RAAC/18-WP/08
04/02/25

International Civil Aviation Organization
ICAO South American Regional Office
Eighteenth Meeting of the Civil Aviation Authorities of the SAM Region (RAAC/18)
(Sao Paulo, Brazil, 24- 26 February 2025)

Agenda Item 3: Environment

ROUTE TO SUSTAINABILITY IN LATIN AMERICA AND THE CARIBBEAN

(Presented by Latin American and Caribbean Air Transport Association - ALTA)

SUMMARY

This paper describes both the current state of aviation in the region and the necessary steps and associated costs to achieve decarbonization goals. The transition to sustainable aviation in Latin America and the Caribbean is a challenge that requires a multidisciplinary approach to reduce CO2 emissions without compromising the accessibility of air transport.

References:

- **Report,** "Route to sustainability in Latin America and the Caribbean." **https://alta.aero/wp-content/uploads/2025/01/Route-to-Sustainability-in-LATAM-and-Caribbean.pdf**

***ICAO Strategic Objectives*:**	*Environmental Protection*

1. Introduction

1.1 Air transport penetration in the region remains low compared to other areas of the world, indicating considerable growth potential. Aviation contributes significantly to GDP and employment in the region, but faces significant sustainability challenges. Therefore, sustainable aviation growth in Latin America and the Caribbean (LAC) should be highlighted for its importance to regional connectivity, tourism, business and cargo transportation.

2. Discussion

2.1 **Climate change and its consequences for the airline industry:** The aviation industry faces the challenge of advancing decarbonization while climate change is causing an increase in the frequency and severity of extreme weather events. These events affect airport infrastructure, flight operations and increase operating costs.

2.2 **Airline Industry Emissions and the Latin American Context:** Although global air traffic has increased 14-fold since 1970, CO2 emissions from aviation have increased by less than 1% due to technological advances and improvements in fuel efficiency. Of the 2.5% of global CO_2 emissions from aviation, only 4.8% are attributable to the region's airlines accumulated between 2013 and 2023. Brazil and Mexico are the main emitters in the region. Emissions from the aviation sector in LAC are projected to grow by 0.9% annually between 2024 and 2050, with a 32% increase compared to 2023 levels.

2.2.1 **Decarbonization Strategies in aviation:** The aviation industry faces the significant challenge of achieving net zero emissions by 2050. The Waypoint 2050 Document, developed by the Air Transport Action Group (ATAG), sets out a detailed vision and possible scenarios for achieving this goal. Below are the key strategies and decarbonization scenarios outlined in the report:

Operational and Infrastructure Improvements: Route optimization and improvements in air traffic management can reduce emissions and can be implemented quickly. It is important to note that many of these measures do not depend on industry but on governments and other stakeholders.

Carbon Reduction and Offset Measures Outside the Sector: In the short term, carbon offsets are presented as a complementary measure while technologies and SAF are being developed. In the long term, carbon capture and storage will be essential to achieve net zero emissions.

Technological Innovation: Modernizing the fleet reduces fuel consumption by up to 20%. This is achieved with more efficient aircraft, advanced engines and lighter materials. Electric, hybrid and hydrogen propulsion are expected to play a crucial role, especially on short- and medium-range flights.

Sustainable Aviation Fuels (SAF): SAF can reduce CO_2 emissions by up to 80% compared to conventional fuel. It is estimated that between 330 and 445 million tons of SAF will be needed annually by 2050. SAF can come from a variety of sources, including non-food crops, waste, fuels produced from recycled CO_2 and low-carbon electricity.

Regulatory Measures: It is necessary to design incentives that encourage investment in sustainable technologies, such as subsidies, tax credits and preferential financing for innovation projects in alternative fuels.

Similarly, three decarbonization scenarios are presented with different levels of adoption of sustainable technologies and fuels, each with its costs and benefits:

- **Scenario IS1:** Includes incremental improvements in operational efficiency and limited use of SAF.

- **Scenario IS2:** Introduces advanced concept aircraft and increased use of SAF.

- **Scenario IS3:** Focuses on radical innovations such as hydrogen-powered aircraft and massive adoption of clean technologies.

2.3 **Costs of achieving decarbonization**

- **Investments Needed:** According to the Waypoint 2050 report by ATAG and ICAO's LTAG analysis, the global costs of transitioning to net-zero aviation are broken down into key categories:

  - **Costs for Aircraft Operators:** Global Investment in Waypoint 2050 Scenario S2: Up to $5.3 trillion from 2020 to 2050. Global Investment in ICAO LTAG Scenario IS3: Up to $4 trillion from 2020 to 2050. Global Annual Average: $170 billion (Waypoint 2050) and $130 billion (ICAO LTAG).

- **Investments by Suppliers (OEMs and Fuel Providers):** Global Investment in Waypoint 2050 Scenario S2: Up to $1.45 trillion from 2020 to 2050. Global Investment in ICAO LTAG Scenario IS3: Up to $3.6 trillion from 2020 to 2050.
- **Other Costs or Investments:** Includes non-recurring costs for OEMs (investments in new aircraft programs), government research and development investments, airport-related costs (hydrogen operations and infrastructure), and expenses for air navigation service providers (ANSPs) to implement operational measures.

- **Proportional Costs for Latin America and the Caribbean**: Assuming Latin America and the Caribbean (LAC) accounts for approximately 6% of global air traffic, it is estimated that the proportional costs for the region will be:
  - **Cost Proportional to the Global Cost of Waypoint 2050 (S2):** US$318 billion from 2020 to 2050.
  - **Cost Proportional to the Global Cost of ICAO LTAG (IS3):** US$240 billion from 2020 to 2050.
  - **Proportional Annual Average:** US$10.2 billion (Waypoint 2050) and US$7.8 billion (ICAO LTAG).

- **Additional Challenges:** The lack of infrastructure in the region significantly raises the costs of SAF implementation. In addition, investment in machinery and technology tends to be higher due to the need to import advanced technology and high tax rates in several countries in the region.

2.4 **Impact on airline ticket prices:** Efficiency improvements and competition are expected to keep prices affordable. A multiple linear regression model shows that additional operating costs due to decarbonization could translate into airfare increases, especially in markets where airlines can pass these costs on to passengers.

3. **Suggested action**

3.1 The Meeting is invited to:

a) **Fostering multiple paths to decarbonization:** The region's abundance of natural resources positions it favourably to lead global SAF production. Fostering the development of new technologies, such as electric or hybrid aircraft, and implementing market mechanisms like carbon offsets are crucial to addressing emissions that cannot be eliminated through other means. Develop a regional roadmap as a pathway for LAC emissions reductions that includes quantifiable targets, assessment of scenarios aligned with LTAG, and government support.

b) **Establish a regulatory framework with clear and consistent goals**: The transition to sustainable aviation in Latin America requires a robust regulatory framework that provides legal certainty and encourages long-term investment. Public policies must be consistent and aligned with global commitments to reducing greenhouse gas emissions. Governments should promote the creation of carbon schemes that include the certification of carbon credits. These credits should be part of a broader approach that enables airlines to effectively offset their emissions while supporting the development of new technologies and scaling SAF production. Instead of imposing mandates that could raise costs, public policies should incorporate incentives to make the adoption of these technologies more economically viable.

c) **Ensuring Sustainable Growth to Enhance Regional Competitiveness:** The development of SAF in the region presents a significant opportunity to generate employment and stimulate economic growth across the supply chain.

d) **Collaborative Investment Funds:** Establish investment funds through collaboration among airlines, airports, investors, lessors, aircraft and engine manufacturers, and large companies committed to emissions reduction.

e) **Infrastructure Investment:** Encourage long-term infrastructure investments for SAF production, storage, and distribution across Latin America. This includes pilot projects that ensure SAF certification for eligibility under CORSIA, allowing airlines to claim emissions reductions effectively.

f) **Create a Favorable Regulatory Environment:** Create regulations that streamline investments, accelerated permitting, tax incentives and clear legal frameworks that reduce uncertainty for investors. Facilitate the export and import of SAF and related technologies through trade agreements.

g) **Support Innovation in Feedstocks:** Establish programs to support the production, research, and development of new SAF feedstocks that are abundant and sustainable in the region. Examples include agricultural and forestry residues. This should include subsidies for farmers and improvements to logistics infrastructure.

h) **Renewable Energy Integration:** Increase the use of renewable energy in SAF production processes. Incorporating low-carbon electricity will reduce energy costs and emissions associated with SAF production, further enhancing its economic and environmental viability.

These actions seek not only to reduce aviation emissions in LAC, but also to improve the competitiveness and accessibility of air transport in the region, ensuring sustainable growth and long-term socioeconomic benefits.

- END -