



*International Civil Aviation Organization*

**THE NINTH MEETING OF AUTOMATIC  
DEPENDENT SURVEILLANCE – BROADCAST  
(ADS-B) STUDY AND IMPLEMENTATION TASK  
FORCE (ADS-B SITF/9)**



Jakarta, Indonesia, 18 -19 August 2010

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**Agenda Item 2:           Review the outcome of the APANPIRG/20 on ADS-B SITF/8 and SEA  
ADS-B WG/4 Meetings**

**OUTCOME OF APANPIRG/20 ON ADS-B**

(Presented by the Secretariat)

**SUMMARY**

This paper reviews the outcome of APANPIRG/20 on ADS-B and works accomplished by the Eighth Meeting of ADS-B Study and Implementation Task Force and the Thirteenth CNS/MET Sub-Group.

Action by ADS-B SITF/9 is at Paragraph 3.

**1                           Introduction**

1.1                       The APANPIRG/20 held from 7 to 11 September 2009 in Bangkok reviewed the work accomplished by Eighth Meeting of the ADS-B Study and Implementation Task Force including work accomplished by Fourth meeting of the SEA ADS-B Working Group. The outcome of APANPIRG/20 on matters relating to ADS-B is provided at Attachment to this paper for review by this meeting.

1.2                       The reports of Eighth Meeting of ADS-B Task Force and Fourth meeting of the working group were also reviewed by CNS/MET SG/13 meeting held in Bangkok from 20 to 24 July 2009 and noted by ATM/AIS/SAR SG/19 meeting held in 22-26 June 2009.

**2.                           Discussion**

2.1                       APANPIRG noted the trial and implementation status by States and some issues observed during the trials and implementation. The actions taken by APANPIRG/20 meeting on ADS-B are provided in the **Attachment** to this paper and highlighted as follows:

- Decision 20/47 – Task ADS-SITF to study the need for developing guidance material for flight inspection/validation of ADS-B ground stations;
- Decision 20/50 – adopted the updated Subject/Tasks List of ADS-B SITF;

- Conclusion 20/51 – organize a regulators’ workshop on ADS-B avionics equipage requirement ;
- Conclusion 20/52 – agreed to comprehensive amendment to FASID table CNS 4A and 4B;
- Conclusion 20/53 – adopted revised Guidelines for Development of ADS-B Implementation Plan by States; and
- Conclusion 20/54 and 20/55 –Regional ADS-B Equipage Requirements.

2.2 The meeting appreciated the efforts and progress made by the ADS-B SITF and the SEA ADS-B WG and expressed its appreciation and gratitude to the Civil Aviation Authority of Viet Nam and VANSCORP for hosting the ADS-B Seminar and the Task Force meeting. The meeting also expressed appreciation to Airservices, Australia for hosting the fourth meeting of the SEA ADS-B Working Group.

2.3 The revised Guidelines for Development of ADS-B Implementation Plan by States adopted by APANPIRG/20 have been posted in the ICAO APAC website: <http://www.bangkok.icao.int/edocs>

2.4 The outcome of APANPIRG/20 on ADS-B related activities was also reviewed by the SEA ADS-B Working Group held 21-22 January 2010 in Jakarta, Indonesia.

### **3. Action required by the Meeting**

3.1 The meeting is invited to review the outcome of the APANPIRG/20.

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**EXTRACT FROM REPORT OF APANPIRG/20**  
**(7 – 11 SEPTEMBER 2009) ON ADS-B**

**3.4 CNS/MET matters**

The meeting reviewed the outcomes of the Thirteenth Meeting of Communications, Navigation and Surveillance/Meteorology Sub-Group (CNS/MET SG/13) of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) held in Bangkok from 20 to 24 July 2009.

***Seminar on Testing Of Navigation and Surveillance Facilities and Validation of Flight Procedures***

3.4.44 The meeting was informed that in accordance with APANPIRG Conclusion 19/32 a ‘Seminar on Navigation and Surveillance Facilities and Validation of Flight Procedures’ was held at the Regional Office, Bangkok from 5 to 7 August 2009. It was jointly hosted by ICAO and Aeronautical Radio of Thailand (Aerothai). After reviewing the outcomes of the Seminar, the meeting adopted the following Decision recommending assessment of the need for developing guidance for inspection/validation of ADS-B ground stations.

**Decision 20/47 - Guidance material for flight inspection/validation of ADS-B ground stations**

That, ADS-B SITF be tasked to study the need for developing guidance material for flight inspection/validation of ADS-B ground stations.

**Surveillance Systems**

***Review Report of the Eighth Meeting of ADS-B Study and Implementation Task Force***

3.4.75 The meeting reviewed the outcome of ADS-B Seminar and the Eighth Meeting of Automatic Dependent Surveillance – Broadcast (ADS-B) Study and Implementation Task Force (ADS-B SITF/8), hosted by CAAV and VANSCORP Viet Nam in Ha Noi, Viet Nam from 18 to 22 May 2009.

3.4.76 The objective of the ADS-B Seminar was to provide information to the participants on ADS-B planning and implementation and to facilitate discussions at the meeting. The Seminar covered a comprehensive list of topics on the ADS-B implementation and was well received by the participants.

***Terms of Reference and Subject/Tasks List of the ADS-B Study and Implementation Task Force***

3.4.77 The meeting noted that no changes to the TOR was proposed and agreed with the Subject/Tasks List updated by the ADS-B SITF and adopted the following Decision:

**Decision 20/50 - Subject/Tasks List of ADS-B Study and Implementation Task Force**

That, the Subject/Tasks List for ADS-B Study and Implementation Task Force provided in **Appendix P** to the Report on Agenda Item 3.4 be adopted.

3.4.78 The meeting considered it essential to develop common understanding for the regulators to publish equipage requirement for ADS-B OUT based service. The meeting supported to organize a regulators workshop on ADS-B OUT equipage requirement before May 2010 as recommended by the Task Force. Australia and USA reconfirmed to support the workshop through coordinating and providing experts including those from industry for the Workshop. Accordingly, the meeting formulated the following Conclusion:

**Conclusion 20/51 - Workshop on ADS-B OUT equipage requirement**

That, ICAO be invited to organize a workshop on ADS-B OUT equipage requirement before May 2010 with the assistance from Australia and USA.

***Updates on ADS-B Planning and Implementation***

3.4.79 The meeting reviewed implementation status updated by States at the Task Force meeting and noted some issues observed during the trials and implementation.

**Australia**

3.4.80 Australia provided explanation and analysis on requirements for TSO 145/6 GPS receiver that includes FDE and SA Aware capabilities and examined ADS-B NUC values for various GPS MMR and transponders. Australia encouraged other States to perform similar analysis to further confirm or refute Australian findings with respect to SA ON avionics ADS-B service reliability.

3.4.81 The meeting noted that a PC based ADS-B Filter called Foreign ADS-B Filter (FAF) is being developed by Australia to control the exchange of ADS-B data between Australia and its neighbors. The development of FAF is expected to be completed in 2009. The functional and system requirement were provided for consideration by other States who wish to share ADS-B derived data. The meeting felt that the FAF could be installed at either site or at both the sites which should be specified in the data sharing agreement. The reliability and redundancy of FAF should also be taken into account when a PC based system is used.

3.4.82 The meeting noted experience gained and lessons learnt in deploying Wide Area Multilateration in Tasmania, Australia. The project started in May 2006 and the Site Acceptance testing commenced in May 2008. A number of flight tests have been conducted as part of Site Acceptance Testing. Final flight test and conclusion of SAT is expected in 2009.

**China**

3.4.83 China provided the result of the Trial & Evaluation Project conducted in South Western part of China to support ADS-B implementation. Several issues including analysis of the invalid data were identified. The meeting discussed and analyzed some issues resulting from the ADS-B evaluation project including velocity and heading evaluation, low updates rate, etc. The issues and findings observed in the real flight testing were considered very useful.

**Hong Kong, China**

3.4.84 It was noted that Hong Kong, China plans to:

- a) mandate ADS-B carriage, by end 2013, for aircraft flying over L642/M771;
- b) mandate ADS-B carriage, by end 2014, for aircraft flying within the Hong Kong FIR; and
- c) mandate ADS-B carriage, after 2015 (TBC), for low flying aircraft, including general aviation aircraft and helicopters.

### **New Caledonia**

3.4.85 Three ground stations were installed at the existing VHF sites in New Caledonia in March 2009. Technical testing will be conducted during October to December 2009 and operational testing will start from end of 2009 and will be completed by mid. 2010.

### **Pakistan**

3.4.86 The meeting noted that most of the Pakistan airspace currently is already under radar surveillance, some gaps in the west, northern mountain regions and some portion in the south and southwest airspace need to be brought under positive visibility/surveillance. PCAA considers ADS-B, a potential option to fill up the gaps in radar surveillance and also considers using ADS-B to provide partial back up to the existing radar. One ADS-B station was installed at Karachi ACC on trial basis for a period of one year.

### **The Philippines**

3.4.87 The Civil Aviation Authority of the Philippines (CAAP) installed a new Mode S SSR capable of processing ADS-B reports based on 1090ES. This enables the monitoring of ADS-B equipped aircraft in the 100NM radius from the radar station. The ADS-B function of the radar will be used to observe and evaluate population of aircrafts equipped with ADS-B within 100 NM. The CAAP has planned to install two stand alone ADS-B stations in Manila and Puerto Princesa by 2012. The CAAP also intends to include the ADS-B function in all other Mode S SSR stations that will be installed in 2012.

### **Viet Nam**

3.4.88 Viet Nam has been participating in South East Asia's programme on ADS-B implementation and has committed to share ADS-B data with its neighboring States. Viet Nam will also consider sharing VHF communication capabilities with neighboring FIR when ADS-B control is applied. Viet Nam had preliminary discussion with stakeholders on upgrading ATM system in Ho Chi Minh AACC to process ADS-B data and sharing of ADS-B data with Singapore.

### ***ADS-B Data Sharing***

3.4.89 ADS-B data sharing between Australia and Indonesia is expected to be operational in the 2nd Quarter 2010. This phase (Phase 1A) will use single data communications infrastructure to support situational awareness and safety nets. It is proposed to use an existing satellite data communications link between Australia and Indonesia. Phase 1A, for which funding has been approved will include data sharing from existing ADS-B sites at:

- Thursday Island (installed)
- Gove (to be installed in 2009)
- Merauke (installed)
- Saumlaki (installed)

3.4.90 The meeting noted that Indonesia has offered to share its ADS-B data from Banda Aceh ground station with Malaysia during the fourth South-East Asia sub-regional ADS-B implementation working group meeting. It was noted that the ADS-B data from Banda Aceh station is expected to enhance Malaysia surveillance capability within its AOR in the Bay of Bengal Area. The meeting further noted that the current Kuala Lumpur ATCC ADS-C/Radar integrated workstation for oceanic (Bay of Bengal) Sector is capable of processing and integrating ADS-B data.

3.4.91 Indonesia confirmed that the ADS-B ground station has been installed with data format ASTERIX 21 version .23 and is ready to further discuss with Malaysia data sharing arrangements. It was encouraging to note the initiatives being taken by Malaysia and Indonesia for ADS-B data sharing in the Bay of Bengal area. States concerned were encouraged to consider sharing VHF communication capability wherever they are applicable.

### *FASID Tables on Surveillance Systems*

3.4.92 The meeting noted that the Tables CNS 4A and 4B of the Asia and Pacific Air Navigation Plan, Volume II, FASID, Doc 9673 were reviewed and updated by the Task Force meeting. Table CNS 4 renamed as Table CNS 4A – Surveillance Systems in 2006 specifies Surveillance System requirements and Table CNS 4B renamed from the Table ATS 3 specifies ATS Automation Systems requirements. The meeting accordingly adopted the following Conclusion:

#### **Conclusion 20/52 - Table CNS 4A and Table CNS 4B**

That, the FASID Table CNS 4A and Table CNS 4B be replaced with updated Tables provided in **Appendix Q** and **Appendix R** to the Report on Agenda Item 3.4 in accordance with the established procedure.

### *South East Asia (SEA) ADS-B Working Group*

3.4.93 The meeting noted the outcome of the fourth meeting of the South East Asia ADS-B Working group hosted by Airservices Australia in Melbourne on 9-10 February 2009. The meeting agreed with the following actions to expedite ADS-B implementation in South China Sea area:

- i) complete installation of ADS-B stations at Natuna and Matak Islands, Singapore and Con Son Island by 2010;
- ii) sharing of ADS-B data and DCPC capability between Indonesia, Singapore and Vietnam to facilitate application of radar-like separation standards;
- iii) commence ADS-B operational trials in 2010 along air routes L642 and M771; and
- iv) the earliest operational trial to be conducted approximately by the end of 2010 depending on new ATC automation system capabilities in the States. It was envisaged that an ADS-B mandate for some flight levels could come into effect in 2013.

### *Cost benefit study for South China Sea area*

3.4.94 CANSO provided information on the outcome of a Cost Benefit Study conducted by CANSO and IATA for initial phase of ADS-B implementation over the South China Sea. The study results indicated a positive business case and highlighted operational efficiencies and savings that can be derived through the implementation. FAA was helping in the analysis, and CAA Singapore was helping with the collection of operational and technical data. The meeting appreciated the outcome of the cost benefit study.

### *Guidelines for Development of ADS-B Implementation plan*

3.4.95 The meeting recalled the “Guidelines for development of ADS-B Implementation plan by States” adopted by APANPIRG/19 meeting under Conclusion 19/35. The meeting endorsed a proposal by Viet Nam and agreed by the Task Force to revise the guidelines with additional information and formulated the following Conclusion:

#### **Conclusion 20/53 - Revised Guidelines for Development of ADS-B Implementation Plan by States**

That, the revised guidelines for Development of ADS-B Implementation Plan by States provided in **Appendix S** to the Report on Agenda Item 3.4 be adopted.

### ***Australian ADS-B aircraft mandate***

3.4.96 Australia informed the meeting that in March 2009, the Civil Aviation Safety Authority (CASA) issued legislation for an ADS-B aircraft equipment mandate both for Australian and foreign registered aircraft for flight in the upper Australian territorial airspace (at and above FL290), with a compliance date on and from 12 December 2013. The text of the mandate is available on the following webpage: [http://www.casa.gov.au/newrules/airspace/jcp/nfrm\\_jcp\\_annexb.pdf](http://www.casa.gov.au/newrules/airspace/jcp/nfrm_jcp_annexb.pdf) The meeting noted additional information provided by Australia at APANPIRG/20 meeting about their plans to revise ADS-B aircraft equipage mandate to make the technical specifications for GNSS position source equipment for aircraft more explicit and extend the date for certain technical compliances (SA Aware) till 2015. These revisions are based on the outcome of various regional meetings which include ADS-B SITF and CNS/MET SG meetings. It was assured that the revision will neither increase the cost nor impose any additional technical requirements. The meeting noted that IATA and their members have been the early supporters of ADS-B and recognized that Australia has been leading the world in many developments. IATA continues to support the intent of the Australian ADS-B mandate.

### ***Options for states to establish Aircraft ADS-B avionics mandate***

#### ***AMC20-24***

3.4.97 The meeting noted the considerations of third meeting of South East Asia ADS-B WG in July 2008 on AMC20-24 published on 25 April 2008 by the European Aviation Safety Agency (EASA) which defines acceptable means of compliance for the airworthiness and operational approval of the “Enhanced Air Traffic Services in Non-Radar Areas using ADS-B Surveillance”. The working group meeting agreed that AMC20-24 with proposed changes serves as baseline document for further consideration. The AMC20-24 with proposed changes by SEA ADS-B WG is provided in the Appendix J to the Report of the ADS-B SITF/8.

#### ***ADS-B OUT Equipage Standards - IATA***

3.4.98 The meeting noted a proposal for ADS-B OUT Equipage Standards proposed by IATA for the Asia/Pacific Region. It was stated that both the Australian approval method and AMC 20-24 are suitable standards for Asia Pacific. EASA AMC20-24 is better recognized as a global benchmark detailing an acceptable means of compliance for operation in non-radar areas. AMC 20-24 should eventually be adopted as the equipage standard for Asia and Pacific. Forward fit aircraft should comply from commencement of operations while retrofit aircraft must comply by 2013.

3.4.99 Regarding approval process for ADS-B OUT, IATA expressed that it should be no different for any other avionics equipment. The contracting States shall recognize as valid an air operator certificate issued by another Contracting State. Australia informed the meeting that a possible way is to endorse the list of CASA approved aircraft that can be provided on request.

#### ***Regional ADS-B Equipage Requirement***

3.4.100 The meeting noted the information of options for states to establish harmonized Aircraft ADS-B avionics mandates including Australian ADS-B mandate for upper airspace from 12 December 2013, AMC20-24 published on 25 April 2008 by the European Aviation Safety Agency (EASA) which defines acceptable means of compliance for the airworthiness and operational approval of the “Enhanced Air Traffic Services in Non-Radar Areas using ADS-B Surveillance”. The meeting also noted the current state of development of the regulations in Canada and USA.

3.4.101 The meeting agreed that the Australian approval method and AMC20-24 are suitable standards for Asia/Pacific Region. However, it was also recognized that some aircraft configurations are currently unable to obtain AMC 20-24 certification without upgrade despite being in compliance with the current Australian standard. In the interim, these aircraft can and should be authorized to operate ADS-B in the Asia/Pacific Region. At the same time, the benefits of SA aware avionics and

FDE were recognized and it is recommended that new aircraft should be fitted with these capabilities. Therefore, States are recommended to identify these capabilities as forward fit requirements as soon as reasonable.

3.4.102 The meeting, after considering additional comment from IATA regarding introduction of appropriate regulations to allow any of the stated requirements, adopted following two Conclusions:

**Conclusion 20/54 - Regional ADS-B Equipage Requirement**

That, States be urged to issue ADS-B authorizations for the interim period 2010-2020 (or until requirements can be harmonized globally) in Non-Radar Areas (NRA) airspace based on:

- AMC20-24 certification or
- Approval by CASA Australia or
- The requirements of the CASA Civil Aviation Order 20.18 Amendment (No. 1) 2009 and Advisory Circular AC21-45

*Note: States that have not yet published regulations should implement necessary regulations that recognize that any one of the above requirements is acceptable and not specify an individual requirement*

**Conclusion 20/55 - Forward Fitment Requirements for SA Aware and FDE functionality**

That, ICAO recommend States concerned to adopt forward fitment requirements which include SA aware and FDE functionality as soon as reasonable.

***Sub-regional ADS-B implementation projects***

3.4.103 The meeting noted the outcome of the discussion by the three ad hoc working groups established during the Task Force meeting to further develop proposals for sub-regional implementation plans for South East Asia, Bay of Bengal and South Asia and Pacific. The outcome is provided in Appendix K to the report of ADS-B SITF/8.

***Note of appreciation***

3.4.104 The meeting appreciated the efforts and progress made by the ADS-B SITF and the SEA ADS-B WG and expressed its appreciation and gratitude to the Civil Aviation Authority of Viet Nam and VANSCORP for hosting the ADS-B Seminar and the Task Force meeting. The meeting also expressed appreciation to Airservices, Australia for hosting the fourth meeting of the SEA ADS-B Working Group.

***Time and Venue of Next Meeting***

3.4.105 The fifth meeting of SEA ADS-B Working Group is scheduled to be held during the end of 2009 or early 2010 in Indonesia and the next meeting of ADS-B Study and Implementation Task Force is scheduled for April/May 2010.

**Under Agenda Item 3.2 of APANPIRG/20 Report:**

***USA - Operational Trial of ADS-B In-Trail Procedures***

3.2.33 The United States provided an in-depth update on planning by the FAA to conduct an operational trial of ADS-B In-Trail Procedures (ITP) in the South Pacific. For ADS-B ITP, the maneuvering aircraft obtains the flight identification on proximate ADS-B equipped non-maneuvering aircraft using ADS-B 'IN' technologies. Based on the ADS-B data from the non-maneuvering or reference aircraft, a pilot can make an ITP altitude change request to ATC. The controller, who maintains separation responsibility at all times can then approve the manoeuvre. The planned trial will be undertaken with United Airlines B747 aircraft, and will be closely monitored and supervised by the FAA. The ATM/AIS/SAR/SG/19 meeting supported the ADS-B ITP operational trials in the South Pacific, noting the significant economic and efficiency benefits for both service providers and airspace users.

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