

# THE EVOLUTION OF CIVIL AVIATION IN BRAZIL: RIO DE JANEIRO INTERNATIONAL AIRPORT GALEÃO/TOM JOBIM

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## Abstract

In 2019 Civil aviation in Brazil completed 83 years of existence. The first civil airport built in Brazil was the Santos Dumont Airport (SDU), in 1936, when Rio de Janeiro was the capital of the Republic. In the 1950s, a new airport was built to accommodate technological changes, new requirements for international flights: Galeão International Airport (IATA GIG, later renamed Rio de Janeiro International Airport Galeão/Tom Jobim, to honor one famous Brazilian musician). This article investigated the GIG Airport, with the objective to discuss the evolution of civil aviation in Brazil. This research investigated all the N=597 Brazilian civil airports, and the n=10 busiest airports in Brazil, comparing with the ten busiest airports worldwide, through descriptive case study, which unit of analysis is the Tom Jobim Airport (GIG). Data were collected through archival research on government database and analyzed through content analysis. Key findings pointed out ten main airports in Brazil, in which passenger flow reached near 147 million people in 2018. Also, findings pointed approximately 14 million passengers transported from GIG to 21 national and 16 international destinations. Reformed to welcome the Olympics 2016, GIG suffers from loss of competitiveness to other destinations and airports. Analysis pointed out the need for improving the quality of services within the Brazilian airport network. Discussion and future research compile the present work.

**Keywords:** Aviation, Civil transportation, Galeão, Tom Jobim, International Airport, Brazil

## Introduction

This single case study investigated the Rio de Janeiro International Airport Galeão/Tom Jobim (IATA: GIG), located in Rio de Janeiro, Brazil, as the unit of analysis [1].

This research was undertaken to deepen the understanding of civil aviation in Brazil, through the investigation of the ten most essential airports in Brazil, highlighting Tom Jobim International Airport, hereafter only GIG [2].

Civil aviation in Brazil started in 1936, when the first civil aviation airport was inaugurated, after two years of civil construction. Santos Dumont Airport (SDU) is located in the Guanabara Bay embankment built for this purpose, on 2.7 million m<sup>3</sup> of sand and rocks, occupying 370,000 m<sup>2</sup> area. When SDU was built, Rio de Janeiro was the capital of the Republic. SDU is 2 km away from Rio de Janeiro financial center (Galeão or Tom Jobim International Airport is 20 km away from the financial center) [3].

Inaugurated with one 700 m-runway, currently counts with two runways, from 1,323 m and 1,260 m, respectively, with a 19,000 m<sup>2</sup> passenger terminal, with eight embark gates, as illustrated in the following Figure 1:



**Figure 1:** Santos Dumont Airport. Air view. Source: Infraero, 2019.

Tom Jobim Airport was initially named Galeão Airport, created in 1920 for military aviation. Civil aviation only took off in 1945, when Galeão was officially classified as International Airport, destined to service larger and modern aircraft. However, Galeão did not have a passenger terminal, built only in 1952. Since 1920s to date, Brazilian airport network

expanded to current 597 airports, with diversified forms of operations, such as (i) federal, (ii) state, (iii) municipal concessions, (iv) private, (v) air force and (vi) army airports, as illustrated in the following Table 1:

Table 1: Airport Network in Brazil, per state. Source: Infraero, 2019

State	Federal	State	Municipal	Concession	Private	FAB (Air Force)	Brazilian Army	Total
Acre	2	0	9	0	0	0	0	11
Alagoas	1	0	4	0	0	0	0	5
Amapa	1	0	4	0	0	0	0	5
AmaZonas	3	3	6	0	0	0	0	9
Bahila	2	0	1	5	0	0	0	11
Ceara	1	0	24	1	0	0	0	26
DF (Capital)	0	0	0	1	0	0	0	1
Espirito Santo	1	0	6	0	0	0	0	7
Goia's	1	0	25	0	0	0	0	26
Maranhao	4	0	30	0	0	0	0	34
Mato Grosso	1	0	40	0	0	0	0	41
Mato Grosso do Sul	3	0	20	0	0	0	0	23
Minas Gerais	7	0	36	4	0	0	0	47
Para	6	0	22	0	0	0	0	28
Paraiba	2	0	13	0	0	0	0	15
Parana	4	0	39	0	4	0	0	47
Pernambuco	3	0	10	0	0	0	0	13
Piaui	2	0	8	0	0	0	0	10
Rio de Janeiro	4	0	10	2	2	3	0	21
Riop Grande do Norte	0	0	7	0	1	0	0	8
Rio Grande do Sul	4	0	65	0	0	0	0	69
Rondonia	1	3	5	0	0	0	0	9
Roraima	2	0	7	0	0	0	0	9
Santa Catarina	3	0	17	4	1	0	0	25
Sao Paulo	3	21	30	8	10	3	1	75
Sergipo	2	0	2	0	0	0	0	4
Tocantins	2	0	15	0	0	0	0	17
<b>Total</b>	<b>65</b>	<b>27</b>	<b>455</b>	<b>25</b>	<b>18</b>	<b>6</b>	<b>1</b>	<b>596</b>

Observe in Table 1 that São Paulo state has the highest airport network in Brazil. However, Rio de Janeiro state has the most important airport for international flights, GIG. Santos Dumont Airport (SDU), once the most important airport in Brazil, currently is restricted to regional flights. Congon has Airport (CGH – regional flights), Guarulhos International Airport (GRU) are the two airports with the highest number of passengers transported [3].

Recent research has attracted scholar attention on civil aviation and aircraft manufacturer industry [5]-[6], and other industries, such as mining industry [7]; craft beer industry [8]-[9]; streaming video industry [10], among others. In this article, the importance of GIG to the Brazilian civil aviation has been examined, after 83 years of existence. The next section presents the methods and limitations of the present research.

### Methods and limitations

The present study is qualitative research, cross-sectional, inductive reasoning, compiled of multiple methods, including descriptive, single case study, in which unit of analysis is the GIG Airport, in Rio de Janeiro, Brazil [1].

Currently in Brazil, there are 597 airports (See Table 1), from which seven are military (1.2 percent), and N=590 are civil airports (98.8 percent). This research is limited to the Brazilian civil aviation [15]. Out of the N=590 civil airports, n=10 busiest ones were investigated, from which GIG, the fourth busiest airport in Brazil is the unit of analysis (See Figure 2), of this descriptive single case study [1]. Moreover, the N=10 busiest airports worldwide (See Figure 1), were investigated to provide a comparison and to portrait the Brazilian civil aviation in passenger transportation within the international scenario.

Data were collected through archival research on Infraero and other Brazilian Federal government databases [15], and further analyzed through content analysis. The sample under investigation (N=590 civil airports) encompasses: (i) federal; (ii) municipal; (iii) state; (iv) concessions, and (iv) private civil airports (See Table 1). In this regard, the unit of analysis [1], Rio de Janeiro International Airport Galeão – Tom Jobim(GIG), is ranked as a concession airport. The concession was granted by the Brazilian Federal Government in 2013 to the winner of a public auction, RIOGaleão consortium, from 2014 to 2039 (See Section 4.4).

This study is limited to the following: (i) passenger transportation. Cargo transportation and other activities such as parking lot administration (in 2015, a parking lot for 2,700 vehicles was inaugurated at GIG in 2015), shopping center, for instance, are not investigated in the present study [4]. Finally, this study is also limited to the Brazilian civil aviation legislation and the IATA’s international standards [2].

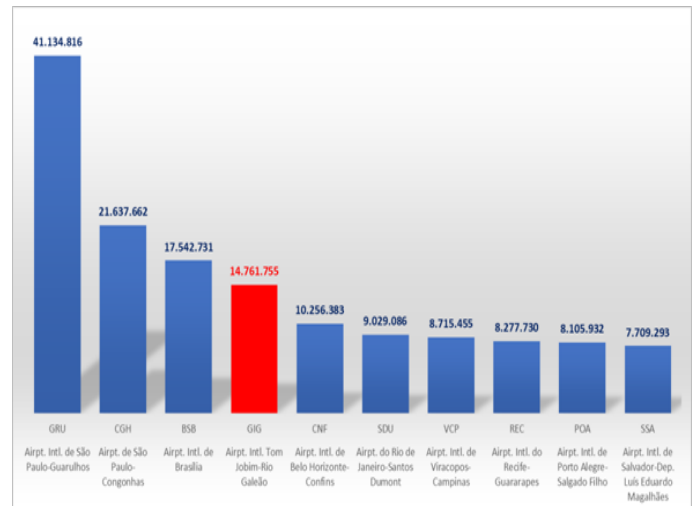
**Air transport: worldwide vs. Brazil**

Figure 1 illustrates the ten most prominent civil transportation airport network worldwide:

#	Airport	Location	Code (IA TA/ICA o	Passenger/ Year
USA	Atlanta Airport International	Atlanta, Georgia, USA	ATL/KATL	104 171 935
China	Beijing Airport International	Pequim, China	PEK/ZBAA	94 393 454
UEA	Dubai Airport International	Dubai,UEA	DXB/OMDB	83 654 250
USA	Airport International de Los Angeles	Los Angeles, USA	LAX/KLAX	80 921 527
Japan	Airport International Haneda	Toquio, Japan	HND/RJTT	79 699 762
USA	O'Hare Airport International	Chicago,USA	ORD/KORD	78 327 479
UK	Heathrow Airport International	Hillingdon, UK	LHR/EGLL	75 715 474
China	Hong Kong Airport International	Hong Kong, China	HKG/VHHH	70 314 462
China	Pudong Airport International	Shanghai, China	PVG/ZSPD	66 002 414
France	Charles de Gaulle Airport International	Paris, France	CDG/LFPG	65 933 145

**Figure 2:** worldwide passenger transportation per airport. Source: IATA, 2019

Observe in Figure 2 that Atlanta International Airport (ATL). While GIG transported approximately 14.7 million passengers in 2018 (see figure 3), ATL transported 7.5 times more passengers than GIG in the same period. Figure 3 illustrates the ten busiest Brazilian airports regarding civil transportation, as follows:



**Figure 3:** Brazilian busiest airports. Source: Infraero, 2019 [15]

Observe that GIG is the fourth busiest airport in Brazil (see Figure 2), while Guarulhos (GRU - São Paulo state) International airport has the highest number of civil transportations within Brazil (approximately 41.1 million passengers), almost three times more passengers transported than GIG (14.7 million passengers). SDU is the sixth busiest airport, with approximately nine million passengers transported in 2018. Since April 21, 1961, Brasilia Federal District is the capital of the Republic. Thus, Brasilia International Airport became the third airport in Brazil, surpassing Rio de Janeiro’s airports (both GIG and SDU, in passenger transportation volume), as depicted in Figure 3.

**Background**

**Galeão Air base (1923-1952)**

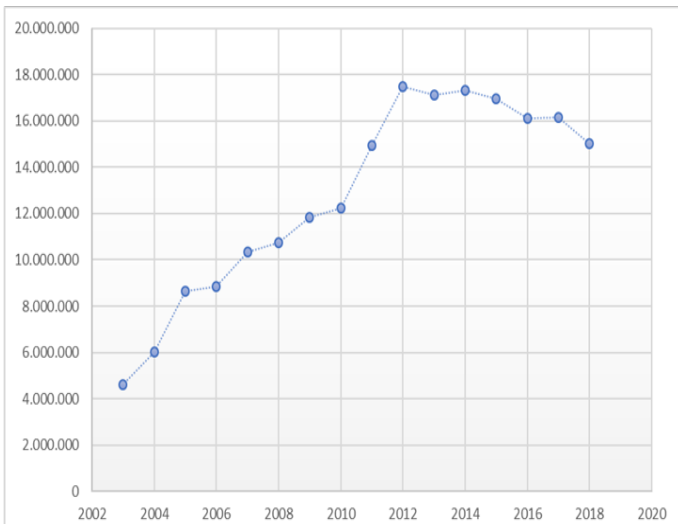
Galeão Airport was initially created for military purposes in 1923. Galeão Air Base, as known at that time, was assigned to accommodate Navy Post Aviation services, in 1935. From 1935 to 1946, Galeão had not a single passenger terminal [17].

**Galeão Airport (1952-1999)**

Six years later, on February 5, 1952, Galeão Airport was inaugurated as a civil airport, with one terminal [17], named TPS-5. This terminal was substituted by Terminal 1 on January 20, 1977. Until 1969, Galeão Airport was controlled by the Federal Government. In 1970, Rio de Janeiro S.A. Airports (ARSA) was established as a State-Owned Company (SOE), with share capital linked to the Ministry of Aeronautics for the administration of Rio de Janeiro International Airport. [17]. In 1972, the Brazilian Airport Infrastructure Company (INFRAERO) was created, as a public company, also linked to the Ministry of Aeronautics, which became the new airport administrator from 1987 until April 2, 2014, when concessionaire RIOGaleão won a bidding contest, and acquired Rio de Janeiro International Airport, from public company Infraero for the next 25 years (2014-2039).

**Rio de Janeiro International Airport Galeão – Tom Jobim (1999 to date)**

In 1999, Galeão International Airport was renamed Rio de Janeiro International Airport Galeão – Tom Jobim (*Aeroporto Internacional do Rio de Janeiro Galeão/Tom Jobim*, in Portuguese) through Law 9.778, from January 5, 1999 [16], to honor the Brazilian singer, master and *Bossa Nova* composer, Antonio Carlos Jobim, or Tom Jobim, one of the greatest Brazilian musicians, deceased in 1995. Figure 4 depicts the passenger transportation volume at GIG, from 2002 to 2018:



**Figure 4:** GIG passenger transportation volume (2002-2018). Source: Infraero, 2019

Observe in Figure 3 that transportation passenger rate decreased from 2012 to date. The current GIG transportation capacity is 30 million passengers per year [4]. In 1999, Terminal 2 (TPS-2) was inaugurated. Current view of Terminal 2 is shown in the following Figure 5:

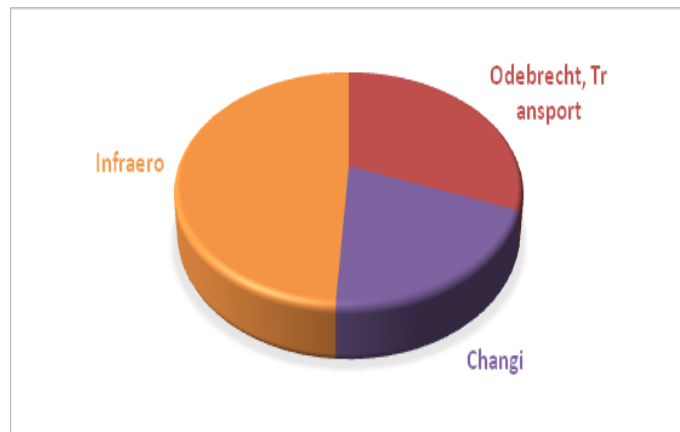


**Figure 5:** Terminal 2 (GIG). Source: author's picture.

**RIO Galeão Concessionary (2014-2039)**

Brazilian government held a public auction on November 22, 2013, to a winner consortium, RIOGaleão. The minimum bid was set at BRL 4.8 billion (approximately \$1 billion), which was surpassed with 293 percent premium, by BRL19 billion (approximately \$5 billion) bid to operate the airport for 25 years, from 2014 to 2039.

The winner consortium is composed of the Airports do Future consortium (formed by Odebrecht and Transport), with 60 percent participation on RioGaleão concessionary, plus the Singaporean Changi International Airport with 40 percent of the remaining 51 percent. Infraero (SOE) kept 49 percent of the total, as illustrated in Figure 6:



**Figure 6:** RioGaleão consortium (2014-2039). Source: RioGaleão, 2019.[4]

As part of the concession collateral, Rio Galeão should extend the parking lot in 1,850 lots, until 2018. On January 25, 2016, the new parking lot was delivered with 2,700 new lots (45 percent above the contract), in total 7,000 parking lots.

**GIG Passenger infrastructure**

GIG currently occupies 18.8 million m<sup>2</sup> airport site, the largest airport in Brazil in total area. Currently, GIG operates with two terminals.

**Terminal 1 (TPS-1):** opened on January 20, 1977, is the oldest of the two Tom Jobim passenger terminals in operation today, partially in operation today, due to civil construction and reforms. Terminal 1 holds 102 check-in positions, four baggage claim belts on international arrivals, five belts on domestic arrivals, and twelve inspection points. Terminal 1 has 22 positions with Finger [4].

**Terminal 2 (TPS-2) and Pier South:** Terminal 2 (TPS-2) started operations in 1999 (see Figure 4), thus the newest of the two passenger terminals at GIG. However, in 2012, Terminal started building a new expansion named Pier South, designed to accommodate international flights, with 26 new boarding bridges, in a 100,000 m<sup>2</sup> area (see Figure 7), opened on May 19, 2016.

The Pier South currently operates most of the international lines such as: (i) Aerolíneas Argentinas, (ii) Air Canada, (iii) Air France, (iv) Alitalia, (v) American Airlines, (vi) Avianca, (vii) British Airways, (viii) Condor Flugdienst, (ix) Copa Airlines, (x) Edelweiss Air, (xi) Emirates, (xii) Emirates Airlines, (xiii) Iberia, (xiv) KLM, (xv) LATAM, (xvi) Lufthansa, (xvii) Passaredo, (xviii) Royal Air Maroc, (xix) TAAG and (xx) United Airlines.

Terminal 2 and Pier South are equipped with 174 check-in positions, six baggage claim belts on international arrivals, and six additional domestic flight belts, as well as 24 inspection points. Terminal 2 has 23 positions with Finger [5].

Figures 7 and 8 illustrate terminals 1 and 2, and South Pier (connected to Terminal 2), as follows:



**Figure 7:** GIG terminals 1 and 2. Source: Infraero, 2019. Reprinted under permission.

Observe in Figure 7 domestic flights in the bottom, and international companies landed in front of the picture.

**Runways:** GIG has two runways: The largest one (track 10/28), is 4,000 meters long and 45 meters wide, made of concrete; the second (track 15/33), is 3,180 meters long and 47 m wide, made of asphalt pavement (see Figure 8) [4].

The runways are equipped with Instrument Land Systems (ILS) ILS allows landing for instruments when the visual flight is not possible due to bad weather.

Category 1 to runway 15/33, and category 2 to track 10/28. In comparison to SDU, GIG's runways are twice the size of SDU's runways, which are not equipped with ILS system. Therefore, SDU only operates in the visual mode for landings and take-offs [4]. The following Figure 7 illustrates GIG's runways:



**Figure 8:** GIG's runways and terminals (airview). Source: Infraero, 2019. Reprinted under permission.

**Aircraft capacity:** GIG holds currently 214 aircraft positions plus two helicopter positions [4], with 45 finger positions in both terminals 1 and 2, plus 39 positions with Finger on South Pier, and additional 65 positions without Finger (remote area), on the three terminals and another 65 positions on the cargo terminal [4].

## Discussion

Civil aviation in Brazil started when the first civil aviation airport in Brazil, Santos Dumont Airport (SDU), was inaugurated in 1936. Rio de Janeiro was the center of gravity for political decisions Rio de Janeiro was the first Republican capital, from 1889 to 1961.

In 1961, the capital was moved to Brasília (Federal District). Therefore, in the first half of the XX Century, SDU Airport was the reference for civil aviation in Brazil. However, after WWII, aviation technology evolves tremendously, and intercontinental flight activities, demanding bigger aircraft, increased civil aviation transportation. In turn, demanding larger runways for landings and take-offs.

Unfortunately, SDU cannot support runway expansions due to its geographical location, surrounded by the Guanabara Bay (see Figure 1). Therefore, longer runways should be used. For this purpose, Galeão airport was adapted from military uses to civil aviation: both SDU and GIG have two runways. However, GIG's runways are four times longer than SDU's, more suitable for the technological demands from the second half of the XX Century to date.

Therefore, in the 1950s, GIG gradually received ever-increasing civil transportation operations. Nevertheless, on February 2, 1957, Brasília airport (BSB) was inaugurated, to accommodate the capital transfer, concluded on April 21, 1961, when Brasília became the capital of the Republic officially (to date).

In the 1960s, both airports in Rio de Janeiro gradually have lost their status, given the political center of gravity has been moved to Brasília. To date, Brasília International Airport (BSB) is the third busiest airport in Brazil, over passing GIG (the fourth – see Figure 3). Santos Dumont Airport (SDU), once international airport operates today only for domestic flights (sixth busiest airport in Brazil – see Figure 3).

Moreover, if in the political scenario, Brasília became the political center in Brazil, São Paulo became the Brazilian economic center in the second half of the XX Century, and São Paulo airports (GRU and CGH) over passed GIG and SDU, respectively in the volume of passenger transportation (see Figure 3).

Despite the decreasing importance of Rio de Janeiro regarding the political and economic scenarios, Rio de Janeiro is still the most visited destination for tourism in Brazil, due to its privileged location and outstanding landscapes. It explains why GIG airport is still the airport with the highest number of international flights.

However, nor the World Cup 2014, neither the Olympics 2016, which was disputed solely in Rio, were capable of bringing more passengers to GIG Airport, which has been losing passengers and flights since 2015 (see Figure 4), where several flights were transferred to other states, such as São Paulo, Brasília, Belo Horizonte, Campinas, and Fortaleza, due to increasing civil transportation activities of such destinations.

Once the most critical airport in Brazil, today, GIG is only the fourth most important in Brazil, behind Guarulhos (GRU), Congonhas (CGH), and Brasília (BSB), as illustrated in Figure 3.

## Future research and implications

One significant implication of this research regards the distance from GIG to the financial center of the city (20 km away), in which normal traffic days takes approximately one-hour traffic jam. In this regard, SDU is only 2 km away from the financial center and tourist attractions. To minimize problems due to its location, in 2016 Rio de Janeiro government inaugurated the BRT system (Bus Rapid Transit), designed to interconnect Rio de Janeiro key locations by bus, creating dedicated corridors for public transportation.

Regarding the GIG, the trans-west corridor (Corredor Transoeste) was designed to connect Barra da Tijuca and Galeão, integrating the Alvorada Terminal, trans-Olympic, trains, subway line, trans-Brazil, and Tom Jobim International Airport. In the current operation, it has 39 km and 44 stations. Despite these solutions, BRT proved not to be as efficient as predicted. There are complaints of the users, because BRT takes too long to transport, has too many stops, and infrequent buses. Therefore, alternative ways of transportation should be investigated for future research, such as subway or Light Rail Vehicles (LRS), extended from Center Rio to GIG airport [13]-[14], for instance.

Future research is also encouraged on the investigation of possible causes for decreasing activity in the number of passengers transported in GIG Airport, such as tourism, recent cases of violence, or other causes to be appreciated in future studies.

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