

Brazil's Priority Transportation Projects



A RESOURCE GUIDE

FOR U.S. INDUSTRY

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DEVELOPMENT AGENCY**



2. AVIATION

2.1 Aviation Opportunities in Brazil

The Brazilian Government's June 2015 decision to concession airports in Florianopolis, Fortaleza, Porto Alegre and Salvador offers U.S. companies the opportunity for market entry.

LATAM Airlines' plan to develop a hub in the Northeast will likely require a substantial amount of airport technologies. Other aviation programs such as the Regional Aviation Development Program (PDAR), include the improvement and modernization of 270 regional airports, poses additional opportunities for U.S. exports.

Because new private airport operators are not bound by traditional public tendering procedures, U.S. companies may engage directly in an effort to feature their products and services. Given the challenging timelines in their concession investment contracts, operators are concerned with timely delivery of products and services.

U.S. businesses should expect private operators to take a long-term view on the technologies they select in that they value quality, and do not let price serve as the sole criterion. Private airport operators typically have a solid understanding of leading aviation technologies.

Current and future concessionaires will need to work with international suppliers of ICT services and systems that support airport applications, in order to improve their respective airports.

There is great opportunity in Brazil's aviation sector and the key for U.S. firms is to engage early in the process. They should make contact with potential private operators (consortiums) that will need aviation services and technologies to fulfill their contractual obligations with the state and federal Governments.

2.2 Federal and State Airport Concessions

On June 9, 2015, the Brazilian Government launched a new stage of the 2015-2018 Logistics Investment Program (PIL), a program to build up and modernize the country's transportation infrastructure. In the airport sector, the program aims to expand aviation infrastructure, improve service quality, attract international human capital, boost tourism and improve cargo transportation. The PIL also aims to create new regional hubs through the concessions of the following airports: Hercilio Luz in Florianopolis (Santa Catarina-SC), Pinto Martins, in Fortaleza (Ceara -CE), Salgado Filho in Porto Alegre (Rio Grande do Sul-RS) and Luiz Eduardo Magalhaes, in Salvador (Bahia-BA).

The total estimated investment is nearly \$3 billion for all four airports, with the breakdown as follows: Porto Alegre Airport at \$806 million, the Salvador Airport at \$967 million, the Florianopolis Airport at \$485 million and the Fortaleza Airport at \$580 million. The public sector financing is expected to come from the Brazilian Development Bank (BNDES) and the private sector financing depends upon each concessionaire's financial arrangements. The private companies participating in the upcoming concessions are likely to consist of partnerships between established airport operators, financing companies and construction contractors.

The Secretariat of Civil Aviation (SAC), which is now under the Ministry of Transportation, Ports and Civil Aviation, initiated a PMI process to prepare feasibility studies for the four biggest airports, managed by Infraero¹. In June 2015, the Government issued the public announcement for the intent to concession the airports. Ten consortiums were selected (out of 30 consortiums that submitted PMIs) to conduct the viability and financial analyses for these airports. In October 2015, the selected consortiums submitted their feasibility studies which were subsequently analyzed by SAC and the National Agency of Civil Aviation (ANAC). SAC has officially announced the selection of the feasibility studies presented by the Aereo Brasil Consortium for the Fortaleza and Salvador Airports, and the Moyses & Pires Sociedade de Advogados Consortium for the Florianopolis and Porto Alegre Airports.

There will be a second Government approval process that requires authorization from the Federal Brazilian Court of Audit (TCU) before the projects can be announced for public bidding. Because there is a substantial amount of paperwork to be prepared for these airport bids, SAC expects the final bid announcements to occur mid-year of 2016. Appendix B of the guide includes a list of the ten consortiums that competed to have their viability studies selected. This information is being provided as these consortiums will have an opportunity to compete in the public bidding for all four of the airports and U.S. companies may wish to reach out to them to determine their interest in participating in the upcoming bids and ultimately offer their equipment and services.

While none of the companies that submitted studies under the PMI is a U.S. company, SAC officials have reported that U.S. companies can participate in supplying aviation technologies and professional services by working with the consortiums that end up winning the contracts.

In addition, the Government of Sao Paulo announced plans to concession six state airports to the private sector in 2016. The Government expects \$30 million to be invested in the concession of regional airports

¹ Florianopolis, Fortaleza, Porto Alegre, and Salvador.

across the cities of Araras, Braganca Paulista, Campinas (Amarais), Itanhaem, Jundiai and Ubatuba. Similarly, the State of Goias has announced its intention to concession the Caldas Novas Airport, which requires airside and landside infrastructure improvements, terminal modernization and parking.

The figure below displays the expected locations of airport concessions in 2016.

Figure 1 – Federal and State Airport Concession Projects for 2016

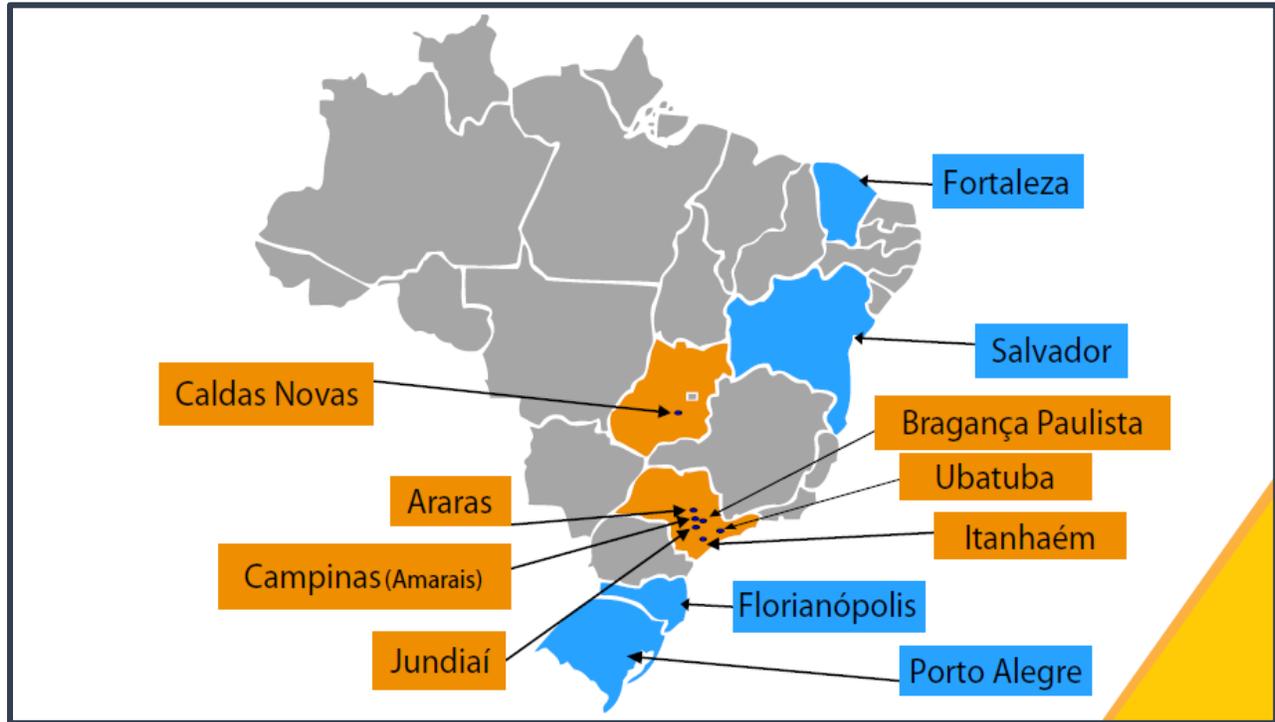


Table 1 provides a summary of Goias' and Sao Paulo's concession programs.

Airport	Capex (U.S. \$)	Typical Air Service	Concession Term (Years)
Araras/SP	2.5M	General Aviation	20
Braganca Paulista/SP	3.5M	General Aviation	30
Caldas Novas/GO	0.2M	Commercial Aviation	20
Campinas/SP (Amarais)	4.7 M	General Aviation	30
Itanhaem/SP	3.0 M	General Aviation	30
Jundiai/SP	7.3 M	General Aviation	30
Ubatuba/SP	4.0 M	General Aviation	30

These upcoming concessions pose many opportunities for U.S. exports, as the projects will require professional services and infrastructure financing. Specifically, upgrades will include new runways and taxiways, aprons, terminal renovation and expansion, as well as parking facilities. These projects are

likely to call for communication systems, airline and airside operational systems, landside operational systems, safety and security systems and airport administrative systems.

The government provides a basic reference to the areas of improvement for each airport and then the consortiums interested in participating in the concession bids present their viability studies, listing the anticipated needs for each airport. Subsequently, SAC selects the preferred viability studies that identify the projected investments and needs for each airport which may include improvements to the airfield, terminals and parking facilities. However, not until the public bid is officially announced, will the public be made aware of the specifics for each airport project in terms of improvements, technologies and final investment.

The following is a list of equipment and systems that will most likely be required for the airport concession projects.

Communications Systems

- Integrated 800 MHz Radio communications
- Private Branch Exchange (PBX) Telephone
- Cellular Telephone
- VoIP Telephone
- Premises Distribution Systems
- Cable Management System
- Network Management Systems
- Local Area Network (LAN)
- Wide Area Network (WAN)
- Virtual Private Network (VPN)
- Network Security Management
- Ethernet
- Wi-Fi
- Gateways
- Intranet
- Extranet
- Internet
- Interfaces to IT Help Desk
- Data Center and associated hardware

Airline and Airside Operation Systems

- Airport Operational Data Base (AODB)
- Resource Management Database (RMS)
- Gate Management System
- Ticket Counter Management System
- Baggage Carousel Management System
- Electronic Visual Information Display Systems (EVIDS)
- Visual Paging and Emergency Display Systems
- Flight Information Display Systems (FIDS)
- Gate Information Display Systems (GIDS)
- Ramp Information Display Systems (RIDS)
- Tug Drive Information Systems
- Baggage Information Display Systems (BIDS)
- Parking Information Display Systems
- Advertising Information Display Systems
- Way-finding Information Display Systems
- Passenger Check-In and Boarding
- Self-Service Kiosk (Check-In)
- Common Use Passenger Processing Systems (CUPPS)
- Common Use Self-Service Kiosks (CUSS)
- Common Use Terminal Equipment (CUTE)
- Departure Control Systems (DCS)
- Weight and Balance systems
- Airline Gateway Server Systems
- Baggage Handling Systems (BHS)
- Baggage Sortation Systems
- Baggage Tracking System
- Cargo Processing Systems
- Passenger Boarding Bridge Systems
- Flight Tracking Systems

- Noise Monitoring Systems
- Weather Tracking Systems

Airport Landside Operation Systems

- Parking Gate and Access Control Systems
- Parking Revenue Control Systems

Airport Safety and Security Systems

- Command and Control Center Systems
- Mobile Command Post Systems
- Computer Aided Dispatch (CAD)
- Closed Circuit Television Systems (CCTV)
- In-Line Explosive Detection Systems (EDS)
- Screening Systems
- Biometrics Systems

Airport Administrative Systems

- Financial Management Systems
- Procurement Management Systems
- Asset Inventory Management Systems
- Financial Assets
- Human Resources Management Systems
- Space and Lease Management Systems
- Property Management Systems
- Noise Monitoring Systems

Other Equipment

- Air Rescue and Fire Fighting systems (ARFF)
- Energy Efficient Lighting Systems

Professional Services

- Airport planning and preliminary engineering services
- Engineering and design services
- Financial services
- Airport systems integration services

- Aircraft Refueling Systems
- Runway and Taxiway Lighting Systems

- Parking Space Management System
- Transportation Dispatch System

- Airport Access Control Systems
- Perimeter Intrusion Detection Systems (PIDS)
- Fire Alarm and Detection Systems
- Emergency Response Systems
- Customs/Immigration Process Systems
- Passenger Screening Systems
- Baggage Screening Systems

- Airport Revenue Management System
- E-Commerce Website for Airport and Tenants
- Tenant Relations Systems (business service, billing, contracts, electronic payment, etc.)
- Database Management Systems
- Public Addressing System
- Tourism and Hotel Information Systems

- Power and Utility systems (Central Energy Plant)
- Electric walkways, escalators, and elevators

- Security planning and design services
- Testing and training services
- Operational and maintenance service contracts
- Project management services

2.3 Information on Airports to be Concessioned

PINTO MARTINS AIRPORT

Pinto Martins Airport Facts

- Located 9 Km away from downtown Fortaleza, in the State of Ceara
- 3rd busiest in the Northeast Region and 12th busiest airport in the country
- Average growth in passenger traffic between 2003-2014 was 12% per year
- Passenger Movement in 2014: 6.5 million
- Cargo Movement in 2014: 57,083 tons
- Traffic Growth in 2014: 10%
- Anticipated Project Investment: \$ 580 million

Expected Areas of Improvements

- Improvement of the runway and taxiway systems
- Improvement/Expansion of Aircraft Apron
- Renovation/expansion Complete passenger terminal
- Construction of parking facility
- Upgrade of ATC and ARFF equipment
- Planning, engineering and design services



Figure 2 – Pinto Martins Airport

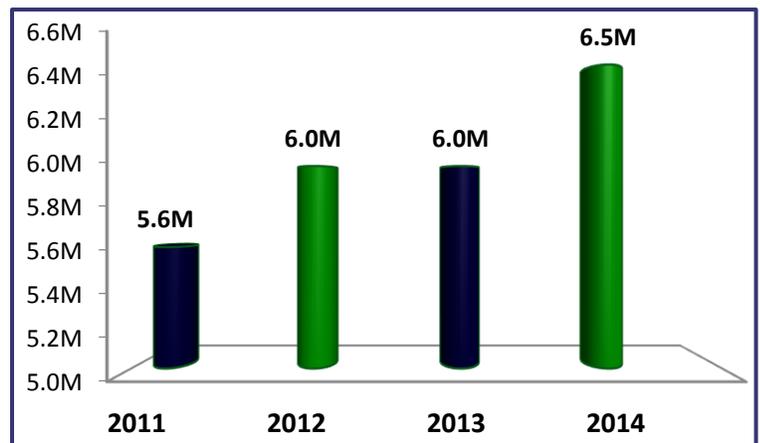


Figure 3- Pinto Martins Airport Annual Passenger Numbers (In Millions)

THE DEPUTADO LUIS EDUARDO MAGALHAES AIRPORT

Magalhaes Airport Facts

- Located 24 Km away from the capital city in the State of Bahia
- Most busy airport in the Northeast Region, and 8th busiest in the country
- Average growth in passenger traffic for 2003-2014 was 9.27% per year
- Passenger movement in 2014: 9.2 million
- Cargo movement in 2014: 36.613 tons
- Anticipated Project Investment: \$ 967 million

Expected Areas of Improvements

- Construction of new runway
- Expansion of the aircraft patio area
- Expansion/modernization of passenger terminal
- Vehicle parking
- Cargo terminal
- Upgrade of ATC and ARFF equipment
- Planning, engineering and design services



Figure 4 – D. Luis Eduardo Magalhaes Airport

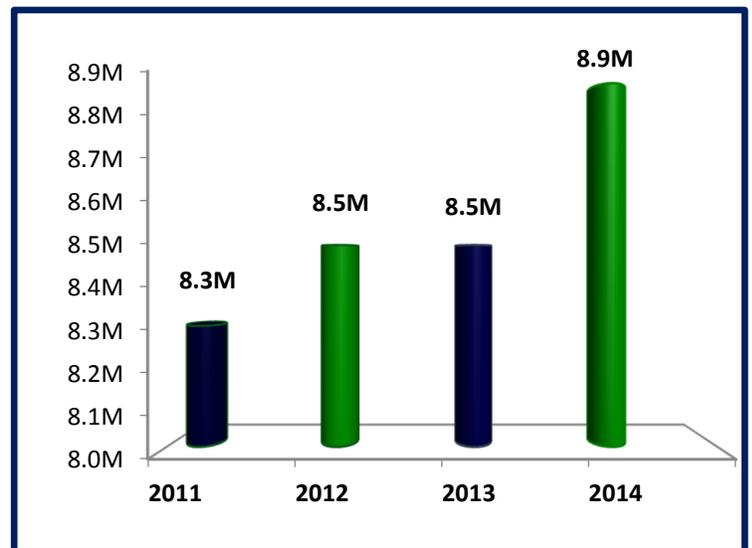


Figure 5 - Magalhaes Airport Annual Passenger Numbers (In Millions)

HERCILIO LUZ AIRPORT

Hercilio Luz Airport Facts

- Located 12 Km away from the capital city in the State of Santa Catarina
- 14th busiest airport in the country and 3rd busiest airport in the Southern Region
- Average growth in passenger traffic between 2003-2014: 9.9% per year
- Passenger movement in 2014: 3.6 million
- Cargo movement in 2014: 9,212 tons
- Anticipated Project Investment: \$ 485 million



Figure 6 – Hercilio Luz Airport

Expected Areas of Improvements

- Upgrades to the runway and taxiway systems
- Construction of aircraft patio
- Improvement to passenger terminal
- Construction of parking facility
- Construction of cargo terminal
- Upgrades to ATC equipment
- Upgrades of ARFF equipment
- Planning, engineering and design services

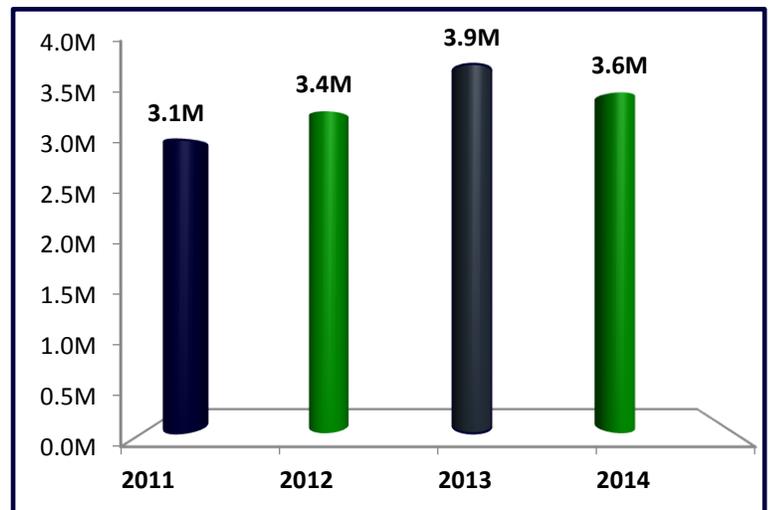


Figure 7 Hercilio Luz Airport Annual Passenger Numbers (In Millions)

SALGADO FILHO AIRPORT

Salgado Filho Airport Facts

- Located 7 Km away from the City of Porto Alegre, State of Rio Grande do Sul
- 9th busiest airport in the country and the most busy in the Southern Region
- Average growth in passenger traffic for 2003-2014: 10.2% per year
- Passenger movement in 2014: 8.4 million
- Cargo Movement in 2014: 29,227 tons
- Anticipated Project Investment: \$ 806 million



Figure 8 – Salgado Filho Airport

Expected Areas of Improvements

- Expansion of the existing landing / take-off runway
- Expansion of aircraft patio area
- Construction of new passenger terminal and expansion of existing one
- Construction vehicle parking
- Construction cargo terminal
- Upgrade of ATC equipment
- Supply/upgrade of ARFF equipment
- Planning, engineering and design services

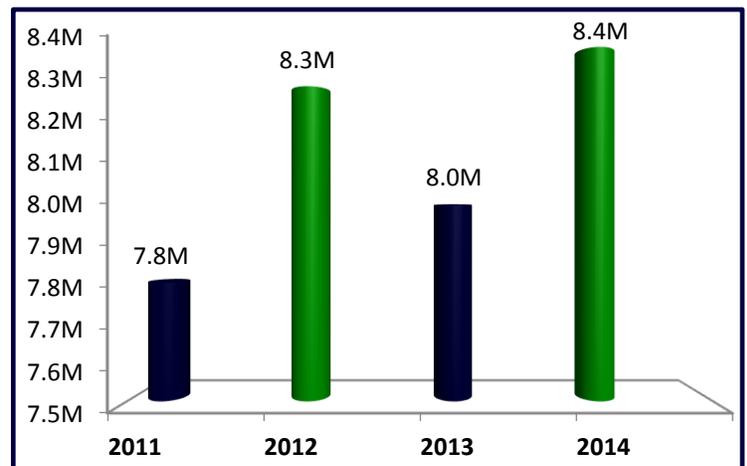


Figure 9 – Salgado Filho Airport Annual Passenger Numbers (In Millions)

Contacts

For more information on the projects listed in this section, please find the relevant contacts listed below.

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ROLIM ADOLFO AMARO AIRPORT

Projected improvements:

- Creation of a Runway End Safety Area (RESA) for both runway approaches
- Improvements to runway and taxiway including adding new lighting systems
- Expanding existing apron
- Construction of airside drainage infrastructure
- Construction of passenger terminal building
- Construction of parking facilities
- Installation of airside technologies
- Upgrades to landside equipment
- Improvements to ATC and communications equipment
- ARFF equipment
- Planning, engineering, design, and project management services



Figure 10 - Rolim Adolfo Amaro Airport

CAMPOS DE AMARAIS AIRPORT

Projected improvements:

- Construction of a Runway End Safety Area (RESA) for both runway approaches
- Improvements to runway and taxiway including new lighting systems
- Expansions of apron
- Construction of airside drainage infrastructure
- Construction of passenger terminal building
- Construction of parking facilities
- Implementation of airside technologies
- Upgrades to landside equipment
- Upgrades to ATC and communications equipment and ARFF equipment
- Planning, engineering, design and project management services



Figure 11 - Campos De Amarais Airport

UBATUBA AIRPORT

Projected upgrades:

- Creation of a Runway End Safety Area (RESA) for both runway approaches
- Improvements to runway including new lighting systems
- Reconstruction of apron
- Improvements to airside drainage infrastructure
- Construction of new passenger terminal building
- Construction of parking facilities
- Upgrades to navigational systems
- Upgrades to landside equipment
- ATC/communications equipment
- ARFF equipment
- Planning, engineering, design, and project management services



Figure 12 - Ubatuba Airport

BRAGANCA PAULISTA AIRPORT

Projected upgrades:

- Creation of a Runway End Safety Area (RESA) for both runway approaches
- Improvements to runway including new lighting systems
- Expansions of apron
- Construction of airside drainage
- Construction of new passenger terminal building
- Construction of parking facilities
- Implementation of airside technologies
- Landside equipment upgrades
- ATC and communications equipment upgrades
- ARFF equipment
- Planning, engineering, design, and project management services



Figure 13 – Braganca Paulista Airport

ITANHAEM AIRPORT

Projected upgrades:

- Implementation of security fencing for the airport perimeter area
- Upgrades to roadway
- Construction of communications station
- Improvements to drainage systems
- Construction of a new terminal building
- Construction of new parking facility
- Implementation of airfield lighting systems
- Construction of new fire station



Figure 14 – Itanhaem Airport

CALDAS NOVAS AIRPORT

Projected upgrades:

- Construction of new airport terminal
- Expansion/reconstruction of runways
- Construction of ATC tower
- Reconstruction/expansion of Apron areas
- Implementation of Navigational Aids (NAVAIDS)
- Upgrades to communication systems
- Upgrades to airport operating systems
- Upgrades to power and utility systems
- Construction of parking areas



Figure 15 –Caldas Novas Airport

2.4 Additional State Airports Expected to be Concessioned

The Bahia Government has been working with SAC to advance the concession of several state airports. SAC recently authorized the concession of the Comandatuba Airport, located in the Una Municipality. SAC also authorized the construction of the Vitoria de Conquista Airport, a city approximately 500 Km from Salvador. The project includes the construction of a runway and ramp that can accommodate Boeing 737s, as well as new power stations, lighting, security and fire-fighting stations. In Bahia, there are several other airports expected to be concessioned including the Barreiras, Caravelas/Teixeira de Freitas, and Lencois/Guanambi airports.

The Government of the State of Ceara is anticipating the concession of state airports such as Itapipoca, Iguatu, Campos Sales, Aracati and Caninde Airports. These airports will require engineering, design and project management services for constructing and improving airport terminals, runways and taxiways, ATC towers, NAVAIDS, airport operating systems, baggage handling systems, security systems, communication systems, energy efficient systems, as well as power and utility systems.

There are other state airports that may be concessioned in the near future (2016 or 2017). The official announcement for these airports will depend on how long it takes for each state to prepare the required documentation. The Zona da Mata Airport in the State of Minas Gerais has received the necessary SAC approvals, while the Pouso Alegre and Sao Lourenco Airports (Minas Gerais) is awaiting SAC's approval. Furthermore, SAC has approved the Campos dos Goytacazes Airport in Rio de Janeiro for concession, as well as the Araras and Guaruja airports in the State of Sao Paulo.

Other state airports that may be concessioned include Sao Paulo, Goias, Bahia and Rio de Janeiro.

Contacts

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State of Goias	State of Bahia	State of Ceara

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2.5 Private Airport and Air Hub Developments in Brazil

Given the growing demand for general aviation operations, private investors seek to explore the possibility of constructing new private airports. SAC has an established process that the private sector must follow in order to obtain the proper approvals and licenses for constructing and operating private airports. Currently, there is one private airport development project underway, which is the Sao Paulo – Catarina Executive Airport. The development of private executive airports for general aviation and tourism purposes will likely call for the services of FBO operators, aircraft maintenance services and equipment, and aviation technologies as the private sector begins to invest in private airport development projects.

2.5.1 Sao Paulo Catarina Executive Airport

JHSF is a major Brazilian commercial and real estate development corporation with substantial assets throughout Brazil and the U.S. JHSF is in the process of constructing a state-of-the-art general aviation executive airport, The Sao Paulo Catarina Executive Airport, in the City of Sao Roque about 35 Km west of the City of Sao Paulo. The new executive airport is designed to accommodate general aviation flights and executive operations, given that general aviation operations at the surrounding airports is very limited.

Summary of the Sao Paulo Catarina Executive Airport

- Designed to accommodate general aviation flights
- Will improve airport infrastructure
- 24-hour operation without hourly restrictions
- Runway will span 2,470 meters x 45 meters
- Accommodates large business jets, such as the Gulfstream G650 and G550, Bombardier's Global 6000, and Dessault Falcon's 8x and Falcon 2000
- 14-minute helicopter flight from Sao Paulo
- Includes 50,000 square meters of hangars and 50,000 square meters of aprons in the first phase
- Features a General Aviation Terminal (GAT) for executive aviation, equipped with complete infrastructure in support of passenger and crew, with baggage inspection equipment
- Service and Maintenance Center
- Helipad offered to passengers for connection to the state capital for business



Figure 16 - Sao Paulo Catarina Executive Airport

Expected equipment and services needed for this project:

- Fixed Base Operators (FBO)
- Navigational Systems
- ATC tower equipment
- Communications systems
- ICT systems
- Baggage inspection equipment
- Maintenance, Repairs, and Overhaul (MRO) services.

Contacts

For more information on this project, please reach out to one of the project contacts below.

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2.5.2 LATAM Airlines Group S.A.

LATAM Airlines Group S.A. recently became one of the largest airline groups in the world, as a result of the merger between TAM S.A. and LAN Airlines S.A.

In 2015, LATAM announced the launch of feasibility studies to establish the first international and domestic hub in Northeast Brazil. LATAM is considering three cities as potential hosts for the hub: Fortaleza, Natal and Recife.

The main objective is to expand LATAM's operations between Europe and South America, and the geographic position of Northeast Brazil serves a strategic location to do so.

The Northeast hub will offer significantly shorter flights between Brazil and the U.S, and between Brazil and Europe, compared to Sao Paulo and Rio de Janeiro. The location will facilitate better connections and connecting times, creating efficiency for the airline.



Figure 17 - TAM Airlines

Expected Category of Airport Systems and Services

- Communication systems
- Airline and airside operational systems
- Landside operational systems
- Safety and security systems
- Airport administrative systems
- Other equipment and professional services to be determined as the project develops

Contacts

For more information on this project, please reach out to one of the project contacts below:

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2.6 Regional Aviation Development Program (PDAR)

In an effort to provide access to air travel for Brazilians living in smaller cities, the Government announced the Regional Aviation Development Program (PDAR) with infrastructure investments of \$2.3 billion. The first stage of the PDAR will benefit 270 out of 689 local and regional airports across Brazil, allowing them to receive commercial flights. The airport owners and operators, mostly states or municipalities, were advised to submit an analysis of their investment needs in terms of financial viability and physical installations such as infrastructure, runways, aprons, terminals, ATC and aviation equipment.

The PDAR is a three-phase process including:

- Feasibility studies;
- Project viability analysis; and
- Preliminary engineering for project development.

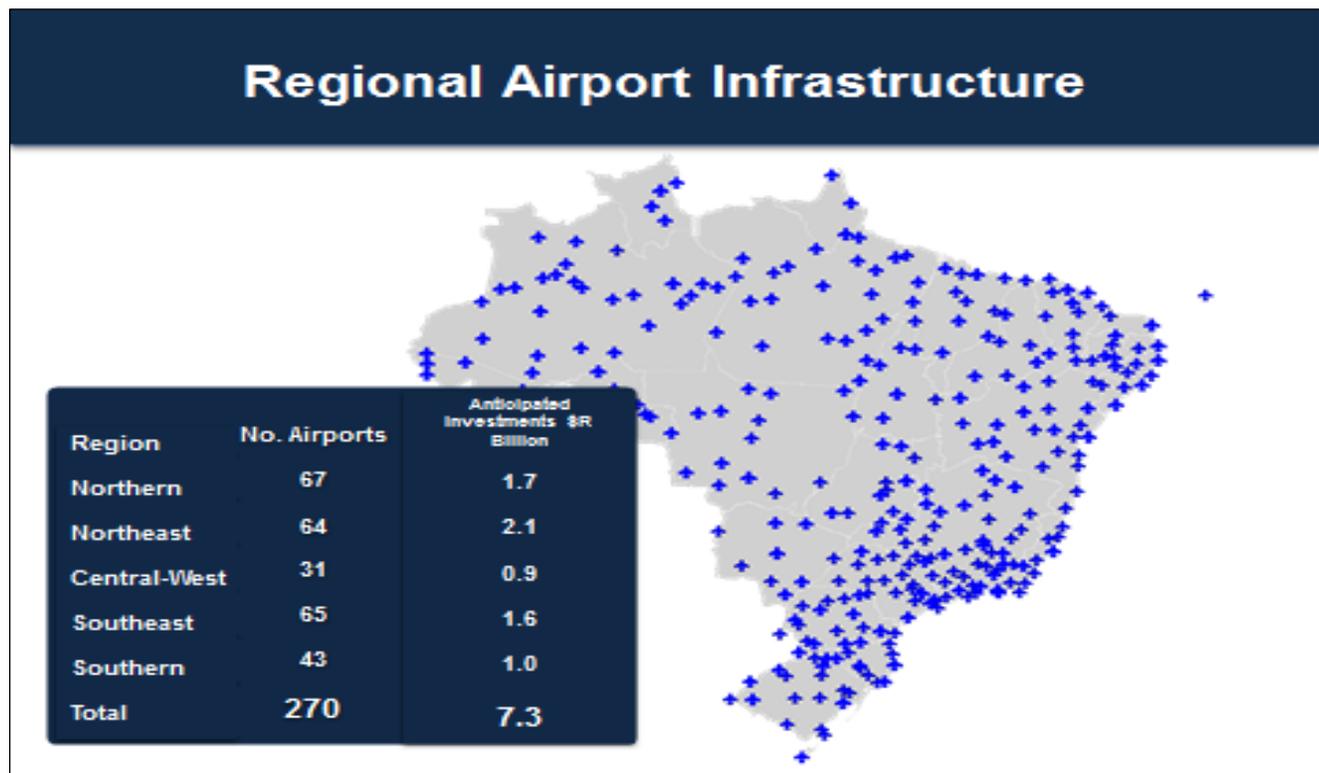
SAC is currently in the second phase of the process, project viability analysis, for all airports previously selected. Before the end of 2016, SAC will move on to the preliminary engineering phase for airports that represent viable opportunities for upgrades and potential concessions.

The FNAC Fund receives its revenues from airport tariffs and concession contracts from major airports across the country. The FNAC likely has a substantial amount of funds on the order of \$2.5 billion, as revenues are collected by the Ministry of Finance, however, the funds have not yet been released by the Government. SAC currently is awaiting the Ministry of Finance's release of funds in order to support the PDAR.

Once SAC reaches an agreement with a state or municipality, these Governments can announce the public tender for their respective airport projects. The type of upgrades expected at each airport varies; some require rehabilitation of terminals and runways, while others require construction of new terminals, runways, ATC towers, navigational aids (NAVAIDS), energy and central utility systems and terminal systems. SAC expects to roll out the actual authorization for the regional airports in phases and as funding becomes available from the FNAC.

The Brazilian states that have been most engaged in this process are Sao Paulo, Goias, Bahia, Ceara, Rio de Janeiro and Minas Gerais. Additionally, the Government has announced that it will ease the restrictions for operators of private airfields. Private airfields will now be allowed to collect landing fees from executive aircraft and air taxis, and they can invest in and operate certain commercial facilities such as shops and restaurants. This liberalization is expected to stimulate further investments in both new private airfields and the modernization of existing ones.

Figure 18 – Regional Airport Development Program (In Brazilian Reales)



Contacts

For more information on the PDAR, please reach out to one of the project contacts below.

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2.7 Brazil Aviation Overview and Regulatory Framework

Brazil has 2,463 airports registered by the national airports authority, National Agency of Civil Aviation (ANAC - Agencia Nacional de Aviacao Civil). Of those, 1,806 operate privately and 657 operate publically. The main commercial airlines are Azul, GOL Airlines and TAM Airlines (recently merged with LAN to form the LATAM Group). These airlines provide service to major cities across Brazil. Over the last ten years, the market has grown more competitive, driving down the cost of air travel. According to ANAC, more than five million passengers traveled between the U.S. and Brazil in 2014, making Brazil one of the top ten international destinations for travel to and from the United States.

The Brazilian regulatory agencies oversee concessionaires and their provision of public services. In addition to monitoring service quality, the regulatory agencies administer the development of concession programs and contracts, the establishment of aviation standards and the imposition of penalties.

The Secretariat of Civil Aviation (SAC) organizes the operation and development of all civil aviation activities. Composed of aviation authorities and institutions, SAC's goal is to support both military and

civil aeronautical and aviation activities in Brazil. SAC draws from several funds such as the National Civil Aviation Fund (FNAC) which allocates and distributes resources within the civil aviation system, and the Federal Program for Airport Assistance (PROFAA) which promotes flight safety and passenger comfort.

As a key agency within SAC, ANAC is responsible for regulating the security and safety of aircraft. It has authority on monitoring, licensing, concessioning and operations of aerodromes and airports. Also under SAC's purview, Infraero provides infrastructure, airport and air navigation services. Infraero is also charged with developing a list of airport improvement projects on an annual basis as part of the agency's Airport Infrastructure Investment Plan. The investment plan is approved by SAC and the Ministry of Finance as part of the national budget.

ACKNOWLEDGEMENTS

The author of this guide would like to express its appreciation to the staff of USDA's Latin American and Caribbean Region, including Mr. Nathan Younge, Ms. Gabrielle Mandel, Ms. Isabel Sepulveda, and Mr. Rodrigo Mota, the staff from the U.S. State Department, Ms. Lindsey M. Zuluaga and Mr. Francisco Sadeck, the staff from the U.S. Commercial Service, Mr. Andrew Gately, Ms. Ebe Raso, and Mr. Genard H. Burity, as well as Mr. Joao R. Silva, from the Federal Aviation Administration for their outstanding support and valuable contributions during the development of this resource guide.

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