

Performance Based Communication Surveillance (PBCS)

Concept of Operations

1. Introduction

1.1. In November 2016, the International Civil Aviation Organization published the sixteenth edition of the ICAO Doc 4444, Procedures for Navigation Services – Air Traffic Management (PANS-ATM). The amendments included the addition of performance-based communication and surveillance (PBCS) requirements for the application of performance-based horizontal separation minima. The *safety impact* of the added requirements would “enable States to ensure that safe application of air traffic management (ATM) operations predicated on communication and/or surveillance performance to eligible operators and that non-compliance is detected and corrected in a timely manner” (ICAO State letter AN 11/1.3.29-16/12, 8 April 2016).

1.2. In the North Atlantic and Asia-Pacific regions, the FAA participated in discussions that led to collective agreement that readiness to comply with the new requirements was not achievable by November 2016 and the consequent establishment of the deferred implementation date of 29 March 2018 (*Summary of Discussions and Conclusions of the 52nd Meeting of the North Atlantic Systems Planning Group [NAT SPG], June 2016; Final Report of the 27th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group [APANPIRG], September 2016*).

1.3. The FAA is currently applying performance-based separation standards in Anchorage, New York, and Oakland oceanic control areas (CTAs), which are impacted by the added level of requirements and approvals associated with implementation of PBCS: the 30 Nautical Mile (NM) longitudinal, 50NM longitudinal and 30NM lateral separation standards. From 29 March 2018, these standards will require the FAA to be in compliance with the required communication performance (RCP) 240 and required surveillance performance (RSP) 180, as defined in Appendices B and C of ICAO Doc, 9869, edition 2, the PBCS Manual.

1.4. In FAA oceanic airspace, performance-based separation standards are enabled by the use of the Advanced Technologies & Oceanic Procedures (ATOP) system, an upgradable automation system used by the Federal Aviation Administration (FAA) to support oceanic air traffic control. ATOP has the capability to detect conflicts between oceanic flights, fully integrates flight data processing, depicts aircraft using a situational display, and supports satellite data link communication and surveillance capabilities.

1.5. The FAA has adopted the implementation task list in Appendix A of the PBCS Manual to facilitate the implementation of RCP240 and RSP180 for oceanic operations. This document describes how the implementation of the PBCS framework will be incorporated with the current application of these separation standards, in line with task C-1, “Operational concepts and procedures for PBCS operations” of the “Group C tasks – ANSP implementation activities – ATS service provision”.

2. Lateral separation standard to be applied

2.1. The 23NM lateral separation standard was introduced in ICAO procedures in section 5.4.2.9 of Doc 4444 in November 2016. However, the FAA has not implemented this standard.

Therefore, 30NM lateral separation standard will be applied between aircraft operating above the floor of controlled airspace and authorized to use Automatic Dependent Surveillance – Contract (ADS-C) for surveillance, with an RSP180 approval, Controller Pilot Data Link Communication (CPDLC) for communication, with an RCP240 approval, and approved for RNP4 operations for navigation.

3. Longitudinal separation standard to be applied

3.1. The 50NM longitudinal separation standard will be applied in accordance with ICAO procedures stipulated in section 5.4.2 of Doc 4444 between aircraft operating above the floor of controlled airspace and authorized to use ADS-C for surveillance, with an RSP180 approval, CPDLC for communication, with an RCP240 approval, and approved for RNP10 operations for navigation.

3.2. The 30NM longitudinal separation standard will be applied in accordance with ICAO procedures stipulated in section 5.4.2 of Doc 4444 between aircraft operating above the floor of controlled airspace and authorized to use ADS-C for surveillance, with an RSP180 approval, CPDLC for communication, with an RCP240 approval, and approved for RNP4 operations for navigation.

3.3. The 5-minute longitudinal separation standard was introduced in ICAO procedures in section 5.4.2.9 of Doc 4444 in November 2016. However, the FAA has not implemented this standard.

4. Aircraft requirements and ICAO flight plans

4.1. Performance-based separation standards will only be authorized for turbojet aircraft that are certified and approved for Reduced Vertical Separation Minima (RVSM); respective Required Navigational Performance (RNP), RCP, and RSP; Automatic Dependent Surveillance Contract (ADS-C); and Controller Pilot Data Link Communication (CPDLC).

4.2. When an aircraft does not satisfy a particular performance requirement, the operator must not include those corresponding qualifiers in the filed flight plan.

4.3. In order to inform the ATOP ground systems that an aircraft is approved and eligible for the application of 30NM lateral separation standard and/or 30NM or 50NM longitudinal separation standards, operators will be required to include the following information in the ICAO flight plan.

- i. The letter “R” is required in Item 10a of the flight plan along with the performance-based navigation levels that can be met specified in Item 18 following the indicator PBN/.
 - a. The RNP4 designator, “L1” is required for 30NM lateral and 30NM longitudinal.
 - b. Either “L1” or the RNP10 designator, “A1” is required for 50NM longitudinal.
- ii. The equipment qualifier J-code must be found within Item 10a of the flight plan. The presence of at least one of the following J-codes is required: “J5” (INMARSAT), “J6” (MTSAT), and “J7” (Iridium) for performance-based separation.
- iii. The equipment qualifier P-code “P2” must be found within Item 10a of the flight plan. The “P2” equipment qualifier indicates the aircraft is certified CPDLC RCP-240.

- iv. The text string “RSP180” must appear in Item 18 of the flight plan, following the indicator for surveillance equipment and capabilities (SUR/), which indicates the airframe is certified and compliant.

5. FANS logon requirements and ADS-C contracts

5.1. As described in 1.2.2.2.1.2 of ICAO Doc 10037, Global Operational Data Link Document (GOLD) Manual, a logon must be initiated either by the flight crew or automatically following a contact request from another ATS unit, in order to establish a CPDLC and/or ADS-C connection. FANS logon information for the FAA oceanic ATOP centers is provided below.

5.1.1. Anchorage: PAZA

5.1.2. New York: KZWY

5.1.3. Oakland: KZAK

5.2. The FAA oceanic systems will only allow controllers to apply reduced separation to aircraft that are logged on and indicate proper equipment in their flight plan. A logon attempt will be rejected by ATOP if the ICAO flight plan does not contain one of the J-codes indicating SATCOM capability (J5, J6 or J7).

5.3. Once an aircraft is logged on, ATOP will default to the appropriate periodic reporting rate for the corresponding ADS-C contract. Aircraft must have an active ADS-C contract with a periodic reporting interval of 10 minutes or less to qualify for performance-based separation.

5.4. An additional check will be performed to determine eligibility for 30NM lateral and 30NM longitudinal separation only. The most recently received ADS position report for the flight must contain a Figure of Merit (FOM) that meets or exceeds the adapted minimum RNP-4 threshold.

6. Concept for use of ATOP oceanic airspace

6.1. The 30NM/50NM longitudinal and 30NM lateral separation standards will only be applied to appropriately equipped pairs of aircraft that have filed in accordance with section 4, and are logged on to the communications/ surveillance system through a communications service provider.

6.2. At this time, there are no plans to restructure the routes, nor will aircraft be loaded on tracks 30NM or 50NM in trail. The controller will apply the separation if, and when, appropriate between aircraft pairs. The FAA is assessing whether the current communication system is reliable enough and provides enough capacity to safely load tracks using reduced separation standards.

Note 1: When two aircraft are eligible for different PBCS reduced separation minima, the larger standard shall be applied between the pair.

Note 2: No changes resulting from this implementation will be required by adjacent air traffic service providers.

Note 3: No changes resulting from this implementation will be required by aircraft operating in airspace adjacent to the FAA oceanic CTAs.

7. Provisions for accommodating aircraft not eligible for 30NM or 50NM longitudinal and/or 30NM lateral separation

7.1. The airspace will not be exclusionary. Aircraft not authorized for RCP240 and RSP180, and those not communicating with ADS-C and CPDLC will still be allowed to fly within the oceanic CTAs; however, these reduced separation standards will not be applied to those aircraft.

7.2. Aircraft that flight plan on the published routes will, by definition, conform to the basic lateral separation minimum. When developing a clearance for an advanced CNS systems aircraft, the lesser equipped aircraft will be separated by at least the minimum standard allowed by its systems. Thus, their operations should not be impacted by the inclusion of more advanced CNS aircraft.

8. Concept for transfer of control into adjacent FIRs not controlled by the U.S.

8.1. Appropriate lateral and longitudinal separation standards, including performance-based separation standards, will continue to be provided during transfers with adjacent Air Navigation Service Providers (ANSPs).

8.2. For inbound transfers, the application of performance-based separation standards is allowed when an advance CPDLC connection has been established. Current data authority is confirmed as soon as practicable upon entry into the airspace.

8.3. For outbound transfers to ANSPs supporting CPDLC, the application of performance-based separation standards is allowed to continue after transfer of communication and control has been successfully completed.

9. Media transitions

9.1. The FAA is currently assessing the impact of the media transitions on the application of performance-based separation minima. Frequently, when an aircraft switches between satellite and very high frequency (VHF) coverage areas, it experiences increased delays in message transmission, impacting the ability of ATC to receive timely surveillance data and/or communicate with the aircraft. Based on the conclusions, this concept of operations may be adjusted to mitigate the impact of this issue.

10. Implementation date

10.1. The software for PBCS automation will be deployed beginning in September 2017, and the targeted implementation date for turning on these additional requirements to determine eligibility for 30NM lateral/30NM longitudinal/50NM longitudinal separation standards is 29 March 2018, in accordance with the regional agreements.

11. References

11.1. ICAO Doc 9869, *PBCS Manual*, 2nd edition, 2017.

11.2. ICAO Doc 10037, *GOLD Manual*, 2017.

11.3. ICAO Doc 4444, *PANS-ATM*, 16th edition, November 2016.