



International Civil Aviation Organization

**FIFTEENTH MEETING OF THE ADS-B STUDY AND IMPLEMENTATION
TASK FORCE (ADS-B SITF/15)**

Bangkok, Thailand, 18 - 20 April 2016

**Agenda Item 5: Asia/Pacific Regional ADS-B planning and implementation information in
the e-ANP**

E-ANP STATUS AND ADS-B PLANNING IN E-ANP

(Presented by the Secretariat)

SUMMARY

This paper presents the status of e-ANP and ADS-B planning information in the new Format. The meeting is invited to note the information provided in this paper.

1. INTRODUCTION

e-ANP WG meeting and regional air navigation tables

1.1 The CNS SG/19 meeting reviewed draft CNS parts of e-ANP based on contributions by the e-ANP Working Group established by the CNS SG/18 meeting. The populated templates and tables were further updated through the relevant meetings and feedback from States/Administrations. As a result of review, the meeting recommended new planning tables for consideration by APANPIRG including the Surveillance Table.

1.2 The new draft surveillance table was resulted from combination of previous FASID Tables 4A and 4B.

1.3 The APANPIRG/26 meeting endorsed the Tables through Conclusion **APANPIRG/26/2 — Adoption of the ASIA/PAC eANP** including the Surveillance Table and invited ICAO to invite ICAO to process the PfAs (Proposal for amendments) for Volume I and Volume II of e-ANP in accordance with the established procedures:

2. DISCUSSION

2.1 In accordance with Conclusion APANPIRG/26/2, ICAO APAC Office issued the PfA T 11/2.1-AP010/16 (AGA) to the Asia and Pacific Regions (APAC) Air Navigation Plan on 18 January 2016.

2.2 ICAO Council approved the new ANP format on 18 June 2014. Accordingly the Proposal for Amendment of APAC e-ANP Volume II has been prepared in accordance with the new regional ANP template approved by the ICAO Council and will replace the current APAC FASID ANP (Doc 9673).

2.3 The States/Administrations were requested to reply to PfA by 12 February 2016.

2.4 After necessary formatting and editorial changes made by ICAO HQs, States/Administrations will be notified of its approval of the PfA shortly.

2.5 The final version of the Surveillance Table in the e-ANP is provided in Attachment to this paper.

3 ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

ASIA AND PACIFIC REGIONS (APAC) AIR NAVIGATION PLAN

VOLUME II

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Specific Regional Requirements

APAC ANP, VOLUME II

PART III – COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

1. INTRODUCTION

1.1 This part of the APAC ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to Communication, Navigation and Surveillance (CNS). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of CNS facilities and services within a specified area in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300) and mandatory requirements related to CNS facilities and services to be implemented by States in accordance with regional air navigation agreements. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

Communications

Aeronautical Fixed Service (AFS)

2.1 The aeronautical fixed service should comprise the following systems and applications that are used for ground-ground (i.e. point-to-point and/or point-to-multipoint) communications in the international aeronautical telecommunication service:

- a) ATS direct speech circuits and networks;
- b) meteorological operational circuits, networks and broadcast systems, including World Area Forecast System – Internet File Service (WIFS) and/or Satellite Distribution System for Information Relating to Air Navigation (SADIS);
- c) the Aeronautical Fixed Telecommunications Network (AFTN);
- d) the Common ICAO Data Interchange Network (CIDIN);
- e) the Air Traffic Services (ATS) Message Handling Services (AMHS); and
- f) the Inter-Centre Communications (ICC).

2.2 To meet the data communication requirements, a uniform high-grade aeronautical network should be provided, based on the Aeronautical Telecommunication Network (ATN), taking into account the existence and continuation of current networks.

2.3 Contingency procedures should be in place to ensure that, in case of a communication centre breakdown, all the parties concerned are promptly informed of the prevailing situation. All possible arrangements should be made to ensure that, in case of breakdown of a communications centre or circuit, at least high-priority traffic continues to be handled by appropriate means.

2.4 AFS planning should permit flexibility in detailed development and implementation. The required AFTN Stations and Centres are listed in the AFTN Plan in [Table CNS II-1](#).

The Aeronautical Telecommunication Network (ATN)

2.5 The ATN should be able to:

- a) support applications carried by the existing networks;
- b) support gateways enabling inter-operation with existing networks; and
- c) support ground-ground communications traffic associated with air-ground data link applications.

2.6 The ATN should make optimum use of dedicated bilateral/multilateral aeronautical links and other communication means commensurate with the operational Quality of Service (QoS) requirements.

2.7 The implementation of the ATN should take into account the need for cost-effective evolution in terms of network capacity, requirements and time-frame and allow for a progressive transition from existing communication networks and services to a uniform, harmonised and integrated communications infrastructure, capable of supporting the implementation of future aeronautical services such as Flight and Flow Information in a Collaborative Environment (F-FICE), System-Wide Information Management (SWIM) applications, etc.

2.8 In case means other than dedicated bilateral links are used by the ATN, States should ensure that Service Level Agreements (SLA) are met in terms of implementation priority, high availability, priority in restoration of service and appropriate levels of security.

2.9 The ATN should provide for interregional connections to support data exchange and mobile routing within the global ATN.

2.10 In planning the ATN, provisions should be made, where required, for interfacing with other international networks. The required ATN Infrastructure Routing Plan is described under [Table CNS II-2](#).

Network services

2.11 The Internet Society (ISOC) communications standards for the Internet Protocol Suite (IPS) should be used for the implementation of AMHS.

2.12 The migration from legacy bit-oriented protocols such as X.25 Protocol suite to IPS should be planned.

2.13 The migration of international or sub-regional ground networks to the ATN based on Internet Protocol (IP) to support AFS communication requirements, while reducing costs, should be planned.

2.14 States should ensure that the solutions provided for the implementation of the ATN meet the air traffic management and aeronautical fixed service requirements. Such requirements should consist of:

- a) Performance requirements: availability, continuity, integrity, monitoring and alerting criteria per data flow. In the case where a Required Communication Performance (RCP) is globally prescribed, requirements derived from RCP should be stated;
- b) Interoperability requirements;
- c) Safety and security requirements, duly derived after the identification of operational hazards and threats, and allocation of objectives; and
- d) Implementation process requirements (creation, test, migration, upgrades, priority in restoration of service, termination).

Network management

2.15 An ICAO centralised off-line network management service is provided to participating AFTN/ AMHS centres in the Asia and Pacific Regions under the ATS Messaging Centre (AMC).

2.16 In the case of integrated communications services procured and shared by several States, organizational provisions should allow for the planning and performing of the management of technical performance, network configuration, fault, security, cost division/allocation, contract, orders and payment.

Specific Air Traffic Management (ATM) requirements

2.17 Where ATS speech and data communication links between any two points are provided, the engineering arrangements should be such as to avoid the simultaneous loss of both circuits. The required ATS direct speech circuits plan is detailed under [Table CNS II-3](#).

2.18 Special provisions should be made to ensure a rapid restoration of ATS speech circuits in case of outage, as derived from the performance and safety requirements.

2.19 Data circuits between ATS systems should provide for both high capacity and message integrity.

2.20 The Inter-Centre Communication (ICC), consisting of ATS Inter-facility Data Communication (AIDC) application and the Online Data Interchange (OLDI) application, should be used for automated exchange of flight data between ATS units to enhance the overall safety of the ATM operation and increase airspace capacity.

2.21 Where Voice over IP is planned or implemented between ATS units for voice communications, it should meet the ATS requirements. When data and voice are multiplexed, particular attention should be paid to the achievement of the ATM performance and safety requirements.

Specific Meteorological (MET) requirements

2.22 The increasing use of the GRIB (Gridded Binary or General Regularly-distributed Information in Binary form) and BUFR (Binary Universal Form for the Representation of meteorological data) code forms for the dissemination of the upper wind and temperature and significant weather forecasts and the planned transition to digital form using Extensible Mark-Up Language (XML)/Geography Mark-Up Language (GML) for the dissemination of OPMET data should be taken into account in the planning process of the ATN.

2.23 In planning the ATN, account should be taken of changes in the current pattern of distribution of meteorological information resulting from the increasing number of long-range direct flights and the trend towards centralized flight planning.

Specific Aeronautical Information Management (AIM) requirements

2.24 The aeronautical fixed service should meet the requirements to support efficient provision of aeronautical information services through appropriate connections to Area Control Centres (ACCs), Flight Information Centres (FICs), aerodromes and heliports at which an information service is established.

Aeronautical Mobile Service (AMS)

2.25 To meet the air-ground data communication requirements, a high-grade aeronautical network should be provided based on the ATN, recognising that other technologies may be used as part of the transition. The network needs to integrate the various data links in a seamless fashion and provide for end-to-end communications between airborne and ground-based facilities.

2.26 Whenever required, use of suitable techniques on VHF or higher frequencies should be made. The required HF Network designators applicable for the Asia and Pacific Regions are listed in [Table CNS II-4](#).

2.27 Aerodromes having a significant volume of International General Aviation (IGA) traffic should also be provided with appropriate air-ground communication channels.

Air-Ground Data Link Communications

2.28 A Strategy for the harmonised implementation of the data link communications in the Asia and Pacific Regions should be developed based on the Global Operational Data Link Document (GOLD) adopted by ICAO Regions and the Aviation System Block Upgrade (ASBU) methodology.

2.29 Where applicable, Controller-Pilot Data Link Communications (CPDLC), based on ATN VDL data link Mode 2 (VDL2) and/or FANS-1/A, should be implemented for air-ground data link communications.

2.30 Partial or divergent aircraft data link evolutions that result in excluding messages from aircraft systems should not be pursued. Interim steps or phases toward full implementation of the common technical definition in ground systems should only be pursued on a regional basis, after coordination between all States concerned.

2.31 Harmonization of operational procedures for implementation of the above packages is essential. States, Planning and Implementation Regional Groups (PIRGs) and air navigation services providers should adopt common procedures to support seamless ATS provision across FIR boundaries, rather than each State or Region developing and promulgating unique procedures for common functions.

Required Communication Performance (RCP)

2.32 The Required Communication Performance (RCP) concept characterizing the performance required for communication capabilities that support ATM functions without reference to any specific technology should be applied wherever possible.

2.33 States should determine, prescribe and monitor the implementation of the RCP in line with the provisions laid down in the *ICAO Manual on Required Communication Performance* (Doc 9869).

Navigation

Navigation Infrastructure

2.34 The navigation infrastructure should meet the requirements for all phases of flight from take-off to final approach and landing.

Note: Annex 10 to the Convention on International Civil Aviation—Aeronautical Telecommunications, Volume I— Radio Navigation Aids, Attachment B, provides the strategy for introduction and application of non-visual aids to approach and landing.

2.35 The ASIA/PAC Regional Performance-Based Navigation (PBN) Implementation Plan provides guidance to air navigation service providers, airspace operators and users, regulators, and international organizations, on the expected evolution of the regional air navigation system in order to allow planning of airspace changes, enabling ATM systems and aircraft equipage. It takes due account of the operational environment of the Asia and Pacific Regions.

PBN Transition Strategy

2.36 During transition to performance-based navigation (PBN), sufficient ground infrastructure for conventional navigation systems should remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip appropriately to attain a performance level equivalent to PBN. States should approach removal of existing ground infrastructure with caution to ensure that safety is not compromised. This should be guaranteed by conducting safety assessments and consultations with the users.

Use of specific navigation aids

2.37 Where, within a given airspace, specific groups of users have been authorized by the competent authorities to use special aids for navigation. The respective ground facilities should be located and aligned so as to provide for full compatibility of navigational guidance with that derived from the SARPs.

2.38 States should ensure and oversee that service providers take appropriate corrective measures promptly whenever required by a significant degradation in the accuracy of navigation aids (either space based or ground based or both) is detected.

Surveillance

2.39 An important element of modern air navigation infrastructure required to manage safely increasing levels and complexity of air traffic is aeronautical surveillance systems.

2.40 When operating Mode S radars, States should coordinate with their corresponding ICAO Regional Office the assignment of their corresponding interrogator identifier (II) codes and surveillance identifier (SI) codes, particularly where areas of overlapping coverage will occur.

Frequency Management

Aeronautical Mobile Service (AMS)

2.41 Frequencies should be assigned to all VHF Aeronautical Mobile Service (AMS) facilities in accordance with the principles laid out in Annex 10, Volume V and *ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) Volumes I and II, and take into account:

- a) agreed geographical separation criteria based on 25 kHz or 8.33 kHz interleaving between channels;
- b) agreed geographical separation criteria for the implementation of VDL services;
- c) the need for maximum economy in frequency demands and in radio spectrum utilization; and
- d) a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band.

2.42 The priority order to be followed in the assignment of frequencies to service is:

- a) ATS channels serving international services (ACC, APP, TWR, FIS);
- b) ATS channels serving national purposes;
- c) channels serving international VOLMET services;
- d) channels serving ATIS and PAR; and
- e) channels used for other than ATS purposes.

2.43 The criteria used for frequency assignment planning for VHF AMS facilities serving international requirements should, to the extent practicable, also be used to satisfy the need for national VHF AMS facilities.

2.44 Special provisions should be made, by agreement between the States concerned, for the sharing and the application of reduced protection of non-ATS frequencies in the national sub-bands, so as to obtain a more economical use of the available frequency spectrum consistent with operational requirements.

2.45 States should ensure that no air/ground frequency is utilized outside its designated operational coverage and that the stated operational requirements for coverage of a given frequency can be met for the transmission sites concerned, taking into account terrain configuration.

Radio navigation aids for Aeronautical Radio Navigation Services (ARNS)

2.46 Frequencies should be assigned to all radio navigation facilities taking into account agreed geographical separation criteria to ILS localizer, VOR and GBAS, X and Y channels to DME, in accordance with the principles laid out in Annex 10, Volume V and *ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) Volumes I and II. Also, the need for maximum economy in frequency demands and in radio spectrum utilization and a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band, need to be considered.

2.47 The principles used for frequency assignment planning for radio navigation aids serving international requirements should, to the extent possible, also be used to satisfy the needs for national radio aids to navigation.

Support to ICAO Positions for ITU World Radiocommunication Conferences (WRCs)

2.48 Considering the importance and continuous demand of the radio frequency spectrum and for the protection of the current aeronautical spectrum and the allocation of new spectrum for the new services and system to be implemented in civil air navigation, States and international organizations are to support ICAO's position at ITU World Radiocommunication Conferences (WRCs) and in regional and other international activities conducted in preparation for ITU WRCs.

Note: The Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718) Volume I, contains ICAO policy statements relevant to the aviation requirements for radio frequency spectrum. The handbook is intended to assist States and ICAO in preparing for ITU WRCs.

3. SPECIFIC REGIONAL REQUIREMENTS

Communications

Aeronautical Fixed Telecommunication Network (AFTN)

3.1 States operating AFTN circuits which do not function satisfactorily 97 per cent of the time during which the circuit is scheduled to be in operation, should exchange monthly circuit performance data. Where a circuit consistently achieves 97 per cent reliability, the exchange of performance data may cease. The circuit performance data should be exchanged directly between the correspondent stations, with copies to the administrations concerned and to the ICAO APAC Regional Office. States should also identify the causes for inadequate circuit performance and take necessary remedial measures.
[ASIA/PAC/3, Conc. 10/2]

3.2 States responsible for the operation of AFTN circuits, which do not adequately meet transit time requirements should record transit time statistics on the twenty-third day of each third month (January, April, July and October) of each year, in accordance with the existing practices, for the AFTN circuits and terminals under their jurisdiction which do not meet the specified transit time criteria. The data recorded should be exchanged directly between the correspondent stations, with copies to administrations concerned and to the ICAO APAC Regional Office.
[ASIA/PAC/3, Conc. 10/3]

Specific ATM requirements

3.3 The AIDC implementation requirements are detailed under [Table CNS II-APAC-1, ATS Inter-facility Data Communication \(AIDC\) Implementation Plan](#) Columns 1 to 4.

Common regional network services

3.4 States should consider implementing digital communication networks or circuits in a coordinated manner in order to meet current and future AFS communication requirements for data/voice communications and to facilitate the introduction of ATN.
[APANPIRG/11, Conc. 11/14]

Navigation

3.5 The navigation system to be used in the Asia and Pacific Regions is documented in the Navigation strategy and periodically reviewed by APANPIRG. The latest version of the ASIA/PAC navigation strategy can be found at <http://www.icao.int/APAC/Pages/edocs.aspx>. The required conventional navigation infrastructure is detailed under [Table CNS II-APAC-2, Radio Navigation Aids](#), Columns 3 to 6.

3.6 States should continue to provide ICAO with information on their flight inspection activities for inclusion in the ASIA/PAC Catalogue of Flight Inspection Units and circulation to States in the ASIA/PAC Region and to the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG).

[ASIA/PAC/3, Conc. 12/8]

3.7 Unless otherwise specified by the APAC navigation strategy, States that have not yet done so, should install VHF omnidirectional radio range (VOR) supplemented by Distance Measuring Equipment (DME) as the primary aid for en-route navigation and, except in specified circumstances, delete any parallel requirement for a Non-Directional Radio Beacon (NDB) from the ANP.

[ASIA/PAC/3, Rec. 5/22]

3.8 GNSS-enabled area navigation systems for all RNP navigation specifications are adopted as minimum requirement in the ASIA/PAC Region.

[APANPIRG/22, Conc. 22/22]

3.9 State aviation authorities, in partnership with other State's agencies are requested to prohibit malicious and unintentional interference to GNSS and regulate legitimate uses of technology to preserve aviation utility of GNSS.

[APANPIRG/22, Conc. 22/28]

3.10 In order to reduce the likelihood of CFIT accidents, States should review non-precision approach procedures with LNAV lines of minima to include CDFA profile. States should also include Baro-VNAV in the current and new RNP APCH approach procedures and consequent LNAV/VNAV approach minima.

[APANPIRG/19, Conc. 19/28]

Surveillance

3.11 The surveillance system to be used in the Asia and Pacific Regions is documented in the Surveillance strategy and periodically reviewed by APANPIRG. The latest version of the ASIA/PAC surveillance strategy can be found at <http://www.icao.int/APAC/Pages/edocs.aspx>. The required surveillance infrastructure is detailed under [Table CNS II-APAC-3, Surveillance](#).

ADS-C

3.12 The 2nd edition of the Global Operational Data Link Document (GOLD) was adopted as ASIA/PAC regional guidance material for use by States and airspace users as the basis for operating Automatic Dependent Surveillance- Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC), in conjunction with Annex 10 - Aeronautical Telecommunications Volume II- Communications Procedures including those with PANS status and the Procedures for Air Navigation Services- Air Traffic Management (PANS ATM Doc 4444).

[APANPIRG/20, Conc.20/73 and APANPIRG/24, Conc.24/34]

ADS-B

3.13 Mode S Extended Squitter (1090 ES) is to be used as the data link for ADS-B radar like services in the Asia and Pacific Regions in the near term.

[APANPIRG/14, Conc.14/20]

3.14 States are urged to consider following regional policy on supporting the provision of direct controller pilot communication capability associated with ADS-B data sharing between adjacent FIRs of States. In order to provide radar like separation services using ADS-B, it is necessary for the controllers to have Direct Controller Pilot Communication (DCPC). In some cases, to achieve radar like separation services it may be necessary for States to provide VHF radio voice communication services for use by adjacent States. It is therefore recommended that States capable to do so, support the provision of VHF radio

voice communication services to adjacent States when this is required to support the delivery of ADS-B based separation. The cost allocated to such service provision shall be agreed between the States concerned.
[APANPIRG/19, Conc.19/38]

3.15 States are urged to support the provision of VHF radio voice air/ground communication infrastructure for use by adjacent States and States sharing ADS-B data and providing VHF voice air-ground communication infrastructure to adjacent States. States should co-ordinate with ICAO APAC Regional Office and their national Telecommunication Regulatory Authority for assignment of specific VHF radio frequencies to be used by the adjacent States.
[APANPIRG/22, Conc.22/32]

SSR

3.16 Due to the low density of SSR interrogator installations in the Asia and Pacific Regions, only Interrogator Identifier (not Surveillance Identifier) codes are used for SSRs Mode S in the areas of overlapping coverage.
[APANPIRG/19, Conc.19/40]

3.17 While implementing SSR Mode S, States should take into account following issues while assigning Interrogator Identifier codes for these installations:

- for planning the implementation of SSR Mode S administrations, States should ensure that the interrogators with overlapping coverage are not operating with the same Interrogator Identifier (II) codes; and
- where, the coverage of the interrogator extends beyond the boundaries of the State, the II code and PRF should be coordinated with the ICAO APAC Regional Office and the neighboring States.

3.18 Administrations should inform the ICAO APAC Regional Office about the assigned II codes and PRFs for these installations.
[APANPIRG/19, Conc.19/40]

3.19 The implementation of Mode S Radar ground stations has increased in the Asia and Pacific Regions, therefore States in these Regions are urged to have aircraft registered, which are equipped with Mode S transponder, regularly inspected to ensure correct operation of these transponders.
[APANPIRG17, Conc.17/29]

Frequency Management

3.20 The ICAO APAC Regional Office, based on the information provided for this purpose by States, will issue Frequency Lists Nos. 1, 2 and 3 at periodic intervals.
[ASIA/PAC/3, Conc.11/4, 11/5 and 12/9]

3.21 In the case of an unidentified interfering station, States should notify the ICAO APAC Regional Office utilizing the procedure and report form developed by the Fifth Session of the Communications Division (1954) and updated by the Communications Divisional Meeting (1978). However, in the case of persistent harmful interference to an aeronautical service which may affect safety, it should be immediately reported to ICAO and to the ITU, using the prescribed format, for appropriate action.
[ASIA/PAC/3, Conc.11/6]

3.23 States, where aeronautical stations are experiencing HF radio interference, should take necessary actions in coordination with the respective radio regulators to identify the source of interference and to eliminate the problem.
[APANPIRG/17, Conc.17 /32]

Aeronautical Mobile Service (AMS)

3.24 The provision of Aeronautical Mobile (R) Service in the Asia and Pacific Regions will be guided by the following strategy:

- VHF voice service, backed by CPDLC and HF will be the primary communication medium for transcontinental traffic; and a combination of CPDLC and HF voice will be the communication medium for oceanic traffic.
- The requirement for basic voice communication will continue, supplemented by Data-Link Flight Information Service (DFIS) applications including D-VOLMET, D-ATIS and PDC to significantly reduce pressure on VHF spectrum congestion.
[APANPIRG/18, Conc.18/29, partly]

Table CNS II-APAC-3 SURVEILLANCE**EXPLANATION OF THE TABLE***Column*

- | | |
|---|---|
| 1 | ATS Units to consider are ACC units and Approach units responsible for International airports and alternate aerodromes, International airports and alternate aerodromes. |
| 2 | The category may be: R, S, T or AD. Categories R,S, T are defined in the Seamless ATM plan. AD means Aerodrome. |
| 3 | Indicate Yes if part(s) of the airspace referred to in Column 2 is (are) not covered by surveillance listed in column 6, and in column remarks when such gaps are planned to be bridged |
| 4 | Indicate Yes or No.

Indicate No in case of standalone displays of ATS surveillance data (should not be used operationally) |
| 5 | Indicate Yes or No |
| 6 | List all types of surveillance used:

<div style="margin-left: 40px;"> PSR
 SSRmS
 SSRmAC
 ADS-B
 ADS-C
 MLAT
 WAM
 PRM </div> |
| 7 | According to the definition in Doc 9830 Appendix B |
| 8 | Remarks |

ATS Units Served	Category of airspace	Surveillance Gaps	Integration of Surveillance Information into ATC Situation Display	Multi-Surveillance Data Processing Capability	Surveillance Used	Level of A-SMGCS Implemented	Remarks
1	2	3	4	5	6	7	8
AUSTRALIA International Airports							
Adelaide	C						Adelaide, Summertown
TCU			YES	YES	PSR+SSRmS+SSRmAC		
APP			YES	YES	PSR+SSRmS+SSRmAC		
TWR			YES	YES	PSR+SSRmS+SSRmAC		
Cairns	C						Redden Creek, Hanns Tableland
TCU			YES	YES	PSR+SSRmS+SSRmAC		
APP			YES	YES	PSR+SSRmS+SSRmAC		
TWR			YES	YES	PSR+SSRmS+SSRmAC		
Brisbane	C						Mt Hardgrave, Brisbane, Mt Sommerville
EC			YES	YES	PSR+SSRmAC+SSRmS+ADS-B		
APP			YES	YES	PSR+SSRmAC+SSRmS+		
ACC			YES	YES	PSR+SSRmAC+SSRmS+ADS-B		
TWR			YES	YES	PSR+SSRmAC+SSRmS+A-SMGCS+SMR	2	
Gold Coast	C						Mt Sommerville, Mt Hardgrave
APP			YES	YES	PSR+SSRmS+SSRmAC		
TWR			YES	YES	PSR+SSRmS+SSRmAC		
Melbourne	C						Gelliebrand Hill, Mt Macedon
EC			YES	YES	PSR+SSRmAC+SSRmS+ADS-B+		
APP			YES	YES	PSR+SSRmAC+SSRmS		
ACC			YES	YES	PSR+SSRmAC+SSRmS+ADS-B		
TWR			YES	YES	PSR+SSRmAC+SSRmS+ADS-B+A-SMGCS+SMR	2	
Perth	C						Perth, Kalamunda, Eclipse Hill
TCU			YES	YES	PSR+SSRmAC+SSRmS		
APP			YES	YES	PSR+SSRmAC+SSRmS		
TWR			YES	YES	PSR+SSRmAC+SSRmS+A-SMGCS+SMR	2	
Sydney	C						Sydney, Mt Boyce, Cecil Park
TCU			YES	YES	PSR+SSRmS+SSRmAC+WAM+MLAT		
APP			YES	YES	PSR+SSRmS+SSRmAC+WAM+MLAT		
TWR			YES	YES	PSR+SSRmS+SSRmAC+A-SMGCS+WAM+MLAT+SMR	2	

ATS Units Served	Category of airspace	Surveillance Gaps	Integration of Surveillance Information into ATC Situation Display	Multi-Surveillance Data Processing Capability	Surveillance Used	Level of A-SMGCS Implemented	Remarks
1	2	3	4	5	6	7	8
Darwin	C		YES	YES	PSR+SSRmS+SSRmAC		Darwin, Knuckeys Lagoon
APP			YES	YES	PSR+SSRmS+SSRmAC		
TWR							
Hobart	D		YES	YES	WAM+ADS-B		Hobart
APP			YES	YES	WAM+ADS-B		
TWR							
Karratha	D		YES	YES	ADS-B		Karratha
APP			YES	YES	ADS-B		
TWR							
Alternate aerodromes							
Alice Springs	D		YES	YES	ADS-B		Alice Springs
APP			YES	YES	ADS-B		
TWR							
Avalon	D		YES	YES	PSR+ SSRm(S)+SSRm(A/C)		Gellibrand Hill, Mt Macedon
APP			YES	YES	PSR+ SSRm(S)+SSRm(A/C)		
TWR							
Canberra	C		YES	YES	PSR+ SSRm(S)+SSRm(A/C)		Mt Majura, Mt Bobbara
APP			YES	YES	PSR+ SSRm(S)+SSRm(A/C)		
TWR							
Coffs Harbour	D		YES	YES	SSRm(S)+SSRm(A/C)+ADS-B		The Round Mountain, Point Lookout
APP			YES	YES	SSRm(S)+SSRm(A/C)+ADS-B		
TWR			YES	YES	-		
Kalgoorlie	G	Over aerodrome	YES	YES			
Launceston	D		YES	YES	WAM+ ADS-B		Launceston
APP			YES	YES	WAM+ ADS-B		
TWR			YES	YES	ADS-B		Learmonth
Learmonth	G		YES	YES	-		
Port Hedland	G	Over aerodrome	YES	YES			
Rock Hampton	D		YES	YES	SSRm(S)+SSRm(A/C)		Mt Alma
APP			YES	YES	SSRm(S)+SSRm(A/C)		
TWR							
Tindal	C						Tindal

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1	2	3	4	5	6	7	8
APP TWR Townsville APP TWR Other aerodromes Broome Albury Tamworth Mackay Hamilton Island	C D D D D D		YES YES YES YES YES YES YES YES YES	YES YES YES YES YES YES YES YES YES	PSR+SSRm(A/C) PSR+SSRm(A/C) PSR+ SSRm(S)+SSRm(A/C) PSR+ SSRm(S)+SSRm(A/C) ADS-B Higher level SSR coverage ? SSRm(A/C) SSRm(A/C)		Townsville, Tabletop Broome Mt Bobbara The Round Mountain Swampy Ridge Swampy Ridge
BANGLADESH Dhaka APP	C				PSR+SSRm AC		
BRUNEI DARUSALAM Brunei APP					PSR + SSRmAC		
CAMBODIA					SSRmAC		
CHINA Beijing ACC Beijing APP Beijing TWR Tianjin APP Tianjin TWR Shijiazhuang APP Shijiazhuang TWR Taiyuan ACC Taiyuan APP Taiyuan TWR					PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC SSRmAC SSRmAC PSR + SSRmAC PSR + SSRmAC		

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1	2	3	4	5	6	7	8
Hohhot ACC Hohhot APP Hohhot TWR Guangzhou ACC Guangzhou APP Guangzhou TWR Shenzhen APP Shenzhen TWR Zhuhai ACC Zhuhai APP Zhuhai TWR Sanya ACC Sanya APP Sanya TWR Haikou ACC Haikou APP Haikou TWR Changsha ACC Changsha APP Changsha TWR Enshi TWR					SSRmAC SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC SSRmAC		
Wuhan ACC Wuhan APP Wuhan TWR Zhengzhou ACC Zhengzhou APP Zhengzhou TWR					PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC		

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1	2	3	4	5	6	7	8
Qingdao ACC Qingdao APP Qingdao TWR					SSRmAC SSRmAC		
Hefei ACC Hefei APP Hefei TWR					PSR + SSRmAC PSR + SSRmAC		
Nanjing ACC Nanjing APP Nanjing TWR					PSR + SSRmAC PSR + SSRmAC		
Lianyungang ACC Lianyungang APP Lianyungang TWR					SSRmAC SSRmAC		
Xuzhou TWR					SSRmAC		
Hangzhou ACC Hangzhou APP Hangzhou TWR					PSR + SSRmAC PSR + SSRmAC		
Nanchang ACC Nanchang APP Nanchang TWR					PSR + SSRmAC PSR + SSRmAC		
Fuzhou ACC Fuzhou APP Fuzhou TWR					PSR + SSRmAC PSR + SSRmAC		
Wenzou TWR					SSRmAC		
Xiamen ACC Xiamen APP Xiamen TWR					PSR + SSRmAC PSR + SSRmAC		
Shenyang ACC					PSR + SSRmAC		

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1	2	3	4	5	6	7	8
Shenyang APP Shenyang TWR					PSR + SSRmAC		
Dalian ACC Dalian APP Dalian TWR Harbin ACC Harbin APP Harbin TWR Xi'an ACC Xi'an APP Xi'an TWR Lanzhou ACC Lanzhou APP Lanzhou TWR Urumqi ACC Urumqi APP Urumqi TWR					PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC SSRmAC + AC SSRmAC PSR + SSRmAC + AC PSR + SSRmAC		
HONG KONG, CHINA Hong Kong ACC Hong Kong APP Hong Kong TWR	S T AD		Yes	Yes	PSR + SSRmAC + ADS-B PSR + SSRmAC PSR + SSRmAC + MLAT	2	SMR, A-SMGCS
MACAO, CHINA Macao TWR	AD		Yes	Yes	SSRmS+SSRmAC		SMR
DPR KOREA Pyongyang Pyongyang ACC Pyongyang APP Pyongyang TWR					SSRmAC PSR + SSRmAC		PAR
FIJI							

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1	2	3	4	5	6	7	8
Naid ACC Nadi APP					ADS-B + ADS-C ADS-B		
FRENCH POLYNESIA Tahiti ACC Tahiti APP Tahiti TWR					SSRmAC + ADS-B + ADS-C SSRmAC		
INDIA Chennai ACC Chennai APP Chennai TWR Delhi ACC Delhi APP Delhi TWR Kolkata ACC Kolkata APP Kolkata TWR Mumbai ACC Mumbai APP Mumbai TWR Bangalore APP Bangalore TWR Shamshabad ACC Shamshabad APP Shamshabad TWR					PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR + ADS-C PSR PSR PSR PSR PSR		MI MI A-SMGCS MI MI A-SMGCS MI MI A-SMGCS MI MI MI MI MI
INDONESIA Jakarta ACC Jakarta APP Medan ACC Medan APP					PSR + SSRmAC + ADS-B PSR + SSRmAC + ADS-B PSR + SSRmAC + ADS-B PSR + ADS-B		ADS-B Trial ADS-C Trial, A-SMGCS

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1	2	3	4	5	6	7	8
Tanjung Pinang APP Pontianak APP Pekanbaru APP Palembang APP Ujung Pandang ACC Ujung Pandang APP Banjarmasin APP Balikpapan APP					SSRmAC ADS-B PSR + SSRmAC + ADS-B PSR + SSRmAC + ADS-B PSR + SSRmAC + ADS-B PSR + SSRmAC + ADS-B SSRmAC + ADS-B PSR + SSRmAC + ADS-B		ADS-C Trial, A-SMGCS
Yogyakarta APP Surabaya APP Bali ACC Bali APP Biak APP Jayapura ACC Jayapura APP Kupang ACC Kupang APP Tarakan ACC Batam ACC Batam APP Sorong ACC					PSR PSR ADS-B SSRmAC + ADS-B PSR PSR ADS-B ADS-B PSR + ADS-B SSRmS SSRmS + ADS-B SSRmS + ADS-B		A-SMGCS A-SMGCS
JAPAN							

ATS Units Served	Category of airspace	Surveillance Gaps	Integration of Surveillance Information into ATC Situation Display	Multi-Surveillance Data Processing Capability	Surveillance Used	Level of A-SMGCS Implemented	Remarks
1	2	3	4	5	6	7	8
Fukuoka ATMC					ADS-C		
Narita APP Narita TWR					PSR + SSRmAC + SSRmS MLAT, PSRMLAT		SMR
Haneda TWR					MLAT		SMR
Chubu APP Chubu TWR					PSR + SSRmAC + SSRmS MLAT		SMR
Osaka APP Osaka TWR					PSR + SSRmAC + SSRmS MLAT		SMR
Kansai APP Kansai TWR					PSR + SSRmAC + SSRmS MLAT		SMR
Fukuoka ACC Fukuoka APP Fukuoka TWR					PSR + SSRmAC + SSRmS PSR + SSRmAC + SSRmS MLAT		SMR
Naha ACC Naha APP Naha TWR					PSR + SSRmAC + SSRmS PSR + SSRmAC + SSRmS MLAT		SMR
Hakodate APP					PSR + SSRmAC		
Sendai APP					PSR + SSRmAC		
Tokyo ACC Tokyo APP					PSR + SSRmAC + SSRmS PSR + SSRmAC + SSRmS		
Niigata APP					PSR + SSRmAC		
Chubu APP					PSR + SSRmAC + SSRmS		
Hiroshima APP					PSR + SSRmAC		
Takamatsu APP					PSR + SSRmAC		

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1	2	3	4	5	6	7	8
Kochi APP Matsuyama TWR Kitakyusyu TWR Nagasaki APP Oita APP Kumamoto APP Miyazaki APP Kagoshima APP Shimajiri APP Ishigaki APP Sapporo ACC					PSR + SSRmAC SSRmAC SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC + SSRmS		
LAO PDR Vientiane ACC Vientiane APP					SSRmAC + SSRmS PSR		
MALAYSIA Langkawi APP Kuala Lumpur ACC Lumpur APP Johor Bharu APP Kota Bharu APP K. Kinabalu ACC					PSR + SSRmAC PSR + SSRmAC + SSRmS PSR + SSRmAC + ADS-C PSR + SSRmS PSR + SSRmS PSR + SSRmAC		

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1	2	3	4	5	6	7	8
K. Kinabalu APP Kuching ACC Kuching APP Kuching TWR Miri APP					PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC		
MONGOLIA Ulaanbaatar ACC Ulaanbaatar APP					ADS-C ADS-C		
MYANMAR Yangon ACC Yangon APP Mandalay APP			Yes Yes Yes	Yes Yes Yes	SSRmAC + ADS-C SSRmAC + ADS-C PSR + SSRmAC		
NEPAL Kathmandu APP					PSR + SSRmAC		
NEW CALEDONIA Tontouta ACC Tontouta APP	A, D G	Yes	Yes	Not applicable	ADS-B	Not applicable	ADS-B Tier 3 implemented, Tier 2 in progress
NEW ZEALAND Christchurch ACC Christchurch TWR					PSR + SSRmAC + SSRmS		
Auckland ACC Auckland TWR Wellington TWR Queenstown TWR					SSRmAC + SSRmS		Auckland A-SMGCS has no SMR Wide Area MDS planned for Queenstown in 2010
PAKISTAN							

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1	2	3	4	5	6	7	8
Karachi ACC Karachi APP Karachi TWR			Yes	Yes	PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC	Nil	
Lahore ACC Lahore APP Lahore TWR			Yes	Yes	PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC	Nil	
Islamabad APP Islamabad TWR			Yes	No	PSR + SSRmAC PSR + SSRmAC	Nil	
PAPUA NEW GUINEA Jacksons APP					PSR + SSRmAC		
Moresby ACC					PSR + SSRmAC		
PHILIPPINES Manila ATM Center					SSRmAC + SSRmS + ADS-B		Planned implementation on Dec. 16
Manila ACC Manila APP					SSRmAC + SSRmS PSR + SSRmAC + SSRmS		
Clark APP					PSR + SSRmAC		
Mactan APP					PSR + SSRmAC		
Kalibo/Caticlan APP					PSR + SSRmAC + SSRmS		Planned implementation on Dec. 16
Bacolod APP					PSR + SSRmAC + SSRmS		Planned implementation on Dec. 16
Davao APP					PSR + SSRmAC + SSRmS		Planned implementation on Dec. 16
REPUBLIC OF KOREA Jeju APP					PSR + SSRmAC		

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1	2	3	4	5	6	7	8
Jeju TWR CheongjuTWR Seoul ACC Seoul APP Incheon TWR Yangyang TWR Gimhae APP Gimhae TWR Daegu APP Jungwon APP Gimpo ACC Gimpo APP Gimpo TWR					PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC PSR + SSRmAC		SMR SMR, A-SMGCS SMR SMR SMR, A-SMGCS
SINGAPORE Singapore ACC Singapore APP Singapore TWR	S T AD		Yes Yes Yes	Yes Yes Yes	PSR + SSRmS + ADS-B + ADS-C PSR + SSRmS+SSRmAC PSR+ADS-B+MLAT	2	
SRI LANKA Colombo ACC Colombo APP					SSRmAC + ADS-B + ADS-C PSR		ADS-C Trial
THAILAND Bangkok ACC Bangkok APP Suvarnabhumi TWR Don Mueang TWR Chiang Mai APP Chiang Mai TWR	S T AD AD T AD		YES YES YES YES YES YES	YES YES YES YES YES YES	PSR + SSRmAC + SSRmS PSR + SSRmAC + SSRmS SMR + MLAT + A-SMGCS SSRmAC SSRmS SSRmS	2	

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1	2	3	4	5	6	7	8
Hat Yai APP Hat Yai TWR	T AD		YES YES	YES YES	SSRmS SSRmS		
Phuket APP Phuket TWR	T AD		YES YES	YES YES	SSRmS SSRmS		
Suratthani APP Suratthani TWR	T AD		YES YES	YES YES	SSRmS SSRmS		
Ubonratchathani APP Ubonratchathani TWR	T AD		YES YES	YES YES	SSRmS SSRmS		
Phitsanulok APP Phitsanulok TWR	T AD		YES YES	YES YES	PSR PSR		
Hua Hin APP Hua Hin TWR	T AD		YES YES	YES YES	PSR PSR		
U Taphao					SSRmAC		
TONGA					ADS-B		
UNITED STATES Alaska ACC Hilo, Hawaii ACC Hilo, Hawaii APP Hilo, Hawaii TWR Honolulu, Hawaii ACC Honolulu, Hawaii APP Honolulu, Hawaii TWR Kahului, Hawaii APP Kahului, Hawaii TWR					ADS-B + ADS-C SSRmAC PSR SSRmS PSR PSR + SSRmAC		

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1	2	3	4	5	6	7	8
Kokee, Hawaii ACC Lihue, Hawaii APP Lihue, Hawaii TWR Mount Kaala, Hawaii ACC Pahoa, Hawaii ACC Kunianiau, Hawaii ACC Guam ACC Mount Santa Rosa, Guam ACC Mount Santa Rosa, Guam APP Mount Santa Rosa, Guam TWR Kona, Hawaii ACC					PSR PSR + SSRmAC PSR + SSRmAC SSRmAC SSRmAC PSR + SSRmAC PSR + SSRmS PSR + SSRmAC SSRmAC		
VIET NAM Hanoi ACC Noibai APP Noibai TWR Ho Chi Minh ACC Danang APP Hanoi ACC Tansan Nhat APP Tansan Nhat TWR					PSR + SSRmAC + ADS-B SSRmAC PSR + SSRmAC + ADS-B + ADS-C PSR PSR		SMR, A-SMGCS SMR, A-SMGCS