



*International Civil Aviation Organization*

## ICAO The Ninth Meeting of the APANPIRG ATM Sub-Group (ATM/SG/9)

Video Teleconference, 01 – 05 November 2021

### **Agenda Item 5: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)**

#### **FUTURE OF THE OCEAN 2035 (FOTO35) PROGRAM OVERVIEW AND ALIGNMENT WITH ICAO GLOBAL INITIATIVES**

(Presented by UNITED STATES)

##### **SUMMARY**

This paper presents a brief overview of the FAA's newest oceanic strategic initiative, Future of the Ocean 2035 (FOTO35), and explains its intended alignment with global ICAO initiatives, such as the Global TBO Concept and the implementation of FF-ICE.

### **1. INTRODUCTION**

1.1 The U.S. Federal Aviation Administration (FAA) invites the meeting to take note of its latest oceanic strategic initiative, Future of the Ocean 2035 (FOTO35), and welcomes all interest of potential future partnership and collaboration. This Information Paper (IP) provides a high-level outline of FOTO35 and details its alignment with broader ICAO global initiatives, such as global Trajectory Based Operations (TBO). The paper was prepared for the Fortieth Working Group Meeting of the ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP).

1.2 The FAA recognizes the importance of continued partnership and collaboration with Air Navigation Service Providers (ANSP) in the Asia-Pacific (APAC) region. Oakland and Anchorage Oceanic Flight Information Regions (FIR) border several APAC FIR, and the FAA has already partnered with the IPACG and ISPACG to ensure that the future of air traffic management (ATM) automation systems in the Pacific will be capable of incorporating the concepts and procedures outlined in global ATM initiatives, such as the ICAO Global Air Navigation Plan (GANP), Aviation System Block Upgrades (ABSU), and Flight and Flow Information for a Collaborative Environment (FF-ICE). The collaborative partnerships formed in the ISPACG and IPACG have already resulted in numerous benefits to the Pacific region. They include, but are not limited to, the Asia and South Pacific Initiative to Reduce Emissions (ASPIRE), Dynamic Airborne Reroute Procedures (DARP), and User Preferred Routes (UPR). Despite these regional successes in the airspace immediately bordering FAA-managed oceanic FIR, the implications of FOTO35 extend beyond those borders. FOTO35 aims to ensure that the benefits that operators leverage in FAA-managed airspace can be reciprocated across the APAC region, and is committed to enhancing future efforts across the region, such as the Indian Ocean Strategic Partnership to Reduce Emissions (INSPIRE).

## 2. DISCUSSION

### INTRODUCTION

2.1 ICAO-delegated oceanic Air Navigation Service Providers (ANSP) play a critical role by directing and overseeing the significant operational safety, performance, and efficiency improvements that connects the worlds land masses . The oceanic operational environment is massive in both scope and scale, and has inherent harmonization shortfalls. The United States (U.S.) Federal Aviation Administration (FAA) manages 24 million square miles of ICAO delegated oceanic airspace in the Atlantic, Pacific, and Arctic oceans. The FAA shares airspace boundaries with eighteen other ANSP and understands the technological and procedural harmonization efforts needed, as well as the difficulties associated with implementing them. Further advances in Air Traffic Management (ATM)-related technology, including the move away from tactical to trajectory-based Air Traffic Control (ATC), is moving domestic and oceanic ATC operational concepts (CONOPS) towards each other.

2.2 A recent study applied to the current and forecasted oceanic environment identified various shortfalls that affect efficiency, predictability, flexibility, and operational continuity. Considering this, the FAA established a new strategic initiative to bring future changes in oceanic system capabilities and ATM and Collaborative Decision Making (CDM) that will facilitate real-time airspace planning, seamless end-to-end operations, and safe integration of emerging users and commercial space operations.

2.3 The purpose of this Information Paper (IP) is to present that strategic initiative, Future of the Ocean 2035 (FOTO35), and demonstrate its alignment with Air Traffic Management Requirements and Performance Panel (ATMRPP) efforts such as:

- The phased implementation of Global Trajectory-Based Operations (TBO) as described in ICAO Doc. 10130,
- Trajectory management through the use of Collaborative Decision Making (CDM) per ICAO Doc. 9971, and
- The phased releases of Flight & Flow Information for a Collaborative Environment (FF-ICE) described in ICAO Doc. 9965.

2.4 This IP will also highlight potential solutions designed to transform current oceanic operations that enhance safety, efficiency, resiliency, and capacity, by promoting a seamless airspace operational environment and global harmonization that benefit airspace users and the world’s flying public. These outcomes are fully aligned with the “seamless and global ATM system” described in the Global ATM Operational Concept (ICAO Doc. 9854).

### TRANSFORMING OCEANIC AIR TRAFFIC MANAGEMENT

2.5 To effectively enhance oceanic air traffic management, benefit airspace users, reduce carbon emissions, and promote global harmonization, the FAA outlined four goals for the FOTO35 strategic initiative:

- Implementing Dynamic End-to-End Operations (DETEOps)
- Enhancing Oceanic Separation Procedures
- Integrating Emerging Users and Commercial Space Operations
- Improving the Oceanic ATM System

2.6 FOTO35 intends to enhance services for all current and future oceanic-system stakeholders by exploring, leveraging, and implementing information sharing capabilities; advanced technologies in Communications, Navigation, and Surveillance (CNS); weather observation and forecasting; artificial intelligence applications; global collaborative decision-making; and new aircraft separation standards and procedures.

#### ALIGNMENT WITH GLOBAL INITIATIVES

2.7 To help ensure alignment with global harmonization efforts, FOTO35 has aligned its goals and strategic concepts with global ATM strategies, including the International Civil Aviation Organization (ICAO) Global Air Navigation Plan (GANP). Additionally, they align with those developed by the ATMRPP, such as concepts detailed in the TBO Concept Document. Analyzing the TBO Concept Document and other ICAO publications, the FOTO35 program has determined that implementing DETEOps can bolster future efforts put forward by the ATMRPP towards achieving future global harmonization.

#### THE NEED FOR DYNAMIC END-TO-END OPERATIONS (DETEOps)

2.8 DETEOps will serve as the implementation mechanism for the ICAO Global TBO Concept in FAA-managed oceanic airspace. This is similar to the FAA CSS-FD program, which is the FAA mechanism for future implementation of FF-ICE. FOTO35 will leverage FAA initiatives and infrastructure, such as FIXM, CSS-FD, and SWIM, to ensure that DETEOps enables the implementation of Global TBO. DETEOps will help provide an optimum outcome for all stakeholders (airspace users, controllers, dispatchers, and third parties) with minimum deviations from a requested flight trajectory or other interruptions. The FOTO35 strategic initiative identified numerous shortfalls in the current operation that limit the abilities of airspace users. Some of these shortfalls include, but are not limited to:

- Limited predictability in being cleared consistent with the filed flight plan, resulting in inefficient fuel loading for operators,
- Limited integrated flow management during capacity/demand imbalances between domestic and oceanic domain (which can result in increased fuel burn); and,
- Operators cannot file and fly preferred altitude, route, and speed trajectories based on business needs for individual flights.

2.9 Following a series of analyses, it was determined that these shortfalls could be alleviated by implementing the ICAO Global TBO Concept through DETEOps. By leveraging global implementation, FOTO35 will create an operational environment in which there are:

- Seamless end-to-end operations between FAA oceanic, offshore, and domestic ATS systems
- Seamless end-to-end operations between FAA oceanic and foreign ANSP ATS systems
- More efficient flights due to improved flight planning processes and more frequently updated trajectories
- Reduced carbon emissions

2.10 Without global commitment and approval to deploy future releases of FF-ICE and SWIM, the shared goals that FOTO35 and the ATMRPP have put forward cannot be accomplished. FOTO35 intends to align with the standards that will emerge out of FF-ICE Release One (R1), and Release Two (R2), via the Common Support Services-Flight Data (CSS-FD), which is the official FAA program that will incorporate principles of FF-ICE into FAA-managed airspace.

IMPROVING OCEANIC ATM AUTOMATION SYSTEMS

2.11 Future global interoperability and seamless transitions between ANSP, increased airspace accommodation and capacity, and system efficiency, flexibility, and predictability are all direct, long-term results of strong data sharing and evolving ATM automation systems. Similar to the TBO concepts put forward by the ATMRPP, through the phased implementation of DETEOps, FOTO35 will:

- Leverage the benefits of new automation capabilities to increase sharing of trajectory information to reach an agreed trajectory and provide planners, controllers, and users with better access to the best available flight data
- Manage trajectory information using the Collaborative Decision Making (CDM) process
- Balance trajectory preferences for all users (including emerging users and space operations) and enable more flexibility such as trajectory negotiations and adjustments in-flight
- Share trajectory information among partner ANSP to ensure better situational awareness for all involved ATM stakeholders and minimize disturbances to other stakeholders

2.12 These efforts will ultimately result in greater interoperability between ANSP and between automation systems, flight deck technologies, and third parties. This will be pivotal to future global harmonization and enhanced aircraft trajectory management.

CONCLUSION OF ATMRPP IP

2.13 Oceanic airspace connects foreign ANSP across the globe. Although FOTO35 is an oceanic strategic initiative, its scope expands far beyond the borders of Oakland, New York and Anchorage Oceanic FIRs. FOTO35 intends to continue aligning its plans to implement DETEOps and future requirements with ICAO objectives and initiatives, so that ANSP across the globe may have the opportunity to leverage the benefits DETEOps provides. The alignment will effectively create seamless end-to-end operations via the various benefits that will come from implementing global TBO, FF-ICE, and other flight information-sharing networks and platforms

**3. CONCLUSION**

3.1 As global ATM concepts and strategies continue to develop, global stakeholder input and collaboration with multiple international bodies and ANSP becomes even more vital than it already is. The FAA continues to recognize the importance of collaborative partnerships with ANSP across the globe and is committed to contributing to ongoing regional efforts to create a safer, more efficient, and seamless air traffic operation. The FAA invites all members of the meeting to continue to explore and understand the benefits that FOTO35 offers and partner for future collaboration.

**4. ACTION BY THE MEETING**

4.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate

.....