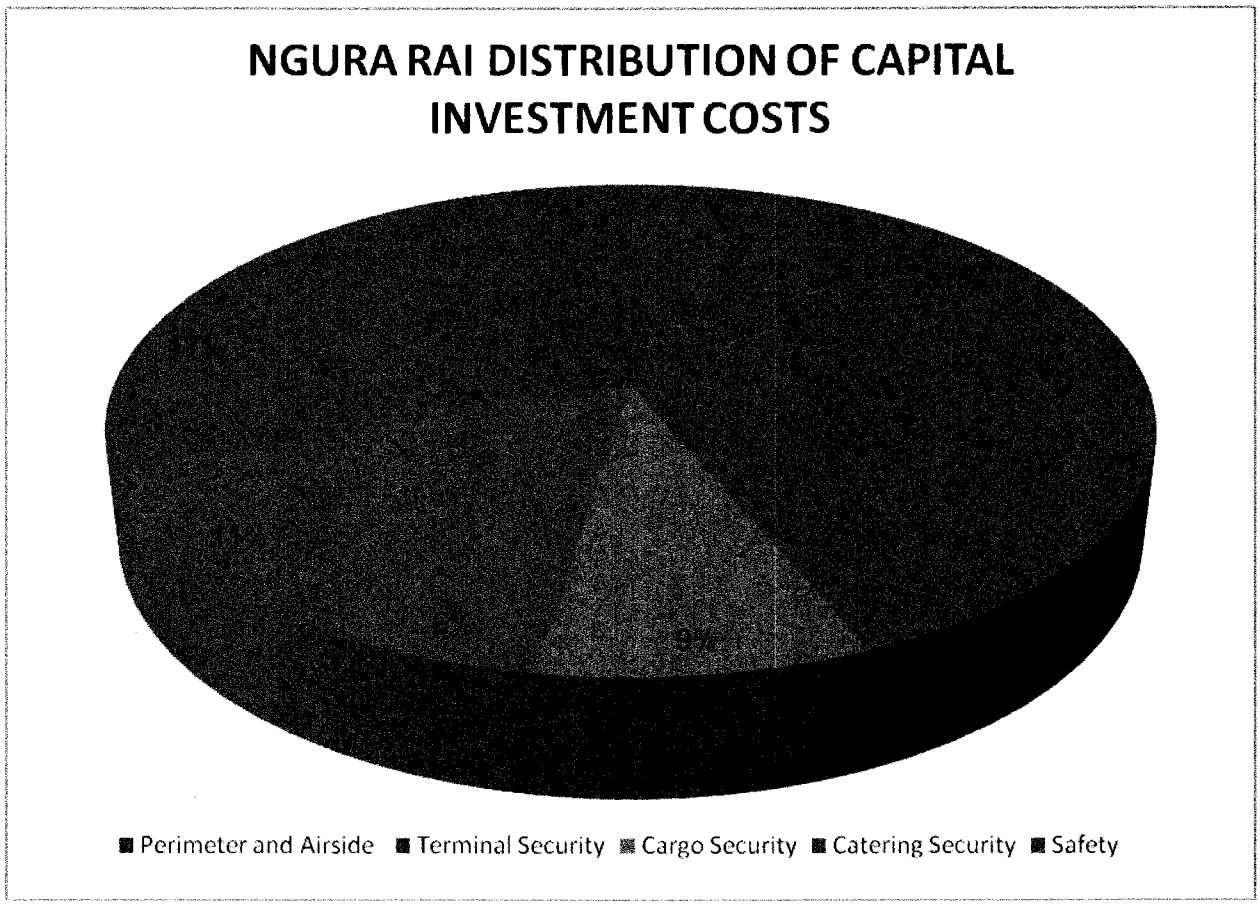

Figure 4: Ngura Rai Capital Investment Costs Distribution

4. POLONIA INTERNATIONAL AIRPORT IN MEDAN

4.1 CAPITAL COSTS FOR SECURITY

The total capital investment costs for the recommended security improvements at Polonia are approximately $6.6 million. These costs include the purchase and installation of the security equipment and systems. The breakout of the total is given in the table below.

Table 28: Total Capital Investment Costs for Security at Polonia

Area Security	
Perimeter System Repair and Upgrade	$1,063,225
Terminal System Repair and Upgrade	$2,603,900
Cargo System Repair and Upgrade	$330,180
Catering Integrated ACAM CCTV Systems	$228,320
Total Installation Labor & Materials	$4,225,625
Mobilization	$250,000
Engineering Preparation	$422,563
Spares	$412,880
Warranty Period	$422,563
Subtotal	$5,733,630
Contingency	$860,045
GRAND TOTAL	$6,593,675

The specific components of the security investment costs are provided in the tables below.

Table 29: Polonia Perimeter and Airside Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Perimeter Fence	3,895	meters	$100	$389,500	$1	$3,895	$5	$19,475	$408,975
Fence Sensors	820	each	$20	$16,400	$1	$410	$5	$2,050	$18,450
Perimeter gate	3	each	$25,000	$75,000	$80	$240	$5	$1,200	$76,200
CCTV on existing pole (refurbish)	20	each	$2,500	$50,000	$8	$160	$5	$800	$50,800
CCTV on new pole	40	each	$5,000	$200,000	$12	$480	$5	$2,400	$202,400
Lighting on pole shared with CCTV	20	each	$1,500	$30,000	$6	$120	$5	$600	$30,600
Replace Perimeter Alarm - CCTV Console	2	each	$50,000	$100,000	$240	$480	$5	$2,400	$102,400
Perimeter cabling	9,840	meters	$10	$98,400	$1	$9,840	$5	$49,200	$147,600
Radio Communications (existing base antenna)	1	lot	$20,000	$20,000	$80	$80	$5	$400	$20,400
Telephone system upgrade	1	lot	$5,000	$5,000	$80	$80	$5	$400	$5,400
Total Perimeter System Repair and Upgrade									$1,063,225

Table 30: Polonia Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Entry Checkpoint relocate X-ray (2005) to bag room	2	each	$5,000	$10,000	$100	$200	$5	$1,000	$11,000
Upgrade X-ray Software/hardware for TIP	2	each	$20,000	$40,000	$16	$32	$5	$160	$40,160
Add ETD	5	each	$60,000	$300,000	$2	$10	$5	$50	$300,050
Add handsearch stations	5	each	$2,000	$10,000	$2	$10	$5	$50	$10,050
New AT Baggage X-ray with TIP	3	each	$300,000	$900,000	$16	$48	$5	$240	$900,240
PASSENGER CHECKPOINT									
Upgrade X-ray Software/hardware for TIP	4	each	$20,000	$80,000	$16	$64	$5	$320	$80,320
Add ETD	6	each	$60,000	$360,000	$2	$12	$5	$60	$360,060
Add handsearch stations	6	each	$2,000	$12,000	$2	$12	$5	$60	$12,060
New cabin baggage X-ray with TIP	2	each	$55,000	$110,000	$8	$16	$5	$80	$110,080
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	40	each	$1,000	$40,000	$8	$320	$5	$1,600	$41,600
Add new doors with controls (CR/KP)	10	each	$2,000	$20,000	$16	$160	$5	$800	$20,800
New Consoles (3 bay) with operator equipment	1	each	$50,000	$50,000	$240	$240	$5	$1,200	$51,200
Central computer with software	1	each	$75,000	$75,000	$16	$16	$5	$80	$75,080
typical cable conduit per door	50	lot	$1,500	$75,000	$4	$200	$5	$1,000	$76,000
CCTV system in terminals									
New indoor cameras (ceiling, pendant or wall mount)	50	each	$1,500	$75,000	$8	$400	$5	$2,000	$77,000
New outdoor cameras (ceiling, pendant or wall mount)	14	each	$2,000	$28,000	$16	$224	$5	$1,120	$29,120
Digital recorder (per 8 cameras)	8	lot	$10,000	$80,000	$4	$32	$5	$160	$80,160
Operator stations	1	lot	$100,000	$100,000	$40	$40	$5	$200	$100,200
Matrix with ACAM link	1	each	$100,000	$100,000	$16	$16	$5	$80	$100,080
typical cable conduit per new camera	64	each	$1,500	$96,000	$8	$512	$5	$2,560	$98,560
Radio Communications	1	lot	$20,000	$20,000	$8	$8	$5	$40	$20,040
Telephone system upgrade	1	lot	$10,000	$10,000	$8	$8	$5	$40	$10,040
Total Terminal Integrated ACAM CCTV System Repair and Upgrade									$2,603,900

Table 31: Polonia Cargo Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Cargo Inspection X-ray	1	each	$200,000	$200,000	$16	$16	$5	$80	$200,080
Add ETD	2	each	$60,000	$120,000	$2	$4	$5	$20	$120,020
Add handsearch stations	2	each	$5,000	$10,000	$8	$16	$5	$80	$10,080
Total Cargo System Repair and Upgrade									$330,180

Table 32: Polonia Catering Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	20	each	$1,000	$20,000	$8	$160	$5	$800	$20,800
Add new doors with controls (CR/KP)	5	each	$2,000	$10,000	$16	$80	$5	$400	$10,400
New Consoles (1bay) with operator equipment	1	each	$25,000	$25,000	$240	$240	$5	$1,200	$26,200
Central computer with software	1	each	$30,000	$30,000	$16	$16	$5	$80	$30,080
typical cable conduit per door	25	lot	$1,500	$37,500	$4	$100	$5	$500	$38,000
CCTV system in catering (two independent facilities)									
New indoor cameras (ceiling, pendant or wall mount)	10	each	$1,500	$15,000	$8	$80	$5	$400	$15,400
New outdoor cameras (ceiling, pendant or wall mount)	6	each	$2,000	$12,000	$16	$96	$5	$480	$12,480
Digital recorder (per 8 cameras)	2	lot	$10,000	$20,000	$4	$8	$5	$40	$20,040
Operator stations	1	lot	$15,000	$15,000	$40	$40	$5	$200	$15,200
Matrix with ACAM link	1	each	$15,000	$15,000	$16	$16	$5	$80	$15,080
typical cable conduit per new camera	16	each	$1,500	$24,000	$8	$128	$5	$640	$24,640
Total Catering Integrated ACAM CCTV Systems									$228,320

4.2 MAINTENANCE, PERSONNEL, AND TRAINING COSTS FOR SECURITY

The annual maintenance, personnel, and training costs for the recommended security improvements at Polonia are approximately $3.5 million. The breakdown of the total is given in the table below.

Table 33: Polonia Security Personnel and Maintenance Annual Costs

Personnel (annual)	$3,120,480
Training (Annual)	$180,052
Maintenance (Annual)	$192,151
Total	$3,492,683

The annual maintenance, personnel, and training costs for the security improvements to each of the security components are given in detail in the tables below.

Table 34: Polonia Annual Perimeter and Airside Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Number of Gates	3	$40,000	$600	$120,600
Perimeter Fence	3,895	$100	$19,475	$408,975
Fence Sensors	820	$20	$2,050	$18,450
CCTV on existing pole (refurbish)	20	$2,500	$800	$50,800
CCTV on new pole	40	$5,000	$2,400	$202,400
Lighting on pole shared with CCTV	20	$1,500	$600	$30,600
Replace Perimeter Alarm - CCTV Console	2	$50,000	$2,400	$102,400
Perimeter cabling	9,840	$10	$49,200	$147,600
Radio Communications (existing base antenna)	1	$100,000	$400	$20,400
Telephone system upgrade	1	$20,000	$400	$5,400
Total Perimeter System Repair and Upgrade				$1,107,625
Personnel (Annual)	54.0	$10,560		$570,240
Personnel Training	54.0	$609		$32,903
Maintenance				$49,843

Table 35: Polonia Annual Terminal Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Entry Checkpoint relocate X-ray (2005) to bag room	2	$5,000	$1,000	$11,000
Upgrade X-ray Software/hardware for TIP	2	$20,000	$160	$40,160
Add ETD	5	$60,000	$50	$300,050
Add handsearch stations	5	$2,000	$50	$10,050
New AT Baggage X-ray with TIP	3	$200,000	$240	$900,240
PASSENGER CHECKPOINT				
Upgrade X-ray Software/hardware for TIP	4	$20,000	$320	$80,320
Add ETD	6	$60,000	$60	$360,060
Add handsearch stations	6	$2,000	$60	$12,060
New cabin baggage X-ray with TIP	2	$55,000	$80	$110,080
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	40	$1,000	$1,600	$41,600
Add new doors with controls (CR/KP)	10	$2,000	$800	$20,800
New Consoles (3 bay) with operator equipment	1	$50,000	$1,200	$51,200
Central computer with software	1	$75,000	$80	$75,080
typical cable conduit per door	50	$1,500	$1,000	$76,000
CCTV system in terminals				
New indoor cameras (ceiling, pendant or wall mount)	50	$1,500	$2,000	$77,000
New outdoor cameras (ceiling, pendant or wall mount)	14	$2,000	$1,120	$29,120
Digital recorder (per 8 cameras)	8	$10,000	$160	$80,160
Operator stations	1	$100,000	$200	$100,200
Matrix with ACAM link	1	$100,000	$80	$100,080
typical cable conduit per new camera	64	$1,500	$2,560	$98,560
Radio Communications	1	$40,000	$40	$20,040
Telephone system upgrade	1	$20,000	$40	$10,040
Total Terminal System Repair and Upgrade				$2,603,900
Personnel (annual)				
Terminal Entry	72	$10,560		$760,320
Passenger Checkpoint	45	$10,560		$475,200
ACAM & CCTV System Support	36	$10,560		$380,160
Employee Checkpoints	9	$10,560		$95,040
Door Control	1	$10,560		$10,560
Patrols	20	$10,560		$211,200
Total	183			$1,932,480
Training (Annual)	183	$609		$111,504
Maintenance (Annual)				$117,176

Table 36: Polonia Annual Cargo Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Cargo Inspection X-ray	1	$200,000	$80	$200,080
Add ETD	2	$60,000	$20	$120,020
Add handsearch stations	2	$5,000	$80	$10,080
Total Capital Costs				$330,180
Personnel Costs (Annual)	27	$10,560		$285,120
Training Costs (Annual)				$16,451
Maintenance Costs (Annual)				$14,858

Table 37: Polonia Catering Annual Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	20	$1,000	$800	$20,800
Add new doors with controls (CR/KP)	5	$2,000	$400	$10,400
New Consoles (1bay) with operator equipment	1	$25,000	$1,200	$26,200
Central computer with software	1	$30,000	$80	$30,080
typical cable conduit per door	25	$1,500	$500	$38,000
CCTV system in catering (two independent facilities)				
New indoor cameras (ceiling, pendant or wall mount)	10	$1,500	$400	$15,400
New outdoor cameras (ceiling, pendant or wall mount)	6	$2,000	$480	$12,480
Digital recorder (per 8 cameras)	2	$10,000	$40	$20,040
Operator stations	1	$20,000	$200	$15,200
Matrix with ACAM link	1	$25,000	$80	$15,080
typical cable conduit per new camera	16	$1,500	$640	$24,640
Total Catering Integrated ACAM CCTV Systems				$228,320
Personnel Costs (Annual)	32	$10,560		$332,640
Training Costs (Annual)	32	$609		$19,193
Maintenance Costs (Annual)				$10,274

4.3 Safety Purchase and Installation Costs

The purchase and installation costs required for the improvements to safety are approximately $2.9 million for Polonia. The breakdown of these costs is given in the table below.

Table 38: Polonia Safety Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Polonia (WIMM)									
Charts, documents and miscellaneous	1	lot	$25,000	$25,000	120	120	$5	$600	$25,600
Emergency Communications and Consoles (EOC and CP)	1	lot	$25,000	$25,000	40	40	$5	$200	$25,200
AIS Internet Terminal Equipment	1	lot	$25,000	$25,000	80	80	$5	$400	$25,400
Emergency Public Notification System (911)	1	shared	$40,000	$40,000	40	40	$5	$200	$40,200
Equipment for aircraft removal update w/provision for crane service	1	each	$300,000	$300,000	40	40	$5	$200	$300,200
Direct burial feeds to Navigation & Radar Aids	4,000	meters	$100	$400,000	2	8,000	$5	$40,000	$440,000
Airfield lighting and signage	1	lot	$50,000	$50,000	40	40	$5	$200	$50,200
Anti blocking communications system	1	each	$50,000	$50,000	20	20	$5	$100	$50,100
ATC Information Systems repair and upgrade	1	lot	$50,000	$50,000	40	40	$5	$200	$50,200
ATCT master communications system	1	shared	shared				$5		
ATCO accommodations	1	lot	$50,000	$50,000	100	100	$5	$500	$50,500
Precision Approach Instrumentation and lighting	1	approach	$1,000,000	$1,000,000	120	120	$5	$600	$1,000,600
Movement Area Maintenance	1	lot	$850,000	$850,000	80	80	$5	$400	$850,400
Cellular radio units and supplies	1	lot	$5,000	$5,000	20	20	$5	$100	$5,100
				$2,870,000				$43,700	$2,913,700

4.4 SAFETY MAINTENANCE AND OPERATIONS COSTS

Annual maintenance, personnel, and training costs for the recommended safety improvements at Polonia are approximately $0.19 million. These costs are summarized in the table below.

Table 39: Polonia Annual Safety Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Charts, documents and miscellaneous	1	$25,000	$600	$25,600
Emergency Communications and Consoles (EOC and CP)	1	$25,000	$200	$25,200
AIS Internet Terminal Equipment	1	$25,000	$400	$25,400
Emergency Public Notification System (911)	1	$40,000	$200	$40,200
Equipment for aircraft removal update w/provision for crane service	1	$300,000	$200	$300,200
Direct burial feeds to Navigation & Radar Aids	4,000	$100	$40,000	$440,000
Airfield lighting and signage	1	$50,000	$200	$50,200
Anti blocking communications system	1	$50,000	$100	$50,100
ATC Information Systems repair and upgrade	1	$50,000	$200	$50,200
ATCT master communications system	1	shared		
ATCO accommodations	1	$50,000	$500	$50,500
Precision Approach Instrumentation and lighting	1	$1,000,000	$600	$1,000,600
Movement Area Maintenance	1	$850,000	$400	$850,400
Cellular radio units and supplies	1	$5,000	$100	$5,100
Total Capital Costs				$906,800
Personnel Costs (Annual)	13.5	$10,560		$142,560
Training Costs (Annual)				$8,226
Maintenance Costs (Annual)				$40,806

The total annual maintenance, personnel, and training costs for the recommended security and safety improvements are approximately $3.7 million as shown in the table below.

Table 40: Polonia Security and Safety Personnel and Maintenance Annual Costs

Personnel (annual)	$3,263,040
Training (Annual)	$188,277
Maintenance (Annual)	$232,957
Total	$3,684,275

4.5 TOTAL SAFETY AND SECURITY INVESTMENT COSTS

Total capital investment costs for the recommended improvements to security and safety are summarized in the two charts below. The table provides an indication of the total investment cost requirements from 2009 to 2019 for Polonia. These costs include capital costs plus personnel, maintenance, and training costs.

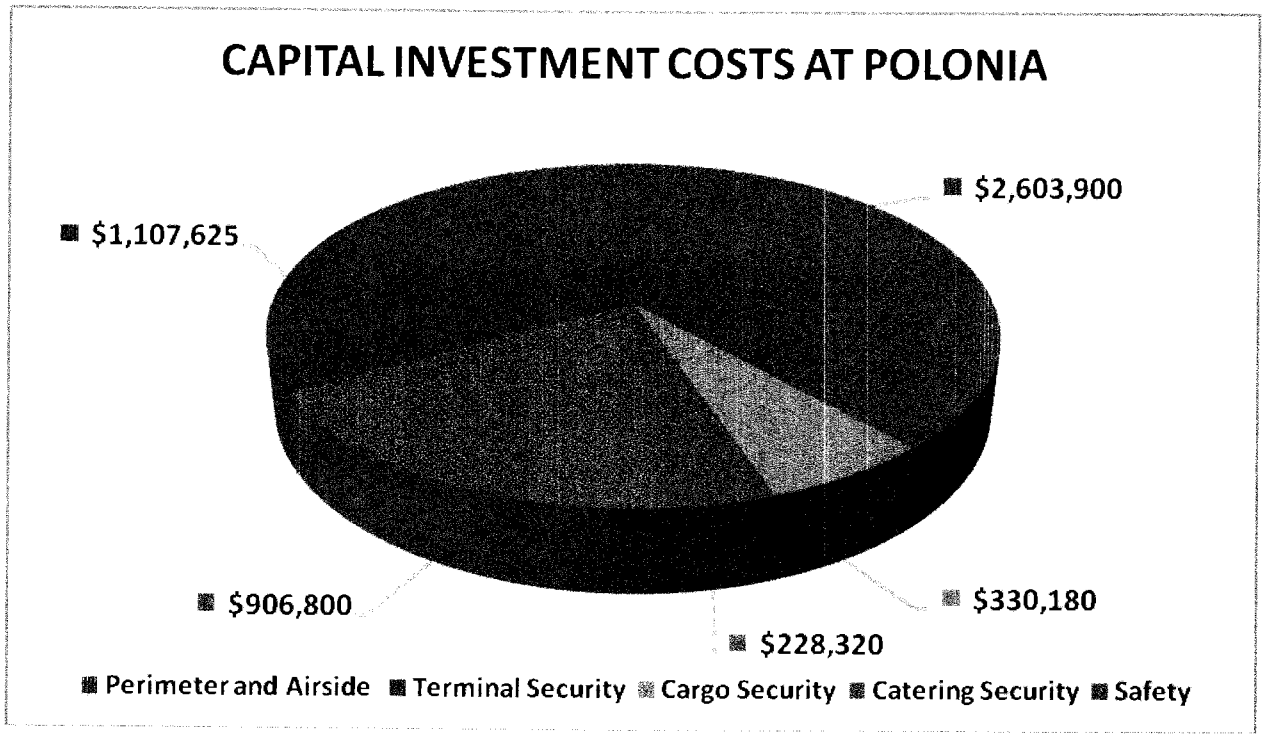

Figure 5: Capital Investment Costs at Polonia

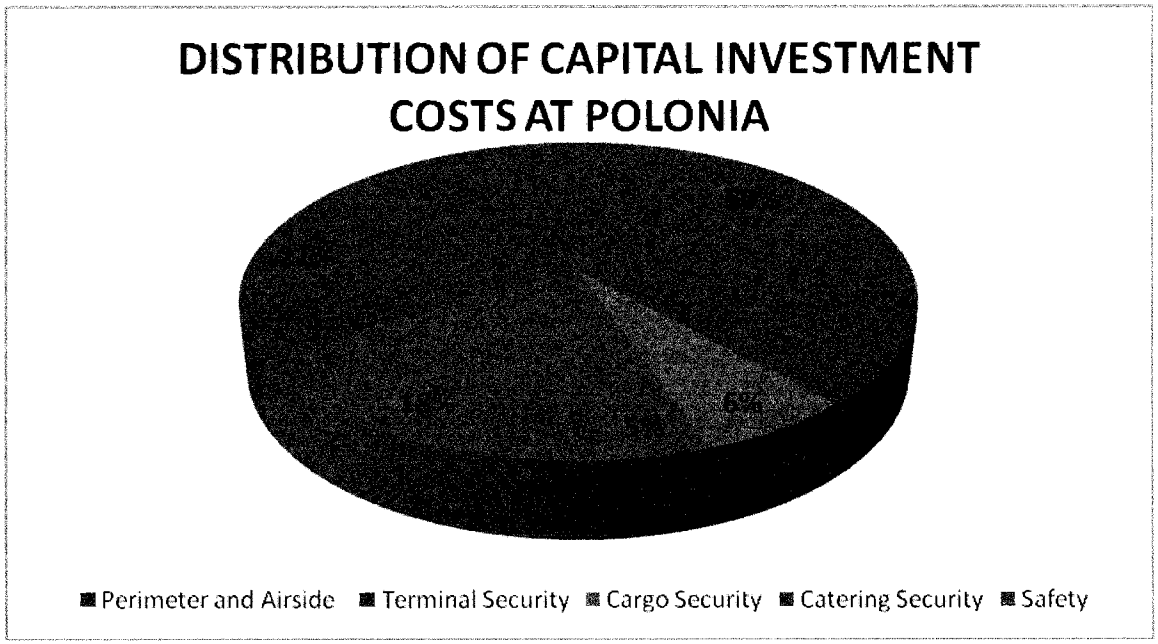

Figure 6: Distribution of Capital Investment Costs at Polonia

Table 41: Polonia Security and Safety Purchase, Installation, and O&M Costs

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$5,176,825										
Personnel Costs (Annual)	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040	$3,263,040
Training Costs (Annual)	$188,277	$188,277	$188,277	$188,277	$188,277	$188,277	$188,277	$188,277	$188,277	$188,277	$188,277
Maintenance Costs (Annual)	$232,957	$232,957	$232,957	$232,957	$232,957	$232,957	$232,957	$232,957	$232,957	$232,957	$232,957

5. SULTAN TAHA AIRPORT IN JAMBI

5.1 CAPITAL COSTS FOR SECURITY

The total capital investment costs for the recommended security improvements at Sultan Taha are approximately $3.1 million. These costs include the purchase and installation of the security equipment and systems. The breakout of the total is given in the table below.

Table 42: Total Investment Costs for Sultan Taha

Area Security	
Perimeter System Repair and Upgrade	$914,000
Terminal System Repair and Upgrade	$715,520
Cargo System Repair and Upgrade	$265,130
Catering Integrated ACAM CCTV Systems	$0
Total Installation Labor & Materials	$1,894,650
Mobilization	$250,000
Engineering Preparation	$189,465
Spares	$182,350
Warranty Period	$189,465
Subtotal	$2,705,930
Contingency	$405,890
GRAND TOTAL	**$3,111,820**

The specific components of the security investment costs are provided in the tables below.

Table 43: Sultan Taha Perimeter and Airside Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Perimeter Fence	3,990	meters	$100	$399,000	1	3,990	$5	$19,950	$418,950
Fence Sensors	600	each	$20	$12,000	1	300	$5	$1,500	$13,500
Perimeter gate	3	each	$25,000	$75,000	80	240	$5	$1,200	$76,200
CCTV on existing pole (refurbish)	0	each	$2,500	$0	8	0	$5	$0	$0
CCTV on new pole	40	each	$5,000	$200,000	12	480	$5	$2,400	$202,400
Lighting on pole shared with CCTV	15	each	$1,500	$22,500	6	90	$5	$450	$22,950
Replace Perimeter Alarm - CCTV Console	1	each	$50,000	$50,000	240	240	$5	$1,200	$51,200
Perimeter cabling	7,200	meters	$10	$72,000	1	7,200	$5	$36,000	$108,000
Radio Communications (existing base antenna)	1	lot	$15,000	$15,000	80	80	$5	$400	$15,400
Telephone system upgrade	1	lot	$5,000	$5,000	80	80	$5	$400	$5,400
Total Perimeter System Repair and Upgrade									$914,000

Table 44: Sultan TahaTerminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Entry Checkpoint relocate X-ray (2005) to bag room	1	each	$5,000	$5,000	100	100	$5	$500	$5,500
Upgrade X-ray Software/hardware for TIP	1	each	$20,000	$20,000	16	16	$5	$80	$20,080
Add ETD	1	each	$60,000	$60,000	2	2	$5	$10	$60,010
Add hand search stations	1	each	$2,000	$2,000	2	2	$5	$10	$2,010
New AT Baggage X-ray with TIP	0	each	$300,000	$0	16	0	$5	$0	$0
PASSENGER CHECKPOINT									
Upgrade X-ray Software/hardware for TIP	1	each	$20,000	$20,000	16	16	$5	$80	$20,080
Add ETD	2	each	$60,000	$120,000	2	4	$5	$20	$120,020
Add hand search stations	2	each	$2,000	$4,000	2	4	$5	$20	$4,020
New cabin baggage X-ray with TIP	1	each	$55,000	$55,000	8	8	$5	$40	$55,040
ACAM SUBSYSTEM									
Add controls to existing doors (CR/KP)	25	each	$1,000	$25,000	8	200	$5	$1,000	$26,000
Add new doors with controls (CR/KP)	5	each	$2,000	$10,000	16	80	$5	$400	$10,400
New Consoles (3 bay) with operator equipment	1	each	$50,000	$50,000	240	240	$5	$1,200	$51,200
Central computer with software	1	each	$75,000	$75,000	16	16	$5	$80	$75,080
typical cable conduit per door	30	lot	$1,500	$45,000	4	120	$5	$600	$45,600
CCTV system in terminals									
New indoor cameras (ceiling, pendant or wall mount)	20	each	$1,500	$30,000	8	160	$5	$800	$30,800
New outdoor cameras (ceiling, pendant or wall mount)	12	each	$2,000	$24,000	16	192	$5	$960	$24,960
Digital recorder (per 8 cameras)	4	lot	$10,000	$40,000	4	16	$5	$80	$40,080
Operator stations	1	lot	$40,000	$40,000	40	40	$5	$200	$40,200
Matrix with ACAM link	1	each	$25,000	$25,000	16	16	$5	$80	$25,080
typical cable conduit per new camera	32	each	$1,500	$48,000	8	256	$5	$1,280	$49,280
Radio Communications	1	lot	$6,000	$6,000	8	8	$5	$40	$6,040
Telephone system upgrade	1	lot	$4,000	$4,000	8	8	$5	$40	$4,040
Total Terminal System Repair and Upgrade									**$715,520**

Table 45: Sultan Taha Cargo Terminal Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Cargo Inspection X-ray	1	each	$200,000	$200,000	16	16	$5	$80	$200,080
Add ETD	1	each	$60,000	$60,000	2	2	$5	$10	$60,010
Add hand search stations	1	each	$5,000	$5,000	8	8	$5	$40	$5,040
Total Cargo System Repair and Upgrade									$265,130

Table 46: Sultan Taha Catering Security Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
CATERING FACILITIES (There Is No Catering Facility At Sultan Taha)									

5.2 MAINTENANCE, PERSONNEL, AND TRAINING COSTS FOR SECURITY

The annual maintenance, personnel, and training costs for the recommended security improvements at Sultan Taha are approximately $1.9 million. The breakdown of the total is given in the table below.

Table 47: Sultan Taha Security Personnel and Maintenance Annual Costs

Personnel (annual)	$1,689,600
Training (Annual)	$97,490
Maintenance (Annual)	$87,257
Total	**$1,874,347**

The annual maintenance, personnel, and training costs for the security improvements to each of the security components are given in detail in the tables below.

Table 48: Sultan Taha Annual Perimeter and Airside Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Number of Gates	3	$40,000	$600	$120,600
Perimeter Fence	3,895	$100	$19,950	$418,950
Fence Sensors	820	$20	$1,500	$13,500
CCTV on existing pole (refurbish)	0	$2,500	$0	$0
CCTV on new pole	40	$5,000	$2,400	$202,400
Lighting on pole shared with CCTV	15	$1,500	$450	$22,950
Replace Perimeter Alarm - CCTV Console	1	$50,000	$1,200	$51,200
Perimeter cabling	7,200	$10	$36,000	$108,000
Radio Communications (existing base antenna)	1	$100,000	$400	$15,400
Telephone system upgrade	1	$20,000	$400	$5,400
Total Perimeter System Repair and Upgrade				$958,400
Personnel Costs (Annual)	54.0	$10,560		$570,240
Training Costs (Annual)	54.0	$609		$32,903
Maintenance Costs (Annual)				$43,128

Table 49: Sultan Taha Annual Terminal Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Entry Checkpoint relocate X-ray (2005) to bag room	1	$5,000	$500	$5,500
Upgrade X-ray Software/hardware for TIP	1	$20,000	$80	$20,080
Add ETD	1	$60,000	$10	$60,010
Add handsearch stations	1	$2,000	$10	$2,010
New AT Baggage X-ray with TIP	0	$200,000	$0	$0
PASSENGER CHECKPOINT				
Upgrade X-ray Software/hardware for TIP	1	$20,000	$80	$20,080
Add ETD	2	$60,000	$20	$120,020
Add handsearch stations	2	$2,000	$20	$4,020
New cabin baggage X-ray with TIP	1	$55,000	$40	$55,040
ACAM SUBSYSTEM				
Add controls to existing doors (CR/KP)	25	$1,000	$1,000	$26,000
Add new doors with controls (CR/KP)	5	$2,000	$400	$10,400
New Consoles (3 bay) with operator equipment	1	$50,000	$1,200	$51,200
Central computer with software	1	$75,000	$80	$75,080
typical cable conduit per door	30	$1,500	$600	$45,600
CCTV system in terminals				
New indoor cameras (ceiling, pendant or wall mount)	20	$1,500	$800	$30,800
New outdoor cameras (ceiling, pendant or wall mount)	12	$2,000	$960	$24,960
Digital recorder (per 8 cameras)	4	$10,000	$80	$40,080
Operator stations	1	$40,000	$200	$40,200
Matrix with ACAM link	1	$25,000	$80	$25,080
typical cable conduit per new camera	32	$1,500	$1,280	$49,280
Radio Communications	1	$6,000	$40	$6,040
Telephone system upgrade	1	$4,000	$40	$4,040
Total Terminal System Repair and Upgrade				$715,520
Personnel (annual)				
Terminal Entry	9	$10,560		$95,040
Passenger Checkpoint	18	$10,560		$190,080
ACAM & CCTV System Support	31.5	$10,560		$332,640
Employee Checkpoints	9	$10,560		$95,040
Door Control	1	$10,560		$5,280
Patrols	20	$10,560		$211,200
Total	88			$929,280
Training (Annual)	88	$609		$53,619
Maintenance (Annual)				$32,198

Table 50: Sultan Taha Annual Cargo Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Cargo Inspection X-ray	1	$200,000	$80	$200,080
Add ETD	1	$60,000	$10	$60,010
Add handsearch stations	1	$5,000	$40	$5,040
Total Capital Costs				$265,130
Personnel Costs (Annual)	18	$10,560		$190,080
Training Costs (Annual)				$10,968
Maintenance Costs (Annual)				$11,931

Table 51: Sultan Taha Catering Annual Security Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
NONE				

5.3 SAFETY PURCHASE AND INSTALLATION COSTS

The purchase and installation costs required for the improvements to safety are approximately $2.7 million for Sultan Taha. The breakdown of these costs is given in the table below.

Table 52: Sultan Taha Safety Purchase and Installation Costs

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL MATERIAL COSTS	LABOR HRS PER UNIT	TOTAL LABOR HRS	UNIT LABOR COST	TOTAL LABOR COSTS	TOTAL INSTALLED COSTS
Jambi (WIPA)									
Charts, documents and miscellaneous	1	lot	$25,000	$25,000	20	20	$5	$100	$25,100
Emergency Communications and Consoles (EOC and CP)	1	lot	$25,000	$25,000	40	40	$5	$200	$25,200
AIS Internet Terminal Equipment	1	lot	$25,000	$25,000	40	40	$5	$200	$25,200
Emergency Public Notification System (911)	1	shared	$40,000	$40,000			$5		
Equipment for aircraft removal update w/provision for crane service	1	each	$300,000	$300,000	40	40	$5	$200	$300,200
Direct burial feeds to Navigation & Radar Aids	2,500	meters	$100	$250,000	2	5,000	$5	$25,000	$275,000
Anti blocking communications system	1	each	$50,000	$50,000	20	40	$5	$200	$50,200
ATC Information Systems repair and upgrade	1	lot	$50,000	$50,000	40	0	$5	$0	$50,000
ATCT master communications system	1	shared	shared				$5		
ATCO accommodations	1	lot	$50,000	$50,000	100	100	$5	$500	$50,500
Precision Approach Instrumentation and lighting	1	approach	$1,000,000	$1,000,000	120	120	$5	$600	$1,000,600
Movement Area Maintenance	1	lot	$850,000	$850,000	80	80	$5	$400	$850,400
				$2,665,000				$27,400	$2,652,400

5.4 SAFETY MAINTENANCE AND OPERATIONS COSTS

Annual maintenance, personnel, and training costs for the recommended safety improvements at Sultan Taha are approximately $0.18 million. These costs are summarized in the table below.

Table 53: Sultan Taha Annual Safety Operations and Maintenance Costs

	NUMBER OF ITEMS	UNIT COST	INSTALLATION COSTS	TOTAL COST
Charts, documents and miscellaneous	1	$25,000	$100	$25,100
Emergency Communications and Consoles (EOC and CP)	1	$25,000	$200	$25,200
AIS Internet Terminal Equipment	1	$25,000	$200	$25,200
Emergency Public Notification System (911)	1	$40,000		
Equipment for aircraft removal update w/provision for crane service	1	$300,000	$200	$300,200
Direct burial feeds to Navigation & Radar Aids	2,500	$100	$25,000	$275,000
Anti blocking communications system	1	$50,000	$200	$50,200
ATC Information Systems repair and upgrade	1	$50,000	$0	$50,000
ATCT master communications system	1	shared		
ATCO accommodations	1	$50,000	$500	$50,500
Precision Approach Instrumentation and lighting	1	$1,000,000	$600	$1,000,600
Movement Area Maintenance	1	$850,000	$400	$850,400
Total Capital Costs				$700,900
Personnel Costs (Annual)	13.5	$10,560		$142,560
Training Costs (Annual)				$8,226
Maintenance Costs (Annual)				$31,541

The total annual maintenance, personnel, and training costs for the recommended security and safety improvements are approximately $2.1 million as shown in the table below.

Table 54: Sultan Taha Security and Safety Personnel and Maintenance Annual Costs

Personnel (annual)	$1,832,160
Training (Annual)	$105,716
Maintenance (Annual)	$118,798
Total	$2,056,673

5.5 TOTAL SAFETY AND SECURITY INVESTMENT COSTS

Total capital investment costs for the recommended improvements to security and safety are summarized in the two charts below. The table provides an indication of the total investment cost requirements from 2009 to 2019 for Sultan Taha. These costs include capital costs plus personnel, maintenance, and training costs.

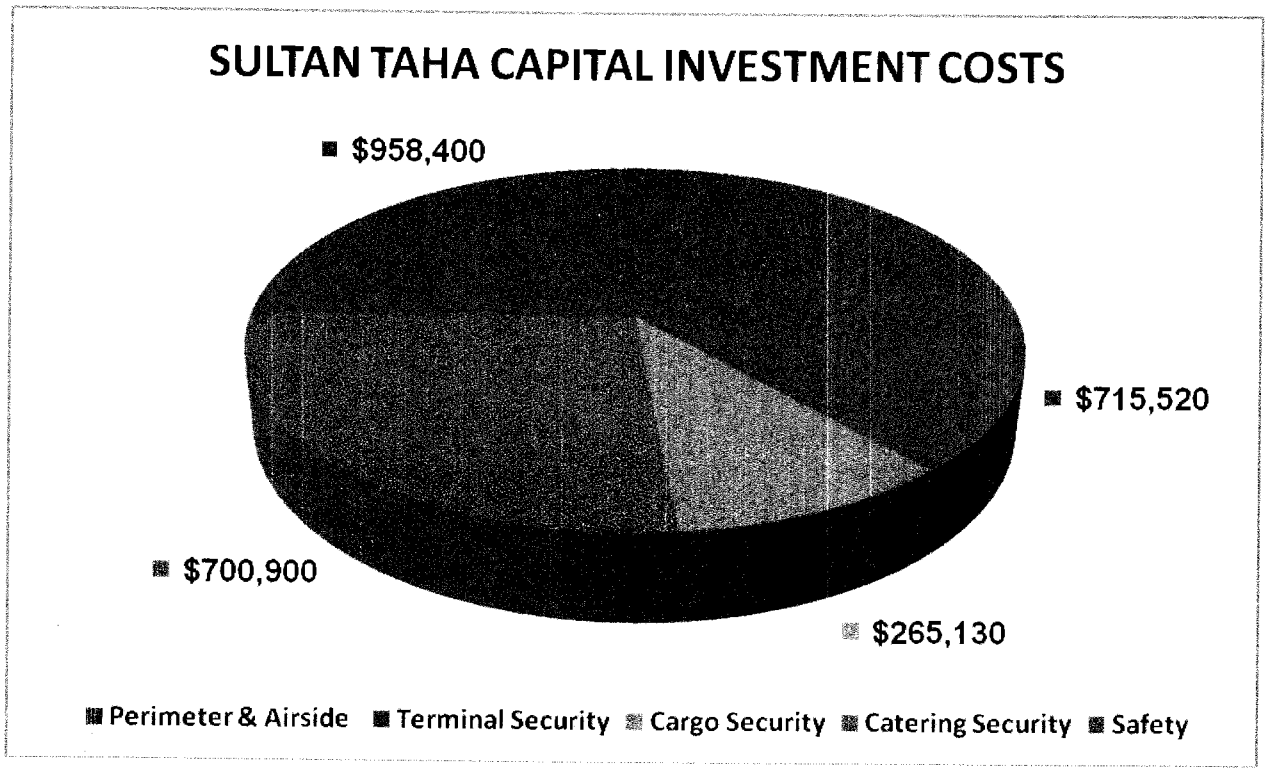

Figure 7: Sultan Taha Capital Investment Costs

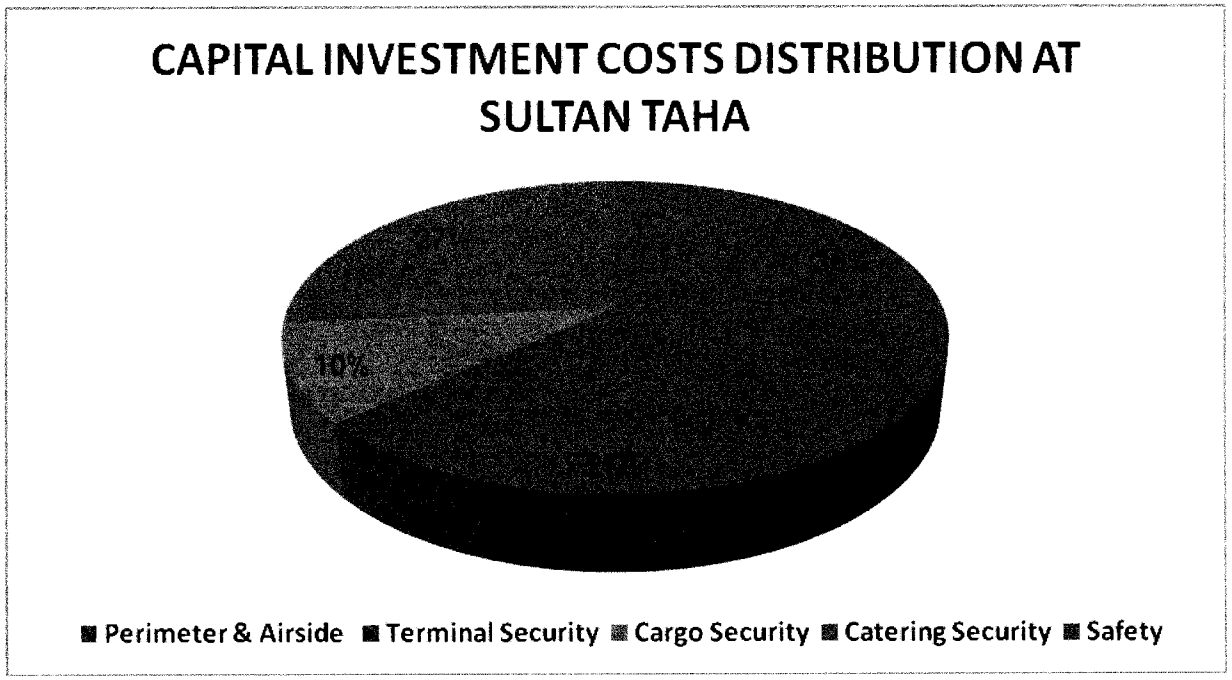

Figure 8: Sultan Taha Capital Investment Costs Distribution

Table 55: Sultan Taha Security and Safety Purchase, Installation, and O&M Costs

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$2,639,950										
Personnel Costs (Annual)	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160	$1,832,160
Training Costs (Annual)	$105,716	$105,716	$105,716	$105,716	$105,716	$105,716	$105,716	$105,716	$105,716	$105,716	$105,716
Maintenance Costs (Annual)	$118,798	$118,798	$118,798	$118,798	$118,798	$118,798	$118,798	$118,798	$118,798	$118,798	$118,798

6. INVESTMENT PLAN FOR THE FOUR AIRPORTS

The total capital costs for the four airports are approximately $35.1 million. As shown in the chart and table below, the largest amount of the capital costs are for security and safety improvements at Soekarno-Hatta International Airport.

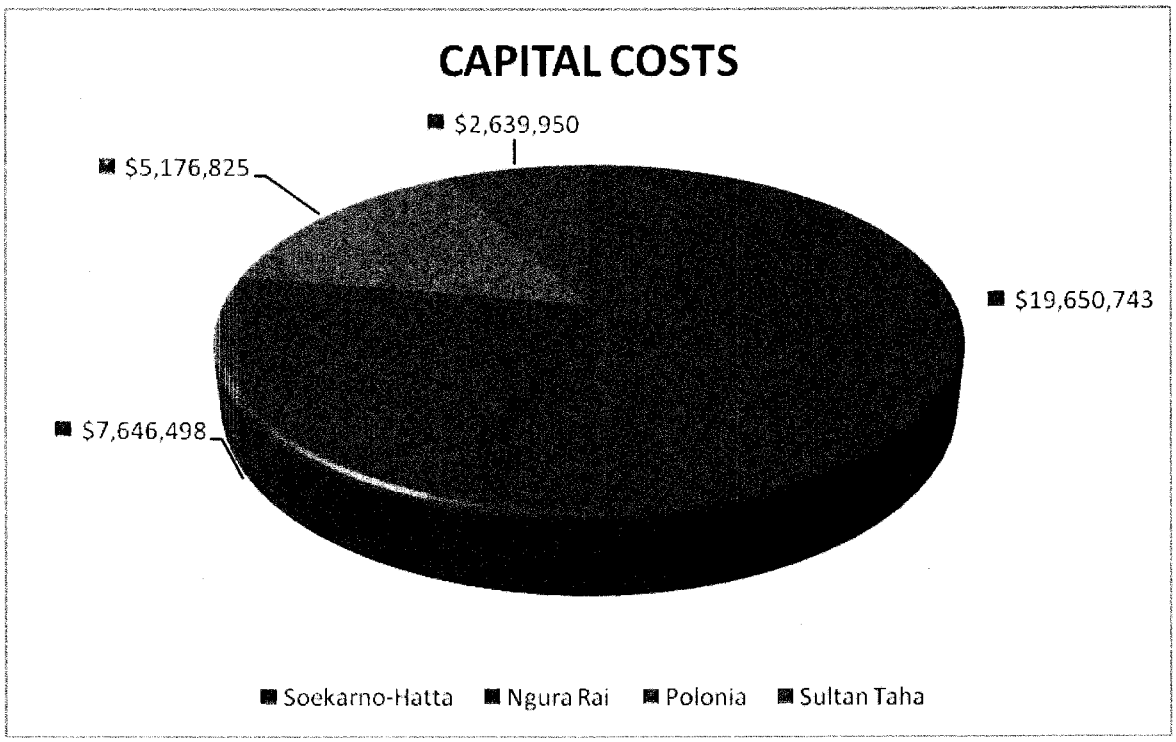

Figure 9: Capital Costs

Table 56: Capital Costs

Soekarno-Hatta	$19,650,743
Ngura Rai	$7,646,498
Polonia	$5,176,825
Sultan Taha	$2,639,950
Total - Four Airports	**$35,114,015**

The tables below show the total capital costs for each of the four airports from 2009 to 2019 and the total capital costs for the four airports together. The costs are provided in constant 2008 dollars, incorporating inflation and exchange rate variations into the dollar amounts.

Table 57: Security and Safety Purchase, Installation, and O&M Costs For Soekarno-Hatta, Ngura Rai, Polonia, & Sultan Taha

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital Costs	$35,114,015	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040	$19,895,040
Training Costs (Annual)	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944	$1,147,944
Maintenance Costs (Annual)	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131	$1,580,131
Total Investment Costs	$57,737,129	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114

Table 58: Total Security and Safety Purchase, Installation, and O&M Costs For Soekarno-Hatta, Ngura Rai, Polonia, & Sultan Taha

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Soekarno-Hatta	$30,916,901	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159	$11,266,159
Ngura Rai	$13,262,505	$5,616,008	$5,616,008	$5,616,008	$5,616,008	$5,616,008	$5,616,008	$5,616,008	$5,616,008	$5,616,008	$5,616,008
Polonia	$8,861,100	$3,684,275	$3,684,275	$3,684,275	$3,684,275	$3,684,275	$3,684,275	$3,684,275	$3,684,275	$3,684,275	$3,684,275
Sultan Taha	$4,696,623	$2,056,673	$2,056,673	$2,056,673	$2,056,673	$2,056,673	$2,056,673	$2,056,673	$2,056,673	$2,056,673	$2,056,673
Total - Four Airports	$57,737,129	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114	$22,623,114

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1. INTRODUCTION

ASI has reviewed the security and safety modifications from an environmental perspective. ASI does not anticipate any environmental issues in installing the recommended security and safety equipment and systems. However, possible environmental issues should be examined when the specific installations are designed. At that time, any environmental issues can be identified.

In anticipation of financing for the security and safety equipment and systems, ASI has examined the environmental guidelines from U.S. bilateral and multi-lateral lending agencies. The guidelines are fairly consistent among the various bilateral and multi-lateral agencies. We have listed the guidelines from several of the agencies below.

2. ENVIRONMENTAL GUIDELINES FROM MULTI-NATIONAL FINANCIAL INSTITUTIONS

2.1 OVERVIEW OF EXPORT-IMPORT (EX-IM) BANK OF THE U.S. ENVIRONMENTAL PROCEDURES[1]

1. The application of Ex-Im Bank's Environmental Procedures is tailored to the characteristics of the various Bank programs, in a form consistent with the Organization for Economic Co-operation and Development (OECD) Common Approaches.
2. All applications for which the Ex-Im bank financial exposure is greater than $10 million will be formally screened and categorized as to their potential for environmental impact and the extent, if any, of subsequent environmental review. only those transactions pertaining to a physical project1 (any commercial, industrial or infrastructure undertaking that results in the construction or the extraction of a tangible asset at an identified location), which has the potential for adverse environmental effects, will be subject to an environmental review.
3. For medium-term transactions, including those covered under Credit Guarantee Facilities, an environmental review will be undertaken only for those transactions, which upon screening, are categorized as pertaining to projects which have the potential for significant adverse environmental effects because they are to be carried out in a sensitive area or are likely to have an adverse impact on such an area.
4. Short-term transactions and transactions having a repayment term of less than two years, including Working Capital transactions, generally will not be subject to environmental screening or review.
5. Ex-Im Bank's Engineering and Environment Division (E&E) Division will provide advice and counseling to exporters and borrowers unfamiliar with the requirements of these procedures, especially in cases involving small and medium-sized exporters.
6. Applicants are required to provide environmental information satisfactory to Ex-Im Bank in support of their applications. In the course of undertaking its evaluation of the environmental effects of projects, Ex-Im Bank may also make use of information provided by other sources, including government entities, intergovernmental organizations, and non-governmental organizations (NGOs).
7. Consistent with the OECD objective of fostering transparency, predictability and responsibility, and to help elicit useful information concerning the environmental effects of projects from interested parties without disclosing proprietary information related to the project or application, when Ex-Im Bank receives a final application

[1] Export-Import Bank of the U.S. Document. Also the U.S. Export-Import Bank Environment Program and Policies can be accessed at http://www.exim.gov/products/policies/environment/environment.html.

for long-term financing for a physical project requiring an environmental review, it will follow the process set forth below:

a) Ex-Im Bank will list the project, its location and a brief description of the project, on the Pending Transactions List located through its WEB site, (www.exim.gov), at http://www.exim.gov/products/policies/environment/envproj.html.

b) In addition to the above, for those applications wherein Ex-Im Bank requires submission of an Environmental Impact Assessment (EIA) or comparable environmental documentation, it will either make a copy of that document available to interested parties or will direct interested parties to a source such as a publicly accessible web site, where the document can be reviewed. The EIA will be made available for at least 30 calendar days prior to Ex-Im Bank's issuance of a Final Commitment. Instructions on how to obtain the EIA will be posted on Ex-Im Bank's Pending Transaction List page.

8. Consistent with the Common Approaches, projects will be evaluated against host-country environmental guidelines and international environmental guidelines. The international guidelines generally applicable will be those of the World Bank as set forth in the Pollution Prevention and Abatement Handbook (PPAH), as well as the World Bank Operational Safeguard Policies.

9. To provide guidance to exporters, Annex A to the Banks Policies[2] sets forth the scope of the environmental guidelines applicable to projects and includes specific quantitative and qualitative guidelines condensed from the PPAH and from those World Bank Operational Policies that are applicable to Ex-Im Bank transactions.

10. For those projects in which the European Bank for Reconstruction and Development (EBRD), the African Development Bank, the Asian Development Bank or the Inter-American Development Bank is involved, Ex-Im Bank may apply the guidelines, in whole or in part, of the respective Multilateral Development Bank (MDB) to the project in order to facilitate U.S. exporter participation in these projects. Where such MDB guidelines are insufficient to adequately consider the potential environmental effects of the project, applicable elements of the World Bank Guidelines will be used to supplement the MDB guidelines. In any event, the Ex-Im Bank Board shall be advised of any material differences between the MDB guidelines applied to a project and the corresponding World Bank Guidelines.

11. For those applications relating to nuclear projects, Ex-Im Bank has formulated separate Nuclear Procedures and Guidelines that are set forth in a separate document.

12. For those projects that Ex-Im Bank determines may significantly affect the quality of the human environment of the U.S., its territories or possessions, or Antarctica, Ex-Im Bank will require adherence to the environmental review procedures required by the National Environmental Policy Act (NEPA), as stipulated in 12 CFR, Chapter IV, Part 408.

[2] See http://www.exim.gov/products/policies/environment/envguide.html

13. Projects should, in all cases, comply with the relevant environmental standards of the host country, and when the applicable international environmental guidelines against which the project has been evaluated are more stringent, these guidelines should be applied.

14. If a project does not meet the applicable environmental guidelines, Ex-Im Bank's Board of Directors will take account of the environmental impact and other factors relevant to the project in determining whether to provide financial support, to provide financial support conditioned on the implementation of measures to mitigate the project's adverse environmental effects, or to decline financial support.

15. Ex-Im Bank will seek to identify and support projects and products that are environmentally beneficial, including support for clean, alternative and renewable energy projects. (Ex-Im Bank's Environmental Exports Program, which provides financial incentives for environmentally beneficial transactions, is set forth in Annex F.)[3]

16. To assist in the management of the major anthropogenic greenhouse gas, carbon dioxide (CO2), the Bank will track the estimated amount of CO2 emissions from projects it supports in the power sector and, to the extent practical, from projects in other sectors that may cause significant production of CO2. The estimated annual amount of the aggregate CO2 directly produced by these projects will be reported in Ex-Im Bank's Annual Report.

17. Consistent with the OECD Common Approaches, Ex-Im Bank will make available to the public a list of those transactions that were approved during the past year for which it conducted an environmental review.

2.1.1 Ex-Im Long Term, Limited Recourse Project Financing Program[4]

Applications for Letters of Interest for limited recourse project financing must be accompanied by an Environmental Screening Document that will be used for initial categorization of the transaction and to inform the applicant as to the scope of environmental information required for a subsequent Final Application. This initial categorization is preliminary and subject to revision once the characteristics of the project are more fully defined at a subsequent application phase.

The E&E Division will be involved in the early stages of processing a Limited Recourse Project Financing application. As part of determining whether Ex-Im Bank will issue a Preliminary Project Letter (PPL), the E&E staff will consider whether the project will raise any potentially insurmountable environmental problems that could lead Ex-Im Bank to withhold financial support for the project. If such problems are identified, Ex-Im Bank shall notify the sponsor and may provide guidance with respect to mitigation measures that could be adopted in order to address these environmental problems.

[3] See http://www.exim.gov/products/policies/environment/annexf.html

[4] U.S. Export-Import Bank Document

When an EIA is required (Category A), the applicant or sponsor of the Project Finance transaction should submit an EIA to Ex-Im Bank as soon as possible, but in no event later than the time of application for a Final Commitment. The EIA also should be made available to interested parties for at least 30 calendar days prior to Ex-Im Bank's issuance of a Final Commitment. An Environmental Analyst from the E&E Division will review the EIA, request further information as necessary from the sponsors or exporters, analyze all relevant information, and prepare an environmental evaluation of the project. The evaluation may include recommendations to the Board of Directors with respect to conditions that must be met to obtain financial support.

As is the case with the financial and technical reporting requirements associated with the evaluation of Limited Recourse Project Finance transactions, Ex-Im Bank reserves the right to require the sponsor to bear the expense of outside specialists to prepare an independent report with respect to any element of the project's environmental effects.

2.1.2 Ex-Im Medium-Term Loans, Guarantees and Insurance[5]

Medium-term financial support provided by Ex-Im Bank through its loan, guarantee, and insurance programs generally covers the export of capital goods and services that are not purchased in conjunction with a particular greenfield project. Applications for Medium-Term transactions will not require submission of an Environmental Screening Document (Annex B)[6].

Ex-Im Bank will internally screen medium-term applications for Final Commitments based on the information contained in the application. For those unusual medium-term transactions where the environmental screening reveals that the underlying project presents the potential for significant adverse environmental effects because it is to be carried out in a sensitive area or likely to have an adverse impact on such an area, the applicant will be informed and required to submit environmental information sufficient for Ex-Im Bank to undertake an environmental review of the project against relevant host-country and applicable international environmental guidelines. Applications for most medium-term transactions will not be subject to an environmental review.

To ensure that projects supported by Ex-Im Bank are constructed and operated in accordance with the relevant host-country and applicable international environmental guidelines, Ex-Im Bank will monitor the environmental performance of Ex-Im Bank supported Category A projects through the term of the Ex-Im Bank financial support, particularly those aspects of projects subject to any Ex-Im Bank financing conditions pertaining to the implementation of measures to mitigate a project's environmental impact. Monitoring will be conducted through the review of information provided by the sponsor and through site visits.

[5] U.S. Export-Import Bank Document
[6] See http://www.exim.gov/products/policies/environment/envscrn.html

3. SUMMARY OF OVERSEAS PRIVATE INVESTMENT CORPORATION (OPIC) ENVIRONMENTAL PROCEDURES[7]

OPIC projects receive thorough yet efficient environmental review, following the process described below. Applicants should carefully review the entire Environmental Handbook, including all Appendices, to ensure full understanding of OPIC's Environmental Procedures.

1. OPIC screens the application to determine whether its support of the project would violate any categorical prohibitions required by OPIC's statute or policy to the extent possible at this early stage. If the project is ineligible, OPIC informs the applicant immediately so as to avoid any unnecessary effort or expense on the part of the applicant.

2. If the project is not categorically ineligible, OPIC continues to screen the application to determine the level of environmental sensitivity associated with the industry sector or site involved and to request the appropriate type of information from the applicant.

3. If the project is identified as a Category A project, an Environmental Impact Assessment (EIA) and/or Initial Environmental Audit (IEAU) is required. Category B projects are subject to internal OPIC assessment based on information supplied by the applicant that need not take the form of an EIA. Category C projects do not have material impacts on the environment and are not subject to environmental assessment.

4. OPIC requires that applicants for Category A projects submit the EIA and/or IEAU in a form that can be made public without compromising business confidential information. With the consent of the applicant, the country and industry sector involved in a Category A project (but not the name of the applicant), are listed on OPIC's Internet Web Site and the EIA and/or IEAU is made publicly available on request for a designated comment period of 60 days prior to any final OPIC commitment to a project. No application for a Category A project can be processed without this public disclosure and review process. By statute, since 1985, environmentally sensitive projects have also been subject to host government notification prior to final commitment.

5. Concurrent with this public notification process, OPIC conducts an internal assessment of the project based on the EIA and other available information, including any comments it receives from the public. Category B projects are also subject to an internal environmental assessment. Through this review process, OPIC environmental staff assesses the impacts of the project and the standards and mitigative conditions applicable to OPIC support.

6. These conditions are discussed with the applicant and included as representations, warranties and covenants in the loan agreement or political risk insurance contract.

7. OPIC monitors project compliance with contractual conditions throughout the term of the OPIC loan agreement or insurance contract.

[7] Excepts from the Overseas Private Investment Corporation *Environmental Handbook*

8. Category A projects are also required to conduct at least one independent environmental audit during the first three years of OPIC support.

Similar procedures, but with restrictions on public disclosure and consultation, apply to OPIC consideration and support of projects supported by an OPIC-guaranteed investment fund or other financial intermediaries.

4. WORLD BANK POLICY ON ENVIRONMENTAL MANAGEMENT[8]

The mainstreaming of environmental sustainability concerns in the Bank's operations continued throughout 2004. In January the Boards approved the new *Bank Group Policy on the Environment,* which incorporates and redefines the former policy on environmentally sustainable development in Southeast Asia. The main goals of the new policy are to:

- Promote a long-term view and perspective of economic and social development;
- Reverse where possible and halt the impoverishment process in Africa by enhancing the access of the poor to environmental resources;
- Help RMCs to build their human capacity and sensitize policymakers on environmental issues and bring about institutional changes to achieve sustainable development; and
- Reinforce the existing partnerships with international institutions and network also with regional and subregional organizations to coordinate interventions in environmental sustainable development.

Two guidelines relevant to the new *Policy on the Environment* were completed and disseminated in 2004, namely the *Strategic Impact Assessment Guidelines* (SIA) and the *Integrated Environmental and Social Assessment Guidelines* (IESA). The SIA is a systematic process of evaluating the environmental consequences of any proposed policy or program. It is also a tool for assessing social and environmental sustainability of policy-based lending, structural adjustment, and sector investment lending. The *IESA Guidelines,* on the other hand, are designed to ensure that both environmental and social issues are mainstreamed in Bank projects throughout the project cycle.

In 2004 the Bank developed a 3-year Implementation Plan (2005-2007) to execute its new *Policy on the Environment.* The Plan seeks to ensure that a strong and diversified economy will continue to take account of environmental protection, and to guarantee that all developmental decision-making integrates economic, social, and environmental considerations. In addition, the Plan aims to ensure that environmental management tools, like environmental reactive and proactive assessments, will be used systematically to monitor environmental performance and encourage community involvement.

[8] Excerpt from the World Bank Strategy for the Environment

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1 INTRODUCTION

ASI has developed estimates of revenues from several alternative passenger facility and cargo facility charges or airport taxes. ASI has also developed estimates of revenue streams and net revenue streams associated with the implementation of the Investment Plan developed in Task 3 with the imposition of alternative passenger and cargo facility charges for security and safety.

Based on these estimates of investment costs and revenues, ASI has carried out economic and financial analyses of the recommended security and safety improvements at Soekarno-Hatta, Ngura Rai, Polonia, and Sultan Taha airports. These analyses include the estimation of the cash flow, the net present value (NPV) and the internal rate of return (IRR) for several different scenarios.

At most airports worldwide, airport operations are usually financed by fees charged at the airports. These fees can include passenger facility charges (PFC), any airport taxes, landing fees, gate fees, aircraft service fees, concession fees, parking fees, airport taxi entry/exit charges, etc. The security charges are usually designated separately, although they can be bundled with other charges.

2 PASSENGER DEMAND AND ECONOMIC ACTIVITY IN INDONESIA

From 1995 through 2005, passenger travel at Indonesia's airports increased almost 200%. During 1998 and 1999, however, passenger travel decreased markedly, in response to the crisis in Southeast Asia that began in 1997. In 1999, passenger travel began increasing and has been increasing sharply since then. These increases mirror somewhat the state of the Indonesia economy, which decreased in 1998 and 1999 and then has been growing steadily - in real terms over the last several years. Although Indonesia's and other Southeast Asian countries' Gross Domestic Products (GDPs) decreased in 1997, 1998, and 1999, the economies of the United States and Europe were substantially stronger, perhaps minimizing some of the impact on air traffic. These events are reflected in the two graphs below.

Figure 1

Figure 2

Air traffic is strongly related to the health of the Indonesia economy and to the economies of its air travel and trading partners, for both cargo and passenger. As the economy of Indonesia has recovered from the crisis in 1997-1998 and the disease scare in 2003, air traffic has recovered and is expected to continue recovering as well. The tables below show the relationship between

changes in GDP and passenger growth and between changes in GDP and cargo growth from 1995 to 2005.

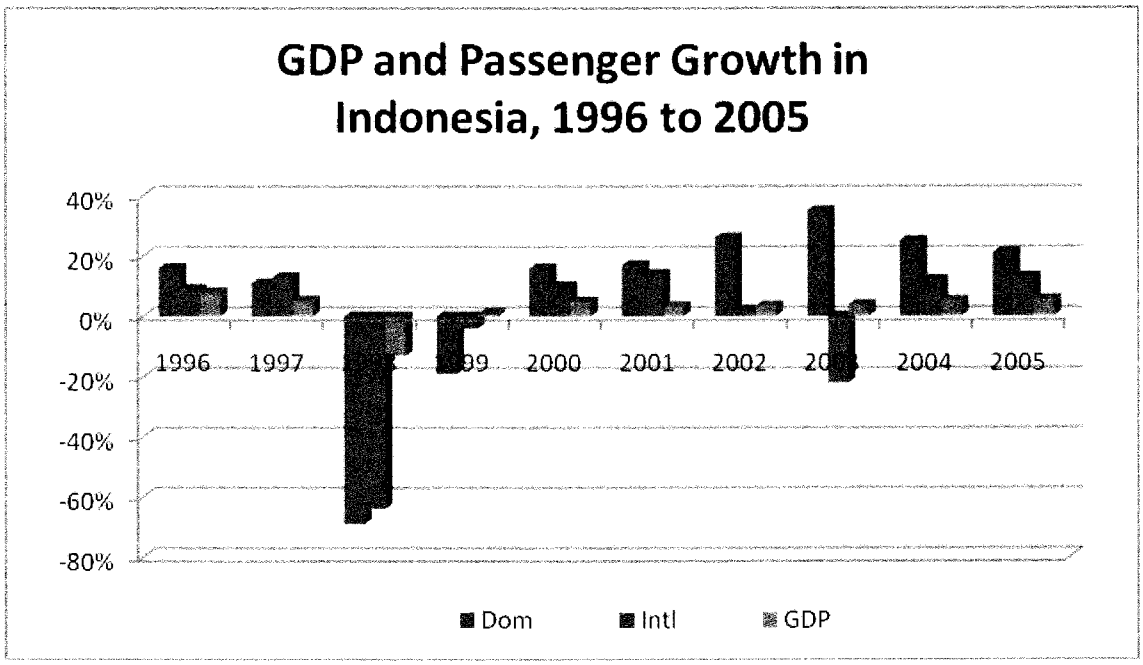

Figure 3

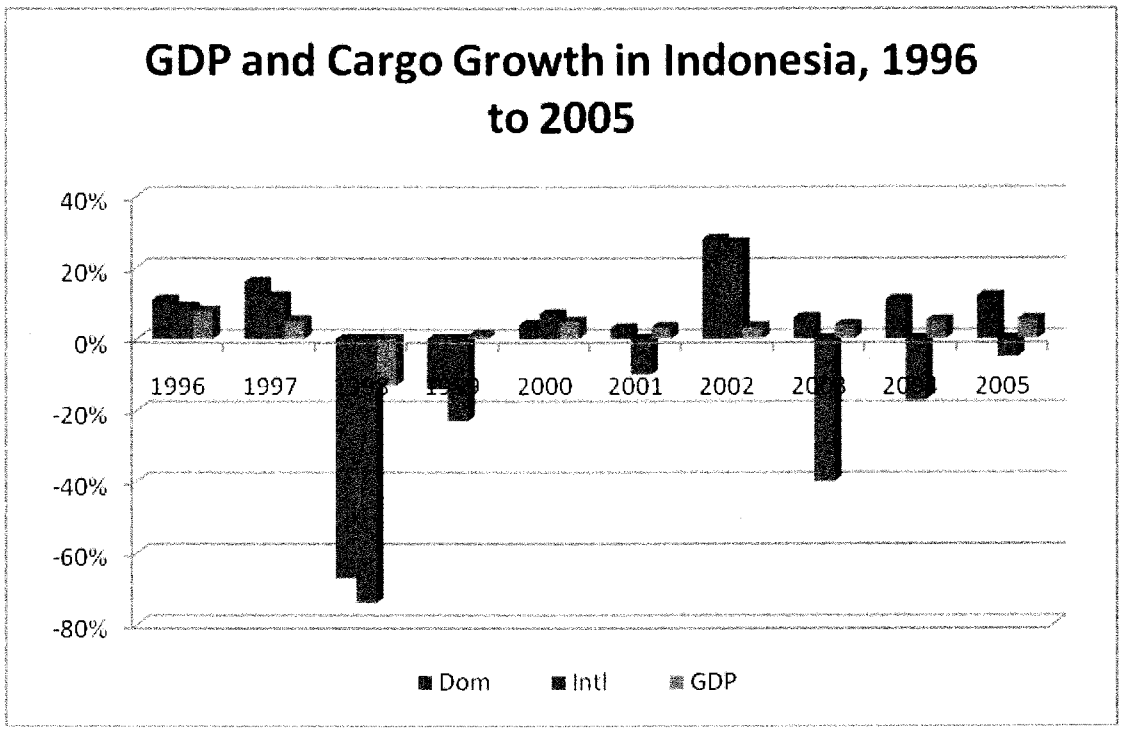

Figure 4

The chart below provides an historical context to the Indonesia economy in relation to two other economies in Southeast Asia. These data show the quarterly changes in the economies in real terms and they also provide insight into Indonesia's aviation growth possibilities vis-à-vis these countries.

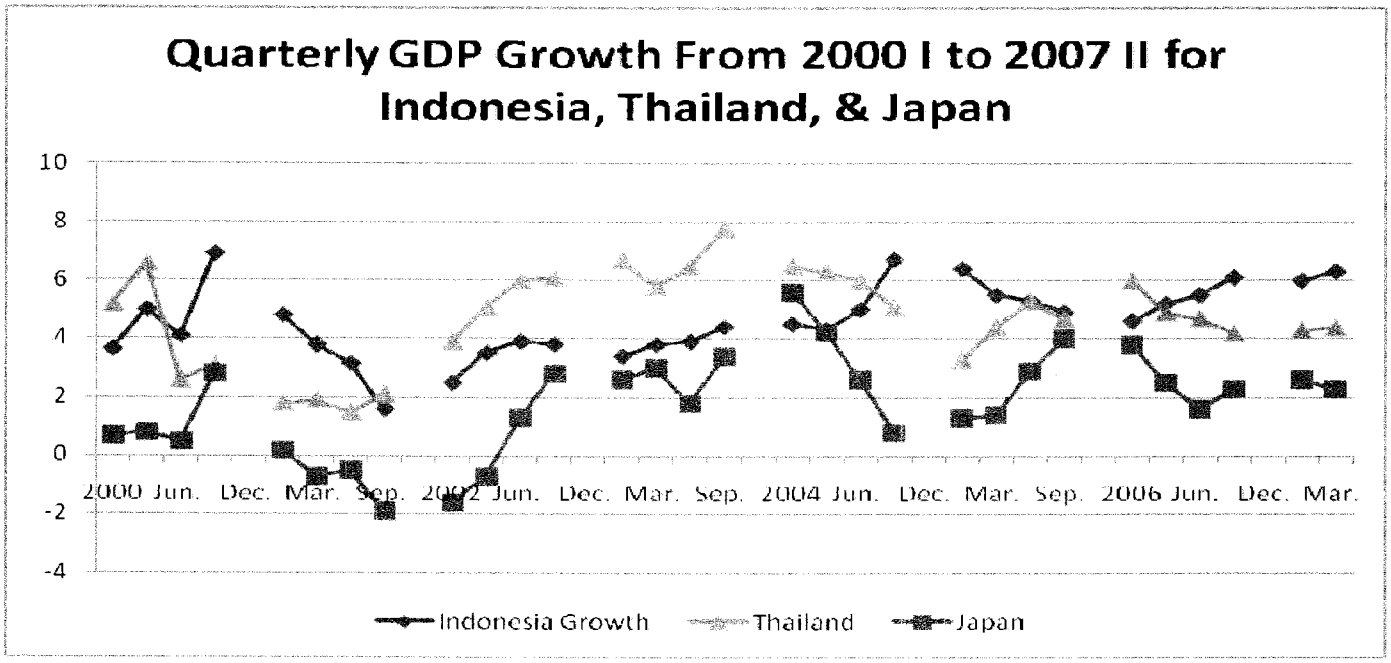

Figure 5

The table below shows the quarterly growth in GDP for Indonesia, Thailand, Japan, South Korea, and Germany from the first quarter of 1995 to the second quarter of 2007. It is interesting to note that the growth rates for the Southeast Asia countries were stronger than Germany's growth rate during the last several years.

Table 1: Quarterly Growth Rates for Indonesia and Comparative Countries

Indonesia Growth		Thailand		Japan		Germany		South Korea	
1995		**1995**		**1995**		**1995**		**1995**	
Mar.	8.11	Mar.	0	Mar.	0.5	Mar.	2.7	Mar.	10
Jun.	7.18	Jun.	0	Jun.	1.2	Jun.	2.5	Jun.	9.7
Sep.	8.76	Sep.	0	Sep.	0.9	Sep.	2	Sep.	9.8
Dec.	8.76	Dec.	0	Dec.	2.8	Dec.	1.1	Dec.	6.8
1996		**1996**		**1996**		**1996**		**1996**	
Mar.	6.34	Mar.	0	Mar.	5.5	Mar.	0.3	Mar.	7.9
Jun.	6.98	Jun.	0	Jun.	3.71	Jun.	2.13	Jun.	6.8
Sep.	8.96	Sep.	0	Sep.	3.2	Sep.	2.4	Sep.	6.4
Dec.	9.5	Dec.	0	Dec.	3.1	Dec.	1.9	Dec.	7.2
1997		**1997**		**1997**		**1997**		**1997**	

Mar.	8.46	Mar.	0	Mar.	2.6	Mar.	1.4	Mar.	5.4
Jun.	6.7	Jun.	0	Jun.	-0.3	Jun.	2.9	Jun.	6.3
Sep.	3.3	Sep.	0	Sep.	1	Sep.	2.4	Sep.	6.3
Dec.	2.4	Dec.	0	Dec.	-0.2	Dec.	2.4	Dec.	3.9
1998		**1998**		**1998**		**1998**		**1998**	
Mar.	-4.49	Mar.	0	Mar.	-3.7	Mar.	3.8	Mar.	-3.8
Jun.	-13.34	Jun.	0	Jun.	-1.8	Jun.	1.7	Jun.	-6.6
Sep.	-16	Sep.	0	Sep.	-3.6	Sep.	2.8	Sep.	-6.8
Dec.	-18.26	Dec.	0	Dec.	-2.8	Dec.	2.6	Dec.	-5.3
1999		**1999**		**1999**		**1999**		**1999**	
Mar.	-6.13	Mar.	0.9	Mar.	0.1	Mar.	0.7	Mar.	4.6
Jun.	1.79	Jun.	3.5	Jun.	0.7	Jun.	1	Jun.	9.8
Sep.	2.85	Sep.	7.7	Sep.	0.9	Sep.	1.2	Sep.	12.3
Dec.	5.36	Dec.	6.5	Dec.	0	Dec.	2.3	Dec.	13
2000		**2000**		**2000**		**2000**		**2000**	
Mar.	3.64	Mar.	5.2	Mar.	0.7	Mar.	3.3	Mar.	12.8
Jun.	4.98	Jun.	6.6	Jun.	0.8	Jun.	3.1	Jun.	9.6
Sep.	4.08	Sep.	2.6	Sep.	0.5	Sep.	2.8	Sep.	9.2
Dec.	6.91	Dec.	3.1	Dec.	2.8	Dec.	1.9	Dec.	4.6
2001		**2001**		**2001**		**2001**		**2001**	
Mar.	4.8	Mar.	1.8	Mar.	0.2	Mar.	1.6	Mar.	3.7
Jun.	3.79	Jun.	1.9	Jun.	-0.7	Jun.	0.6	Jun.	2.7
Sep.	3.15	Sep.	1.5	Sep.	-0.5	Sep.	0.3	Sep.	1.8
Dec.	1.6	Dec.	2.1	Dec.	-1.9	Dec.	-0.1	Dec.	3.7
2002		**2002**		**2002**		**2002**		**2002**	
Mar.	2.5	Mar.	3.9	Mar.	-1.6	Mar.	-1.2	Mar.	5.7
Jun.	3.5	Jun.	5.1	Jun.	-0.7	Jun.	0.1	Jun.	6.3
Sep.	3.9	Sep.	6	Sep.	1.3	Sep.	0.4	Sep.	5.8
Dec.	3.8	Dec.	6.1	Dec.	2.8	Dec.	0.5	Dec.	6.8
2003		**2003**		**2003**		**2003**		**2003**	
Mar.	3.4	Mar.	6.7	Mar.	2.6	Mar.	0.2	Mar.	3.7
Jun.	3.8	Jun.	5.8	Jun.	3	Jun.	-0.2	Jun.	1.9
Sep.	3.9	Sep.	6.5	Sep.	1.8	Sep.	-0.2	Sep.	2.3
Dec.	4.4	Dec.	7.8	Dec.	3.4	Dec.	0.2	Dec.	3.9
2004		**2004**		**2004**		**2004**		**2004**	
Mar.	4.5	Mar.	6.5	Mar.	5.6	Mar.	1.5	Mar.	5.3
Jun.	4.3	Jun.	6.3	Jun.	4.2	Jun.	2	Jun.	5.5
Sep.	5	Sep.	6	Sep.	2.6	Sep.	1.3	Sep.	4.6
Dec.	6.7	Dec.	5.1	Dec.	0.8	Dec.	1.5	Dec.	3.3
2005		**2005**		**2005**		**2005**		**2005**	
Mar.	6.4	Mar.	3.3	Mar.	1.3	Mar.	1.1	Mar.	2.7
Jun.	5.5	Jun.	4.4	Jun.	1.4	Jun.	0.6	Jun.	3.3
Sep.	5.3	Sep.	5.3	Sep.	2.9	Sep.	1.4	Sep.	4.5
Dec.	4.9	Dec.	4.7	Dec.	4	Dec.	1	Dec.	5.3
2006		**2006**		**2006**		**2006**		**2006**	
Mar.	4.6	Mar.	6	Mar.	3.8	Mar.	1.4	Mar.	6.1
Jun.	5.2	Jun.	4.9	Jun.	2.5	Jun.	2.4	Jun.	5.3
Sep.	5.5	Sep.	4.7	Sep.	1.6	Sep.	2.8	Sep.	4.6
Dec.	6.1	Dec.	4.2	Dec.	2.3	Dec.	3.7	Dec.	4

2007		2007		2007		2007		2007	
Mar.	6	Mar.	4.3	Mar.	2.6	Mar.	3.6	Mar.	4
Jun.	6.3	Jun.	4.4	Jun.	2.3	Jun.	2.5	Jun.	4.9

Another important economic component is the inflation rate. The chart below shows the inflation rates of Indonesia, Thailand and Japan from the first quarter of 2000 to the third quarter of 2007. Indonesia's inflation rate is markedly higher than that of Thailand and Japan for the period 2000 to 2002 and for the period spanning the end of 2005 and the beginning of 2006. This high inflation rate reflected considerable weakness in the Indonesia economy during those periods in that it negatively impacted the standard of living of Indonesia citizens. However, the chart shows that in 2007, Indonesia finally established some control over inflation and lowered it substantially. This provides a stable background for airline ticket pricing and should exert positive influences on passenger travel and cargo shipments. The ensuing tables provide additional information on the level of prices and inflation in Indonesia and its trading partners.

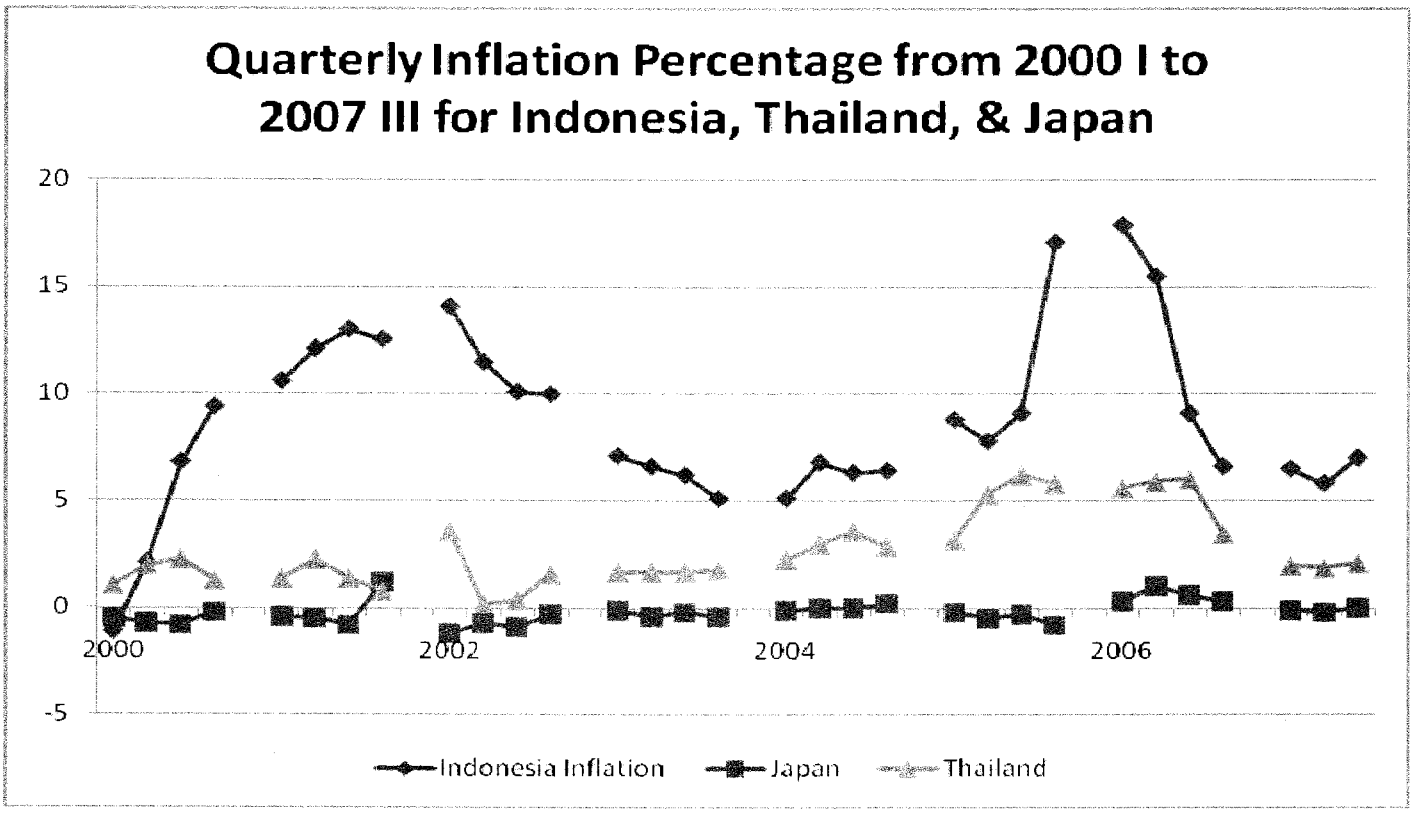

Figure 6

Table 2: Monthly Indonesia's Consumers Price Indices and Inflation Rates, 1999 - 2006

	CPI	Inflation	CPI	Inflation	CPI	Inflation	CPI	Inflation	CPI	Inflation	CPI	Inflation	CPI	Inflation	CPI	Inflation
January	204.54	2.97	205.12	1.32	222.10	0.33	254.12	1.99	276.33	0.80	110.45	0.57	118.53	1.43	138.72	1.36
February	207.12	1.26	205.27	0.07	224.04	0.87	257.93	1.50	276.87	0.20	110.43	-0.02	118.33	-0.17	139.53	0.58
March	206.75	-0.18	204.34	-0.45	226.04	0.89	257.87	-0.02	276.23	-0.23	110.83	0.36	120.59	1.91	139.57	0.03
April	205.34	-0.68	205.48	0.56	227.07	0.46	257.26	-0.24	276.65	0.15	111.91	0.97	121.00	0.34		
May	204.76	-0.28	207.21	0.84	229.63	1.13	259.31	0.80	277.23	0.21	112.90	0.88	121.25	0.21		
June	204.07	-0.34	208.24	0.50	233.46	1.67	260.25	0.36	277.49	0.09	113,44	0,48	121.86	0.50		
July	201.93	-1.05	210.91	1.28	238.42	2.12	262.32	0.82	277.58	0.03	113,88	0,39	122.81	0.78		
August	200.05	-0.93	211.99	0.51	237.92	-0.21	263.13	0.29	279.92	0.84	113,98	0,09	123.48	0.55		
September	198.40	-0.68	211.87	-0.06	239.44	0.64	264.53	0.53	280.93	0.36	114,00	0,02	124.33	0.69		
October	198.51	0.06	214.33	1.16	241.06	0.68	265.95	0.54	282.48	0.55	114,64	0,56	135.15	8.70		
November	199.00	0.25	217.15	1.32	245.18	1.71	270.87	1.85	285.32	1.01	115,66	0,89	136.92	1.31		
December	202.45	1.73	221.37	1.94	249.15	1.62	274.13	1.20	287.99	0.94	116.86	1.04	136.86	-0.04		
Inflation Rate		**2.01**		**9.35**		**12.55**		**10.03**		**5.06**		**6.40**		**17.11**		**1.98**

*) Base year 1996
**) Base year 2002

Table 3: Inflation Rates For Indonesia And Comparative Countries

Indonesia Inflation		Japan		Thailand		South Korea		Germany		U.S.	
1995		**1995**		**1995**		**1995**		**1995**		**1995**	
Mar.	3.04	Mar.	0.1	Mar.	0	Mar.	4.7	Mar.	2	Mar.	2.9
Jun.	2.34	Jun.	0.1	Jun.	0	Jun.	0	Jun.	1.9	Jun.	3.1
Sep.	1.41	Sep.	0.1	Sep.	0	Sep.	0	Sep.	1.8	Sep.	2.6
Dec.	1.85	Dec.	-0.5	Dec.	7.5	Dec.	4.7	Dec.	1.7	Dec.	2.7
1996		**1996**		**1996**		**1996**		**1996**		**1996**	
Mar.	3.26	Mar.	-0.2	Mar.	7.3	Mar.	4.5	Mar.	1.7	Mar.	2.8
Jun.	0.77	Jun.	0.09	Jun.	5.5	Jun.	5.5	Jun.	1.4	Jun.	2.8
Sep.	0.91	Sep.	0.09	Sep.	4.6	Sep.	4.7	Sep.	1.4	Sep.	3
Dec.	1.53	Dec.	0.6	Dec.	4.8	Dec.	4.5	Dec.	1.4	Dec.	3.3
1997		**1997**		**1997**		**1997**		**1997**		**1997**	
Mar.	1.96	Mar.	0.5	Mar.	4.5	Mar.	4.5	Mar.	1.5	Mar.	2.8
Jun.	2.54	Jun.	2.2	Jun.	4.4	Jun.	4	Jun.	1.7	Jun.	2.3
Sep.	5.37	Sep.	2.4	Sep.	7	Sep.	4.2	Sep.	1.9	Sep.	2.2
Dec.	11.05	Dec.	1.8	Dec.	7.7	Dec.	6.6	Dec.	1.8	Dec.	1.7
1998		**1998**		**1998**		**1998**		**1998**		**1998**	
Mar.	25.13	Mar.	2.2	Mar.	9.5	Mar.	9	Mar.	1.1	Mar.	1.4
Jun.	46.55	Jun.	0.1	Jun.	10.7	Jun.	7.5	Jun.	1.2	Jun.	1.7
Sep.	75.47	Sep.	-0.2	Sep.	7	Sep.	6.9	Sep.	0.8	Sep.	1.5
Dec.	77.63	Dec.	0.6	Dec.	4.3	Dec.	4	Dec.	0.5	Dec.	1.6
1999		**1999**		**1999**		**1999**		**1999**		**1999**	
Mar.	4.08	Mar.	-0.4	Mar.	1.6	Mar.	0.5	Mar.	0.4	Mar.	1.7
Jun.	2.73	Jun.	-0.3	Jun.	-1.2	Jun.	0.6	Jun.	0.4	Jun.	2
Sep.	0.02	Sep.	-0.2	Sep.	-0.8	Sep.	0.8	Sep.	0.7	Sep.	2.6
Dec.	2.01	Dec.	-1.1	Dec.	0.7	Dec.	1.4	Dec.	1.2	Dec.	2.7
2000		**2000**		**2000**		**2000**		**2000**		**2000**	
Mar.	-1.1	Mar.	-0.5	Mar.	1.1	Mar.	1	Mar.	1.9	Mar.	3.7
Jun.	2.1	Jun.	-0.7	Jun.	2	Jun.	2.2	Jun.	1.9	Jun.	3.7
Sep.	6.8	Sep.	-0.8	Sep.	2.3	Sep.	3.9	Sep.	2.3	Sep.	3.5
Dec.	9.4	Dec.	-0.2	Dec.	1.3	Dec.	3.2	Dec.	2.2	Dec.	3.4

2001		**2001**		**2001**		**2001**		**2001**		**2001**	
Mar.	10.6	Mar.	-0.4	Mar.	1.4	Mar.	4.4	Mar.	2.5	Mar.	2.9
Jun.	12.11	Jun.	-0.5	Jun.	2.3	Jun.	5.2	Jun.	3.1	Jun.	3.2
Sep.	13.01	Sep.	-0.8	Sep.	1.4	Sep.	3.2	Sep.	2.1	Sep.	2.6
Dec.	12.55	Dec.	1.2	Dec.	0.8	Dec.	3.2	Dec.	1.7	Dec.	1.6
2002		**2002**		**2002**		**2002**		**2002**		**2002**	
Mar.	14.08	Mar.	-1.2	Mar.	3.6	Mar.	2.3	Mar.	1.8	Mar.	1.5
Jun.	11.48	Jun.	-0.7	Jun.	0.2	Jun.	2.6	Jun.	0.8	Jun.	1.1
Sep.	10.1	Sep.	-0.9	Sep.	0.4	Sep.	3.1	Sep.	1	Sep.	1.5
Dec.	10	Dec.	-0.3	Dec.	1.6	Dec.	3.7	Dec.	1.1	Dec.	2.4
2003		**2003**		**2003**		**2003**		**2003**		**2003**	
Mar.	7.1	Mar.	-0.1	Mar.	1.7	Mar.	4.5	Mar.	1.2	Mar.	3
Jun.	6.6	Jun.	-0.4	Jun.	1.7	Jun.	3	Jun.	1	Jun.	2.1
Sep.	6.2	Sep.	-0.2	Sep.	1.7	Sep.	3.3	Sep.	1.1	Sep.	2.3
Dec.	5.1	Dec.	-0.4	Dec.	1.8	Dec.	3.4	Dec.	1.1	Dec.	1.9
2004		**2004**		**2004**		**2004**		**2004**		**2004**	
Mar.	5.1	Mar.	-0.1	Mar.	2.3	Mar.	3.1	Mar.	1.1	Mar.	1.7
Jun.	6.8	Jun.	0	Jun.	3	Jun.	3.6	Jun.	1.7	Jun.	3.3
Sep.	6.3	Sep.	0	Sep.	3.6	Sep.	3.9	Sep.	1.8	Sep.	2.5
Dec.	6.4	Dec.	0.2	Dec.	2.9	Dec.	3	Dec.	2.1	Dec.	3.3
2005		**2005**		**2005**		**2005**		**2005**		**2005**	
Mar.	8.8	Mar.	-0.2	Mar.	3.2	Mar.	3.1	Mar.	1.8	Mar.	3.1
Jun.	7.8	Jun.	-0.5	Jun.	5.3	Jun.	2.5	Jun.	2	Jun.	2.5
Sep.	9.1	Sep.	-0.3	Sep.	6.2	Sep.	2.7	Sep.	1.9	Sep.	4.7
Dec.	17.1	Dec.	-0.8	Dec.	5.8	Dec.	2.6	Dec.	2.3	Dec.	2.2
2006		**2006**		**2006**		**2006**		**2006**		**2006**	
Mar.	17.9	Mar.	0.3	Mar.	5.6	Mar.	2	Mar.	1.8	Mar.	3.4
Jun.	15.5	Jun.	1	Jun.	5.89	Jun.	2.6	Jun.	2	Jun.	4.33
Sep.	9.1	Sep.	0.6	Sep.	6	Sep.	2.7	Sep.	2.4	Sep.	2.1
Dec.	6.6	Dec.	0.3	Dec.	3.5	Dec.	2.1	Dec.	1.4	Dec.	3
2007		**2007**		**2007**		**2007**		**2007**		**2007**	
Mar.	6.5	Mar.	-0.1	Mar.	2	Mar.	2.2	Mar.	1.9	Mar.	2.8
Jun.	5.8	Jun.	-0.2	Jun.	1.9	Jun.	2.5	Jun.	1.8	Jun.	2.7
Sep.	7	Sep.	0	Sep.	2.1	Sep.	2.3	Sep.	2.5	Sep.	2.9

3 SOEKARNO-HATTA INTERNATIONAL AIRPORT - JAKARTA

3.1 CURRENT AVIATION ACTIVITY

Air traffic variations at Soekarno-Hatta International Airport are very similar to that of total air traffic in Indonesia. The air traffic at Soekarno-Hatta is a major portion of air traffic throughout Indonesia, especially international traffic, because it is the largest airport in the largest city in the country. From 1995 through 2005, passenger travel at Soekarno-Hatta increased almost 200%. During 1998 and 1999, however, passenger travel decreased markedly, in response to the crisis in Southeast Asia that began in 1997. In 1999, passenger travel began increasing and has been increasing since then. These increases clearly reflect the changes in GDP for Indonesia. The charts below provide a picture of aircraft movements, passenger traffic, and cargo traffic at Soekarno-Hatta from 1995 to 2007. The tables following the charts show the detail underlying the graphics in the charts.

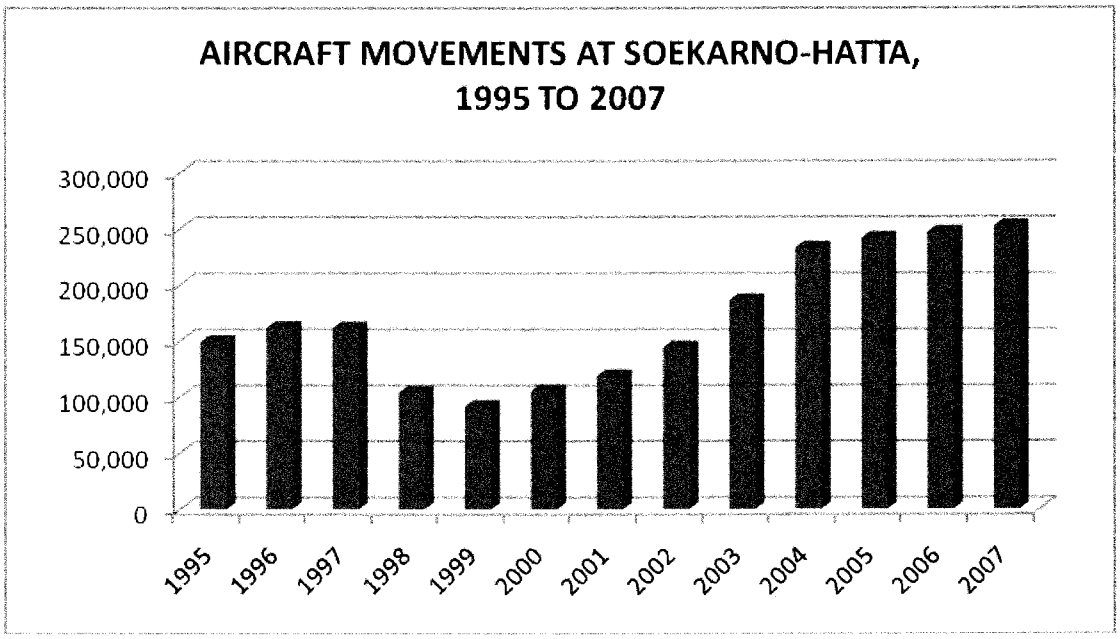

Figure 7

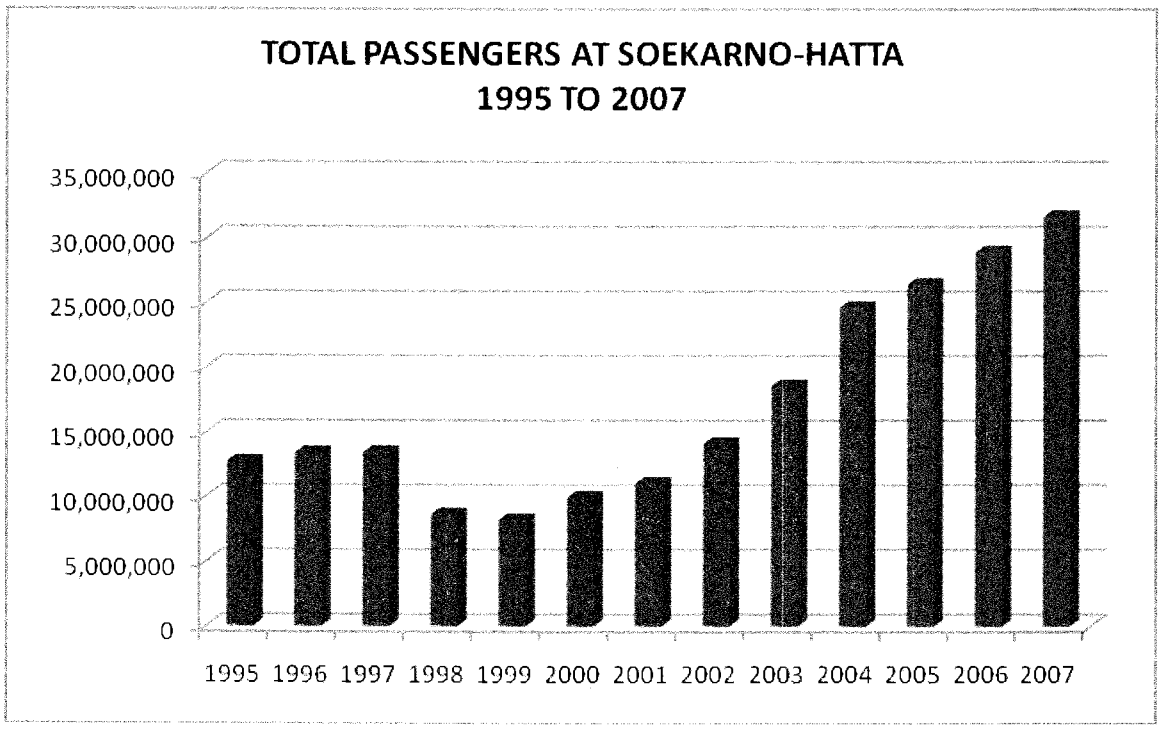

Figure 8

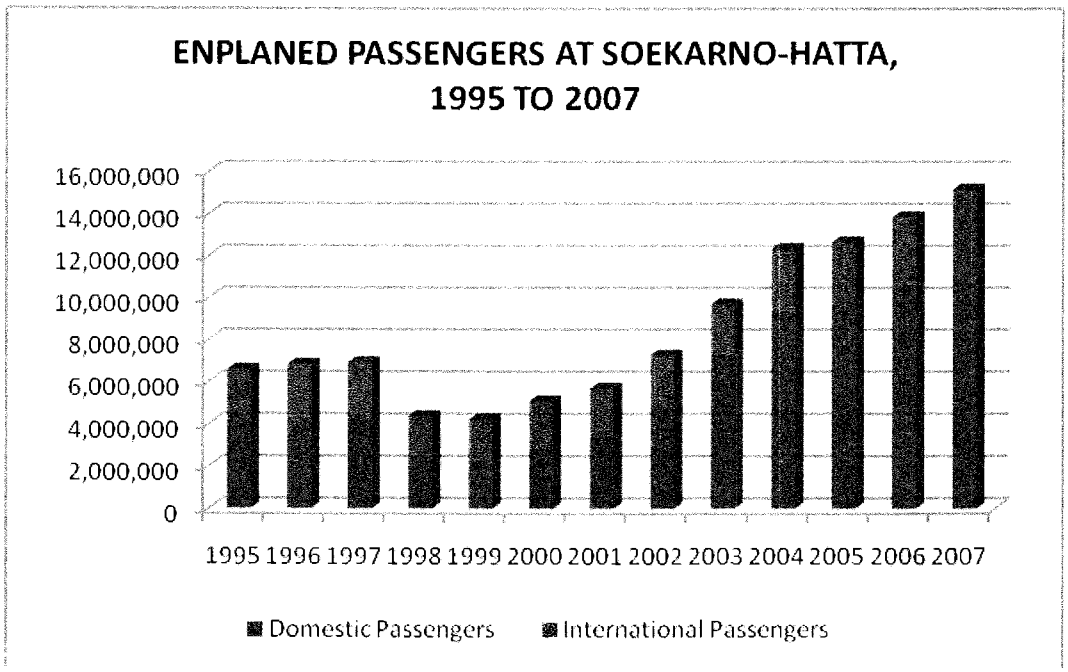

Figure 9

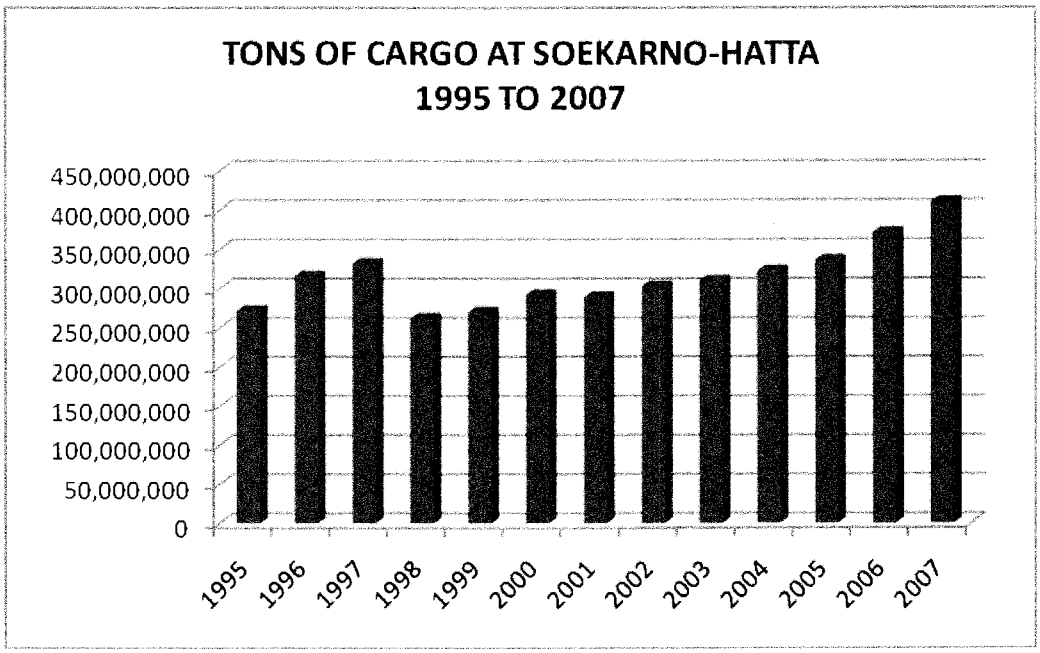
TONS OF CARGO AT SOEKARNO-HATTA
1995 TO 2007
450,000,000
400,000,000
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007

Figure 10

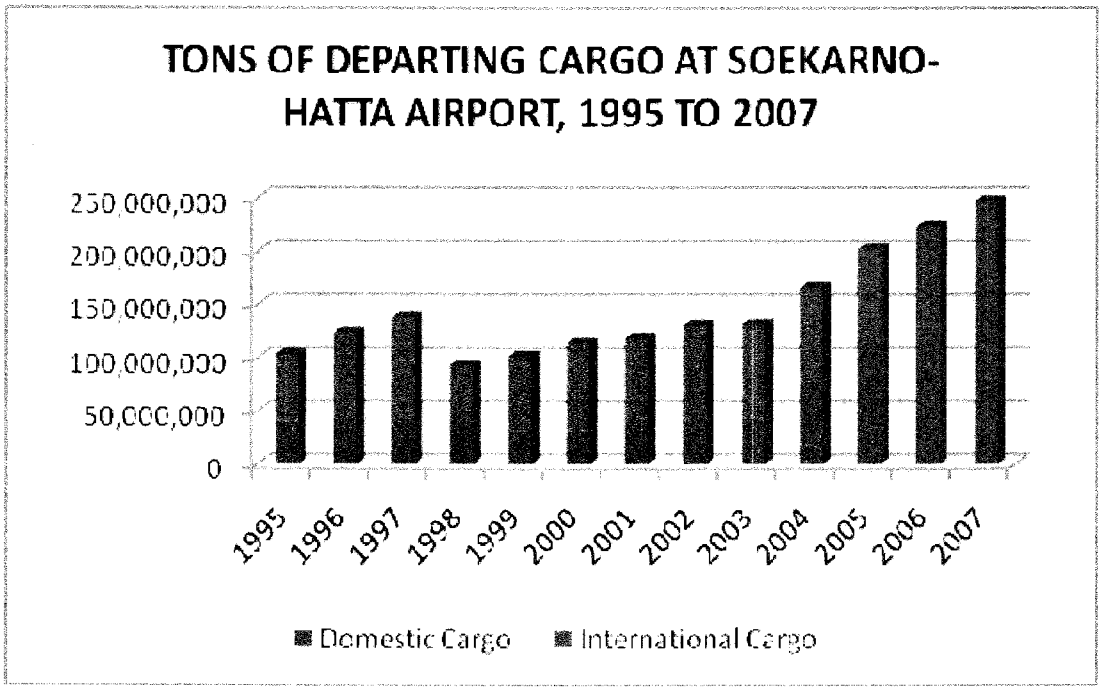
TONS OF DEPARTING CARGO AT SOEKARNO-HATTA AIRPORT, 1995 TO 2007
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Domestic Cargo
International Cargo

Figure 11

Table 4: Domestic Aviation Activity at Soekarno-Hatta / Jakarta , 1995 to 2007

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	56,019	56,001	112,020	4,178,568	4,000,548	8,179,116	232,443	40,524,387	63,987,553	104,511,940
1996	60,931	60,859	121,790	4,295,829	4,125,005	8,420,834	190,897	42,787,090	75,015,789	117,802,879
1997	57,960	58,140	116,100	4,219,045	3,966,418	8,185,463	237,231	42,495,751	78,923,667	121,419,418
1998	34,618	34,707	69,325	2,562,820	2,398,400	4,961,220	56,801	39,957,699	55,020,001	94,977,700
1999	31,437	31,354	62,791	2,308,076	2,039,021	4,347,097	149,310	32,373,691	59,208,275	91,581,966
2000	37,485	37,556	75,041	2,845,834	2,541,477	5,387,311	372,316	31,791,817	65,890,687	97,682,504
2001	42,429	42,463	84,892	3,416,730	3,126,592	6,543,322	392,803	38,343,423	72,807,025	111,150,448
2002	54,867	54,728	109,595	4,779,124	4,331,534	9,110,658	479,265	40,876,911	73,401,129	114,278,040
2003	76,463	76,340	152,803	7,344,625	6,485,039	13,829,664	951,346	43,705,693	90,791,367	134,497,060
2004	96,105	96,151	192,256	9,412,332	9,388,926	18,801,258	1,238,815	79,030,629	75,846,396	154,877,026
2005	100,114	100,369	200,483	9,752,645	10,921,703	20,674,348	1,305,342	117,322,952	59,655,792	176,978,744
2006	102,284	102,545	204,829	10,672,678	11,952,021	22,624,699	1,428,484	129,593,390	65,895,003	195,488,393
2007	104,502	104,768	209,270	11,679,504	13,079,536	24,759,040	1,563,242	143,147,154	72,786,754	215,933,909

International Aviation Activity at Soekarno-Hatta / Jakarta

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	18,587	16,861	37,268	2,404,553	2,179,722	4,584,275	147,075	62,768,090	104,972,237	167,740,327
1996	19,966	20,101	40,067	2,546,032	2,453,862	4,999,894	158,941	81,184,803	117,424,733	198,609,536
1997	22,734	22,833	45,567	2,711,765	2,569,052	5,280,817	220,706	95,279,702	125,751,703	211,031,405
1998	17,294	17,376	34,670	1,815,307	1,859,066	3,674,373	115,143	53,090,799	114,044,419	167,135,218
1999	14,395	14,523	28,918	1,913,913	1,966,975	3,880,888	159,752	69,384,871	109,452,812	178,837,783
2000	15,389	15,381	30,770	2,245,161	2,317,975	4,563,136	353,037	82,078,551	112,498,592	194,577,143
2001	17,043	17,098	34,141	2,257,161	2,250,017	4,507,178	215,619	79,614,230	98,276,413	177,890,643
2002	17,405	17,575	34,980	2,509,468	2,515,915	5,025,383	185,688	89,806,311	99,167,175	188,973,486
2003	16,771	16,906	33,677	2,379,790	2,403,358	4,783,148	139,682	87,153,429	88,473,406	175,626,835
2004	20,428	20,479	40,908	2,932,641	2,939,362	5,872,003	171,191	86,145,440	81,559,203	167,704,643
2005	20,609	20,539	41,148	2,909,043	2,890,018	5,799,061	168,731	85,060,691	74,072,874	159,133,565
2006	21,056	20,984	42,040	3,183,473	3,162,653	6,346,126	184,649	93,956,921	81,819,923	175,776,843

2007	21,512	21,439	42,952	3,483,791	3,461,007	6,944,799	202,068	103,783,579	90,377,211	194,160,790

Total Aviation Activity at Soekarno-Hatta / Jakarta

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	74,606	72,862	149,288	6,583,121	6,180,270	12,763,391	379,518	103,292,477	168,959,790	272,252,267
1996	80,897	80,960	161,857	6,841,861	6,578,867	13,420,728	349,838	123,971,893	192,440,522	316,412,415
1997	80,694	80,973	161,667	6,930,810	6,535,470	13,466,280	457,937	137,775,453	204,675,370	332,450,823
1998	51,912	52,083	103,995	4,378,127	4,257,466	8,635,593	171,944	93,048,498	169,064,420	262,112,918
1999	45,832	45,877	91,709	4,221,989	4,005,996	8,227,985	309,062	101,758,562	168,661,087	270,419,749
2000	52,874	52,937	105,811	5,090,995	4,859,452	9,950,447	725,353	113,870,368	178,389,279	292,259,647
2001	59,472	59,561	119,033	5,673,891	5,376,609	11,050,500	608,422	117,957,653	171,083,438	289,041,091
2002	72,272	72,303	144,575	7,288,592	6,847,449	14,136,041	664,953	130,683,222	172,568,304	303,251,526
2003	93,234	93,246	186,480	9,724,415	8,888,397	18,612,812	1,091,028	130,859,122	179,264,773	310,123,895
2004	116,534	116,630	233,164	12,344,973	12,328,288	24,673,261	1,410,006	165,176,069	157,405,599	322,581,668
2005	120,723	120,908	241,631	12,661,688	13,811,721	26,473,409	1,474,073	202,383,643	133,728,666	336,112,309
2006	123,340	123,529	246,870	13,856,151	15,114,674	28,970,825	1,613,132	223,550,311	147,714,926	371,265,237
2007	126,014	126,207	252,222	15,163,295	16,540,543	31,703,839	1,765,310	246,930,734	163,163,965	410,094,698

3.2 FORECASTS OF AVIATION ACTIVITY AT SOEKARNO-HATTA

To obtain forecasts of passenger enplanements and cargo shipping from Soekarno-Hatta International Airport, ASI extended forecasts that had been developed in 2004. These forecasts were adjusted to take into account the actual data for 2004 through 2007. The tables below provide the base forecasts.

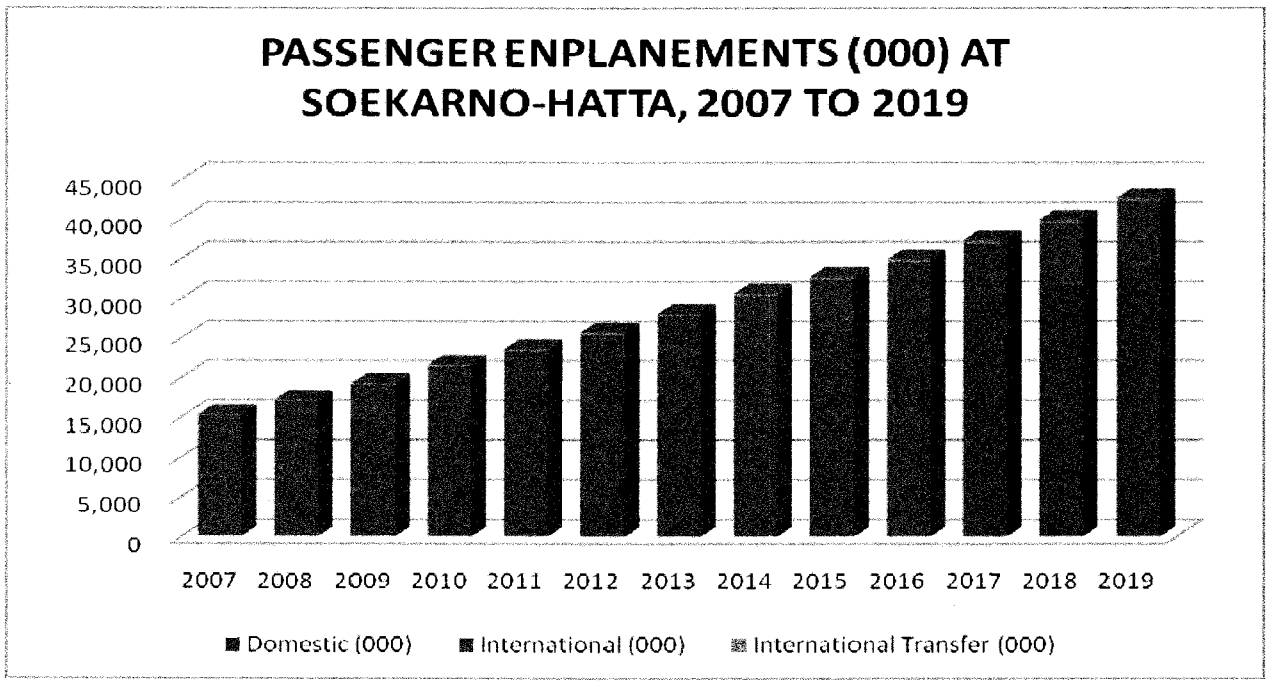

Figure 12

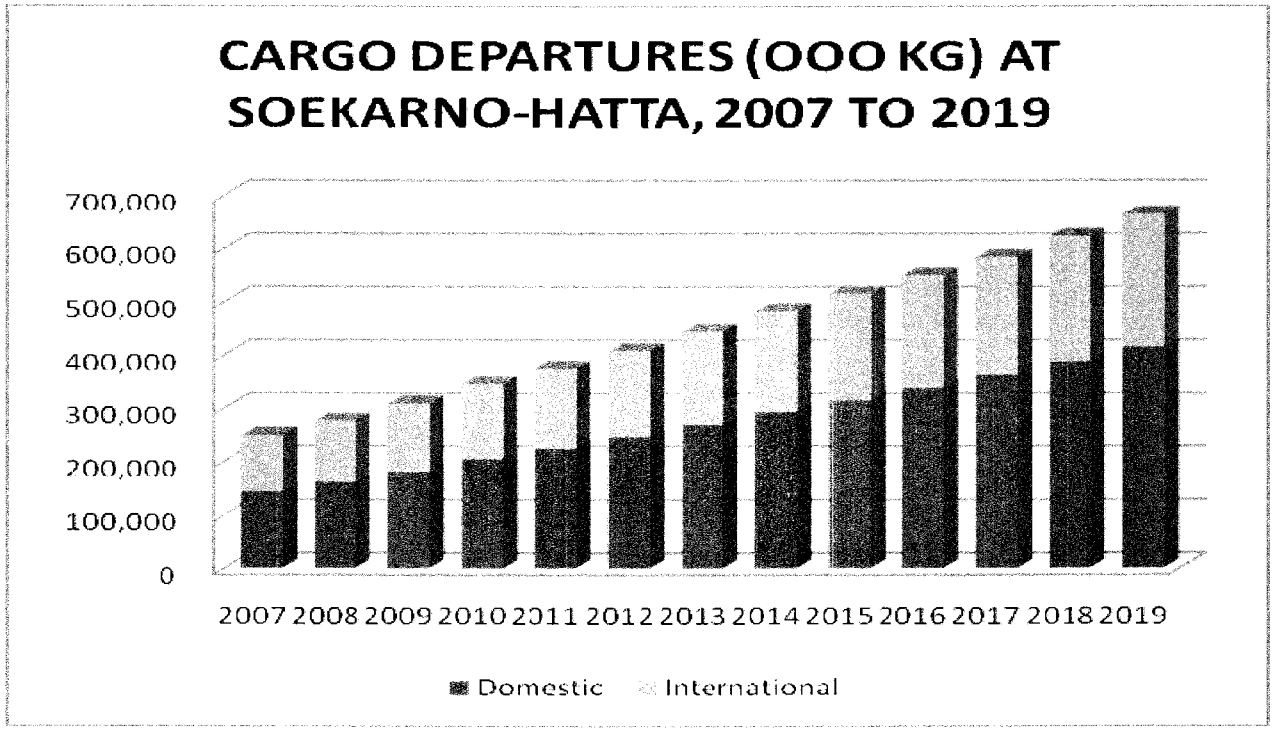

Figure 13

3.3 REVENUES AND CASH FLOW AT SOEKARNO-HATTA

3.3.1 Scenario 1

ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.50 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected from cargo activity by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

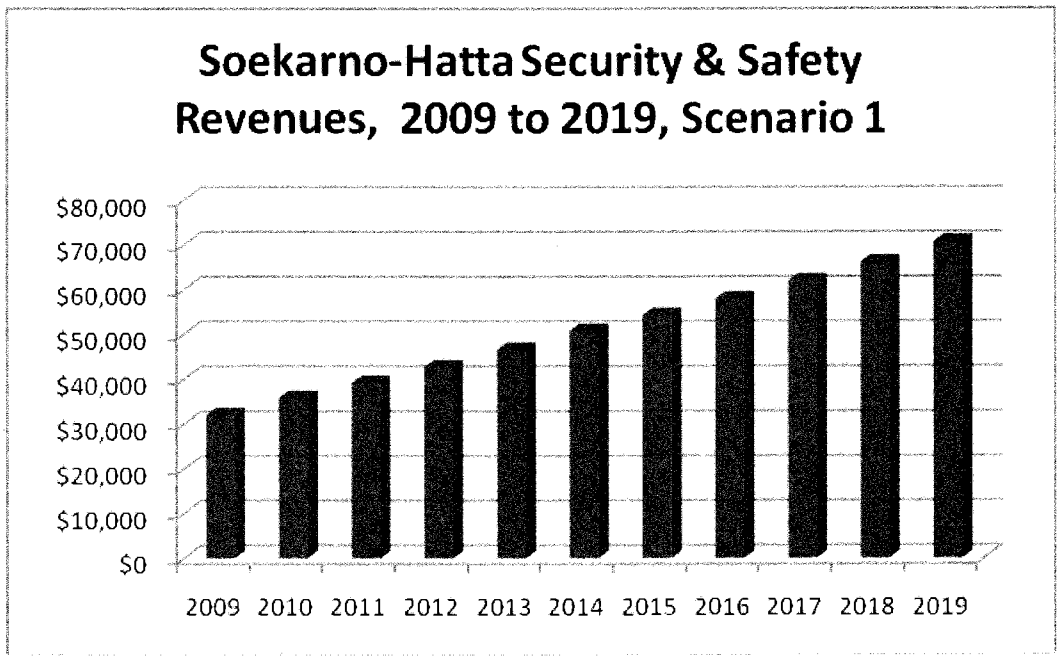
Soekarno-Hatta Security & Safety Revenues, 2009 to 2019, Scenario 1
$80,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Figure 14

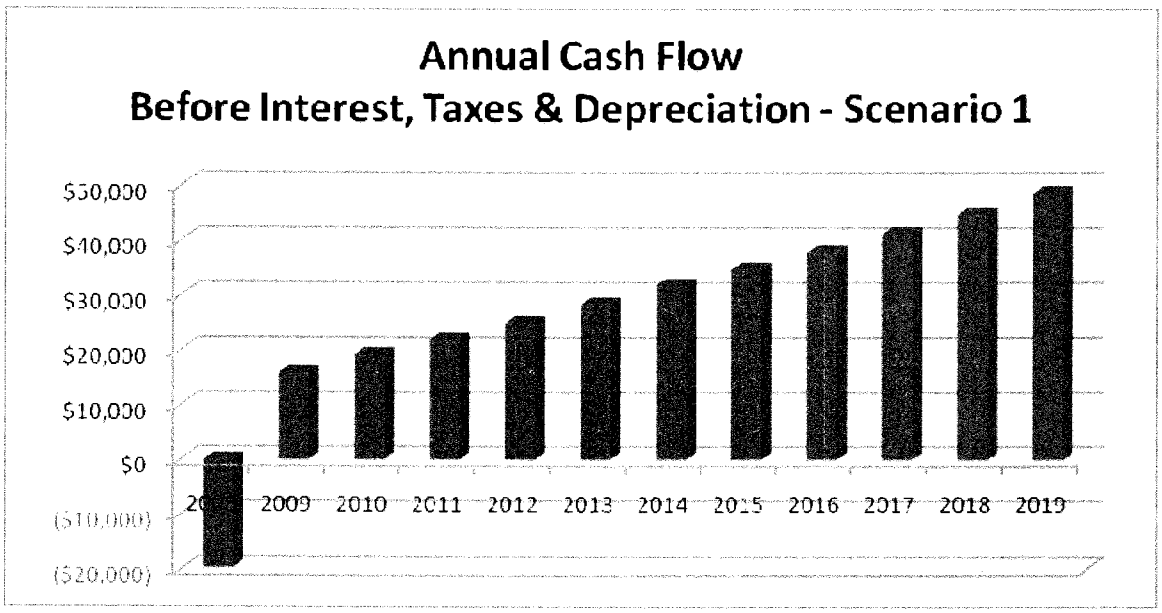
Annual Cash Flow
Before Interest, Taxes & Depreciation - Scenario 1
$50,000
$40,000
$30,000
$20,000
$10,000
$0
($10,000)
($20,000)
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Figure 15

Table 5: Soekarno-Hatta Scenario 1: Revenues, Costs, & Cash Flow, 2009 TO 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00
Passenger Security Fee - International		$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00
International		$4,240	$4,678	$5,040	$5,430	$5,851	$6,304	$6,670	$7,057	$7,467	$7,901	$8,359
International Transfer		$244	$269	$289	$311	$334	$359	$379	$401	$423	$447	$472
Domestic		$14,824	$16,700	$18,286	$20,022	$21,923	$24,004	$25,713	$27,544	$29,506	$31,607	$33,857
Total Security Revenues ($000)		$19,308	$21,647	$23,615	$25,763	$28,108	$30,667	$32,763	$35,002	$37,396	$39,954	$42,689
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
Passenger Safety Fee - International		$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
International		$2,120	$2,339	$2,520	$2,715	$2,925	$3,152	$3,335	$3,529	$3,734	$3,950	$4,180
International Transfer		$122	$134	$145	$155	$167	$180	$190	$200	$212	$223	$236
Domestic		$7,412	$8,350	$9,143	$10,011	$10,961	$12,002	$12,857	$13,772	$14,753	$15,803	$16,929
Total Safety Revenues ($000)		$9,654	$10,824	$11,807	$12,881	$14,054	$15,334	$16,381	$17,501	$18,698	$19,977	$21,344
Total Passenger Revenues ($000)		$28,963	$32,471	$35,422	$38,644	$42,161	$46,001	$49,144	$52,503	$56,094	$59,931	$64,033
Cargo Security Revenue												
Cargo Security Fee - Domestic		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
Cargo Security Fee - International		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
International		$632	$697	$751	$809	$871	$939	$993	$1,051	$1,112	$1,177	$1,245
Domestic		$908	$1,023	$1,121	$1,227	$1,343	$1,471	$1,576	$1,688	$1,808	$1,937	$2,075
Total Cargo Security Revenues ($000)		$1,540	$1,720	$1,871	$2,036	$2,215	$2,410	$2,569	$2,739	$2,920	$3,114	$3,320
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
Cargo Safety Fee - International		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
International		$632	$697	$751	$809	$871	$939	$993	$1,051	$1,112	$1,177	$1,245
Domestic		$908	$1,023	$1,121	$1,227	$1,343	$1,471	$1,576	$1,688	$1,808	$1,937	$2,075
Total Cargo Safety Revenues ($000)		$1,540	$1,720	$1,871	$2,036	$2,215	$2,410	$2,569	$2,739	$2,920	$3,114	$3,320
Total Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Passenger Enplanements (000)	17,224	19,308	21,647	23,615	25,763	28,108	30,667	32,763	35,002	37,396	39,954	42,689

Passenger Revenues ($000)		$28,963	$32,471	$35,422	$38,644	$42,161	$46,001	$49,144	$52,503	$56,094	$59,931	$64,033
Cargo Departures (000 Kg.)	275,766	308,000	344,040	374,263	407,166	442,989	481,994	513,848	547,827	584,074	622,742	663,993
Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Total Revenues ($000)		$32,043	$35,911	$39,165	$42,716	$46,591	$50,820	$54,282	$57,981	$61,934	$66,159	$70,673
Total Airport Capital Costs	$19,651		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816
Training Costs (Annual)		$566	$566	$566	$566	$566	$566	$566	$566	$566	$566	$566
Maintenance Costs (Annual)		$884	$884	$884	$884	$884	$884	$884	$884	$884	$884	$884
Total Investment Costs ($000)		$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266
Annual Cash Flow ($000)	($19,651)	$20,776	$24,645	$27,899	$31,450	$35,325	$39,554	$43,016	$46,715	$50,668	$54,893	$59,407
Cumulative Cash Flow	($19,651)	$1,126	$25,770	$53,669	$85,119	$120,444	$159,999	$203,015	$249,730	$300,398	$355,291	$414,698

3.3.2 Scenario 2

In Scenario 2, ASI has estimated the revenues that would be collected if $0.50 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

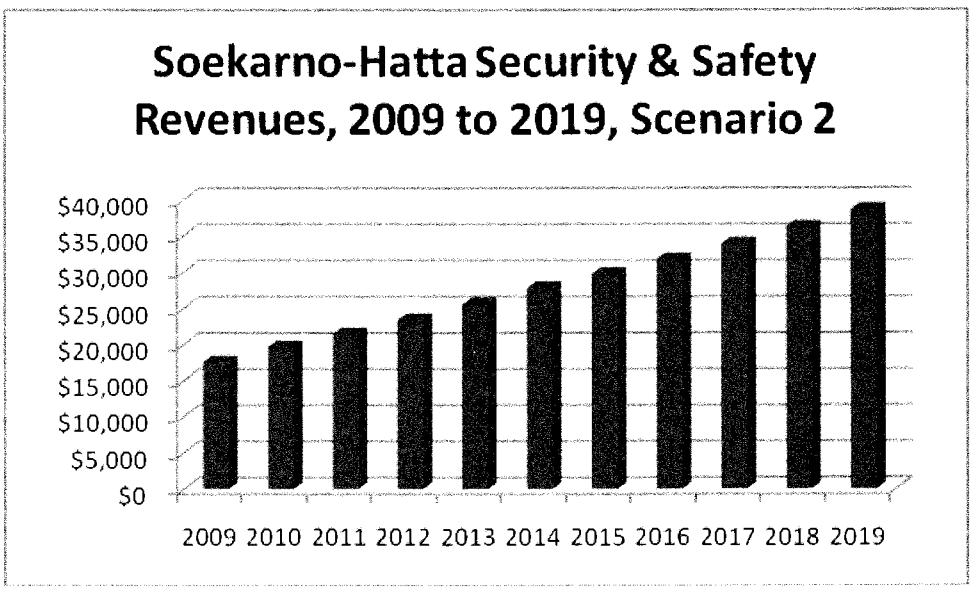

Figure 16

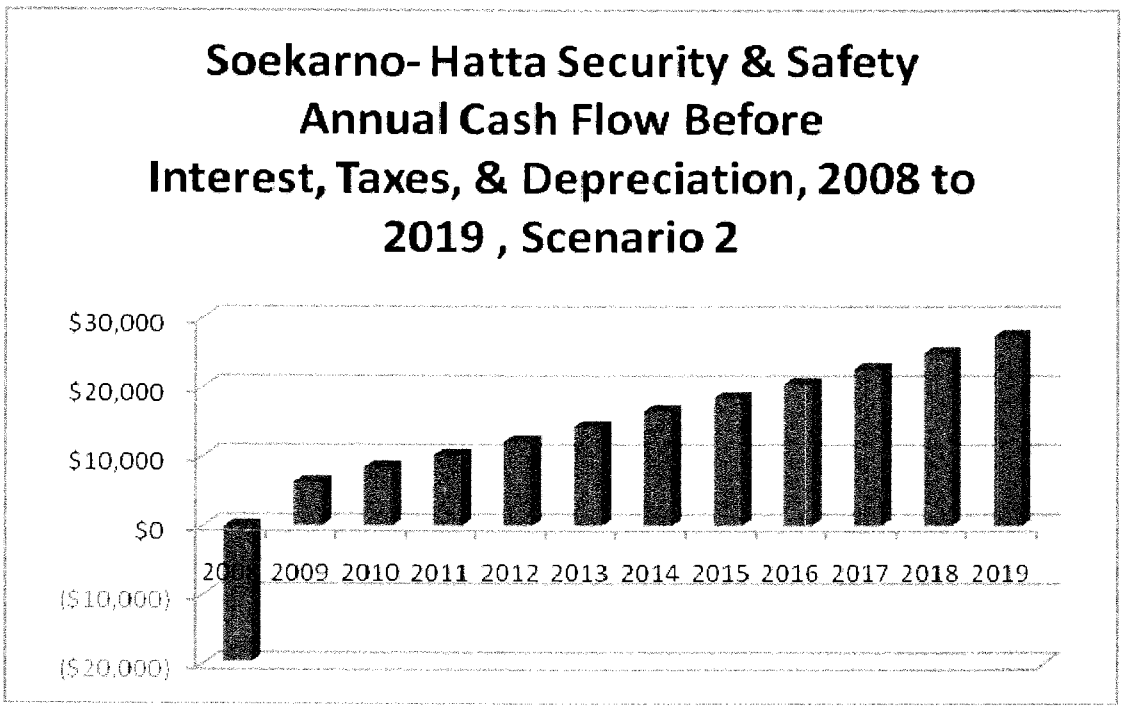
Soekarno- Hatta Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019 , Scenario 2
$30,000
$20,000
$10,000
$0
($10,000)
($20,000)
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

Figure 17

Table 6: Soekarno-Hatta Scenario 2: Revenues, Costs, & Cash Flow, 2009 TO 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Security Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$2,120	$2,339	$2,520	$2,715	$2,925	$3,152	$3,335	$3,529	$3,734	$3,950	$4,180
International Transfer		$122	$134	$145	$155	$167	$180	$190	$200	$212	$223	$236
Domestic		$7,412	$8,350	$9,143	$10,011	$10,961	$12,002	$12,857	$13,772	$14,753	$15,803	$16,929
Total Security Revenues ($000)		$9,654	$10,824	$11,807	$12,881	$14,054	$15,334	$16,381	$17,501	$18,698	$19,977	$21,344
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$1,060	$1,169	$1,260	$1,358	$1,463	$1,576	$1,667	$1,764	$1,867	$1,975	$2,090
International Transfer		$61	$67	$72	$78	$84	$90	$95	$100	$106	$112	$118
Domestic		$3,706	$4,175	$4,571	$5,005	$5,481	$6,001	$6,428	$6,886	$7,376	$7,902	$8,464
Total Safety Revenues ($000)		$4,827	$5,412	$5,904	$6,441	$7,027	$7,667	$8,191	$8,751	$9,349	$9,989	$10,672
Total Passenger Revenues ($000)		$14,481	$16,235	$17,711	$19,322	$21,081	$23,000	$24,572	$26,252	$28,047	$29,966	$32,017
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$632	$697	$751	$809	$871	$939	$993	$1,051	$1,112	$1,177	$1,245
Domestic		$908	$1,023	$1,121	$1,227	$1,343	$1,471	$1,576	$1,688	$1,808	$1,937	$2,075
Total Cargo Security Revenues ($000)		$1,540	$1,720	$1,871	$2,036	$2,215	$2,410	$2,569	$2,739	$2,920	$3,114	$3,320
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$632	$697	$751	$809	$871	$939	$993	$1,051	$1,112	$1,177	$1,245
Domestic		$908	$1,023	$1,121	$1,227	$1,343	$1,471	$1,576	$1,688	$1,808	$1,937	$2,075
Total Cargo Safety Revenues ($000)		$1,540	$1,720	$1,871	$2,036	$2,215	$2,410	$2,569	$2,739	$2,920	$3,114	$3,320
Total Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Passenger Enplanements (000)	17,224	19,308	21,647	23,615	25,763	28,108	30,667	32,763	35,002	37,396	39,954	42,689

Passenger Revenues ($000)		$14,481	$16,235	$17,711	$19,322	$21,081	$23,000	$24,572	$26,252	$28,047	$29,966	$32,017
Cargo Departures (000 Kg.)	275,766	308,000	344,040	374,263	407,166	442,989	481,994	513,848	547,827	584,074	622,742	663,993
Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Total Revenues ($000)		$17,561	$19,676	$21,454	$23,394	$25,511	$27,820	$29,710	$31,730	$33,888	$36,193	$38,656
Total Airport Capital Costs	$19,651		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816
Training Costs (Annual)		$566	$566	$566	$566	$566	$566	$566	$566	$566	$566	$566
Maintenance Costs (Annual)		$884	$884	$884	$884	$884	$884	$884	$884	$884	$884	$884
Total Investment Costs ($000)		$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266
Annual Cash Flow ($000)	($19,651)	$6,295	$8,410	$10,188	$12,128	$14,244	$16,554	$18,444	$20,464	$22,621	$24,927	$27,390
Cumulative Cash Flow	($19,651)	($13,356)	($4,946)	$5,242	$17,369	$31,614	$48,168	$66,612	$87,076	$109,697	$134,624	$162,014

3.3.3 Scenario 3

In Scenario 3, ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

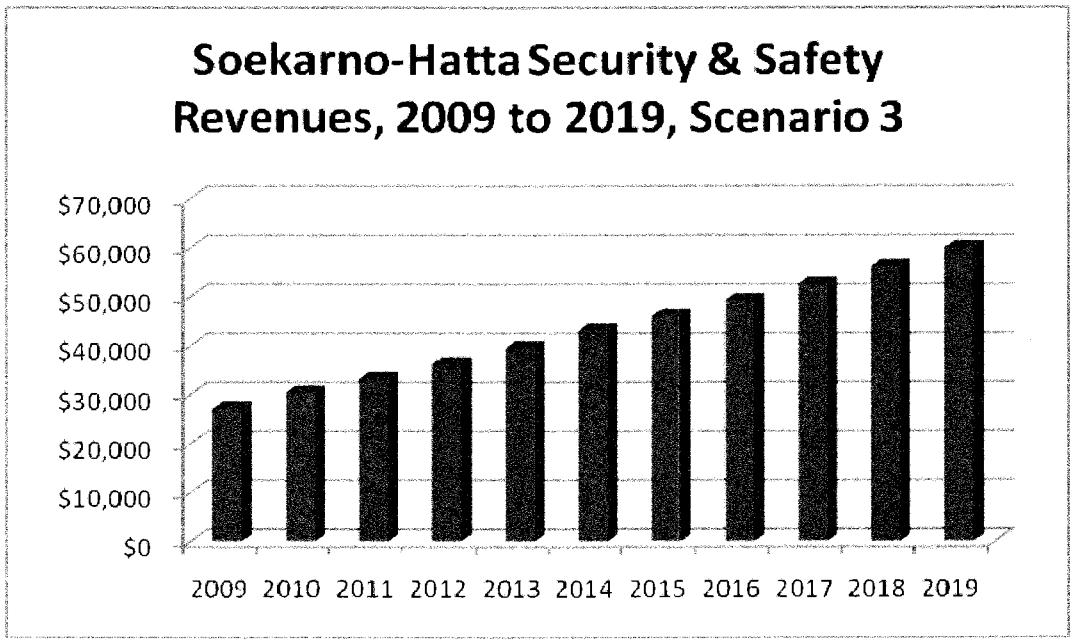

Figure 18

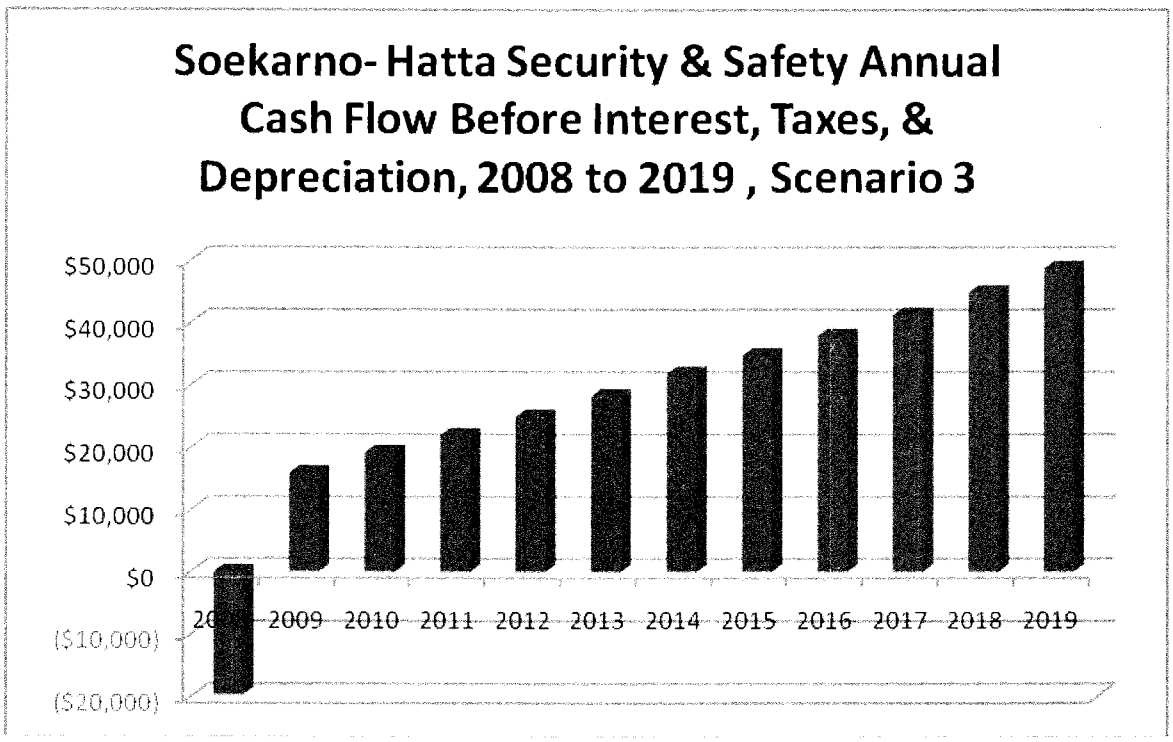
Soekarno- Hatta Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019 , Scenario 3
$50,000
$40,000
$30,000
$20,000
$10,000
$0
($10,000)
($20,000)
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Figure 19

Table 7: Soekarno-Hatta Scenario 3: Revenues, Costs, & Cash Flow, 2009 TO 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00
Passenger Security Fee - International		$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00
International		$4,240	$4,678	$5,040	$5,430	$5,851	$6,304	$6,670	$7,057	$7,467	$7,901	$8,359
International Transfer		$244	$269	$289	$311	$334	$359	$379	$401	$423	$447	$472
Domestic		$14,824	$16,700	$18,286	$20,022	$21,923	$24,004	$25,713	$27,544	$29,506	$31,607	$33,857
Total Security Revenues ($000)		$19,308	$21,647	$23,615	$25,763	$28,108	$30,667	$32,763	$35,002	$37,396	$39,954	$42,689
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25
Passenger Safety Fee - International		$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25
International		$1,060	$1,169	$1,260	$1,358	$1,463	$1,576	$1,667	$1,764	$1,867	$1,975	$2,090
International Transfer		$61	$67	$72	$78	$84	$90	$95	$100	$106	$112	$118
Domestic		$3,706	$4,175	$4,571	$5,005	$5,481	$6,001	$6,428	$6,886	$7,376	$7,902	$8,464
Total Safety Revenues ($000)		$4,827	$5,412	$5,904	$6,441	$7,027	$7,667	$8,191	$8,751	$9,349	$9,989	$10,672
Total Passenger Revenues ($000)		$24,135	$27,059	$29,519	$32,204	$35,135	$38,334	$40,953	$43,753	$46,745	$49,943	$53,361
Cargo Security Revenue												
Cargo Security Fee - Domestic		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
Cargo Security Fee - International		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
International		$632	$697	$751	$809	$871	$939	$993	$1,051	$1,112	$1,177	$1,245
Domestic		$908	$1,023	$1,121	$1,227	$1,343	$1,471	$1,576	$1,688	$1,808	$1,937	$2,075
Total Cargo Security Revenues ($000)		$1,540	$1,720	$1,871	$2,036	$2,215	$2,410	$2,569	$2,739	$2,920	$3,114	$3,320
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
Cargo Safety Fee - International		$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
International		$632	$697	$751	$809	$871	$939	$993	$1,051	$1,112	$1,177	$1,245
Domestic		$908	$1,023	$1,121	$1,227	$1,343	$1,471	$1,576	$1,688	$1,808	$1,937	$2,075
Total Cargo Safety Revenues ($000)		$1,540	$1,720	$1,871	$2,036	$2,215	$2,410	$2,569	$2,739	$2,920	$3,114	$3,320
Total Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Passenger Enplanements (000)	17,224	19,308	21,647	23,615	25,763	28,108	30,667	32,763	35,002	37,396	39,954	42,689
Passenger Revenues ($000)		$24,135	$27,059	$29,519	$32,204	$35,135	$38,334	$40,953	$43,753	$46,745	$49,943	$53,361

Cargo Departures (000 Kg.)	275,766	308,000	344,040	374,263	407,166	442,989	481,994	513,848	547,827	584,074	622,742	663,993
Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Total Revenues ($000)		$27,215	$30,499	$33,261	$36,275	$39,564	$43,154	$46,092	$49,231	$52,585	$56,170	$60,001
Total Airport Capital Costs	$19,651		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816
Training Costs (Annual)		$566	$566	$566	$566	$566	$566	$566	$566	$566	$566	$566
Maintenance Costs (Annual)		$884	$884	$884	$884	$884	$884	$884	$884	$884	$884	$884
Total Investment Costs ($000)		$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266
Annual Cash Flow ($000)	($19,651)	$15,949	$19,233	$21,995	$25,009	$28,298	$31,888	$34,825	$37,965	$41,319	$44,904	$48,735
Cumulative Cash Flow	($19,651)	($3,701)	$15,532	$37,527	$62,536	$90,834	$122,722	$157,547	$195,512	$236,831	$281,735	$330,470

4 NGURA RAI INTERNATIONAL AIRPORT – DEPENSAR, BALI

4.1 CURRENT AVIATION ACTIVITY

Air traffic at Ngura Rai International Airport has a somewhat different pattern from other Indonesia airports perhaps because it is a very popular tourist destination in Indonesia. The air traffic at Ngura Rai is a relatively larger portion of international passenger traffic for Indonesia. From 1995 through 2005, passenger travel at Ngura Rai increased less than 100%, which is in sharp contrast to Soekarno-Hatta. During 1998 and 1999, however, passenger travel decreased somewhat, in response to the crisis in Southeast Asia that began in 1997. Later terrorist activity in Bali, a series of bombing on 12 October 2002 and a series of bombings on 1 October 2005, restrained the growth in passenger travel. The charts below provide a picture of aircraft movements, passenger traffic, and cargo traffic at Ngura Rai from 1995 to 2007. The tables following the charts show the detail underlying the graphics in the charts.

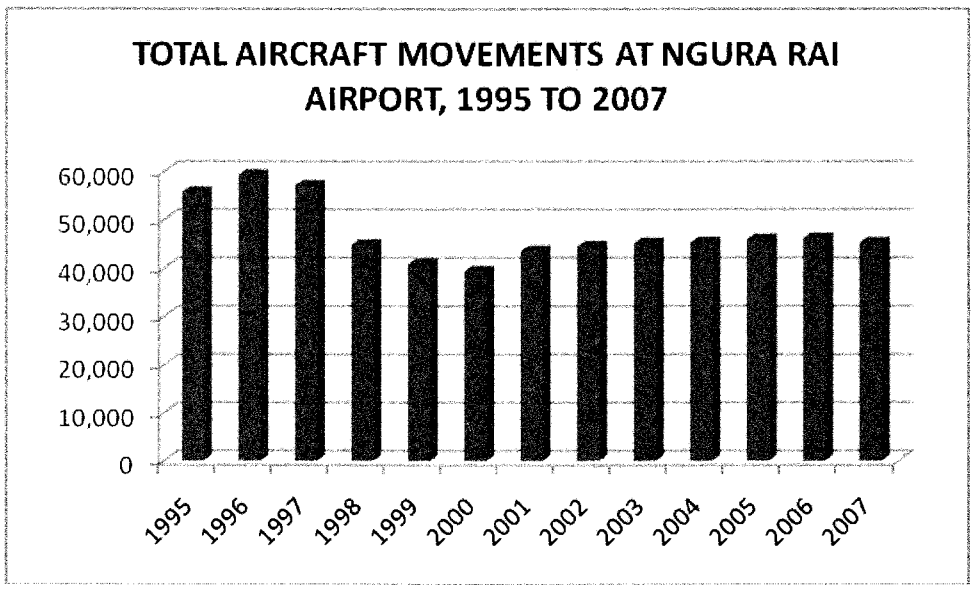

Figure 20

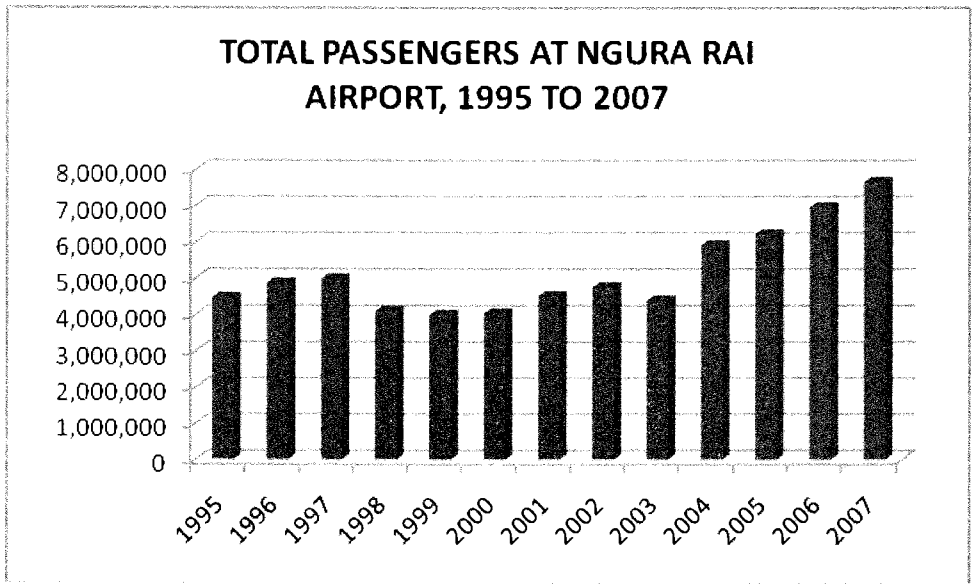

Figure 21

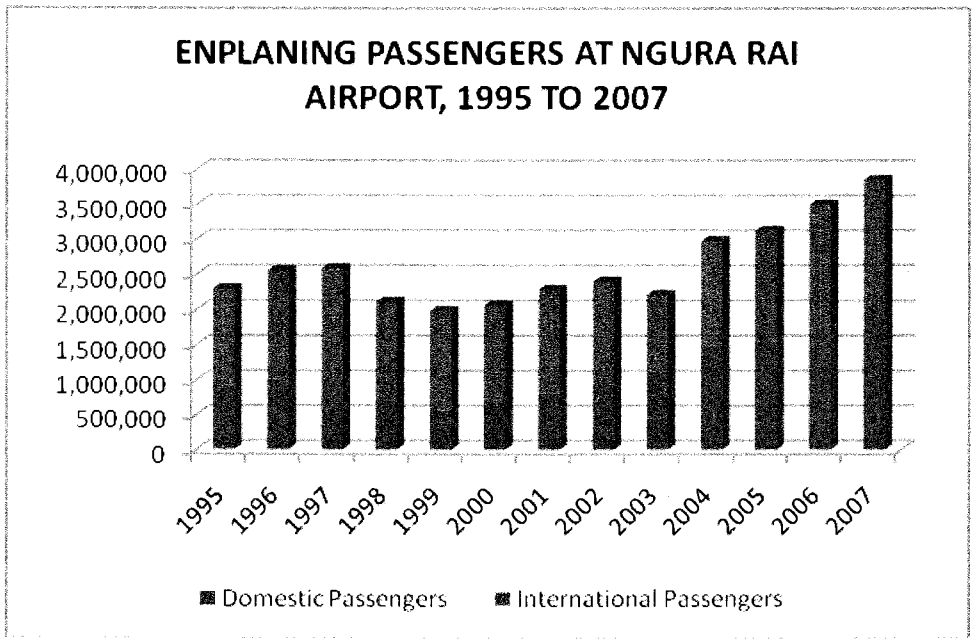

Figure 22

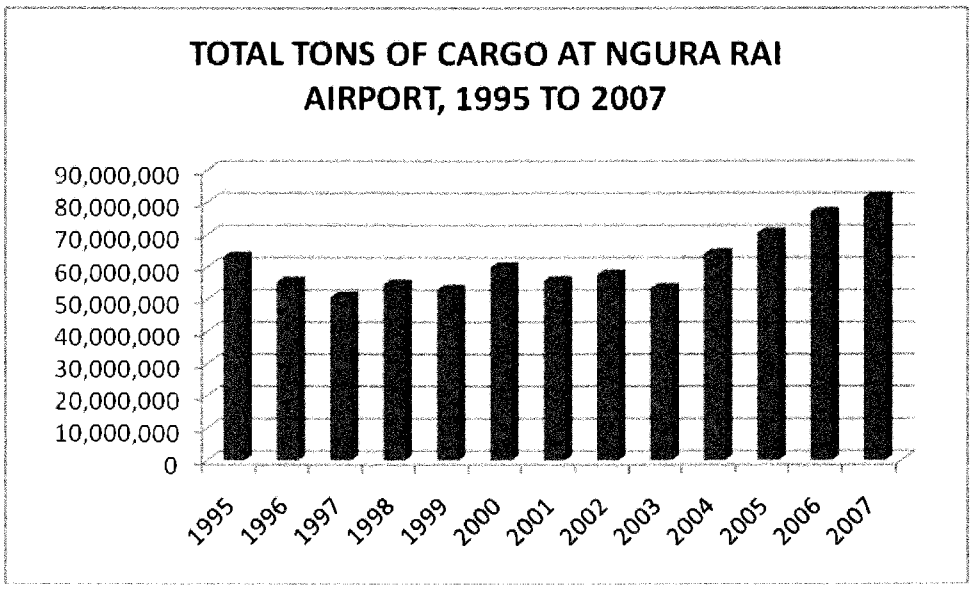
TOTAL TONS OF CARGO AT NGURA RAI AIRPORT, 1995 TO 2007
90,000,000
80,000,000
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007

Figure 23

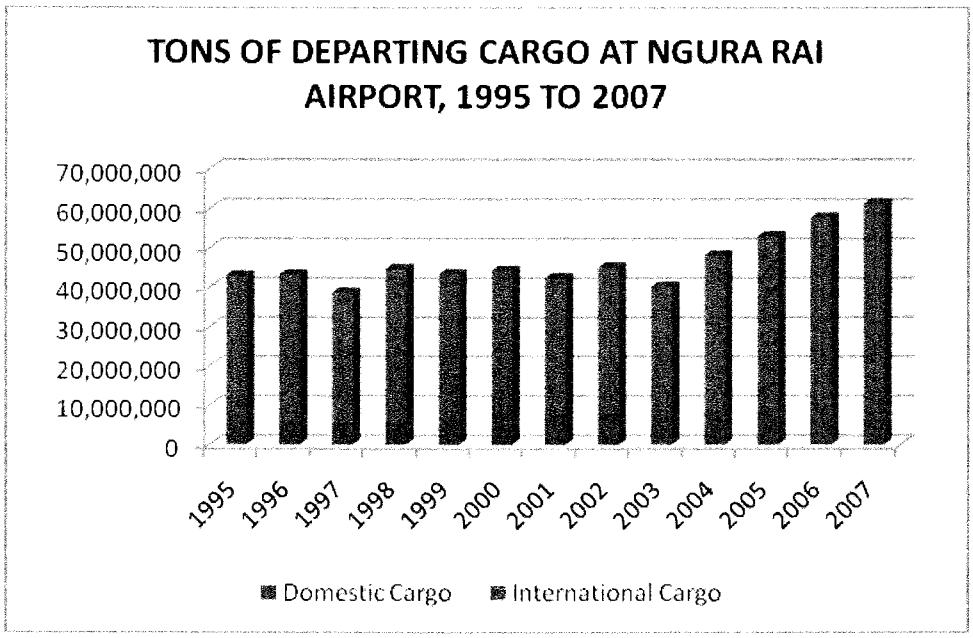
TONS OF DEPARTING CARGO AT NGURA RAI AIRPORT, 1995 TO 2007
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Domestic Cargo
International Cargo

Figure 24

Table 8: Domestic Aviation Activity at Ngurah Rai/Bali , 1995 to 2007

	Movements			Passengers				Cargo		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	17,474	17,443	34,917	923,960	948,167	1,872,127	57,346	8,574,658	7,249,167	15,823,825
1996	17,842	18,004	35,846	1,011,620	1,037,539	2,049,159	47,486	6,242,867	6,992,317	13,235,184
1997	16,719	16,857	33,576	1,010,957	1,023,270	2,034,227	58,432	5,679,260	7,401,343	13,080,603
1998	12,306	12,328	24,634	711,275	706,381	1,417,656	50,321	5,800,280	6,935,513	12,735,793
1999	10,902	10,907	21,809	573,247	590,719	1,163,966	34,085	7,228,587	6,644,209	13,872,796
2000	10,714	10,764	21,478	633,583	661,099	1,294,682	167,930	8,383,552	8,382,244	16,765,796
2001	12,260	12,250	24,510	808,092	782,729	1,590,821	89,650	7,860,524	8,380,859	16,241,383
2002	13,119	13,094	26,213	940,035	950,837	1,890,872	96,254	8,330,766	7,239,105	15,569,871
2003	14,452	14,502	28,954	1,120,795	1,099,756	2,220,551	102,449	7,502,346	7,788,678	15,291,024
2004	14,481	14,531	29,012	1,481,048	1,438,758	2,919,806	107,111	9,002,815	9,346,414	18,349,229
2005	14,698	14,749	29,447	1,555,100	1,510,696	3,065,796		9,903,097	10,281,055	20,184,152
2006	14,772	14,823	29,594	1,741,712	1,691,979	3,433,692		10,794,375	11,206,350	22,000,725
2007	14,476	14,526	29,002	1,915,884	1,861,177	3,777,061		11,442,038	11,878,731	23,320,769

Table 9: International Aviation Activity at Ngurah Rai/Bali , 1995 to 2007

	Movements			Passengers				Cargo		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	10,416	10,331	20,747	1,376,651	1,232,899	2,609,550	117,054	34,371,275	13,041,354	47,412,629
1996	11,660	11,752	23,412	1,540,720	1,289,049	2,829,769	136,691	36,972,033	5,239,738	42,211,771
1997	11,784	11,696	23,480	1,576,472	1,386,472	2,962,944	164,472	32,905,696	4,742,902	37,648,598
1998	10,144	10,019	20,163	1,395,509	1,289,035	2,684,544	57,914	38,820,315	3,073,292	41,893,607
1999	9,462	9,414	18,876	1,408,788	1,430,740	2,839,528	48,065	36,107,493	3,031,622	39,139,115
2000	8,973	8,874	17,847	1,430,856	1,315,544	2,746,400		35,903,279	7,301,761	43,205,040
2001	9,605	9,399	19,004	1,479,979	1,453,022	2,933,001		34,522,016	4,989,717	39,511,733
2002	9,115	9,091	18,206	1,463,112	1,411,818	2,874,930	30,858	36,735,665	5,391,134	42,126,799
2003	8,340	7,839	16,179	1,090,040	1,084,915	2,174,955	44,485	32,573,667	5,608,759	38,182,426
2004	8,357	7,855	16,211	1,496,622	1,501,410	2,998,032	61,078	39,088,400	6,730,511	45,818,911
2005	8,482	7,972	16,455	1,571,453	1,576,481	3,147,934	64,132	42,997,240	7,403,562	50,400,802
2006	8,524	8,012	16,537	1,760,027	1,765,658	3,525,686	71,827	46,866,992	8,069,882	54,936,875

2007	8,354	7,852	16,206	1,936,030	1,942,224	3,878,254	79,010	49,679,012	8,554,075	58,233,087

Table 10: Total Aviation Activity at Ngurah Rai/Bali , 1995 to 2007

	Movements			Passengers				Cargo		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	27,890	27,774	55,664	2,300,611	2,181,066	4,481,677	174,400	42,945,933	20,290,521	63,236,454
1996	29,502	29,756	59,258	2,552,340	2,326,588	4,878,928	184,177	43,214,900	12,232,055	55,446,955
1997	28,503	28,553	57,056	2,587,429	2,409,742	4,997,171	222,904	38,584,956	12,144,245	50,729,201
1998	22,450	22,347	44,797	2,106,784	1,995,416	4,102,200	108,235	44,620,595	10,008,805	54,629,400
1999	20,364	20,321	40,685	1,982,035	2,021,459	4,003,494	82,150	43,336,080	9,675,831	53,011,911
2000	19,687	19,638	39,325	2,064,439	1,976,643	4,041,082	167,930	44,286,831	15,684,005	59,970,836
2001	21,865	21,649	43,514	2,288,071	2,235,751	4,523,822	89,650	42,382,540	13,370,576	55,753,116
2002	22,234	22,185	44,419	2,403,147	2,362,655	4,765,802	127,112	45,066,431	12,630,239	57,696,670
2003	22,792	22,341	45,133	2,210,835	2,184,671	4,395,506	146,934	40,076,013	13,397,437	53,473,450
2004	22,838	22,386	45,223	2,977,670	2,940,168	5,917,838	168,189	48,091,216	16,076,924	64,168,140
2005	23,180	22,721	45,902	3,126,554	3,087,176	6,213,730	64,132	52,900,337	17,684,617	70,584,954
2006	23,296	22,835	46,131	3,501,740	3,457,638	6,959,377	71,827	57,661,368	19,276,232	76,937,600
2007	22,830	22,378	45,209	3,851,914	3,803,401	7,655,315	79,010	61,121,050	20,432,806	81,553,856

4.2 FORECASTS OF AVIATION ACTIVITY AT NGURA RAI

To obtain forecasts of passenger enplanements and cargo shipping from Ngura Rai International Airport, ASI extended forecasts that had been developed in 2004. These forecasts were adjusted to take into account the actual data for 2004 through 2007. The tables below provide the forecasts.

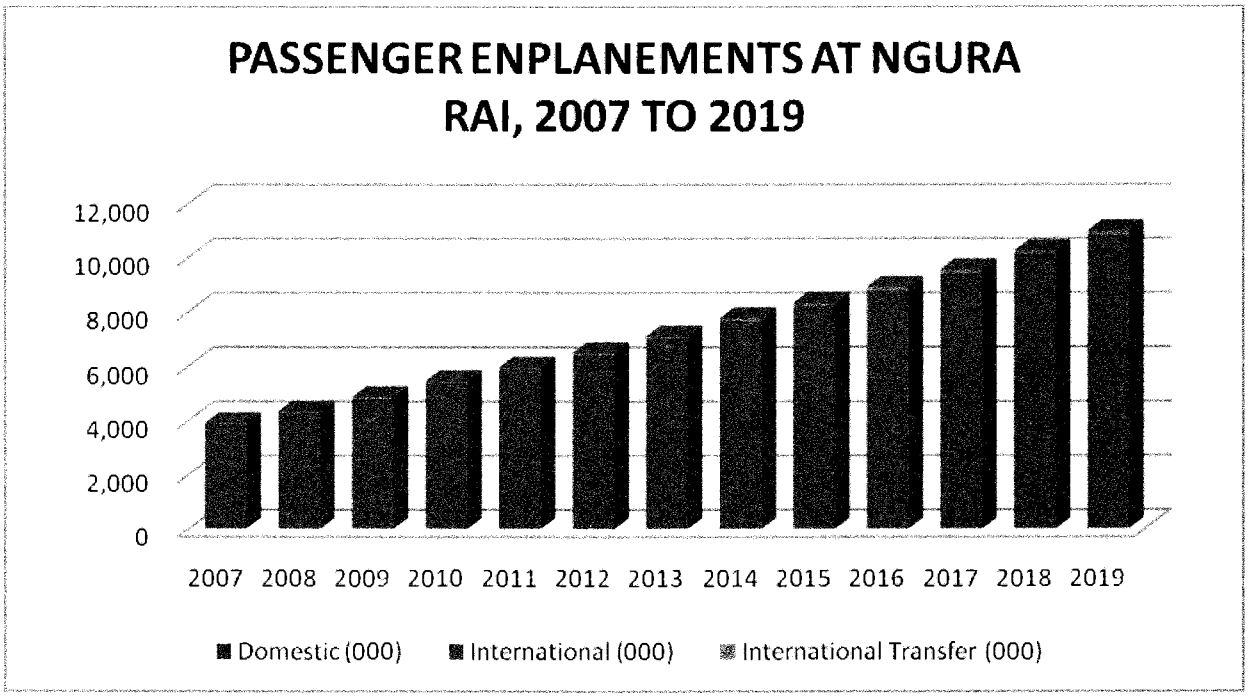

Figure 25

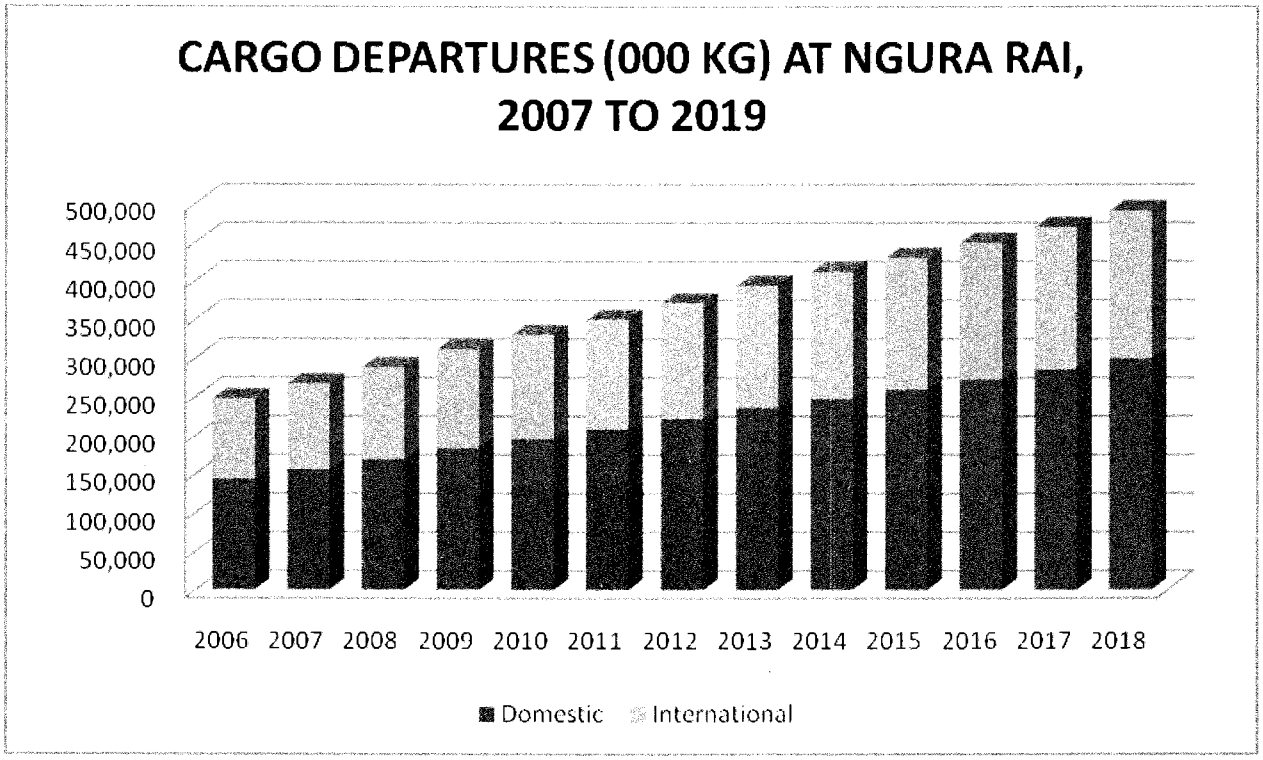

Figure 26

4.3 REVENUES AND CASH FLOW AT NGURA RAI

4.3.1 Scenario 1

ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.50 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

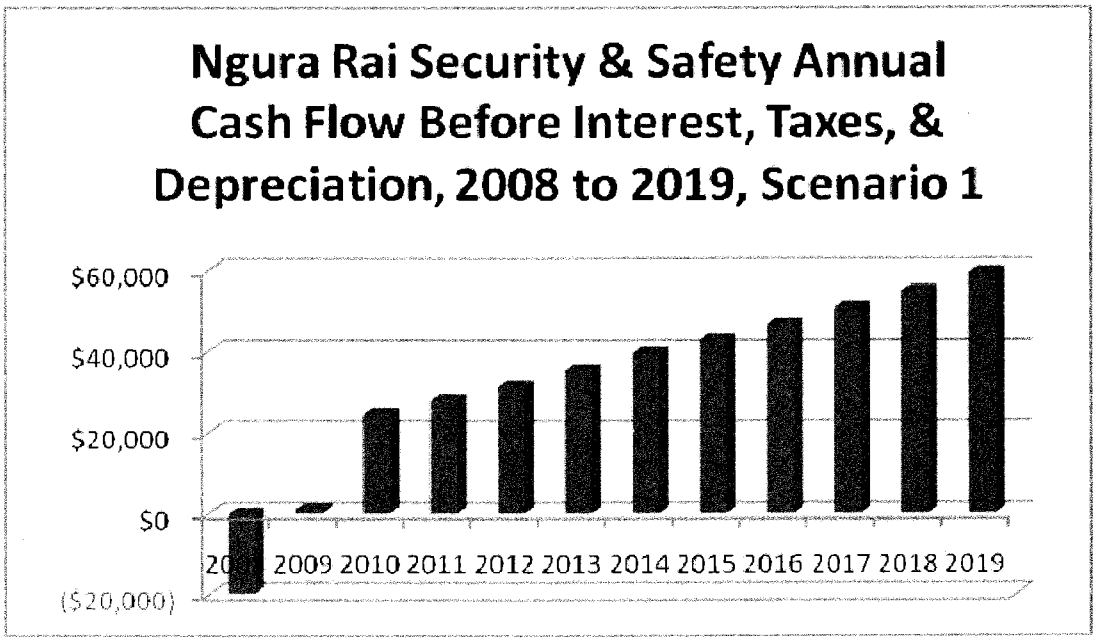
Ngura Rai Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 1
$60,000
$40,000
$20,000
$0
($20,000)
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

Figure 27

Table 11: Ngura Rai Scenario 1: Revenues, Costs, & Cash Flow, 2009 TO 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		1	1	1	1	1	1	1	1	1	1	1
Passenger Security Fee - International		1	1	1	1	1	1	1	1	1	1	1
International		$2,248	$2,423	$2,564	$2,713	$2,871	$3,038	$3,170	$3,309	$3,453	$3,604	$3,761
International Transfer		$60	$70	$78	$87	$98	$110	$120	$130	$142	$155	$169
Domestic		$2,564	$2,965	$3,314	$3,704	$4,139	$4,626	$5,033	$5,477	$5,960	$6,486	$7,057
Total Security Revenues ($000)		$4,872	$5,458	$5,956	$6,504	$7,108	$7,773	$8,323	$8,916	$9,555	$10,245	$10,988
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Safety Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$1,124	$1,211	$1,282	$1,356	$1,435	$1,519	$1,585	$1,654	$1,727	$1,802	$1,881
International Transfer		$30	$35	$39	$44	$49	$55	$60	$65	$71	$78	$85
Domestic		$1,282	$1,483	$1,657	$1,852	$2,069	$2,313	$2,517	$2,739	$2,980	$3,243	$3,529
Total Safety Revenues ($000)		$2,436	$2,729	$2,978	$3,252	$3,554	$3,887	$4,162	$4,458	$4,778	$5,122	$5,494
Total Passenger Revenues ($000)		$7,307	$8,186	$8,933	$9,756	$10,661	$11,660	$12,485	$13,375	$14,333	$15,367	$16,482
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$596	$638	$672	$708	$746	$786	$817	$850	$884	$919	$956
Domestic		$845	$918	$977	$1,041	$1,108	$1,180	$1,237	$1,297	$1,360	$1,427	$1,496
Total Caargo Security Revenues ($000)		$1,440	$1,556	$1,649	$1,749	$1,854	$1,966	$2,054	$2,147	$2,244	$2,346	$2,452
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$596	$638	$672	$708	$746	$786	$817	$850	$884	$919	$956
Domestic		$845	$918	$977	$1,041	$1,108	$1,180	$1,237	$1,297	$1,360	$1,427	$1,496
Total Cargo Safety Revenues ($000)		$1,440	$1,556	$1,649	$1,749	$1,854	$1,966	$2,054	$2,147	$2,244	$2,346	$2,452
Total Cargo Revenues ($000)		$2,881	$3,112	$3,299	$3,497	$3,708	$3,931	$4,109	$4,295	$4,489	$4,692	$4,905
Passenger Enplanements (000)	17,224	19,308	21,647	23,615	25,763	28,108	30,667	32,763	35,002	37,396	39,954	42,689
Passenger Revenues ($000)		$28,963	$32,471	$35,422	$38,644	$42,161	$46,001	$49,144	$52,503	$56,094	$59,931	$64,033

Cargo Departures (000 Kg.)	275,766	308,000	344,040	374,263	407,166	442,989	481,994	513,848	547,827	584,074	622,742	663,993
Cargo Revenues ($000)		$3,080	$3,440	$3,743	$4,072	$4,430	$4,820	$5,138	$5,478	$5,841	$6,227	$6,640
Total Revenues ($000)		$32,043	$35,911	$39,165	$42,716	$46,591	$50,820	$54,282	$57,981	$61,934	$66,159	$70,673
Total Airport Capital Costs	$19,651		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816	$9,816
Training Costs (Annual)		$566	$566	$566	$566	$566	$566	$566	$566	$566	$566	$566
Maintenance Costs (Annual)		$884	$884	$884	$884	$884	$884	$884	$884	$884	$884	$884
Total Investment Costs ($000)		$30,917	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266	$11,266
Annual Cash Flow ($000)	($19,651)	$1,126	$24,645	$27,899	$31,450	$35,325	$39,554	$43,016	$46,715	$50,668	$54,893	$59,407
Cumulative Cash Flow	($19,651)	($18,525)	$6,120	$34,019	$65,469	$100,794	$140,348	$183,364	$230,079	$280,748	$335,640	$395,047

4.3.2 Scenario 2

In Scenario 2, ASI has estimated the revenues that would be collected if $0.50 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

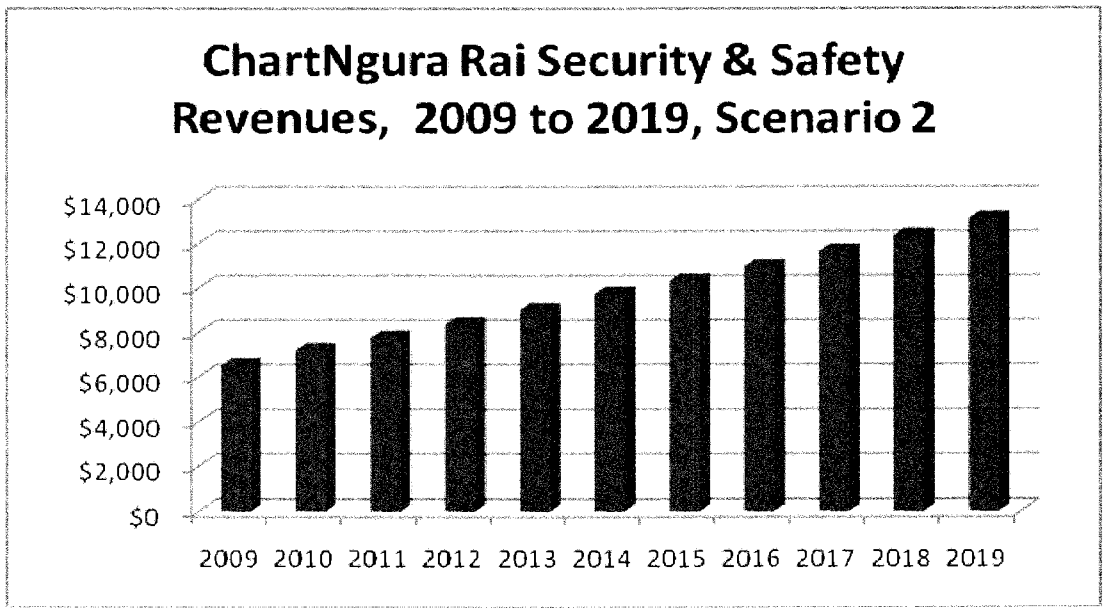

Figure 28

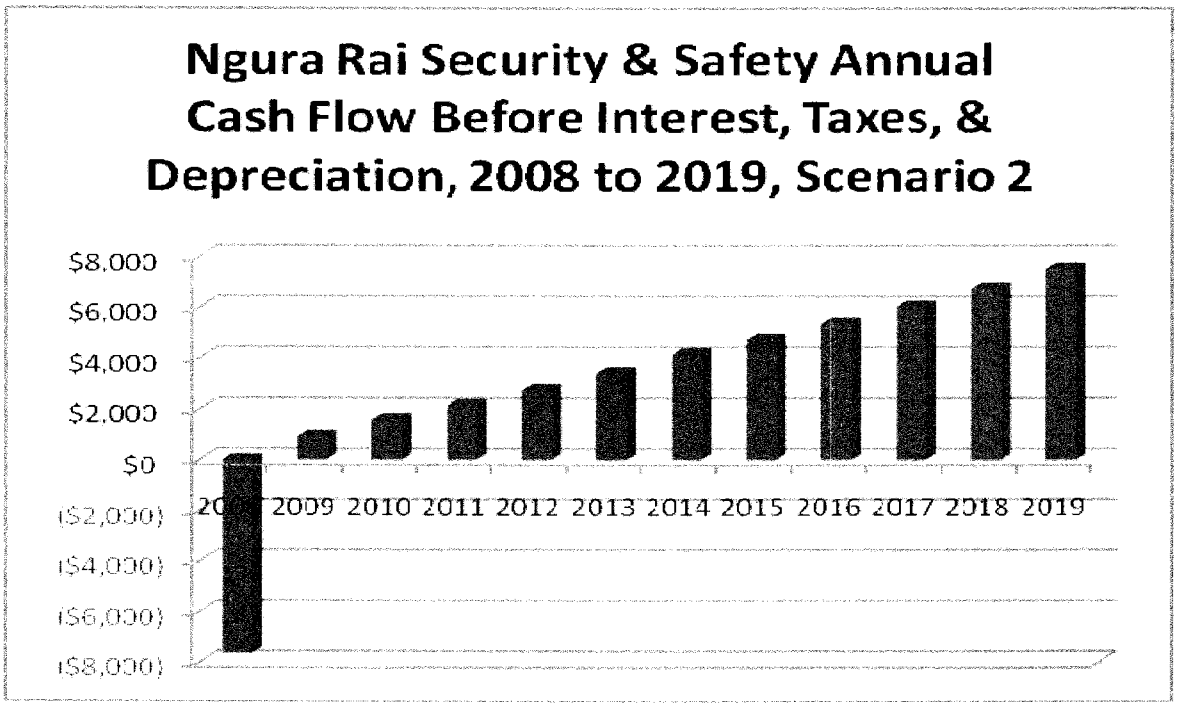
Ngura Rai Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 2
$8,000
$6,000
$4,000
$2,000
$0
($2,000)
($4,000)
($6,000)
($8,000)
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

Figure 29

Table 12: Ngura Rai Scenario 2: Revenues, Costs, & Cash Flow, 2009 TO 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Security Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$1,124	$1,211	$1,282	$1,356	$1,435	$1,519	$1,585	$1,654	$1,727	$1,802	$1,881
International Transfer		$30	$35	$39	$44	$49	$55	$60	$65	$71	$78	$85
Domestic		$1,282	$1,483	$1,657	$1,852	$2,069	$2,313	$2,517	$2,739	$2,980	$3,243	$3,529
Total Security Revenues ($000)		$2,436	$2,729	$2,978	$3,252	$3,554	$3,887	$4,162	$4,458	$4,778	$5,122	$5,494
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$562	$606	$641	$678	$718	$759	$793	$827	$863	$901	$940
International Transfer		$15	$17	$19	$22	$24	$27	$30	$33	$36	$39	$42
Domestic		$641	$741	$828	$926	$1,035	$1,156	$1,258	$1,369	$1,490	$1,621	$1,764
Total Safety Revenues ($000)		$1,218	$1,364	$1,489	$1,626	$1,777	$1,943	$2,081	$2,229	$2,389	$2,561	$2,747
Total Passenger Revenues ($000)		$3,654	$4,093	$4,467	$4,878	$5,331	$5,830	$6,243	$6,687	$7,167	$7,683	$8,241
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$596	$638	$672	$708	$746	$786	$817	$850	$884	$919	$956
Domestic		$845	$918	$977	$1,041	$1,108	$1,180	$1,237	$1,297	$1,360	$1,427	$1,496
Total Caargo Security Revenues ($000)		$1,440	$1,556	$1,649	$1,749	$1,854	$1,966	$2,054	$2,147	$2,244	$2,346	$2,452
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$596	$638	$672	$708	$746	$786	$817	$850	$884	$919	$956
Domestic		$845	$918	$977	$1,041	$1,108	$1,180	$1,237	$1,297	$1,360	$1,427	$1,496
Total Cargo Safety Revenues ($000)		$1,440	$1,556	$1,649	$1,749	$1,854	$1,966	$2,054	$2,147	$2,244	$2,346	$2,452
Total Cargo Revenues ($000)		$2,881	$3,112	$3,299	$3,497	$3,708	$3,931	$4,109	$4,295	$4,489	$4,692	$4,905
Passenger Enplanements (000)	4,354	4,872	5,458	5,956	6,504	7,108	7,773	8,323	8,916	9,555	10,245	10,988
Passenger Revenues ($000)		$3,654	$4,093	$4,467	$4,878	$5,331	$5,830	$6,243	$6,687	$7,167	$7,683	$8,241

Cargo Departures (000 Kg.)	266,698	288,062	311,152	329,870	349,723	370,782	393,119	410,890	429,471	448,900	469,214	490,456
Cargo Revenues ($000)		$2,881	$3,112	$3,299	$3,497	$3,708	$3,931	$4,109	$4,295	$4,489	$4,692	$4,905
Total Revenues ($000)		$6,534	$7,205	$7,765	$8,375	$9,038	$9,761	$10,351	$10,982	$11,656	$12,376	$13,145
Total Airport Capital Costs	$7,646		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984
Training Costs (Annual)		$288	$288	$288	$288	$288	$288	$288	$288	$288	$288	$288
Maintenance Costs (Annual)		$344	$344	$344	$344	$344	$344	$344	$344	$344	$344	$344
Total Investment Costs ($000)		$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616
Annual Cash Flow ($000)	($7,646)	$918	$1,589	$2,149	$2,759	$3,422	$4,145	$4,735	$5,366	$6,040	$6,760	$7,529
Cumulative Cash Flow	($7,646)	($6,728)	($5,139)	($2,990)	($231)	$3,191	$7,336	$12,072	$17,438	$23,477	$30,237	$37,766

4.3.3 Scenario 3

In Scenario 3, ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

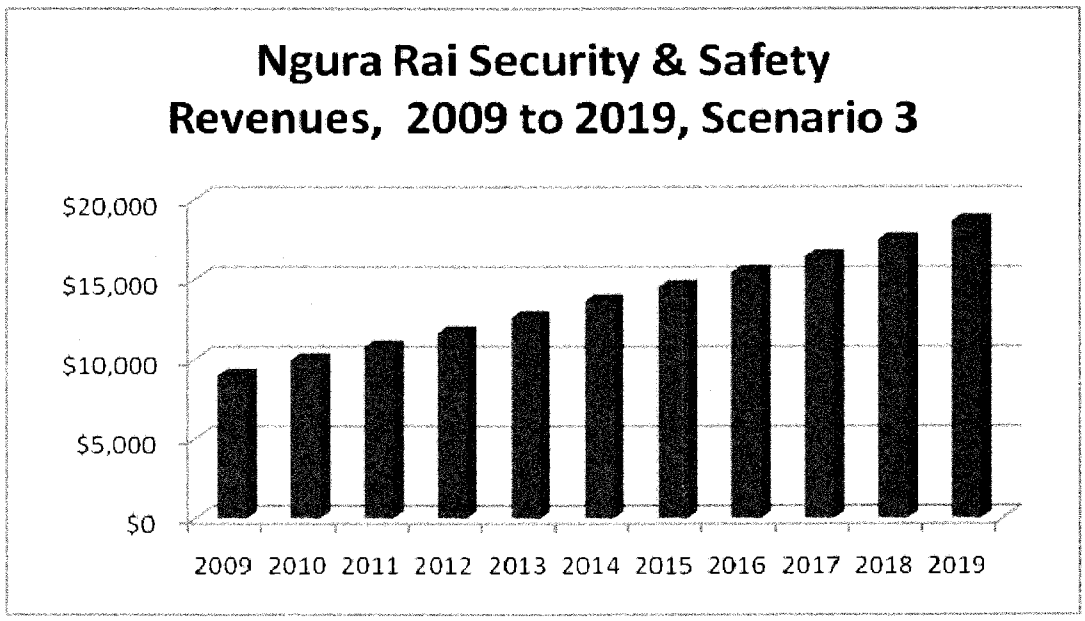

Figure 30

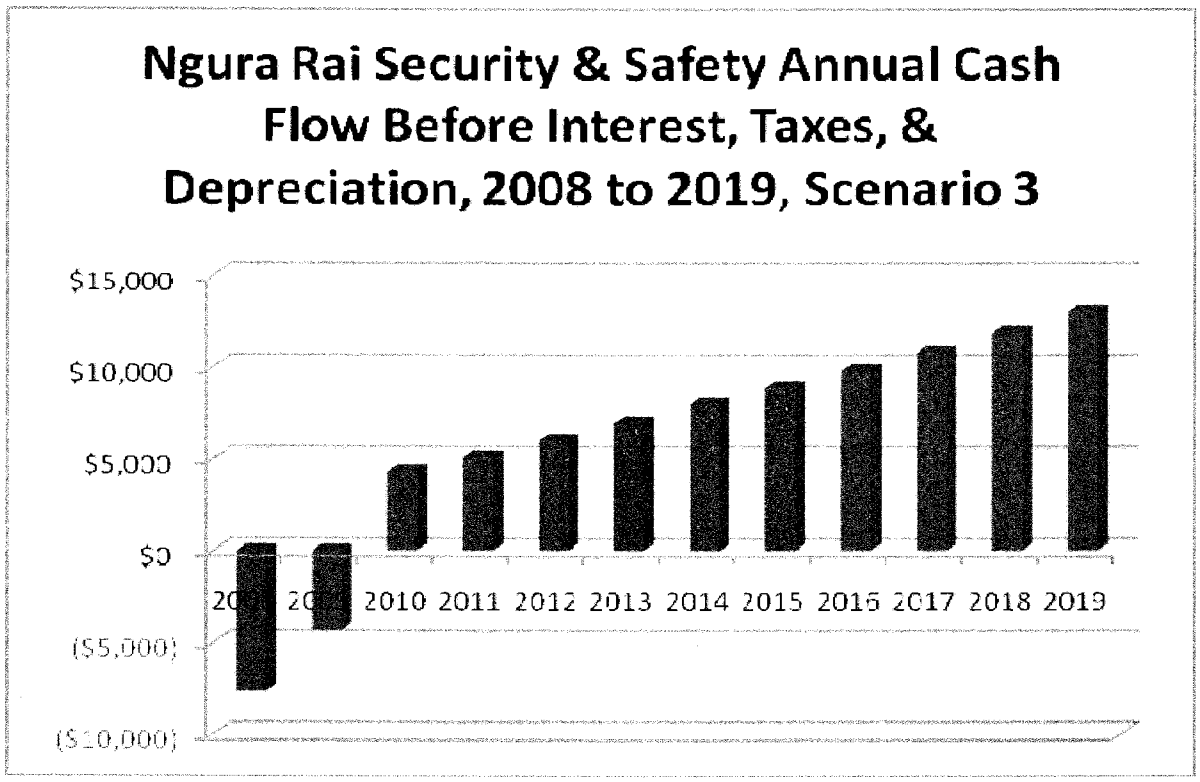
Ngura Rai Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 3
$15,000
$10,000
$5,000
$0
($5,000)
($10,000)
2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

Figure 31

Table 13: Ngura Rai Scenario 3: Revenues, Costs, & Cash Flow, 2009 to 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		1	1	1	1	1	1	1	1	1	1	1
Passenger Security Fee - International		1	1	1	1	1	1	1	1	1	1	1
International		$2,248	$2,423	$2,564	$2,713	$2,871	$3,038	$3,170	$3,309	$3,453	$3,604	$3,761
International Transfer		$60	$70	$78	$87	$98	$110	$120	$130	$142	$155	$169
Domestic		$2,564	$2,965	$3,314	$3,704	$4,139	$4,626	$5,033	$5,477	$5,960	$6,486	$7,057
Total Security Revenues ($000)		$4,872	$5,458	$5,956	$6,504	$7,108	$7,773	$8,323	$8,916	$9,555	$10,245	$10,988
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$562	$606	$641	$678	$718	$759	$793	$827	$863	$901	$940
International Transfer		$15	$17	$19	$22	$24	$27	$30	$33	$36	$39	$42
Domestic		$641	$741	$828	$926	$1,035	$1,156	$1,258	$1,369	$1,490	$1,621	$1,764
Total Safety Revenues ($000)		$1,218	$1,364	$1,489	$1,626	$1,777	$1,943	$2,081	$2,229	$2,389	$2,561	$2,747
Total Passenger Revenues ($000)		$6,090	$6,822	$7,444	$8,130	$8,884	$9,716	$10,404	$11,145	$11,944	$12,806	$13,735
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$596	$638	$672	$708	$746	$786	$817	$850	$884	$919	$956
Domestic		$845	$918	$977	$1,041	$1,108	$1,180	$1,237	$1,297	$1,360	$1,427	$1,496
Total Cargo Security Revenues ($000)		$1,440	$1,556	$1,649	$1,749	$1,854	$1,966	$2,054	$2,147	$2,244	$2,346	$2,452
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$596	$638	$672	$708	$746	$786	$817	$850	$884	$919	$956
Domestic		$845	$918	$977	$1,041	$1,108	$1,180	$1,237	$1,297	$1,360	$1,427	$1,496
Total Cargo Safety Revenues ($000)		$1,440	$1,556	$1,649	$1,749	$1,854	$1,966	$2,054	$2,147	$2,244	$2,346	$2,452
Total Cargo Revenues ($000)		$2,881	$3,112	$3,299	$3,497	$3,708	$3,931	$4,109	$4,295	$4,489	$4,692	$4,905
Passenger Enplanements (000)	4,354	4,872	5,458	5,956	6,504	7,108	7,773	8,323	8,916	9,555	10,245	10,988
Passenger Revenues ($000)		$6,090	$6,822	$7,444	$8,130	$8,884	$9,716	$10,404	$11,145	$11,944	$12,806	$13,735

Cargo Departures (000 Kg.)	266,698	288,062	311,152	329,870	349,723	370,782	393,119	410,890	429,471	448,900	469,214	490,456
Cargo Revenues ($000)		$2,881	$3,112	$3,299	$3,497	$3,708	$3,931	$4,109	$4,295	$4,489	$4,692	$4,905
Total Revenues ($000)		$8,970	$9,934	$10,743	$11,627	$12,592	$13,647	$14,513	$15,440	$16,433	$17,498	$18,639
Total Airport Capital Costs	$7,646		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984	$4,984
Training Costs (Annual)		$288	$288	$288	$288	$288	$288	$288	$288	$288	$288	$288
Maintenance Costs (Annual)		$344	$344	$344	$344	$344	$344	$344	$344	$344	$344	$344
Total Investment Costs ($000)		$13,263	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616
Annual Cash Flow ($000)	($7,646)	($4,292)	$4,317	$5,127	$6,011	$6,976	$8,031	$8,897	$9,824	$10,817	$11,882	$13,023
Cumulative Cash Flow	($7,646)	($11,939)	($7,621)	($2,494)	$3,517	$10,493	$18,525	$27,422	$37,246	$48,063	$59,945	$72,968

5 POLONIA INTERNATIONAL AIRPORT – MEDAN

5.1 CURRENT AVIATION ACTIVITY

The pattern of air traffic at Polonia International Airport in Medan is similar to that of all air traffic in Indonesia. From 1995 through 2005, passenger travel at Polonia airport more than doubled. During 1998 and 1999, however, passenger travel decreased somewhat, in response to the crisis in Southeast Asia that began in 1997. The level of passenger traffic remained roughly constant until 2002 when it started increasing quite markedly. The charts below provide a picture of aircraft movements, passenger traffic, and cargo traffic at Polonia from 1995 to 2007. The tables following the charts show the detail underlying the graphics in the charts.

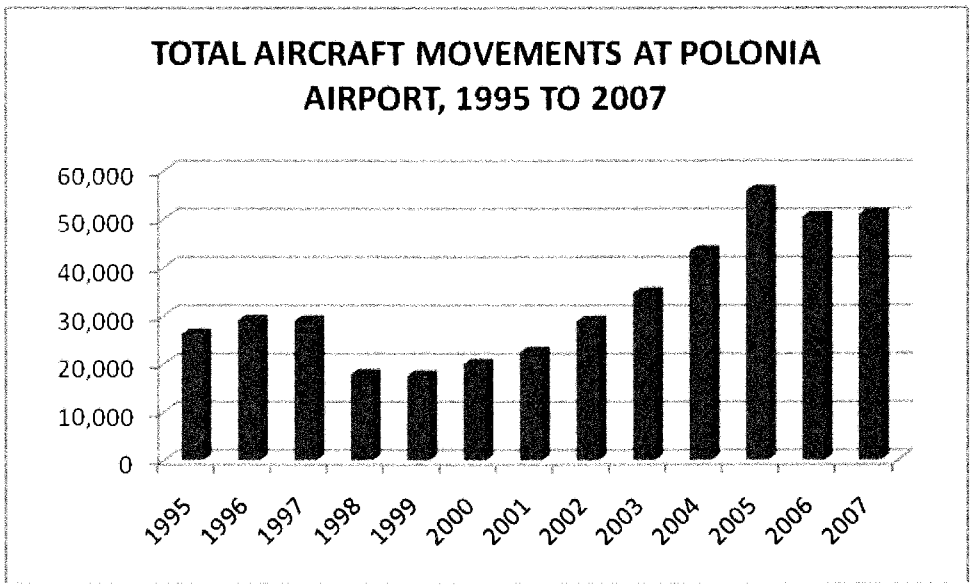

Figure 32

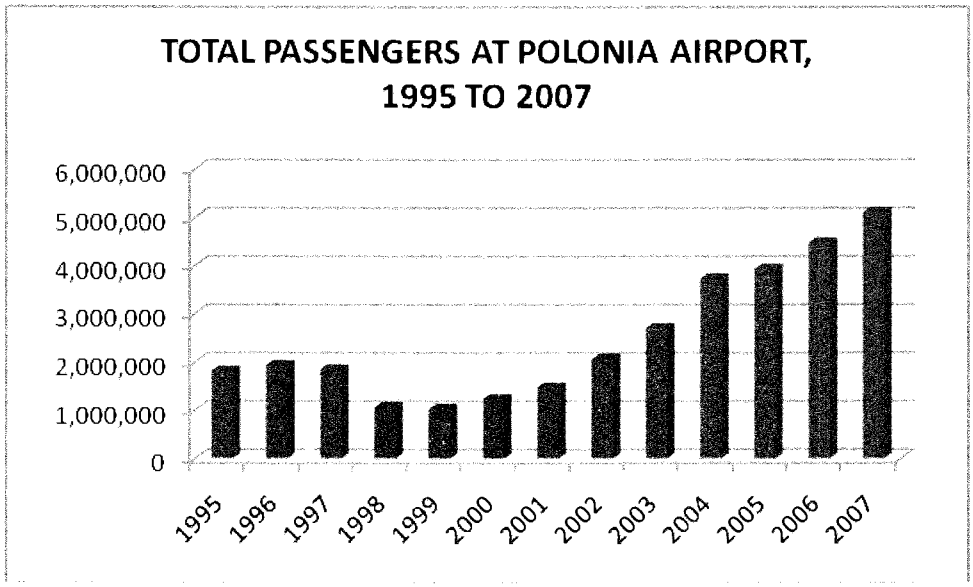

Figure 33

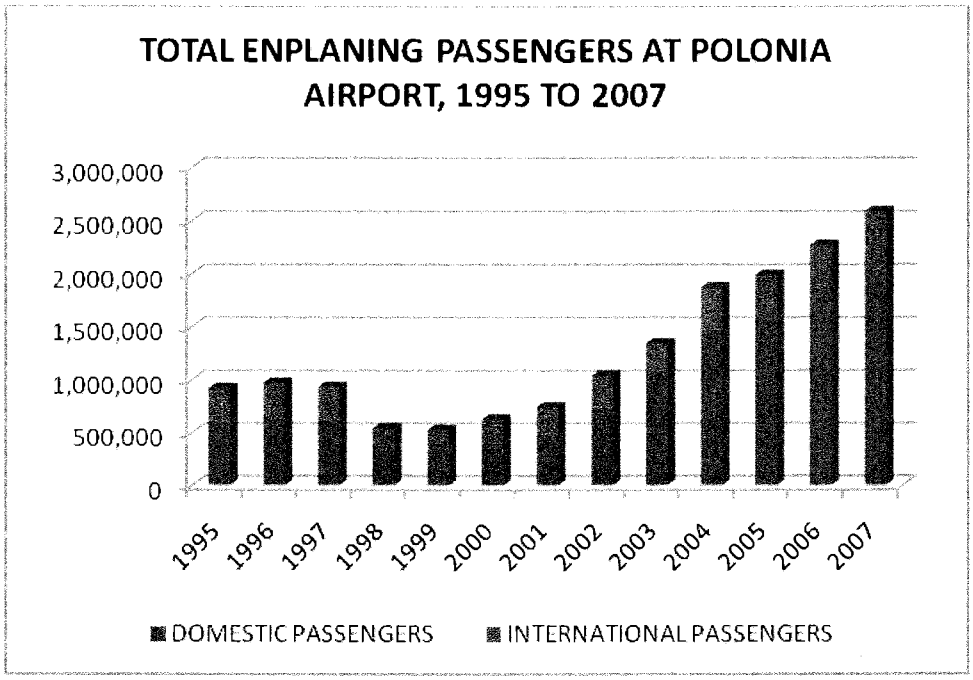

Figure 34

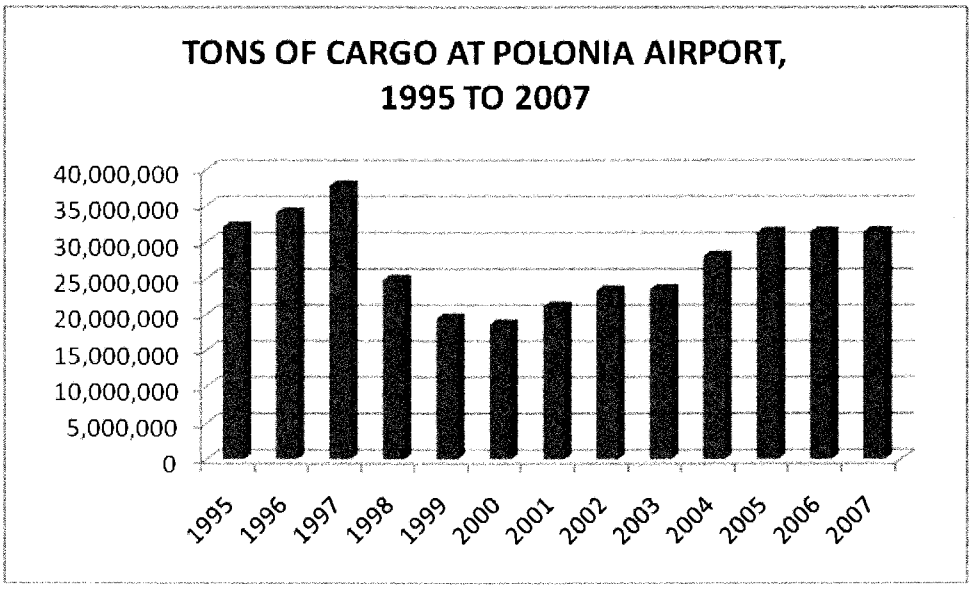
TONS OF CARGO AT POLONIA AIRPORT, 1995 TO 2007
40,000,000
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007

Figure 35

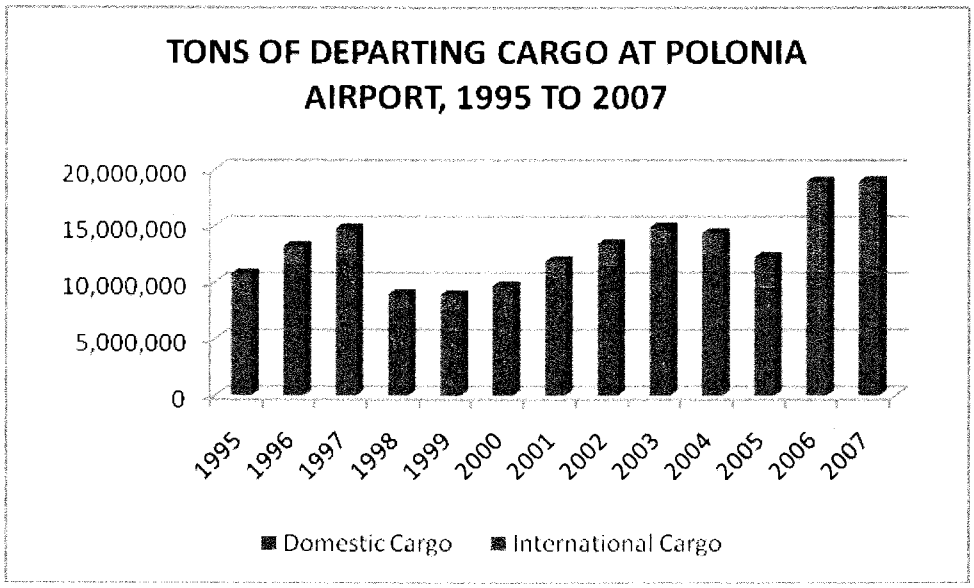
TONS OF DEPARTING CARGO AT POLONIA AIRPORT, 1995 TO 2007
20,000,000
15,000,000
10,000,000
5,000,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Domestic Cargo
International Cargo

Figure 36

Table 14: Domestic Aviation Activity at Polonia/Medan , 1995 to 2007

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	9,937	9,913	19,850	609,007	628,836	1,237,843	26,792	8,851,548	10,887,714	19,739,262
1996	10,847	10,841	21,688	634,476	649,750	1,284,226	26,118	11,580,718	11,048,978	22,629,696
1997	10,661	10,642	21,303	623,743	629,372	1,253,115	22,845	12,445,500	14,219,620	26,665,120
1998	6,751	6,646	13,397	372,374	367,606	739,980	9,225	7,820,397	10,047,543	17,867,940
1999	6,565	6,492	13,057	349,178	335,445	684,623	9,611	7,650,485	5,914,698	13,565,183
2000	7,237	7,220	14,457	401,444	388,556	790,000	15,502	8,282,228	5,739,155	14,021,383
2001	7,869	7,808	15,677	487,342	494,425	981,767	20,688	10,469,834	5,615,544	16,085,378
2002	11,038	11,025	22,063	740,385	740,160	1,480,545	22,611	11,517,227	6,603,410	18,120,637
2003	14,415	14,387	28,802	1,056,888	1,065,888	2,122,796	31,186	13,524,355	6,011,986	19,536,251
2004	17,899	17,885	35,785	1,474,331	1,465,355	2,939,701	68,682	12,374,159	11,558,657	23,932,762
2005	22,998	23,008	46,006	1,571,417	1,538,838	3,110,255	100,114	9,573,858	17,779,336	27,353,194
2006	20,738	20,747	41,486	1,791,246	1,754,109	3,545,355	114,119	10,957,631	5,571,682	16,529,312
2007	20,966	20,976	41,942	2,041,827	1,999,495	4,041,322	130,084	10,973,398	5,579,699	16,553,097

Table 15: International Aviation Activity at Polonia/Medan , 1995 to 2007

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	3,133	3,153	6,286	312,220	275,296	587,516	58,653	1,856,395	10,487,247	12,343,642
1996	3,664	3,659	7,323	337,575	320,275	657,850	38,168	1,574,880	9,844,194	11,419,074
1997	3,801	3,821	7,622	311,365	292,613	603,978	22,624	2,306,139	8,818,240	11,124,379
1998	2,148	2,236	4,384	167,509	158,389	325,898		1,105,058	5,818,622	6,923,680
1999	2,195	2,254	4,449	176,926	177,144	354,070		1,220,935	4,670,074	5,891,009
2000	2,743	2,744	5,487	226,099	227,004	453,103		1,385,730	3,235,419	4,621,149
2001	3,347	3,397	6,744	256,755	248,414	505,169		1,355,660	3,666,974	5,022,634
2002	3,381	3,366	6,747	296,186	291,176	587,362		1,855,815	3,355,219	5,211,034
2003	2,968	29,781	5,939	287,693	294,657	582,350		1,317,133	2,634,590	3,951,723
2004	4,132	20,491	7,502	397,427	394,720	792,147		1,961,983	2,189,548	4,151,531
2005	5,889	4,917	9,806	419,433	403,271	822,704		2,621,982	1,371,717	3,993,699
2006	5,310	4,434	8,842	478,108	459,685	937,794		7,944,427	6,918,196	14,862,623
2007	5,369	4,483	8,940	544,992	523,992	1,068,984		7,955,859	6,928,151	14,884,010

Table 16: Total Aviation Activity at Polonia/Medan , 1995 to 2007

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	13,070	13,066	26,136	921,227	904,132	1,825,359	85,445	10,707,943	21,374,961	32,082,904
1996	14,511	14,500	29,011	972,051	970,025	1,942,076	64,286	13,155,598	20,893,172	34,048,770
1997	14,462	14,463	28,925	935,108	921,985	1,857,093	45,469	14,751,639	23,037,860	37,789,499
1998	8,899	8,882	17,781	539,883	525,995	1,065,878	9,225	8,925,455	15,866,165	24,791,620
1999	8,760	8,746	17,506	526,104	512,589	1,038,693	9,611	8,871,420	10,584,772	19,456,192
2000	9,980	9,964	19,944	627,543	615,560	1,243,103	15,502	9,667,958	8,974,574	18,642,532
2001	11,216	11,205	22,421	744,097	742,839	1,486,936	20,688	11,825,494	9,282,518	21,108,012
2002	14,419	14,391	28,810	1,036,571	1,031,336	2,067,907	22,611	13,373,042	9,958,629	23,331,671
2003	17,383	44,168	34,741	1,344,581	1,360,545	2,705,146	31,186	14,841,488	8,646,576	23,487,974
2004	22,031	38,376	43,287	1,871,759	1,860,075	3,731,848	68,682	14,336,141	13,748,205	28,084,293
2005	28,887	27,925	55,812	1,990,850	1,942,109	3,932,959	100,114	12,195,840	19,151,053	31,346,893
2006	26,049	25,181	50,328	2,269,354	2,213,795	4,483,149	114,119	18,902,058	12,489,878	31,391,935
2007	26,335	25,458	50,882	2,586,819	2,523,487	5,110,306	130,084	18,929,257	12,507,850	31,437,107

5.2 FORECASTS OF AVIATION ACTIVITY AT POLONIA

To obtain forecasts of passenger enplanements and cargo shipping from Polonia International Airport, ASI extended forecasts that had been developed in 2004. These forecasts were adjusted to take into account the actual data for 2004 through 2007. The tables below provide the forecasts.

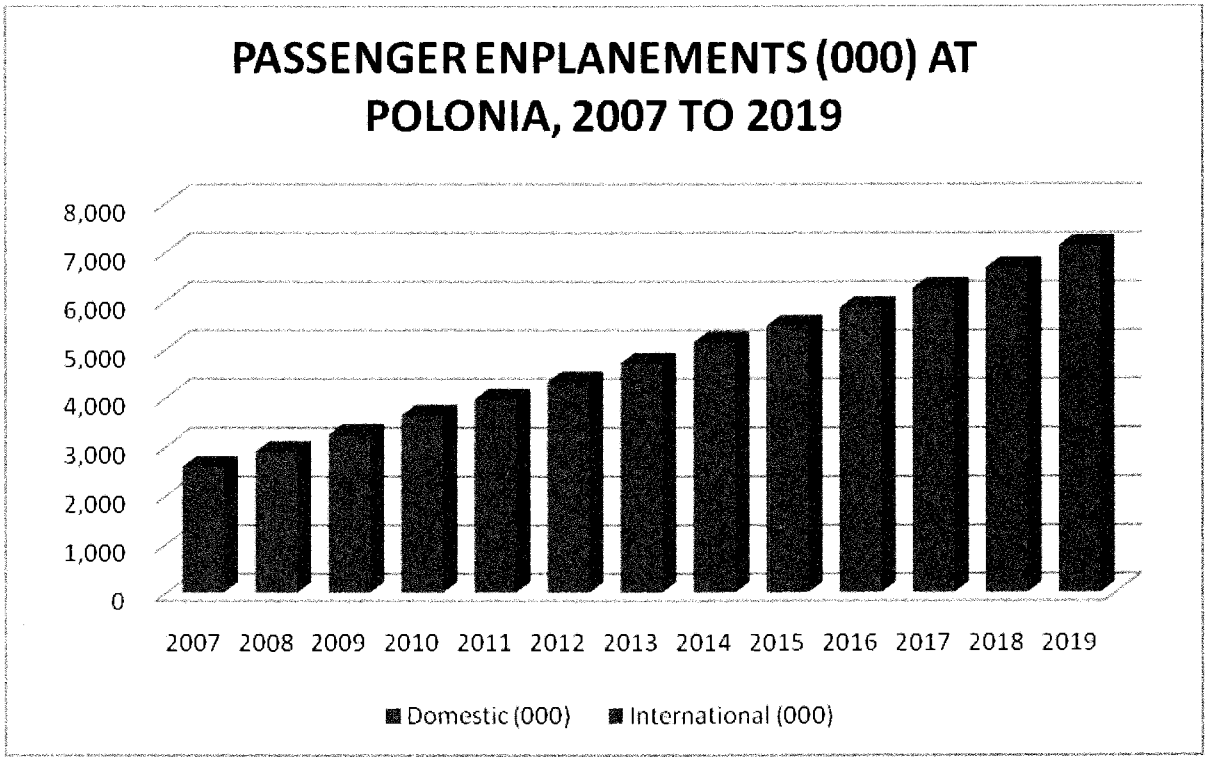

Figure 37

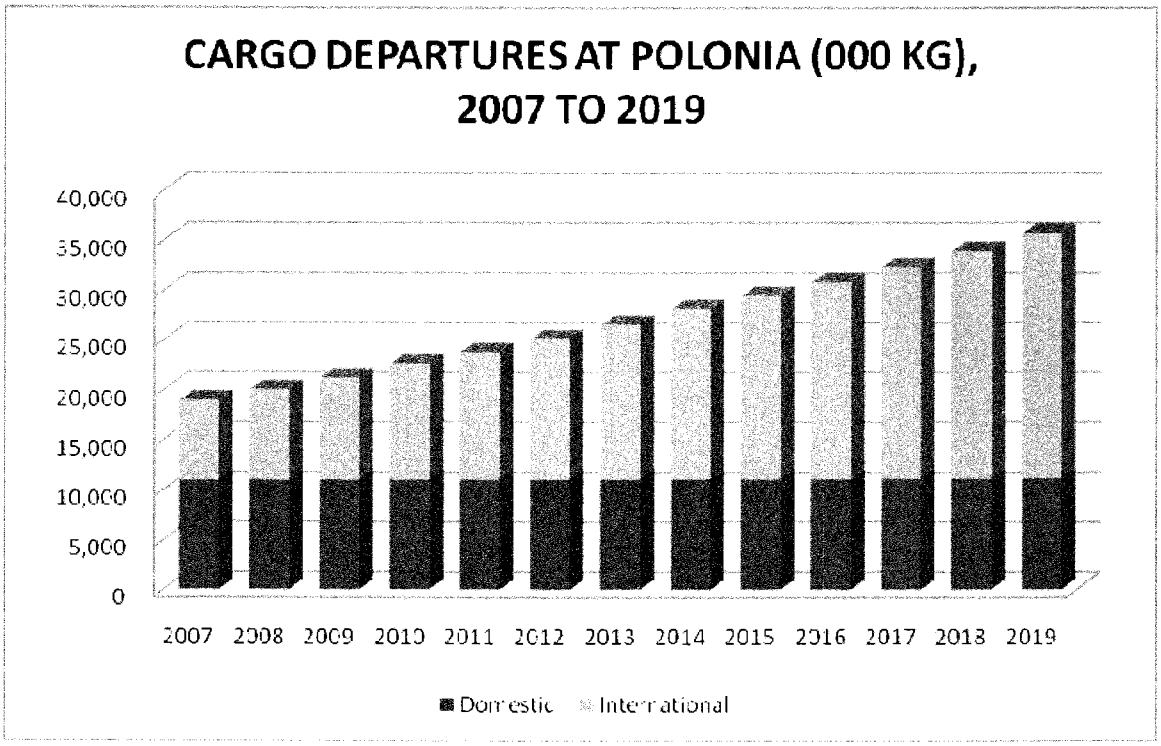

Figure 38

5.3 REVENUES AND CASH FLOW AT POLONIA

5.3.1 Scenario 1

ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.50 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

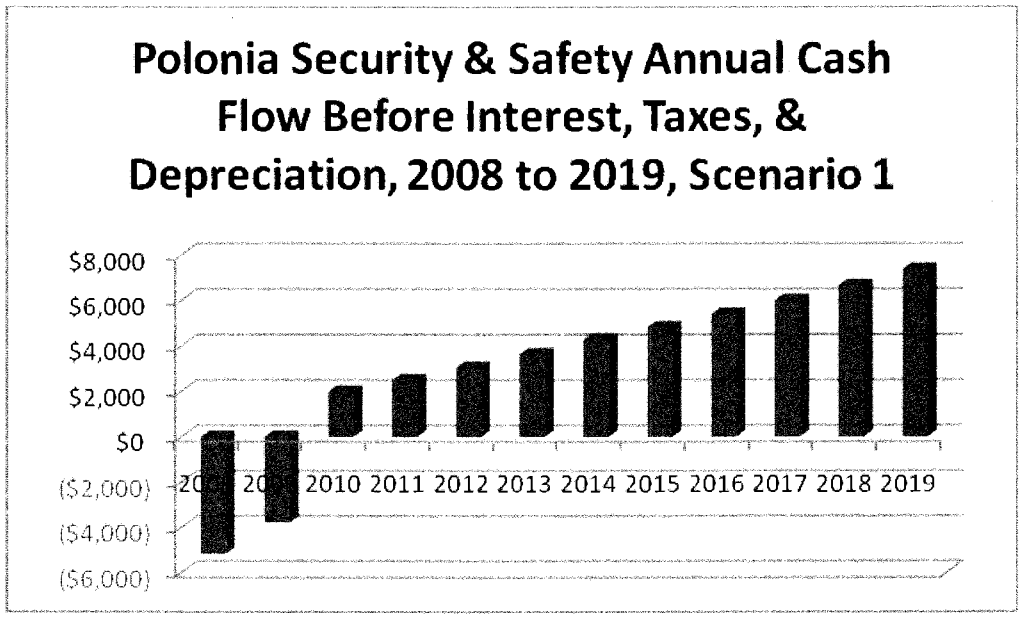
Polonia Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 1
$8,000
$6,000
$4,000
$2,000
$0
($2,000)
($4,000)
($6,000)
2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

Figure 39

Table 17: Polonia Scenario 1: Revenues, Costs, & Cash Flow, 2009 to 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		1	1	1	1	1	1	1	1	1	1	1
Passenger Security Fee - International		1	1	1	1	1	1	1	1	1	1	1
International		$705	$802	$885	$976	$1,077	$1,188	$1,280	$1,379	$1,486	$1,601	$1,725
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$2,539	$2,832	$3,077	$3,343	$3,631	$3,945	$4,201	$4,473	$4,763	$5,072	$5,400
Total Security Revenues ($000)		$3,245	$3,634	$3,962	$4,319	$4,709	$5,133	$5,481	$5,852	$6,249	$6,673	$7,125
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Safety Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$353	$401	$443	$488	$539	$594	$640	$690	$743	$801	$863
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$1,270	$1,416	$1,538	$1,671	$1,816	$1,973	$2,100	$2,237	$2,381	$2,536	$2,700
Total Safety Revenues ($000)		$1,622	$1,817	$1,981	$2,159	$2,354	$2,567	$2,741	$2,926	$3,125	$3,336	$3,563
Total Passenger Revenues ($000)		$4,867	$5,451	$5,943	$6,478	$7,063	$7,700	$8,222	$8,779	$9,374	$10,009	$10,688
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$51	$58	$64	$70	$77	$85	$92	$99	$106	$114	$123
Domestic		$55	$55	$55	$55	$55	$55	$56	$56	$56	$56	$56
Total Cargo Security Revenues ($000)		$106	$113	$119	$126	$133	$141	$147	$154	$162	$170	$178
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$51	$58	$64	$70	$77	$85	$92	$99	$106	$114	$123
Domestic		$55	$55	$55	$55	$55	$55	$56	$56	$56	$56	$56
Total Cargo Safety Revenues ($000)		$106	$113	$119	$126	$133	$141	$147	$154	$162	$170	$178
Total Cargo Revenues ($000)		$212	$226	$238	$251	$266	$281	$294	$308	$323	$339	$357
Passenger Enplanements (000)	2,897	3,245	3,634	3,962	4,319	4,709	5,133	5,481	5,852	6,249	6,673	7,125
Passenger Revenues ($000)		$4,867	$5,451	$5,943	$6,478	$7,063	$7,700	$8,222	$8,779	$9,374	$10,009	$10,688

Cargo Departures (000 Kg.)	20,017	21,249	22,643	23,827	25,129	26,560	28,135	29,433	30,829	32,329	33,942	35,676
Cargo Revenues ($000)		$212	$226	$238	$251	$266	$281	$294	$308	$323	$339	$357
Total Revenues ($000)		$5,080	$5,678	$6,181	$6,730	$7,328	$7,982	$8,516	$9,087	$9,697	$10,349	$11,045
Total Airport Capital Costs	$5,177		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263
Training Costs (Annual)		$188	$188	$188	$188	$188	$188	$188	$188	$188	$188	$188
Maintenance Costs (Annual)		$233	$233	$233	$233	$233	$233	$233	$233	$233	$233	$233
Total Investment Costs ($000)		$8,861	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684
Annual Cash Flow ($000)	($5,177)	($3,782)	$1,994	$2,497	$3,045	$3,644	$4,297	$4,832	$5,403	$6,013	$6,664	$7,360
Cumulative Cash Flow	($5,177)	($8,958)	($6,965)	($4,468)	($1,423)	$2,221	$6,519	$11,350	$16,753	$22,766	$29,430	$36,790

5.3.2 Scenario 2

In Scenario 2, ASI has estimated the revenues that would be collected if $0.50 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019. The table shows that with this scenario, the collected revenues do not cover the aggregate investment costs over the first ten years to 2019.

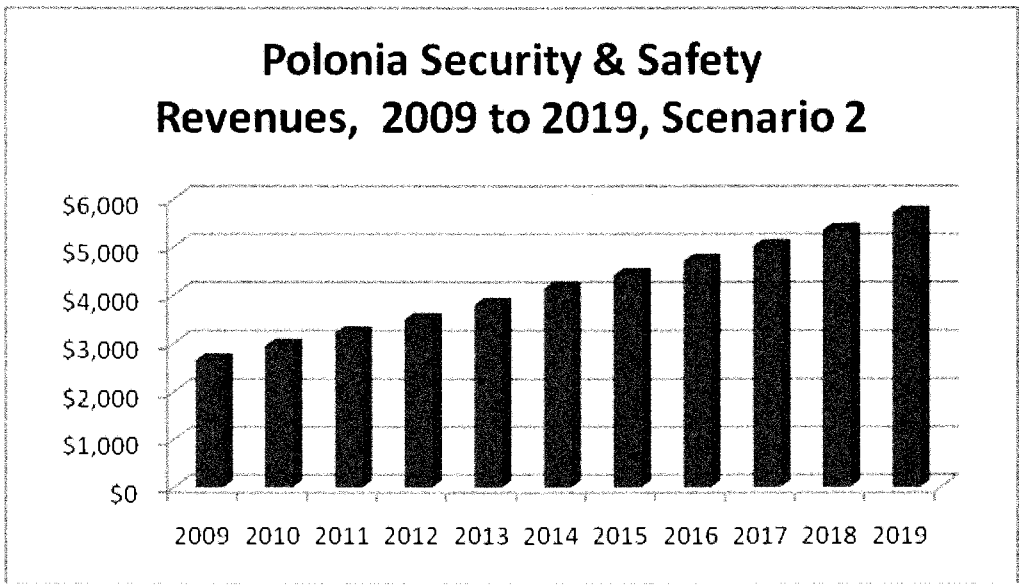

Figure 40

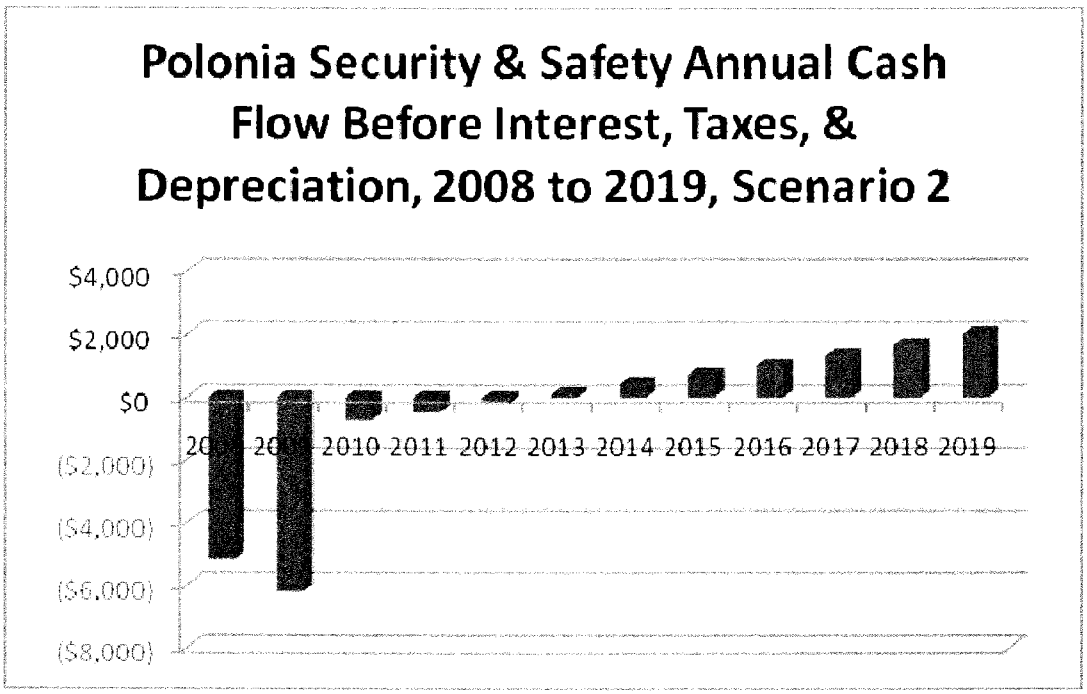
Polonia Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 2
$4,000
$2,000
$0
($2,000)
($4,000)
($6,000)
($8,000)
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Figure 41

Table 18: Polonia Scenario 2: Revenues, Costs, & Cash Flow, 2009 to 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Security Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$353	$401	$443	$488	$539	$594	$640	$690	$743	$801	$863
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$1,270	$1,416	$1,538	$1,671	$1,816	$1,973	$2,100	$2,237	$2,381	$2,536	$2,700
Total Security Revenues ($000)		$1,622	$1,817	$1,981	$2,159	$2,354	$2,567	$2,741	$2,926	$3,125	$3,336	$3,563
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$176	$201	$221	$244	$269	$297	$320	$345	$372	$400	$431
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$635	$708	$769	$836	$908	$986	$1,050	$1,118	$1,191	$1,268	$1,350
Total Safety Revenues ($000)		$811	$909	$990	$1,080	$1,177	$1,283	$1,370	$1,463	$1,562	$1,668	$1,781
Total Passenger Revenues ($000)		$2,434	$2,726	$2,971	$3,239	$3,531	$3,850	$4,111	$4,389	$4,687	$5,005	$5,344
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$51	$58	$64	$70	$77	$85	$92	$99	$106	$114	$123
Domestic		$55	$55	$55	$55	$55	$55	$56	$56	$56	$56	$56
Total Cargo Security Revenues ($000)		$106	$113	$119	$126	$133	$141	$147	$154	$162	$170	$178
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$51	$58	$64	$70	$77	$85	$92	$99	$106	$114	$123
Domestic		$55	$55	$55	$55	$55	$55	$56	$56	$56	$56	$56
Total Cargo Safety Revenues ($000)		$106	$113	$119	$126	$133	$141	$147	$154	$162	$170	$178
Total Cargo Revenues ($000)		$212	$226	$238	$251	$266	$281	$294	$308	$323	$339	$357
Passenger Enplanements (000)	2,897	3,245	3,634	3,962	4,319	4,709	5,133	5,481	5,852	6,249	6,673	7,125

Passenger Revenues ($000)		$2,434	$2,726	$2,971	$3,239	$3,531	$3,850	$4,111	$4,389	$4,687	$5,005	$5,344
Cargo Departures (000 Kg.)	20,017	21,249	22,643	23,827	25,129	26,560	28,135	29,433	30,829	32,329	33,942	35,676
Cargo Revenues ($000)		$212	$226	$238	$251	$266	$281	$294	$308	$323	$339	$357
Total Revenues ($000)		$2,646	$2,952	$3,210	$3,491	$3,797	$4,131	$4,405	$4,698	$5,010	$5,344	$5,701
Total Airport Capital Costs	$5,177		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263
Training Costs (Annual)		$188	$188	$188	$188	$188	$188	$188	$188	$188	$188	$188
Maintenance Costs (Annual)		$233	$233	$233	$233	$233	$233	$233	$233	$233	$233	$233
Total Investment Costs ($000)		$8,861	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684
Annual Cash Flow ($000)	($5,177)	($6,215)	($732)	($475)	($194)	$113	$447	$721	$1,013	$1,326	$1,660	$2,016
Cumulative Cash Flow	($5,177)	($11,392)	($12,124)	($12,599)	($12,792)	($12,680)	($12,233)	($11,512)	($10,498)	($9,173)	($7,513)	($5,496)

5.3.3 Scenario 3

In Scenario 3, ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019.

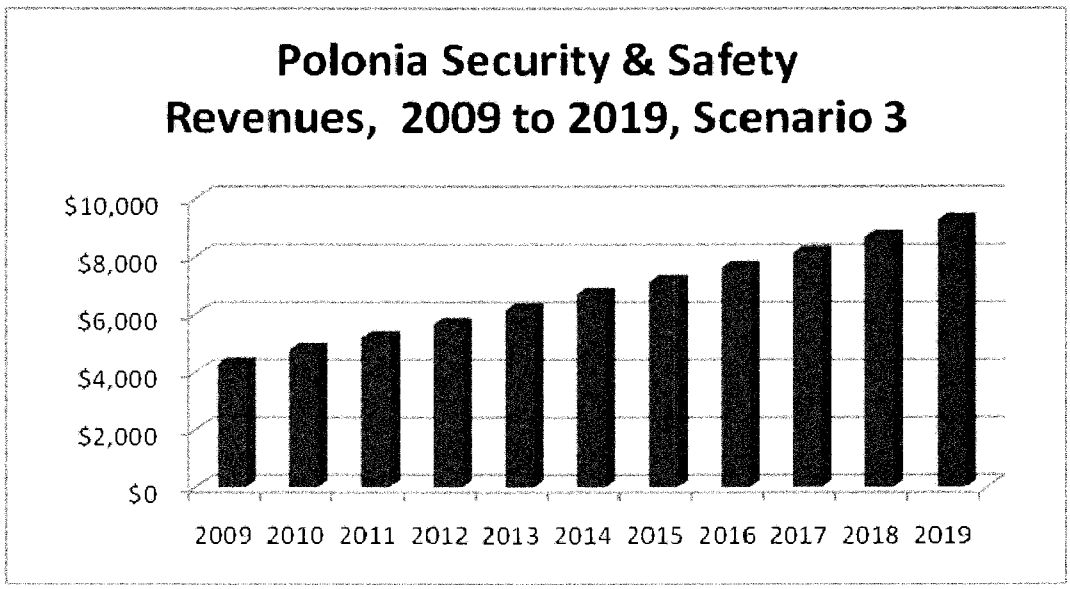

Figure 42

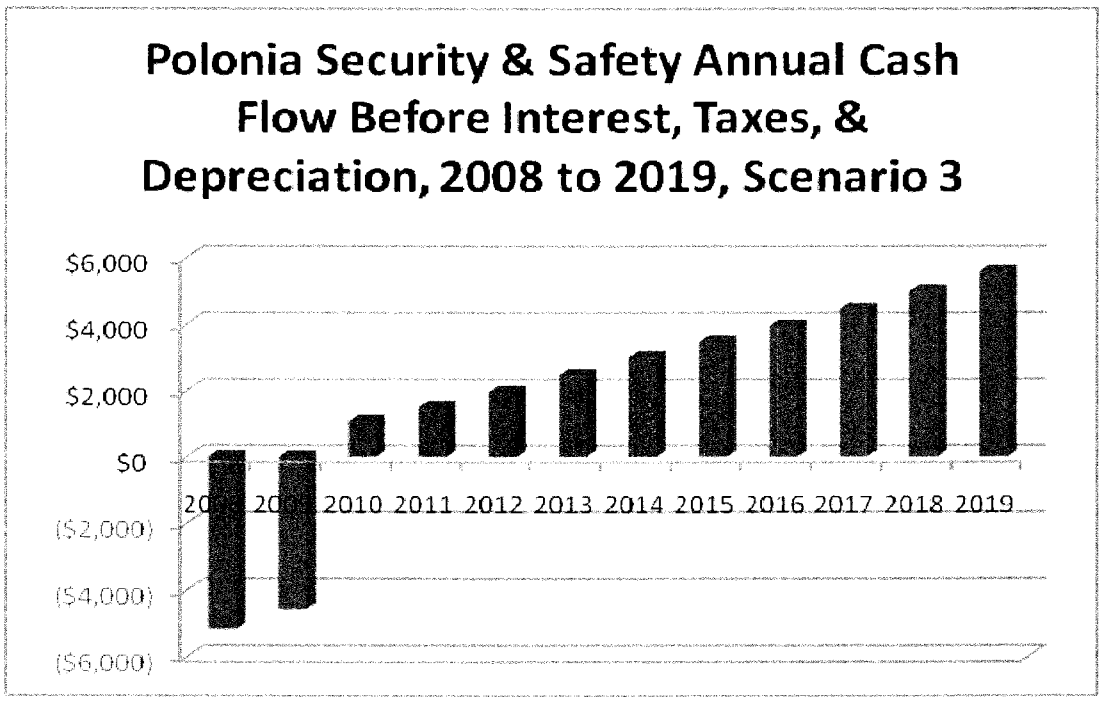
Polonia Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 3
$6,000
$4,000
$2,000
$0
($2,000)
($4,000)
($6,000)
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Figure 43

Table 19: Polonia Scenario 3: Revenues, Costs, & Cash Flow, 2009 To 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		1	1	1	1	1	1	1	1	1	1	1
Passenger Security Fee - International		1	1	1	1	1	1	1	1	1	1	1
International		$705	$802	$885	$976	$1,077	$1,188	$1,280	$1,379	$1,486	$1,601	$1,725
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$2,539	$2,832	$3,077	$3,343	$3,631	$3,945	$4,201	$4,473	$4,763	$5,072	$5,400
Total Security Revenues ($000)		$3,245	$3,634	$3,962	$4,319	$4,709	$5,133	$5,481	$5,852	$6,249	$6,673	$7,125
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$176	$201	$221	$244	$269	$297	$320	$345	$372	$400	$431
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$635	$708	$769	$836	$908	$986	$1,050	$1,118	$1,191	$1,268	$1,350
Total Safety Revenues ($000)		$811	$909	$990	$1,080	$1,177	$1,283	$1,370	$1,463	$1,562	$1,668	$1,781
Total Passenger Revenues ($000)		$4,056	$4,543	$4,952	$5,399	$5,886	$6,417	$6,851	$7,316	$7,811	$8,341	$8,907
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$51	$58	$64	$70	$77	$85	$92	$99	$106	$114	$123
Domestic		$55	$55	$55	$55	$55	$55	$56	$56	$56	$56	$56
Total Cargo Security Revenues ($000)		$106	$113	$119	$126	$133	$141	$147	$154	$162	$170	$178
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$51	$58	$64	$70	$77	$85	$92	$99	$106	$114	$123
Domestic		$55	$55	$55	$55	$55	$55	$56	$56	$56	$56	$56
Total Cargo Safety Revenues ($000)		$106	$113	$119	$126	$133	$141	$147	$154	$162	$170	$178
Total Cargo Revenues ($000)		$212	$226	$238	$251	$266	$281	$294	$308	$323	$339	$357
Passenger Enplanements (000)	2,897	3,245	3,634	3,962	4,319	4,709	5,133	5,481	5,852	6,249	6,673	7,125
Passenger Revenues ($000)		$4,056	$4,543	$4,952	$5,399	$5,886	$6,417	$6,851	$7,316	$7,811	$8,341	$8,907

Cargo Departures (000 Kg.)	20,017	21,249	22,643	23,827	25,129	26,560	28,135	29,433	30,829	32,329	33,942	35,676
Cargo Revenues ($000)		$212	$226	$238	$251	$266	$281	$294	$308	$323	$339	$357
Total Revenues ($000)		$4,268	$4,769	$5,190	$5,650	$6,151	$6,698	$7,146	$7,624	$8,135	$8,680	$9,263
Total Airport Capital Costs	$5,177		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263	$3,263
Training Costs (Annual)		$188	$188	$188	$188	$188	$188	$188	$188	$188	$188	$188
Maintenance Costs (Annual)		$233	$233	$233	$233	$233	$233	$233	$233	$233	$233	$233
Total Investment Costs ($000)		$8,861	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684	$3,684
Annual Cash Flow ($000)	($5,177)	($4,593)	$1,085	$1,506	$1,966	$2,467	$3,014	$3,461	$3,940	$4,450	$4,996	$5,579
Cumulative Cash Flow	($5,177)	($9,770)	($8,685)	($7,178)	($5,213)	($2,746)	$268	$3,730	$7,669	$12,120	$17,116	$22,695

6 SULTAN TAHA INTERNATIONAL AIRPORT – JAMBI

6.1 CURRENT AVIATION ACTIVITY

Air traffic at Sultan Taha International Airport is different from that of the air traffic at the previous three airports. Sultan Taha is a relatively small airport with essentially no international traffic. Passenger traffic and cargo traffic at Sultan Taha have exhibited a pattern with more variation than the other airports, but the airport still exhibited substantial increases in passengers and cargo from 1995 to 2007. The charts below provide a picture of aircraft movements, passenger traffic, and cargo traffic at Sultan Taha from 1995 to 2007. The tables following the charts show the detail underlying the graphics in the charts.

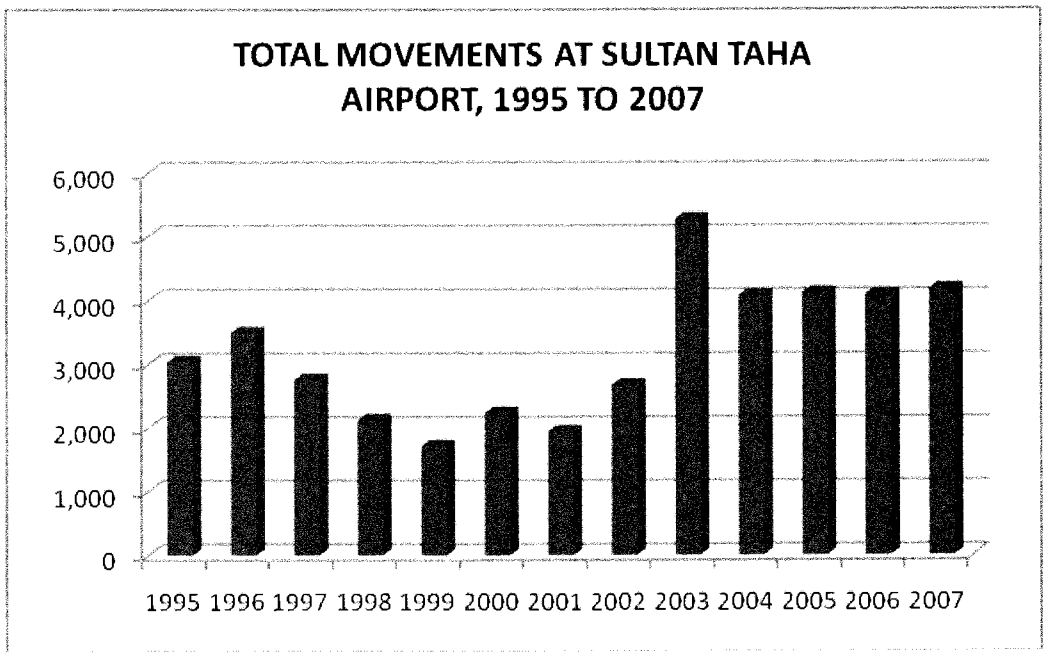

Figure 44

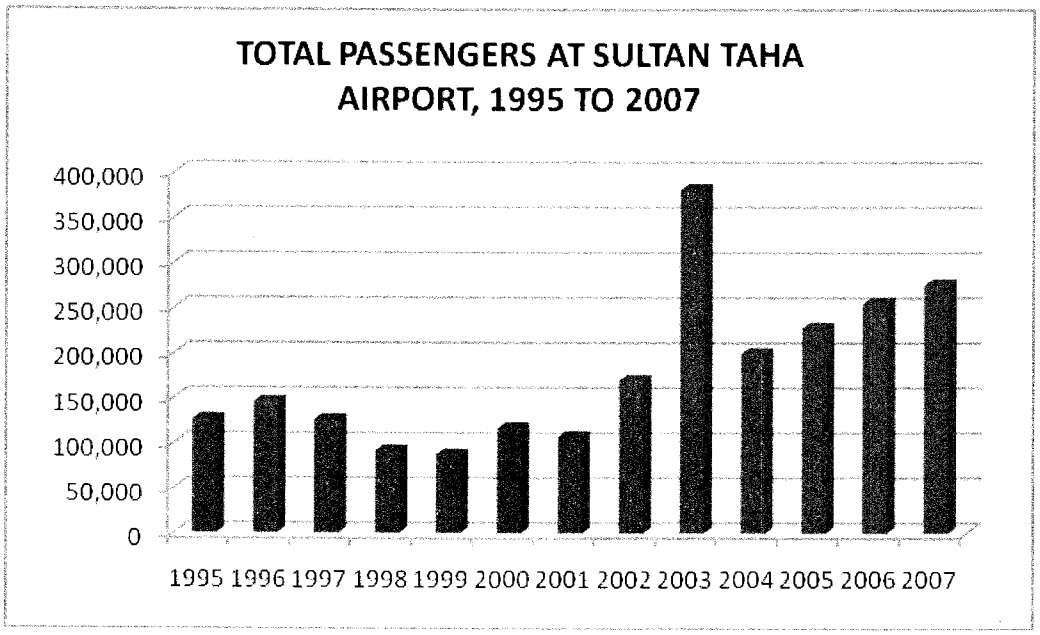

Figure 45

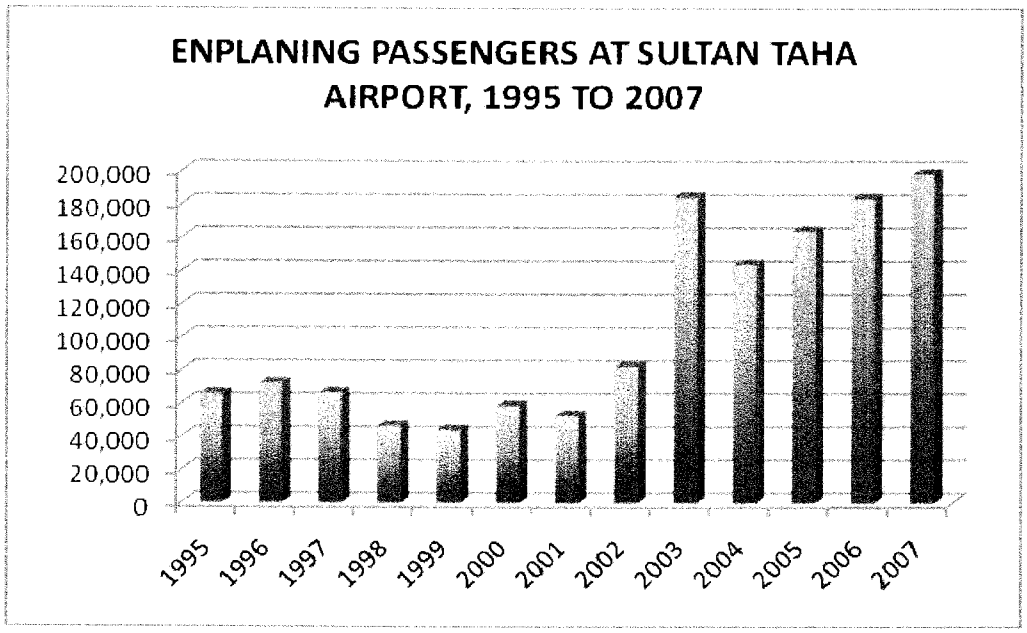

Figure 46

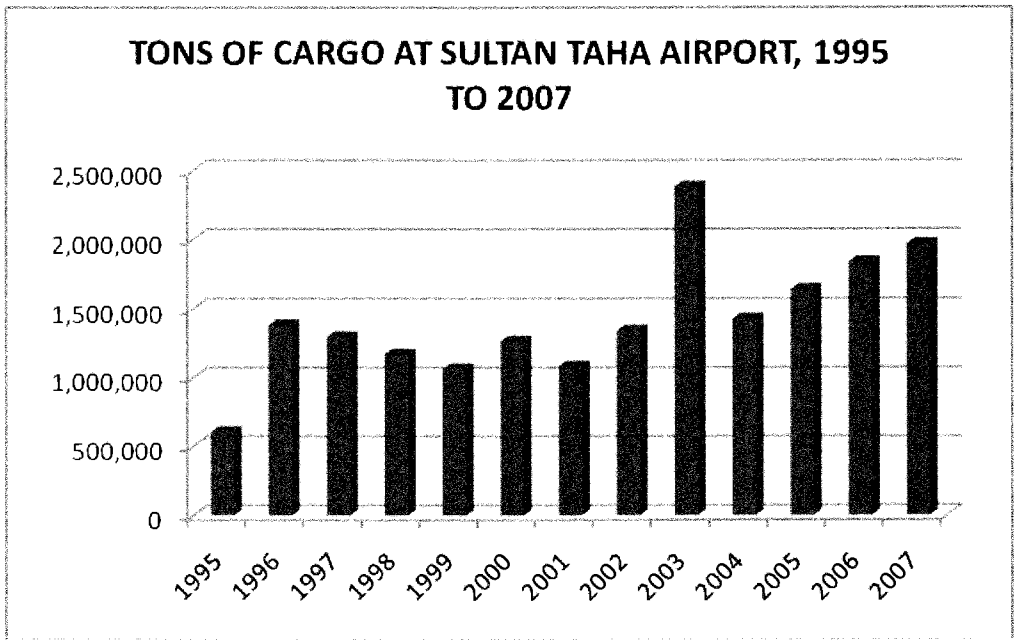
TONS OF CARGO AT SULTAN TAHA AIRPORT, 1995 TO 2007
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007

Figure 47

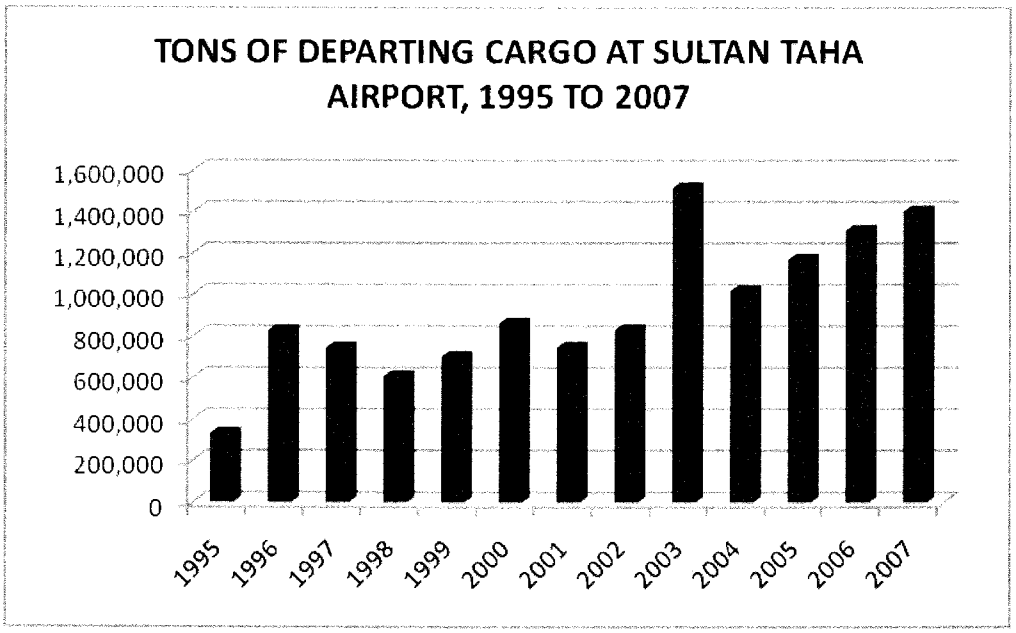
TONS OF DEPARTING CARGO AT SULTAN TAHA AIRPORT, 1995 TO 2007
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007

Figure 48

Table 20: Total Aviation Activity at Sultan Taha/Jambi , 1995 to 2007

	Movements			Passengers				Cargo in Metric Tons		
Year	Departures	Arrivals	Total	Departures	Arrivals	Total	Transit	Departures	Arrivals	Total
1995	1,521	1,521	3,042	65,804	60,917	126,721	5	331,286	276,020	607,306
1996	1,750	1,748	3,498	72,414	73,415	145,829	-	828,665	553,788	1,382,453
1997	1,383	1,381	2,764	66,414	59,975	126,389	-	746,188	551,182	1,297,370
1998	1,065	1,064	2,129	46,614	45,568	92,182	-	607,153	564,466	1,171,619
1999	859	858	1,717	44,240	43,787	88,027	-	701,669	361,886	1,063,555
2000	1,122	1,123	2,245	58,577	58,420	116,997	-	862,076	403,955	1,266,031
2001	975	972	1,947	52,752	55,133	107,885	-	747,554	335,779	1,083,333
2002	1,338	1,341	2,679	82,355	87,715	170,070	-	831,308	511,448	1,342,756
2003	2,641	2,639	5,280	184,203	197,314	381,517	-	1,516,227	866,604	2,382,831
2004	2,037	2,039	4,076	143,962	156,277	200,239	1,177	1,017,966	409,152	1,427,118
2005	2,057	2,059	4,117	164,117	178,156	228,272		1,170,661	470,525	1,641,186
2006	2,047	2,049	4,096	183,811	199,534	255,665		1,311,140	526,988	1,838,128
2007	2,088	2,090	4,178	198,516	215,497	276,118		1,402,920	563,877	1,966,797

6.2 FORECASTS OF AVIATION ACTIVITY AT SULTAN TAHA

To obtain forecasts of passenger enplanements and cargo shipping from Sultan Taha Airport, ASI extended forecasts that had been developed in 2004. These forecasts were adjusted to take into account the actual data for 2004 through 2007. The tables below provide the forecasts.

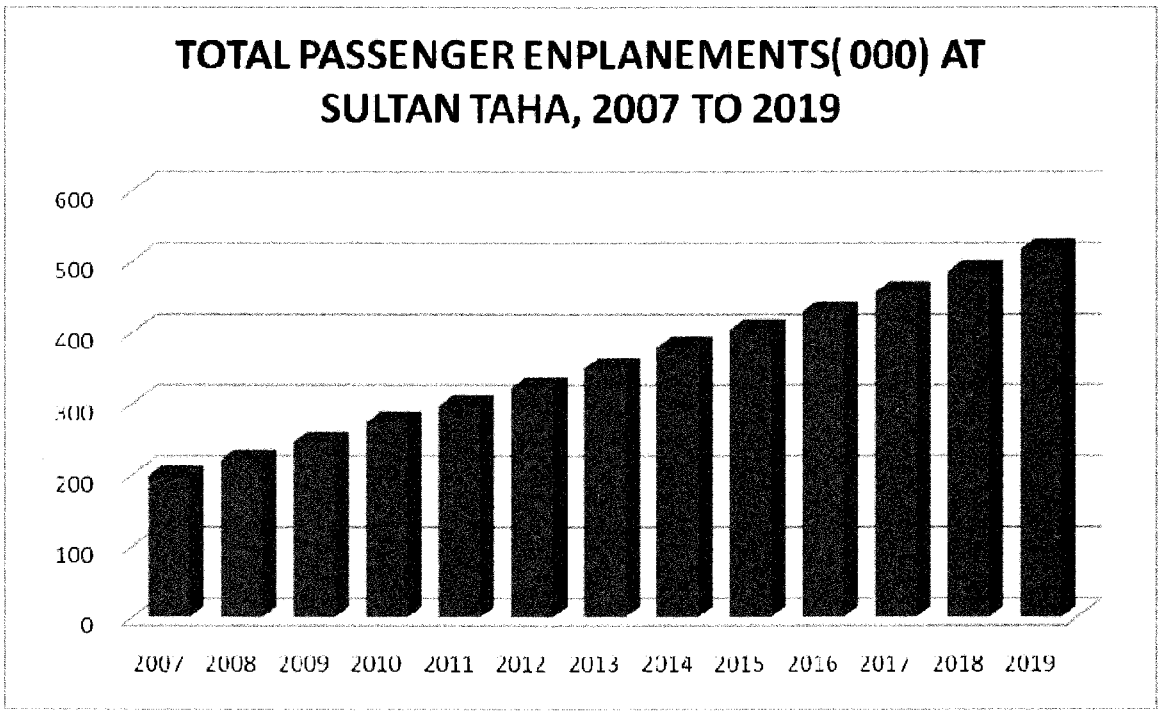

Figure 49

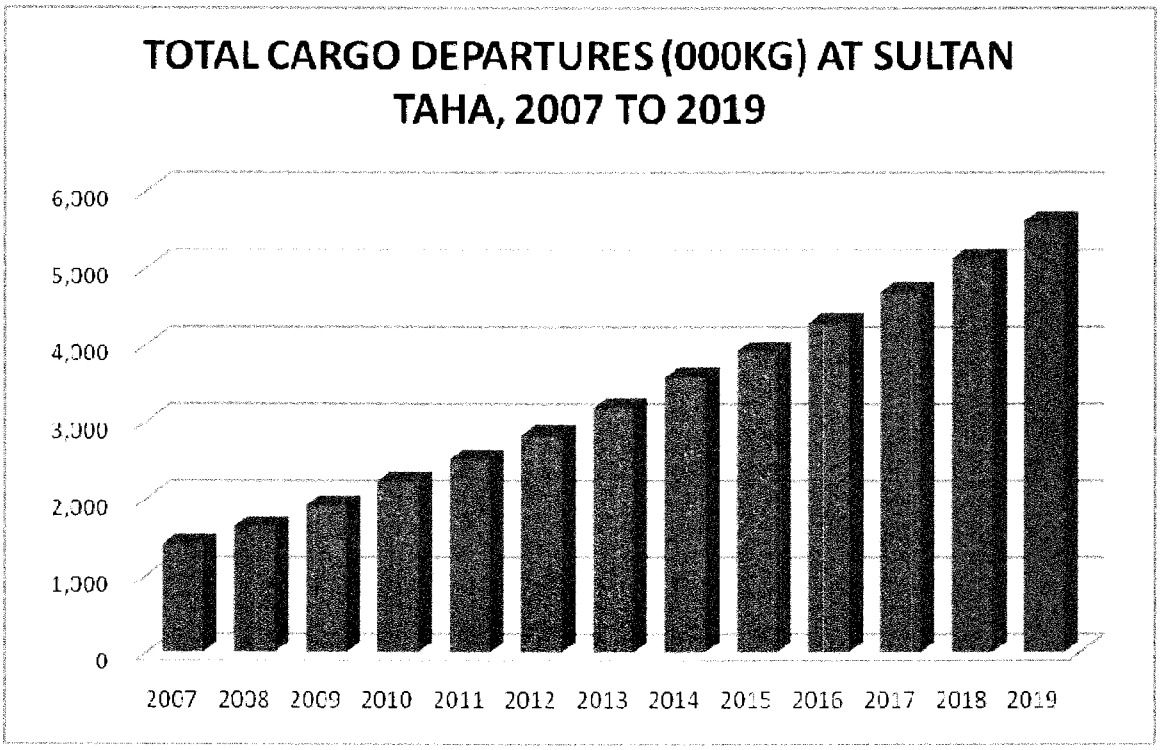

Figure 50

6.3 REVENUES AND CASH FLOW AT SULTAN TAHA

6.3.1 Scenario 1

ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.50 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019. In this scenario, the annual cash flow and cumulative cash flow are negative for each year of the entire period from 2008 to 2019.

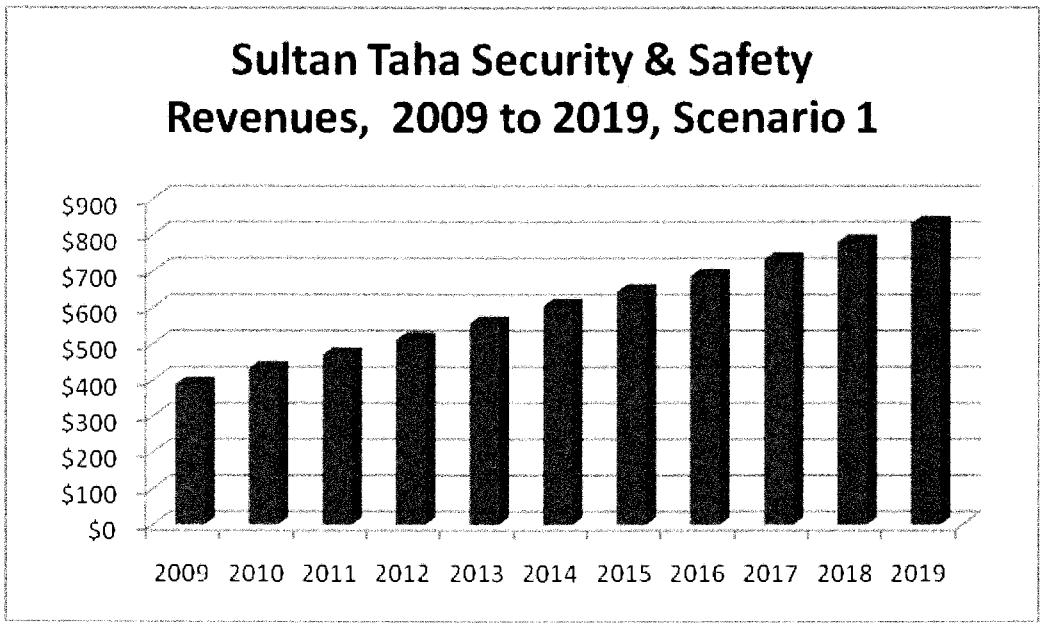
Sultan Taha Security & Safety
Revenues, 2009 to 2019, Scenario 1
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Figure 51

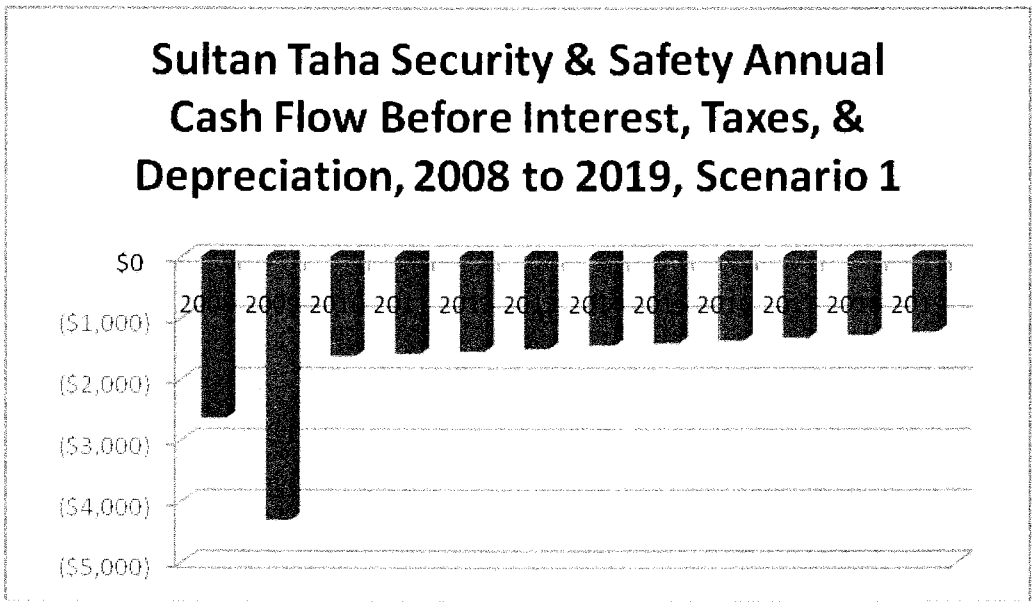
Sultan Taha Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 1
$0
($1,000)
($2,000)
($3,000)
($4,000)
($5,000)

Figure 52

Table 21: Sultan Taha Scenario 1: Revenues, Costs, & Cash Flow, 2009 To 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		1	1	1	1	1	1	1	1	1	1	1
Passenger Security Fee - International		1	1	1	1	1	1	1	1	1	1	1
International		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$247	$275	$299	$325	$353	$384	$408	$435	$463	$493	$525
Total Security Revenues ($000)		$247	$275	$299	$325	$353	$384	$408	$435	$463	$493	$525
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Safety Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$123	$138	$150	$162	$177	$192	$204	$217	$232	$247	$263
Total Safety Revenues ($000)		$123	$138	$150	$162	$177	$192	$204	$217	$232	$247	$263
Total Passenger Revenues ($000)		$370	$413	$449	$487	$530	$575	$613	$652	$695	$740	$788
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Domestic		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cargo Security Revenues ($000)		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Domestic		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cargo Safety Revenues ($000)		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Total Cargo Revenues ($000)		$19	$22	$25	$28	$32	$36	$39	$43	$47	$51	$56
Passenger Enplanements (000)	221	246	274	297	322	350	380	404	430	457	486	517

Passenger Revenues ($000)		$369	$411	$446	$484	$525	$569	$606	$644	$685	$729	$776
Cargo Departures (000 Kg.)	1,637	1,911	2,230	2,509	2,824	3,178	3,576	3,912	4,279	4,682	5,121	5,603
Cargo Revenues ($000)		$19	$22	$25	$28	$32	$36	$39	$43	$47	$51	$56
Total Revenues ($000)		$388	$433	$471	$512	$557	$605	$645	$687	$732	$780	$832
Total Airport Capital Costs	$2,640		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832
Training Costs (Annual)		$106	$106	$106	$106	$106	$106	$106	$106	$106	$106	$106
Maintenance Costs (Annual)		$119	$119	$119	$119	$119	$119	$119	$119	$119	$119	$119
Total Investment Costs ($000)		$4,697	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057
Annual Cash Flow ($000)	($2,640)	($4,308)	($1,623)	($1,586)	($1,545)	($1,500)	($1,451)	($1,412)	($1,369)	($1,324)	($1,276)	($1,225)
Cumulative Cash Flow	($2,640)	($6,948)	($8,572)	($10,158)	($11,702)	($13,202)	($14,654)	($16,065)	($17,435)	($18,759)	($20,036)	($21,261)

6.3.2 Scenario 2

In Scenario 2, ASI has estimated the revenues that would be collected if $0.50 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019. In this scenario, the annual cash flow and cumulative cash flow are negative for each year of the entire period from 2008 to 2019.

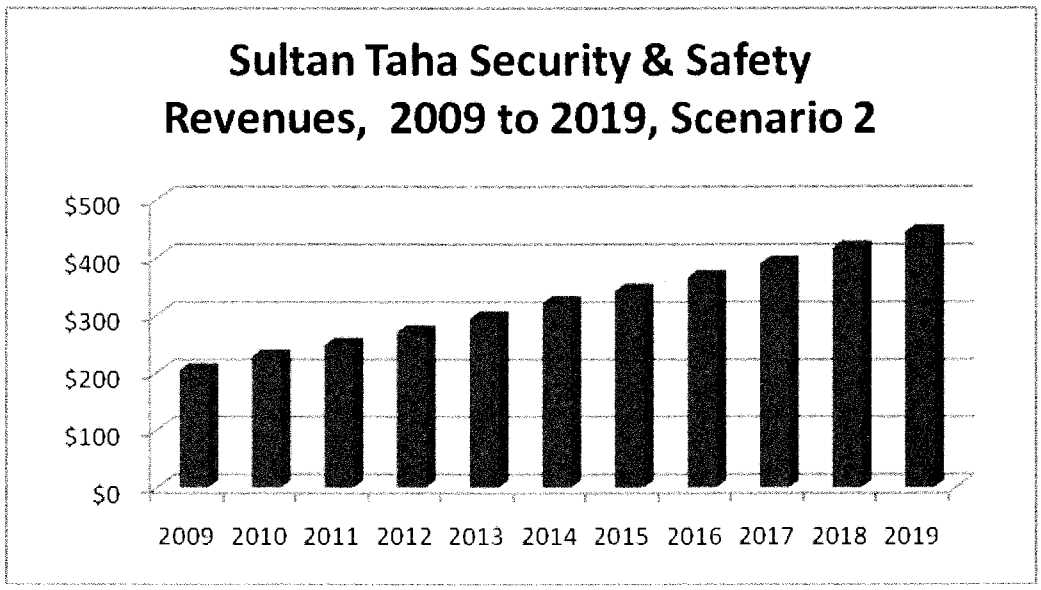

Figure 53

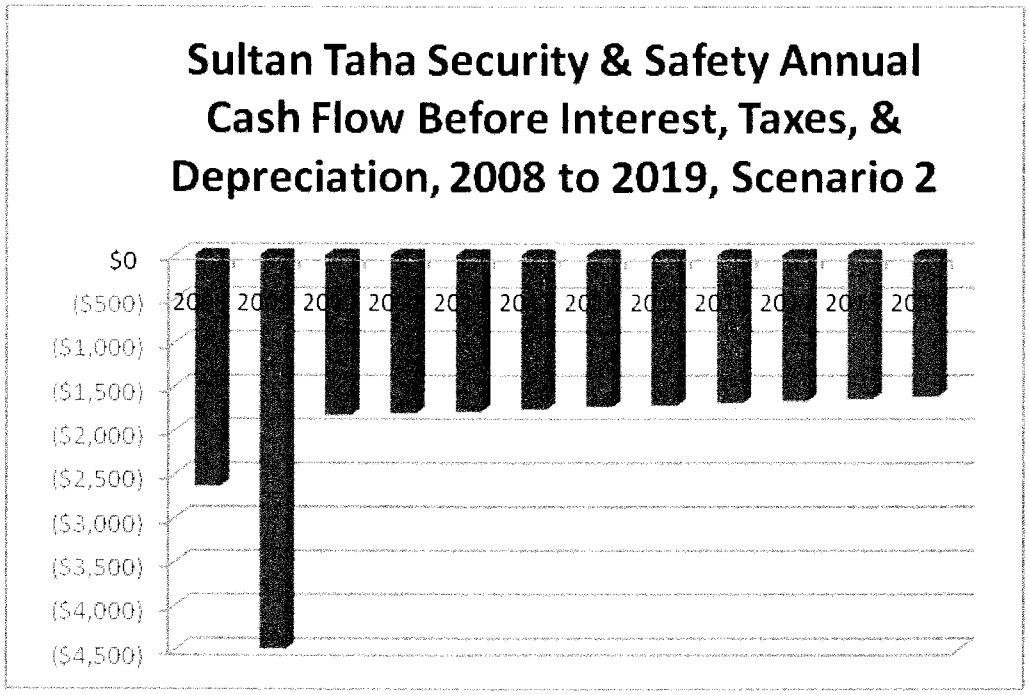
Sultan Taha Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 2
$0
($500)
($1,000)
($1,500)
($2,000)
($2,500)
($3,000)
($3,500)
($4,000)
($4,500)

Figure 54

Table 22: Sultan Taha Scenario 2: Revenues, Costs, & Cash Flow, 2009 To 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Passenger Security Fee - International		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
International		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$123	$138	$150	$162	$177	$192	$204	$217	$232	$247	$263
Total Security Revenues ($000)		$123	$138	$150	$162	$177	$192	$204	$217	$232	$247	$263
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$62	$69	$75	$81	$88	$96	$102	$109	$116	$123	$131
Total Safety Revenues ($000)		$62	$69	$75	$81	$88	$96	$102	$109	$116	$123	$131
Total Passenger Revenues ($000)		$185	$207	$224	$244	$265	$288	$306	$326	$347	$370	$394
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Domestic		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cargo Security Revenues ($000)		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Domestic		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cargo Safety Revenues ($000)		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Total Cargo Revenues ($000)		$19	$22	$25	$28	$32	$36	$39	$43	$47	$51	$56

Passenger Enplanements (000)	221	246	274	297	322	350	380	404	430	457	486	517
Passenger Revenues ($000)		$185	$205	$223	$242	$262	$285	$303	$322	$343	$365	$388
Cargo Departures (000 Kg.)	1,637	1,911	2,230	2,509	2,824	3,178	3,576	3,912	4,279	4,682	5,121	5,603
Cargo Revenues ($000)		$19	$22	$25	$28	$32	$36	$39	$43	$47	$51	$56
Total Revenues ($000)		$204	$228	$248	$270	$294	$320	$342	$365	$390	$416	$444
Total Airport Capital Costs	$2,640		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832
Training Costs (Annual)		$106	$106	$106	$106	$106	$106	$106	$106	$106	$106	$106
Maintenance Costs (Annual)		$119	$119	$119	$119	$119	$119	$119	$119	$119	$119	$119
Total Investment Costs ($000)		$4,697	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057
Annual Cash Flow ($000)	($2,640)	($4,493)	($1,829)	($1,809)	($1,787)	($1,762)	($1,736)	($1,715)	($1,692)	($1,667)	($1,641)	($1,613)
Cumulative Cash Flow	($2,640)	($7,133)	($8,962)	($10,770)	($12,557)	($14,320)	($16,056)	($17,770)	($19,462)	($21,129)	($22,770)	($24,383)

6.3.3 Scenario 3

In Scenario 3, ASI has estimated the revenues that would be collected if $1 is the passenger facility charge for security for each passenger enplaning and $0.25 is the passenger facility charge for safety for each passenger enplaning. ASI has also estimated the revenues that would be collected by assigning a $0.005 per ton for cargo departing the airport. These revenues are given in the first chart below.

ASI then estimated the annual cash flow for these annual revenues and the annual costs for security and safety improvements that are given in Task 3. The annual cash flow is given in the second chart below. The table that follows provides the detail for the annual cash flow estimations from 2008 to 2019. In this scenario, the annual cash flow and cumulative cash flow are negative for each year of the entire period from 2008 to 2019.

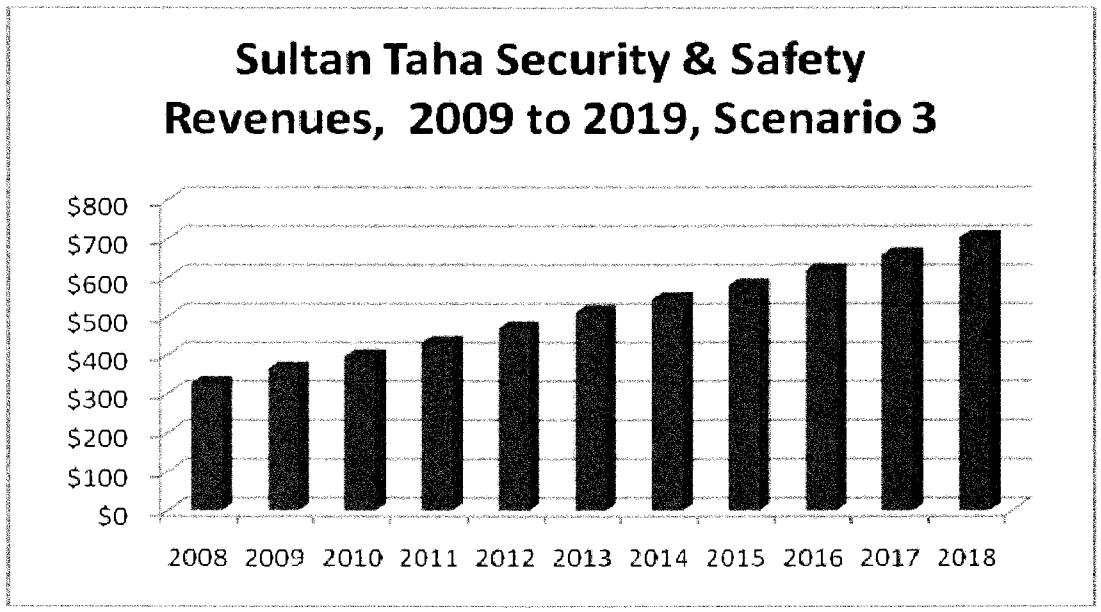

Figure 55

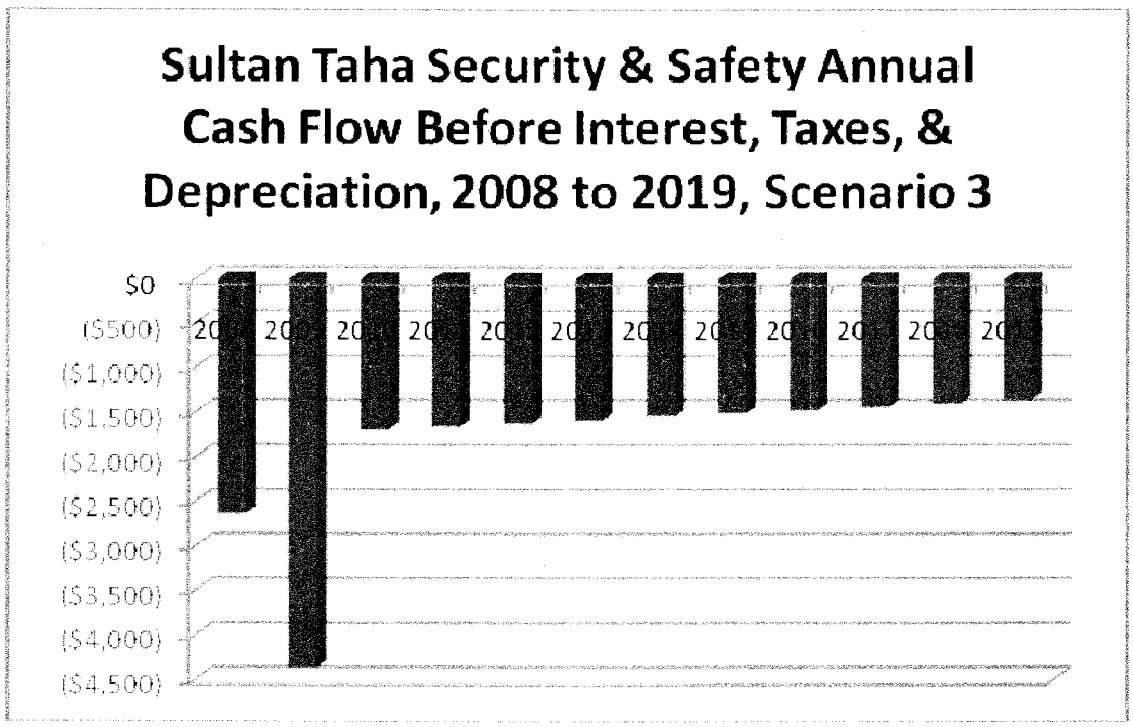
Sultan Taha Security & Safety Annual Cash Flow Before Interest, Taxes, & Depreciation, 2008 to 2019, Scenario 3
$0
($500)
($1,000)
($1,500)
($2,000)
($2,500)
($3,000)
($3,500)
($4,000)
($4,500)

Figure 56

Table 23: Sultan Taha Scenario 3: Revenues, Costs, & Cash Flow, 2009 To 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Passenger Security Revenue $000)												
Passenger Security Fee - Domestic		1	1	1	1	1	1	1	1	1	1	1
Passenger Security Fee - International		1	1	1	1	1	1	1	1	1	1	1
International		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$247	$275	$299	$325	$353	$384	$408	$435	$463	$493	$525
Total Security Revenues ($000)		$247	$275	$299	$325	$353	$384	$408	$435	$463	$493	$525
Passenger Safety Revenue												
Passenger Safety Fee - Domestic		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Passenger Safety Fee - International		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
International		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
International Transfer		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Domestic		$62	$69	$75	$81	$88	$96	$102	$109	$116	$123	$131
Total Safety Revenues ($000)		$62	$69	$75	$81	$88	$96	$102	$109	$116	$123	$131
Total Passenger Revenues ($000)		$309	$344	$374	$406	$441	$479	$511	$544	$579	$616	$656
Cargo Security Revenue												
Cargo Security Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Security Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Domestic		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cargo Security Revenues ($000)		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Cargo Safety Revenue												
Cargo Safety Fee - Domestic		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cargo Safety Fee - International		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
International		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Domestic		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cargo Safety Revenues ($000)		$10	$11	$13	$14	$16	$18	$20	$21	$23	$26	$28
Total Cargo Revenues ($000)		$19	$22	$25	$28	$32	$36	$39	$43	$47	$51	$56
Passenger Enplanements (000)	221	246	274	297	322	350	380	404	430	457	486	517

Passenger Revenues ($000)		$308	$342	$372	$403	$437	$475	$505	$537	$571	$608	$646
Cargo Departures (000 Kg.)	1,637	1,911	2,230	2,509	2,824	3,178	3,576	3,912	4,279	4,682	5,121	5,603
Cargo Revenues ($000)		$19	$22	$25	$28	$32	$36	$39	$43	$47	$51	$56
Total Revenues ($000)		$327	$365	$397	$431	$469	$510	$544	$580	$618	$659	$702
Total Airport Capital Costs	$2,640		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Personnel Costs (Annual)		$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832	$1,832
Training Costs (Annual)		$106	$106	$106	$106	$106	$106	$106	$106	$106	$106	$106
Maintenance Costs (Annual)		$119	$119	$119	$119	$119	$119	$119	$119	$119	$119	$119
Total Investment Costs ($000)		$4,697	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057	$2,057
Annual Cash Flow ($000)	($2,640)	($4,370)	($1,692)	($1,660)	($1,625)	($1,588)	($1,546)	($1,513)	($1,477)	($1,439)	($1,398)	($1,354)
Cumulative Cash Flow	($2,640)	($7,010)	($8,702)	($10,362)	($11,987)	($13,575)	($15,121)	($16,634)	($18,111)	($19,549)	($20,947)	($22,301)

7 FINANCIAL IMPACTS OF ALTERNATIVE REVENUE SCENARIOS

The following table shows the Net Present Value (NPV) for each of the scenarios described above for each of the four airports. Soekarno-Hatta has the largest NPV, primarily because of the substantial passenger traffic at the airport. A positive NPV indicates that the airport can recover its investment costs during the period of the forecast from 2008 to 2019. A negative NPV indicates that the airport will not recover its investment costs within the forecast period. Polonia does not recover its costs for Scenario 2 and Sultan Taha does not recover its costs for any of the scenarios that are analyzed. For passenger and cargo security and safety fees that are uniform across all airports, Sultan Taha will require investment support outside of its own airport revenues.

Table 24: Net Present Value (NPV) – ($000)

	Scenario		
	1	2	3
Soekarno-Hatta	$194,226	$68,149	$152,200
Ngura Rai	$177,985	$13,823	$28,840
Polonia	$13,069	($8,043)	$6,032
Sultan Taha	($13,402)	($14,967)	($13,923)

The following table shows the Internal Rate of Return for each of the scenarios described above for each of the four airports. Soekarno-Hatta generally has the largest IRR, primarily because of the substantial passenger traffic at the airport relative to the recommended investments in security and safety improvements. A positive IRR indicates that the airport can recover its investment costs during the period of the forecast from 2008 to 2019. The IRR also provides an assessment of the return that might be forthcoming if the investment had an equity component. Since Polonia does not recover its costs for Scenario 2 and Sultan Taha does not recover its costs for any of the scenarios that are analyzed, the associated IRR for each relevant scenario will be negative. In the case of Sultan Taha, the IRR is prohibitively negative.

Tale 25: Internal Rate of Return (IRR)

	Scenario		
	1	2	3
Soekarno-Hatta	121.2%	50.5%	97.3%
Ngura Rai	82.7%	31.9%	40.1%
Polonia	30.2%	-6.4%	19.7%
Sultan Taha	NA	NA	NA

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1 OVERVIEW

The four airports, Soekarno-Hatta, Polonia, Ngura Rai, and Sultan Taha, differ in size and in the distribution of passengers and cargo. Task 5 showed the differences between international and domestic passengers and cargo for each airport. Ngura Rai is part of the corporation, Angkasa Pura I (AP I), two of the airports, Soekarno-Hatta and Polonia, are part of Angkasa Pura II (AP II), and Sultan Taha is currently under the auspices of the Directorate of Civil Aviation. The revenues vary widely among the four airports. ASI has reviewed the financial statements of AP I and AP II to identify the potential for financing the recommended security and safety modifications to these four airports.

ASI has reviewed the possibilities for financing the security equipment and services at each of the four airports independently of the operating revenues of the airports. As was seen in Task 5, a modest increase in security and safety fees can provide sufficient revenue to cover the operations and maintenance costs if AP I and AP II choose to provide the initial capital investment. Moreover, the initial capital investment and the ongoing costs including the amortization of loans could be sustained for Soekarno-Hatta, Polonia, and Ngura Rai. Sultan Taha would require additional assistance to finance the recommended security and safety measures because appropriate fees would not be able to cover the capital costs, the operating costs, the maintenance costs, and the finance costs.

ASI identified the investment requirements in Task 3. Although there may be other alternatives, ASI assessed those that maximized the security and safety potential at each of the four airports. Imposing specific security and safety fees, as has been done at other airports, provides an opportunity for the airports to recover the costs of the enhanced systems by financing the security and safety itself or by entering into a concession arrangement with another entity. A positive cash flow allows for private sector financing with potential guarantees to the lender(s) by the multilateral financial institutions with a relatively small equity.

ASI has reviewed the potential for mixing public and private sector funds through co-financing arrangements, including the use of the World Bank, the International Finance Corporation (IFC), the Asian Development Bank (ADB), the U.S. Export-Import Bank, and the Overseas Private Investment Corporation (OPIC). If the borrower is AP I, AP II, or some other party in Indonesia, these institutions can assist in the financing by providing guarantees and insurance – substantially reducing the risk to the lender. If the borrower is a United States entity (such as in a BOT arrangement), the financing would, for the most part, be from the private sector without assistance from the multilateral institutions.

1.1 SUMMARY OF AP I AND AP II FINANCIAL ORGANIZATIONS

The charts and tables below show that AP I and AP II are financially sound and have assets. The income statements show positive net income and the cash flow statements show positive cash flow.

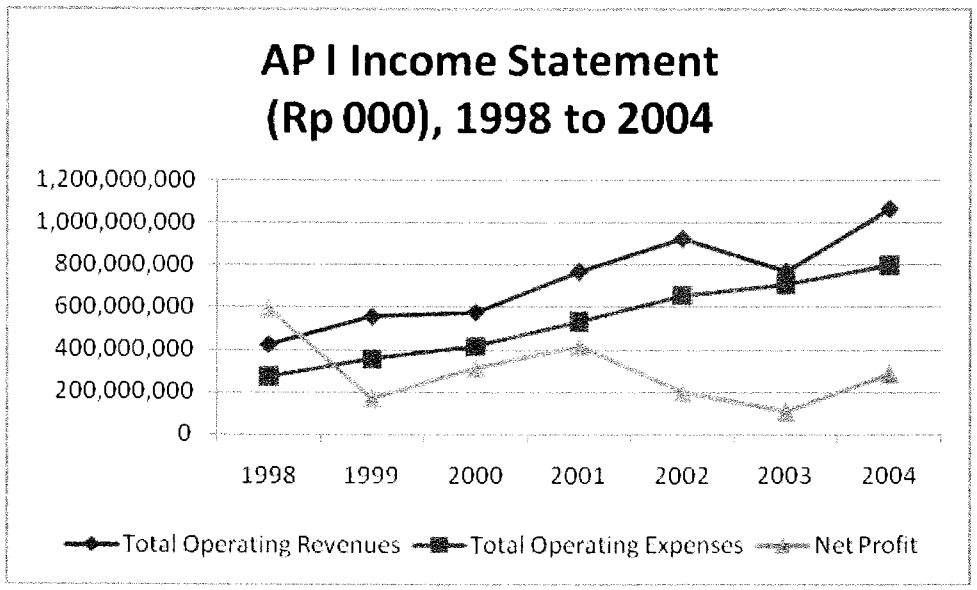

Figure 1.

Table 1: AP I Comparative Income Statement (Rp 000), 1999-2001

OPERATING REVENUE	1998	1999	2000	2001	2002	2003	2004
Aeronautical	302,113,559	458,826,417	468,606,774	621,277,870	767,235,573	608,254,797	861,843,822
Non-aeronautical	120,918,709	96,387,208	106,667,768	145,544,598	155,793,527	158,650,222	200,774,661
Total Operating Revenues	423,032,268	555,213,625	575,274,542	766,922,468	923,028,498	766,905,019	1,062,618,483
OPERATING EXPENSES							
Salary	89,747,893	117,624,531	136,109,633	176,621,295	228,911,979	236,392,847	312,043,111
Maintenance Expenses	25,475,151	34,117,771	46,783,345	51,269,425	61,455,414	67,697,391	61,312,361
Inventory Expenses	5,891,278	7,415,073	8,386,205	9,361,609	10,257,972	11,479,941	14,232,179
Rent Expenses	26,939,258	20,903,318	31,078,133	35,113,982	44,313,883	50,556,002	57,713,164
General Expenses	43,000,124	59,990,381	48,710,720	134,684,203	146,088,697	152,166,105	167,952,677
Depreciation Expenses	67,918,476	82,560,814	104,975,808	120,761,292	122,207,597	158,743,410	156,028,823
Bad Debt Expenses	11,712,468	30,902,480	38,759,592	4,000,829	43,685,151	30,720,590	31,064,982
Total Operating Expenses	270,684,649	353,514,368	414,803,437	531,812,635	656,920,693	706,756,286	800,347,297
Operating Income	119,246,819	201,699,257	160,471,105	235,109,833	266,107,805	60,148,733	262,271,186
Other Revenues - net	682,513,215	3,706,545	264,760,705	304,429,163	-25,296,583	80,114,755	109,673,869
Income Before Tax	801,760,035	205,405,803	425,231,810	539,538,996	240,811,223	140,263,488	371,945,055
Company Tax	209,669,820	34,007,814	112,707,702	121,430,798	42,355,794	31,094,956	85,192,775
Net Profit	592,090,215	171,397,988	312,524,109	418,108,198	198,455,429	109,168,533	286,752,280

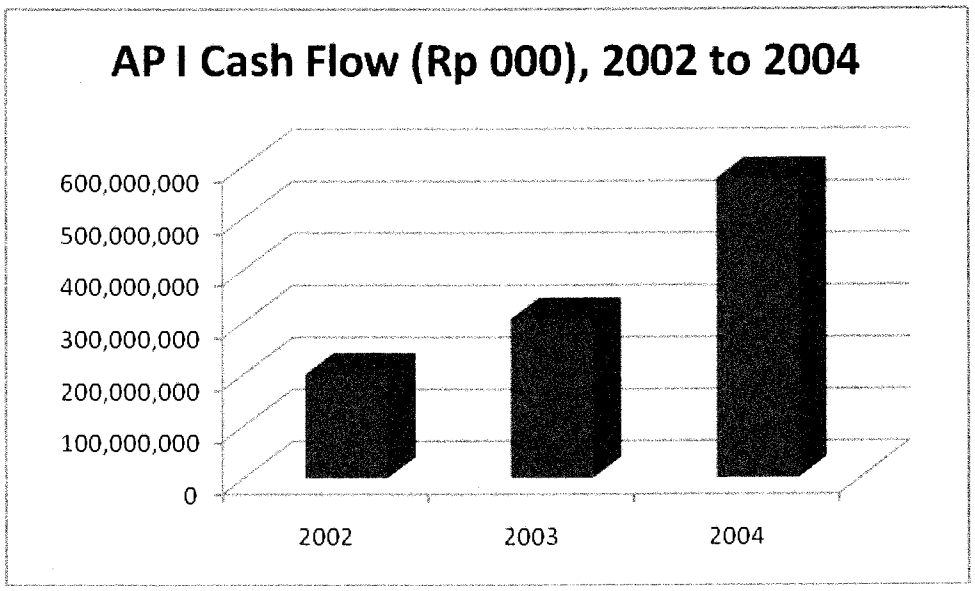

Figure 2.

Table 2: AP I Cash Flow Report (Rp 000), 2002-2004

	2002	2003	2004
NET CASH FROM (FOR) OPERATING ACTIVITIES			
Net Profit	198,455,429	109,168,533	286,752,280
Depreciation Expenses	119,683,205	145,769,047	
Amortization Expenses	2,524,392		139,891,796
Correction on Previous Year's Profit			12,033,340
Fixed Withdrawal Losses	-8,242,990		9,717,099
Non Productivity Assets Value Depreciation Expenses	1,248,962		-29,242,693
Cash From Activities Before Working Capital Changes	313,668,999	258,937,580	419,151,822
Net Cash from Operating Activities	224,355,724	267,932,248	428,916,914
Previous Year's Profit Distribution	-418,108,198	-198,455,429	-95,968,212
Net Cash From (For) Funding Activities	-338,477,357	292,242,603	173,200,894
NET CASH ADD (LESS)	-244,778,718	105,864,448	268,541,940
Cash & Cash Equivalent as of January 1	445,567,678	200,788,960	306,653,408
Cash & Cash Equivalent as of December 31	200,788,960	306,653,408	575,195,348

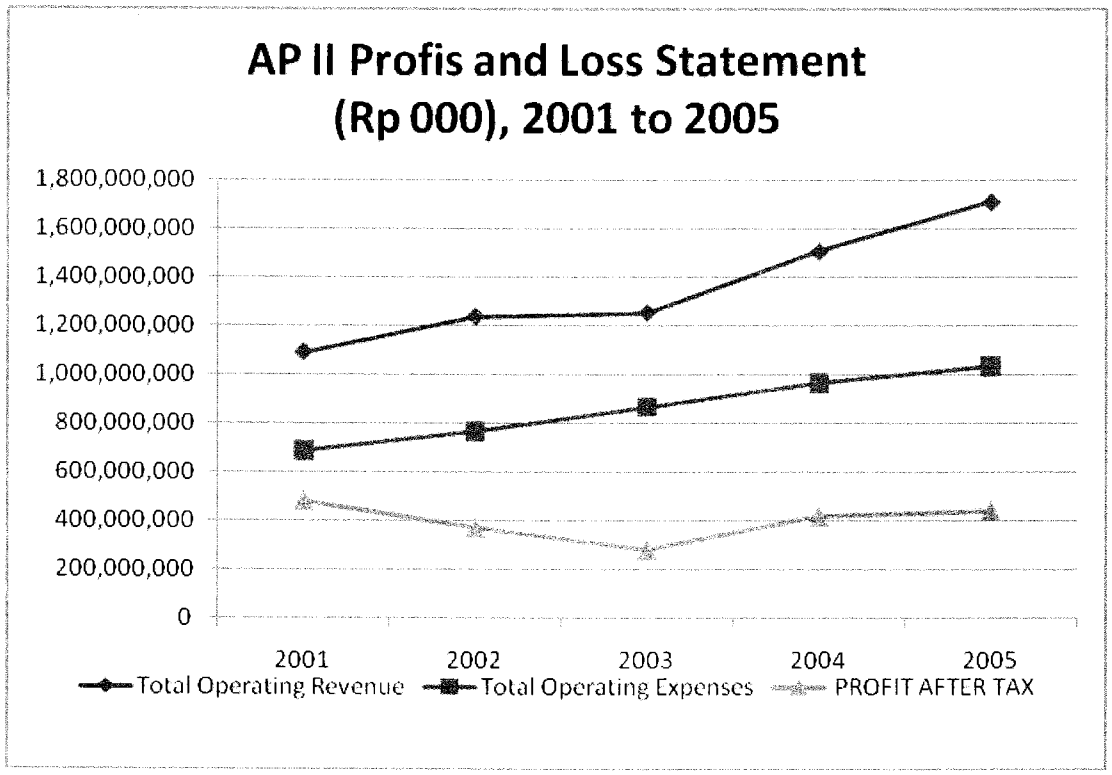

Figure 3.

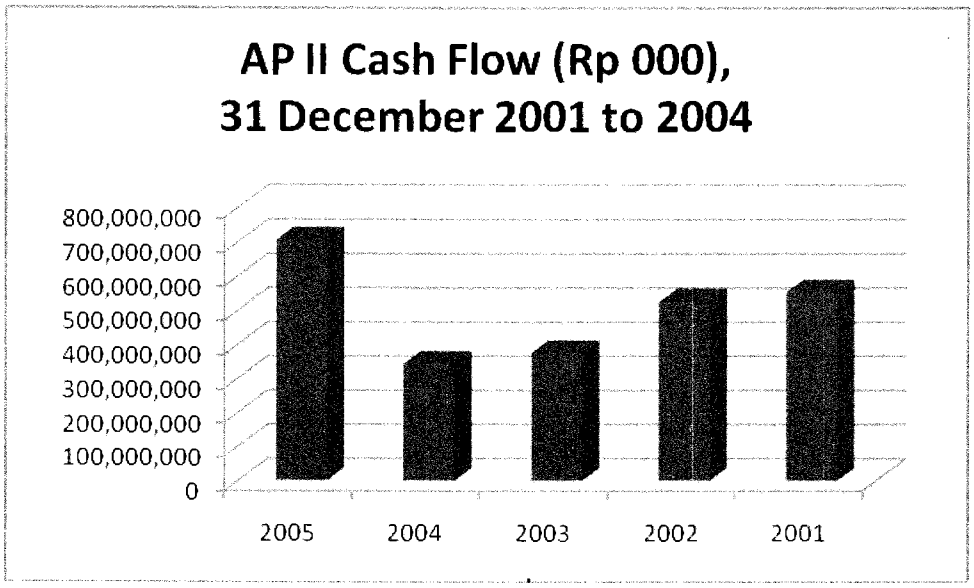

Figure 4.

Table 3: AP II Profits and Loss Statements - (Rp 000), December 31, 2001 - 2004

	2001	2002	2003	2004	2005
OPERATING REVENUE					
Aeronautic	878,318,199	1,009,868,335	9,942,441,893	1,219,716,540	1,361,391,015
Non-Aeronautic	211,378,227	225,937,556	258,619,681	286,611,481	348,988,336
Total Operating Revenue	1,089,696,426	1,235,805,891	1,252,863,871	1,506,328,022	1,710,379,351
OPERATING EXPENSES					
Personnel Expenses	310,069,397	339,760,222	375,795,559	460,609,827	460,864,440
Maintenance and Inventory Expenses	73,814,802	85,659,958	92,475,144	101,055,499	110,917,995
Rent	69,749,254	91,889,555	107,785,262	125,612,108	145,245,383
General Expenses	94,678,040	124,441,591	131,221,251	141,897,108	165,736,841
Bad Debts	5,187,000	9,146,646	48,413,709	20,051,594	31,105,207
Depreciation and Amortization	135,097,764	117,371,931	114,056,119	117,485,825	122,717,737
Total Operating Expenses	688,596,257	768,279,902	869,747,044	966,711,962	1,036,587,604
OPERATING INCOME (LOSS)	401,100,169	467,525,989	383,116,827	539,616,060	673,791,747
NON-OPERATING INCOME (EXPENSES)					
Non-Operating Income	245,746,598	147,869,825	98,606,636	116,445,191	132,035,114
Non-Operating Expenses	73,435,357	89,493,033	58,817	40,457,720	37,502,207
Total Non-Operating Income (Loss)	172,311,242	58,376,792	39,789,169	75,987,470	94,532,907
PROFIT (LOSS) BEFORE EXTRA-ORDINARY ITEMS	573,411,411	525,902,781	422,905,996	615,603,530	768,324,654
Extraordinary Items	73,443,036	-17,856,118	-22,579,122	-8,705,245	-99,449,346
PROFIT (LOSS) BEFORE TAX	646,854,446	508,046,663	400,326,874	606,898,286	668,875,308

INCOME TAX					
Current Income Tax	-145,075,486	-137,269,673	-122,371,244	-179,675,463	-231,608,642
Deferred Income Tax	-20,032,820	839,163	6,055,923	-7,811,088	4,685,804
PROFIT AFTER TAX	481,746,141	371,616,153	284,011,553	419,441,735	441,952,471

Table 4: AP II Cash Flows Statements - Rp December 31, 2001 - 2004

	2005	2004	2003	2002	2001
CASH FLOW FROM OPERATING ACTIVITIES					
Net Profit (Loss)	441952471	419411735	284011523	371616153	481746141
Adjustments					
Depreciation	122717737	108546332	113690095	104832242	123596358
Bad Debt Allowance					
Cash Flow From Operating Activities	723551492	286727446	140256286	731995249	723984447
CASH FLOW FROM INVESTMENT ACTIVITIES	(54787810)	(130217570)	(106875836)	(424096006)	(357726937)
CASH FLOW FROM FINANCING ACTIVITIES	(306306682)	(188311772)	(182746436)	(336363135)	(621223613)
Net Increase (Decrease) of Cash and Cash Equivalent	362457000	(31801896)	(149365986)	(28463891)	(254516102)
Beginning Balance of Cash and Cash Equivalent	344562633	376364528	525730515	554194406	808710508
ENDING BALANCE OF CASH AND CASH EQUIVALENT	707019633	344562633	376364528	525730515	554194406

1.2 SUMMARY

Task 5 indicated the revenues that would accrue from different combinations of passenger departure fees (international and domestic), different cargo departure fees (international and domestic), and a safety fee. These fees can be varied and combined in other ways as well. The fees that we analyzed were specifically focused on covering the expenses of the new security and safety equipment and systems. Existing airport fees may cover some of the existing airport security and safety costs whereas the remainder of the costs will be covered from general revenues. ASI has evaluated several different levels of the specific security fee as a means to recovering the costs of the security equipment and services. The analysis in Task 5 shows that the fee necessary to cover the security and safety expenses varies quite markedly from airport to airport. However, we kept each of the analyzed fees constant across all of the airports rather than vary them to cover the individual airport costs.

These estimates do not include a financial or economic risk assessment. The forecasts are annual forecasts to 2015. A new forecast incorporating more recent changes in traffic patterns and expected economic growth in Indonesia and its primary aviation partners, with pessimistic and optimistic alternatives, would provide a clearer picture for the revenues over the next 10 to 20 years. In fact, this would be a first step in the actual financing acquisition process.

In addition, the costs associated with the alternatives will vary depending on the bids from manufacturers. The equipment, installation, training, and maintenance costs will be the subject of negotiations. ASI has provided an indication of costs in Task 3.

2 FINANCING OPTIONS

Provided that a security fee is used for the security equipment and services and a safety fee is used for the safety equipment and services, AP I, AP II, and DCAA have a number of financing options. The aviation sector in Indonesia, particularly in Sumatra, Java, and Bali, is robust. The airports can collect fees to repay any debt and provide an adequate return to potential equity investors as well.

The primary financing options include, but are not limited to:

- Financing by AP I and AP II with some equity from the organizations and debt from an Indonesian commercial institution (with some guarantees from multilateral financial institutions) - operations of the security function could be by AP I and AP II or contracted out to another organization..

- Financing by AP I and AP II with some equity from the organizations or other sources and debt from a bank with American operations (with guarantees for 85% from the U.S. Export-Import Bank) -- operations of the security function could be by AP I and AP II or contracted out to another organization.

- A Build-Operate-Transfer (BOT) agreement between AP I or AP II and a competitively selected organization that would provide all investments in security and would operate the security function for a specified length of time, at the end of which the operations and equipment would be transferred back to AP I and AP II – during this time, AP I and AP II would receive royalties (and an annual fixed fee) based on predetermined and negotiated criteria.

- A concession arrangement in which AP I and AP II would finance the equipment and installation and the concessionaire would receive a share of the net revenue based on its successful operation of the security function.

These options indicate alternative organizational arrangements for the security functions with the financing of the initial investment and the ongoing operations and maintenance expenses depending on the specific form of the arrangement.

3 RECOMMENDATIONS

ASI recommends that AP I, AP II, and DCAA jointly establish a security fee for recovering the costs of the capital equipment purchases and the ongoing operating and maintenance costs of the security functions for the airports. As described in Task 5, the amount of the security fee will depend on the final designs for the total security system and on the organization of the management of security at the airport.

ASI also recommends that AP I and AP II decide on the structure and operation of the security function prior to entering into any agreements with equipment manufacturers or security service companies or organizations. The structure and operational requirements will have an impact on the level of the security fee and how it is collected.