

Twentieth Meeting of the Cross Polar Trans East Air Traffic Management Providers' Work Group (CPWG/20)

(Anchorage, Alaska 26-29 October 2015)

Agenda Item 5:

Implementation of Automatic Dependent Surveillance-Broadcast (ADS-B) In-Trail Procedure (ITP)

(Presented by the Federal Aviation Administration)

SUMMARY

This paper presents information on development of automation and procedures to support use of the ADS-B ITP in the FAA's Oceanic Flight Information Regions (FIRs).

1 Introduction

1.1. Automatic Dependent Surveillance – Broadcast (ADS-B) In-trail procedure (ITP) is designed to improve service to properly equipped aircraft by allowing an oceanic air traffic controller to have an option for granting an altitude change request when other standard separations, such as ADS-C distance-based 30 NM longitudinal separation minima, do not allow for a climb or descent through the altitude of a blocking aircraft.

1.2. The ADS-B ITP is different from the Automatic Dependent Surveillance-Contract (ADS-C) Climb/Descent Procedure (CDP) in that it is a pilot-requested climb or descent through blocking traffic using ADS-B In equipment on the aircraft. With ADS-B ITP, the maneuvering (trailing or leading) aircraft obtains the flight identification (ID), altitude, position and ground speed transmitted by proximate ADS-B equipped non-maneuvering aircraft. Based on the ADS-B data from the non-maneuvering, or reference aircraft, a pilot can request clearance for an ITP altitude change to ATC. The controller verifies that the ITP and reference aircraft are same direction traffic and that the maximum closing Mach differential is less than or equal to a Mach number of 0.06. If the controller determines that the requesting aircraft will maintain standard separation minima with all aircraft other than the ITP reference aircraft, a clearance for the climb or descent may be issued. After re-validating that the ITP initiation criteria are still valid, the maneuvering aircraft may then vertically transition through the altitude of the non-maneuvering aircraft utilizing the 10 NM ITP longitudinal separation standard (15 NM at initiation of the ITP).

1.3. Since December 2011, Oakland Air Route Traffic Control Center (ARTCC) has conducted a manual operation trial of the ADS-B ITP. The trial began in the South Pacific (SOPAC) but has been expanded to include the entire Oakland Oceanic FIR.

1.4. The ADS-B ITP procedure is published in the Procedures for Air Navigation Service- Air Traffic Management (PANS-ATM) Doc. 4444 5.4.2.7.

2 Discussion

2.1. Similar to work undertaken with ADS-C CDP, the FAA began work to automate the manual checklist criteria into its Advanced Technology and Oceanic Procedures (ATOP) system. The operational functional requirements of the automation are as follows:

1. CPDLC clearance request is properly formatted
2. Request indicates no more than 2 reference aircraft
3. ITP and reference aircraft are single aircraft not flying in formation with other aircraft
4. Request indicates ITP distance between ITP aircraft and any reference aircraft is at least 15NM
5. ITP aircraft is CPDLC connected
6. ITP aircraft is not involved in another ITP maneuver (e.g., it is not an ITP or reference aircraft in another ITP)
7. ITP aircraft has no imminent or actual conflicts at the requested altitude
8. Reference aircraft not involved in another ITP maneuver
9. Reference aircraft no more than 2000 ft. of ITP aircraft
10. Reference aircraft assigned single altitude
11. Closing Mach difference equal to or less than 0.06 between ITP and reference aircraft
12. Aircraft are same direction
13. Aircraft are not on a deviation (or not on offset combined with a rejoin clearance which is treated as a deviation)
14. Aircraft meet at least one of the following conditions:
 - a. Same identical track, or
 - b. Devoid of waypoint transitions where a turn occurs, or
 - c. For each ITP and reference aircraft pair, every turn at a waypoint transition meets at least one of the following conditions:
 - i. The turning aircraft is the leading aircraft and turns away from the track of the following aircraft, or
 - ii. The turning aircraft is the following aircraft and turns toward the track of the leading aircraft.

2.2. The FAA has developed procedures for FAA Order JO 7110.65 Air Traffic Control and the United States Aeronautical Information Publication (AIP) with expected publication in May 2016. The FAA's procedures mirror those of PANS-ATM Doc. 4444 5.4.2.7 with the exception of a difference at 5.4.2.7 .3.2 d) which states-

5.4.2.7.3.2. *A controller may clear an aircraft for an ITP climb or descent provided the following conditions are satisfied:*

- d) both the ITP aircraft and reference aircraft are either on;*
- 1) same identical tracks and any turn at a waypoint shall be limited to less than 45 degrees; or*
 - 2) parallel tracks or same tracks with no turns permitted during the manoeuvre.*

2.3. ATOP is designed to check for turns that maintain or increase required separation during the ITP. Therefore, aircraft on same tracks with a turn would be permitted to perform the ITP if ATOP determines that there would be no degradation in required separation. Accordingly, the procedure has been drafted to reflect the following-

X. *Clear an aircraft for an ADS-B In Trail Procedure (ITP) climb or descent provided the following conditions are satisfied:*

x) both the ITP aircraft and reference aircraft are either on:

- (a) same identical tracks and any turn at a waypoint shall be limited to less than 45 degrees;*
or
- (b) same tracks with no turns permitted that degrade required separation during the ITP.*

2.4. All required Safety Management System (SMS) work is completed and the draft procedure is currently under review by Air Traffic Safety Oversight (AOV) to approve this reduced separation standard.

2.5. ATOP automation is expected to be delivered in the January-February timeframe of 2016 to all three FAA Oceanic FIRs. Further testing and controller training will need to be conducted at each facility prior to implementation. Implementation of the procedure is expected in mid-CY2016.

3 Recommendation

3.1. The Meeting is invited to note the information provided in this paper.