



COMMITTEE ON AVIATION ENVIRONMENTAL PROTECTION (CAEP)

EIGHTH MEETING

Montréal, 1 to 12 February 2010

Agenda Item 2: Review of technical proposals relating to aircraft engine emissions

CREATION OF AN AIRE-LIKE PARTNERSHIP TO FOCUS ON MAIN TRAFFIC FLOWS AND REDUCE EMISSIONS BETWEEN EUROPE AND LATIN AMERICA

(Presented by Spain, Italy, United Kingdom, Netherlands and the European Commission)

SUMMARY

This paper presents the European interest in encouraging the development of activities to reduce the environmental impact of aviation at international level and to broaden and extend the experience and benefits from ongoing initiatives such as AIRE and ASPIRE to other world regions such as the Europe - South America (EUR/SAM) oceanic routing areas (South Atlantic routes), than the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) and the Asia Pacific Initiative to Reduce Emissions (ASPIRE) and with a further perspective to cover the entire trans-Atlantic area.

Action by the CAEP is paragraph 6.

1. INTRODUCTION

1.1 ICAO has emphasized that States should remain committed, to work in managing emissions from international civil aviation in order to achieve an environmentally sustainable air transport industry. This objective requires a combination of measures including operational ones, and in particular ATM improvements as described in Chapter 6 of ICAO guidance *Operational Opportunities to Minimize Fuel Use and Reduce Emissions* (Circ 303).

1.2 The Civil Air Navigation Services Organization (CANSO) environmental key goal for international ATM system is to increase airspace efficiency to 96% by 2050.

¹ Spanish provided by Spain, Italy, United Kingdom, Netherlands and the European Commission

1.3 SESAR, together with NextGen, is being developed in the context of the ICAO's Global ATM Operational Concept, which provides guidelines to States and industry for the improvement of ATM.

1.4 Solid cooperation between the NextGen programme and SESAR is already taking place in this context. A good example is the implementation of the joint initiative AIRE (Atlantic Interoperability Initiative to Reduce Emissions), a programme designed to improve energy efficiency and lower engine emissions and aircraft noise in the North Atlantic airspace. The SESAR Joint Undertaking is responsible for its management from the European side. The participants include ANSPs, airlines and manufacturers from European Union Member States and the United States and concrete demonstration flights have been conducted with results being validated.

1.5 Another illustration of international cooperation held in this context, is the Asia and Pacific Initiative to Reduce Emissions (ASPIRE), a partnership of air navigation service providers and the FAA, focused on the reduction of the impact of aviation on the environment through the improvement of ATM in the region.

2. BACKGROUND: AIRE AND ASPIRE PARTNERSHIPS

2.1 The Phase I AIRE oceanic flight demonstrations in the North Atlantic, took place from 19 - 28 May 2008. The demonstrations were conducted using eight Air Europa revenue flights. These flights took off from Madrid (Spain) and flew through Santa Maria, New York, and Miami oceanic airspace to destinations in the Caribbean region. During the flights, Air Europa's Airline Operation Center (AOC), New York's Air Route Traffic Control Center (ARTCC), and Santa Maria Center (Portugal) used existing technologies to improve trajectories during the oceanic flights.

2.2 From June to October 2009, the Phase II AIRE demonstrations have validated the environmental advantages of the new procedures tested on the preliminary Phase I. As reported by Air Europa after testing 117 revenue flights from Madrid to the Caribbean region and from Tenerife to Miami, fuel savings increased during the tests period, as the acquired procedures augmented experience, obtaining an average fuel saving of 760 kg fuel/flight (2,2%) during October 2009 flights, on the oceanic phase only.

2.3 The use of CPDLC (*Controller Pilot Data Link Communications*) and ADS-C (*Automatic Dependant Surveillance*) has played an essential role on the development of these tests. Action was taken over three main parameters: a) Horizontal adjustments: Shorter random routes. b) Vertical optimum profiles. c) Speed changes.

2.4 In addition to AIRE, between September 2008 and November 2008, the ASPIRE Partners (in the Pacific Ocean) collaborated with airlines and industry on a series of three test flights, designed to demonstrate the potential fuel and emissions savings from the harmonization of existing green procedures and technologies. Those test demonstrated combined savings of around 3.5% for the en-route phase. Potential emissions reductions higher than 10 % per flight are expected to be achieved.

3. CURRENT SITUATION: SOUTH-ATLANTIC ROUTES

3.1 Commercial aviation in the South Atlantic (EUR/SAM) airspace is characterized primarily by modern jet passenger and freight aircraft flying distances on average longer than 4000

nautical miles and with durations of eight hours or more. The oceanic en route area covered has lower traffic density in the Southern part and higher density in Northern part.

3.2 The airspace characteristics mentioned above, are similar to those of the Asia Pacific Region airspace, consequently the results of the ASPIRE partnership initiatives can be valuable references to study and implement similar programmes in the Europe - South America routes.

3.3 The FIRs involved in the EUR/SAM routes are: Canarias, Casablanca, Sal Oceanic, Dakar Oceanic, Atlantico, Santa Maria and Recife. The use of CPDLC (*Controller Pilot Data Link Communications*) and ADS-C (*Automatic Dependant Surveillance*) is not yet available within the whole EUR/SAM routes.

3.4 Air traffic flow is constricted in the upper airspace to four airways (West to East: UN-741, UN-866, UN-873 and UN- 857) except in an additional RANDOM route 50 NM West of UN-741 currently used on flights between Madrid and Santiago de Chile.

3.5 Data from Aena (Spanish ATM and Airports organization) show that traffic in the EUR/SAM Corridor increased by 31,8% in the period 2004-2008 and estimate a high increase (over 60%) of traffic in those routes in the mid-term (2010-2015).

4. POSSIBLE IMPROVEMENTS IN SOUTH-ATLANTIC AIRSPACE AND RELATED BENEFITS

4.1 The collected data from the AIRE and ASPIRE flight tests demonstrates the environmental benefits of both programs and can help to accelerate the development of oceanic operational procedures and standards on the South Atlantic Ocean airspace.

4.2 The main ATM improvement opportunities would be linked to the certification of CPDLC and ADS-C in all FIRs routes and the possible addition of RANDOM routes in the area.

4.3 Implementation of an AIRE-like partnership focusing on main traffic flows between the Europe - South America (EUR/SAM) oceanic routing areas would increase the current efforts to integrate new technologies and procedures.

4.4 According to results from MECETA (the Spanish Model to Calculate Aviation Emissions), in 2008 there were 35.000 movements on this corridor with an estimated fuel consumption of 3.010.000 Tons of fuel.

4.5 Implementing programs that could offer a potential reduction of 6% of fuel burn on a gate to gate basis on oceanic South Atlantic flights, the potential economic and environmental benefits would be (based on 2008 traffic):

- Energy savings per year: 180.600 Tons of fuel.
- Emissions savings per year: 570.696 Tons of CO₂.
- Energy savings per flight: 5,16 Tons of fuel.

- Emissions savings per flight: 16,30 Tons of CO₂.

4.6 Improvement of Europe - South America (EUR/SAM) oceanic trajectories can present operational benefits in four areas: at congested airports, in the terminal area, en-route and oceanic. These benefits have the potential to deliver improvements in the short term.

4.7 Benefits listed in this paper are provisional. This project could be proposed as a pilot program to work in parallel with the future WG2 (Operations) task (see WP/44 appendix A) which will develop agreed global metrics and methods for demonstrating environmental benefits resulting from operations improvements. With robust metric and assessment methods provided by CAEP, this should facilitate the recognition and extension of the improvements implemented in South Atlantic airspace to other regions of the world.

4.8 In addition to the environmental focus, also safety relevant aspects could be addressed, such as in the ongoing OPTIMI project.

4.9 Such cooperation would not exclude a broadening of partnerships also in the North-Atlantic region, with the ultimate objective to maximise safety and to minimise the environmental impact of aviation on trans-Atlantic routes.

5. SUMMARY

5.1 Building on the success of the AIRE and ASPIRE Partnerships, the European Commission has placed a priority on establishing a similar initiative in the Europe - South America (EUR/SAM) oceanic routing areas (South Atlantic routes). A similar South Atlantic partnership would offer an opportunity to demonstrate possible ATM improvements to reduce carbon emissions from international aviation.

5.2 The availability of relevant aeronautical data presented to all airspace users in a functional format can highly contribute to reduce the aviation environmental footprint. An improvement of the aeronautical information management will help to meet the environmental expectations of the aviation stakeholders and ATM community, providing significant benefits on fuel efficiency and emissions reductions.

5.3 Some of these opportunities are currently being tested and implemented by the SESAR Joint Undertaking, the FAA and different service providers in other countries, and could be applied in a South Atlantic emissions reduction initiative and extended to other regions of the world.

5.4 Spain, Italy, United Kingdom, Netherlands and the European Commission, wishes to promote the partnership with other organizations, agencies or entities that may participate in the planning, development, and maintenance of measures to improve the South Atlantic oceanic routes, as something necessary to achieve the maximum environmental and operational benefits of potential emissions reductions programs.

6. **ACTION BY THE CAEP**

6.1 The CAEP is invited to:

- a) take note of the initiatives described in this paper and the potential benefits that could be achieved worldwide from the cooperation between countries and organizations in the ATM field and the deployment of ATM concepts and solutions which improve aviation efficiency and reduce fuel consumption and emissions; and
- b) acknowledge the need for collaboration and establishment of synergies between different countries and authorities to improve aviation efficiency, in particular by creating an AIRE-like partnership between Europe and Latin America to cover the south-Atlantic routes, and ultimately, in addition to the existing AIR initiative, the entire transatlantic area.

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