International Civil Aviation Organization

The Twenty-Second Meeting of the APANPIRG ATM/AIS/SAR Sub-Group (ATM/AIS/SAR/SG/22)

Bangkok, Thailand, 25 – 29 June 2012

Agenda Item 4: Review outcome of relevant meetings

ASIA/PACIFIC SEAMLESS ATM PLANNING GROUP OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents information from the First Meeting of the ICAO Asia/Pacific Seamless ATM Planning Group (APSAPG/1, Bangkok, Thailand, 31 January to 3 February 2012), and Seamless ATM planning progress.

This paper relates to –

Strategic Objectives:

A: ***Safety*** *– Enhance global civil aviation safety*

C: ***Environmental Protection and Sustainable Development of Air Transport*** *– Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

Global Plan Initiatives:

GPI-1 Flexible use of airspace
GPI-3 Harmonization of level systems
GPI-4 Alignment of upper airspace classifications
GPI-5 RNAV and RNP (Performance-based navigation)
GPI-6 Air traffic flow management
GPI-7 Dynamic and flexible ATS route management
GPI-8 Collaborative airspace design and management
GPI-9 Situational awareness
GPI-10 Terminal area design and management
GPI-11 RNP and RNAV SIDs and STARs
GPI-12 Functional integration of ground systems with airborne systems
GPI-13 Aerodrome design and management
GPI-14 Runway operations
GPI-15 Match IMC and VMC operating capacity
GPI-16 Decision support systems and alerting systems
GPI-17 Data link applications
GPI-18 Aeronautical information
GPI-19 Meteorological Systems
GPI-20 WGS-84
GPI-21 Navigation systems
GPI-22 Communication infrastructure
GPI-23 Aeronautical radio spectrum

1. INTRODUCTION

1.1 The First Meeting of the ICAO Asia/Pacific Seamless ATM Planning Group (APSAPG/1) was held in Bangkok, Thailand from 31 January to 3 February 2012.

1.2 The APSAPG/1 meeting was attended by 48 participants from Australia, Bangladesh, Cambodia, China, Hong Kong China, India, Indonesia, Japan, Lao PDR, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, IATA, IFATCA and CANSO.

2. DISCUSSION

48th DGCA Conference List of Action Items

2.1 The meeting reviewed the list of DGCA Conference Action Items germane to Seamless ATM. Regarding Action Item 48/1, the meeting noted that State ATM modernization programme information and experiences would be a resource on the APSAPG website page.

2.2 Action Item 48/2 requested APSAPG to study the proposed ICAO Aviation System Block Upgrades and provide advice on the benefits, business case and implications to States and Administrations and explore formulating a regional position prior to the 12th Air Navigation Conference. The economic aspects of ASBU were discussed and it was determined that although the APSAPG itself would not be in the position of providing detailed economic and business case data because each implementation situation would vary according to the operating environment, it was possible to provide high-level guidance such as guidance to States for the development of cost benefit analysis of implementation activity. The Asia/Pacific Regional Position on ASBU was expected to be an APSAPG/2 key deliverable.

2.3 Action Item 48/3 related to the request for APSAPG to identify the critical minimum operational and system needs under the ASBUs for implementation. The meeting noted that APSAPG was already tasked through its Terms of Reference (TOR) to determine the key and minimum requirements (including but not limited to, technologies, regulations, training, airspace organisation) for seamless ATM, which included ASBU elements.

Seamless ATM Definition

2.4 CANSO suggested to the meeting that to facilitate discussions on a Seamless ATM plan for the region it was necessary at the onset for the APSAPG to agree on the definition of the term Seamless ATM operations. An agreed definition would enable the APSAPG to focus more effectively on the details of a regional plan without losing the big picture. CANSO proposed the following definition:

> *Seamless ATM operations is defined as ATM operations in contiguous airspace that is technically and procedurally interoperable, universally safe, and in which all categories of airspace users transition between Flight Information Regions, or other vertical or horizontal boundaries, without requiring a considered action to facilitate that transition and without any noticeable change in:*
>
> *1) Type or quality of service received;*
>
> *2) Air navigation and communications performance standards; and*
>
> *3) Standard practices to be followed.*

2.5 IATA also proposed the meeting adopt the CANSO definition of Seamless ATM, which had been endorsed by Air Navigation Service Providers (ANSPs) worldwide. It was agreed that there was no need for APSAPG to endorse a specific definition, as there was concern about the usage of terms such as 'without considered action' when different airspace classes naturally changed the service level but the CANSO definition was acknowledged. The meeting agreed that the Australian alternative was an appropriate description of Seamless ATM objectives:

> *The objective of Seamless ATM is the safe and interoperable provision of harmonized and consistent air traffic management to a flight appropriate to the airspace category and free of transitions, due to a change in the air navigation service provider or Flight Information Region.*

Asia/Pacific Seamless ATM Strategies

2.6 The meeting recognized that each ANSP and ATM system did not operate in isolation, and that future overall effectiveness and seamlessness of an evolving, integrated ATM framework was dependent on ensuring that adjacent ANSPs and their ATM systems were interoperable. In areas of multiple jurisdictions, collaboration among ANSPs and airspace users was required. CANSO highlighted two example initiatives that were progressing well, due to collaboration among neighbouring ANSPs and their stakeholders, including a Collaborative Decision-Making (CDM) initiative involving the Bangkok- Singapore city pair.

2.7 IFATCA was of the view that controllers had to be involved at all stages of planning and implementing a Seamless ATM Environment project in the Asia/Pacific Region in order to ensure that there was no misunderstanding of the objectives and final outcomes, and to avoid some of the earlier problems in the Single European Sky Automation Research (SESAR, Europe) and NextGen (USA) programmes. It was noted that some States in the region might face challenges not just involving operational issues, but also necessitating a change to their basic administrative and managerial model in terms of implementing Safety Management Systems (SMS) and 'Just Culture' principles.

2.8 IFATCA highlighted the fragmented nature of ANSP provision in the Asia/Pacific Region, compared to the North American and European major traffic areas. Noting that the NextGen and SESAR programmes were quite slow and expensive, IFATCA acknowledged the Asia/Pacific did not have to develop such extensive technology programmes.

2.9 IFATCA noted that some Functional Airspace Blocks (FAB) being used in Europe could not be developed as envisaged because of political or national security or job security issues. IFATCA stated that any change to Major Traffic Flows (MTF) could impact the many regional and domestic routes, particularly crossing routes. It was important that the APSAPG did not just focus on the MTF, but also included the airports, and terminal airspace elements.

2.10 It was contended that one item that must be considered was controller workload and complexity using a safety case analysis. Controllers needed to be aware of the technology used by aircraft in addition to their own procedures and facilities. As an example, some time ago, the Asia/Pacific developed a unique Flight Level Allocation Scheme (FLAS[1]) for the South China Sea. IFATCA stated that this required transitions between the FLAS and the universal model which created workload, which with today's traffic was very difficult.

2.11 IFATCA also suggested that the 'first come, first served' concept needed to be reviewed, with some differentiation for lesser performing aircraft. They noted the emphasis on Coordination, Collaboration and Cooperation, but asked to add a fourth 'Communication' [with controllers].

[1] Procedurally-based system intended to vertically separate potentially conflicting aircraft.

2.12 Hong Kong China agreed that APSAPG needed to apply a gate-to-gate approach for Seamless ATM to be successful. The USA stated that one difficulty was the balance between a systems approach and a local implementation, so care was needed to avoid complexity.

2.13 IATA informed the meeting that Asia/Pacific was the world's fastest growing aviation market, and Asia Pacific currently handled 26% of global passenger numbers and this proportion is expected to increase to 30% of global traffic over the next three years – a 7% annual increase. Aircraft numbers were expected to grow three-fold over the next twenty years, with much of the increase occurring between Asia/Pacific city pairs. It was considered as inconceivable that traffic increases of this magnitude could be handled effectively and efficiently without significant enhancement of the ATM processes.

2.14 IATA stressed that they were not pursuing a single sky, but seamless ATM. They noted that it cost EUR12B to provide European ATC, which was calculated to have an inefficiency cost of EUR4B. Of this, EUR3B was associated with the lack of Seamless ATM activity and EUR1B regarding disaggregation of ATC units or Flight Information Regions (FIRs), thus a focus on Seamless ATM was the priority.

2.15 It was noted that of the aircraft surveyed by IATA which operated in the Asia/Pacific Region, over 50% operated within the United States and Europe. As these aircraft would be equipped for both NextGen and SESAR requirements, IATA stated that Asia/Pacific must take advantage of this capability. IATA believed that what Asia/Pacific was doing was in line with other regions such as Europe, because the avionics and other technology would be similar.

2.16 Australia stated that it was not clear how the Seamless effort would integrate with the Global Air Navigation Plan (GANP) and the Global Air Navigation Concept. ICAO stated that integration of the Seamless ATM Plan with the Regional Air Navigation Plan and the GANP would have to be considered further at APSAPG/2 and at APANPIRG. Singapore stated that the Seamless ATM Plan should be relevant to this region and that high-level targets should be established as aspirational goals. Singapore stated that the target implementation date should allow flexibility for early implementation by the States/ANSP concerned.

2.17 IATA advocated adoption of the ICAO Aviation System Block Upgrades (ASBU) to ensure global harmonization, with an initial focus on Block 0 to better utilize current avionics. There was consensus by the meeting that the ASBU concept was an appropriate guiding mechanism. However as the ASBU document was still being drafted and not formally endorsed until the 12th Air Navigation Conference, it could not be formally endorsed by APSAPG/1.

2.18 The Republic of Korea stated that each State had different capabilities and implementation situations, and that all ASBU elements could be implemented through the result of study and analysis. They noted that a capability matrix would be helpful to determine the implementations status and identify implementation strategies. The meeting also recalled that programmes such as NextGen had a common budget and a quite different situation to the individual Asia/Pacific States. Thus the Asia/Pacific Seamless ATM Plan would be largely conceptual in nature, containing principles and guidance.

2.19 The meeting recalled that the ICAO Asia/Pacific Seamless Air Traffic Management (ATM) Ad Hoc meeting (Bangkok, 17 August 2011) confirmed the following key administrative APSAPG principles:

- meetings should be either twice or three times a year (dependent on resources);
- work should focus on identifying Seamless ATM gaps, barriers and enablers for gate-to-gate operations on the busiest Asia/Pacific MTFs in an incremental manner (project orientated), with an operational plan for each MTF; and

- information on Seamless ATM and APSAPG would be circulated by administrations and through an Internet site (ICAO Regional Office 'Meetings' website), which would aim to provide simple templates, guidance material and Seamless ATM principles for administrations.

2.20 It was noted that the challenge for APSAPG was to be an agent of change, both as a model in its working relationships and through bold, visionary recommendations. A comprehensive study of the Asia/Pacific MTFs had been initiated by the Regional Office. Each MTF route and a number of short-haul city pair routes was intended to be analysed from airport gate to airport gate, with a focus on aerodrome operations. Each FIR that the ATS route passed through was intended to be examined in detail to determine the gap between:

- the current level of ATM capability and Asia/Pacific Air Navigation Concept of Operations requirements; and
- the Asia/Pacific Air Navigation Concept of Operations and the Aviation Safety Block Upgrade (ASBU) concept (Block Zero – 0) in terms of the ASBU elements and when the Blocks might be implemented in the Asia/Pacific Region.

2.21 The intention of the MTF Study was to provide accurate inputs into the Capabilities Matrix, and determine the portions of airspace that required an ATM service upgrade, an enhanced capability or a different approach by the States concerned.

2.22 The APSAPG/1 meeting noted the need for special analysis of the aerodrome environment, in addition to the ASBU elements, identify efficiency improvements and interoperability for the terminal environment, otherwise gains made in other areas could be lost. Thus, a study of aerodrome aspects, which included terminal airspace, would provide a focus on this area.

2.23 The analysis of MTF airspace essentially created FAB, which was consistent with the European process. It was expected that these FAB would influence or affect non-FAB adjoining airspace due to common aircraft equipage requirements and ATM interfaces, so eventually contiguous airspace would share the same capabilities across the Asia/Pacific Region. Japan suggested that the APSAPG should review the need and readiness on each MTF toward Block 0, and then identify recommendations to achieve its implementation.

2.24 The meeting was asked to take into account the regional characteristics and uniqueness in defining the future Seamless ATM concept for the APAC Regions, as it had 38 member States and two Special Administrative Regions, with a large differential in ATM capabilities as well as air traffic operating environment. It would be unrealistic to expect all states in the regions are managing or will be managing the same type and level of air traffic operations.

2.25 The Seamless ATM Ad Hoc meeting had noted that the necessary enabling technology was present but it was somewhat fragmented, and being implemented slowly, mainly due to the very diverse APAC economies and environment, and terminal airspace congestion. In discussing Seamless ATM, the APSAPG/1 reviewed 53 draft principles which had been captured from the Seamless ATM Ad Hoc Meeting (**Appendix 1)**. Subsequently, the Southeast Asia and South Asia/Indian Ocean ATM Coordination Groups also reviewed the draft principles without comment.

2.26 Through discussion at the Secretariat, a 54th draft principle regarding the availability of high-fidelity ATC simulators for controller training, to support the optimal application of ATC separations for a Seamless ATM environment was developed. The ATM/AIS/SAR Sub-group is invited to further review the principles, which were expected to be formally endorsed by APSAPG/2 and approved by APANPIRG/23.

Aviation System Block Upgrade Integration

2.27 APSAPG/1 was tasked with determining how to integrate the ASBU concept with Seamless ATM activity, while taking into account the established GANP and its 23 Global Plan Initiatives (GPIs). This integration had to take place within the context of the established Air Navigation Concept of Operations, although the latter was iterative in nature and was intended to be incorporated (subsumed) within the Seamless ATM Plan.

2.28 The ASBU process included a business case aspect, which could be dealt with by a regional body, but as the Asia/Pacific Region did not have a regional regulator or service provider, this would have to be determined by individual States or implementing bodies. APSAPG/1 considered that business cases needed to be conducted by the implementation body that was investing, however, APSAPG could assist in the development of high-level supporting material, some of which was already provided in the ASBU Document itself. Thus it was not considered necessary for APSAPG to include specific business case studies.

2.29 The Meeting endorsed the development of a capabilities matrix to provide a target and means of monitoring the progress of ASBU implementation. The matrix detailed the ASBU Block 0 (systems available by 2013) and non-ASBU components that would be expected to support Seamless ATM. A State Letter T3/10.1.21 – AP048/12 (ATM) dated 12 April 2012 was issued by the Regional Office, which was intended to provide data for the capabilities matrix. Only **13** administrations provided data by 11 June 2012, and the results of their Seamless ATM capability are included the early draft matrix appended at **Attachment A**.

Civil/Military Cooperation

2.30 APSAPG/1 noted the crucial role of civil/military cooperation in Seamless ATM development. It was recognized that there were numerous ICAO documents with references to civil/military cooperation, including Annex 11 and Doc 4444 – *Procedures for Air Navigation Services – Air Traffic Management*; and two new Circulars:

- Circular 328 *Unmanned Aircraft Systems*; and
- Circular 330 *Civil/Military Cooperation in Air Traffic Management*.

2.31 Regarding Special Use Airspace (SUA), the meeting noted the following principles that had been espoused at the Seamless ATM Ad Hoc meeting:

- many so-called ‘prohibited’ areas may be more correctly described as restricted areas as they can have military and even civil operations from time to time;
- restricted areas may not be designated over the high seas or in airspace of undetermined sovereignty in accordance with the Annex 2 definition;
- restricted areas need to be as small as practicable, while encompassing the activity therein;
- danger areas may be considered in lieu of restricted areas, if the pilot can determine the nature of the hazard; and
- SUA should only be activated when required (activation by NOTAM, rather than the reverse, as it is easier for the status to be discerned by flight planners).

2.32 The meeting noted that military participants at past civil aviation meetings might not have been at the appropriate decision-making level and that limited their input at meetings. Another issue was that military representatives could change position so there was a lack of continuity of understanding civil matters. However it was recognised that military representation was still valuable, and provided the opportunity to understand the military perspective as well.

2.33 The 47th Director's General of Civil Aviation (DGCA) Conference urged greater participation of military authorities in civil forums to facilitate optimum utilization of airspace. Thus civil representatives should consider including their military counterparts in their delegations whenever possible. Military cooperation cells in civil Air Traffic Control (ATC) Centres to ensure appropriate civil/military tactical communication was also encouraged.

2.34 The meeting recalled the outcomes from the Global Forum on Civil/Military Cooperation (Montréal, 19 - 21 October 2009), which recognised that peace and stability were essential preconditions for social and economic development. The meeting noted that supporting the national civil aviation infrastructure was consistent with national security objectives.

2.35 It was considered appropriate to review and update the APANPIRG/9 Conclusion on civil/military cooperation, in order to include the key elements of the 1998 guidelines as part of the APSAPG Asia/Pacific Seamless ATM Plan as appropriate. Incorporation into a formal Plan endorsed by each Asia/Pacific State for consideration as national legislation, policies and procedures was considered to be a more effective method of promoting essential change in this area.

Development of a National Plan

2.36 New Zealand informed the meeting that it was in the process of developing a National Airspace Policy, and a National Airspace and Air Navigation Plan. These would be guided by principles outlined in the ICAO Global ATM Operational Concept and the GANP, and linked to the National Airspace Policy and State Safety Program. Seamless ATM principles and priorities would be important in guiding the integration of relevant plan components with those of neighbouring States. The meeting recognised that the development process mechanism could be used as a template by States wanting to develop such a plan.

ATM Coordination Groups

2.37 India informed the meeting that Seamless ATM principles were applied across many FIRs and airspaces and therefore required inputs and coordination between many States. The meeting noted that ATM Coordination Groups such as the Bay of Bengal Arabian Sea Indian Ocean ATM coordination meeting (BOBASIO) were very important in terms of implementation of Seamless ATM planning outcomes.

APSAPG Process

2.38 IATA highlighted that two APSAPG 'sub-groups' were required to:

- set performance targets, goals and timeframes regarding economic and environmental aspects of Seamless ATM in the short, medium and longer term; and
- identify the gap between current capabilities and standardized, harmonized and interoperable (seamless) Asia Pacific ATM, including documentation of individual Asia Pacific State ATM upgrade plans.

2.39 APSAPG/1 had a lengthy discussion about whether there was an objective or mandate to set economic and environmental performance targets, especially as the Asia/Pacific had individual jurisdictions, unlike the United States and to some extent, Europe; thus the situations were quite different. Hong Kong, China recalled that recent environmental conferences had failed to agree on targets. Japan stated that regional targets should be achievable (such as the implementation of Block 0), with specific targets left to States.

2.40 In order to exchange information and apportion work to assist ICAO, it was agreed that simple e-mail Contact Lists would be created to allow the informal flow of information between APSAPG members or their advisors (subject matter experts) that had indicated a desire to be involved. The meeting clarified that the information being discussed was intended to be draft material, thus the input by participants would not represent the final position of States involved.

APSAPG Meetings

2.41 Japan proposed to host the APSAPG/2 in a location to be finalised during the week of 6-10 August 2012. India proposed to host the APSAPG/3 in Chennai, during early 2013.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) discuss the 54 Draft Seamless ATM Principles;

c) urge administrations to complete the questionnaire from State Letter T3/10.1.21 – AP048/12 (ATM) intended to support the Seamless ATM Capabilities Matrix; and

d) discuss any relevant matters as appropriate.

…….

Appendix 1: Draft Seamless ATM Principles

People: Cultural and Political Background

1. High-level political support for Seamless initiatives, including military cooperation.
2. Education and implementation of non-punitive reporting and continuous SMS improvement systems.
3. Recognition that a regulator - service provider split allows an optimal client focus and business approach to Seamless ATM development.

Aviation Regulations, Standards and Procedures

4. Harmonised regional or sub-regional rules and guidelines, modelled on the regional application of common regulations incorporated by reference into local legislation.
5. Shared ATM operational standards, procedures, guidance materials through common manuals and templates.
6. An emphasis on ATM personnel competence, selection, training and English proficiency, with the possibility of common licences or mutual recognition.
7. An emphasis on delivery of tactical ATM services based on CNS capability, resulting in flexible, dynamic systems.

ATM Coordination

8. The strengthening of cohesive ATM Coordination Groups to allow effective implementation of Seamless ATM.
9. Sub-regional ATFM based on system-wide CDM serving the busiest terminal airspace and MTF.
10. Cross-border/FIR cooperation for use of aeronautical facilities and airspace, collaborative data sharing, airspace safety assessment and ATM Contingency planning.
11. Encouragement of military participation in civil ATM meetings and in ATS Centres where necessary.

Airspace Organisation

12. Flexible use airspace arrangements implemented as far as practicable.
13. Special Use Airspace subject to regular review by an independent airspace authority (non-airspace user) to ensure it is appropriate in terms of purpose, size, activation and designation.
14. The minimisation of Flight Information Regions and complex airspace through amalgamation and technology.
15. Development of a regional ATC Sector capacity evaluation tool.
16. In accordance with the on-going activities for formulation of relevant ICAO SARPs for Remotely Piloted Aircraft (RPA), the integration of RPA/UAS into civil airspace dependent on key issues related to control and command of the aircraft, including ‘lost link’, over-the-horizon capabilities and the frequency spectrum, as well as ‘sense and avoid’ technologies.

Facilities: Aerodromes

17. A focus on an integrated transport system in terms of air, rail, land and maritime.
18. The need for aerodrome operators to have aeronautical experience, actively participating in aviation meetings and CDM development.
19. Planning and coordination with local authorities to take into account noise, obstacles, airport and PBN development issues.
20. Capacity and ground aid planning, including Low Visibility Operations (LVO) assessment, aerodrome complexity, taxiing and pushback, and runway capacity.

ATS Units

21. Collaboration by ANSPs for evaluation and procurement of ATM facilities.
22. The minimisation of ATS units and Centres through amalgamation and technology.
23. The use of automation, satellite-based systems and remote facilities to provide Seamless ATM services where practicable.
24. The use of high-fidelity simulators to train controllers on the optimal application of ATC separations and procedures, that support Seamless ATM applications, emergency and contingency responses, testing of software releases, and may serve as a backup ATM platform.

Navigation Aids

25. The continued transition from ground-based aids to satellite-based PBN procedures, while maintaining a necessary redundancy and contingency network.
26. Support for a GNSS-based, integrated regional PBN approval standard.
27. Regional cooperation for SBAS in terms of interoperability and increased service areas and a GNSS ionospheric monitoring network.

Telecommunication

28. Encouragement of the ATN and diverse satellite communication systems (Inmarsat, Iridium, MTSAT, etc.).
29. The implementation of SATVOICE technologies and standards.
30. Enhancement of data-link capabilities (VHF, HFDL, etc.).
31. In remote areas, the encouragement of VSAT networks for COM, SUR.
32. The prioritisation of AIDC systems to alleviate ATC coordination issues.

ATS Surveillance

33. The encouragement of ADS-B and/or MLAT implementation to improve ATS surveillance coverage, redundancy and multiple tracking capability.
34. Establishment of ADS-C where radar, ADS-B and/or MLAT is not possible.
35. Expansion of ATS surveillance data-sharing initiatives.

Technology and Information: Flight Operations

36. Support for PBN specifications that include GNSS ‘low end’ aircraft and better spacing for terminal airspace, based on empirical data.
37. Implementation of UPR and DARP where practical.

38. Universal implementation of CDO and CCO, unless restricted by factors such as terrain, SUA, and noise constraints.

39. The encouragement of airborne capabilities such as of Self-Separation and Spacing and Advanced Strategic Lateral Offset Procedures (SLOP), in order to support Trajectory-Based Operations.

Aeronautical Data

40. Early implementation of AIM (including SWIM) for advanced States.

41. Use of 'champion' States, seminars/workshops, special projects and combined resources for less developed States.

42. Cooperative development and use of aeronautical databases such as the European Aeronautical Database (EAD).

43. Development of information for political decision-makers on the importance of AIM.

44. Regulation of aeronautical data and its quality, to ensure interoperable operations.

ATM Systems

45. Encouragement of active conflict probing (tactical and strategic) support tools.

46. Inter-facility Flight Data Processing System capability.

47. Implementation of Amendment 1, ICAO Doc 4444 (PANS ATM, FPL 2012).

48. Collaborative development of CDM, ATFM, A/MAN and D/MAN support tools.

49. Encouragement of Digital ATIS and VOLMET information systems.

50. Integration of military ATM systems into civil ATM systems.

Safety Nets

51. Regional mandates for MSAW, STCA, TCAS (ACAS), EGPWS (TAWS).

ATM Modernisation Projects

52. Inter-regional cooperation ('clustering') for the research, development, tendering of contracts and implementation of ATM projects.

53. A focus on simpler universal technologies for earliest deployment and best cost benefits, using a staged implementation.

54. The encouragement of sub-regional and regional regulatory, service provision, research and development, and other industry bodies that cluster capabilities and optimise resources for Seamless ATM development.

Attachment A

Seamless ATM Implementation	ASBU Block 0 elements (18)																		State Totals
	B0-05	B0-10	B0-15	B0-20	B0-25	B0-30	B0-35	B0-40	B0-65	B0-70	B0-75	B0-80	B0-84	B0-85	B0-86	B0-101	B0-102	B0-105	
United States	2	2	2	2	2	1	2	2	2	0	1	2	2	2	1	2	2	2	31
Australia	1	2	0	1	2	0	2	2	2	1	2	2	2	2	1	2	2	2	28
New Zealand	1	2	1	1	2	1	1	2	2	1	2	1	2	0	1	2	2	2	26
Singapore	2	2	1	1	0	1	1	2	2	1	2	1	2	2	0	2	2	2	26
Hong Kong, China	1	2	1	1	1	1	1	2	2	1	2	2	2	1	2	2	1	2	27
Republic of Korea	2	2	0	1	2	1	1	2	2	1	2	0	2	0	2	2	2	2	26
Fiji	1	2	0	0	2	0	0	2	1	1	0	0	1	2	1	2	1	2	18
Japan	2	2	0	1	2	1	2	2	2	1	2	0	2	0	0	2	1	2	24
Thailand	0	1	1	0	0	0	1	2	0	1	2	1	2	2	2	2	1	2	20
India	1	1	1	1	1	1	1	2	1	1	2	1	2	0	1	2	2	2	23
Malaysia	0	2	1	0	1	0	1	2	0	1	2	0	2	0	0	2	2	2	18
Indonesia	1	0	0	0	1	0	1	2	0	1	0	0	2	0	0	2	2	0	12
Philippines	1	2	0	1	0	0	1	0	2	1	0	0	0	0	0	2	1	0	11
Afghanistan	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	4
French Polynesia	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	4
Bangladesh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DPR Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lao PDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maldives	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mongolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myanmar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nauru	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nepal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Papua New Guinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sri Lanka	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viet Nam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Element Total	15	22	8	10	18	7	15	26	18	12	19	10	25	13	11	26	21	22	
APAC %	47%	37%	14%	17%	31%	12%	26%	44%	31%	20%	32%	17%	43%	22%	19%	44%	36%	37%	

Attachment A

Gl. Plan	APAC Concept of Ops			**Regional Elements (7)**			State	**Civ/Mil Elements (10)**		% Military	SUA	International	Integrated	Joint Aids	Shared	Common	Common	State CM
CERT	FIR	NAV	SUR	APT	ACCESS	DAT	Totals	Body	Liaison	SUA	Review	SUA	ATM	Aerodromes	Data	training	procedures	Total
2	0	2	2	2	2	1	11	2	2	1	1	2	1	2	2	2	2	17
1	2	1	2	2	2	2	12	2	1	2	2	0	1	2	2	2	2	16
2	2	2	2	2	2	0	12	0	2	2	2	2	2	2	2	2	2	18
2	2	1	2	2	2	2	13	2	2	2	0	0	0	2	1	2	2	13
1	2	1	0	2	1	2	9	0	1	2	0	2	2	2	2	2	2	15
2	2	1	2	2	0	0	9	2	2	0	2	0	2	2	2	2	2	16
2	2	1	0	2	2	2	11	2	2	2	2	2	2	2	2	2	2	20
2	2	1	2	2	1	0	10	1	2	2	1	0	2	2	0	2	2	14
1	2	1	2	1	2	0	9	2	2	0	2	2	1	2	2	0	0	13
2	2	1	0	0	1	0	6	0	2	0	0	0	0	2	2	0	2	8
2	0	1	2	0	0	0	5	2	2	1	0	0	1	2	2	2	2	14
1	2	1	2	0	0	2	8	0	2	2	0	2	0	0	1	1	1	9
2	0	1	0	2	0	0	5	2	2	2	0	2	0	0	1	2	2	13
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	20	15	18	19	15	11		17	24	18	12	14	14	22	21	21	23	
37%	34%	26%	31%	32%	26%	19%		29%	41%	31%	20%	24%	24%	37%	36%	36%	39%	

State Grand Total		
Value	%	
59	84%	United States
56	80%	Australia
56	80%	New Zealand
52	74%	Singapore
51	73%	Hong Kong, China
51	73%	Republic of Korea
49	70%	Fiji
48	69%	Japan
42	60%	Thailand
37	53%	India
37	53%	Malaysia
29	41%	Indonesia
29	41%	Philippines
4	6%	Afghanistan
4	6%	French Polynesia
0	0%	Bangladesh
0	0%	Cambodia
0	0%	China
0	0%	DPR Korea
0	0%	Lao PDR
0	0%	Maldives
0	0%	Mongolia
0	0%	Myanmar
0	0%	Nauru
0	0%	Nepal
0	0%	Pakistan
0	0%	Papua New Guinea
0	0%	Solomon Islands
0	0%	Sri Lanka
0	0%	Viet Nam

Element Values*	0. Non-ASBU/Seamless ATM activity	1. Initial development supporting ASBU/Seamless
B0-05 CDO	Use of conventional stepped arrival procedures	STAR with flexible PBN procedures or ATS surveillance-based procedures
B0-10 FUA	SUA is not subject to FUA (such as activation by NOTAM)	Partial flexibility of controlled or special use airspace
B0-15 AMAN-DMAN	No formal runway sequencing management	Basic runway sequencing procedures
B0-20 CCO	Use of conventional departure procedures	Flexible PBN or surveillance-based procedures in use to RNAV SID
B0-25 AIDC	ATS messages conducted by voice and/or AFTN	AIDC testing
B0-30 AIS-AIM+	Partial Phase 1 AIM transition	Phase 1 and 2 AIM transition
B0-35 ATFM	No formal ATFM activity	Basic ATFM, no automated decision support tools
B0-40 ADS-C, CPDLC	ADS-C, CPDLC not used in oceanic/remote airspace	Either ADS-C or CPDLC used for oceanic airspace
B0-65 PBN	Approach procedures with no vertical guidance	Approach procedures with vertical guidance
B0-70 WAKE	Applied minima more conservative than PANS ATM	Application of pre-2012 wake separation minima
B0-75 SMS	No electronic surface movements surveillance	Electronic surface movements surveillance
B0-80 CDM	No formal airport CDM	Basic airport CDM in use
B0-84 ADS-B, MLAT	No ADS-B or MLAT ground-based surveillance where possible	ADS-B trial or provided as an add-on to MLAT
B0-85 ATSA	No ADS-B aircraft requirements	ADS-B Out aircraft mandate in law
B0-86 ITP	No use of ITP in oceanic or remote airspace	ITP trial planned or in progress
B0-101 ACAS	No specific aircraft safety net requirements	ACAS I required
B0-102 NET	No ATM safety nets in use	Partial implementation of ATM safety nets, mode S
AD CERT	No State aerodrome certification rules	Aerodrome certificiation, not covering all four GPI elements
AD WARN	No formal aerodrome status warnings	Basic non-digital aerodrome warnings
FIR	More than two FIRs and ACCs, no rationalisation	Rationalisation of FIR boundaries or ACCs planned
NAV	No PBN ATS route or airspace structure	Partial PBN airspace/route structure, RNAV specifications
SUR	Limited or nil ATS surveillance where possible to deploy	Use of procedural systems monitored by ATS surveillance
APT	No formal airport capacity analysis	Airport runway capacity analysis undertaken (AAR)
ACCESS	Procedural FLAS within ATS surveillance coverage	Limited FLAS used only for specified occasions
DAT	No data sharing between Area Control Centres	FIRB and inter-ACC ATS surveillance data sharing
CM BODY	No formal body to coordinate civil-military activities is in place	Civil-military meetings are held to discuss strategic issues
LIAISON	No formal civil-military liaison takes place for tactical responses	Civil-military tactical liaison is in place for special events
% MILITARY SUA	30% or more of airspace is military special use airspace	15-29% of of airspace is military special use airspace
SUA REVIEW	Special use airspace is not regularly reviewed for use, size, etc.	SUA is regularly reviewed but not by an independent body (not airspace users)
INTERNATIONAL SUA	Restricted and/or prohibited areas are designated in international waters	Military danger areas are designated in international waters
INEGRATED ATM	No integration of civil and military ATM systems	Partial integration of civil and military ATM systems
JOINT AIDS, ADS	Not civil-military joint provision of navigation aids or aerodromes	Joint provision of some naviation aids
SHARED DATA	No ATS surveillance data is shared between civil and military ATM units	Civil ATS surveillance data is shared with military ATM units
COMMON TRAINING	Common training is not conducted between civil and military ATM units	Common training is conducted for special events
COMMON PROCED'S	Civil and military ATM units have minimal common procedures	Civil and militry ATM units have common procedures for special events

*Applied to international aerodomes, airspace and ATS routes

2. Mature system supporting ASBU/Seamless ATM

STAR arrivals to CDO or OPD
FUA principles apply to controlled and special use airspace or not applicable
Electronic, integrated AMAN/DMAN tools in use
CCO PBN procedures with RNAV SID
Full AIDC operational deployment
Phase 1 and 2 and partial Phase 3 AIM transition
Collaborative ATFM with automated support tools
Not applicable, or ADS-C, CPDLC and HF/SATVOICE
PBN approach procedures with vertical guidance
Application of new 2012 wake turbulence minima
ASMGCS and cockpit moving map in operation or not applicable
Integrated airport CDM, automated data exchange
Where appropriate, ADS-B ATS surveillance is provided, or is not applicable
ADS-B Out mandate, certain aircraft require ADS-B In
Not applicable, or ITP approved for use
ACAS II required for certain aircraft (TAWS)
Mode S, MSAW, STCA and where appropriate, CPAR
Aerodrome certificiation covering all four areas
Full digital, integrated aerodrome warnings service
Cross-FIRB ATC services, amalgamation of FIRs/ACCs or not applicable
PBN airspace/route structure
Use of ATS surveillance based ATC minima
Comprehensive capacity analysis for aircraft and passenger movements to support ATFM
No procedural FLAS
ATS surveillance and ATM systems data sharing or not applicable
A formal civil-military body is in place to manage strategic CM matters or not applicable
Permanent civil-military liaison positions are in place in relevant ATC Centres or not applicable
Less than 15% of airspace is military special use airspace or not applicable
SUA is regularly reviewed by an independent body or not applicable
Military danger areas are designated in international waters, clear of ATS routes or not applicable
Full integration of civil - military ATM systems (including common procurement) or not applicable
Joint provision of some navigation aids and aerodromes or not applicable
Military ATS data (filtered as required) is shared with civil ATM units or not applicable
Common training is conducted for all civil-military matters or not applicable
Civil and military units have common procedures for all relevant liaison or not applicable