
U.S. TRADE AND DEVELOPMENT AGENCY



EXECUTIVE SUMMARY

**Air Navigation System Analysis Feasibility Study (for) the Ghana Civil Aviation Authority
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**U.S. Firm: Advanced Management Technology, Inc.
Main Contact Name: Ms. Laura Bachurski
Current Phone: 703-841-2684
Fax: 703-841-1458
Website: www.amti.com**

**Project Sponsor: Ghana Civil Aviation Authority
Main Contact Name: Wing Commander Andy Mensah
Current Phone: 233-21-77-76-171
Fax: 233-21-77-32-93**

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**Sector: Transportation
Region: Africa/Middle East
Country: Ghana**

1.0 Background

In August 1999 Advanced Management Technology, Incorporated (AMTI) was selected by the Ghana Civil Aviation Authority (GCAA) to conduct an Air Navigation System Analysis Feasibility Study. The study included assessments of air traffic control (ATC) facilities, structures, communications, navigation, and surveillance systems, training, manpower utilization and schedules, and environmental concerns. AMTI provided alternative options for communications, navigation, surveillance and air traffic management (CNS/ATM) implementation and identified funding mechanisms that could be used to finance recommended improvements. This document provides an analysis of the air navigation system with specific recommendations for improvement and a tender for VSAT procurement. The final report summarizes Tasks 1-4 and provides a blueprint for affordable and effective CNS/ATM implementation and a long-term solution to air navigation. The executive summary is intended to be used as an investment brief for future financiers.

The study was sponsored by the U.S. Trade and Development Agency (TDA). As required by the TDA, this final report substantially and comprehensively outlines the work performed by the contractor and has been approved by the GCAA. The work performed under this contract was completed by AMTL

2.0 General

The CNS/ATM feasibility study completed by AMTI consisted of five task assignments. It focused on the capability of Ghana to modernize their air traffic control system with the advanced technology of CNS/ATM and improve their communications infrastructure with Very Small Aperture Terminals (VSAT). A brief evaluation of Ghana's operational ATC facilities was also conducted. The team's analysis along with suggested approaches to improve this system was provided to the GCAA.

3.0 CNS/ATM Feasibility Study

3.1 Task 1: Identify the status of CNS/ATM project implementation in the region and industry

The overall objective of Task 1 of the Ghana National Air Navigation Feasibility Study is to identify and document the international trends CNS/ATM on a worldwide basis and within the African Region. This discussion of international trends in CNS/ATM focuses on various technologies including differential Global Positioning System (GPS), data link, aeronautical telecommunications, radar and air traffic management systems. This task identifies barriers associated with CNS/ATM implementation and indicates how civil aviation authorities are overcoming them. Also included in this task is a summary of various funding options and an indication of when and how new technology will be inserted into the transition to CNS/ATM.

3.2 Task 2: **Perform site visits to assess current infrastructure of the Air Navigation System**

Task 2 of the Ghana National Air Navigation Feasibility Study documents the on-site assessments of the current air navigation system infrastructure in Ghana. This assessment evaluates the strengths and weaknesses of the air navigation system and establishes a baseline from which the country can determine its needs for progression to a CNS/ATM system by the year 2010. AMTI also reviewed the financial status and the prospects for funding improvements to the CNS/ATM and VSAT infrastructure in Ghana. An initial financial assessment is provided.

3.3 Task 3: **Determine the best technology options & prioritized investment plan**

In Task 3 AMTI identifies the options for GCAA to modernize Ghana's air traffic control system with advanced CNS/ATM technology and an improved communications infrastructure using VSATs.

To accomplish this task, AMTI developed a list of technological options for Ghana's consideration, all of which will be stand-alone options capable of satisfying Ghana future CNS/ATM needs. We concentrated on the modernization and sectorization of airspace including the adjacent Flight Information Regions (FIR) of Togo and Benin Republic, the communication, navigation, and surveillance services that should be provided, and the air traffic management procedures that should be developed and implemented.

This task also includes a discussion on the facilities required to implement the future air navigation system, the technologies that will be required, and the equipment that will promote the expanded use of satellite technology. AMTI provides recommendations on staffing requirements and required training of personnel.

Finally, AMTI assessed the equipment that will be part of the CNS/ATM concept. AMTI completes this task with a list of manufacturers, technical descriptions, costs, etc., as well as our conclusions regarding CNS/ATM equipment, noting the strengths and weaknesses of each.

3.4 Task 4: **Development of financial options**

Task 4 identifies the potential sources of financing and mechanisms available to GCAA to support its acquisition of VSAT and CNS/ATM system installations and upgrades needed for efficient navigation service provision.

Based on an evaluation of Ghana's operational air traffic control facilities, AMTI suggested infrastructure improvement options for GCAA consideration to modernize and improve services in the Accra FIR including air spaces of Benin and Togo. These suggested options each build on the previous one in some form, but any option can be implemented independently to enable GCAA to implement the level of infrastructure commensurate with its corporate business plan.

The detailed tender documentation and system specifications for beginning the procurement process of the VSAT system are provided separately. As agreed with GCAA, these cover the basic requirements of the World Bank (WB) and African Development Bank (ADB).

3.5 Task 5: **Provide tender documents for VSAT and produce a final air navigation system analysis and plan**

The fifth and final task summarizes the findings of the study and reviews the environmental impacts of the proposed modernization. Also included is a final air navigation system analysis and CNS/ATM transition or implementation plan. This plan has been developed in parallel with the Agency for the Air Navigation Security in Africa and Madagascar (ASECNA) CNS/ATM initiatives and the African-Indian Ocean Regional CNS/ATM initiatives.

Additionally the fifth task called for the development of a tender document for procuring a VSAT communications system. This executive summary in the form of an investment brief is a part of the final task and presents an overview for financiers considering GCAA's modernization plans and the required investments. It provides a brief description of the modernization project, the investment requirements, background on the project sponsors, and financing options available to the sponsor.

4.0 AMTI Team Contact Information

Advanced Management Technology, Incorporated
1515 Wilson Boulevard, Suite 1100
Arlington, VA 22209 USA
Telephone: +703-841-2684
Fax: +703-841-1486

Booz-Allen & Hamilton (BAH)
Allen Building
8283 Greensboro Drive
McLean, VA 22102 USA
Telephone: +703-902-5000
Fax: +703-902-3333

Harris Corporation
1000 Perimeter Road
Building 21, Mail Stop 3A/3361
Palm Bay, FL 32905 USA
Telephone: +321-727-5848
Fax: +321-727-5811