



International Civil Aviation Organization

**ELEVENTH MEETING OF THE SOUTHEAST
ASIA AND BAY OF BENGAL SUB-REGIONAL
ADS-B IMPLEMENTATION WORKING GROUP
(SEA/BOB ADS-B WG/11)**



New Delhi, India 17 – 19 November 2015

Agenda Item 2: Review the outcome of ADS-B SITF/14 and APANIRG/26

OUTCOME OF ADS-B SITF/14 AND APANPIRG/26 ON ADS-B

(Presented by the Secretariat)

SUMMARY

This paper reviews the outcome of APANPIRG/26 on ADS-B and works accomplished by the Fourteenth Meeting of ADS-B Study and Implementation Task Force and the Nineteenth meeting of CNS Sub-group of APANPIRG.

1. INTRODUCTION

1.1 APANPIRG/26 meeting held from 7-10 September 2015 in Bangkok, Thailand reviewed the outcome of the Fourteenth Meeting of the Automatic Dependent Surveillance – Broadcast (ADS-B) Study and Implementation Task Force (ADS-B SITF/14) and an ADS-B Seminar held from 14 to 17 April 2015 in Christchurch, New Zealand including the work accomplished by the Tenth meeting of the SEA and BOB ADS-B Working Group (held in Singapore in November 2014) . The report of APANPIRG/26 is posted at:

<http://www.icao.int/APAC/Meetings/Pages/2015-APANPIRG26.aspx>

1.2 The SEA/BOB ADS-B Working Group reports its outcome of discussion to APANPIRG through ADS-B Study and Implementation Task Force and CNS Sub-group of the ANPANPIRG. The complete report of the ADS-B SITF/14 meeting including review result of SEA/BOB ADS-B WG/10 meeting is posted at:

<http://www.icao.int/APAC/Meetings/Pages/2015-ADS-B-SITF14.aspx>

1.3 The reports of Fourteenth Meeting of ADS-B SITF and Tenth Meeting of the SEA/BOB Working Group were also reviewed by CNS SG/19 meeting held at ICAO Regional Office in Bangkok, Thailand in July 2015 and noted by ATM SG/3 meeting held in August 2015.

2. DISCUSSION

2.1 APANPIRG/26 meeting noted the updates of implementation activities by States and developments and some issues observed during implementation of ADS-B in the Region. The actions taken by APANPIRG/26 meeting on ADS-B related matters are highlighted below:

2.2 The meeting noted that an ADS-B Seminar was held in conjunction with the ADS-B SITF/14 meeting which provided an opportunity for sharing information and experience focused on mandating carriage/operational use of ADS-B from regulators; airframe and avionics manufacturers; air space users' perspective; system/equipment suppliers, and Air Navigation Service Providers.

2.3 The meeting adopted Conclusion on Amendment to AIGD

Conclusion APANPIRG/26/40 – Amendment to ADS-B Implementation and Operations Guidance Document (AIGD)

That, the consolidated amendment to the AIGD provided in **Appendix H to WP/9** is adopted.

(Follow-up State Letter T 8/10.21:AP146/15 (CNS) dated 24 September 2015)

2.4 Noting Section 5.1.2 of AIGD regarding a need for State to establish an Implementation Team to ensure international coordination, IBAC stated that the tasks listed in the section provide good guidance for States that plan to implement ADS-B in sovereign airspace, and it is important that States cooperate with neighbors with contiguous airspace. It may also need to provide guidance to those States that may have ANS responsibilities over the high seas or in international airspace. IBAC offered its assistance in developing some draft text for consideration by appropriate bodies of APANPIRG.

Operational Approval for Receiving ADS-B Surveillance Service

2.5 APANPIRG/25 held in September 2014 did not adopt the second part of the draft Conclusion formulated by ADS-B SITF/13 meeting i.e. "States in the Asia and Pacific Regions may choose to require or not require an Operations Specification or Operations Approval for ADS-B OUT". The ADS-B SITF/14 meeting further discussed this issue including the outcome of ad hoc working group and SEA/BOB ADS-B WG. As a result of discussion, the APANPIRG/26 adopted following Conclusions:

Conclusion APANPIRG/26/41 – Approval and Monitoring Requirements for Operation using ADS-B

That, States:

- a) do not require operational approval for the operational use of ADS-B OUT by ATC;
- b) note that operational approval may be required for ADS-B IN applications where there is a safety case;
- c) monitor ADS-B transmissions from aircraft and take action to ensure compliance with Regional Supplementary Procedure MID/ASIA Section 5.5; and

d) provide capabilities to either:

- reject ADS-B data from aircraft which are known to transmit misleading ADS-B data until corrective actions have been successfully conducted; or
- implement procedures to ensure that such aircraft are safely managed.

Conclusion APANPIRG/26/42 – Template for Promulgation of ADS-B Avionics Equipage Requirements

That, based on APANPIRG Conclusion 20/54, States intending to implement ADS-B based surveillance service for a defined airspace and having not published regulations be urged to promulgate mandating rules for ADS-B Avionics Equipage Requirements as soon as possible using the following template:

On and after dd/mm/yyyy, if an aircraft operates on airways (insert routes).....at or above FLXXX.....(or in defined airspace boundaries at or above FLXXX):

the aircraft must carry serviceable 1090 MHz ES ADS-B transmitting equipment that has been certificated as meeting EASA AMC 20-24, or FAA AC No. 20-165A – Airworthiness Approval of ADS-B, or meets the equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.

Note: This Conclusion supersedes APANPIRG Conclusion 21/39 (i.e. removes any requirement for operations approval)

Conclusion APANPIRG/26/43 – Guidelines for Airworthiness Approval for ADS-B Avionics Equipage

That, States be advised to use the guidelines provided in **Appendix I** to WP/9 for Airworthiness Approval for ADS-B OUT Avionics Equipage.

Note: This Conclusion supersedes APANPIRG Conclusion 21/40

(Follow-up State Letter T 8/10.21:AP154/15 (CNS) dated 02 October 2015)

Enhancing Aviation safety through Establishment of a Regional ADS-B Avionics Problem Report Database (APRD)

2.6 The meeting noted the latest satisfactory progress in establishment of a Regional ADS-B Avionics Problem Reporting Database (APRD) in collaboration with the ICAO Regional Sub-office (RSO). During 51st DGCA Conference held in November 2014, Hong Kong China presented a paper outlining a proposal on the establishment of the Regional APRD for sharing the analysis results with a view to enhancing aviation safety for the Region. The proposal gained support from the Conference. The demonstration made by Hong Kong China at the Task Force meeting included the work flow of problem reporting and phases of processing, and also the roles of the reporting Administration/ANSP, ICAO, verifying and follow-up parties, as well as a prototype of the database and human-machine interface (HMI) design. The APRD will contain useful information on the generic ADS-B avionics performance problem commonly encountered in the Region. The APRD is being posted on an ICAO secure website, with States/Administrations requesting access required to

nominate registered points-of-contact, who would be notified whenever there were updates to the APRD.

Regional ADS-B Requirement for New Aircraft

2.7 ADS-B SITF proposed the revised wording for an Asia/Pacific Region ADS-B forward fitment commencing in 2018. It was pointed out that as the lowest cost of fitment of ADS-B was during manufacture, the proposal would allow the avoidance of later retrofit costs, bringing long term savings to the aviation community without any significant cost in the short term. While the Asia/Pacific Region had taken the pragmatic view of ADS-B implementation using DO-260 and DO-260A, implementation of DO-260B would leverage off the Europe (from 2016) and FAA mandates (from 2020 not only for forward fit) and promote global harmonization. Mandates for forward fit would minimize the economic burden on aircraft operators, as it would not apply to existing aircraft.

2.8 Defining a forward fit mandate according to the date of issue of a certificate of airworthiness could result in the mandate being applied to an imported aircraft that is quite old. Mandates determined by date of manufacture were a better option. The meeting noted that the overall purpose was to commence the transition to a DO-260B environment by applying only to newly manufactured aircraft from a defined future date. Accordingly, the APANPIRG/26 adopted the following Conclusion:

Conclusion APANPIRG/26/44 – ADS-B OUT Forward Fit Equipage

That, States/Administrations in APAC Region be strongly encouraged to mandate that registered aircraft with a maximum certified take-off mass exceeding 5 700 kg or having a maximum cruising true airspeed capability greater than 250 knots, with a date of manufacture on or after 8 June 2018 (two years after the European forward fitment mandate is effective) be equipped with ADS-B avionics compliant with Version 2 ES (equivalent to RTCA DO260B) or later version.

(Follow-up State Letter T 8/10.21:AP162/15 (CNS) 30 October 2015)

2.9 The meeting noted with appreciation the updated ADS-B implementation status in the APAC Region provided in **Appendix A** to this paper (Appendix J to APANPIRG26/WP/9). This meeting is expected to further update the information contained in Appendix A.

Future work of ADS-B SITF

2.10 The ADS-B SITF meeting recalled that the Task Force had met 14 times in the past 12 years. A number of guidance materials in particular for the AIGD had been developed and then adopted by APANPIRG from time to time to assist States in the planning and implementation of ADS-B. The Task Force would further discuss outstanding issues/tasks at its next meeting and, depending on the scale of work involved, any uncompleted tasks would be addressed by other contributory bodies of APANPIRG after its next meeting. In addition, the need for guidance on Mode S SSR planning and implementation was identified, as the region was not taking advantage of the technology that was available to improve safety and efficiency outcomes.

2.11 In view of the foregoing, the meeting agreed to the proposal of the Task Force that ADS-B SITF should meet in its present form for one more meeting in 2016 to provide the opportunity to finalize the current outstanding action items where possible, and to arrange for the transfer of action items to new body which would cover broader surveillance technologies including ADS-B, and SSR

Mode S and Multilateration applications. The next meeting of the ADS-B SITF would be a back to back meeting with a new surveillance body.

2.12 In this connection, the meeting reviewed and agreed to the draft Terms of Reference for a broader “Surveillance Implementation Coordination Group (SURICG)”. Consequently, the APANPIRG/26 adopted following Decision:

Decision APANPIRG/26/45 – Surveillance Implementation Coordination Group

That, the Surveillance Implementation Coordination Group (SURICG) be established with Terms of Reference provided in **Appendix K** to WP/9.

2.13 It was decided that SEA/BOB ADS-B WG which currently reports to ADS-B SITF would report to APANPIRG through SURICG from 2017 onwards.

Update on the ADS-B Collaboration Project in the South China Sea

2.14 Singapore presented the paper on the collaborative efforts of States to achieve a seamless ADS-B surveillance coverage over a portion of the South China Sea area with the aim of improving safety, capacity and efficiency. The meeting noted the progress of the collaborative efforts of Indonesia, Singapore and Viet Nam to achieve seamless ADS-B surveillance coverage over a portion of the South China Sea area.

2.15 Singapore and Viet Nam had agreed on a progressive phased approach to reduce longitudinal separation on specified ATS routes to allow airspace users the optimum benefits of ADS-B. From the previous 50 NM longitudinal separation, the minimum separation would be reduced to 20NM over 3 phases commencing in December 2013 and planned to be completed at the end of 2015.

Surveillance Data sharing between India and Myanmar

2.16 India and Myanmar provided updates on their ADS-B implementation programme and readiness status for ADS-B data sharing in accordance with guidance of APANPIRG. The meeting congratulated to the States for the progress made and encourage States to overcome the identified issues to realize the data sharing in order to enhance flight safety and coverage of surveillance in the Bay of Bengal area.

Outcome of ADS-B SITF/14 on report of SEA/BOB ADS-B WG/10

2.17 The ADS-B SITF/14 meeting noted the important outcomes of the SEA/BOB ADS-B WG/10 meeting and the actions items agreed for further follow-up by the Task Force.

2.18 The meeting is invited to recall that the lack of separation minima for using ADS-B/CPDLC and ADS-B/Satcom Voice (DCPC) was an issue identified by the Working Group. Both ADS-B SITF/14 and CNS SG/19 meeting endorsed the following draft Conclusion formulated by SEA/BOB ADS-B WG:

Draft Conclusion ADS-B SITF 14/1 – Need Guidance on Separation Minima

That, ICAO (SASP) be invited to study the separation minima that can be applied using ADS-B with CPDLC and ADS-B with “DCPC” type (i.e. without operators) of SATCOM voice in remote airspace outside the range of VHF voice communications of the responsible ATC unit.

2.19 In discussing this draft Conclusion CNS SG/19-13, ATM SG/3 noted that the presentation of any proposal on development of separation standards to the Separation and Airspace Safety Panel (SASP) needed to clearly define the purpose, benefits and priority. It was also noted that the work of establishing a separation standard normally required complex modelling. The ATM SG noted that requests for development of a separation standard normally required delivery of a fully developed working paper to SASP with the necessary details and supporting arguments, so it was not considered appropriate to agree to an APANPIRG Conclusion without this material. As a result, the ATM/SG/3 meeting did not support this Draft Conclusion for consideration by APANPIRG.

2.20 With reference to the need to formulate ADS-B performance standards for any future space-based ADS-B implementation, the ADS-B SITF/14 meeting endorsed the following Decision:

Decision ADS-B SITF 14/2 – Study the application of space based ADS-B

That, the ADS-B SITF or its alternate body to:

- a) study the application of space-based ADS-B in the Asia Pacific region; and
- b) focus on regional aspects, develop recommendations on implementation of ADS-B delivered from space-based platforms, and on required performance standards.

2.21 Regarding the performance requirement for the space based ADS-B service, the meeting also considered that it is a global issue therefore it would be more appropriate to refer it to ICAO Headquarters for further action.

2.22 The meeting also noted that the Terms of Reference of SEA/BOB ADS-B WG had been amended by the Working Group to include the identification of implementation issues and proposal of solutions for the identified issues.

2.23 Singapore had presented their monitoring result for ADS-B stations and the avionics to the WG meeting. Singapore had shared that about 90% of the ADS-B equipped airframes were equipped with DO-260 avionics, about 6% were equipped with DO-260A avionics and 4% were equipped with DO-260B avionics.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) review the outcome of the APANPIRG/26 and take any necessary follow-up actions;
- b) update the information contained in Appendix A to this paper.

d) provide capabilities to either:

- reject ADS-B data from aircraft which are known to transmit misleading ADS-B data until corrective actions have been successfully conducted; or
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3. ACTION BY THE MEETING

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- a) review the outcome of the APANPIRG/26 and take any necessary follow-up actions;
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CNS SG/19
Appendix J to the Report

ADS-B IMPLEMENTATION STATUS IN THE APAC REGION

State/ Administration	ADS-B Ground Infrastructure and ATC System readiness or Implementation plan	Date of issue/effectiveness date of equipage mandate	Mandated Airspace and/or ATS-routes	Intended separation criteria to be applied	Remarks
AFGHANISTAN	ADS-B & Multi Lateration system installed.				subject to safety assessment
AUSTRALIA	<p>A total of 33 ADS-B stations and 28 WAM stations are currently used.</p> <p>ATC system readiness since 2004.</p> <p>ADS-B data sharing with Indonesia operational since 2/2011.</p> <p>ASMGCS using multilateration is operational in Brisbane, Sydney & Melbourne. It is being installed in Perth.</p> <p>Additional 13 ADS-B stations from 2014-2016.</p> <p>OneSKY replacing current ATM system is estimated for full operational around 2020.</p>	<p>2009/effective date of mandating in UAP 12/12/2013.</p> <p>A forward fit ADS-B mandate also applies from 2/2014 for all IFR aircraft at all flight levels.</p> <p>An ADS-B for all IFR aircraft applies from 2/2017.</p>	<p>at/above FL290 UAP from 12/2013 for domestic & foreign aircraft.</p> <p>Mandates for additional flight level are considered for 2015 & 2017.</p> <p>WAM is operating in Tasmania since 2010 delivery 5 Nm separation service.</p> <p>WAM is also operating in Sydney for 3 Nm separation service in TMA and for precision runway monitoring function.</p>	<p>5 NM</p> <p>3 NM SYDWAN</p>	

CNS SG/19
Appendix J to the Report

State/ Administration	ADS-B Ground Infrastructure and ATC System readiness or Implementation plan	Date of issue/effectiveness date of equipage mandate	Mandated Airspace and/or ATS-routes	Intended separation criteria to be applied	Remarks
BANGLADESH	Bangladesh has a plan to commission four ADS-B ground stations to be installed at Dhaka, Cox's Bazar, Saidpur and Barisal Airports by 2016. ADS-B data will be integrated with new ATS system at Dhaka.				
CAMBODIA	3 ADS-B ground stations installed at Phnom Penh, Siem Reap and Stung Treng City since 2011 and able to provide full surveillance coverage for Phnom Penh FIR. Cambodia is willing to share data with others.				
CHINA	<p>5 UAT ADS-B sites are used for flight training of CAFUC.</p> <p>8 ADS-B stations installed by end of 2012. 200 ADS-B stations nationwide will be deployed as 1st phase.</p> <p>1 ADS-B station operational in Sanya FIR since 2008. Sanya ATC system ready since July 2009 to support L642 and M771.</p> <p>Chengdu-Jiuzhai project finished in 2008 with 2 ADS-B stations and</p>	NOTAM issued on ADS-B trial operation			ADS-B signal alone won't be used for ATC separation

CNS SG/19
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State/ Administration	ADS-B Ground Infrastructure and ATC System readiness or Implementation plan	Date of issue/effectiveness date of equipage mandate	Mandated Airspace and/or ATS-routes	Intended separation criteria to be applied	Remarks
	<p>additional site is planned to enhance the surveillance coverage.</p> <p>Chengdu - Lhasa route surveillance project completed with 5 ADS-B stations using 1090ES since 2010. Trials planned from May 2011.</p> <p>1 ADS-B site installed in Sanya FIR since 2008. 3 additional ground stations planned, Trial planned for Jun, 2011.</p>				
HONG KONG CHINA	<p>A larger-scale A-SMGCS covering the whole Hong Kong International Airport put into operational use in April 2009.</p> <p>Data collection/analysis on aircraft ADS-B equipage in Hong Kong airspace conducted on quarterly basis since 2004.</p> <p>ADS-B trial using a dedicated ADS-B system completed in 2007.</p> <p>ADS-B out operations over PBN routes L642 and M771 at or above</p>	<p>AIP supplement issued on 29 Oct.2013/12 Dec. 2013 as effective date.</p>	<p>L642/M771 ATS routes.</p>	<p>To be determined.</p>	<p>ADS-B signals being fed to ATC controllers under an operational trial programme.</p> <p>ADS-B operation in Hong Kong FIR re-scheduled for Dec. 2016. An AIP Supplement was issued on 29 Aug. 2014.</p>

CNS SG/19
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State/ Administration	ADS-B Ground Infrastructure and ATC System readiness or Implementation plan	Date of issue/effectiveness date of equipage mandate	Mandated Airspace and/or ATS-routes	Intended separation criteria to be applied	Remarks
	<p>FL 290 within HK FIR was effective in December 2013 and within HK FIR at or above FL 290 is planned for December 2016.</p> <p>ADS-B ground station infrastructure completed in 2013.</p> <p>ADS-B trial using ADS-B signal provided by Mainland China to cover southern part of Hong Kong FIR commenced in 2010.</p>				
MACAO, CHINA	Mode S MSSR coverage available for monitoring purposes.				
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	ADS-B has been used as back-up surveillance of SSR since 2008.				
FIJI ISLANDS	ADS- B /multilateration ground stations installed. Situations awareness service will be provided in 2013.	ADS-B mandate commencing form 31 st December 2013			
FRANCE (<i>French Polynesia</i>)	ATM system is ready for ADS-B sensors/Installation of 5 first GS expected at beginning of 2017. 2nd stage with implementation of 7 GS and associated VHF coverage.			5 NM for airspace under coverage.	

CNS SG/19
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INDIA	<p>ASMGCS (SMR + Multilat) is operational at Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad Airports.</p> <p>ASMGCS is also being installed at 05 more international airports.</p> <p>ADS-B Ground Stations installed at 14 locations in phase one across continental and Oceanic airspace at Port Blair. 07 more ADS-B Ground stations in phase two in 2014.</p> <p>ATS systems at 12 ACCs are capable of processing ADS-B data and provide the information on Display.</p> <p>Wide area Multilateration pilot project is being planned in Kolkata TMA to augment the surveillance coverage.</p>	<p>AIP supplement issued on 17th April 2014 with effective date of implementation from 29th May 2014.</p>			<p>ADS-B in India to provide redundancy for radar and filling the surveillance gaps.</p> <p>Currently study the integrity of ADS-B data and evaluating in both Non-radar and radar environment for ATC purposes.</p>
INDONESIA	<p>30 Ground Station successfully installed.</p> <p>Since 2009, ATC Automation in MATSC has capabilities to support ADS-B application.</p>	<p>On 24 July 2014 DGCA published AIRAC AIP Supplement No. 10/14 for using ADS-B for situation awareness effective from 18 Sep. 2014 to 25 June 2015.</p>			<p>ADS-B Task Force Team is considering a mandate in 2016.</p> <p>Mandate for 3 ATS routes: B472, M768, R592</p>

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	<p>ADS-B Task Force team established to develop planning and action concerning ADS-B Implementation within Indonesia FIR</p> <p>ADS-B data sharing with Australia and Singapore.</p>	<p>AIP Supplement on ADS-B Implementation (Tier-1)(mandate) being published with effective date on 25 June 2015.</p>			<p>from 25 June 2015 subject to safety assessment process.</p>
JAPAN	<p>Multilateral Systems for surface monitoring have been implemented at seven airports and are being implemented at another one airport.</p> <p>PRM (WAM) is planned to be implemented at Narita Airport. (Operation will start in 2014).</p> <p>Basic design of en-route WAM system completed in FY2013. Plans to start manufacture in FY2014 and estimated operational in FY2018.</p> <p>Plan to evaluate accuracy of ADS-B information and has intension to introduce ADS-B to the oceanic direction.</p>				

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MALAYSIA	<p>Malaysia planned to start mandate ADS-B requirement in KL FIR in 2018 and full implementation of ADS-B service at specific routes/exclusive airspace by end of 2020.</p> <p>One station at Terrengganu. Plan to install two ADS-B stations at Pulau Langkawi and Genting Highland and new ATM centre being built for KL FIR. The project expected to complete by end of 2019.</p>	<p>Plan to issue mandate with target effective date end of 2018.</p>			
MALDIVES	<p>4 ADS-B stations installed in Nov. 2012 (2 at Male' Ibrahim Nasir Intl Airport, 1 at Kulhudhuffushi Island in the North and 1 at Fuah Mulah Island in the South to cover 95% of the FIR at/above FL290. Maldives' ADS-B is integrated with the ATM system (in November 2013), and under observation prior to commencing trials.</p> <p>Maldives has planned to share ADS-B data with its adjacent FIRs.</p>				<p>Seaplane in Maldives equipped with ADS-B for AOC purpose. These seaplanes have ADS-B IN functions as well.</p>

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MONGOLIA	Five ADS-B ground stations for combination with SSR will be implemented first quarter of 2013. Full coverage for surveillance gaps will be implemented by 2015-2016.				
MYANMAR	ADS-B ground stations to be installed at Sittwe, Co Co Island by end of 2014 as 1 st phase Yango , Lashio and Myeik - 2015 as 2 nd phase; Kengteng, Myitkyina in 2016. Completion of integration to Euro Cat. C. in 2014. Agreed to share ADS-B data with India, agreement on sharing being negotiated.				Supplement radar and fill the gaps to improve safety and efficiency. ADS-C/CPDLC integrated in Yangon ACC since 2010.
NEPAL	ADS-B feasibility study conducted in 2007.				
NEW CALEDONIA	Three ADS-B ground stations commissioned in 2010 to cover international traffic at La tontouta airport serving Tontouta ACC & APP. It is used for Situation awareness and SAR.				

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NEW ZEALAND	<p>MLAT and ADS-B data is being used from the WAM system centered in the Queenstown area to provide surveillance coverage and surveillance separation (5 nm) over the southern half of the South Island of New Zealand.</p> <p>Additionally MLAT data from the Auckland MLAT system is used to provide airport surface movements at NZAA.</p> <p>The New Zealand Navigation and Airspace and Air Navigation Plan “New Southern SKY” issued in May 2014</p>			5 NM Surveillance Separation	
PAKISTAN	<p>Tender for procurement of 5 ADS-B stations issued to be installed at Pasni, Lakpass, Rojhan, Dalbandin and Laram-top. Contract expected to be finalized by end of 2015. These stations will be DO260B compliant and operational by end of 2016.</p>				

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PAPUA NEW GUINEA	Legislation mandating ADS-B and guidelines for aircraft equipage and operational approval to be issued by 31/12/2011 with target mandatory date by mid-2015 and plans to provide ADS-B service above FL245 within Port Moresby FIR and also in specific higher traffic areas domestically.				
PHILIPPINES	Four (4) ADS-B ground stations (Manila, Palawan, Pangasinan and Ilocos Norte) with target date to complete by end 2016. ATM Center expected to be available in 2016.				
REPUBLIC OF KOREA	ADS-B implemented 2008 for SMC in Incheon International Airport. ROK is developing ADS-B system since 2010 through R&D group. The testbed at Gimpo Airport supporting both 1090ES and UAT, undergoing operational testing (2013-16). At Incheon Intl Airport, promotion of surface surveillance (2014-17) In 2 nd phase from 2015 to 2016, ADS-B ground stations will				

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	supplement to the radar in the terminal area and fill up the gap between radar coverage. The last phase from 2017 to 2020, ADS-B will be deployed for entire Incheon FIR.				
SINGAPORE	<p>The airport MLAT system was installed in 2007 and “far-range” ADS-B sensor was installed in 2009.</p> <p>ATC system has been processing ADS-B data since 2013.</p>	<p>AIC was issued on 28 December 2010/effective from 12 Dec.2013.</p> <p>AIP supplement published in Nov 2013 to remind operators of ADS-B exclusive airspace implementation.</p> <p>AIP updated in Jan 2015 to remove the need for ops approval and to include the FAA standard as an additional accepted means to meet the equipage requirements.</p>	<p>L642 and M771.</p> <p>At and above FL290. Also affect the following ATS routes N891, M753, L644 & N892</p>	<p>40nm on ATS routes L642, L644, M753, M771, N891 and N892</p> <p>30nm implemented on 26th June 2014 on ATS routes L642, M753, M771 and N892;</p> <p>20nm planned for end 2015</p>	<p>Safety case was completed end of November. 2013.</p>
SRI LANKA	<p>ADS-B Trials planned for 2012 and implementation in 2013. 5 ADS-B ground station was planned and willing to share ADS-B data with neighbouring States through a central processor which is ready for trial in 4th Quarter 2014.</p>				<p>An AIC on ADS-B services with TMA of Colombo FIR issued on 10 Nov. 2014 (A02/14) with effective 1 Sep. 2015.</p>

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THAILAND	<p>Multilateration implemented in 2006 at Suvarnbhumi Int'l. Airport.</p> <p>ADS-B Ground Stations (DO260B compliant) installed in Thailand for internal research and development project. ADS-B is planned to be part of future surveillance infrastructure. New ATM System to be operational in 2017 will be capable of processing ADS-B data.</p>				
TONGA	Trial planned for 2017				
UNITED STATES	<p>As of 1 April 2015, the “baseline” set of Service Volumes planned by the FAA in 2007 are operational, using data from 634 radio sites installed by Exelis. Since 2007, FAA has planned and funded activities to activate additional Service Volumes that Exelis will service using and additional 29 radio sites; 9 of these radio sites have been installed by Exelis as of 1 April 2015.</p> <p>As of 1 April 2015, 123 of the 231 U.S. air traffic control facilities are using</p>	The U.S. ADS-B Out rule (14 CFR 91.225 and 14 CFR 91.227) was issued in May 2010 and specifies that the ADS-B Out mandate is effective on 1 January 2020.	Class A, B, and C airspace, plus Class E airspace above 10,000 ft MSL. See 14 CFR 91.225 for details.	<p>The U.S. is using both terminal and en route (5nm) separation criteria, depending on the specific airspace and available surveillance information. Terminal separation includes the following separation criteria:</p> <ul style="list-style-type: none"> - 3nm - 2.5nm - indepen- 	

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	ADS-B for ATC separation; all facilities are planned to be using ADS-B by 2019.			dent parallel approach operations down to 4300 ft centreline separation - dependent parallel approach operations down to 2500 ft centreline separation (currently 1.5 nm diagonal distance).	
VIET NAM	Two phases ADS-B implementation plan adopted. Phase 1 implemented in March 2013. Phase 2 for whole lower and upper airspace of Ha Noi and Ho Chi Minh FIR to be completed by 2016.	AIC issued on 20 June 2013/ADS-B mandating effective from 12 December 2013 in Ho Chi Minh FIR.	M771, L642, L625, N892, M765, M768, N500 and L628 At/above FL290.		Operators required to have operational approval from State of aircraft registry.
