



Agenda Item 2: Review of Air Navigation Matters
2.2 Air Navigation specific activities:
2.2.1 Air Traffic Management (ATM)

**UPDATE ON ACTIVITIES OF THE ATLANTIC INTEROPERABILITY INITIATIVE TO
REDUCE EMISSIONS (AIRE)**

(Presented by the United States of America)

SUMMARY	
This paper presents information on the AIRE Partnership Phase II Oceanic Demonstration.	
Strategic Objectives	<i>This working paper is related to Strategic Objectives C and D.</i>

1. Introduction

1.1 Introduced in 2007, the AIRE Partnership is an international government, airline, and industry partner's initiative to minimize global aviation's environmental impact. The AIRE program is working to accelerate the development and implementation of oceanic procedures that result in environmentally friendly operations such as reduced emissions and noise. AIRE is working on efforts to integrate new technologies and procedures under NextGen and SESAR to achieve the following objectives:

- a) Hasten development of operational procedures to reduce aviation's environmental footprint for all phases of flight, from gate to gate;
- b) Accelerate incorporation and world wide interoperability of environmentally friendly procedures and standards;
- c) Capitalize on existing technology and best practices;
- d) Provide a systematic approach with short, medium and long-term initiatives; and,
- e) Validate improvements with flight trials and demonstrations.

1.2 The AIRE Partnership focus includes all flight segments, beginning with the departure gate and terminating when an aircraft arrives at its destination; hence, "Gate to Gate." AIRE focuses on the entire flight, with a "phased approach" to flight demonstration initiatives including:

- Increase operator efficiency
- Increased system precision and enhanced automation
- Reduce fuel burn
- Improve predictability

- Reduce greenhouse gas emissions (AIRE initiative)
- Increase oceanic traffic flow capacity

1.3 AIRE will conduct a structured flight demonstration program to explore the potential environmental benefits of new aviation technologies and improved operational procedures. Near and longer term outcomes are anticipated that will lead to implementation of proven technologies and procedures, and subsequently, shorter flight time averages, significant industry fuel savings, and commensurate engine emission reductions.

2. Discussion

2.1 Trans-Atlantic flight demonstrations, occurring from 19 – 28 May 2008, were made possible with the international partnership, collaboration, and commitment of the FAA, Nav Portugal, European Commission, and Air Europa Airlines. The Phase I AIRE Oceanic demonstrations were conducted using a selected number of Air Europa revenue flights. These flights took off from Madrid (Spain) and flew through Santa Maria, New York, and Miami oceanic airspace to various destinations in the Caribbean. During the flights, Air Europa's Airline Operation Center (AOC), New York's Air Route Traffic Control Center (ARTCC), and Santa Maria Center (Portugal) utilized existing oceanic technologies to periodically improve flight trajectories.

2.2 Starting in 2009, AIRE demonstrations will validate the environmental advantages of new procedures for all phases of flight, from engine start at the departure gate through taxi, take off and climb to cruise altitude, en-route to the destination, approach, landing and taxi to the arrival gate. The collected data from these flight tests will be used to determine the environmental benefits. The results of these demonstrations are envisioned to accelerate the development of oceanic operational procedures and standards on both sides of the Atlantic Ocean.

- a) Two of the Oceanic Initiatives that the FAA is rolling into the AIRE program are User Preferred Routes (UPR) and Oceanic Tailored Arrivals (OTA).
- b) UPRs got their start in the South Pacific.
 - Users choose optimum routes based on individual airframes to maximize the efficiency of the route at the time of flight planning
 - In December 2000, use of UPRs began between U.S. and the South Pacific, replacing the South Pacific Organized Track System (PACOTS) generated tracks in that region of the Oakland OCA/Flight Information Region (FIR).
 - In September 2007, operational use of UPRs began between Asia and New Zealand/Caledonia
 - UPR trials began in the Central East Pacific (CEP) in 2008 between:
 - o California and Hawaii;
 - o Sydney/Brisbane and Narita;
 - o California and Singapore.
 - Annual Savings
 - o Estimated (2008)
 - Los Angeles to Singapore up to 1,000,000 kg fuel or 3,160,000 kg of CO₂

- Australia to Japan up to 1,000,000 kg fuel or 3,160,000 kg of CO₂
 - New Zealand/Caledonia to Japan up to 1,090,000 kg fuel or 3,444,400 kg of CO₂
 - o Realized
 - Russian Trans East: 1,090,000 kg fuel or 3,410,000 kg CO₂
 - California-South Pacific: 1,272 kg fuel or 4,015 kg CO₂ savings/flight
 - Asia-New Zealand/Caledonia: 2,090,000 kg fuel or 6,540,000 kg CO₂
 - Asia-Hawaii: 2,270,000 kg fuel or 7,100,000 kg CO₂
 - RJAA-YSSY/YBBN/YBCG/YBCS 1,890,000 kg or 5,910,000 kg CO₂
 - o Total Savings
 - More than 7,340,000 kg fuel or 22,970,000 kg of CO₂
- c) Oceanic Tailored Arrivals (OTA)
- Customized optimal approach profile up-linked to an aircraft via FANS data link using the Advanced Technologies and Oceanic Procedures (ATOP) system to provide a fuel-efficient, low-noise descent profile
 - o December 2007: Trials began for Pacific Oceanic flights transitioning for San Francisco International Airport (SFO) arrivals
 - Projected savings of up to 800 pounds of fuel per flight on an approach
 - o September 2008: Miami Tailored Arrivals (TAs) Trials demonstrate and prove OTA concept in East Coast environment
 - o October 2008: Operational development of Los Angeles International Airport (LAX) OTAs began
 - Benefits to date
 - o Dec 2007 thru Dec 2008 aircraft participating in SFO trials collectively used 2,000,000 pounds less fuel and reduced carbon dioxide emissions by 6,000,000 pounds according to Boeing data
 - o On average Boeing 777s flying full TAs used 1,303 lbs less fuel
 - o On average Boeing 747s flying full TAs used 2,291 lbs less fuel

2.3 Phase II AIRE Oceanic demonstrations will provide metrics to quantify en route performance, identify changes in cruise efficiency, compare those changes to the reference oceanic baseline and to the cost of the user preferred trajectories.

2.4 The objectives of the Phase II AIRE Oceanic Demonstration are:

- a) Illustrate the emissions reductions that can be achieved when a limited set of flights are allowed to fly closer to their 4D User Preferred Trajectories (UPT); and,
- b) Show the feasibility of linking an oceanic trajectory to a Tailored Arrival procedure.

2.5 The FAA, NATS UK and Nav Portugal will collaborate on the Phase II AIRE Oceanic Demonstration. The demonstrations will be limited to candidate flights whose planned flight trajectories are mainly within the oceanic airspace controlled by New York (ZNY) and Santa Maria (LPPO) oceanic centers. The airline partners for this phase are American Airlines, Air France, Air Europa, Air Portugal and Lufthansa.

2.6 The following criteria are used to select candidate flights for the Phase II AIRE Oceanic Demonstration:

- a) The candidate flights must have the majority of their Oceanic flight plan operate within ZNY and LPPO oceanic airspace;
- b) The candidate flights will be limited to those by aircraft that are Automatic Dependent Surveillance-Contract (ADS-C) and Controller-Pilot Data Link communications (CPDLC) equipped, flown by crews trained and certified to use that equipment and logged on to the appropriate ATS Facility; and,
- c) The candidate flights will be limited to westbound flights that enter North Atlantic Oceanic airspace from within the LPPO CTA, and proceed directly into the ZNY CTA. (Eastbound flights may be considered for later phases of AIRE Oceanic Demonstrations.)

2.7 The Phase II AIRE Oceanic Demonstration will be conducted over the period from June 2009 through September 2009. During the demonstration period, the AIRE participant flights may also be able to request and receive Tailored Arrival clearances into Miami International (MIA).

2.8 The data collection on the candidate flights will end at the conclusion of the AIRE Oceanic Demonstration period (expected to be the end of September 2009); however, airlines may continue to use the procedures for flight optimization.

3. Conclusion

3.1 The E/CAR/WG is invited to note the information provided in this paper.