International Civil Aviation Organization

Seventh Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/7)

Bangkok, Thailand, 3 to 6 July 2023

Agenda Item 3: Regional Reporting

ASIA/PACIFIC SEAMLESS ANS PLAN UPDATE

(Presented by the Secretariat)

SUMMARY

This paper presents a proposed update of the Performance Improvement Plan of the Asia/Pacific Seamless ANS Plan for initial review by AOP/SG.

1. INTRODUCTION

1.1 The update cycle of the Asia/Pacific Seamless ANS Plan was based on the intention that the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) and its contributory bodies conduct a complete review every three years to align with the review cycle of the Global Air Navigation Plan (GANP). The last review of the Seamless Plan was conducted in 2019, in the same year as the last major update of the GANP

1.2 Phase II of the *Performance Improvement Plan* of the Seamless Plan was expected to be implemented by 07 November 2019, Phase III by 03 November 2022, and Phase IV by 25 November 2025.

1.3 The Asia/Pacific Air Navigation Plan Volume III is intended to incorporate regional planning objectives, priorities and targets, implementation monitoring and reporting, and other regional guidance material, under the management of APANPIRG.

1.4 The 10th Meeting of the Air Traffic Management Sub-Group of APANPIRG (ATM/SG/10, Video Teleconference, 17 to 21 October 2022) was informed of Secretariat planning for the update of the Asia/Pacific Seamless ANS Plan, and formed two Small Working Groups (SWG) to develop guidance material and performance expectations for inclusion in the updated version of the plan.

1.5 The outcomes of the ATM/SG/10 meeting were subsequently reported to the APANPIRG/33, held in Bali, Indonesia, from 22 to 24 November 2022. The APANPIRG/33 meeting also discussed outcomes from the 26th Meeting of the Communications, Navigation and Surveillance Sub-Group (CNS SG/26), held by Video Teleconference from 05 to 09 September 2022.

1.6 The following includes Seamless ANS Plan-related discussion outcomes from the APANPIRG/33 meeting, and an initial proposed update of the Seamless ANS Plan.

2. DISCUSSION

APANPIRG/33 Discussion

Updating the Asia/Pacific Seamless ANS Plan (WP/20)

2.1 The Secretariat presented a proposal for the update of the Asia/Pacific Seamless Air Navigation Services (ANS) Plan for APANPIRG's consideration.

2.2 The update cycle of the Seamless ANS Plan was based on the intention that APANPIRG and its contributory bodies conduct a complete review every three years to align with the review cycle of the Global Air Navigation Plan (GANP) and the meeting cycle of the ICAO Assembly. The last review of the Seamless ANS Plan was conducted in 2019, in the same year as the last major update of the GANP.

2.3 The scheduling of the Seamless ANS Plan updates to coincide with the GANP cycle and the approval of the GANP update by the Assembly presented a significant challenge to the Asia/Pacific Region in terms of fully analyzing and comprehending GANP changes which may be still under final development quite late in the cycle, and then identifying and prioritizing GANP elements for regional implementation while developing any proposed regional planning elements in parallel. An example was provided, where the 2019 meetings of all APANPIRG technical Sub-Groups were held prior to the formal approval of the GANP update by the 40th Session of the Assembly.

2.4 The meeting agreed to the proposal for the Seamless ANS Plan to be updated during 2022/2023, and presented to APANPIRG Sub-Groups in 2023 before then being presented for the approval of APANPIRG/34 in 2023. Subsequent updates of the Seamless ANS Plan would be conducted in the year immediately following the year of the ICAO Assembly.

2.5 APAC Administrations were invited to provide details of a single Point of Contact for participation in the review activity.

2.6 **Attachment 1** provided APANPIRG/33 with an initial summary of considerations for the update of the Seamless ANS Plan. It was proposed that the Seamless ANS Plan be updated during 2022/2023, and presented to APANPIRG Sub-Groups in 2023 before then being presented for the approval of APANPIRG/34 in 2023.

2.7 The meeting was also informed that the unavailability of the Seamless ANS reporting portal, which had been requested in 2019, had been the subject of intensive coordination between the CNS Section of ICAO APAC Office and ICAO Headquarters. A further delay in the development of a new reporting interface was caused by licensing issues. However, a new reporting interface had been made available for internal ICAO review and testing before proceeding to final stages of development.

2.8 Japan expressed support for the proposal, which would also take into consideration the outcomes of the 41st Session of the ICAO Assembly.

2.9 AOP/SG/7 is invited to note that the Secretariat had initially given consideration to both updating the Seamless ANS Plan and migrating it into ANP Vol III in the same operation. However, after subsequent internal discussion the Secretariat considered this would be confusing for Stakeholders, and therefore determined that the migration into ANP Vol III be executed under a separate project after the update of the existing Seamless ANS Plan.

Demonstration of ANS Reporting Portal

2.10 ICAO provided a demonstration of the Seamless ANS Reporting Portal (β version) that was currently being developed by ICAO.

2.11 ICAO informed the meeting that the Portal was undergoing testing by ICAO at the moment but would also be available for testing by APAC States/Administrations. States/Administrations that wished to participate in the trial testing of the reporting portal were invited to contact ICAO. Following successful testing and finalization of the reporting portal, APAC States/Administrations would be notified of its availability by State Letter.

Conclusions Relating to the Asia/Pacific Seamless ANS Plan

2.12 The following Conclusion relating to the Asia/Pacific Seamless ANS Plan was agreed by APANIRG/33:

Conclusion APANPIRG/33/9 *(CNS SG/26/06 (SWIM TF/06/02, SWIM TF/06/04)):* ***The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan***

1. *To set the timeframe for the implementation of SWIM in the Asia-Pacific region to be between 2024 and 2030, with 2030 being the target timeline for implementation completion.*
2. *To include SWIM implementation in the next edition of the Asia/Pacific Seamless ANS Plan.*

2.13 The following Decisions (excerpts) relating to the Seamless ANS Plan were agreed by ATM/SG/10:

Decision ATM/SG/10-3: Establish FF-ICE Operational Requirements Small Working Group

That, ATM/SG establishes the FF-ICE Operational Requirements Small Working Group, that will:

.....

e) recommend priority ASBU elements and develop draft regional performance objectives for consideration for inclusion in the Asia/Pacific Seamless ANS Plan version 4.0.

Decision ATM/SG/10-8: Space Vehicle Launch and Re-entry Coordination Small Working Group

That, the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG), reporting to ATM/SG, be formed to:

.....

2. Recommend consolidated guidance and performance expectations for inclusion in the 2023 update of the Asia/Pacific Seamless ANS Plan.

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Initial Proposal – Revision of the Asia/Pacific Seamless ANS Plan

2.14 A draft proposal for revision of the Seamless ANS Plan Section 7 – *Performance Improvement Plan* is provided in **Attachment 2**. This section of the Plan provides the regional performance expectations, including elements relating to aerodrome operations and planning. The meeting is invited to examine the attachment and provide feedback to the Secretariat, and in particular the following:

- Proposed preliminary paragraph (x.xx), intended to provide information during initial consultation but to be later relocated into the revised Section 2, *Plan Objectives and Development*.
- editoral amendments to existing Phase II and III performance expectations;
- the re-inclusion of reference to *high density* aerodromes at various points commencing with paragraph 7.1, and a revised definition proposed (footnote to paragraph 7.1);
- inclusion of omitted heading Aerodrome Operations immediately prior to paragraph 7.18;
- paragraphs 7.22 and 7.23 reworded to refer to *Terminal Areas serving high density aerodromes*, and placed under new heading *Terminal Operations*;
- new paragraph x.xx (future numbering) after 7.23 proposing a new airspace/ATC procedure in Terminal Areas serving high density aerodromes;
- clarification of wording in paragraph 7.48, and provision of Annex 14 reference for ICAO aerodrome reference codes provided in a footnote;
- paragraph 7.49 reworded to refer to ATM systems serving *high density* international aerodromes;
- new Phase V paragraphs 7.60, 7.61, 7.65 and 7.66, relevant to aerodrome operations and planning.

2.15 AOP/SG is invited to identify Priority 1 ASBU elements identified in the new performance expectations.

2.16 AOP/SG is further invited to comment on a Secretariat proposal to revise the numbering format of performance expectations to more clearly identify the implementation phase to which they apply, and to future-proof the document against re-numbering of existing paragraphs at future updates where superseded phases are removed. This would also remove the requirement for confusing update of the Seamless ANS Reporting Form when it becomes available.

2.17 The following format is being considered by the Secretariat:

Phase III performance expectations:

III-1 text

III-2 text

III-3 text

Phase IV performance expectations;

IV-1 text

IV-2 text

IV-3 text

Further Development

2.18 It is intended that Sections 1 to 6 of the Seamless ANS Plan be rationalized and simplified to the extent possible, removing information considered redundant, duplicated, or explaining now widely-understood concepts.

2.19 Guiding principles adopted by the Secretariat for this work are:

- refrain from introducing new regional elements, except where absolutely necessary;
- focus on APAC Regional Prioritization of ASBUs; and
- keep in mind the ICAO *No Country Left Behind* (NCLB) principle.

2.20 The process agreed by APANPIRG/33 for updating the Plan includes the following:

1. Secretariat editorial review, and inclusion of new elements arising from APANPIRG/33;
2. Circulation to Points of Contact for APAC Administrations for comment, feedback;
3. Circulation to APANPIRG Sub-Groups;
4. (if necessary) workshop activity; and
5. Presentation of final draft to APANPIRG/34 for adoption.

2.21 Asia/Pacific Administrations wishing to participate in the review of the Seamless ANS Plan have provided their POC details. The proposal will be presented to the CNS, MET and ATM Sub-Groups of APANPIRG for discussion, before being presented to APANPIRG/34 for approval under a formal Conclusion.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the outcomes of discussion of APANPIRG/33 and ATM/SG/10;

b) review and provide feedback to the Secretariat on the proposed revision of the Seamless ANS Plan Section 7 – *Performance Improvement Plan*;

c) note, and participate in, the further development of the Plan update; and

d) discuss any relevant matters as appropriate.

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ATTACHMENT 1: INITIAL CONSIDERATIONS FOR UPDATE OF ASIA/PACIFIC SEAMLESS ANS PLAN (Current Version 3.0)

Need for Update of APSAP

GANP Update, Revising Performance Expectations, KPI

The COVID-19 crisis has proven to be a challenge for the safety and resilience of the aviation system. Furthermore, the economic impact of the COVID-19 pandemic on the aviation industry had forced the re-evaluation of priorities at regional and national levels that may risk the achievement of the GANP vision. Hence a comprehensive review of APSAP implementation, milestones and priorities should be taken up.

GANP and GASP have been updated in 2022. Additional KPIs have been included to link safety with GANP.

Review of Scope of Plan (1.1 to 1.8)

Clear linkage between APSAP and RANP Vol III to be brought out.

Review of Update Cycle (1.9-1.14)

The ICAO Assembly, at its 39th Session, agreed on the expansion of the GANP lifecycle through three-year minor and six-year major updates, as relevant, in order to provide for stability. While the sixth edition of the GANP, endorsed by the Assembly at its 40th Session, constituted a major update, a seventh edition, containing minor updates, is being proposed for endorsement in the 41st Assembly.

In order to keep the APSAP current, it is proposed to conduct a complete review every three years (or a shorter period determined by APANPIRG) of the Plan to align with the review cycle of the GANP. Hence it is proposed to undertake the review in 2022-2023 and submit for approval of APANPIRG/34 in 2023.

The next review will be undertaken in 2025-26 and put up for approval of APANPIRG in 2026.

Review of Executive Summary

Update the sections 3.1 to 3.17

Review of Background info and linkage to ASBU (5.2 to 5.8)

APAC ASBU Block 0 and Block 1 implementation, priorities need to be reviewed by each concerned section.

Considering that the next review of APSAP will be in 2026, we also need to review the Priorities within each ASBU element. Not all modules of a particular element within a Block may be equally desirable or applicable.

Review of Regional Elements (5.9 to 5.10)

There are 20 regional Elements described across Operational and Technology. These need to be reviewed.

Review of prioritization for APAC (5.11)

There are 16 Priority 1 elements including the Regional Elements. This also need a review.

Review of Human Performance section (5.12 to 5.22)

There is a large section focusing on Human Performance. With the publication of PANS TRG in 2020 a large part of this section is superfluous. Needs to be reviewed.

Also the AOP has published guidance on CBT for Airport Operations Personnel.

Review of CMC (5.23 to 5.33)

Publication of Doc 10088 has largely provided guidance to States on CMC and FUA. This section needs to be updated including the 10 CMC elements.

Review of UAS (para 5.35 – 5.38)

Inline with regional guidance and latest HQ publications.

Review of Current Situation (6.1 – 6.41)

To be updated

Review of Performance Improvement Plan (7.1 to 7.56)

Review of PARS Phases – Review Phase II, III and develop Phase IV

Review of PSAL Phases – Review Phase II, III and develop Phase IV

Review of Milestones, Priorities and Actions (9.1 to 9.14)

Section 9.1 to 9.14 – Reference to NANP and actions

Review of Appendices

Appendix B: Review 12th ANC Recommendations for relevance

Appendix C: Seamless ANS Principles

The 37 principles of APSAP which include People, Facilities and Technology will need to be reviewed

Appendix D: Review of Capacity expectations – why this is needed?

Mapping of ASBU B0, B1 and B2 elements, priorities and responsible ICAO RO section

Functional Category	Element	Description	Priority	Responsibility for Review and Monitoring
Information	AMET B0/1-4	Meteorological observations, forecast, warning, climatological and historical products, and dissemination (PASL 7.41)	1	RO (MET)
	AMET – B1/1-4	Meteorological products supported by automated decision systems or aids using IWXXM (PASL 7.56)	2	
	DAIM-B1/1 – 6:	Provision of quality-assured digital aeronautical data and information, including AIP, terrain and obstacle, aerodrome and instrument flight procedure data sets (PASL 7.40)	1	RO(ATM-AIM)
	DAIM-B1/7	Provision of digital NOTAM improvements (PASL 7.55)	2	
	FICE-B0/1:	Automated basic AIDC (PASL 7.26)	1	RO (CNS)
Operational	ACDM-B0/1-2:	ACIS (PARS 7.3)	1	RO (ATM-ATFM)
	ACDM-B1/1 – 2:	Airport CDM Integration with ATM Network, AOP and APOC (PARS 7.18)	2	RO (AGA) / RO (ATM-ATFM)
	APTA-B0/1 – 2:	Basic PBN SID and STAR procedures, PBN non-precision approaches (PARS 7.4, 7.5, 7.10, 7.13, 7.14, 7.21)	1	RO (CNS) / RO (PBN)
	APTA-B0/3 and 6	SBAS/GBAS CAT I precision approach procedures, and PBN Helicopter PinS Operations (PARS 7.5, 7.6, 7.10, 7.14, 7.21)	3	
	APTA-B0/4 – 5, 7 – 8:	CDO (Basic) and CCO (Basic), and performance-based aerodrome operating minima for advanced/basic aircraft (PARS 7.14, 7.19, 7.21)	2	
	APTA-B1/1 – 5:	advanced capability PBN approaches, PBN SID and STAR procedures and performance-based aerodrome	3	

		operating minima for advanced aircraft with SVGS, CDO and CCO (Advanced) (PARS 7.14, 7.21, 7.22, 7.23)		
	CSEP-B1/1 – 4:	basic airborne situational awareness AIRB and VSA, and performance-based horizontal separations (PARS 7.20)	2	?????
	FRTO-B0/1 – 4:	Direct routing, Airspace Planning and FUA, Flexible Routings, and basic conflict detection and conformance monitoring (PASL 7.29, 7.31, 7.36)	1	RO (ATM) / RO (ATM-AOM) / RO (ATM-CMC)
	FRTO-B1/1 – 7:	Free Route Airspace, RNP routes, Advanced FUA and Airspace Management (ASM), Dynamic Sectorisation, Enhanced Conflict Detection Tools and Conformance Monitoring, and Multi-Sector Planner Function (PASL 7.29, 7.51)	2	
	NOPS-B0/1 – 5:	Initial integration of ASM with ATFM, Collaborative Network Flight Updates, Basic Network Operation Planning and Initial Airport/ATFM slots, A-CDM Network Interface and Dynamic Slot Allocation (PASL 7.38)	1	RO (ATM-ATFM)
	NOPS-B1/1 – 10:	Short Term ATFM measures, Enhanced NOPS Planning, Enhanced integration of airport operations and NOPS planning, Enhanced Traffic Complexity Management, Full integration of ASM with ATFM, Initial Dynamic Airspace configurations, Enhanced ATFM slot swapping, Extended Arrival Management, ATFM Target Times and Collaborative Trajectory Options Programme (PASL 7.52)	2	
	OPFL-B0/1:	ITP	3	RO (ATM) / RO (AOM)

	OPFL-B1/1:	CDP	3	????
	RATS-B1/1	Remotely Operated Aerodrome Air Traffic Services	3	RO (AGA) / RO (CNS) / RO (ATM)
	RSEQ-B0/1 – 2:	Arrival and Departure Management (PASL 7.32)	1	RO (ATM) / RO (AGA)
	RSEQ-B0/3 –	Point merge	3	RO (ATM) / RO (AOM)/ RO (PBN)
	RSEQ-B1/1 –	Extended arrival metering (PASL 7.46)	2	RO (ATM) / RO (ATFM)
	SNET-B0/1 – 4	STCA, MSAW, APW, APM (PASL 7.31)	1	RO (ATM) / RO (CNS)
	SNET-B1/1 – 2:	Enhanced STCA with aircraft parameters and in complex TMAs (PASL 7.50)	2	
	SURF-B0/1 – 3:	Basic ATC surface operations tools, comprehensive situational awareness, situational awareness, alerting service (PASL 7.47)	2	
	SURF-B1/1 – 5:	Advanced surface traffic management visual aids, pilot comprehensive awareness and runway alerting, enhanced ATC alerting, routing service to support ATC and EVS for taxiing (PASL 7.48)	2	
	TBO-B0/1:	Introduction of time-based management within a flow centric approach (PASL 7.52)	2	RO (ATM) / RO (AOM) / RO (ATFM) / RO (CNS)
	TBO-B1/1 –	Initial Integration of time-based decision making processes (PASL 7.52)	2	
CNS Technology and Services	ASUR-B0/1 – 3:	ADS-B, MLAT, SSR-DAPS (PARS 7.8, 7.11, PASL 7.26, 7.28, 7.30)	1	RO (CNS)
	ASUR-B1/1 –	Reception of aircraft ADS-B signals from space (SB ADS-B) (PASL 7.54)	2	
	COMI-B0/1 – 2, 4 – 6:	ACARS, ATN/OSI, VDL Mode 2 Basic, SATCOM Class C Data, HFDL (PASL 7.54)	2	
	COMI-B0/3, 7:	VDL Mode O/A, AMHS (PASL 7.25)	1	
	COMI-B1/1 – 4:	VDL Mode 2 Multi-Frequency, SATCOM Class B	2	RO (CNS)

		(SB-S) Voice and Data, ATN/IPS and AeroMACS Ground-Ground (PASL 7.53)		
	COMS-B0/1 – 2:	CPDLC (FANS 1/A & ATN B1) for domestic and procedural airspace and ADS-C (FANS 1/A) for procedural airspace (PARS 7.14, PASL 7.29, 7.53)	2	
	COMS-B1/1 – 3	: PBCS approved CPDLC (FANS 1/A+), ADS-C and SATVOICE for domestic and procedural airspace (PARS 7.14, PASL 7.53)	2	
	NAVS-B0/1 – 4:	SBAS, GBAS, ABAS, MON (PARS 7.7)	2	
	NAVS-B1/1:	Extended GBAS	3	

PERFORMANCE IMPROVEMENT PLAN

x.xx The Asia/Pacific Seamless ANS Plan, Version 3.0 (November 2019) , specified performance objectives to be implemented in three phases of *Preferred Aerodrome/Airspace and Route Specifications* (PARS) and *Preferred ANS Service Levels* (PASL). This version of the Plan, is structured under the following phases:

- Phase II – expected implementation by 07 November 2019;
- Phase III - expected implementation by 03 November 2022; and
- Phase IV – expected implementation by 27 November 2025; and
- Phase V – expected implementation by 23 November 2028.

Note 1: Phase I – elements (expected implementation by November 2015) that had not been completed by November 2019 were moved to Phase II;

Note 2: Phases II and III are retained in this version of the plan due to the delayed availability of the implementation reporting mechanism following the 2019 update, and taking into consideration the impact of the COVID-19 pandemic.

Preferred Aerodrome/Airspace and Route Specifications (PARS)

Note 1: prior to implementation, the applicability of PARS should be verified by analysis of safety, current and forecast traffic demand, efficiency, predictability, cost effectiveness and environment to meet expectations of stakeholders.

Note 2: Phase I had an expected implementation by 12 November 2015.

PARS Phase II (expected implementation by 07 November 2019)

Aerodrome Operations

7.1 All high density international aerodromes[1] should enable, in accordance with an Airport Master Plan, aerodrome management and coordination services:

a) when traffic density requires, an appropriate apron management service to regulate aircraft operations in coordination with ATS;

b) ATS coordination (including meetings and agreements) related to:

[1] High density aerodromes referenced in these performance objectives are:

- aerodromes having 100,000 scheduled movements per annum or more; or
- aerodromes where strategic slot allocation is implemented; or
- aerodromes designated by the relevant authority as requiring or potentially requiring ATFM implementation.

- airport development and maintenance planning;
- local authority coordination (environmental, noise abatement, and obstacles);

c) regular airport capacity analysis, ~~which included~~ including a detailed assessment of passenger, airport gate, apron, taxiway and runway capacity.

~~*Note 1: Sample runway capacity figures are provided from several States in **Appendix D**.*~~

7.2 Where practicable, all high density international aerodromes should provide, in accordance with an Airport Master Plan, the following facilities to optimise runway capacity:

a) additional runway(s) with adequate separation between runway centrelines for parallel independent operations;

b) parallel taxiways, rapid exit taxiways at optimal locations to minimize runway occupancy times and entry/exit taxiways;

c) rapid exit taxiway indicator lights (distance to go information to the nearest rapid exit taxiway on the runway);

d) twin parallel taxiways to separate arrivals and departures;

e) perimeter taxiways to avoid runway crossings;

f) taxiway centreline lighting systems;

g) adequate manoeuvring area signage (to expedite aircraft movement);

h) holding bays;

i) additional apron space in contact stands for quick turnarounds;

j) short length or tailored runways to segregate low speed aircraft;

k) taxi bots or towing systems, preferably controlled by pilots, to ensure efficiency and the optimal fuel loading for departure; and

l) advanced visual docking guidance systems.

7.3 All high density international aerodromes should operate an A-CDM system for ACIS integrated with the ATM network function consistent with **ACDM-B0/1 – 2** (Priority 1).

Terminal Operations (Category T airspace)

7.4 Where practicable, all aerodromes should have **RNAV 1** (ATS surveillance environment) or **RNP 1** (ATS surveillance and non-ATS surveillance environments) SID/STAR procedures consistent with **APTA-B0/2** (Priority 1).

Note 1: Where a short length or tailored runway designed to segregate low speed aircraft is established, the runway should be served by PBN procedures including SID and STAR that provided segregation from the procedures serving other aerodrome runways as far as practicable.

Note 2: PBN procedures that overlay visual arrival and departure procedures should be established where this provided an operational advantage.

7.5 Where practicable, all instrument runways serving aeroplanes should have the following precision approach systems (or if an APV is not practical, PBN non-precision approaches) consistent with **APTA-B0/1** (Priority 1) and **APTA-B0/3**:

a) SBAS/GBAS precision approaches; or ILS/MLS approaches (with APV approach as a backup); or

b) Approaches with Vertical Guidance (APV), either RNP APCH with Barometric Vertical Navigation (Baro–VNAV) or augmented GNSS (e.g. SBAS); or

c) if an APV is not practical, straight-in RNP APCH with Lateral Navigation (LNAV).

Note: When establishing the implementation of PBN approach procedures in accordance with Assembly Resolution A37-11, States should first conduct an analysis of the instrument runway eligibility for APV approaches. This analysis should include the feasibility of the APV at a particular location, the presence of regular commercial operations and the current or projected user fleet capability for APV. Locations where APV approach were either not feasible or where regular operators could not realise the benefit of APV should implement RNP APCH with LNAV minima instead of APV, to provide the safety benefits of straight-in approach procedures.

7.6 All international aerodromes with rotary wing operations should establish PBN arrival/departure, approach and/or en-route transiting procedures. PBN Helicopter PinS Operations should be established consistent with **APTA-B0/6** where there is an operational benefit (Priority 3).

7.7 SBAS, GBAS, ABAS and MON systems should be established as appropriate to the level and type of aircraft operations and the operating environment consistent with **NAVS-B0/1 - 4**, subject to an assessment of benefits and costs.

Note 1: the application of GNSS and its augmentations such as GBAS Landing System (GLS) is recommended where these systems were economically beneficial.

Note 2: As far as practicable, airspace and instrument flight procedures associated with international aerodromes should not be constrained by international borders and political barriers, and be established only after appropriate consideration of:

a) environmental efficiencies;

b) noise abatement and local authority regulations;

c) adjacent aerodromes;

d) conflicting instrument flight procedures; and

e) affected ATC units or ATM procedures.

7.8 Unless supported by alternative means of ATS surveillance (such as radar, where there are no plans for ADS-B), all Category T airspace supporting international aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B OUT using 1090ES with DO-260/260A and 260B capability to support **ASUR-B0/1**.

Note 1: non-exclusive means that non-ADS-B aircraft may enter the airspace, but may be accorded a lower priority than ADS-B equipped aircraft, except for State aircraft.

Note 2: in areas where ADS-B based separation service was provided, a mandate for the carriage of ADS-B OUT using 1090ES with DO260/60A or 260B is recommended.

Note 3: States should refer to the ADS-B implementation in the ICAO ADS-B Implementation and Guidance Document (AIGD).

7.9 All Category T airspace supporting international aerodromes should require the carriage of an operable mode S transponder within airspace where Mode S radar services are provided to support **ASUR-B0/3**.

7.10 All Category T airspace supporting international aerodromes should be designated as non-exclusive or exclusive PBN airspace as appropriate to allow operational priority for PBN approved aircraft, except for State aircraft, to facilitate seamless operations and off-track events such as weather deviations to support **APTA-B0/1 – 3 and 6**.

En-route Operations

7.11 Unless supported by alternative means of ATS surveillance (such as radar, where there are no plans for ADS-B), all Category S upper controlled airspace supporting international aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B OUT using 1090ES with DO-260/260A and 260B capability to support **ASUR-B0/1**.

7.12 All Category R and S upper controlled airspace should require the carriage of an operable mode S transponder within airspace where Mode S radar services are provided to support **ASUR-B0/3**.

7.13 All Category R and S upper controlled airspace should be designated as non-exclusive or exclusive PBN airspace as appropriate to allow operational priority for PBN approved aircraft, except for State aircraft, to facilitate seamless operations and off-track events such as weather deviations to support **APTA-B0/2**.

Note 1: airspace mandates should be harmonised with adjacent airspace and implemented in accordance with guidance provided in this document.

7.14 As far as practicable, all new ATS Routes should be PBN Routes in accordance with the following specifications to support **APTA-B0/1 – 8**, and **APTA-B1/1 – 5**:

- Category R airspace – **RNP 4**, **RNP 10** (RNAV 10) (other acceptable navigation specifications – RNP 2 oceanic); and
- Category S airspace –**RNAV 2** or **RNP 2**.

Note 1: ATS routes should be designated with a navigation performance specification commensurate with the CNS/ATM operational environment (within Category S airspace, the PBN specification is not significant to ATC as it is used for track-keeping assurance, not ATC separation). The ATS route navigation performance specification selected should be harmonised and utilise the least stringent requirement needed to support the intended operation. When obstacle clearance or ATC separation requirements demand, a more stringent navigation specification may be selected.

Note 2: RNP 2 is expected to be utilised before Phase 2, when the RNP 2 instrument procedure design, ATC separation standards and operational approval are in place. The Asia/Pacific recognises an equivalency for RNP 2 as being an aircraft approved for RNAV 2, RNP 1 and with GNSS. Prior to the ICAO standard flight plan being updated to recognise RNP 2, States should ensure that aircraft operators with RNP 2 approval file designator 'Z' in field 10 and 'NAV/RNP 2' in field 18 (in addition to designator 'R' to indicate PBN approved).

Note 3: within Category R airspace, transition to RNP 4 or RNP 2 oceanic specifications is recommended at the earliest opportunity. RNP 4 and RNP 2 requires ADS-C and CPDLC, whereas RNP 2 oceanic requires dual independent installations.

~~*Note 4: the Nineteenth Meeting of the Regional Airspace Safety Monitoring and Advisory Group (RASMAG/19, 26 – 30 May 2014) endorsed the application of 8NM spaced RNAV 2 ATS routes within Category S airspace by the Republic of Korea, as it had demonstrably met the Target Level of Safety.*~~

7.15 All States should use the ICAO Table of Cruising Levels (FLOS) based on feet as contained in Annex 2 Appendix 3a.

Civil-Military Cooperation

7.16 Civil-Military Airspace expectations are as follows:

a) SUA should only be established after due consideration of its effect on civil air traffic by the appropriate Airspace Authority to ensure it will be:

- used for the purpose that it is established;
- used regularly;
- as small as possible, including any internal buffers, required to contain the activity therein;
- if applicable, operated in accordance with FUA principles; and
- activated only when it is being utilised; and

b) SUA should be regularly reviewed to ensure the activities that affect the airspace, and size and timing of such activity are accurately reflected by the SUA type, dimensions, activation notice and duration of activation.

Unmanned Aircraft Systems

7.17 States should implement regulations supporting the integration of UAS operations in non-segregated airspace, using a risk-based approach and in accordance with the Asia/Pacific Regional Guidance for the Regulation of UAS, as a minimum.

Seamless PARS Phase III (expected implementation by 03 November 2022)

Aerodrome Operations

7.18 All high density international aerodromes should operate an A-CDM system integrated with the ATM network, and an AOP and where practicable an APOC consistent with **ACDM-B1/1 – 2**.

Terminal Area Operations

7.19 Terminal Areas serving high density ~~All~~ international aerodromes should implement CCO and CDO operations consistent with **APTA-B0/4 – 5** where practicable, and performance-based aerodrome operating minima-advanced and basic aircraft consistent with **APTA-B0/7 – 8**.

Note: this does not preclude a State considering implementation of CCO/CDO and performance-based aerodrome operating minima at other aerodromes as appropriate.

7.20 Unless excepted by ATC, all aircraft operating within Category S and T controlled airspace should have systems that enable basic airborne situational awareness AIRB and VSA and where applicable, performance-based horizontal minima consistent with **CSEP-B1/1 – 4**.

En-Route Operations

7.21 As far as practicable, all new ATS Routes should be PBN Routes in accordance with the following specifications to support **COMS-B0/1 – 2, COMS-B1/1 – 3**, **APTA-B0/1 – 8**, and **APTA-B1/1 – 5**:

- Category R airspace – **RNP 2 Oceanic** (other acceptable navigation specification – **RNP 4**); and
- Category S airspace –**RNAV 2** or **RNP 2**.

PARS Phase IV (expected implementation by 27 November 2025)

Terminal Operations

7.22 ~~All~~ Terminal Areas serving all high density international aerodromes should implement advanced capability PBN SID and STAR procedures and performance-based aerodrome operating minima for advanced aircraft with SVGS consistent with **APTA-B1/1 – 3**.

Note: this does not preclude a State considering implementation of advanced capability PBN SID and STAR procedures and performance-based aerodrome operating minima for advanced aircraft at other aerodromes as appropriate.

7.23 Where there is an operational benefit, all Terminal Areas serving high density international aerodromes should implement Advanced CDO and CCO operations consistent with **APTA-B1/4 – 5**.

x.xx Where there is an operational benefit, Terminal Areas serving all high density international aerodromes should implement point merge operations consistent with **RSEQ-B0/3**.

Preferred ANS Service Levels (PASL)

Note: prior to the implementation, the applicability of PASL should be verified by analysis of safety, current and forecast traffic demand, efficiency, predictability, cost effectiveness and environment to meet expectations of stakeholders.

PASL Phase II (expected implementation by 07 November 2019)

ATS Communications

7.24 All ATS sectors providing ATS surveillance in adjacent airspace should have direct speech circuits or digital voice communications, meeting pre-established safety and performance requirements, and where practicable, automated hand-off procedures that allow the TOC of aircraft without the necessity for voice communications, unless an aircraft requires special handling.

Note: this element is applicable to ATC sectors within ATS units and between ATS units providing services in adjacent airspace.

7.25 Where applicable, all ATC Sectors should be supported by VDL Mode O/A and AMHS communication systems consistent with **COMI-B0/3, 7** (Priority 1).

7.26 ATS systems should enable AIDC (version 3 or later), or an alternative process that achieves at least the same level of performance as AIDC, between en-route ATC units and terminal ATC units where transfers of control are conducted consistent with **FICE-B0/1,** unless alternate means of automated communication of ATM system track and flight plan data are employed (Priority 1). As

far as practicable, the following AIDC messages types should be implemented:

- Advanced Boundary Information (ABI);
- Coordinate Estimate (EST);
- Acceptance (ACP);
- TOC; and
- Assumption of Control (AOC).

Note: States should note the necessity to utilise Logical Acknowledgement Message processing (LAM) when implementing AIDC (refer to guidance in Chapter XX in PAN ICD).

ATS Surveillance

7.27 ADS-B (using 1090ES), MLAT or radar surveillance systems should be used to provide coverage of all Category S airspace as far as practicable, and Category T airspace supporting international aerodromes, consistent with **ASUR-B0/1 – 2**. Data from ATS surveillance systems should be integrated into operational ATC aircraft situation displays (standalone displays of ATS surveillance data should not be used operationally).

Note 1: ATM systems, including ATS surveillance systems and the performance of those systems, should support the capabilities of PBN navigation specifications and ATC separation standards applicable within the airspace concerned. Guidance on the performance of ATS communication and surveillance systems is available in ICAO Document Doc 10037 (*Global Operational Data-link Document)*

Note 2: ATC units with ADS-B where Category S and Category T airspace supporting high-density aerodromes may consider utilizing ADS-B for situational awareness and/or separation.

Note 3: ATC units operating within controlled airspace wholly served by Mode S SSR and/or ADS-B surveillance should implement the use of the standard non-discrete Mode A code 1000 for Mode S transponder equipped aircraft to reduce the reliance on assignment of discrete Mode A SSR codes and hence reduce the incidence of code bin exhaustion and duplication of code assignment.

7.28 Subject to appropriate filtering, ATS surveillance data, particularly from ADS-B, should be shared with neighbouring ATC units to support **ASUR-B0/1 – 2**.

7.29 Within Category R airspace, ADS-C surveillance and CPDLC should be enabled to support PBN-based separations, as well as UPR and DARP, consistent with **COMS-B0/1 – 2** and **FRTO-B0/1-4** and **FRTO-B1/1 – 7**.

~~*Note: At the 6th Worldwide Air Transport Conference (ATCONF, Montréal, 18-22 March 2013) support was expressed for work to be undertaken on the schemes of economic incentives, 'best equipped or capable, best served' and 'most capable, best served' concepts. The CONOPS states that in each case where any aircraft that does not meet specified requirements, it should receive a lower priority, except where prescribed (such as for State aircraft).*~~

7.30 Mode S surveillance and the use of Mode S Downlinked Aircraft Parameters (DAPS) should be enabled in all upper level Category S airspace and all Category T airspace servicing high

density city pairs consistent with **ASUR-B0/3**. ATM automation system specifications should include the processing and presentation in ATC human-machine interfaces and decision support and alerting tools, the communications, navigation and approach aid indicators received in items 10 and 18 of FPL and ATS messages, where applicable, and the following Mode S or ADS-B downlinked aircraft parameters as a minimum:

- Aircraft Identification;
- Aircraft magnetic heading;
- Aircraft indicated airspeed or Mach Number; and
- Pilot selected altitude.

Note1: DAPS may not be present in downlinked reports from some aircraft ADS-B applications.

Note 2: Downlinking of correct Aircraft Identification (Flight ID) enables automated coupling of ATS surveillance system information with the flight plan, and unambiguous ATC identification of aircraft. States should undertake comprehensive education programs to ensure pilots set the correct Flight ID. Guidance on the correct use of the aircraft identification function is provided in the ADS-B Implementation and Operations Guidance Document, available on the ICAO Asia/Pacific Regional Office website.

7.31 ATS surveillance systems should enable basic conflict detection and conformance monitoring STCA, MTCD, APW, APM and MSAW consistent with **FRTO-B0/4** and **SNET-B0/1 – 4** (Priority 1). Route Adherence Monitoring (RAM) should be utilised when monitoring PBN route separations. Cleared Level Adherence Monitoring (CLAM) should be utilised to monitor RVSM airspace.

Air Traffic Management

Note: ATM system design (including ATS communication and surveillance, ATC separation minimum, aircraft speed control and ATC training) should be planned and implemented to support optimal aerodrome and enroute operations determined by the capacity expectations for the runway(s) and airspace concerned.

7.32 All international aerodromes where ATFM facilities are required should be served by AMAN/DMAN facilities consistent with **RSEQ-B0/1 – 2** (Priority 1).

Note: All AMAN systems should take into account airport gates for runway selection and other aircraft departures from adjacent gates that may affect arriving aircraft.

7.33 Controlled airspace classification should be consistent with Annex 11 Appendix 4 and applied as follows:

a) Category R upper controlled airspace– **Class A**; and

b) Category S upper controlled airspace– **Class A**, or if there are high level general aviation or military VFR operations: **Class B** or **C**; and

c) Category S lower controlled airspace- **Class C**, **D** or **E** airspace, as determined by safety assessments.

7.34 All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, taking into account such factors as:

a) the automation of the ATM system, including automated hand-off between sectors;

a) the capability of the ATC communications system;

b) the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points; and

c) ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.

Note 1: the delivery of ATC services should be based primarily on the CNS/ATM capability. When using Annex 10 compliant ATS surveillance, 5NM (enroute) or 3NM (terminal) surveillance-based separations should be authorised within ATC sectors. At the TOC points in such environments, 5-10NM should be authorised with auto hand-off and surveillance data-sharing or overlapping coverage at the TOC point, and 5-20NM without auto hand-off, as determined by an appropriate safety assessment.

Note 2: the efficacy, continuity and availability of ATM services should be supported by adherence with regional planning and guidance material regarding ATM automation and ATM contingency systems (regarding ATM contingency operations, refer to the Regional ATM Contingency Plan).

7.35 Priority for FLAS level allocations should be given to higher density ATS routes over lower density ATS routes. FLAS should comply with Annex 2, Appendix 3a unless part of an OTS. FLAS other than OTS should only be utilised for safety and efficiency reasons within:

a) Category R airspace with the agreement of all ANSPs that provide services:

- within the airspace concerned; and
- within adjacent airspace which is affected by the FLAS; or

b) Category S airspace with the agreement of all ANSPs that provide services:

- where crossing track conflictions occur within 50NM of the FIRB; and
- ATS surveillance coverage does not overlap the FIRB concerned, or ATS surveillance data is not exchanged between the ATC units concerned.

7.36 ATC units should conduct Airspace Planning and enable systems that manage direct and flexible routings where practicable, and the optimal operation of FUA consistent with **FRTO-B0/1 – 4** (Priority 1).

7.37 All ATC Sectors should have a nominal aircraft capacity figure based on a scientific capacity study and safety assessment, to ensure safe and efficient aircraft operations.

~~*Note: A study of the terminal ATC Sector airspace capacity every 15 minutes is provided in Appendix D*~~

7.38 All ACCs operating within FIRs where demand may exceed capacity should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements, initial integration of ASM with ATFM, Collaborative Network Flight Updates, Basic Network Operation Planning and Initial Airport/ATFM slots, A-CDM Network Interface and Dynamic Slot Allocation consistent with **NOPS-B0/1 – 5** (Priority 1).

Note 1: refer to the Asia/Pacific ATFM Framework on Collaborative ATFM for more details on Network Operations expectations.

Note 2: full FUA is not yet incorporated into the Asia/Pacific ATFM Framework for Collaborative ATFM.

7.39 ~~ATC systems should utilise electronic flight progress strips wherever automation systems allow the capability due to efficiency and transcription error/data mismatch issues.~~

Air Navigation Services

7.40 ATM systems should be supported by digitally-based AIM systems consistent with **DAIM-B1/1 – 6,** in adherence with ICAO and regional AIM planning and guidance material. ATM systems should be supported by aeronautical information digital data exchange of at a minimum, version AIXM 5.1 (Priority 1).

Note: Regional AIM policies are contained within the Asia/Pacific Regional Plan for Collaborative AIM ~~Plan~~.

7.41 Aeronautical meteorological observations, forecast, warning, climatological and historical products (such as aerodrome meteorological forecasts and reports, aerodrome warnings and wind shear warnings) should be disseminated to users consistent with **AMET-B0/1-4**, and in accordance with global and regional guidance material. An agreement between the MET authority and the appropriate ATS authority should be established to ensure the appropriate exchange of meteorological information obtained from aircraft (Priority 1).

7.42 An appropriate enhanced SAR system and systems to support aircraft tracking capability should be established consistent with the provisions of Annex 12 and to support **GADS-B1/1 – 2**, and in accordance with the *Asia/Pacific SAR Plan*.

ANSP Human and Simulator Performance

7.43 The following systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material:

a) human performance training for all managers of operational air navigation services (such as aerodrome operators, ATC organisations and aeronautical telecommunications), such training to include the importance of:

- a proactive organisational culture where managers and operational staff are informed and safety is a first priority, using open communications and an effective team management approach;
- assessment and management of risks by safety review and assessment teams comprising multidisciplinary operational staff and managers which review safety performance and assess significant proposals for change to ATM systems, particularly those related to human capabilities and limitations;
- human factors in –
    - air safety investigation;
    - system design (ergonomics, human-in-the-loop);
    - effective training (including the improved application of simulators);
    - fatigue management;

- automated safety nets; and
- contingency planning;

- effective safety reporting systems that –
  - are non-punitive, supporting a 'Just Culture';
  - promote open reporting to management; and
  - focus on preventive (systemic), not corrective (individual) actions in response to safety concerns, incidents and accidents.

b) human performance-based training and procedures for operational staff providing ATS, including:

- the application of tactical, surveillance-based ATC separation;
- control techniques near minimum ATC separation; and
- responses to ATM contingency operations, irregular/abnormal operations and safety net alerts.

c) human performance-based training and procedures for staff providing operational air navigation services (such as aerodrome staff operating 'airside', air traffic controllers and aeronautical telecommunications technicians) regarding the importance of:

- an effective safety reporting culture; and
- 'Just Culture' (Priority 1).

Note 1: prevention of fatigue systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should be consistent with guidance within ICAO Doc 9966 FRMS – Fatigue Risk Management System.

Note 2: regarding ATM contingency operations, refer to the Regional ATM Contingency Plan.

Civil-Military Cooperation

7.44 Civil-Military ATM expectations are as follows:

a) a national Civil-Military body should be formed to coordinate strategic civil-military activities (military training should be conducted in locations and/or at times that do not adversely affect civilian operations, particularly those associated with major aerodromes);

b) formal civil-military liaison should take place for tactical responses by encouraging military participation at civil ATM meetings and within ATC Centres;

c) integration of civil and military ATM systems using joint procurement, and sharing of ATS surveillance data (especially from ADS-B systems) should be provided as far as practicable;

d) joint provision of Civil-Military navigation aids and aerodromes;

e) common training should be conducted between civil and military ATM units in areas of common interest; and

f) civil and military ATM units should utilize common procedures as far as practicable.

Note: the term 'military' in this context may include other State functions such as customs, police, and paramilitary activities.

7.45 All States with organisations that conduct ballistic launch or space re-entry activities should ensure:

a) the development of written coordination agreements between the State civil aviation authority and the launch/re-entry agency concerned;

b) that strategic coordination is conducted between the State civil aviation authority and any States affected by the launch/re-entry activity at least 14 days prior to the proposed activity, providing notice of at least:

i) three days for the defined launch window; and

ii) 24 hours for the actual planned launch timing;

c) that consideration of affected airspace users and ANSPs is made after consultation, so that the size of the airspace affected is minimized and the launch window is optimized for the least possible disruption to other users ; and

d) that communication is established with affected ANSPs to provide accurate and timely information on the launch/re-entry activity to manage tactical responses (for example, emergencies and activity completion) (Priority 1).

Note 1: increasingly, ballistic launch and space re-entry activity is being conducted by commercial organisations, so this element applies equally to State or private operations.

Note 2: guidance for States on ballistic launch and space re-entry activity is available on the ICAO Asia/Pacific eDocuments webpage.

PASL Phase III (expected implementation by 03 November 2022)

Aerodrome Operations

7.46 All ATC units providing services to high density international aerodromes should operate extended arrival metering consistent with **RSEQ-B1/1**.

7.47 All ATC units providing services to international aerodromes should operate basic ATC surface operations tools, comprehensive situational awareness, situational awareness, alerting service consistent with **SURF-B0/1 – 3**.

7.48 All ATC units providing services to international (ICAO aerodrome reference codes[2] 3 and 4) aerodromes should operate advanced surface traffic management visual aids, pilot comprehensive awareness and runway alerting, enhanced ATC alerting, routing service to support ATC and enhanced vision systems (EVS) for taxiing and runway safety alerting logic consistent with **SURF-B1/1 – 5**.

Note1: AMAN/DMAN arrival/departure management needs to be integrated with advanced surface management systems: A-SMGCS with SMAN or ASDE-X.

Note 2: SURF standards are provided in EUROCAE/RTCA documents ED-159/DO-312/ ED-165.

[2] Annex 14 *Aerodromes* Volume I *Aerodrome Design and Operations* section 1.6

7.49 All ATM systems serving high density international aerodromes should implement Data-link Departure Clearance (DCL) compliant with EUROCAE WG78/RTCA SC 214 standards.

Terminal Operations

7.50 ATS surveillance systems should enable Enhanced STCA with aircraft parameters and in complex TMAs consistent with **SNET-B1/1 – 2**.

En-Route Operations

7.51 ACCs should enable, where practicable, Free Route Airspace, RNP routes, Advanced FUA and Airspace Management (ASM), Dynamic Sectorisation, Enhanced Conflict Detection Tools and Conformance Monitoring and Multi-Sector Planner Function consistent with **FRTO-B1/1 – 7**.

Note: CPAR is a key enabler for 'free route airspace' and enroute UPR and DARP operations.

7.52 All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Short Term ATFM measures, Enhanced NOPS Planning, Enhanced integration of airport operations and NOPS planning, Enhanced Traffic Complexity Management, Full integration of ASM with ATFM, Initial Dynamic Airspace configurations, Enhanced ATFM slot swapping, Extended Arrival Management, ATFM Target Times and Collaborative Trajectory Options Programme consistent with **NOPS-B1/1 – 10** supporting the integration of time-based management within a flow centric approach, consistent with **TBO-B0/1** and **TBO-B1/1**.

7.53 All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with:

a) **COMI-B0/1 – 2, 4 – 6** including ACARS, ATN/OSI, VDL Mode 2 Basic, SATCOM Class C Data, and HFDL; and

b) **COMI-B1/1 – 4**, including VDL Mode 2 Multi-Frequency, SATCOM Class B (SB-S) Voice and Data, ATN/IPS and AeroMACS Ground-Ground; and

c) **COMS-B0/1 – 2**, including CPDLC (FANS 1/A & ATN B1) for domestic and procedural airspace and ADS-C (FANS 1/A) for procedural airspace; and

d) **COMS-B1/1 – 3**, including PBCS approved CPDLC (FANS 1/A+), ADS-C and SATVOICE for domestic and procedural airspace.

Note 1: the Asia/Pacific Region has established the CRV (Common aeRonautical Virtual private network), in order for ANSPs serving as Inter-regional Backbone Boundary Intermediate Systems to connect to the IP network infrastructure of other regions.Note 2: ANSPs should upgrade their ATS voice communication systems or implement analogue/digital VoIP converters in compliance with the EUROCAE ED-137 standards (interoperability standards for VOIP ATM components).

7.54 ACCs operating within Category R airspace should implement SB ADS-B consistent with **ASUR-B1/1**, subject to an assessment of costs and benefits.

Note: this does not preclude the use of SB ADS-B by other ATC units to augment surveillance capability or to act as a backup.

Air Navigation Services

7.55 ATM systems should be supported by digitally-based NOTAM consistent with **DAIM-B1/7**.

Note: Regional AIM policies are contained within the Asia/Pacific Collaborative AIM Plan.

7.56 All States should ensure that aeronautical meteorological products supported by automated decision systems or aids using IWXXM consistent with **AMET-B1/1 – 4**.

PASL Phase IV (expected implementation by 27 November 2025)

7.57 Capability for providing aeronautical meteorological observations, forecast, warning, climatological and historical products (such as aerodrome meteorological forecasts and reports, aerodrome warnings and wind shear warnings) in support of automated decision processes or aids and performance based requirements, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support should be enabled, consistent with **AMET-B1/1-3**.

7.58 Meteorological information should be disseminated to users consistent with **AMET-B1/1-4**, and in accordance with global and regional guidance material.

7.59 Where there is an operational benefit, Remotely operated Aerodrome Air Traffic Services should be implemented, consistent with **RATS B1/1**.

PARS Phase V (expected implementation by 23 November 2028

Aerodrome Operations

7.60 All high density international aerodromes should establish Airport Operations Centres (AOPCs) consistent with ACDM-B2/2.

7.61 Where there is an operational requirement and benefit, all international aerodromes should implement performance-based aerodrome operating minima consistent with APTA-B2/4.

PASL Phase V (expected implementation by 23 November 2028)

ATS Communications

7.62 States should establish FF-ICE (Flight and Flow Information for Collaborative Environment) services consistent with FICE-B2/1 -9. In particular, as a minimum, the following FICE services should be established;

a) Planning Service -FICE-B2/1

b) Filing Service- FICE-B2/2

c) Flight Data Request service- FICE-B2/4

d) Notification Service- FICE-B2/5

e) Publication Service- FICE-B2/6

7.63 All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with:

a) **COMI-B2/1 – 3** including Air/Ground ATN/IPS and AeroMACS and Links for non-safety communication; and

b) **COMS-B2/1 – 3**, including PBCS approved CPDLC, ADS-C and SATVOICE for domestic and procedural airspace.

7.64 States should establish SWIM services consistent with **SWIM-B2/1 to B2/5**.

Air Traffic Management

7.65 All ATC units providing services to international high density aerodromes should operate enhanced surface guidance for pilots and vehicle drivers, comprehensive situational awareness and conflict alerting service for runway operations consistent with SURF-B2/1 – 3.

7.66 All aerodromes where ATFM facilities are required, should be served by an integrated system of arrival and departure management sequences into a single runway or dependent runways consistent with **RSEQ-B2/1**.

7.67 ACCs and terminal airspaces should enable Dynamic Airspace Configurations for different traffic flow or complex situations, Enhanced Conflict Detection Tools and Conformance Monitoring consistent with **FRTO-B2/1 – 2 and NOPS-B2/2**.

7.68 ACCs should enable, where practicable, large-scale cross-border Free Route Airspace in coordination with adjacent FIRs, and enhanced conflict resolution tools consistent with **FRTO-B2/3 – 4**.

7.69 ACCs should enable, where practicable, ATFM for cross-border Free Route Airspace in coordination with adjacent FIRs, and enhanced conflict resolution tools consistent with NOPS-B2/6 and **FRTO-B2/3 – 4**.

7.70 All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, collaborative network operations planning, further integration of airport operations and NOPS planning, multi ATFM slot swapping and airspace user priorities consistent with **NOPS-B2/1-5** supporting the integration of time-based management within a flow centric approach, consistent with **TBO-B0/1** and **TBO-B1/1**.

Air Navigation Services

7.71 ATM systems should be supported by:

a. digitally-based AIM systems ~~consistent with **DAIM-B2/1 – 5**~~, in adherence with ICAO and regional AIM planning and guidance material; and

b. integrated aeronautical information service in a SWIM environment in support of enhanced operational ground and air decision-making processes for all phases of flight. ~~-DAIM-B2/1~~;

consistent with **DAIM-B2/1-5**.

7.72 Integrated Aeronautical meteorological observations, in support of enhanced ATM and airport decision making process, particularly in the near term should be established consistent with **AMET-B2/1-3**.

7.73 Integrated meteorological information service in the SWIM environment in support of

enhanced operational ground and air decision-making processes, particularly in the planning phase and near-term should be implemented consistent with AMET-B2/4.

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