International Civil Aviation Organization 21/11/06
NORTH AMERICAN, CENTRAL AMERICAN AND CARIBBEAN OFFICE
Twentieth Meeting of Directors of Civil Aviation of the Eastern Caribbean (20th E/CAR DCA)
Miami, Florida, United States 4 to 7 December 2006

Agenda Item 7: Other business

ADVANCED TECHNOLOGIES AND OCEANIC PROCEDURES (ATOP) SYSTEM

Presented by the United States of America

SUMMARY

One of the major objectives of the United States is to provide improved oceanic air traffic control services. With the advent of Advanced Technologies and Oceanic Procedures and the establishment of Ocean 21 Systems in New York, Oakland and Anchorage the FAA is now able to better manage oceanic air traffic, reducing oceanic separation standards, and increasing the number of change requests granted thus significantly increasing capacity and efficiency in the oceanic environment. This IP contains a Power-Point briefing outlining ATOP's Ocean-21 System operational capabilities.

1. Introduction

1.1 The United States has developed an ATOP platform system (Ocean-21) that is a single, satellite based, integrated oceanic air traffic control system currently in use at all three FAA oceanic air traffic control centers. These centers combine common procedures, training and maintenance support. The system provides:

a) Integrated flight and radar data processing
b) Enhanced Conflict Probe to detect conflicts between aircraft
c) CPDLC, AIDC, and ADS surveillance capabilities
d) Automated procedures

2. Discussion

2.1 The **attached** power-point presentation provides information on the operational capabilities of the ATOP's Ocean-21 System in a complex oceanic traffic environment and the capability of this system to quickly and efficiently provide information to air traffic controllers to better serve the users.

3. Actions Suggested

3.1 The meeting is invited to take note of the information in this paper.

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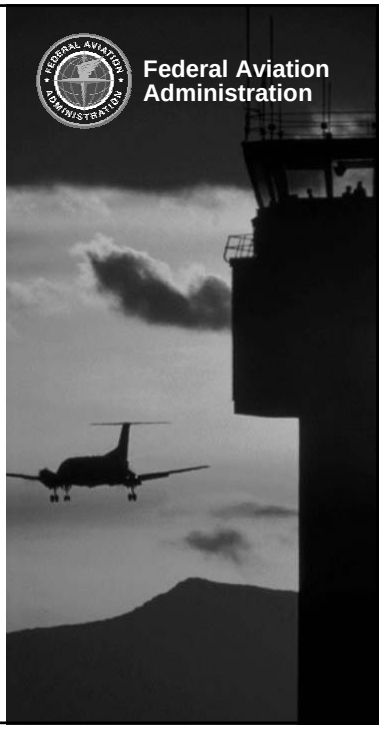
20th E/CAR DCA – IP/12

ATTACHMENT

Advanced Technologies and Oceanic Procedures (ATOP)



ICAO - 20th Meeting Eastern Caribbean Directors General of Civil Aviation (E/CAR DGCA)

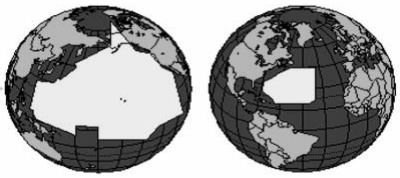
Presented by: **Luis A. Ramirez, Director**
ATO EnRoute & Oceanic
Safety and Operations Support

Date: **December 2006**

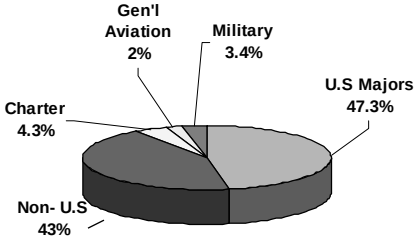
The Oceanic Environment

Unique Airspace with Complex Separation Standards and Coordination Rules

- **International Civil Aviation Organization (ICAO) delegated 24M sq miles of international oceanic airspace to the US**



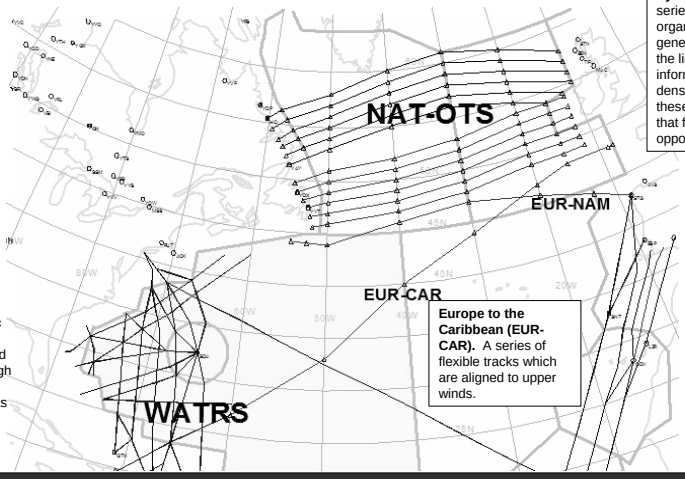
Oceanic User Community



Facility	Controllers	Miles of Airspace	Flights per day
New York (ZNY)	100	3.3M sq miles	500
Oakland (ZOA)	90	18.6M sq miles	600
Anchorage (ZAN)	45	2.75M sq miles	200

Atlantic Operations

4 main traffic flows affect US Atlantic oceanic operations, controlled from New York Center:



NAT Organized Track System (OTS). A series of highly organized tracks generated twice daily in the light of wind information. The density of traffic on these tracks is such that few crossing opportunities exist.

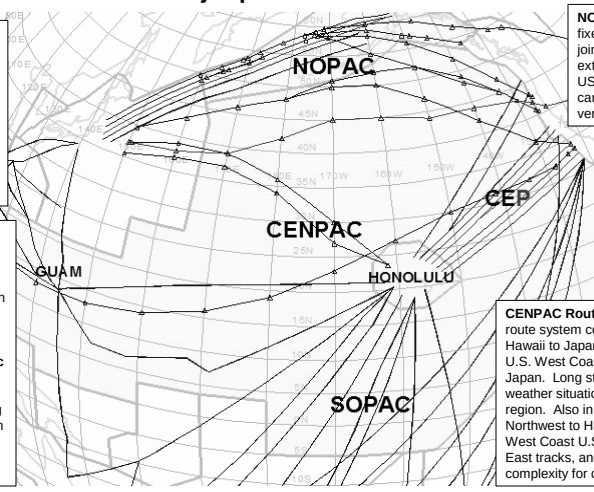
Europe to North America (EUR-NAM). Random tracks are used which can become more complex due to the random nature of the crossing tracks.

Europe to the Caribbean (EUR-CAR). A series of flexible tracks which are aligned to upper winds.

Western Atlantic Route System (WATRS). A fixed set of tracks of high complexity which experiences peaks of high traffic density.

Pacific Operations

Operations in the Pacific are controlled from Anchorage and Oakland Centers. The major pacific traffic flows are:



NOPAC Route System. A series of fixed tracks and transition routes joining Alaska to Asia. Used extensively by aircraft from Eastern USA to the Far East, these routes can be particularly long and are thus very vulnerable to adverse winds.

Central East Pacific (CEP) Route System. A high-density route structure consisting of fixed uni- and bi-directional tracks joining Western USA to Hawaii.

CENPAC Route System. The Central Pacific route system consists of PACOTS traffic from Hawaii to Japan, Japan to Hawaii, Japan to the U.S. West Coast, and the U.S. West Coast to Japan. Long stage length tracks and complex weather situations characterize the CENPAC region. Also in this region, the Pacific Northwest to Hawaii fixed tracks cross the West Coast U.S. to Japan PACOTS and Far East tracks, and thereby create additional complexity for controllers.

Pacific Organized Track System (PACOTS). Flexible tracks generated twice daily, depending on winds, between North America and Hawaii to Asia and Australia. PACOTS exist in NOPAC, CENPAC and SOPAC regions.

Guam. An area of fixed tracks with a large number of crossing points. The PACOTS tracks also cross through this area, adding to the complexity.

Hawaii to South Pacific (SOPAC). A mixture of fixed and random tracks of great length, including the PACOTS tracks from Los Angeles and San Francisco to Auckland and Sydney.

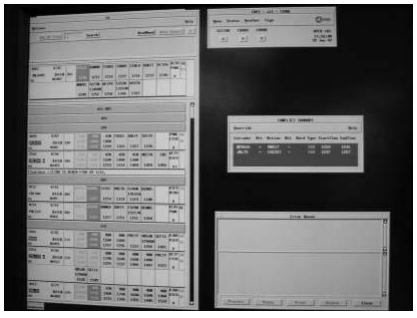
ATOP

ATOP is a single, satellite based, integrated oceanic system for all three oceanic air traffic control centers combining common procedures, training, maintenance and support.

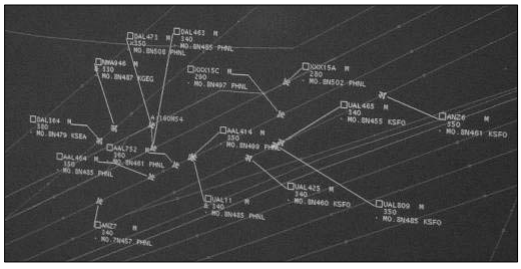
- **Fully integrates flight and radar data processing**
- **Enhance Conflict Probe to detect conflicts between aircraft**
- **Provides CPDLC, AIDC, and ADS surveillance capabilities**
- **Automates the manual processes used today**

Communications with ATOP

No longer reliant on HF voice



Electronic flight strips



Position reporting with ATOP

ATOP Operational Position

ATOP Site Status

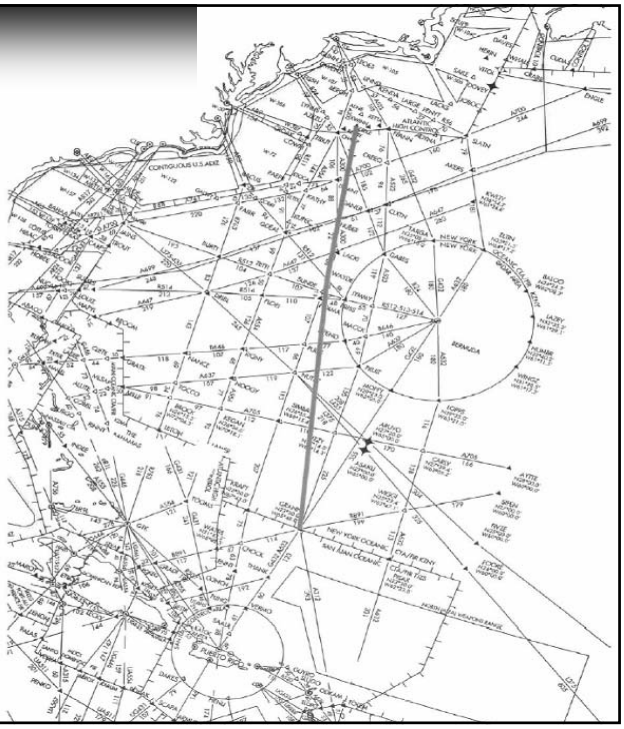
Oakland Center
- Began daily operational use in June 2004
- Achieved full 24/7 transition in October 2005

New York Center
- Began initial live operations in March 2005
- Achieved full 24/7 transition in June 2005

Anchorage Center
- Site testing ongoing
- Initial live operations March 2006

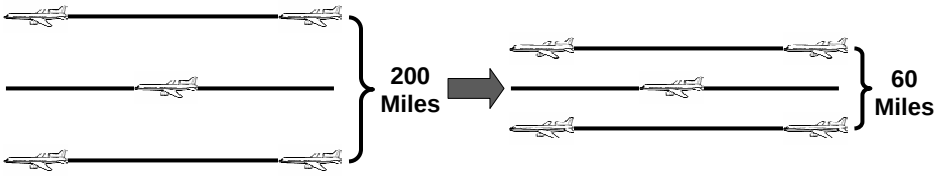
New Atlantic Routes

ATOP automation has allowed for the use of new routes from South America to New York as a test program, saving between 2000-4000 pounds of fuel per flight

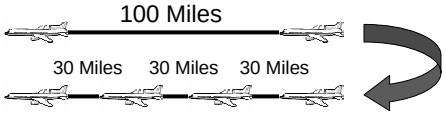


Reduced Separation Standards

Lateral Separation

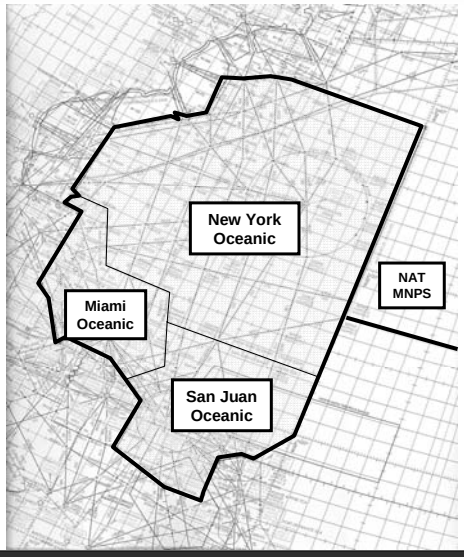


Longitudinal Separation



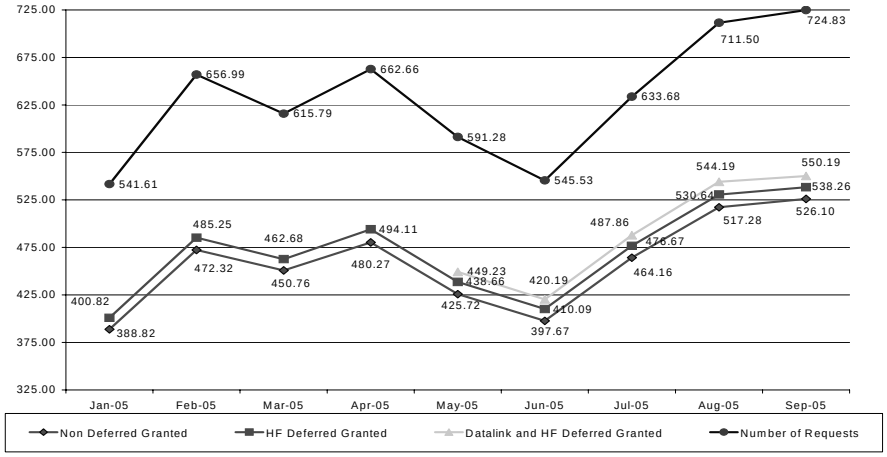
Aircraft separation in the South Pacific was reduced from 100 nautical miles lateral/10 minutes longitudinal to 30 nm lateral/30 nm longitudinal (equates to 4 minutes)

The OSRWG and the WATRS Plus Project



- **WATRS Plus Objectives**
- **Reduction of lateral separation from 90NM to 50NM between approved RNP10 aircraft (non-exclusionary)**
- **Redesign airspace to enable more efficient operation and enhance en-route capacity. 50-75% increase in route options**
- **Harmonize routes with those in the ICAO Caribbean (CAR) and South American (SAM) Regions**
- **Increased operational efficiency**
- **Savings to the users**

Number of Change Requests and Granted



90% more altitude change requests were granted at Oakland Center and New York Center in September 2005 vs. September 2004

Exploring Future Oceanic Technologies

- **ATOP, aligned with NGATS through our GATI activities, provides the infrastructure platform for:**
  - Full 4-D trajectory managed environment
  - System Wide Information Management (SWIM)
  - Waypoint Traffic Management
  - ADS-B Enroute procedures

ATOP is…

- **The most advanced procedural air traffic control system in the world**
- **The first system to utilize a dual channel architecture, providing critical 24/7 functionality even during maintenance activities**
- **On time and on budget**
- **Revolutionizing oceanic air traffic control**
- **Reestablishing the FAA as a world leader in the provision of air traffic control systems and services**

The Federal Aviation Administration

A 50,000 people-strong Global Aviation Authority with an unmatched safety record, modern systems and skilled implementation, utilizing new technologies to provide air navigation services to the world