**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** |
| --- | --- | --- | --- | --- | --- |
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| **AFGHANISTAN** | ADS-B & Multi Lateration system installed. |  |  |  | subject to safety assessment |
| **AUSTRALIA** | A total of 45 ADS-B ground stations and 28 WAM stations are operational (Total 73)  ATC readiness since 2004  ADS-B data sharing with Indonesia operational since 2/2011.  ADS-B data sharing planned with PNG  ASMGCS using multilateration and ADS-B is operational in Brisbane, Sydney, Melbourne and Perth  An additional 15 ADS-B ground stations are planned in 2017-2020 period.  Onesky replacing the current ATM system is expected to be fully operational in 2020 period. | 2009/effective date of mandating in upper airspace 12/12/2013.  A forward fit ADS-B mandate also applies from 2/2014 for all IFR aircraft at all flight levels.  An ADS-B mandate for all IFR aircraft applies from 2/2017. | At/above FL290 from 12/2013 for domestic & foreign aircraft.  All airspace for IFR aircraft from 2/2017 | 3NM and 5 NM surveillance separation.  3/2016 - Manual of ATC updated to include 3 nautical mile separation using ADS-B in terminal control unit.  Vectoring allowed using ADS-B  Precision Runway Monitoring for Sydney WAM | WAM is operating in Tasmania since 2010 with 5 NM separation service.  WAM is also operating in Sydney for 3 NM separation service in TMA and for precision runway monitoring function. |
| **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 2019.  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** | 5 UAT ADS-B stations used for flight training at CAFUC to be upgraded to support 1090ES by 2017.  310 ADS-B stations nationwide will deployed as 1st phase by the end of 2017.  1 ADS-B station operational in Sanya FIR since 2008. Sanya ATC system ready since July 2009 to support L642 & M771.  Additional 3 ground stations deployed in 2015.  Chengdu-Jiuzhai project finished in 2008 with 2  ADS-B stations  Chengdu - Lhasa route surveillance project completed with 6 ADS-B stations using 1090ES since 2010. Trials operated from May 2011.  9 ADS-B stations deployed on the routes H15 and Z1 in 2015. | NOTAM issued on ADS-B trial operation |  |  | ADS-B signal alone won’t be used for ATC separation |
| **HONG KONG CHINA** | A larger-scale  A-SMGCS  covering the  whole Hong  Kong International  Airport put into  operational use  in April 2009.  Data collection/  analysis on aircraft ADS-B equipage in  Hong Kong airspace conducted on quarterly basis since 2004.  ADS-B trial using a dedicated  ADS-B system completed in 2007.  ADS-B out operations over PBN routes L642 and M771 at or above FL 290 within HK FIR was effective in December 2013 and within HK FIR at or above FL 290 is planned for December 2016.  ADS-B ground station infrastructure completed in 2013.  ADS-B trial using ADS-B signal provided by Mainland China to cover southern part of Hong Kong FIR commenced in 2010. | AIP supplement issued on 29 Oct.2013/12 Dec. 2013 as effective date. | L642/M771  ATS routes. | To be determined. | ADS-B signals being fed to ATC controllers under an operational trial programme.  ADS-B operation in Hong Kong FIR re-scheduled for Dec. 2016. An AIP Supplement was issued on 29 Aug. 2014. |
| **MACAO, CHINA** | Mode S MSSR coverage available for monitoring purposes. |  |  |  | Airspace – ATZ only |
| **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 provided in 2013. BY EMAIL | ADS-B mandate commencing form 31st December 2013 |  |  |  |
| **FRANCE**  ***(French Polynesia)*** | 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. |  |
| **INDIA** | ASMGCS (SMR + Multilat) is operational at Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad Airports.  ASMGCS is also being installed at 05 more international airports.  ADS-B Ground Stations were installed at 21 locations across continental airspace and including Oceanic airspace at Port Blair.  Procurement of 10 more ADS-B Ground stations is under consideration in 2016..  ATM automation systems at 22 ATC Centres are capable of processing  ADS-B data and provide the information on Display. | AIP supplement issued on 17th April 2014 with effective date of implementation from 29th May 2014. |  |  | ADS-B in India to provide redundancy for radar and filling the surveillance gaps.  ADS-B data trial operations commenced in 2015 in both Non-radar and radar environment, in Enroute & Terminal phases of flight for ATC purposes.  AIP SUP 18 of 2014 issued |
| **INDONESIA** | 30 Ground Station successfully installed.  Since 2009, ATC Automation in MATSC has capabilities to support ADS-B application.  ADS-B Task Force team established to develop planning and action concerning ADS-B Implementation within Indonesia FIR  ADS-B data sharing with Australia and Singapore. | 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.  AIP Supplement on ADS-B Implementation (Tier-1)(mandate) being published with effective date on 25 June 2015. | Mandate from Janaury 2018 for Class A airspace from FL290 to FL460 | Intended to use for 5 NM separation |  |
| **JAPAN** | Multilateration Systems for surface monitoring have been implemented at eight airports  PRM (WAM) has been implemented at Narita Airport.  En-route WAM system is manufacturing and will be put into operation in FY2018  Plan to evaluate accuracy of ADS-B information and has intension to introduce  ADS-B to the oceanic direction. |  |  |  |  |
| **LAO PDR.** | 2 ADS-B ground stations were installed in Vientiane and Luangprabang Int’l Airport in 2015 and the ADS-B data is fused with MSSR data target in the ATM Automation system.  3 additional ADS-B ground stations (DO-260B compliant) will be completed the installation at existing MSSR sites (Xiengkhouang, Savannakhet and Champasack) by 2016 to Q1 of 2017 to enhance the full ADS-B coverage of Lao FIR. |  |  |  |  |
| **MALAYSIA** | Malaysia installing two (2) ADS-B ground stations in Genting Highland and Langkawi. The said ADS-B are expected to be commissioned by end of 2019.  Malaysia revised the plan to start mandate ADS-B requirement for implementation of ADS-B service for exclusive airspace/route without radar coverage within KL FIR by the end 2022.  Specific Routes for ADS-B Implementation Plan: P574, N571, L510, P628, L645 & P627. | Revised Plan to issue mandate with target effective date by end of 2022. |  | ICAO approved surveillance separation. |  |
| **MALDIVES** | 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.  Maldives has planned to share ADS-B data with its adjacent FIRs. Updated by email |  |  |  | Seaplane in Maldives equipped with ADS-B for AOC purpose.  These seaplanes have ADS-B IN functions as well. |
| **MONGOLIA** | Ten ADS-B ground stations for combination SSR and filled the  surveillance gaps implemented in 2015 and integrated with ATM system and trial operation in early 2016. |  |  |  |  |
| **MYANMAR** | ADS-B ground stations to be installed at  Sittwe, Co Co Island by end of 2014 as 1st phase Yango , Lashio and Myeik -2015 as 2nd 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. |  |  |  |  |
| **NEW ZEALAND** | 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.  Additionally MLAT data from the Auckland MLAT system is used to provide airport surface movements at NZAA.  The New Zealand Navigation and Airspace and Air Navigation Plan “New Southern SKY” issued in May 2014 | New Zealand has plans to introduce ADS-B OUT mandates as follows: ADS-B OUT equipment requirement for all aircraft operating in controlled airspace above FL 245 from 1 January 2019  ADS-B OUT equipment requirement for all aircraft operating in controlled airspace from 1 January 2022. A forward fit requirement for ADS-B equipage on all newly registered aircraft in 2017.  The Rule will not specify particular Technical Standing Orders (TSO), or transponder GNSS receiver models for position input into ADS-B. |  | 5 NM Surveillance Separation in en-route airspace, and 3NM surveillance separation in terminal airspace. |  |
| **PAKISTAN** | 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 2017. |  |  |  |  |
| **PAPUA NEW GUINEA** | Initially 8 ADS-B sites to be deployed across PNG to provide seamless coverage above FL285.  First site to be installed May/June 2016, with remainder to be completed between May-July 2017.  Up to an additional 7 sites to be rolled-out in the 2018/19 timeframe. Site location will be dependent on infrastructure, security and an analysis of Phase 1 site performance.    In late 2016, PNGASL (ANSP) will be implementing a replacement ATM automation system.  The system will support fusion of ADS-B and RADAR data.  From 2017 onwards, PNGASL will be looking to share ADS-B data with Indonesia and Australia. | An ADS-B mandate is on CASA PNG roadmap, however legislation yet to be developed.  The Australian mandates will largely drive equipage for overflights (e.g. East-Asia to Australia/South Pacific).  Expectation is that PNGASL (the ANSP) will lead development of ADS-B mandate framework.  Initial steps may include mandate above F245 – but will depend on performance of Phase 1 ADS-B deployment.  Country-wide mandate not envisaged before 2021/22. | None | **Air Traffic Control**  Approach/Arrivals  2017 – 5NM  2018 – 3NM (approach)  Upper Airspace (>FL245)  2017/18 – Situational awareness.  2018/19 – 5NM  Note: Implementation dictated by training requirements and new ATM system transition priorities.  **Flight Service**  Directed Traffic (FIS)  2017 – Situational awareness |  |
| **PHILIPPINES** | Four (4) ADS-B ground stations (Manila, Palawan, Pangasinan and Zambales) with target date tocomplete 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 Gimpor Airport supporting both 1090ES and UAT, undergoing operational testing (2013-16). At Incheon Intl Airport, promotion of surface surveillance (2014-17) In 2nd phase from 2015 to 2016, ADS-B ground stations will 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** | The airport MLAT system was installed in 2007 and “far-range” ADS-B sensor was installed in 2009.  ATC system has been processing ADS-B data since 2013. | AIC was issued on 28 December 2010/effective from 12 Dec.2013.  AIP supplement published in Nov 2013 to remind operators of  ADS-B exclusive airspace implementation.  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. | L642 and M771.  At and above FL290. Also affect the following ATS routes  N891, M753, L644 & N892 | 40nm on ATS routes L642, L644, M753, M771, N891 and N892    30nm implemented on  26th June  2014 on ATS routes L642, M753, M771 and N892;  20nm planned for end 2016 | Safety case was completed end of November. 2013. |
| **SRI LANKA** | Installation of five (05) ADS-B Ground Receiving stations have been re-planned to be completed by end of November 2016, with its commissioning & ATM System Readiness by end of December 2016. | Revised Date of Equipage mandate 31st Dec. 2016 | All ATS Routes within Colombo TMA | Initially 5 nm within Approach Radar Coverage, 8 nm within Area Radar Coverage & Procedural Separation minima outside Radar Coverage. | Reduction of Terminal/En-route separation to 30 nm & Use of ADS-B alone for vectoring & separation only after safety assessment. |
| **THAILAND** | Multilateration implemented at VTBS in 2006,  installed at VTBD in 2016 which to be implemented in 2017;  and to be installed at VTCC and VTSP in 2017.  ADS-B ground stations (DO-260B compliant) installed  in Thailand for internal research & development project.  Thailand is currently undergoing the operational approval  process to have ADS-B as part of surveillance infrastructure.  Nationwide WAM+ADS-B covering all  en-route and  TMA airspace to be installed in 2017.  New ATM System to be operational in 2017 will be  capable of processing ADS-B and WAM data and  integration of data from multiple sensor types. | Plan to issue mandate with target effective date end of 2018. |  |  |  |
| **TONGA** | Trial planned for 2017 |  |  |  |  |
| **UNITED STATES** | As of 1 April 2016, the “baseline” set of Service Volumes planned by the FAA in 2007 are operational, using data from over 600 radio sites installed by Harris. Since 2007, FAA has planned and funded activities to activate additional Service Volumes that Harris will service using additional radio sites; all but 16 of these radio sites have been installed and are operational as of 1 April 2016.  As of 1 April 2016, 135 of the 226 U.S. air traffic control facilities are using ADS-B for ATC separation; all En Route Centers and major Terminal facilities are using ADS-B for ATC separation; all remaining facilities are planned to be using ADS-B by 2019. | 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. | 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:  - 3nm  - 2.5nm  - indepen-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 commenced in 2015 for whole lower and upper Hanoi FIR and 2018 for Ho Chi Minh FIR | 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. |

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