



International Civil Aviation Organization

**The First Meeting of the ICAO Asia/Pacific Seamless ATM Planning Group (APSAPG/1)**

Bangkok, Thailand, 31 January – 03 February 2012

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**Agenda Item 3: Drivers for a Seamless ATM Environment**

**A PLANNING FRAMEWORK FOR SEAMLESS ATM**

(Presented by IATA)

**SUMMARY**

The purpose of this paper is to facilitate agreement on a number of principles which will guide the work of the APSAPG in the development of the seamless ATM (Air Traffic Management) plan for the Asia Pacific Region. This paper discusses:

- A definition of seamless Air Traffic Management (ATM)
- The need to set performance targets for the short, medium and longer term.
- The adoption of the ICAO Aviation System Block Upgrades (ASBU) to ensure global harmonization, and
- Proposes short term cooperative activities which will demonstrate the benefits of seamless air traffic management.
- Proposes the establishment of a small working group to baseline the current state of ATM across the Region together with States upgrade plans for the next 10 years as appropriate.
- Confirm the intent to provide an initial Seamless ATM Master Plan for Asia Pacific at APANPIRG/23 with a final MASTER PLAN report at APANPIRG/24 in 2013 which has ICAO and State endorsement.

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*

**1. INTRODUCTION**

1.1 Asia Pacific is the world's fastest growing aviation market;

- Asia Pacific currently handles 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 are expected to grow three fold over the next twenty years
- Much of the increase will be between city pairs in Asia Pacific.
- Such growth is expected in spite of the projected global downturn of activity over the next two years

- 1.2 It is inconceivable that traffic increases of this magnitude can be handled effectively and efficiently without significant enhancement of the air traffic management processes.
- 1.3 Failure to act will not only compromise safety in the Region but will also limit the economic benefit of aviation if people and goods cannot be moved safely, efficiently and in a cost effective manner.
- 1.4 Asia Pacific based airlines will suffer further economic penalties as the technologies required to obtain the benefit from seamless air traffic management are deployed in other part of the world. Our airlines WILL need to invest in this new capability to operate globally. Without deployment in our region the payback period will be significantly extended.
- 1.5 It is undeniable that the economic benefit of aviation will be reduced unless the development of infrastructure keeps pace with the increasing demand.
- 1.6 Preparation for this growth is evidenced by the considerable projected capital expenditure in Asia Pacific airport infrastructure which is expected to top USD60B in the next 10 years from a total global projected airport capital expenditure of USD150B.
- 1.7 We know that there is considerable development of ATM infrastructure by a number of States and ATM providers within their airspace – the challenge now is to “link” this airspace with seamless ATM.
- 1.8 Seamless Asia Pacific ATM will link the supply chain for ATM and will enable the maximum benefits of the capital investments to be obtained as well as provide the very significant collateral benefit to society as a whole.
- 1.9 This project aims to develop similar capabilities to those of Europe’s Single European Skies (SES) and the United States NextGen programs. The objective must be to improve ATM efficiency across our Region and at the same time harmonize with other global programs.
- 1.10 But an important difference in Asia Pacific is the agreement to pursue “seamless ATM” rather than a “single sky”.
- 1.11 Current airspace sovereignty, and airspace delegated by ICAO to a State, will remain unchanged.
- 1.12 A key deliverable initially of the APSAPG will be to scope the benefit of Asia Pacific Seamless ATM. By way of example, it is estimated that Europe’s inefficiency of ATM is equivalent to 25% of the total cost of ATM in Europe (EURO 3B versus total cost of ATM EURO 12B).
- 1.13 It is reasonable to expect a similar level of flight efficiency benefit in the Asia Pacific Region.
- 1.14 The increase in ATM capacity through harmonization may be achievable without substantial investments – thus leading to a reduction in unit costs borne by users. Even if increased resources are required for the transition to seamless functionality, it is reasonable to expect that there will not be any long term increased ATM costs for users.

## **2 BACKGROUND**

- 2.1 The 46<sup>th</sup> Conference of Asia Pacific Directors General of Civil Aviation (2009) agreed in principle to embark on a project to deliver a seamless Asia Pacific sky.
- 2.2 Subsequently the issue has been progressed at a number of ICAO meetings and Workshops.
- 2.3 In 2010 APANPIRG/22 agreed to establish the Asia Pacific Seamless ATM Planning Group (APSAPG) reporting to APANPIRG.
- 2.4 The 48<sup>th</sup> Conference of Directors General of Civil Aviation urged States and Administrations to become involved in the APSAPG and to share information and experience on their ATM modernization programs.
- 2.5 In particular it was considered that the experience and capability developed through State programs such as those of Japan, India, Singapore, China, and others, will be beneficial to this Project Group.
- 2.6 The DG's Conference also supports a proposal that the APSAPG consider ICAO's proposed Aviation Systems Block Upgrades (ASBU) as the initial roadmap towards seamless Asia Pacific ATM.
- 2.7 The ASBU roadmap was adopted by the Global Air Navigation Seminar in 2011 and will be formally endorsed at the 12<sup>th</sup> Air Navigation Conference (2012). It is reasonable that given this lead time that work by States/Administrations and ATM providers could begin in anticipation of a formal endorsement.
- 2.8 It was also recognized that safety is paramount. The inaugural meeting of the newly formed ICAO Regional Aviation Safety Group (RASG), held in conjunction with DGCA/48, considered a paper proposing the establishment of a process to collect safety data across the region. It was agreed that to generate seamless ATM across the interface between States would require a comprehensive analysis of existing and future hazards in order for the Safety Cases to mitigate these risks. The ICAO Regional Office noted this IATA paper and forwarded it to ICAO Headquarters for expert advice.

## **3 DISCUSSION**

### **3.1 SEAMLESS AIRSPACE**

#### **3.1.1 CANSO define seamless airspace as:**

“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:

- Type or quality of service received,
- Air navigation and communications performance standards
- Standard practices to be followed.

#### **3.1.2 CANSO characterize operations in a seamless airspace as:**

- Standardized: Terms/Definitions; ATM and pilot procedures; application of aircraft separation; airborne and navigation performance requirements; Communication and surveillance performance requirements; airspace

organization, regulation and structure; Air/Ground phraseology, flight plan format, data message sets and protocols, aeronautical information format

- Harmonized:
  - Flight level allocation schemes appropriate to ATM requirements and to the direction of flight for bidirectional routes
  - ATS route structure across FIR boundaries based on the traffic flow and fleet capability
- Interoperable: ATM automation systems

3.2 PERFORMANCE MEASURES AND TARGETS

3.2.1 If a measure of success of Seamless ATM is the level of seamless airspace (harmonised, standardized and interoperable airspace) then the target must reflect this aspiration together with defined benefits.

3.2.2 ATM providers and Airlines will need to have quantifiable targets for efficiency, safety, costs and emission reduction in order to develop a sound cross Industry cost benefit analyses.

3.3 Set out below are the primary targets of Europe Single European Sky and US NextGen programs.

|                    | <b>SES</b>  | <b>NextGen</b>  | <b>Seamless Asian Sky (suggested)</b>                              |
|--------------------|---|---|--|
| <b>Efficiency</b>  | Threefold increase in capacity; significant delay reduction   | 35% delay reduction by 2018 with increasing capacity and extend capability  | XX Increase airspace capacity, XX delay reduction                  |
| <b>Costs</b>       | Cutting ATM costs by 50%, 250 million Euros savings through delay reduction (current delay costs 1 billion/year ) | 23 billion dollars benefit by 2018 through delay reduction (current total delay costs 6.5 billion/year) and 1.4 billion dollars fuel saving | \$xx B in fuel saving through delay reduction and route efficiency |
| <b>Safety</b>      | Improving safety performance by a factor of 10 as traffic grows   | Reducing current 1.43 accidents per million sectors   | Improving safety performance                                       |
| <b>Environment</b> | Reducing the environmental impact per flight by 10%, carbon-neutral air traffic growth                            | Reducing carbon dioxide emissions by 14 million tons  | Reducing regional carbon emissions by xx%                          |

3.4 ICAO AVIATION SYSTEMS BLOCK UPGRADE (ASBU)

3.4.1 In 2004 ICAO published the “Future ATM Concepts” document which had been developed over the previous decade.

3.4.2 The intention of Future ATM Concepts was to focus on the delivery of capabilities for ATM improvements, as distinct from technology, as the primary enabler of improved ATM

performance. It was acknowledged that with well defined capabilities the Industry would then develop the appropriate technologies to deliver these capabilities (e.g. 4D trajectory, System Wide Information Management) which would bring the benefits to ATM.

- 3.4.3 Whilst the various regional or State ATM upgrade programs have made significant progress towards realizing some of the capabilities envisaged in the Future ATM concepts there is now greater recognition of the need to ensure harmonization of these programs.
- 3.4.4 Failure to harmonize systems, which could result in differing requirements and differing timeframes depending on the Region, will inevitably burden the air transport system with inefficiencies and safety concerns. Avionics requirements and timing in one Region must align with other Regions to ensure the maximum benefit is obtained from these and other investments. Failure to do so increases the payback period which will have a negative impact on the Cross Industry Business Case.
- 3.4.5 Today, much of the current avionic technology is under-utilized globally. If airlines are expected to continue investment in new avionics it is essential that the benefits be clearly defined, recognized in ATM planning and delivered when agreed.
- 3.4.6 The ASBU will enable in-step global progress to deliver the immediate benefits of currently available avionics and harmonized plans going forward.
- 3.4.7 The ASBU comprises a suite of enablers, called modules, each having the essential qualities of:
- A clearly-defined measurable operational improvement and success metric
  - Necessary equipment and/or systems in aircraft and on ground along with an operational approval or certification plan
  - Standards and procedures for both airborne and ground systems
  - A positive business case over a clearly defined period of time
- 3.4.8 As mentioned above, the first Block Upgrade is Block zero for which no new airborne technologies are required
- 3.4.9 It should be noted that not all Blocks will be required in all airspaces.
- 3.4.10 It is proposed that the APSAPG adopted the following timeframe for implementation of benefit.
- Short term – Regional implementation of ASBU BLOCK 0 by 2018
  - Medium term – Seamless Major Traffic Routes (AR1-AR10 inclusive) by 2023
  - Long Term – Seamless Asia Pacific ATM by 2035
- 3.4.11 The APSAPG is invited to agree that ABSU, as part of the Global Air Navigation Plan, is the appropriate framework for an ATM roadmap in Asia Pacific and the APSAPG Seamless ATM plans.
- 3.4.12 It is also proposed that the current ICAO workgroups in Asia Pacific be the primary focus of delivering the improvements across the Region within the context of a MASTER ATM PLAN developed by the APSAPG for APANPIRG later this year.

#### **4 NEAR TERM IMPLEMENTATION OF IMPROVEMENTS.**

4.1 Whilst it is necessary to commence the strategic planning required for this Regional project there will be great value attached to actually demonstrating to our Region, and other Regions, that seamlessness can provide immediate benefits.

4.2 This section suggests one option and invites the meeting to develop another proposal.

##### **4.2.1 AIR ROUTE M771 AND L642**

4.2.2 Industry has tried, for many years, to initiative a route restructure in the South China Sea to improve the efficiency of air routes.

4.2.3 This effort has been unsuccessful for a variety of reasons. Whilst some work continues IATA airlines propose that that the States involved agree to further work within the context of APSASG objectives.

4.2.4 Initially this work would entail identification of the requirements of seamlessness and the impediments to seamlessness.

4.2.5 States should consider the current and near term capability, and as a result efficiency benefit now (or shortly available), on these routes. We should now ensure that airlines obtain the reduced separation and great flight efficiency from the capabilities provided by ADS/CPDLC, ADS-B OUT, and Radar coverage – much of which is currently available on these routes and/or where extensions will produce significant improvement. This falls neatly within ASBU Block Zero

4.2.6 This process would provide immediate benefits but perhaps of equal importance would show all States that a focus on benefit from current capability improves in flight efficiency and reduced ATC workload to enable greater capacity on the routes.

4.3 The Meeting participants are requested to suggest a further proposal for short term implementation which will demonstrate the value of seamlessness and also provide learning and experience for the States involved.

#### **5 ACTION BY THE PROJECT GROUP**

5.1 That the APSAPG agree;

- a) That the CANSO definition of SEAMLESS AIRSPACE is adopted.
- b) That a sub group be established to develop performance targets, goals and timeframes for standardized, harmonized and interoperable (seamless) Asia Pacific ATM and to report to the next meeting of APSAPG.
- c) That the ICAO Aviation System Block Upgrade be adopted as guidance material for the development of a Regional plan for seamless Asia Pacific ATM with an initial focus on BLOCK 0 to better utilize current avionics.
- d) That the APSAPG agree on two immediate initiatives to demonstrate the benefits of “seamless air traffic management” to guide future work;
  - States involved with ATM on M771 and L642, together with Industry partners, commence the planning required for the implementation of seamlessness across these two key routes.
  - An additional suggestion to be developed by the APASG

- e) That a sub group be established to document Asia Pacific ATM capabilities to identify the gap between current capabilities and standardized, harmonized and interoperable (seamless) Asia Pacific ATM. This group will also document individual Asia Pacific States ATM upgrade plans.
  - Note. This group will require States and Organizations to consider allocating full time resource to this task for a period of three months prior to the next meeting.

It is expected that the APSAPG will develop a comprehensive interim report for APANPIRG/23 2012 with a view to a final report comprising the equivalent of an Asia Pacific ATM Master plan to 2030 by APANPIRG24 in 2013.

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