



International Civil Aviation Organization

**The First Meeting of the APANPIRG ATM Sub-Group
(ATM /SG/1)**

Bangkok, Thailand, 20 – 24 May 2013

Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

APSAPG OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents an overview of the outcomes from the Second Meeting of the ICAO Asia/Pacific Seamless Air Traffic Management Planning Group (APSAPG/2, Tokyo, Japan, 6 - 10 August 2012) and the Third Meeting of the APSAPG (Chennai, India, 21 - 25 January 2013).

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-2 Reduced vertical separation minima
- 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 Second Meeting of the ICAO Asia/Pacific Seamless Air Traffic Management (ATM) Planning Group (APSAPG/2) was held at Tokyo, Japan from 6 to 10 August 2012. The meeting was attended by 41 participants from Australia, Cambodia, China, Hong Kong China, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, CANSO, IATA and IFALPA.

1.2 The Third Meeting of the ICAO Asia/Pacific Seamless Air Traffic Management (ATM) Planning Group (APSAPG/3) was held at the Hotel Trident in Chennai, India from 21 to 25 January 2013. The meeting was attended by 36 participants from Australia, Bangladesh, Hong Kong China, India, Indonesia, Japan, Malaysia, Nepal, New Zealand, Republic of Korea, Singapore, Thailand, United States, ACI, CANSO, IATA, and IFATCA.

2. DISCUSSION

Seamless ATM Drivers

2.1 The Association of Southeast Asian Nations (ASEAN) had identified the need for significant change within the ATM system was required to support the 2015 Roadmap for Integration of Air Travel Sector (RIATS). Moreover, ASEAN stated in their ASEAN connectivity Master Plan and Implementation Framework that attention to harmonising ASEAN air navigation system was required to anticipate the growing air traffic in the region, and that failure to improve these facilities could result in limited growth potential.

2.2 IATA highlighted the airline industry's concern at the increasing level of delay at many airports and major routes questioning the ability of the Asia Pacific ATM infrastructure to meet future air traffic demand. IATA also outlined their program for 2013 to identify key airports with capacity constraints and to work with airports and Air Navigation Service Provider (ANSP) on determination and agreement of practical capacity levels.

2.3 IATA had conducted an analysis of the Singapore to Hong Kong, China city pair, and found that from 2004 to 2011 the average 'block to block' times had increased in the order of 2.9 to 3.9 minutes per flight; thus it was clear that the current ATM system was not providing the efficiencies of reduced fuel burn and emissions per flight that it needed to.

2.4 IATA commented that there had been no capacity improvement in this area for ten years, and that the ATM system was not keeping pace with traffic growth. The capability to deal with rapid traffic growth, similar to the capability in Europe and North America, was needed.

2.5 IATA noted that within the South China Sea, planning for enhanced surveillance using radar, Automatic Dependent Surveillance-Broadcast and Automatic Dependent Surveillance-Contract (ADS-B and ADS-C) for remote areas was underway. However, planning had not progressed in a synchronized fashion in order to result in the development of a complete surveillance capability. Despite a positive business case, forthcoming ADS-B mandates, and equipage up 79% in the area, it was still not clear when users could expect surveillance-based service delivery.

2.6 IATA presented information on the critical importance of aviation to economies and the historically high cost of aviation fuel. Noting that the objective was to achieve a single airspace continuum free of operational discontinuities and inconsistencies, IATA stressed that the expected economic benefits to be derived from Seamless ATM included, for example, passenger time savings, lower fares and rates, productivity improvements, stimulation of related industries, and transfer of high-technology skills.

2.7 If seamless airspace was fully realized, IATA stated that fewer ATM facilities covering wider areas could be envisaged. Thus during the transition towards seamlessness, some economic and organizational issues were likely to emerge, such as the establishment of a common charging scheme, as well as possible principles for the distribution of revenues among different providers.

2.8 At APSAPG/2, IATA offered to develop an economic study of the costs and benefits of transition to Seamless ATM. The draft study entitled ‘Economic Analysis of Seamless Air Traffic Management’ was presented at APSAPG/3. It was predicated on the assumption that there would be an economic consequence if ASBU Block 0 critical elements were not implemented or was delayed. While noting that the work was in draft and needed cost components to enable a full cost benefit study, the meeting encouraged further State input to develop the draft and congratulated IATA for the excellent work that had been conducted thus far. The key outcomes of this initial study were:

- without ASBU Block 0 improvements, aviation’s contribution to Asia/Pacific Regional Gross Domestic Product (GDP) would fall from 2.22% to 0.81% by the year 2030; and
- this represented a loss of economic benefit to the Regional economies of Asia Pacific of some USD16.63B per annum, or USD815B compounded by 2030.

2.9 In addition to losses which would accrue due to the failure to implement ASBU Block 0 in a timely manner, Asia/Pacific based airlines would suffer economic penalties as the technologies required to obtain the benefits from Seamless ATM were deployed in other parts of the world. This would require investment by airlines without operational benefits in the Asia/Pacific.

Seamless ATM Principles

2.10 APSAPG/2/WP07 provided the draft Seamless ATM Principles that had been initially developed from discussion at the ICAO Asia/Pacific Seamless ATM Symposium and Ad Hoc Meeting (Bangkok, Thailand, 15 to 17 August 2011) and reviewed at APSAPG/1 and the ATM/AIS/SAR/SG/22 meeting. The Draft Principles were intended to provide the basis for Seamless ATM policy and were thus crucial to set the over-arching expectations for the development of the Plan, and State actions consequential to the Plan.

2.11 After feedback from the early draft with the addition of the principle regarding simulators and the deletion of the Doc 4444 principle, there were 53 Draft Principles. These Draft Principles were extensively discussed and analysed by the APSAPG/2 meeting. After review, the remaining 37 Draft Principles as amended were further reviewed at APSAPG/3 and incorporated into the Draft Seamless ATM Plan.

Civil/Military Cooperation

2.12 ICAO presented information on the assessment process used to incorporate civil/military principles into the early draft Asia/Pacific Seamless ATM Plan. APSAPG/1/WP04 provided information on the development of civil/military cooperation and the forums that had advanced this issue.

2.13 There were 10 civil/military elements within the Seamless ATM questionnaire, which were intended to contribute towards the overall ‘seamless’ assessment of airspace and systems of each State. In this connection, the civil/military elements constituted 29% of the overall assessment, reflecting the importance of this subject in terms of its effect on Seamless ATM operations.

2.14 The APSAPG Co-Chair stated that there was much scope for improvement in civil/military cooperation in some States. He noted that overall progress had been slow, mainly because of a lack of military participation in civil forums.

Service Delivery Objectives

2.15 IATA recommended that the ATM enhancement efforts currently underway in the South China Sea area should be mapped by APSAPG as Service Delivery Objectives to provide a practical demonstration of the Seamless Airspace concept in Asia. ATM/AIS/SAR/SG/22 discussed progress on surveillance capability for the South China Sea (SCS) in WP45, which had suggested service delivery outcomes and efficiency objectives should drive efforts and a focus was required to deliver surveillance-based outcomes for all SCS ‘Main Trunk’ routes.

2.16 CANSO presented examples of specific initiatives in ADS-B and CDM where a number of States and their stakeholders were working together to transform ATM operations, which could be replicated across the entire Asia/Pacific Region provided there was proactive collaboration in the planning and execution of cross-border projects. CANSO underlined the need to have a strong focus on deliverables by translating strategies into action.

Aviation System Block Upgrades (ASBU)

2.17 Hong Kong, China recommended that the ATS Inter-facility Data-Link Communications (AIDC), Collaborative Decision-Making (CDM), Air Traffic Flow Management (ATFM), and ADS/Controller Pilot Data-link Communication (CPDLC) Block 0 elements should be considered as minimum operational and system needs; thus collaboratively implemented within the Asia/Pacific. To optimize cost-effectiveness, Hong Kong, China stated that it was important to highlight potential system interoperability issues induced by implementing different versions of individual ASBU modules such as AIDC and/or Aeronautical Information Exchange Model (AIXM). States were urged to consider interoperability and backward compatibility between systems being implemented.

2.18 Thailand noted that module B0-30: Service Improvement through Digital AIM was originally classified as non-critical. However, the module was related to three Regional Block 1 modules so it needed a higher priority.

2.19 Australia outlined the importance of the specific ATM safety priorities of the Asia/Pacific region forming a key part of the consideration of an updated draft Global Air Navigation Plan (GANP) and draft Aviation System Block Upgrades at the 12th Air Navigation Conference (AN.Conf/12, Montreal, 17-30 November 2012). Australia noted that the regional priorities, which first and foremost should focus on enhanced safety, may not be the same as those planned in Europe or North America, and nor may they address identical solutions being identified in those regions.

2.20 The Secretariat presented a draft Asia/Pacific Position Statement on the ASBU initiative. The 48th Conference of Directors General of Civil Aviation Asia and Pacific Regions (DGCA/48, New Caledonia, 10 to 14 October 2011) had requested APSAPG to study the proposed ASBU 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.

2.21 The meeting extensively discussed the draft Position Statement, and after modifying its content accordingly, agreed to a revised draft. The meeting incorporated the inputs from Australia, Hong Kong, China, Japan and Thailand into the list of element implementation priority.

2.22 A Draft Conclusion was agreed for APANPIRG’s consideration as follows:

Draft Conclusion APSAPG/2-1 Asia/Pacific Position Statement on ASBU

That, the Asia/Pacific Position Statement containing the response to the Draft Aviation System Block Upgrade (ASBU) Document appended as **Appendix E to the Report** be adopted for States to use as a reference in formulating their position for the 12th Air Navigation Conference.

Human Performance

2.23 IFATCA presented a paper at APSAPG/3 focused on the need for human performance to be considered at all stages and at all levels of development of any ATM plan, noting that four papers on this subject had been provided at the AN-Conf/12.

2.24 IFATCA felt that while there had been much discussion on the automation and modernisation of ATM systems, but there has been very little reference to human factors and human performance. Human performance in the context of new automated ATM systems included such diverse elements as, equipment design, training, acceptance of change, workload, 'just culture' reporting and staffing.

2.25 IFATCA also stressed the importance of matching automated systems between units with contiguous airspace, or the efficiency of modern equipment and new procedures would be lost at the transfer point. They stated that although automated ATM systems reduced controller workload, the incremental reliance on automation to complete many current tasks and functions of the controller required a fundamental change in the actions, responsibilities and skills of the controller. Therefore a comprehensive training programme was required.

2.26 IFATCA suggested that contrary to belief that the introduction of automated systems reduced the amount of training that was required; the converse was true, as training must cover the automated system and include the traditional control procedures as part of the contingency and fall-back plan. They stated that while a number of States were advanced in Block 0 implementation, the ones that were behind were a concern, as they could affect overall regional progress.

MTF and Sample Regional Route Study

2.27 The Secretariat presented the initial results of the Major Traffic Flow (MTF) and Sample Regional Routes to determine the status of Seamless ATM capability and issues, in order to identify improvements for Seamless ATM capability. The purpose of the study was to identify the:

- (a) status of the airspace or Flight Information Regions (FIR) regarding the ATM infrastructure, capabilities and procedures;
- (b) areas of mismatch between FIRs in regard to ATM infrastructure, capabilities and procedures, which presents obstacles to seamless ATM; and
- (c) areas of mismatch within the same airspace between ATM capability and ATM service provision.

2.28 In order to provide a comprehensive picture of the Asia Pacific airspace, two routes from each MTF and busy Asia/Pacific short-haul routes serving city pairs were chosen to access the current ATM service level, compared against the CNS capability within, and across FIRs. This was intended to identify the areas of mismatch in capabilities or service levels where interstate cooperation could lead to immediate progress in achieving greater seamlessness and ATM efficiencies.

2.29 Each route was segmented by Asia/Pacific FIRs, and the individual FIR or airspace was in turn organized into three categories:

- Category T- Terminal Airspace;
- Category S - En-route airspace where Very High Frequency communications and ATS surveillance services can be provided without satellite communications; and
- Category R- En-route non-Category B airspace (generally remote/oceanic).

2.30 The Secretariat presented the initial results of the MTF and Sample Regional Routes at the APSAPG/3 meeting. The study affirmed that, in general, ATM for flights operating on MTFs between large FIRs in Category R airspace (particularly where the multiple FIRs and ATCCs belonging to one state were merged into two or less FIRs and Area Control Centres) was to a large extent, fairly seamless. Examples were flights operating on Major Traffic Flows AR-1, AR-2, AR-6, AR-7 and AR-8.

2.31 Where routes (both long and short haul) cross multiple small FIRs, particularly in busy regional flows, there was a greater likelihood of lack of seamless ATM, possibly caused by a combination of inconsistent application of ATM procedures and standards, un-harmonized infrastructure development, route structure, transfer of control and other legacy issues. However, there were also examples of fairly seamless ATM between some busy city pairs in the region (and the world), resulting from bilateral efforts between ANSPs.

2.32 Key issues identified by the Study relevant to Seamless ATM were:

- fragmented FIRs resulting in multiple Transfer of Control points;
- traffic growth which had outpaced ANSP infrastructure, routes and airspace capacity;
- routes reliant on ground based nav aids or established for historical reasons, around which SUAs have grown;
- use of Flight Level Allocation Systems (FLAS) for flight level separation instead of use of horizontal separation;
- two different Flight Level Allocation Schemes (FLOS) - metric and imperial in the region;
- routes with flight level, direction, and time restrictions, some uncoordinated with neighbours;
- non-existent or unreliable surveillance/communications capability in some locations;
- ATS capability not fully utilised to provide appropriate level of service;
- hand-off procedures not aligned to ATM facilities and capabilities;
- infrastructure development based only on national requirements, resulting in duplicated and yet uncoordinated facilities;
- unnecessarily conservative separation requirements at transfer of control points;
- apparent reluctance to apply ICAO separation minima, including Global Navigation Satellite System (GNSS) separations;
- requirement for effective focus groups to address ATM issues;
- need for regular review of operational issues, and ATM services with users; and
- uncoordinated and limited use of AIDC.

2.33 IATA noted that pilots had often been required to adjust their flight levels at certain transfer points on some of these routes. In their view, such practices indicated that more work was required before the ATM in these locations could be labelled as 'seamless'.

Seamless ATM Assessment

2.34 ICAO presented the results of the Asia/Pacific Seamless ATM Survey at APSAPG/2 and APSAPG/3. The purpose of the questionnaire was to collect information regarding the status of current Asia/Pacific Air Navigation Service capabilities and aircraft equipage in order to support Seamless ATM planning. The information also provided valuable information on capability and planning that assisted the early drafting of the Asia/Pacific Seamless ATM Plan itself. A copy of the latest iteration of the Seamless ATM Assessment Sheet is appended at **Attachment A**.

Seamless ATM Draft Plan

2.35 In accordance with the APSAPG Terms of Reference (TOR), a draft Seamless ATM Plan outline was required to be developed for APANPIRG/23 (10-14 September 2012), with the completed Plan to be submitted to APANPIRG/24 in 2013. APSAPG/2/WP10 provided the initial draft Asia/Pacific Seamless ATM Plan for consideration in terms of its structure and general direction.

2.36 The APSAPG/2 meeting discussed the draft at length, and amended the draft accordingly. There was considerable discussion about the terms used to indicate the expectations of ATM service levels, and how these expectations might be presented in later versions. It was stressed that there needed to be a substantial effort by APSAPG members to research, develop draft material, and review draft excerpts for the Plan prior to APSAPG/3. Moreover, it was emphasised that anything could be amended up until the APSAPG/4 meeting, so it was a matter for States to research and use the time available to present satisfactory material in-between meetings.

2.37 APANPIRG/23 reviewed and thanked the Secretariat for the effort in compiling the draft APAC Seamless ATM Plan. APANPIRG noted that the completed document would become useful guidance material to assist the implementation of seamless ATM and should achieve seamless ATM across the Asia/Pacific regions in a truly collaborative, practical and visionary manner.

2.38 APANPIRG/23 noted the request from IATA that States support:

- discussion at key airports to develop realistic capacity evaluation;
- establishment of A/CDM (Airport Collaborative Decision Making) at selected airports;
- dialogue to improve gate-to-gate CDM along major routes across boundaries; and
- IATA in developing the APSAPG Seamless ATM economic study.

2.39 APANPIRG noted that ICAO was in discussion with the Asia/Pacific Economic Cooperation body (APEC), Association of Southeast Asian Nations (ASEAN) in order to brief these regional bodies on the Seamless ATM Plan initiative.

2.40 The APSAPG/3 meeting extensively discussed the updated draft Seamless ATM Plan (version 0.7). Comments from Japan (WP17), Hong Kong, China (WP18) and India (WP24) had been incorporated within a master version 0.8 document, which was reviewed paragraph by paragraph.

2.41 Since the APSAPG/3 meeting, comments had been provided by key stakeholders and the draft plan amended accordingly as version 0.9 (**Attachment B**).

Seamless ATM Implementation

2.42 New Zealand presented information identifying the Seamless ATM work undertaken in the South Pacific. New Zealand noted that Seamless ATM implementation was already in progress within the Pacific region at different levels.

2.43 New Zealand emphasised that to achieve an interoperable and Seamless ATM system, there had to be performance objectives, progress metrics and co-operation between States to allow States across the region to cooperate, learn from and partner each other. The APSAPG Co-Chair commended the work of Informal South Pacific Air Traffic Services Co-ordinating Group (ISPACG) in pursuing Seamless ATM implementation, noting that there should be performance tools to assess the progress of change.

2.44 Singapore noted that the Southeast Asia ATM Coordination Group (SEACG) and South Asia Indian Ocean ATM Coordination Group (SAIOACG) had been working on seamless efforts and that the use of high level planning systems for implementation would further enhance the work of such groups. In this regard, the Asia/Pacific Seamless ATM Plan would provide further guidance and reference for key improvements to the areas relevant to such groups.

2.45 Japan highlighted the long history of progress through informal meetings like the Informal Pacific ATC Planning Group (IPACG), indicating that States did not need to wait for ICAO formal meetings to progress.

2.46 Hong Kong, China felt that ICAO should be the facilitator to coordinate the formulation of the Seamless ATM Plan but it would be the prerogative of individual States to oversee the implementation of Seamless ATM across the region. Singapore highlighted that APANPIRG and its contributory bodies had the ability to carry the implementation of the various seamless initiatives. The various Sub-Groups had extensive experience in implementing new region-wide initiatives, which were testament to the efficacy of the APANPIRG framework.

2.47 CANSO felt that oversight was extremely important as states were not in a position to resolve regional issues. The meeting discussed the issue at length, and concluded that states were ultimately responsible for addressing and implementing issues and solutions related to their airspace, with ICAO's assistance.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) provide feedback to the Secretariat on the draft Seamless ATM Plan V 0.8d (**Attachment B**); and
- c) discuss any relevant matters as appropriate.

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