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**The Second Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/3)**

Bangkok, Thailand, 16 – 19 April 2024

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#### **Agenda Item 4: Implementation of CNS-ATM Systems**

### **TRIAL OPERATION OF SEPARATION MINIMA USING SPACE BASED ADS-B AND CPDLC IN MUMBAI FLIGHT INFORMATION REGION**

(Presented by INDIA/AIRPORTS AUTHORITY OF INDIA)

#### **SUMMARY**

This paper presents trial operation of separation minima using ATS surveillance System where VHF Voice Communications are not available. The surveillance is provided by Space Based ADS-B and primary communication means is CPDLC.

## **1. INTRODUCTION**

1.1 The 9<sup>th</sup> amendment to PANS-ATM (Doc 4444) introduced a new separation minima using ATS surveillance System where VHF Voice Communications are not available in Chapter-8 para 8.7.4. These separation minima help states who have implemented surveillance systems for the oceanic airspace in their FIRs to reduce horizontal separation where VHF Voice Communications are not available. India has started the trial operation of such reduced separation in its oceanic airspace.

## **2. DISCUSSION**

2.1 India has implemented Space Based ADS-B (SADS-B) in the oceanic airspace of Mumbai, Kolkata and Chennai FIR since January 2021. However, the data from SADS-B integrated in ATM Automation Systems were used for situational awareness only. ADS-C and CPDLC have been introduced in Oceanic airspace of Indian FIRs since 1998 and fully operationalized from 2006.

2.2 Normally surveillance service is provided with direct controller-pilot communication voice (VHF). However, 9<sup>th</sup> amendment of PANS-ATM (Doc 4444) 8.7.4 provides for separation minima by use of surveillance service where VHF is not available.

2.3 These separation minima specified in 8.7.4 shall only be applied between identified aircraft when there is reasonable assurance that identification will be maintained can be applied between identified aircraft pairs only.

2.4 The Note 4. in para 8.7.4 says — Application of the separation minima in 8.7.4.2, 8.7.4.3 and 8.7.4.4 includes elements of both procedural control and ATS surveillance services;

refer to Annex 1 — Personnel Licensing for applicable air traffic controller rating requirements.

2.5 As per para 8.7.4.1 Where direct controller-pilot VHF voice communications are not available, separation minima described in 8.7.4.2, 8.7.4.3 and 8.7.4.4 may be applied utilizing positioning information derived from an ATS surveillance system, provided the following requirements are met:

- a) a navigational performance of RNP 4 or RNP 2 shall be prescribed;
- b) the communication system shall satisfy RCP 240;
- c) an alternate means of communication shall be available so as to allow the controller to intervene and resolve a conflict within a total time of nine minutes, should the normal means of communication fail; and

Note.— The total time specified in c) includes the four minutes allocated to RCP 240.

d) route conformance monitoring shall be ensured by the use of ATS surveillance system lateral deviation alerts with a warning threshold normally set at a maximum 3.0 NM.

1) Warning thresholds greater than 5.6 km (3.0 NM) may be set, provided the lateral separation minima in 8.7.4.2 a) and 8.7.4.3 are increased by 1.9 km (1.0 NM) for each 1.9 km (1.0 NM) that the warning threshold is increased; and

2) ATS surveillance systems shall provide for the display of alerts in a clear and distinct manner to enable immediate action by the controller in the event of a lateral deviation.

8.7.4.2 Unless otherwise prescribed in accordance with 8.7.4.3 and 8.7.4.4, the separation minima shall be:

- a) 35.2 km (19.0 NM) lateral spacing between parallel or non-intersecting tracks;
- b) 35.2 km (19.0 NM) lateral separation of aircraft operating on intersecting tracks applied in accordance with 5.4.2.1.5 a) and b);
- c) 31.5 km (17.0 NM) longitudinal separation of aircraft operating on same tracks or crossing tracks applied in accordance with 5.4.2.9.5 provided that the relative angle between the tracks is less than 90 degrees; and
- d) opposite direction aircraft on reciprocal tracks may be cleared to climb or descend to or through the levels occupied by another aircraft, provided that surveillance position reports have been received from both aircraft demonstrating the aircraft have passed each other by 9.3 km (5.0 NM).

8.7.4.3 The separation minimum in 8.7.4.2 a) may, if so prescribed by the appropriate ATS authority, be reduced, but not below 27.8 km (15.0 NM), provided either:

a) the density of traffic in the airspace, as measured by occupancy, is less than 0.6; or

b) the proportion of total flight time spent by aircraft off the cleared track does not exceed the following:

1) for aircraft deviating 13.0 km (7.0 NM) or more off the cleared track,  $3 \times 10^{-5}$  per flight hour; and

2) for aircraft deviating 20.4 km (11.0 NM) or more off the cleared track,  $1 \times 10^{-5}$  per flight hour.

8.7.4.4 The separation minimum in 8.7.4.2 c) may be reduced to 26 km (14 NM), provided that the relative angle between the tracks is less than 45 degrees.

8.7.4.5 Vectoring shall not be used in the application of these separation minima.

2.6 India has started the trial of 20NM longitudinal separation based on above criteria between eligible pairs of aircraft on routes L301 and L639 in Mumbai FIR from 15<sup>th</sup> January 2024 using Space Based ADS-B and CPDLC after stake holder consultation, safety assessment and permission from the Regulator.

**2.7 This type of separation minima is used for the first-time outside Canada and Europe.**

2.8 Initially the trial operation had been kept for two hours between 02:30 to 04:30 UTC due to the totally new nature of the separation application. However, the number of eligible pairs was very less in this period. From 5<sup>th</sup> March the trial period has been changed from 04:30 to 06:30UTC. It is expected to get more number of eligible pair during this period. Gradually the hours of operation will increase.

2.9 Oman has agreed in principle to accept this reduced separation but not yet ready to sign the letter of agreement. Therefore, presently the separation is used for east bound aircraft pairs only. It will be extended to west bound traffic as soon as Muscat ACC signs the LoA with Mumbai ACC/OCC.

2.10 FPLs of compliant East Bound aircraft over w/p RASKI were assessed for the mention of COM/NAV/SUR functionalities.

2.11 Upon Space Based ADS-B pick up of targets the estimates were co-related with the Space Based- ADS- B tracks, and identity was duly established by the U5 N surveillance controller for the aircraft which are compliance from COM perspective ie; RCP240-CPDLC and the identification so established was conveyed to the compliant East Bound aircraft through CPDLC.

- 2.12 Identification was maintained all through the sector U5N and approaching way point RITPO/ANKOX, the tracks were radar handed off to ACC sector U5V.
- 2.13 The Trial operation will continue for three months or more. Depending on the success of the trial and lesson learnt, it can be extended to other routes as well as Oceanic airspace of Kolkata and Chennai FIR.

### **3. ACTION BY THE MEETING**

- 3.1 The meeting is invited to:
- a) note the information contained in this paper; and
  - b) discuss any relevant matters as appropriate.

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