



International Civil Aviation Organization

ICAO

**Tenth Meeting of the FANS Interoperability Team –
Asia (FIT-Asia/11)**

Video Teleconference, 23 – 27 August 2021

Agenda Item 3: PBCS Developments and Implementation

PERFORMANCE-BASED COMMUNICATION AND SURVEILLANCE (PBCS) IMPLEMENTATION AND READINESS STATUS IN SINGAPORE FLIGHT INFORMATION REGION (FIR)

(Presented by SINGAPORE)

SUMMARY

This paper presents an update on Singapore's Performance-Based Communication and Surveillance (PBCS) implementation and readiness status in supporting the application of the performance-based reduced horizontal separation minima using Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data-link Communications (CPDLC) in accordance with globally accepted specifications of Required Communication Performance (RCP) and Required Surveillance Performance (RSP).

1. INTRODUCTION

1.1 Under the Asia Pacific Seamless ATM Plan, the implementation of ADS-C and CPDLC was identified as one of the ten regional priorities and targets to support the Aviation System Block Upgrades (ASBU) initiative.

1.2 To ensure that data link operations are being carried out safely and efficiently, a PBCS framework consisting of performance monitoring programs would be required to facilitate the assessment of the data link actual communication and surveillance performance against globally accepted RCP and RSP specifications. In the event where deficiencies in data link performance are detected, corrective actions to report, analyse and resolve problems would be needed to maintain the data link service integrity, reliability and continuity.

1.3 Recognizing the importance and benefits of PBCS implementation, especially in enhancing the data link communication and surveillance capabilities for flight operations in remote and oceanic areas and in reducing data link connectivity and communication errors between aircraft and ATS facilities, Singapore has fostered close cooperation and collaboration among the key stakeholders with a common objective towards the eventual implementation of PBCS in supporting the application of performance-based reduced horizontal separation minima.

2. DISCUSSION

2.1 PBCS has been implemented within the Singapore FIR with effect from 29 March 2018. Singapore took guidance from the PBCS implementation plan prescribed under the Performance-Based Communication and Surveillance (PBCS) Manual (Doc 9869 2nd Edition). The PBCS implementation plan entails specific tasks listed in the implementation checklist of PBCS manual and may include tasks of other aspects which can be taken into consideration during the development of the plan. These defined tasks were subsequently translated into local action items which the PBCS implementation team will undertake and implement within a realistic timeframe.

2.2 Singapore has completed most of the tasks defined in the PBCS implementation plan. As such, status for Group A to C tasks can be found in previous year updates and have been removed from this report. The remaining update of our PBCS implementation status is listed in the following table: -

Checklist for PBCS implementation plan in Singapore			
Group D tasks		Aircraft operator, Aircraft type/system (airworthiness) eligibility	
Task ID	TASK descriptor	Implementation Status	Action Plan
D-1	Aircraft operator readiness	Completed	Locally registered air operators (9V) are expected to be ready for PBCS operations where operational approval would be obtained for communication and/or surveillance capability including aircraft equipage for operations where RCP and/or RSP specifications have been prescribed. As of 1 July 2020, 75.00% of all the locally registered fleets were granted with PBCS operational approval.
D-2	Confirm initial operator and/or aircraft type/system compliance with RCP/RSP	Completed	Compliance checks were conducted on Singapore air operators after promulgation of the regulations. ADS-C/CPDLC aircraft equipment and operator capabilities' compliance with RCP/RSP specifications were confirmed through the monitoring of the datalink performance, to support the initial approval of the operator. Statistic was collected after the PBCS implementation and as of 30 June 2021, it showed that about 79.5% of flights using data link services on RNP10 ATS routes within Singapore FIR had PBCS indicators filed in their flight plan, a noticeable increase of 8% as compared to 31 December 2019 (71.5%). The increase in PBCS indicators filed for flights using datalink services are likely due to the airlines using their newer fleet of aircraft for fuel savings in view of the reduced traffic due to COVID-19.
Group E tasks		All stakeholders – post-implementation monitoring	
Task ID	TASK descriptor	Implementation Status	Action Plan

E-1	PBCS monitoring, analysis and reporting - post implementation	Local PBCS Monitoring Programme Completed	<p>South East Asia Safety Monitoring Agency (SEASMA) which includes the conduct of annual airspace risk assessment, collect LLE & LLD data and monitoring of PBCS approvals vs PBCS operations. Boeing Central Reporting Agency (CRA) will continue to provide analysis for data link problem reports.</p> <p>Singapore has been monitoring the data link performance for CPDLC and ADS-C and working closely with CSP and aircraft operators to resolve data link issues.</p> <p>Singapore has also removed HF datalink messages from our performance analysis in order to more accurately reflect the datalink performance of aircraft and ground stations and will continue to remind operators to use VHF and SATCOM media in Singapore FIR.</p>
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2.3 Singapore provided interim updates on the PBCS implementation status by responding to ICAO survey of the status of current and planned implementation of performance-based horizontal separation minima (**Attachment A**) and will continue to do so annually at a date not later than 30th April each year. The survey allows us to assess and review our current PBCS implementation plan while keeping our PBCS implementation readiness and preparedness status in check.

2.4 Recognizing the need to make data link performance information available to States, Regional Monitoring Agencies (RMA), and Operators in multiple ICAO Regions, and the consequent need to standardize the presentation format of information, Singapore has facilitated by providing the data link performance reports in the new templates available for their collation into Aggregated Regional Data for reporting to FIT-Asia and the Regional Airspace Safety Monitoring Agency (RASMAG).

Future Developments

2.5 Singapore is looking to develop capabilities to conduct real-time monitoring of PBCS performances. This is currently being explored to be done through constant calculations of CPLDC and ADS-C message transactions to check if the required ASP or ACP benchmarks are met. This will allow any non-compliance to the required PBCS requirements to be identified immediately and appropriate actions can be taken.

2.6 The PBCS compliance status of airframes within the area of responsibilities would be referenced on auxiliary displays by controllers in the application of performance-based separation minima. This will ensure safer application of the reduced separation minima brought about by the PBCS concept.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

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

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ATTACHMENT A: SINGAPORE RESPONSE - SURVEY OF THE STATUS OF CURRENT AND PLANNED IMPLEMENTATION OF PERFORMANCE-BASED HORIZONTAL SEPARATION MINIMA

Instructions: Complete the Survey and return by email to the ICAO APAC Regional Office (apac@icao.int) by 30 th April 2021				Y/N	If NO, Planned Date
1. Has your State completed any of the following preparations for PBCS implementation?					
PBCS Implementation Task List	Task Group	Task ID	TASK descriptor		
	Group A	A-1	AIP (Prescription of an RCP/RSP specification. Also see B-3 below)	Y	
		A-2	PBCS policies, objectives supporting safety oversight of ANSP PBCS operations	Y	
		A-3	PBCS policies, objectives supporting safety oversight of Aircraft Operator and Aircraft System PBCS operations	Y	
		A-4	Proposal for Amendment to ICAO Doc 7030 - <i>Regional Supplementary Procedures</i> for PBCS operations , if applicable	Y	
	Group B	B-1	PBCS Implementation Plan	Y	
		B-2	Target dates for PBCS and relevant ATM operations	Y	
		B-3	RCP/RSP specifications	Y	
		B-4	PBCS awareness	Y	
	Group C	C-1	Operational concepts and procedures for PBCS operations	Y	
		C-2	ATM automation system changes to use flight plan RCP/RSP indicators	Y	
		C-3	ATM automation changes for PBCS monitoring	Y	
		C-4	Confirm initial ANSP compliance with RCP/RSP specifications	Y	
	Group D	D-1	Aircraft operator readiness	Y	
		D-2	Confirm initial operator and/or aircraft type/system compliance with RCP/RSP	Y	
	Group E	E-1	PBCS monitoring, analysis and reporting - post implementation	Y	

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