

INDUSTRY INSIGHTS

Aviation Briefing

Prepared by ICF International for ALTA

2016 Edition 2



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Quarterly Aviation Briefing

2016 Edition 2

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BOEING 787 -9 MARKET OVERVIEW

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Launched in April 2004 as the 7E7, the Boeing 787 family initially comprised three models: the high-capacity, short-range 787-3, medium-capacity, long range 787-8, and high-capacity, longer-range 787-9. Orders for the 787-3 version, designed with the Japanese domestic market in mind, were limited and in 2010, all were converted to the 787-8 variant. Boeing subsequently launched the higher capacity 787-10 during the 2013 Paris Air Show, restoring the current family offering to three variants.

The 787 was a radical departure from traditional commercial transport aircraft in terms of materials and systems architecture. Composites comprise about 50% of the primary structure of the 787, including wing spars and floor beams, and reduce weight by approximately 20% compared to conventional airframe designs.

The 787 features a no-bleed electrical system as opposed to the pneumatic systems found on current generation commercial jetliners and provides a number of benefits including weight savings, improved engine efficiency and reduced maintenance costs. Operators of the 787 have a choice of two new-technology engines, the General Electric GENx 1B and the Rolls-Royce Trent 1000 series both delivering significantly improved fuel consumption and reduced noise and emissions.

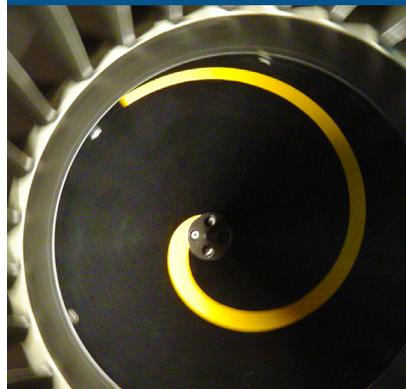
Relative to the baseline 787-8, the stretched 787-9 seats 250-290 passengers in a three-class configuration and, with increased maximum take-off weight (“MTOW”) and fuel capacity, has an enhanced range of up to 8,500 nautical miles. It allows airlines, such as launch customer Air New Zealand, to open new long haul routes as a replacement for the Boeing 777-200ER and the Airbus A340-300/-500.

The 787-9 has sold well since entering service in 2014 with about 128 in service and about 470 on firm order backlog. In Latin America, LAN Airlines operates 12 aircraft and has nine on order for delivery in 2017, while AeroMexico holds nine orders for delivery in 2016, 2017 and 2018. LAN Airlines has chosen the Rolls-Royce Trent 1000 engine to power its fleet while AeroMexico has selected the General Electric GENx 1B70.

The 787-9 is positioned in the small twin-aisle market segment – an active sector that has shown consistent demand as airlines value the flexibility and efficiency these aircraft provide in operation. However, competition in this segment is fierce with the A350-900 (some 29 in service and 596 on firm order backlog), A330-200/300 (nearly 1,170 in service and about 396 on order including the new-technology neo variant) and 767-300ER (about 440 in service) all challenging the 787-9.

With its large fleet and firm order backlog, ICF expects demand, values and lease rates for the 787-9 to continue to be firm, especially if traffic demand maintains its current robust level. Over the longer term, residual value retention for the 787-9 is expected to be above average.

**LAN AIRLINES HAS CHOSEN
THE ROLLS-ROYCE TRENT
1000 ENGINE TO POWER ITS
FLEET WHILE AEROMEXICO
HAS SELECTED THE GENERAL
ELECTRIC GENX 1B70**



REPORT FROM HAVANA

By Elizabeth Jaedicke and Jared Harckham

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It's been widely reported that Cuba is undergoing significant change, with the aviation and tourism sectors both driving the change and benefiting from it. Cuba, always a tourist draw, has big plans to modernize and expand its tourism infrastructure.

Recently, the authors represented ICF at the United Nations World Tourism Organization (UNWTO) seminar on Tourism and Culture in Havana. The event was not long after the visit paid by U.S. President Obama to Cuba and the preceding announcements about expanded air service between the countries. Since that time, the U.S. has announced the designation of six of its airlines to serve nine provincial cities in Cuba as well as 20 daily frequencies to Havana operated by 8 U.S. airlines. In addition to the beginning of nonstop scheduled service between Cuba and the U.S, American cruise ships have started stopping at Havana as well. In fact, during the week the authors were in Havana, the first U.S. cruise ship operated by Fathom (part of Carnival) from Miami arrived in Havana.

The conference made it possible for ICF to chat with high-level representatives of Empresa Cubana de Aeropuertos y Servicios Aeronáuticos (ECASA), Cuba's national airport authority, and flag carrier Cubana, who shared the status of their organizations. Air service is being expanded between the countries but will not be fully normalized since the new air service is only by U.S. carriers, with the Cuban carrier, Cubana, on the sidelines. Lawsuits related to the U.S. economic embargo of Cuba are pending and they could result in Cubana's aircraft being impounded if they landed in the United States. Cubana management would like to modernize its fleet but finds it difficult to lease aircraft due to the U.S. embargo and its long reach to companies around the world. Meanwhile, the airline's management is working to merge the operations of Cuban regional carrier Aero Caribbean with that of Cubana to create an integrated carrier, that can offer coordinated flight schedules, fares and seamless operations.

Cubana is one of the world's oldest airlines, dating to 1929 and is an IATA IOSA certified carrier. As of July 2016, Cubana serves 13 destinations within Cuba and 14 international destinations. Cubana's domestic and international seats have been increasing over the last five years.

ARRIVALS FOR PERSONAL PURPOSES IN CUB (THOUSANDS)



Source: Oficina Nacional de Estadística e Información, República de Cuba

JULY DEPARTING SEATS FROM HAV BY CU



Many of the new U.S.-Cuba scheduled flights will result in the cancelation of the charter flight programs that have been operating from U.S. gateways to Cuba. Accordingly, not all markets are expecting immediate net increases in traffic. ECASA is, however, expecting more traffic in Havana and has a plan to expand and modernize HAV's Terminal 3. Charter flights from the U.S. have operated at Terminal 2, which is crowded and lacking in customary amenities. When the T3 work is complete, ECASA expects that most U.S. flights will operate there, with just the overflow at the older terminal.

New flights from the United States, cruises from the U.S., and a renewed Cuban emphasis on tourism from the global market are the reasons for a dramatic increase in tourism infrastructure planned for Cuba. In recent years Cuba has invested in the meticulous restoration of historical buildings (particularly in Old Havana), entertainment venues and classic hotels in Havana and in the development of plans for world-class beach resorts around the country. The recent National Plan for Economic and Social Development revealed in April 2016 includes plans to build over 100,000 hotel rooms in Cuba over the next 15 years. Along with tourism infrastructure growth, service levels and foreign-language skills have improved

appreciably in recent years. However, Internet access remains spotty and frustrating for foreign visitors.

Finally, an anecdote may be illustrative of the changes taking place in Cuban tourism. During the UNWTO conference visit, your authors ventured out to lunch at one of Havana's privately-owned restaurants, Café Laurent, located in a former apartment on the top floor of a building looking out at Havana, the U.S. Embassy and the Caribbean. Food and service at the restaurant were delightful, and the other diners were a mix of international and Cuban business people and diplomats. During lunch a team of people arrived at the restaurant asking diners to sign waivers to be in a documentary that would be filmed in the restaurant momentarily. The subject of the film were the media-seeking Kardashian family and Kanye West, who were accompanied by film crew, staff and nannies while they ate lunch. This group was visiting Havana to film episodes of their reality television show Keeping Up with the Kardashians. These visitors and other celebrities in town for the Chanel fashion show arrived at Havana's private aviation terminal. Quite a change from revolutionary Havana.

A DRAMATIC INCREASE IN TOURISM INFRASTRUCTURE PLANNED FOR CUBA



INDUSTRY INSIGHTS – LATIN AMERICA

by Eric Toler and Cindy Chin

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Introduction

Remarkable growth of carriers in Latin America over the past decade has driven structural changes for the Latin American airline industry. These structural shifts have altered the playing field while ushering the region's carriers into the world spotlight as truly global brands. As their international presence continues to expand, Latin American airlines have begun to reap the benefits of continued consolidation, driving both larger profit margins and greater consumer choice.

The global industry has entered a new era of unprecedented profitability, and Latin American carriers are no exception, despite major headwinds in the region. Carriers continue to develop despite challenging economic conditions in many countries, a sign of the truly robust nature of the industry.

While GDP growth and financial innovation have undoubtedly played a role, evolutions in management have driven a large part of this industry transformation into the financial juggernaut it is today. The fractionated nature of the region is a relic of the past, as carriers continue to effectively consolidate both their tangible and intangible assets, benefitting shareholders, employees, and customers throughout the region and the world.



The region has seen regulatory advancements, such as ICAO and SAM's SRVSOP program, but there remains much to do by governments to improve industry support.

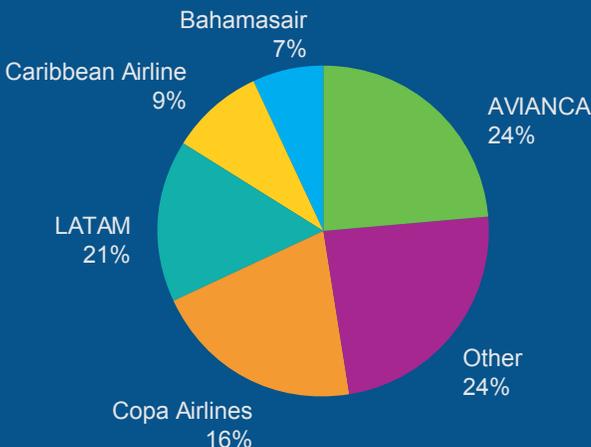
International Emergence

Long-Haul markets served by carriers in the region have grown, facilitated by larger consolidated brands as well as increased partnerships with global airlines. The five largest airlines now operate over 75% of long-haul markets, as opposed to just under 50% a decade earlier.

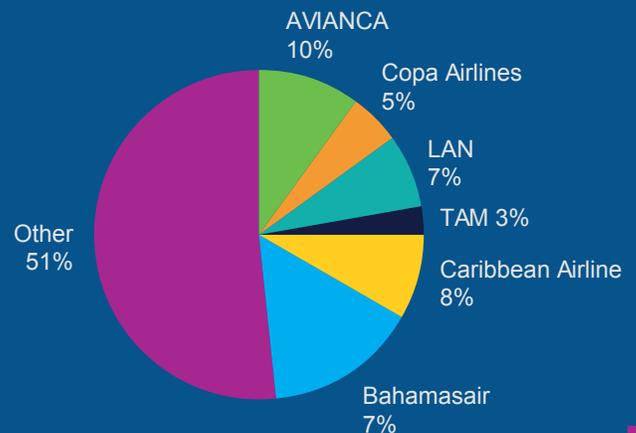
Rapidly growing traffic flows from other regions of the world, most notably The United States, Canada, and European nations have driven this growth. As the Latin American market continues to emerge, these international flows should grow to rival the intra-South American market.

The integration of Latin American airlines into global alliances has only bolstered this trend and these partnerships will maintain this trend into the future.

SHARE OF FREQUENCY BY AIRLINE (YE MAY 2016)



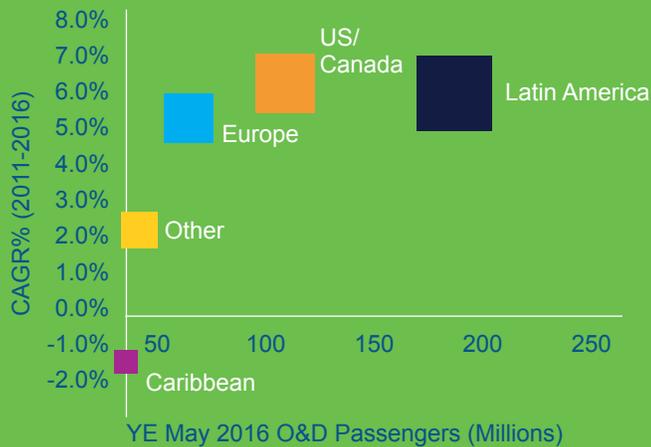
SHARE OF FREQUENCY BY AIRLINE (YE MAY 2006)



Global Footprint

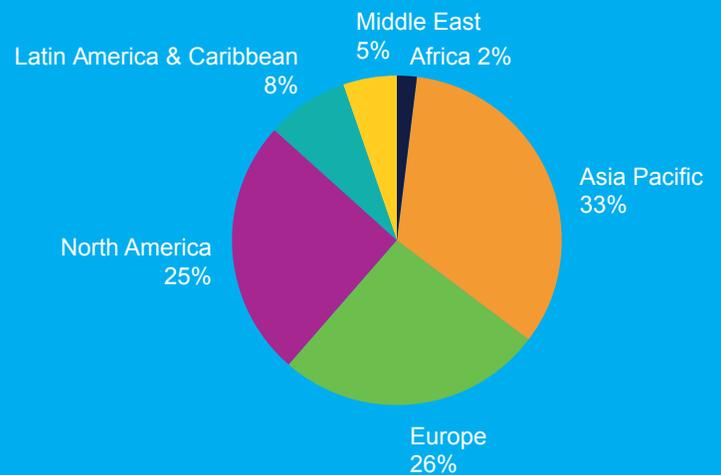
While no region in the world can match the exploding market of East Asia, Latin America maintains large potential growth rates in international traffic, consistent with other emerging markets. Latin America and The Caribbean boasts approximately an 8% share of global traffic, with a projected annual growth rate of 4.7%. This is higher than the mature markets of North America and Europe.

LATIN AMERICA/CARIBBEAN TRAFFIC FLOWS AT REGIONAL LEVEL (11' – 16')



Source: IATA PaxIS, bi-directional total

SHARE OF GLOBAL PASSENGER TRAFFIC IN 2014



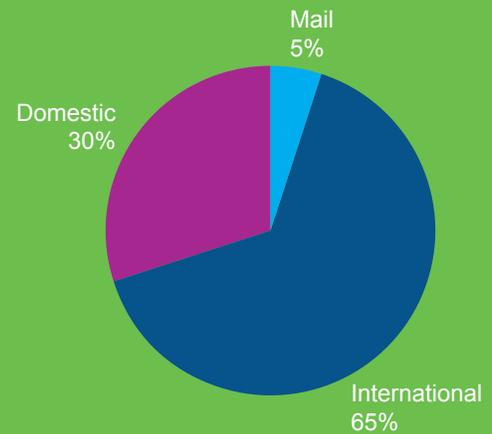
PROJECTED ANNUAL GROWTH RATE FOR INTERNATIONAL TRAFFIC 2014-2034



Cargo Impact

Despite a recent softening in the global cargo market, Latin American and Caribbean airlines shown large growth rates in their cargo volumes. International cargo has shown the most growth overall in the ten year period from 2004 to 2014, and shows the greatest potential for future growth.

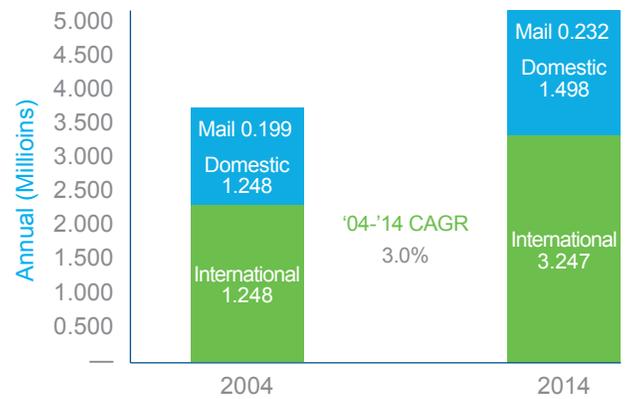
LATIN AMERICA/CARIBBEAN AIR FREIGHT 2014



Source: Airport Council International



LATIN AMERICAN CARGO GROWTH 2004-2014



Source: Airport Council International

Airline Accidents

As the emergence of Latin American and Caribbean airlines continues, an improving safety record has helped add legitimacy and credibility to the international image of the region's carriers. The region has shown a complete improvement from ten years ago, with total crashes and fatalities down 39% and 79% respectively.

Source: Bureau of Aircraft Accidents Archives

Employment in Air Transport

In 2014, The Air Transport Industry in Latin America and The Caribbean generated:

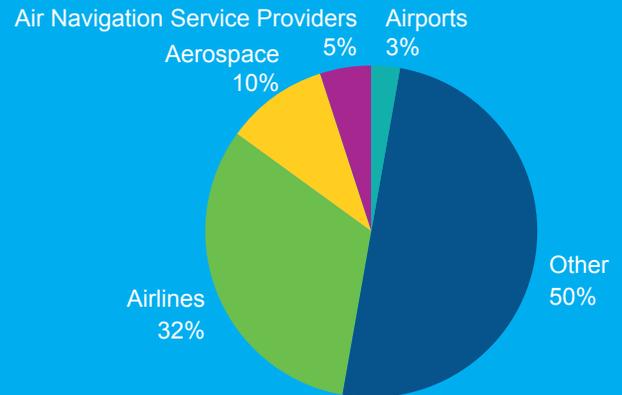
- 255.8 million passengers
- 2,599,944 flights
- 326.8 billion RPKs
- 370 commercial airports
- 2,036 aircraft in service
- 29 navigation providers
- 78% average regional load factor

JOBS AND GDP GENERATED BY AIR TRANSPORT IN 2014



Source: ATAG Aviation Benefits Beyond Borders July 2016

SHARE OF DIRECT JOBS GENERATED BY AIR TRANSPORT



Source: ATAG Aviation Benefits Beyond Borders July 2016



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For more than 50 years, ICF International (formerly ICF SH&E) has been serving the air transportation industry. ICF provides trusted aviation and aerospace expertise to airlines, airports, governments, international agencies, manufacturers, and financial institutions.

ICF's core aerospace capabilities include strategy and network planning, forecasting, operations, and logistics; revenue management; asset management and appraisals, supply chain and maintenance management, safety, and security and regulatory compliance; financial due diligence; and privatization, alliances, mergers, acquisitions, and alliances. For airports, ICF is a leader in air service development, demand forecasting, commercial planning, system and economic impact studies, sustainability, ground handling, and cargo operations. In addition to aviation, ICF is a leader in the energy, environment and transportation industries, public safety and defense, health, social programs, and consumer and financial business. This breadth of expertise further enhances the wealth of knowledge and experience available to its aviation clientele.

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