



International Civil Aviation Organization

**Third Meeting of the ICAO Asia/Pacific Seamless ATM Planning Group
(APSAPG/3)**

Chennai, India, 21-25 January 2013

Agenda Item 4: Asia/Pacific Seamless ATM Status and Strategies

SEAMLESS ATM ASSESSMENT SURVEY

(Presented by Secretariat)

SUMMARY

This paper presents the results of the Seamless ATM Survey, which was conducted to provide information on the status of various factors, including Aviation System Block Upgrade (ASBU) elements, within the Asia/Pacific Region.

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 APSAPG is required by its Terms of Reference (TOR) to the current status of APAC administration's Seamless ATM capability, including the identification of gaps affecting harmonization and interoperability. As part of this process, a State Letter T3/10.1.21 – AP048/12 (ATM) dated 12 April 2012 was sent to all administrations with with Flight Information Regions (FIRs).

1.2 The intent and purpose of the questionnaire was to facilitate the collection of information regarding current Asia/Pacific Air Navigation Service capabilities and aircraft equipage in order to support Seamless ATM planning, and is exclusively for identifying a validated inventory. A copy of the Questionnaire and results were presented to the Twenty-Second Meeting of the APANPIRG Air Traffic Management/Aeronautical Information Services/Search and Rescue Sub-Group (ATM/AIS/SAR/SG/22, Bangkok, Thailand, 25 to 29 June 2012).

1.3 The APSAPG/2 meeting had requested that the Regional Office issue a State Letter requesting updates, and reminding the States which had yet to respond to the first letter to provide information, which will enable the Secretariat to provide a more robust and comprehensive picture of the APAC region's Seamless ATM capability. 4 States have provided new information and 7 States have provided updates. The Secretariat wishes to thank them for the efforts.

2. DISCUSSION

Survey Results

2.1 The survey results received thus far were collated into a Seamless ATM Assessment spreadsheet, in order to provide an overall measure of assessment and comparison. The quantification of answers was achieved by using a simple word picture assessment process. In this connection, 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**.

2.2 Of the 30 administrations surveyed, a total of thirteen (13) States responded before the APSAPG meeting. As mentioned in the introduction above, 11 states have responded to the second letter dated 29 August 2012, out of which 4 provided new information. The results indicated that there were three general groups of administrations in terms of their Seamless ATM capability. The first group in the top third already had relatively Seamless ATM capability:

- United States, 84%;
- Australia, 80%;
- New Zealand, 80%;
- Singapore, 74%;
- Hong Kong, China, 76%;
- Republic of Korea, 73%;
- Fiji, 70%; and
- Japan, 69%.

2.3 It was noticeable that all States providing ATM services within the Pacific Region were represented in this top group, except for French Polynesia which did not respond to the survey. However, French Polynesia was known to have interoperability capability with adjacent administrations from Informal South Pacific ATS Coordinating Group (ISPACG) reports. Conversely, only three administrations from the Asia Region indicated a reasonable degree of current Seamless ATM capability.

2.4 The second group in the middle third had significant gaps in Seamless ATM capability, but were expected to be working towards interoperability and enhanced systems:

- India 63%;
- Thailand, 60%;
- China, 60%;
- Malaysia, 53%;
- Indonesia, 41%;
- Myanmar 39%;
- Philippines 37%;
- Afghanistan 36%; and
- Bangladesh 19%.

2.5 The following administrations did not respond to the survey, so had default results if not known by other means which were assigned a nil (zero) rating:

- French Polynesia;
- Cambodia;
- DPR Korea;
- Lao PDR;
- Maldives;
- Mongolia;
- Nauru;
- Nepal;
- Pakistan;
- Papua New Guinea;
- Solomon Islands;
- Sri Lanka; and
- Viet Nam.

2.6 It was expected that States would provide further information to the Regional Office that could provide a more robust picture of Seamless ATM capability that could be reported on a regular basis.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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Seamless ATM Implementation	ASBU Block 0 elements (18)																		State
	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	Totals
United States	2	2	2	2	2	1	2	2	2	0	1	2	2	2	1	2	2	2	31
New Zealand	1	2	1	1	2	1	1	2	2	1	2	1	2	0	1	2	2	2	26
Australia	1	2	0	1	2	0	2	2	2	1	2	2	2	2	1	2	2	2	28
Hong Kong, China	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	1	1	2	22
Singapore	2	2	1	1	0	1	1	2	2	1	2	1	2	2	0	2	2	2	26
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
India	2	2	1	1	1	1	1	2	1	1	2	1	2	0	1	2	2	2	25
Thailand	0	1	1	0	0	0	1	2	0	1	2	1	2	2	2	2	1	2	20
China	1	0	2	1	2	0	0	2	2	2	2	1	0	0	2	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
Myanmar	1	1	0	1	0	1	1	1	0	1	0	0	0	0	0	2	2	0	11
Philippines	1	2	0	1	0	0	1	0	2	1	0	0	0	0	0	0	0	0	8
Afghanistan	0	0	0	0	0	1	1	0	0	1	0	0	2	2	0	1	0	0	8
Bangladesh	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2
Maldives	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Polynesia	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	4
Cambodia	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
Mongolia	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	18	23	10	12	20	9	17	29	19	17	20	10	24	14	13	29	24	24	
APAC %	56%	39%	17%	20%	34%	15%	29%	49%	32%	29%	34%	17%	41%	24%	22%	49%	41%	41%	

Gl. Plan CERT	APAC Concept of Ops			Regional Elements (7)			State Totals	Civ/Mil Elements (10)		% Military	SUA	International	Integrated	Joint Aids	Shared	Common	Common	State CM Total
	FIR	NAV	SUR	APT	ACCESS	DAT		Body	Liaison	SUA	Review	SUA	ATM	Aerodromes	Data	training	procedures	
2	0	2	2	2	2	1	11	2	2	1	1	2	1	2	2	2	2	17
2	2	2	2	2	2	0	12	0	2	2	2	2	2	2	2	2	2	18
1	2	1	2	2	2	2	12	2	1	2	2	0	1	2	2	2	2	16
2	1	2	2	2	1	1	11	2	2	2	2	2	2	2	2	2	2	20
2	2	1	2	2	2	2	13	2	2	2	0	0	0	2	1	2	2	13
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
2	2	1	2	0	1	0	8	0	2	0	2	1	0	2	2	0	2	11
1	2	1	2	1	2	0	9	2	2	0	2	2	1	2	2	0	0	13
2	1	1	2	0	2	0	8	2	1	0	0	2	1	2	1	0	2	11
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	2	0	2	1	1	0	8	1	2	1	1	2	0	0	0	0	1	8
2	0	1	0	2	0	0	5	2	2	2	0	2	0	0	1	2	2	13
1	0	1	1	1	0	0	4	2	2	0	0	2	1	2	2	0	2	13
0	1	1	1	1	1	0	5	0	1	0	1	2	0	0	0	1	1	6
0	2	1	2	0	2	0	7	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	25	20	30	22	21	10		24	31	19	18	23	16	26	24	22	29	
48%	43%	34%	51%	37%	36%	17%		41%	53%	32%	31%	39%	27%	44%	41%	37%	49%	

State Grand Total		
Value	%	
59	84%	United States
56	80%	New Zealand
56	80%	Australia
53	76%	Hong Kong, China
52	74%	Singapore
51	73%	Republic of Korea
49	70%	Fiji
48	69%	Japan
44	63%	India
42	60%	Thailand
42	60%	China
37	53%	Malaysia
29	41%	Indonesia
27	39%	Myanmar
26	37%	Philippines
25	36%	Afghanistan
13	19%	Bangladesh
7	10%	Maldives
4	6%	French Polynesia
0	0%	Cambodia
0	0%	DPR Korea
0	0%	Lao PDR
0	0%	Mongolia
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 certification, 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
INEGRAED 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 navigation 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 military 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 certification 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