



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE**

**REPORT OF
THE FOURTH MEETING OF
THE SOUTH EAST ASIA SUB-REGIONAL ADS-B
IMPLEMENTATION WORKING GROUP
(SEA ADS-B WG/4)**

Melbourne, Australia, 9-10 February 2009

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1. INTRODUCTION

1.1 The Fourth Meeting of the South East Asia Sub-Regional ADS-B Implementation Working Group, hosted by Airservices, Australia was held from 9-10 February 2009 at the Rydges Hotel Melbourne, Australia.

1.2 In welcoming participants to Melbourne, Mr. Greg Dunstone, Surveillance Programme Leader, Airservices Australia and Chairman of APANPIRG ADS-B Study and Implementation Task Force, highlighted tasks for the working group and encouraged participants to continue working to progress the implementation of ADS-B in the sub-region.

1.3 Mr. Greg Dunstone was the moderator for the meeting and Mr. Li Peng Regional Officer, CNS of the ICAO Asia and Pacific Regional Office acted as the secretary for the meeting.

1.4 The meeting was attended by 32 Participants from Australia, Brunei Darussalam, Indonesia, Malaysia, Singapore, Thailand, Viet Nam, CANSO, IATA, SITA and 2 Representatives from the industry. List of participants is at **Attachment 1**.

1.5 The meeting met as a single body. The working language was English only inclusive of all documentation and this Report. The meeting considered 6 Working Papers and 12 Information Papers. List of Working Papers and Information Papers are provided at **Attachment 2**.

Agenda Item 1: Adoption of Agenda

1.1 The agenda adopted by the meeting was as follows:

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Review of the outcome of APANPIRG/19, DGCA/45 and other ICAO forum

Agenda Item 3: Review of the Terms of Reference

Agenda Item 4: Updating States' activities and issues on regional trials.

Agenda Item 5: Updating progress of South East Asia ADS-B study project by IATA and CANSO.

Agenda Item 6: Review of sub-regional implementation plan.

- Near-term implementation plan, including operational plan
- Harmonization of ADS-B regulations, rules and procedures

Agenda Item 7: Any other Business

Agenda Item 8: Date and Venue for the Next Meeting

Agenda Item 2: Review of the outcome of the APANPIRG/19, DGCA/45 and other ICAO forum**Outcome of APANPIRG/19**

2.1 The meeting reviewed outcome of the nineteenth meeting of APANPIRG held in Bangkok from 1-5 September 2008. The meeting noted that APANPIRG/19 appreciated the efforts and progress made by the ADS-B Study and Implementation Task Force and the SEA ADS-B Working Group. APANPIRG/19 adopted the guidance materials and guidelines for ADS-B Out planning and implementation developed by the ADS-B Task Force and the Working Group. APANPIRG/19 also formulated several Conclusions relating implementation of ADS-B including the revised mandate regional ADS-B Out Implementation. The extract from report of APANPIRG/19 on ADS-B is placed in **Appendix A** to this report. APANPIRG/19 expressed gratitude to China for hosting the ADS-B Seminar and ADS-B SITF/7 meeting and to Singapore, Indonesia and Malaysia for hosting the meetings of the SEA ADS-B Working Group.

2.2 The meeting noted that all the regional planning documents and guidance material adopted by APANPIRG/19 have been posted on the ICAO APAC website:
<http://www.bangkok.icao.int/edocs>

2.3 The meeting recalled that APANPIRG/19 adopted conclusion regarding the revised mandate regional ADS-B Out Implementation based on recommendation from IATA. IATA expressed that requirement for equipage mandates should be published as soon as possible with target publication date no later than 2010. It is time now for States to publish their harmonized requirements to allow operators have more time for preparation and compliance. The preparation and transition period would take about 5 years or more.

Outcome of DGCA/45

2.4 The meeting reviewed the ADS-B related outcome of 45th Directors General of Civil Aviation (DGCA) Conference held in Malaysia in November 2008.

2.5 The DGCA/45 recognized that the current period of global financial turbulence, any initiative to enhance operational efficiency with the objective of achieving cost-saving would be very much welcomed by operators and some good initiatives being taken and put into implementation and operation including ADS-B to improve airspace capacity and efficiency. The Conference called for State authorities, airline operators and ANSPs to adopt a collaborative approach to improve the operating environment and to foster and sustain the continued growth of the industry.

2.6 With respect to implementation of ADS-B in the Region, the Conference developed the following Action Item :

ACTION ITEM 45/3

Recognizing the benefits that can be derived from implementation of ADS-B, the Conference invited the ICAO APANPIRG ADS-B Study and Implementation Task Force (ADS-B SITF) to develop guidance material for harmonized regulations of ADS-B systems on aircraft.

2.6.1 The meeting supported the Action Item formulated by the 45th DGCA Conference and reconfirmed to take follow-up action to contribute towards development of the required guidance material. The meeting recalled the discussions at the third meeting of the working group that AMC20-24 would provide the baseline requirement for harmonization. IATA pointed out that as ADS-B is still as a new technology, harmonized regulations for equipage requirements are necessary which could certainly significantly reduce the equipage cost. Further discussions on the subject were taken under agenda item 6.

Agenda Item 3: Review Terms of Reference

3.1 The meeting recalled that APANPIRG/18 meeting under Conclusion 18/38 agreed to the establishment of a sub-regional ADS-B implementation Working Group in the South-East Asia area (SEA ADS-B WG) to develop the terms of cooperation and an implementation plan for near-term ADS-B applications in the sub-region.

3.2 The meeting recalled the progress made the working group on the following agreed tasks:

- agreed to the Term of Reference of the SEA ADS-B Working Group at the 1st meeting and revised at the 3rd meeting;
- developed the cost apportionment framework for ADS-B Ground Stations and ADS-B Surveillance Data Sharing;
- agreed guidelines to be used for the development of implementation plan;
- developed a sample agreement for ADS-B Data Sharing;
- agreed upon a SEA ADS-B project which outlines implementation issues to be undertaken by IATA and CANSO for the sub-region;

- Phase I –SEA ADS-B Implementation Plan (data sharing among Indonesia, Singapore and Viet Nam) be further enhanced at subsequent meetings; and
- AMC20-24 with proposed changes serves as baseline document for further consideration by ADS-B SITF and CNS/MET Sub-group of APANAPIRG.

3.3 The meeting recalled that the third working group meeting had reviewed the TOR and had agreed to revise the TOR to include Cambodia and CANSO as members of the working group. It was also agreed to include the issue of developing model document for possible use by States on establishing ADS-B avionics fitment mandate concentrating on the technical requirement and timing for avionics fitment. The revised TOR includes “Coordination for implementation of the plan” as sub-paragraph c). In addition to the ADS-B ground stations, the requirement for provision of VHF radio communication service had been also identified and included in the revised TOR

3.4 The meeting reviewed the TOR and considered it broad enough as it stands. The meeting did not identify need to further amend the TOR at the meeting.

3.5 Recognising that the area of interest to the working group for sharing ADS-B surveillance data is not only limited for air space between Australia and Singapore, South East Asia but also cover most part of South China Sea area, the working group agreed to invite other States that have interest to participate in the future meetings of the working group. The meeting agreed that Brunei Darussalam as member of the working group. The secretariat was requested to invite China and Hong Kong China for the next meeting of the working group.

Agenda Item 4: Updating States’ activities and issues on regional trials.

Australia

UAP Updates

4.1 The meeting noted the following updates on Australian ADS-B Upper Airspace Project:

4.2.1 In the last six months, ADS-B ground stations have been commissioned at the following sites:

- Meekathara
- Caiguna
- Newman
- Telfer
- Leonora

4.2.2 16 ADS-B ground stations are now in operational use and ADS-B approved aircraft numbers continue to grow – approximately 60% of all international flights are now eligible for ADS-B services. The meeting was also informed that within Australian ATS surveillance system coverage, identified aircraft are given priority over non-identified aircraft. It means that ADS-B equipped aircraft detected by a ground station have operational priority above aircraft that are not detected.

4.2.3 Australia reaffirmed its commitment to ADS-B despite the setback of the ATLAS project. ADS-B is now used for limited ATM operational use. Full use for 5 NM separations depends on dual data links to ADS-B ground stations. This has been reflected in CASR part of 171 and 172.

4.2.4 Australia also provided an update on the proposed wider use of satellite-based technology for navigation and surveillance. It provides an overview of the progress made with the proposal, decisions that have been made on replacement of conventional infrastructure and government agencies' view that Australia should extend the application of satellite-based technology to enhance air traffic surveillance and air navigation.

ADS-B Availability and continuity studies

4.3 Australia presented 3 related papers (IP3, IP4 and IP5) which provided analysis of received ADS-B data. Papers previously presented by Australia showed a significant difference between GPS receivers with and without Selective Availability (SA).

4.3.1 These papers examined ADS-B data in March, April, May 2008 and showed that the difference (SA aware or not) is not as large as previously thought, because earlier studies had not removed avionics faults unrelated to GPS satellite geometry issues.

4.3.2 IP4 catalogues ADS-B outages not related to GPS satellite geometry which included:

- No GPS for whole flight leg (probably on data from "one side" of aircraft)
- No GPS for part of flight leg
- Intermittent GPS connection

4.3.3 IP5 examined ADS-B NUC values for various GPS MMR and transponders. The major finding is that one transponder product is reporting lower NUC values than specified and this software error has been rectified.

4.3.4 IP3 then re-examined the overall statistics, after removing the impacts of the issues identified in IP4 & 5. The conclusions being as follows:

When considering the outages caused by GPS constellation issues:

a) From an availability point of view – assuming $NUC > 4$ is the requirement:

- SA aware receivers deliver exceptionally good performance.
- SA ON receivers delivered an availability of 99.97% once ADS-B outages not related to GPS geometry are discarded. This rises to 99.993% if one transponder type is not included.

From a continuity (reliability) point of view

- SA aware receivers deliver very good performance.
- SA ON receivers deliver a somewhat poor MTBF for GPS constellation geometry related failures of only 1,005 flight hours. The RTCA RAD standard expects 5,000 hours for the GNSS receive function.

4.3.5 It is clear that SA aware avionics delivers better results however, SA ON avionics availability (due to GPS geometry) is better than previously estimated. At the same time, some concern remains regarding the reliability and continuity of the GPS function for SA ON avionics.

ADS-B Filter for Data Sharing

4.4 Australia had decided to develop a flexible Linux PC based ADS-B Filter to manage and control the exchange of ADS-B data between Australia and its neighbors. It is called Foreign ADS-B Filter (FAF). The development of FAF is expected to be completed in 2009. The recommended connection and functions of the FAF is provided in the **Appendix B** to this report for consideration by other States who wish to share ADS-B derived data.

4.4.1 It was clarified that a full specification has been developed but that coding and testing was not yet complete

4.4.2 IATA stated that FAF is an excellent way forward. It was also clarified that ICAO does not normally develop equipment standards but rather defines "signals in space".

4.4.3 Regarding location of the filter, the meeting felt the FAF could be installed at either site or at both sides which should be specified in the data sharing agreement. The reliability and redundancy of FAF should be also taken into account when PC based system is used.

Indonesia

4.5 Indonesia informed the meeting that Indonesia have installed 22 ADS-B ground stations with dual redundant systems at (Makassar, Sorong, Natuna, Kupang, Merauke, Banda Aceh, Matak, Cilacap, Soekarno Hatta Airport-Jakarta, Tarakan, Pangkalan Bun, Palu, Kintamani - Bali, Waingapu, Alor, Galela, Ambon, Saumlaki, Medan, Pakanbaru, Palembang and Pontianak. Indonesia has plan to cover all Indonesia Airspace around 30 ADS-B Ground Stations using 1090 Mode S ES Technology.

4.5.1 ADS B ground stations located at Matak and Natuna are planned for Cross FIR ADS-B Data Sharing with Singapore and ADS-B ground stations at Waingapu, Kupang, Saumlaki and Merauke are planned for Cross FIR ADS-B Data Sharing with Australia. Cross FIR Operational Data sharing is considered as the initial application of ADS-B Services in Indonesia.

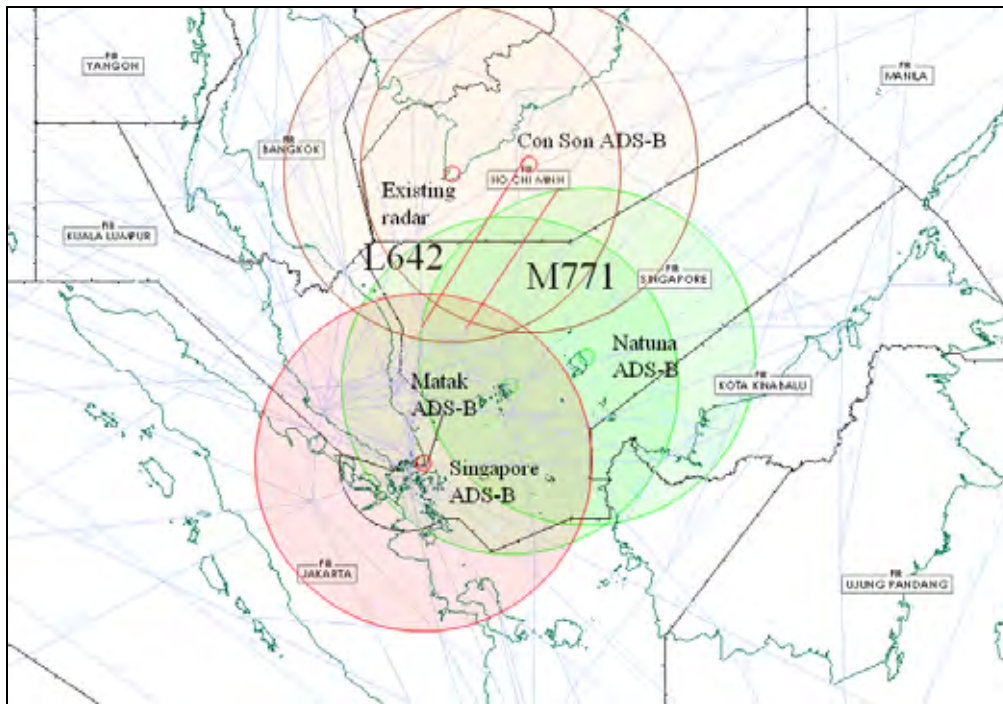
4.5.2 In short term, DGCA Indonesia has a plan to use of ADS-B for ATC Situational Awareness in Makkasar Air Traffic Service Center (MATSC). After succesfully implement ADS-B for situational awareness, Indonesia will implement ADS-B for provision of separation services.

Malaysia

4.6 Malaysia informed the meeting that an ADS-B ground station was installed at Genting Highland by SELEX SI since November 2008 for testing, data collection and study for replacing en-route radar. An ADS-B combine with multi-lateration will be installed at Terengganu Airport in West Malaysia. The commissioning of the system is planned by the end of 2009. Malaysia is also installing two new radars in East Malaysia at Sibul and Tawau airports.

Singapore

4.7 Singapore reported that they awarded a contract to Comsoft in December 2008 for the supply and installation of an ADS-B station and a data processor. The system is expected to commission by October 2009. In view of the readiness of Singapore ADS-B, Matak ADS-B and Natuna ADS-B by early 2010 and Con Son ADS-B by late 2010, Singapore proposed to commence ADS-B operational trial along routes L642 and M771 by early 2010 as shown in the following chart.



4.7.1 CAAS is also discussing with DGCA Indonesia and VANSCORP on sharing their ADS-B data and Direct Controller-Pilot Communications (DCPC) capability.

4.7.2 As the result of discussion, the meeting agreed to expedite implementation through the following actions:

- 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 DGCA Indonesia, CAAS and VANSCORP to facilitate application of radar-like separation standards;
- iii) commence ADS-B operational trials in 2010 along air routes L642 and M771.

Thailand

4.8 The meeting was informed that the ADS-B Project was on going. Thailand is still waiting for delivery of the equipment.

Viet Nam

4.9 Viet Nam provided updates on their ADS-B related activities. A meeting was held with Singapore regarding cooperation for providing ADS-B surveillance service and sharing ADS-B derived data was considered. Viet Nam has radar coverage for its air space with some gap at the FIR boundary. Consideration was given to install three ADS-B sites as proposed before. Viet Nam is conducting a survey which is expected to be completed in May 2009. ATM automation system in Ho Chi Minh would be integrated with ADS-B and new ATM automation system will be installed in Ha Noi in 2012.

4.9.1 Singapore requests Vietnam to provide VHF voice communication services together with ADS-B data from Con Son. Vietnam is considering the request.

Brunei Darussalam

4.10 Brunei Darussalam expressed appreciation for the invitation for participation of the meeting. Brunei informed the meeting that Brunei Darussalam plans to install an ADS-B station this year as a back up to ATC surveillance system. Brunei only provides ATC services within its TMA which is under Kota Kinabalu FIR so ADS-B derived data is not considered for use for separation at this stage.

Agenda Item 5: Updating progress of South East Asia ADS-B study project by IATA and CANSO

5.1 CANSO and IATA informed the meeting that at the 3rd SEA ADS-B Sub-Regional ADS-B WG Meeting in July 08, CANSO and IATA were requested to conduct a cost benefit analysis for the SEA ADS-B project being undertaken by Indonesia, Vietnam and Singapore. In providing a status update, CANSO said that the study was being undertaken jointly with IATA with assistance from CANSO members, in particular the FAA which is helping in the analysis, and CAAS which is helping with the collection of operational and technical data. CANSO briefed the meeting on the objectives, scope and methodology of the study as well as the assumptions made. The study is currently in the data collection and analysis phase and the aim is to complete the study in time for the next ADS-B Study and Implementation Task Force Meeting. The meeting was requested to provide feedback on the assumptions.

5.2 The meeting asked IATA/CANSO to consider the following factors in preparation of the business case:

- ensure that full costs of ADS-B avionics and aircraft downtime are not attributed to ADS-B project since aircraft operate globally and most aircraft will be fitted during periods of heavy maintenance;
- do not necessarily assume that ADS-B will increase the number of required ATCOs. In particular ADS-B can reduce workload compared to procedural ATC;
- ensure that sunk costs are not included in the cost side;
- consider whether value of time to customers should be included; and
- consider the value of saved carbon emissions.

5.3 There followed considerable discussion regarding the attribution of ADS-B avionics equipment cost to one project. The meeting was reminded of the IATA position which stated that ANSP business cases should assume that IATA aircraft equipage costs are zero, in view of global operations. IATA noted that most aircraft operating within the proposed project area will be subject to the expected Hong Kong ADS-B mandate in 2013.

5.3.2 The meeting agreed that a one page concept of operations statement would be useful in the business case to adequately set the context.

5.3.3 This project is now to be considered in phases as indicated by CANSO. Whilst the business case is being finalised, the 3 individual states will need to develop separate project plans, data sharing and DCPC (VHF communication) site sharing plans. The earliest operational trial will be in approximately at the end of 2010 but depending on new ATC automation system capabilities in the states. Real tactical advantage is not expected till 2011 and it is envisaged that an ADS-B mandate for some flight levels could come into effect in 2013.

5.3.4 Discussion took place on the need to get regulators involved and on the need to get operational aspects decided and deployed. Avionics rules, technical & operational procedures and training will be critical.

Agenda Item 6: Review of sub-regional implementation plan

- Near-term implementation plan, including operational plan
- Harmonization of ADS-B regulations, rules and procedures

Australian ADS-B aircraft mandate

6.1 Australia informed the meeting that the Civil Aviation Safety Authority (CASA) will issue an ADS-B aircraft equipment mandate for flight in the upper airspace at and above FL290 for all aircraft operation in Australian territorial airspace with a compliance date of 12 December 2013. This is the first aircraft mandate for ADS-B carriage to be issued in Australia. It is applicable to both Australian and foreign aircraft when operating in Australia. It is intended that CASA will promulgate the rules in February 2009. The text of the mandate as it applies to Australian registered aircraft is placed in the **Appendix C** to this report.

6.1.1 IATA supported CASA's positive approach for equipage requirement for upper airspace to provide five years for the operators' preparation and compliance.

6.1.2 IATA also raised the concern on the issue of switching off transponders for non-compliance transmission of the ADS-B Out signal. So far, it is not possible to turn off the ADS-B transmission separately. It was clarified that the requirement to turn off ADS-B by turning off the transponder satisfies the rule. However it was acknowledged that this would be unlikely to be used because of ACAS considerations. The intent of the rule is to support future equipment designs.

6.1.3 The meeting considered necessary to harmonize the requirements between States. Australia informed the meeting coordination was carried out with USA, Canada and Europe. The approach could not be fully identical and the European AMC20-24 is useful baseline as discussed at the previous meeting of the working group.

Indonesia – Australia Project

6.2 Australia presented a strawman paper on a possible project to be considered by the meeting, to introduce data sharing between Australia and Indonesia with the objective of improving safety and efficiency at the FIR boundary.

6.2.1 It was made clear that this proposal has neither co-coordinated nor approved or discussed within Indonesia nor Australia. The proposal is attached at **Appendix D** to this Report.

6.2.2 The meeting strongly supported the proposed project. In particular IATA stated that if it is proceeded, it would be a significant step. CANSO also expressed its support to the proposal saying it would be a good step by step approach.

6.2.3 Indonesia and Australia agreed to seek support for this project within their own organisations and report to the next meeting of ADS-B Task Force on the outcome.

ADS-B collaborated Implementation Plan over South China Sea

6.3 The updates to the implementation project in the South China Sea area is presented by Singapore (WP05) and discussed under agenda item 4 and IP/10 presented by CANSO and IATA discussed under agenda item 5.

Harmonization of rule for equipage requirement

6.4 Australia provided an overview of the status of ADS-B avionics standards and their status worldwide including FAA, Canada, Europe and Australia. The difficulties in adopting a single standard applicable at same time were outlined.

6.4.1 The difficulties included:

- the different timelines in Europe & USA;
- the different objectives in different regions (near term Enroute, future TMA and surface operations and air-sir operations);
- the messages from airlines wishing to minimise the number of upgrades, wanting benefits now, but wanting to delay upgrades; and
- the fact that Europe & USA had not stabilised on DO260A Change x (or perhaps even DO260B)

6.4.2 For Asia Pacific the meeting agreed that the main focus was delivery of 5 Nm separation standards in the Enroute environment in the near term. It was accepted that the need for post 2020 included DO260A or later versions and also improved GPS performance.

6.4.3 The meeting considered some alternatives for Asia Pacific including:

- adoption of the proposed Australian rule but noted that this was not accepted in USA, Europe nor Canada;
- adoption of AMC20-24 but noting that this does not include a requirement for SA awareness nor Fault Detection & Exclusion (FDE);
- adoption of the proposed Australian rule including acceptance of AMC20-24 as one means of gaining approval of an aircraft ADS-B equipment configuration (Australia's CASA yet to confirm this as acceptable – but this approval was considered likely); and
- to require SA awareness or not.

6.4.4 Singapore Airlines spoke of difficulties in getting AMC20-24 approval from aircraft manufacturers – even for those already approved to receive ADS-B services in Australia. It was agreed that the source of these difficulties needed to be resolved because one expectation of AMC20-24 was to approve those aircraft that used HPL to generate DO260 NUC. Singapore airlines warned of the risk that if the rules were too stringent then airlines would simply not be compliant and would not be able to bring the efficiencies and safety improvements envisaged.

6.4.5 Australia volunteered to prepare a paper for the ADS-B Task Force Meeting to outline the issues and to compare the options.

6.4.6 IATA offered to prepare a paper for the next ADS-B Study and Implementation Task Force meeting in May 2009 on their preferred avionics equipment standard for APAC Region.

List of Action items and tasks

6.5 As a result of brainstorm discussion, the meeting developed a list of action items and tasks for members to take follow-up actions after the meeting. The list of action items and tasks is provided in the **Appendix E** to this report.

Agenda Item 7: Any Other Business

7.1. The meeting expressed its appreciation and gratitude to the Airservices Australia for hosting the meeting, the visit to the Melbourne ATM centre observing operation of ADS-B surveillance service, hospitality and the support provided.

7.2 The meeting consider it necessary to invite more participants from the aircraft regulatory authorities of SEA states to support developing the harmonized equipage requirements. Therefore, the meeting suggested highlighting this in the letter of invitation letter for the next ADS-B Study and Implementation Task Force meeting to be held in May 2009.

ATMnet Update

7.3 SITA provided an update to the proposed Air Traffic Management IPVPN community network. SITA highlighted the operational benefits of subscribing to ATMnet allowing States to implement data sharing between FIRs. There are several advantages in establishing this ATMnet such as by having an harmonised implementation for all States with a common platform for sharing ADS-B data across boundaries areas. The ATMnet will operate in a private and fully redundant environment, managed and secured with restricted IP access to a community of users. SITA also briefly explained the type of price components for the ATMnet subscription. States will first need to agree to share data and sign off the data sharing agreement between States. Once the agreement is in place and State has decided what ADS-B information to be sent, they can then subscribe to ATMnet to implement data sharing. SITA recognised the benefits that can be derived from ADS-B implementation and demonstrated its readiness to implement ATMnet as part of its service to ATI industry.

7.4 The representative from Thales provided an introduction to the FAA's programme on the Surveillance Broadcast Service System (SBSS) which is part of the US next generation air traffic control system. The objective, scope, service and applications and the implementation status and time frame of the programme were introduced.

Agenda Item 8: Time and Venue of Next Meeting

8.1 The meeting identified the need to organize another meeting to progress the sub-regional plan. The meeting discussed the possible date in November 2009. Indonesia expressed that if no offer by other member States of the working group, Indonesia would like to host next meeting. The exact date and venue of the next meeting will be further coordinated and the members of the working group will be informed in due course.

8.2 The meeting appreciated the offer by Viet Nam for hosting the eighth meeting of ADS-B Study and Implementation Task Force and ADS-B Seminar in Ha Noi from 18 to 22 May 2009.

EXTRACT FROM REPORT OF APANPIRG/19 (1 - 5 SEPTEMBER 2008) ON ADS-B

Surveillance Systems

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

3.4.56 The meeting noted the outcome of the Seventh Meeting of ADS-B Study and Implementation Task Force. An ADS-B Seminar and the Seventh Meeting of Automatic Dependent Surveillance – Broadcast (ADS-B) Study and Implementation Task Force (ADS-B SITF/7), both hosted by ATMB China, were held in Chengdu, China from 7 to 11 April 2008.

3.4.57 The objective of the ADS-B Seminar was to provide information to the participants on ADS-B planning and implementation. The Seminar covered a list of topics on the ADS-B implementation and was well received by the participants.

3.4.58 In accordance with the subject/tasks list adopted by APANPIRG/18, the ADS-B SITF/7 had completed the following tasks.

- The Guidance Material on Reporting Probability of ADS-B update;
- Guidance Material on Reporting ADS-B Avionics fitment;
- The Guidance Material on Security issues associated with ADS-B;
- The Guidance Material on the performance criteria for multi-sensor fusion;
- The Guidelines for the development of implementation plan by States; and
- A sample Agreement for ADS-B Data Sharing.

3.4.59 The meeting noted that the ADS-B Study and Implantation Task Force had proposed replacement of “ADS” reference in PANS ATM Doc 4444, Appendix 2 Flight Planning and Surveillance Equipment in the Item 10 with ‘ADS-C’. The proposal was forwarded to the ICAO headquarters for further consideration.

Using ADS-B surveillance service in the North Asia area

3.4.66. A proposal from IATA for the installation of minimum 8 ADS-B ground stations and significant data communication infrastructure to improve surveillance and ATM service covering three major ATS routes in the North Asia area was noted by the meeting.

Examine the feasibility of using ADS-B derived data for height monitoring

3.4.67. The ADS-B SITF/7 meeting reviewed the analysis of the alternative solution of using ADS-B for height monitoring for RVSM operation. The meeting confirmed that ADS-B reports both Mode C barometric altitude and GNSS Geometric height and thus it is a suitable candidate for providing data for RVSM height monitoring. However, a number of limitations on the quality and accuracy of the available data exist. The meeting also expressed concerns regarding the limited resources and expertise on the subject of RVSM within the group. Some experts from Industry indicated that they would further investigate as to how ADS-B derived data could be processed and used for height monitoring. The meeting noted the result of the initial study as shown in **Appendix K** to the Report on Agenda Item 3.4. The issue was further

discussed by the CNS/MET Sub group meeting and the need for further study by technical experts in the field was noted.

Update of ICAO Panels on ADS-B Related issues

3.4.68. The meeting noted that the amendments to PANS-ATM including ADS-B based separation became applicable on 22 November 2007. The Aeronautical Surveillance Panel (ASP) has developed SARPs and supporting technical specifications for a new version of extended squitter messages (named as Version 1) in support of ADS-B, which has also become applicable on 22 November 2007 as part of Amendment 82 to Annex 10. Technical details and Mode S/extended squitter register definitions that were shown in an Appendix of Annex 10, Volume III, have been relocated to a new technical manual (Doc 9871 - Technical Provisions for Mode S Services and Extended Squitter).

3.4.69. The meeting agreed with the Subject/Tasks List updated by the ADS-B SITF and adopted the following Decision.

Decision 19/33 - 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 L** to the Report on Agenda Item 3.4 be adopted.

Guidance Materials for Implementation of ADS-B

3.4.70. The meeting reviewed several guidance materials for implementation of ADS-B in the Region developed by the ADS-B Study and Implementation Task Force and adopted the following Conclusion:

Conclusion 19/34 – Guidance Materials on Implementation of ADS-B

That, the following Guidance Materials on the implementation of ADS-B Out Services be adopted for use by States in the Asia and Pacific Regions:

- Reporting Probability of ADS-B update as shown in **Appendix M**;
- Reporting ADS-B Avionics fitment as shown in **Appendix N**;
- the performance criteria for multi-sensor fusion as shown in the **Appendix O**.

Advisory Material on ADS-B Security

3.4.71. The meeting noted that the ADS-B Study and Implementation Task Force discussed and agreed that the security threats had to be kept in perspective and that today's systems like VHF communication, CPDLC/ADS-C and Nav aids are also subject to similar threats. In addition aviation security and safety benefits from ADS-B had to be weighed against risks. Suitable mitigators were required against the risks depending on the likelihood and consequence of the identified risks.

3.4.72. The meeting noted that legislation and enforcement of legislation was an important part of reducing risk exercises for all these technologies and that CNS/MET SG/12 endorsed the advisory material on security issues associated with ADS-B as shown in the *Appendix C2* to the Report of ADS-B SITF/7 and recommended to publish it in the restricted page on the ICAO APAC Website. A delegate from USA at CNS/MET SG/12 Meeting identified some shortcomings in the material and agreed to provide written comments to the Secretariat for further consideration by the ADS-B Study and Implementation Task Force at its next meeting.

Guidelines for the development of Implementation Plan

3.4.73. Considering that the guidelines developed by the South East Asia (SEA) ADS-B working group would be useful for other States in developing similar sub-regional or national implementation plans, the meeting adopted the following Conclusion.

Conclusion 19/35- Guidelines for the development of ADS-B Implementation Plan

That, States be advised to use the following guidelines for the development of ADS-B implementation plan.

- a) minimize capital and operating costs of ADS-B data facilities;
- b) give priority to provide coverage over major traffic flows;
- c) provide ADS-B coverage in areas within 150 NM from FIR boundaries;
- d) suitable sites with power, shelter, access routes and data communication links shall be preferred; and
- e) overlapping of ADS-B coverage is preferred.

Sample Agreement for ADS-B Data Sharing

3.4.74. The meeting reviewed and endorsed the sample agreement for ADS-B Data Sharing and Cost Apportionment developed by the SEA ADS-B working group and comments on the same by the ADS-B SITF. Accordingly, the meeting adopted the following Conclusion.

Conclusion 19/36 – Sample Agreement for ADS-B Data Sharing

That, the sample Agreement for ADS-B Data Sharing and the Cost Apportionment framework provided in the **Appendices P and Q** respectively to the Report on Agenda Item 3.4 be adopted as the regional guidance material.

Requirements for ADS-B Out Avionics

3.4.75. The meeting noted that at CNS/MET SG/12 meeting, IATA proposed a draft Conclusion regarding ADS-B OUT Avionics Equipage Requirements to supersede APANPIRG Conclusion 18/35. It was recalled that APANPIRG/18 had identified the need and benefits of a mandate for aircraft to be equipped with ADS-B OUT. There was a need for early and clear indications to avionics vendors, airframe OEMs, ANSPs, airlines, operators and regulators regarding the future of ADS-B.

3.4.76. IATA stated that there is some confusion about the intent of the conclusion 18/35 with regard to whether the target date meant publication by 2010 or compliance by 2010. The meeting noted that irrespective of the viewpoint, it is now too late to reasonably expect airlines to comply with an equipage mandate by 2010. It was therefore recommended that with many states progressing with their plans to implement ADS-B surveillance, it is vital that some guidelines on the issue of equipage mandate be finalized without delay to ensure that the operational benefits from ADS-B are realized.

3.4.77. The meeting also took into account the comments from ATM/AIS/SAR Sub-group on the proposal from IATA in relation to Conclusion 18/35 that only one State in the Region had mandated ADS-B out. They also noted that due to the requirement of aircraft equipage, especially due to the retrofit requirements, compliance with this mandate was not achievable in the Region by 2010. As such the word “mandate” may no longer be appropriate given that compliance would not be possible in the short time frame specified. Therefore, ATM/AIS/SAR/SG/18 recommended that the CNS/MET Sub-Group review the use of the word “mandate” with the objective of raising a replacement Conclusion for consideration by APANPIRG/19.

3.4.78. However, in their working paper presented to CNS/MET SG/12, IATA still supported the term “Mandate” as being appropriate as originally agreed by APANPIRG/18, but with revised target dates. In view of the foregoing, the meeting adopted the following Conclusion to supersede the APANPIRG Conclusion 18/35.

Conclusion 19/37 –Revised Mandate Regional ADS-B Out Implementation

States intending to implement ADS-B based surveillance service, be urged to

- a) determine ADS-B OUT equipage mandates based upon the ability to provide ADS-B OUT separation services;
- b) expedite the implementation of ADS-B OUT in accordance with the Regional Air Navigation Plan and the provision of separation services based on ADS-B OUT;
- c) publish their equipage mandates as soon as possible, with a target publication date of no later than 2010 so that operators can plan ahead their forward purchasing and retrofit; and

- d) choose a date after mid 2012 on which the ADS-B out equipage mandate will become effective in airspace served by ADS-B ground stations with sufficient transition period to enable fleet equipage.

Note: The implementation would require aircraft equipped with avionics compliant with either;

1) *Version 0 ES as specified in Annex 10, Volume IV, Chapter 3, Paragraph 3.1.2.8.6 (up to and including Amendment 82 to Annex 10) and Chapter 2 of the Technical Provisions for Mode S Services and Extended Squitter (ICAO Doc 9871) (Equivalent to DO260) to be used till at least 2020.*

Or

2) *Version 1 ES as specified in Chapter 3 of the Technical Provisions for Mode S Services and Extended Squitter (ICAO Doc 9871) (Equivalent to DO260A)*

Outcome of South East Asia ADS-B Working Group/3 Meeting

3.4.79. The meeting noted that the South East Asia ADS-B Working Group established by APANIRG/18 met three times:

- 1st meeting was held on 15 and 16 November 2007 in Singapore;
- 2nd meeting was held from 27 to 29 February 2008 in Bali, Indonesia; and
- 3rd meeting was held on 2 and 3 July 2008 in Putrajaya, Malaysia.

3.4.80. The working group has progressed on following agreed tasks:

- agreed to the Term of Reference of the SEA ADS-B Working Group at the 1st meeting and revised at the 3rd meeting;
- developed the cost apportionment framework for ADS-B Ground Stations and ADS-B Surveillance Data Sharing;
- agreed guidelines to be used for the development of implementation plan;
- developed a sample agreement for ADS-B Data Sharing;
- agreed upon a SEA ADS-B project which outlines implementation issues to be undertaken by IATA and CANSO for the sub-region;
- Phase I –SEA ADS-B Implementation Plan (data sharing among Indonesia, Singapore and Viet Nam) be further enhanced at subsequent meetings; and
- AMC20-24 with proposed changes serves as baseline document for further consideration by ADS-B SITF and CNS/MET Sub-group of APANAPIRG.

3.4.81. The working group recognized that to enable radar like separation, ADS-B based surveillance service must be complemented by the Direct Controller Pilot Communication (DCPC) such as VHF radio voice communication. Without supporting communication infrastructure, the ADS-B based surveillance will provide minimal operational benefits to the air space users. In view of the foregoing, the meeting adopted the following Conclusion.

Conclusion 19/38 - Support provision of VHF radio voice communication associated with ADS-B data sharing between adjacent States

That, States be urged to consider following regional policy on supporting 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 the States to provide VHF radio voice communication services for use by adjacent States.

It is therefore recommended that States capable to do so support provision of VHF radio voice communication services to adjacent States when this is required to support the delivery of ADS-B based separation services. Cost of such service provision shall be agreed between the States concerned.”

Note of appreciation

3.4.82. The meeting appreciated the efforts and progress made by the ADS-B SITF and the SEA ADS-B WG. The meeting expressed its appreciation and gratitude to the Air Traffic Management Bureau and the Civil Aviation Administration of China for hosting the ADS-B Seminar and ADS-B SITF/7 meeting. The meeting also expressed appreciation to Singapore, Indonesia and Malaysia for hosting the meetings of the SEA ADS-B Working Group.

Time and Venue of Next Meeting

3.4.83. The South East Asia ADS-B Study and Implementation Task Force Working Group meeting is scheduled to be held in the end of 2008 or early 2009 and the next meeting of ADS-B Study and Implementation Task Force is scheduled for April 2009.

Regional Surveillance Strategy for Asia/Pacific Region

3.4.84. The meeting reviewed the surveillance strategy for Asia and Pacific Regions adopted by APANPIRG/18. The meeting noted that the strategy was considered as living document which is regularly updated based on the developments. The meeting noted that the amended strategy had been proposed by an ad hoc working group and endorsed by the CNS/MET SG/12. In view of the foregoing, the meeting adopted a Conclusion as follows.

Conclusion 19/39 – Regional Surveillance Strategy for Asia/Pacific Region

That, the revised Regional Surveillance Strategy for Asia/Pacific Region provided in the **Appendix R** to the Report on Agenda Item 3.4 be adopted.

Multilateration Systems

3.4.85. The meeting noted that Malaysia has introduced the Multilateration (MLAT) at Kuala Lumpur International Airport (KLIA) to supplement the Surface Movement Radar (SMR). MLAT system is able to provide complete coverage of the runways, taxiways/taxi lanes and aprons and also airspace coverage up to 25 NM.

3.4.86. The meeting was informed of the process that would be used by the Civil Aviation Authority New Zealand to certify two proposed multilateration systems. One system would be used to support low visibility operations at Auckland International Airport, and would be certified primarily against EUROCAE ED-117, MOPS for Mode S Multilateration Systems for use in the Advanced Surface Movement Guidance and Control Systems (A-SMGCS). The second system would provide wide area coverage around Queenstown, and it was intended to use the forthcoming EUROCAE ED-142 as the base operational standard. Other certification standards would include Annex 10 SARPs for SSR and ICAO guidance material on SSR and A-SMGCS. The certification would also depend upon the provision of a detailed safety case and development of specific operational and technical procedures, together with evidence of appropriate training and satisfactory acceptance testing and commissioning.

3.4.87. The meeting noted that ICAO headquarters has also worked on the standard based on the EUROCAE for the multilateration standard.

USA ADS-B Update

3.4.88. The United States informed the meeting that the Federal Aviation Administration (FAA) has awarded a national contract to provide Automatic Dependent Surveillance – Broadcast (ADS-B) services. ADS-B technology has been identified as the surveillance solution that can meet these needs by providing critical flight information simultaneously to pilots and air traffic controllers.

The U.S. ADS-B program is deploying communications, weather, and ADS-B stations on oil platforms in the Gulf of Mexico since 1998. The United States wishes to identify the equipped airframes in preparation for an ADS-B service in the Gulf of Mexico.

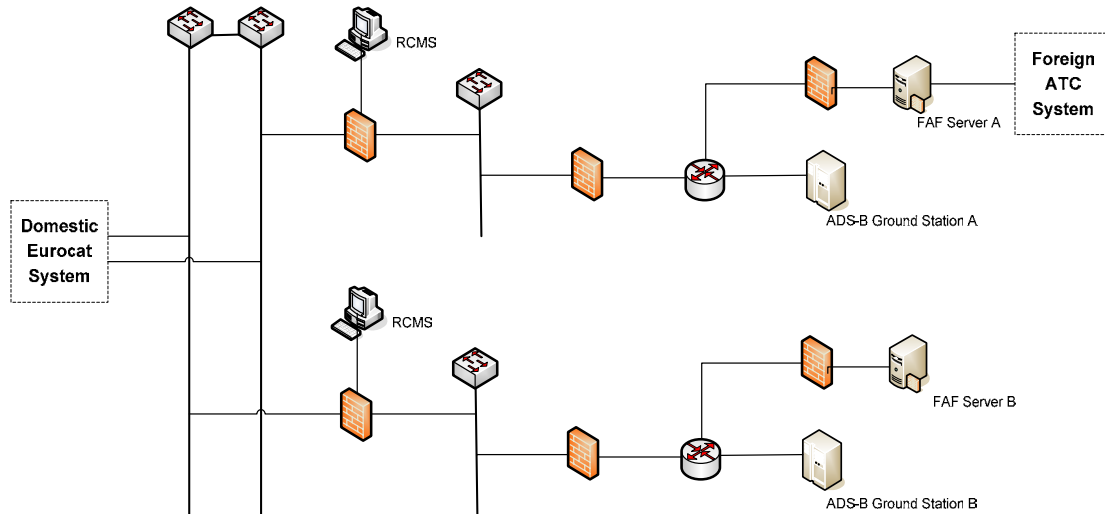
3.4.89. At the first meeting of the GREPECAS ATM/CNS Sub-group – CNS Committee, Surveillance Task Force in June 2007, several member States in the CAR/SAM region expressed an interest in conducting an ADS-B partnership effort in the region. To determine the feasibility of using ADS-B as a surveillance tool in the CAR/SAM, which includes E-CAR, it was considered necessary to understand the performance gaps that could be mitigated and benefits possible with improved Surveillance and Broadcast Services. The United States sees benefits from future use of ADS-B and is ready to participate with States by providing ADS-B surveillance service including technical, programmatic and contract management support for procuring surveillance services.

ADS-B Programme in New Caledonia

3.4.90. The meeting was informed that France has been involved in study and implementation of ADS-B technology for many years and has started the deployment of ADS-B ground stations in Corsica and La Réunion Islands since 2007. A decision to implement the ground stations in New Caledonia was made in 2007. Two ground stations will be implemented before the end of 2008: one for Tontouta airport to support the international traffic and the other for Magenta airport for the domestic traffic. A third ground station will be installed by March 2009 to improve the coverage on the South East coast. Along with the above timelines, the ADS-B controller position display should be available in the two ATC sites at Tontouta and Magenta airports by mid 2009. The three ADS-B ground stations should be technically operational in the 3rd quarter of 2009.

FOREIGN ADS-B FILTER

1.1 The FAF is to be installed between the domestic ADS-B network and foreign ADS-B networks as shown below :



1.2 The FAF provides the following functions :

- Acts as a filter to ensure that only data agreed to be shared is passed between FIRs. Filter behaviour is defined in offline tables. It may also perform geographical filtering eg: remove data from areas that are sensitive or restrict sharing to within 200Nm of the boundary etc.
- Performs security and validity checks on network information and ADS-B data to satisfy the requirements of the two different FIRs/ ANSPs. Data is rejected if mandatory fields are not present or data does not meet expectations.
- Acts as a gateway between domestic and foreign ATC systems by performing network address translation and data format adaptation according to the characteristics of the two systems to make sure little change is needed to the core ATC systems or networks.
 - For example, Australian Asterix Cat21 data includes two extra fields beyond that defined in the standard. These extra fields will be stripped to allow transmission in the Asia Pacific standard (Asterix Cat21 version 0.23) to any adjacent FIR.
- Performs functions normally performed by the Australian ADS-B ground stations, which may not necessarily be performed by a foreign FIR. Eg: 24 bit code filtering.
- Allows adaptation to changes in data sharing agreements without incurring costs of changes to the ATC automation system.
- Provides logging and integrates with a SNMP based Remote Monitoring and Control System to support alerts to users.

4 BENEFITS

4.1 Short Term

In general, it provides the technical platform to support flexibility in cross FIR boundary data sharing:

- Adapts external ADS-B data flows to the ADS-B network used in Australia.
- Easily integrated into the Eurocat system or other ATC systems
- Allows for flexibility to cope with changes to data sharing agreements – tailored for each adjacent FIR
- Allows filtering of sensitive categories of aircraft, airspace etc.

4.2 Strategic

- FAF supports data sharing – and data sharing enhances surveillance cross-boundary ATC safety & efficiency.

ANNEX A: FUNCTIONAL REQUIREMENT SUMMARY

Capacity

FAF is able to support 100 ADS-B sites and 10 ATC systems at the same time.

Data Formats

- Eurocat Asterix Category 21 supported
- Monitoring message (SNMP) supported

Update Rate

- Decided by the agreement bilaterally between two parties

Latency

- A data throughput delay less than 100 mS

Network

- Supports connection between foreign and domestic ADS-B data communication networks based on a mutually-agreed basis between ANSPs of adjoining member States/ ADS-B data service providers.
- Supports multicast (preferred) and point-point TCP/IP for the interface.
- FAF appears to the network as a “pseudo” ADS-B ground station(s)

Safety

- Firewall
- Valid user register information
- Network parameters filter before connection
- Data content filter after connection

Maintenance

- Exception display on screen
- Remote access to log files
- Monitoring service from RCMS
- Offline Configuration to tailor system for remote sites & networks
- Document for technical and operational support

Further improvements

Further development or changes shall be decided by the agreement or contract between two parties.

ANNEX B : SYSTEM REQUIREMENT

Hardware Minimum Requirement

- Pentium IV 2.4GHz/800MHz FSB
- 256MB 333MHz DDR SDRAM memory
- 40GB Hard Drive

Operating System

The operating system shall be Mandrake 10.2 Linux (Mandriva 2005), kernel version 2.6.11-6.

Interface Specification

- Physical Layer
Physically the interface shall comply with the IEEE 802.3 ethernet 100BaseTX (preferred) or 10BaseT terminated onto an RJ-45 patch port.
- Network Layer
The network layer is implemented using the Internet Protocol (IP) and the network shall support Internet Control Message Protocol (ICMP) level 0, 1 and 2.
- Transport Layer
In the transport layer, the protocols UDP and TCP are available. The application use the transport protocols al follows:
UDP: Asterix and SNMP messages.
TCP: Telnet sessions or File transfers FTP (Eg. for Software upload).

Civil Aviation Order 20.18 Amendment Order (No. 1) 2009

1 Name of instrument

This instrument is the *Civil Aviation Order 20.18 Amendment Order (No. 1) 2009*.

2 Commencement

This instrument commences on the day after it is registered.

3 Amendment of Civil Aviation Order 20.18

Schedule 1 amends Civil Aviation Order 20.18.

Schedule 1 Amendment

[1] Subsection 9B

substitute

9B Directions relating to carriage and use of automatic dependent surveillance – broadcast equipment

9B.1 This subsection applies to aircraft engaged in private, aerial work, charter or regular public transport operations.

9B.2 In this subsection and Appendix XI:

ADS-B means automatic dependent surveillance – broadcast.

ADS-B test flight means a flight to prove ADS-B transmitting equipment that is newly installed on the aircraft undertaking the flight.

aircraft address means a unique combination of 24 bits assigned to an aircraft by CASA or by a relevant RAAO for the purpose of air to ground communications, navigation and surveillance.

approved equipment configuration means an equipment configuration that:

- (a) meets the conditions for approval set out in Appendix XI; or
- (b) is approved in writing by CASA.

Note Equipment configurations approved by CASA are published in Appendix D of Advisory Circular 21-45.

ATSO means Australian Technical Standard Order of CASA.

EASA means the European Aviation Safety Agency.

ETSO means European Technical Standard Order of the EASA.

FAA means the Federal Aviation Administration of the United States.

FL 290 means flight level 290.

Note Flight level 290 is defined in subregulation 2 (1) of CAR 1988.

RAAO means a recreational aviation administration organisation that is recognised by CASA.

TSO means Technical Standard Order of the FAA.

9B.3 If an aircraft carries ADS-B transmitting equipment for operational use in Australian territory, the equipment must comply with an approved equipment configuration.

- 9B.4 If an aircraft carries ADS-B transmitting equipment for operational use in Australian territory, the equipment must transmit:
- (a) a flight identification that corresponds exactly to the aircraft identification mentioned on the flight notification filed with air traffic control (*ATC*) for the flight; or
 - (b) if no flight notification is filed for the flight — a flight identification that is:
 - (i) for an aircraft registered on the Australian Civil Aircraft Register and operating wholly within Australian territory — the aircraft's registration mark; or
 - (ii) for an Australian aircraft registered by a RAAO — in accordance with the organisation's operations manual; or
 - (c) another flight identification directed or approved by ATC.
- 9B.5 If an aircraft carries ADS-B transmitting equipment that complies with an approved equipment configuration, the equipment must be operated continuously during the flight in all airspace at all altitudes unless the pilot is directed or approved otherwise by ATC.
- 9B.6 If an aircraft carries ADS-B transmitting equipment which does not comply with an approved equipment configuration, the equipment must be deactivated before the aircraft flies in Australian territory.
- 9B.7 However, the equipment need not be deactivated as mentioned in paragraph 9B.6 if the aircraft is undertaking an ADS-B test flight in VMC in airspace below FL 290.
- 9B.8 On and after 12 December 2013, if an aircraft operates at or above FL 290, it must carry serviceable ADS-B transmitting equipment that complies with an approved equipment configuration.
- Note* On and after 12 December 2013, an aircraft must carry and continuously operate compliant ADS-B transmitting equipment in accordance with paragraph 9B.8.
- Apart from this, there is no obligation to carry compliant ADS-B transmitting equipment.
- However, including the effect of subsection 9B.5 above, if compliant ADS-B transmitting equipment is in fact carried, whether voluntarily or in accordance with the obligation under 9B.8, it must be operated continuously in all airspace, at all altitudes.
- 9B.9 Paragraph 9B.8 does not apply to an aircraft if the aircraft owner, operator or pilot has written authorisation from CASA for the operation of the aircraft without the equipment.

[2] Appendix XI

substitute

Appendix XI

Approved equipment configuration — conditions for approval

- 1 An equipment configuration is approved only if it meets all of the conditions set out in this Appendix.
- 2 It is a condition of approval that the ADS-B transmitting equipment must be of a type that is:
 - (a) authorised:
 - (i) by the FAA in accordance with TSO-C166 as in force on 20 September 2004 or TSO-C166a a later version as in force from time to time on 21 December 2006; or
 - (ii) by CASA in accordance with ATSO-C1004 as in force on 2 October 2003 or a later version as in force from time to time; or

- (iii) by CASA in accordance with ATSO-C1005 as in force on 22 December 2004 or a later version as in force from time to time; or
 - (b) otherwise authorised by CASA for this purpose.
- 3 It is a condition of approval that, on and after 28 June 2012, the geographical position transmitted by the ADS-B transmitting equipment must be determined by:
 - (a) a GNSS receiver of a type that is authorised by the FAA in accordance with one of the following:
 - (A) TSO-C145a as in force on 19 September 2002;
 - (B) TSO-C146a as in force on 19 September 2002;
 - (C) TSO-C145b as in force on 5 March 2007;
 - (D) TSO-C146b as in force on 5 March 2007;
 - (E) TSO-C145c as in force on 2 May 2008;
 - (F) TSO-C146c as in force on 9 May 2008; TSO-C145a or TSO-C146a as in force on 19 September 2002 or a later version as in force from time to time; or
 - (b) another system authorised by CASA for this purpose.
- 4 It is a condition of approval that the pressure altitude transmitted by the ADS-B transmitting equipment must be determined by:
 - (a) a barometric encoder of a type that is authorised by :
 - (i) the FAA in accordance with TSO-C88a as in force on 18 August 1983 or TSO-C88ba later version as in force from time to time on 6 February 2007; or
 - (ii) the EASA in accordance with ETSO-C88a as in force on 24 October 2003 or a later version as in force from time to time; or
 - (b) another system authorised by CASA for this purpose.
- 5 It is a condition of approval that, unless otherwise approved in writing by CASA, the ADS-B transmitting equipment must:
 - (a) allow the pilot to activate and deactivate it during flight; and
 - (b) transmit the current aircraft address.

Note The requirement in paragraph 5 (a) is met if the ADS-B transmitting equipment has a cockpit control that enables the pilot to turn the ADS-B transmissions on and off.

PROPOSED PROJECT – AUSTRALIA-INDONESIA

1 Context

Australia and Indonesia have ADS-B programs and have both deployed some ADS-B ground stations. Both states are wishing to improve safety and efficiency for flights crossing the boundaries between their respective FIRs.

2 Operational Concept & Scope

An operational deployment of ADS-B cross FIR boundary data sharing is proposed to be deployed in a step by step manner as follows :

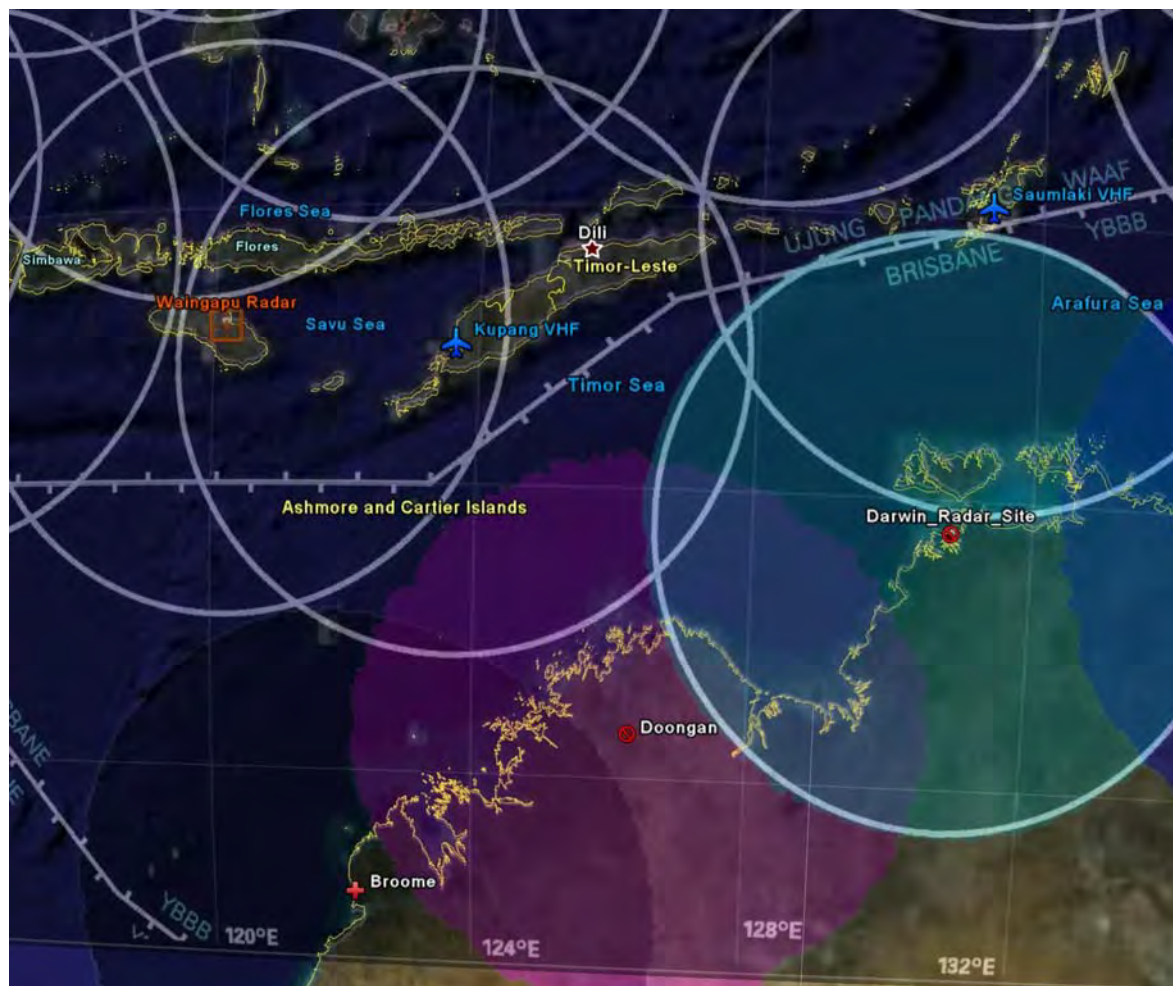
Phase 1 - Commence with initial ADS-B data transfer to/from Australia and Indonesia to support increased safety, situational awareness, automatic flight plan updating and safety nets. This is identical to the way in which Australia uses ADS-B today.

Subject to each state's development and delivery of appropriate regulations, policies, and technical and operational training, expected project outcomes would be :

- reduced numbers of safety incidents at the FIR boundary
- earlier detection of ATC and pilot errors (co-ordination errors, incorrect Flight level etc)
- increased support and confidence in data sharing to allow introduction of radar-like separation at the FIR boundary in a future phase.
- technical & operational analysis of data in preparation for future application of radar like separation services
-

This phase could commence operations before all the infrastructure for radar-like separation at the boundary is considered. This phase could include :

- **Phase 1 A** : Data sharing from existing ADS-B sites
 - o Thursday Island
 - o Gove
 - o Merauke
 - o Saumlaki



Phase 2 - This phase could transition to full radar-like separation when both parties have in place suitable ATC infrastructure such as :

- ❖ duplicated data communication capability
- ❖ DCPC for both parties at the boundary
- ❖ revised boundary separation standards and MOUs
- ❖ Policies, regulations and extensive training

3 Schedule

The following schedule milestone are proposed for Phase 1A :

Complete data sharing agreement : September 2009

Parties send data for Phase 1A (3 sites each) : February 2010

NOTAM/AIC publication : April 2010

Operational use : May 2010

4 Business Case concept

Phase 1 A is justified on safety grounds and for strategic reasons – and to create the environment for a more comprehensive ADS-B separation service.

Australia is already committed to installation of these ADS-B ground stations and their long term maintenance to support Australia's domestic needs. Therefore there are no additional ground station costs for this proposal.

Likewise, Indonesia is already committed to installation of these ADS-B ground stations to support Indonesia's domestic needs.

Aircraft will need to be fitted to support the Australian proposed mandate in 2013 – and before that benefits will be provided to aircraft that choose to equip.

Costs will include :

- Establish & maintain a two way data link between Ujung Pandang and Brisbane
- Project management
- Legal and other costs to establish the Data sharing agreement
- Incremental procedure development

Phase 1B could follow in 2011 if Phase 1A is successful

**LIST OF ACTION ITEMS AND TASK LIST
ARISING FROM THE MEETING**

	Action	Taken by	Due date
1	Prepare a paper on the plans for and status of ADS-B data sharing between Indonesia-Malaysia	Malaysia	ADS-B Task Force Meeting – 18 May 2009
2	Prepare a paper on the experience of using the ADS-B data sharing template and make any recommendations for change of the data sharing template.	Singapore & Indonesia	ADS-B Task Force Meeting – 18 May 2009
3	Identify the reasons for non compliance of some aircraft to AMC 20-24 when already approved for operations in Australia	Aric Oh (Singapore Airlines)	By email before ADS-B Task Force Meeting – 18 May 2009
4	Prepare a paper on the “state of play” of development of ADS-B avionics regulations explaining differences between regions, states	Australia	ADS-B Task Force Meeting – 18 May 2009
5	Prepare a paper on the status of the proposed Indonesia-Australia project	Australia & Indonesia	ADS-B Task Force Meeting – 18 May 2009
6	Complete the business case on the South China Sea project including a 1 page Con Ops	IATA/CANSO	ADS-B Task Force Meeting – 18 May 2009
7	Consider a side meeting for regulators to discuss the status of avionics standards and rulemaking at the ADS-B Task Force	ADS-B TF Chairman & ICAO Secretariat	ADS-B Task Force Meeting – 18 May 2009
8	Prepare a proposal on avionics equipage acceptable to IATA members relevant to Asia Pacific objectives	IATA	ADS-B Task Force Meeting – 18 May 2009

**FOURTH MEETING OF THE SOUTHEAST ASIA
SUB-REGIONAL ADS-B IMPLEMENTATION
WORKING GROUP (SEA ADS-B WG/4)**

Melbourne, Australia, 9-10 February 2009

Attachment 1 to the Report

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International Civil Aviation Organization

**FOURTH MEETING OF THE SOUTHEAST ASIA
SUB-REGIONAL ADS-B IMPLEMENTATION
WORKING GROUP (SEA ADS-B WG/4)**



Melbourne, Australia, 9 – 10 February 2009

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4	3	Review of Terms of Reference of the SEA ADS-B Working Group	Secretariat
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11	4	ADS-B Program in Indonesia	Indonesia
12	7	ATM net update	SITA
