



- Agenda Item 2: Review of Air Navigation Matters**
2.2 Air Navigation specific activities:
2.2.1 Air Traffic Management (ATM)
2.2.2 Communications, Navigation and Surveillance (CNS)

**SAN JUAN (ZSU) SECTOR 10 SURVEILLANCE AND COMMUNICATION
ENHANCEMENT PROJECT**

(Presented by the United States of America)

SUMMARY	
The purpose of this paper is to inform the group that the United States (U.S.) Federal Aviation Administration (FAA) is implementing measures to enhance radar and Advanced Technologies and Oceanic Procedures (ATOP)/Ocean21 System surveillance in ZSU Sector 10 airspace.	
Strategic Objectives	<i>This working paper is related to Strategic Objective D.</i>

1. Introduction

1.1 In September 2008, the U.S. FAA convened a task force to assess measures, issues and schedules for enhancing radar and ATOP Ocean21 surveillance in San Juan (ZSU) Sector 10 non-radar airspace and to take action to implement any changes deemed necessary. The U.S. FAA Air Traffic Organization (ATO), Oceanic and Offshore Operations Office (AJE-32) was assigned the responsibility to lead this effort.

1.2 ZSU Sector 10 airspace is non-radar airspace to the north and east of Puerto Rico. Refer to the **Appendix** for a general depiction of non-radar airspace in ZSU Sector 10.

2. Discussion

2.1 **Radar and VHF coverage enhancements influencing the project:** The following enhancements to radar and VHF/UHF coverage in ZSU Sector 10 airspace were implemented in November-December 2008 and were considered during the assessment of the project.

- a) Grand Turk radar coverage was expanded to 250NM in November 2008.

- b) Pico Del Este (Pico) radar and VHF coverage was expanded from 200 NM to 240 NM in December 2008. A flight check showed the radar provided coverage out to 250 NM at and above flight level 200. This is a significant expansion in that it places a number of crossing waypoints under radar surveillance and within the range of VHF communications.

2.2 **Ocean21 System Capabilities:** A key task in the project has been to determine the benefits that may be obtained by expanding use of the FAA Ocean21 system into ZSU Sector 10 airspace. The Ocean21 system has been operational in adjoining New York (ZNY) Oceanic airspace since June 2005. The Ocean21 system provides integrated communication, surveillance, and air traffic management. It gives oceanic air traffic controllers a set of automated decision support tools to assist in aircraft separation assurance, coordination, flight data management, and controller-pilot communication. The Ocean21 enhanced Air Traffic Service (ATS) automation system integrates the following elements:

- Automatic Dependant Surveillance-Contract (ADS-C) and conventional position reports
- System-maintained electronic flight data
- Controller-pilot datalink communication (CPDLC)
- Flight data message processing
- Automated inter-facility and intra-facility coordination
- Automated conflict prediction and resolution (CPAR)
- Graphic dynamic situation display to the controller and interactive electronic flight strips
- Aircraft labels and aircraft position symbols

2.3 Status of Work

2.3.1 The FAA Task force evaluated a three-phase plan for ZSU Sector 10 airspace. The following paragraphs provide a status on the phases considered.

- a) **Phase 1: Operational trials expanding use of Ocean21 Conflict Prediction and Resolution (CPAR) into ZSU Sector 10 airspace.** Since it took advantage of existing center capabilities, the FAA was able to implement Phase 1 during the week of February 23, 2009. New York Oceanic (ZNY) and ZSU implemented controller procedures to utilize CPAR capabilities in the portion of ZSU Sector 10 airspace now covered by CPAR. The procedures call for ZNY controllers to notify ZSU controllers when the CPAR alerts the ZNY controller of a potential conflict occurring in ZSU Sector 10 airspace.
- b) **Phase 2: Transfer control of ZSU Sector 10 airspace to ZNY.** Phase 2 will be implemented on October 22, 2009. In Phase 2, ZNY will take control of all ZSU Sector 10 airspace. In Phase 2, the full capabilities of Ocean21 will be used to provide enhanced surveillance of Sector 10 airspace. See paragraph 3 for a full discussion of Phase 2 benefits.

- c) **Phase 3: Explore enhancements that could be obtained by providing radar data feed and Remote Communications Air/Ground (RCAG) to the San Juan Combined Center Radar Approach Control (CERAP) from other ATS providers.** The FAA has also agreed to explore additional enhancements to safety and efficiency that may be obtained by providing radar data feed and RCAG to the San Juan CERAP from other ATS providers and is assessing the related costs, benefits, issues, and schedules.

2.4 **Safety and Efficiency Benefits Provided by Phase 2 Expanded ZNY Ocean21 CPAR Coverage and Transfer of ZSU Sector 10 Non-radar Airspace to ZNY Control.**

2.4.1 **Potential Safety Benefits Provided.** Expanding Ocean21 system coverage by transferring ZSU Sector 10 airspace to ZNY will provide the following safety benefits:

- a) **Conflict Prediction and Resolution (CPAR).** CPAR automatically evaluates aircraft flight profiles and alerts the controller when separation does not meet applicable minimum standards.
- b) **Conformance Monitoring of Position Reports.** Ocean21 compares cleared profile against reported profile and automatically trial probes Out of Conformance (OOC) reports.
- c) **Reduction of Coordination Errors between Facilities.** Ocean21 continually compares an aircraft's cleared profile to the coordinated profile and warns the controller when discrepancies are detected, thereby reducing coordination errors between facilities.
- d) **Enhanced Surveillance and Communication for Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC) Equipped Aircraft.** Ocean21 provides enhanced surveillance and communication to aircraft equipped with ADS-C and CPDLC. As the number of ADS-C and CPDLC-equipped aircraft increases, Ocean21 will provide route conformance monitoring and faster ATC communications for more flights.
- e) **Faster response to aircraft requests made on HF.** Ocean21 provides automatic processing of HF messages, thereby enabling a faster response time to aircraft requests made on HF.

2.4.2 **Potential Efficiency Benefits Provided.** The FAA Task Force believes that expanding Ocean21 system coverage by transferring ZSU Sector 10 airspace to ZNY can provide the following efficiency benefits:

- a) **Operational consolidation of separation and ATC to a single facility.** Non-radar services will be provided by a single facility (ZNY) utilizing a single operating system (i.e., Ocean21). This will:
 - 1) Reduce aircraft re-routes and altitude changes generated by inter-facility coordination, thereby reducing fuel burn and associated carbon emissions.

- 2) Assist in maintaining operational currency and completing refresher training requirements.
- b) **Workload reduction by elimination of HF message processing by ZSU and ARINC.** Expansion of Ocean21 surveillance in ZSU Sector 10 non-radar airspace could eliminate in excess of 275 HF messages that are currently processed daily between ZSU and ARINC.
- c) **Provision of radar separation to ZNY airspace boundary.** Incorporation of non-radar airspace into Ocean21 will allow ZSU to use specific radar rules (i.e., the 15-degree divergence rule) to clear aircraft to their requested altitude sooner.
- d) **Profiled climb and descent clearances into and out of St Maarten (TNCM) and Antigua (TAPA).** Ocean21 will enhance the availability of profiled climbs and descents to/from TNCM and TAPA, thereby reducing fuel burn and carbon emissions.
- e) **Ability to support future separation reduction initiatives.** Incorporation of ZSU Sector 10 airspace in Ocean21 will allow future application of reduced separation standards (i.e., 50 NM longitudinal, 30 NM lateral and longitudinal).

2.5 Aeronautical Chart and Caribbean / South American (CAR/SAM) Air Navigation Plan (ANP) Revision

2.5.1 The aeronautical chart changes for Phase 2 were published in the FAA National Flight Data Digest on 24 August 2009. The changes to the CAR/SAM ANP have been submitted to the ICAO Mexico City Office.

3. Conclusion

3.1 The meeting is invited to note that in February 2009, the U.S. FAA implemented Phase 1 and on October 22 2009, is implementing Phase 2 of its plan to enhance safety and efficiency in ZSU Sector 10 by expanding ZNY Ocean21 system coverage. In addition, in Phase 3, the FAA is exploring obtaining radar data feed and RCAG from other ATS providers for ZSU.

3.2 The meeting is invited to comment on the U.S. FAA's action to enhance safety and efficiency in ZSU Sector 10.

General Depiction of Airspace Proposed To Be Transferred to ZNY

Phase 2

Pico Radar