International Civil Aviation Organization

The Twenty-First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/21)

Bangkok, Thailand, 14-17 June 2016

Agenda Item 2: Review Outcomes of Related Meetings

FIT-ASIA/5 MEETING OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of the Operational Data Link Seminar and 5th Meeting of the Future Air Navigation Services (FANS) Interoperability Team – Asia (FIT-Asia/5) for review by RASMAG/21.

1. INTRODUCTION

1.1 The Operational Data Link Seminar and 5th Meeting of the Future Air Navigation Services (FANS) Interoperability Team – Asia (FIT-Asia/5) were held in Bangkok, Thailand, from 2 to 6 May 2016.

1.2 Seminar presentations, and the meeting report and papers for FIT-Asia/5, are available on the Asia/Pacific Regional Office website at http://www.icao.int/APAC/Meetings/Pages/2016-FIT-Asia5.aspx

1.3 The Operational Data Link Seminar was conducted to assist States in developing their understanding of ICAO Performance-based Communications and Surveillance (PBCS) standards and recommended practices applicable from 10 November 2016. Outcomes from the Seminar were considered by the FIT-Asia/5 meeting, and resulted in a number of recommendations and Draft Conclusions for consideration by RASMAG/21.

2. DISCUSSION

FIT-Asia/5 CRA Arrangements, and Problem and Performance Reporting

2.1 The meeting was reminded of the Annex 11 standard requiring that safety related changes to the ATS system are subject to a safety assessment demonstrating that an acceptable level of safety was met, and post-implementation monitoring to ensure the defined level of safety continued to be met.

2.1 The meeting reviewed APANPIRG ***Conclusion 24/24***, requesting that States register on the FIT-Asia website and report problems to the CRA, and ***Conclusion 26/25***, defining the circumstances under which an APANPIRG Air Navigation Deficiency would be raised against failure of States to engage in problem reporting and the reporting of problem and performance analyses to a recognized FIT.

2.2 The FIT-Asia Data Link Status Table (**Attachment A**) includes, for FIT-Asia administrations:

a) data link service status;

b) Asia/Pacific Seamless ATM Plan performance expectation to implement ADS-C/CPDLC (where known);

c) FIT-Asia CRA registration status;

d) Record of submission of problem reports to the FIT-Asia CRA since FIT-Asia/4;

e) Record of provision of ADS-C/CPDLC performance data analysis to FIT-Asia; and

f) Indication of existing and proposed new, amended or deleted Air Navigation Deficiencies.

2.3 At the suggestion of New Zealand (non-FIT-Asia State), the meeting agreed that the FIT-Asia Data Link Status Table should be further developed to include information on the data link status of the entire APAC Region including non-FIT-Asia States.

2.4 8 FIT-Asia administrations are known to be providing ADS-C/CPDLC services. Only 3 of these administrations had submitted problem reports to a recognized CRA. Only 3 FIT-Asia administrations that provided operational ADS-C/CPDLC services submitted performance analyses to FIT-Asia/5.

2.5 The South East Asia Safety Monitoring Agency (SEASMA) provided CRA services to 3 FIT-Asia States (Philippines, Singapore and Viet Nam). Problem reports were submitted by Singapore. Philippines had also registered on the FIT-Asia CRA website, and had been submitting problem reports to that service.

2.6 Singapore advised that the process of gaining approval for continuation of the SEASMA service beyond September 2016 was underway and updated information would be provided to APANPIRG/27.

2.7 The meeting was reminded that RASMAG was the regional body that authorized monitoring organizations to provide a CRA service. Organizations or States considering developing a CRA service needed to take into account the RASMAG policy to restrict the proliferation of safety monitoring services, and the considerable technical capability that was needed to perform CRA.

Air Navigation Service Deficiencies Relating to Data Link Performance Monitoring and Analysis

2.8 The list of Air Navigation Deficiencies relating to data link performance monitoring and analysis was reviewed by the meeting. No new Deficiencies were raised, and no Deficiencies were deleted from the list.

2.9 The existing Deficiency listed for Sri Lanka was modified to remove “not registered with competent CRA”. The existing Deficiency for Viet Nam was amended to include “Problem Reports not provided to CRA”.

2.10 The Deficiency List as agreed by the meeting was provided at **FIT-Asia/5/Report of the Meeting/Appendix G**.

FIT-Asia Problem Report Briefing

2.11 FIT-Asia Central Reporting Agency (CRA, provided by Boeing CRA) presented information on problem reports received through the Informal South Pacific ATS Coordination Group (ISPACG) CRA website, which also provides the FIT-Asia CRA facility.

2.12 The following issues arising from the analysis of problem reports were highlighted:

- In cases where States were conducting trial ADS-C/CPDLC operations during limited time periods, neighbouring States should ensure that data link transfers are not attempted outside the trial periods;

- Failure of data link service providers (DSP) to internetwork messages, to ensure delivery to ANSPs using the alternate DSP;

- The need for aircraft-recorded data to support further investigation of the "ACK-n-Toss" issue, whereby aircraft were downlinking acknowledgement messages in response to uplinks, but then discarding the uplink.

- The significance of position coordinate information which was currently disregarded by most ANSPs when included in AFN logon downlinks, but may be considered by some ANSPs as a criteria for acceptance or rejection of the downlink under future requirements.

2.13 A back-up table of known software issues for the information of Aircraft Operators was included in the presentation.

Review of ADS/CPDLC Operations

Progress on Improving Problem Reporting Mechanism in China

2.14 In **FIT-Asia/5/WP03/Attachment A** China provided an action plan to address the establishment of a data link problem reporting mechanism. The meeting noted the significant effort being made by China to develop their performance monitoring and analysis processes.

2.15 FIT-Asia CRA (Boeing CRA) agreed to develop some brief guidance outlining how a CRA may be established in cooperation between a State and a competent CRA as currently identified by RASMAG.

2.16 In response to a query, the administrator of the ISPACG CRA and FIT-Asia CRA website (New Zealand) informed the meeting that feedback to the CRA on performance problems could be provided through the website. The meeting was reminded of the importance of establishing and updating State points-of-contact for the coordination of CRA technical analysis.

Data Link Performance Reports.

2.17 Only China, India and Singapore provided data link performance reports to FIT-Asia/5.

China Data Link Performance

2.18 As the longitudinal separation minimum in use was 10 minutes, China analysed data link performance against the Required Surveillance Performance 400 (RSP400) and Required Communication Performance 400 (RCP400) criteria. 100% of CPDLC messages met the RCP400 criteria. (95% within 320 seconds, 99.9% within 370 seconds)

2.19 ADS-C Downlink Latency for the Urumqi FIR is provided in **Table 1** and **Figure 1**. It was noted that downlink latency for messages sent by satellite, and VHF data link met the 95% criteria, and fell just below the 99.9% criteria. HF data link latency fell below both the 95% and 99.9% criteria.

2.20 Urumqi FIR ADS-C Downlink Latency				
Messages		**% < 300 sec (Target 95%)**	**%< 400 sec (Target 99.9%)**	**Remarks**
Satellite	226,290	99.76%	99.85%	-
VHF	201,765	99.87%	99.93%	-
HF	955	89.11%	92.64%	-
Total	429,010	99.79%	99.87%	-

Table 1: Urumqi FIR ADS-C Downlink Latency per Media Type

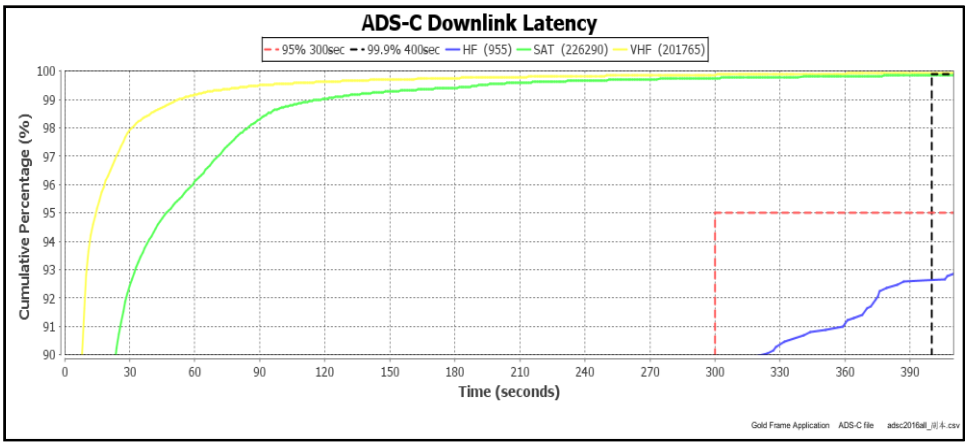

Figure 1: Urumqi FIR ADS-C Downlink Latency

2.21 **FIT-Asia/5/WP/05/Attachments A and B** provided further detailed analysis.

India Data Link Performance

2.22 India provided performance data for the ADS-C/CPDLC data link ground station in the Chennai FIR for the period from February to December 2015. Of the 4 data link ground systems operational in India, it was possible to extract data only from the Chennai ground system. **Table 2** and **Figure 2** present the overall CPDLC ACP by media type for the analysis period.

CHENNAI FIR CPDLC ACP				
Messages		% < 180 sec (Target 95%)	% < 210 sec (Target 99.9%)	Remarks
Satellite	44080	99.06%	99.46%	
VHF	81246	99.58%	99.71%	
HF	3	75.71%	80.48%	
ALL	125329	99.40%	99.62%	

Table 2: Chennai FIR CPDLC ACP per media type

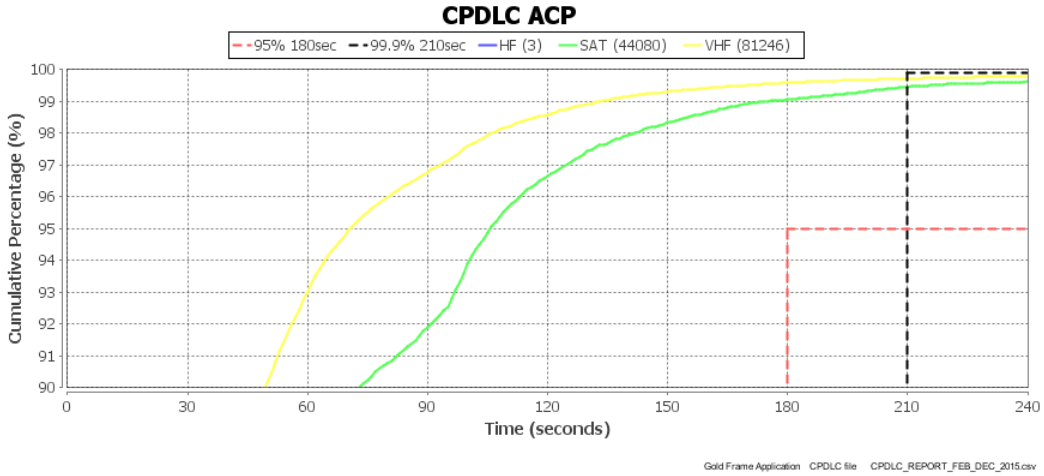

Figure 2: Chennai FIR ACP by Data Link Media Type

2.23 **Table 3** and **Figure 3** present ADS-C Downlink Latency for messages sent within the Chennai FIR per media type for the analysis period.

2.24 CHENNAI FIR ADS-C Downlink Latency				
Messages		% < 90 sec (Target 95%)	% < 180 sec (Target 99.9%)	Remarks
Satellite	218330	95.41%	98.60%	
VHF	312981	97.98%	99.36%	
HF	2193	66.99%	84.72%	
Total	533504	96.80%	98.99%	

Table 3: Chennai FIR ADS-C Downlink Latency per media type

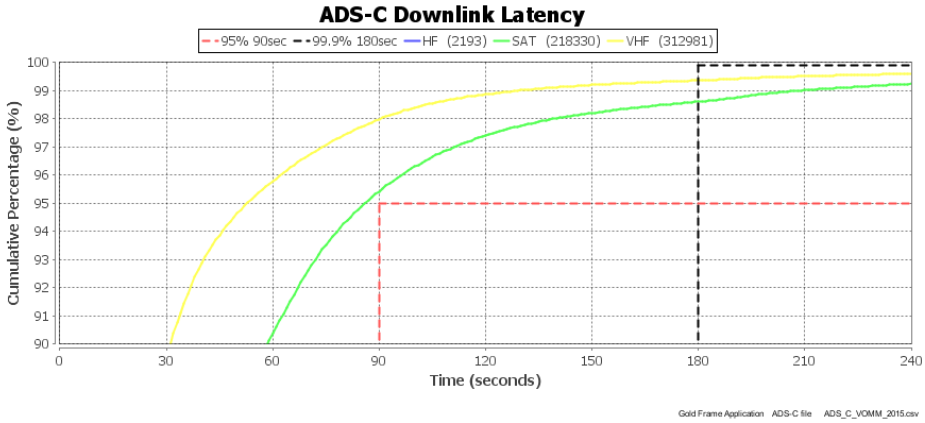

Figure 3: Chennai FIR ADS-C Downlink Latency per Media

2.25 Further data link performance analysis for the Chennai FIR was provided in **FIT-Asia/5 IP/02 Attachment A**.

Data Link Performance Report for Singapore FIR 2015 (IP/03)

2.26 Singapore presented data link performance data for the Singapore FIR for 2015.

2.27 **Table 4** and **Figure 4** summarize overall CPDLC ACP by media type for the period from January to December 2015. The ACP for messages sent via Satellite and VHF met the 95 percent criterion but marginally fell below the 99.9 percent criterion.

2.28 WSJC FIR CPDLC ACP by Data Link Media Type

Messages		**% > 180 sec (Target 95%)**	**%> 210 sec (Target 99.9%)**
Satellite	19,517	97.82	98.64
VHF	39,489	99.48	99.60
Total	59,006	98.93	99.28

Table 4: WSJC FIR CPDLC ACP by Data Link Media Type

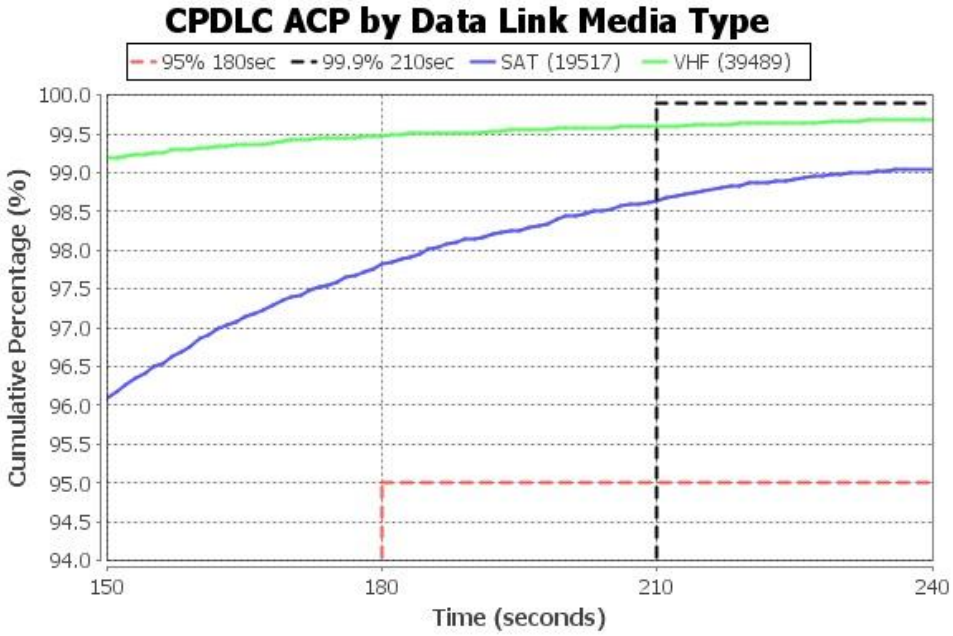

Figure 4: WSJC FIR CPDLC ACP by Data Link Media Type

2.29 **Table 5** summarizes ADS-C downlink latency per media type for the analysis period. The downlink latency met the 95% criterion but fell marginally below the 99.99% criterion.

2.30 WSJC FIR ADS-C Downlink Latency

Messages		**% > 90 sec (Target 95%)**	**%> 180 sec (Target 99.9%)**
Satellite	24,544	96.40%	99.36%
VHF	45,799	99.40%	99.80%
Total	70,343	98.36%	99.65%

Table 5: WSJC FIR ADS-C Downlink Latency by Data Link Media Type

2.31 Further detailed analysis was provided to the meeting in **FIT-Asia/5/IP03/Attachment A**.

FIT-Asia/5 Outcomes Resulting from the Operational Data Link Seminar

2.2 The Operational Data Link Seminar was supported by the attendance of members of the Operational Data Link Specific Working Group of the ICAO Communication Panel (OLPLINK WG, formerly OPLINKP). 18 presentations were made to the Seminar covering a broad range of topics related to PBCS including *inter alia* preparation and implementation, post-implementation monitoring and performance analysis, transition strategy, challenges and issues, and ATC automation system considerations.

2.32 A list of action items arising from FIT-Asia/5 consideration of the outcomes of the Seminar was provided in **FIT-Asia/5/Report of the Meeting/Appendix E.**

2.33 The meeting agreed to recommend to APANPIRG/27, through RASMAG/21, that a Regional Transition Strategy should be based on option **3** of the following:

1. Stop applying performance-based separation minima from the applicability date of the new provisions, until PBCS was fully implemented.

   Note: Under this option the use of RCP / RSP flight plan designators by ANSPs beginning November 2016 would, in effect, stop the application of existing performance-based horizontal separation minima if many operators were not yet eligible to file RCP / RSP indicators in FPL.

2. Consider the implemented performance-based separation minima to have "trial" status.

3. Continue with the current operational implementation of performance-based separation minima under certain conditions.

   Conditions: Recognizing that performance-based separations are currently applied by a number of States, and that monitoring, analysis and rectification of CPDLC and ADS-C performance and problems should be conducted under existing provisions of the ICAO Doc. 9869 – PBCS Manual and Doc 10037 Global Operational Data Link Document (GOLD)

2.34 **FIT-Asia/5/Report of the Meeting/Appendix E** listed the outcomes considered and agreed by the meeting, in the form of a list of action items and the following Draft Conclusions:

Draft Conclusion FIT-Asia/5-1: PBCS Operator Requirements	
That, States are urged to take appropriate measures to develop, establish, implement and promulgate, through advisory circular or other relevant State instrument, necessary policies and procedures to enable operators conducting flights in airspace where separations are dependent on performance-based communication and surveillance (PBCS) to start using required communication performance (RCP) / required surveillance performance (RSP) indicators in the flight plan as soon as possible. This should take into account: a) time for the operator to comply with the States' policies; and b) the need for the State to distribute data from PBCS monitoring programs, as necessary.	Expected impact: ☐ Political / Global ☒ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: To ensure aircraft operators are prepared for implementation of performance-based separations by States in APAC and other Regions implementing the new PBCS provisions	
When: 10 November 2016	Status: Draft to be adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

Draft Conclusion FIT-Asia/5-2: State Implementation of ICAO Provisions for PBCS	
That, States that apply or plan to apply 30 NM and/or 50 NM longitudinal separation minima and/or 23 NM lateral separation minimum are urged to implement the ATM system capability to process and use ICAO PBCS flight plan indicators to determine aircraft eligibility for performance-based separation by not later than 29 March 2018; and Common implementation dates are applied by States using RCP/RSP indicators to establish performance-based separation in adjacent airspace, supported by joint submission of Proposals for Amendment (PfA) to ICAO Doc 7030 – Regional Supplementary Procedures.	Expected impact: ☐ Political / Global ☒ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: Recognizing that many States will not be ready to fully implement the new PBCS provisions on the applicability date of 10 November 2016.	
When: As soon as possible, but not later than 29 March 2018.	Status: Draft to be adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

Draft Conclusion FIT-Asia/5-3: Asia/Pacific Region PBCS Transition Strategy	
That, the Asia/Pacific Region PBCS Transition Strategy at **Attachment B** be endorsed, and posted on the Asia/Pacific Regional Office website.	Expected impact: ☐ Political / Global ☒ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: Recognizing that many States will not be ready to fully implement the new PBCS provisions on the applicability date of 10 November 2016.	
When: As soon as possible, but not later than 29 March 2018.	Status: Draft to be adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

2.35 The meeting requested that, due to the timing of the APANPIRG/27 meeting being only 2 months before the applicability of the new RCP/RSP provisions, ICAO Asia/Pacific Regional Office circulate a State letter highlighting the outcomes from FIT-Asia/5 and the Draft Conclusions that would be proposed to APANPIRG/27. Accordingly, State Letter AP064/16 (ATM) was distributed to States on 3 June 2016. The letter enclosed attachments:

A. Summary of Outcomes of the Operational Data Link Seminar and FIT-Asia/5;

B. A List of challenges and issues related to PBCS implementation;

C. A Draft PBCS implementation plan checklist;

D. A Draft APAC Regional PBCS transition strategy; and

E. A survey of the current and planned implementation of performance-based horizontal separation minima.

2.36 To facilitate standardized tracking, recording and reporting of PBCS planning and implementation status, the meeting agreed to utilize the PBCS Planning Chart appended at **FIT-Asia/5/Report of the Meeting/Appendix D**.

2.37 The meeting reviewed the FIT-Asia task list, closing or completing 3 tasks and raising 11 new tasks. 7 outstanding or ongoing tasks remained open. The task list as updated by the meeting was provided at **FIT-Asia/5/Report of the Meeting/Appendix D**.

Expanded Role for En-Route Monitoring Agencies (EMAs)

2.38 The meeting discussed the possible future requirement for safety monitoring of data link performance reports under PBCS, and whether this may potentially be included in an expanded role for En-route Monitoring Agencies (EMAs), was discussed. The meeting agreed that the matter should be referred to RASMAG for consideration.

2.39 Accordingly, RASMAG/21 may recall the following APANPIRG Conclusion:

Conclusion 24/25: En-Route Monitoring Agency Role and Tasks

Considering the requirement for a defined process of monitoring airframe Required Communication Performance (RCP) and Required Surveillance Performance (RSP) compliance, and analysis of data-link performance affecting horizontal separation standards that utilise data-link, Asia/Pacific States should:

a) in collaboration with RASMAG, assign an En-Route Monitoring Agency (EMA) for each FIR; and

b) support the assigned EMA with the provision of information regarding –

i. observed aircraft horizontal navigation performance; and

ii. observed non-compliant data-link performance of individual aircraft; and

iii. aircraft data-link approvals, and

c) recognise the potential benefit of EMAs in providing risk analysis to support horizontal separation implementation.

2.40 Noting the PBCS requirements supporting several horizontal separation minima either currently or planned to be implemented in the APAC Region, RASMAG should consider expanding the role of Asia/Pacific Region EMAs to incorporate Conclusion 24/25, and to also conduct safety monitoring of the new PBCS provisions.

3. ACTION BY THE MEETING

The meeting is invited to:

a) note the information contained in this paper;

b) Note the poor engagement of FIT-Asia States, and the current Air Navigation Deficiencies relating to data link performance monitoring, analysis and problem reporting;

c) Refer the outcomes of the Data Link Seminar and the following Draft Conclusions to ATM/SG for further consideration:

i) **Draft Conclusion FIT-Asia/5-1: PBCS Operator Requirements;**

ii) **Draft Conclusion FIT-Asia/5-2: State Implementation of ICAO Provisions for PBCS**

iii) **Draft Conclusion FIT-Asia/5-3: Asia/Pacific Region PBCS Transition Strategy**

d) Agree to expand the EMA role to include APANPIRG Conclusion 24/25 and PBCS safety monitoring.

e) discuss any relevant matters as appropriate.

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Administration	Datalink Service Status				ADS-C/ CPDLC Seamless Expectation (Nov 2015)	FIT-Asia CRA Registration	Problem Reports to FIT-Asia CRA	ADS/CDPLC Operational Performance Reported to FIT-Asia
	ADS-C	CPDLC	AIDC	Others (i.e.DFIS)				
Afghanistan					TBA			
Bangladesh					TBA			
Bhutan					TBA			
Cambodia					TBA			
China	X	X			YES	YES		YES
Hong Kong China					TBA			
Macao China					NO			
India	X	X			YES	YES	YES	YES
Indonesia	X	X			YES	YES		
DPR Korea					TBA			
Republic of Korea					TBA			
Lao PDR					TBA			
Malaysia	X	X			YES	YES		
Myanmar	X	X			YES	YES		
Maldives	X	X			YES	YES		
Mongolia					YES			
Nepal					TBA			
Pakistan					TBA			
Philippines					YES	YES + SEASMA*	YES	
Sri Lanka	X	X			YES	**YES**		
Singapore	X	X			YES	SEASMA*	YES	YES
Thailand					TBA			
Viet Nam	X	X			YES	SEASMA*		

* *The South East Asia Safety Monitoring Agency (SEASMA) provides CRA service for Philippines, Singapore and Viet Nam. Philippines has not yet implemented data-link services. Singapore provides performance reports for the Singapore FIR to FIT-Asia. Current SEASMA CRA arrangements expire September 2016.*

** *To be updated during FIT-Asia/5*

Current ANS Deficiency | Proposed ANS Deficiency | Deficiency for deletion

DRAFT

PERFORMANCE-BASED COMMUNICATION AND SURVEILLANCE (PBCS) IMPLEMENTATION STRATEGY FOR THE ASIA/PACIFIC (APAC) REGIONS

Considering that:

1. The ICAO Provisions for PBCS including new Standards and Recommended Practices (SARPS) and related guidance material are applicable from 10 November 2016;

2. Aircraft operators are not likely to be ready to file Required Communication Performance (RCP) and Required Surveillance Performance (RSP) designators in flight plans[i];

3. Some Asia/Pacific Region States providing Required Navigation Performance (RNP)-based horizontal separation minima requiring the use of Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance – Contract (ADS-C) are not likely to be ready to implement separation minima based on PBCS designators in flight plans;

4. Some States outside the APAC Regions may require the filing of PBCS designators in flight plans for the provision of 50 NM and 30 NM longitudinal and 23 NM (formerly 30 NM) lateral separation minima on or soon after the applicability date of the PBCS provisions;

5. Area Navigation (RNAV) and Required Navigation Performance (RNP)-based 50 NM and 30NM longitudinal 30NM lateral separation minima are currently being applied in some APAC Region FIRs, normally between a relatively small proportion of eligible aircraft pairs;

6. RNAV and RNP-based horizontal separation minima should already be supported by data link performance monitoring in accordance with Annex 11 requirements; and

7. ATM automation systems should, as a minimum, currently be configured to accept without processing PBCS indicators in received flight plans[ii].

The APAC Regional PBCS Implementation Strategy is as follows:

1. States are urged to take appropriate measures to develop, establish, implement and promulgate, through advisory circular or other relevant State instruments, necessary policies and procedures to enable operators conducting flights in airspace where separations are dependent on Performance-Based Communication and Surveillance (PBCS) to start using required communication performance (RCP) / required surveillance performance (RSP) indicators in the flight plan as soon as possible.

   This should take into account:

   a. time for the operator to comply with the States' policies; and

   b. the need for the State to distribute data from PBCS monitoring programs, as necessary.

2. The application of existing and planned RNAV and RNP-based 50 NM and 30NM longitudinal and 30NM lateral separation minima should continue, subject to the conditions that:

   a. PBCS monitoring is in place; and

   b. Performance-based horizontal separation using PBCS designators in flight plans is implemented as soon as practically possible;

3. Common implementation dates are applied by States using PBCS indicators to establish performance-based separation in adjacent airspace, supported by joint submission of Proposals for Amendment (PfA) to ICAO Doc 7030 – Regional Supplementary Procedures; and

4. States that apply or plan to apply 30 NM and/or 50 NM longitudinal separation minima and/or 30 NM or 23 NM lateral separation minimum are urged to implement the ATM system capability to process and use ICAO PBCS flight plan indicators to determine aircraft eligibility for performance-based horizontal separation by **not later than 29 March 2018**; and

5. States applying performance-based horizontal separation minima, whether RNAV/RNP or PBCS based, should report their implementation status to the FANS-Interoperability Team – Asia (FIT-Asia) at least once annually, and upon any change of implementation status[iii].

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[i] RCP and RSP designators in the flight plan complement existing Required Navigation Performance (RNP) designators

[ii] As described in the *Asia/Pacific Guidance Material for the Implementation of Amendment 1 to the 15th Edition of the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444).*

[iii] Reporting form to be developed and distributed by the FIT-Asia Secretary.