



*International Civil Aviation Organization*

**AUTOMATIC DEPENDENT SURVEILLANCE –  
BROADCAST SEMINAR AND TWELFTH MEETING  
OF AUTOMATIC DEPENDENT SURVEILLANCE –  
BROADCAST (ADS-B) STUDY AND  
IMPLEMENTATION TASK FORCE (ADS-B SITF/12)**



Kolkata, India, 15-18 April 2013

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**Agenda Item 7: Development of Asia/Pacific Regional ADS-B implementation plan and sub-regional ADS-B implementation plan**

**REPORT OF CANSO FOCUS GROUP MEETINGS**

(Presented by CANSO)

**SUMMARY**

This paper presents outcome of focus group meetings for the Bay of Bengal and South China Sea.

**1. Background**

1.1 At ADS-B SITF/11 meeting in April 2012, CANSO proposed to facilitate a two day focus group meeting in Singapore in July 12 for the relevant parties to focus on specific project deliverables and milestones using the framework/model developed for the initial phase of the South China Sea project. The focus group meeting could comprise India, Myanmar, Maldives and Sri Lanka for the Bay of Bengal and the Indian Ocean; and Singapore, Philippines and Brunei for the eastern part of the South China Sea.

**2. Outcome**

Bay of Bengal

2.1 Arising from the above mentioned proposal, two meetings were held in Singapore. The first on meeting from 3-4 July 12 involved India and Myanmar with facilitation by CANSO, IATA and CAAS. At the meeting, India and Myanmar in-principle agreed to share ADS-B data and VHF facilities from the following sites:

From Myanmar to India

- (i) Sittwe
- (ii) Coco Island

From India to Myanmar

- (i) Agartala
- (ii) Port Blair

2.2 Under this ADS-B data sharing arrangement, India and Myanmar would have end-to-end surveillance coverage on M770 and associated routes (Note that there is radar coverage at Calcutta and Myeik). Myanmar would have backup surveillance at the Southwestern part and Northwestern part of Yangon FIR. The Surveillance coverage of both States would also be enhanced as the ADS-B stations at the adjacent State would be able to receive ADS-B reports from aircraft flying at lower altitude, which may be beyond the line of sight of their own surveillance sources.

2.3 The plan is to sign data sharing agreement and to issue a NOTAM/AIC for ADS-B mandate by 1H 2013 to be effective from 1H 2015. India and Myanmar have since met at the sidelines of the APANPIRG meeting in Bangkok in September 12 to discuss the ADS-B data sharing agreement. The Record of Discussion less the appendices is at **Annex 1**.

#### South China Sea

2.4 A second meeting facilitated by CANSO was held on 19 July 12 involving the Philippines and Singapore for the eastern part of the South China Sea. Brunei unfortunately was unable to attend the meeting. Under this proposal, ADS-B stations at Quezon-Palawan and Brunei would provide surveillance for the two trunk routes in the eastern part of the South China Sea viz N884 and M767.

2.5 The meeting agreed on the installation of an ADS-B station and VHF communications at Quezon-Palawan where CAAP would operate and maintain the equipment with the running cost and maintenance charges borne by user. Both parties aim to sign the ADS-B data sharing agreement and to issue a NOTAM/AIC for ADS-B mandate by 1H 2013 to be effective from 1H 2015. The Record of Discussion is at **Annex 2**.

#### Next Steps

2.6 Although Brunei, Sri Lanka and the Maldives were unable to attend the meeting, the two focus group meetings have taken important first steps in agreeing on the projects and mapping out the project plans.

2.7 Implementation of such cross-border projects requires hard work and perhaps more importantly, close cooperation and coordination by the parties concerned. Ultimately a plan is only as good as its implementation and it is crucial that the parties concerned follow up quickly on the agreed project milestones.

2.8 For the other parties that have not yet come on board CANSO remains available to assist and facilitate such cross border projects. For the South China Sea East project, Brunei's participation is key to achieving end-to-end surveillance on the two trunk routes. With participation by Maldives and Sri Lanka, we have the possibility of a similar project over the Indian Ocean. The rationale for closer collaboration in ADS-B implementation in the region is spelt out in Action Item 48/4 of the 48<sup>th</sup> DGCA Conference and it is worthwhile repeating it here:

*Recognizing that the full benefits of ADS-B would only be achieved through harmonized implementation, the Conference urges States and Administrations to expedite ADS-B implementation and share with ICAO Regional Office their implementation plans*

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## ANNEX 1

### ADS-B FOCUS GROUP MEETING ON 3-4 JULY 2012 IN SINGAPORE

#### RECORD OF DISCUSSION

1 The meeting was attended by representatives from the Airports Authority of India (AAI), Civil Aviation Authority of Singapore (CAAS), Department of Civil Aviation of Myanmar (DCA Myanmar), International Air Transport Association (IATA) and Civil Air Navigation Services Organisation (CANSO). The attendance list is shown in **Attachment A**.

2 Mr Chiang Hai Eng from CANSO welcomed all participants to the ADS-B Focus Group Meeting. He said that this meeting arose from ADS-B SITF/11 which supported a proposal by CANSO to facilitate a two day focus group meeting in Singapore in July 2012 for the parties concerned to focus on specific project deliverables and milestones using the framework/model developed for the initial phase of the South China Sea project. It was agreed that the Focus Group Meeting could comprise India, Myanmar, the Maldives and possibly Sri Lanka for Bay of Bengal and Indian Ocean; and Singapore, the Philippines and Brunei for the eastern part of the South China Sea. (Note: discussions on the eastern part of the South China Sea were however rescheduled to a later date as the Philippines and Brunei could not make it to this meeting. There were no representatives from the Maldives and Sri Lanka). The slides are attached in **Appendix A**.

3 Mr Chiang said that this meeting was a response to a call to action by the DGCAs at its last conference in Noumea. He recalled the following Action Item **48/4** of the 48<sup>th</sup> DGCA Conference:

*Recognizing that the full benefits of ADS-B would only be achieved through harmonized implementation, the Conference urges States and Administrations to expedite ADS-B implementation and share with ICAO Regional Office their implementation plans*

4 The meeting discussed and agreed on the objectives and agenda of the meeting at **Appendix B**.

5 In the morning part of 3 July 2012, Mr Yeo Cheng Nam from CAAS shared the key lessons learnt from the implementation of the initial phase of the South China Sea project (**Appendix C**). Mr Ho Wee Sin from CAAS shared with the meeting on the Sample ADS-B data and VHF sharing agreements (**Appendix D and E**) and the various financing models and maintenance options.

6 In the afternoon, the meeting discussed the ADS-B data and VHF sharing arrangement in the Bay of Bengal/Indian Ocean. Mr K.V.Murali from AAI shared the implementation plans of India with the meeting. He said that under Phase 1, India will install and commission 14 ADS-B stations at Agartala, Ahmadabad, Amirtsar, Calicut, Cochin, Coimbatore, Guwahati, Jaipur, Lucknow, Mangalore, Nagpur, Port Blair and Trivandrum and Varanasi by October 2012. Under Phase 2, tentatively, more ADS-B stations would be installed at Agatti, Aurangabad, Barhampur, Dibrugarh, Jaisalmer, Kandla, Paykyong and Tiruchirapalli by first half of 2013. Under Phase 3, tentatively, six more ADS-B stations would be added. The slides are attached in **Appendix F**.

7 Mr Thet Lwin from DCA Myanmar also shared the implementation plans of Myanmar with the meeting. He said that under Phase 1, Myanmar would install and commission two ADS-B stations at Coco Island and Sittwe by first half 2013. Under Phase 2, tentatively, more ADS-B stations would be installed at Lashio, Myeik and Yangon by second half of 2014.

8 Mr Hermizan Jumari facilitated the discussion on ADS-B data and VHF sharing arrangement in the Bay of Bengal highlighting the benefits from achieving end-to-end surveillance / communication coverage over remote / oceanic areas. Where end-to-end coverage could not be achieved, enabling tactical control of flights at crossing routes would also yield significant benefit through reduction of separation. He added these should be the basis of the objectives to enhance the surveillance / communication coverage over these areas. The discussion then focused on the feasibility of India and Myanmar collaborating to achieve those objectives. The outcome of the discussions is summarized as follows

(a) India and Myanmar in-principle agreed to share ADS-B data and VHF facilities from the following sites, subject to approval from appropriate authorities:

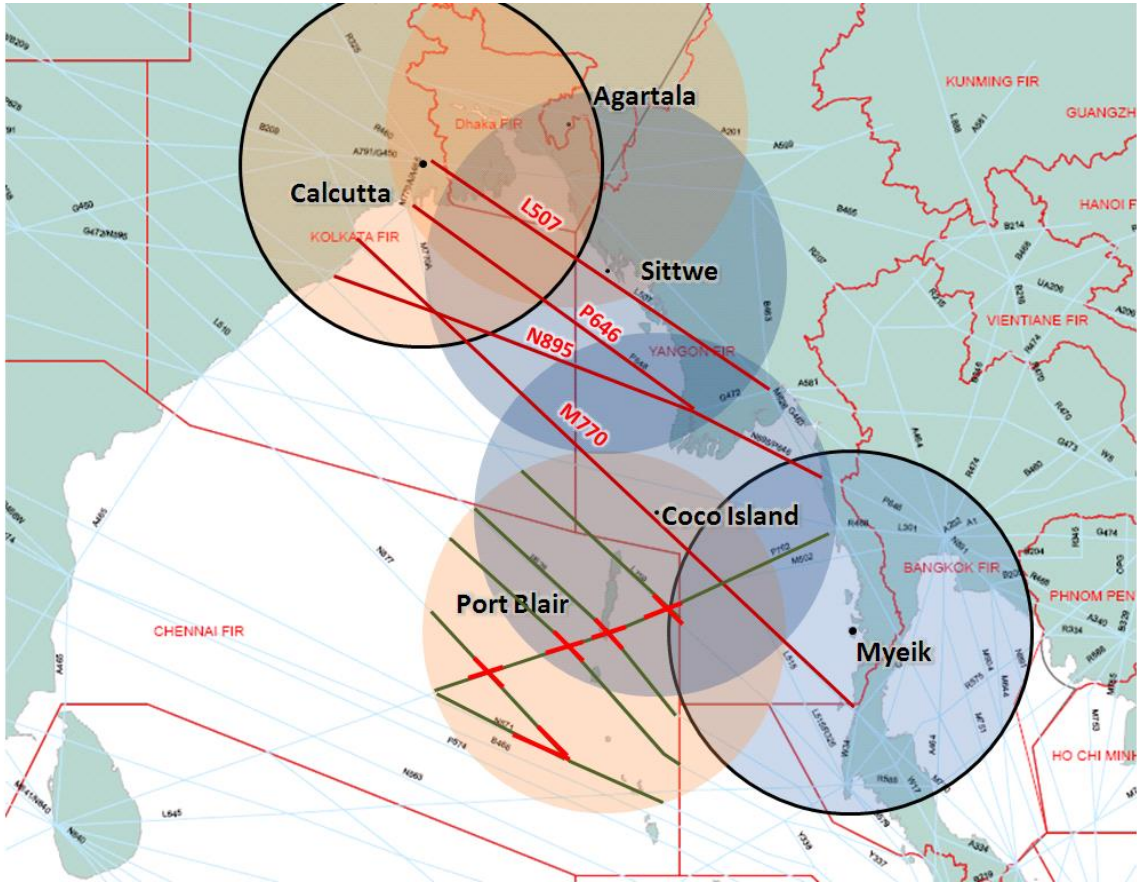
From Myanmar to India

- (i) Sittwe
- (ii) Coco Island

From India to Myanmar

- (i) Agartala
- (ii) Port Blair

The sites are shown in the following chart.



Under this ADS-B data sharing arrangement, India and Myanmar would have end-to-end surveillance coverage on M770 and associated routes (Note that there is radar coverage at Calcutta and Myeik). Myanmar would have backup surveillance at the Southwestern part and Northwestern part of Yangon FIR. The Surveillance coverage of both States would also be enhanced as the ADS-B stations at the adjacent State would be able to receive ADS-B reports from aircraft flying at lower altitude, which may be beyond the line of sight of their own surveillance sources.

(b) The tentative milestones are shown in the following table:

Milestone / Issues	India	Myanmar
Agree in principle to share data from sites	Agreed during SEA/BOB ADS-B WG/7	Agreed during SEA/BOB ADS-B WG/7
Nominated sites	Agartala & Port Blair	Sittwe & Coco Island
Objectives	<ul style="list-style-type: none"> <li>• Reduce separation through enhanced surveillance / communication coverage</li> <li>• Enhance safety and capacity over crossing routes</li> <li>• Back-up surveillance / communication coverage</li> <li>• Enhancement of surveillance coverage at lower altitude</li> </ul>	

Benefits	<ul style="list-style-type: none"> <li>End-to-end coverage on M770 and other trunk routes (refer to chart).</li> </ul>	
Date to sign data sharing agreement	1H 2013	1H 2013
Date to issue NOTAM/AIC for ADS-B mandate	Publish in 1H 2013 Effective from 1H 2015	Publish in 1H 2013 Effective from 1H 2015
Date to sign operational Letter of Agreement	2H 2013	2H 2013
Date to test inter-FIR VSAT link	1H 2014	1H 2014
Date to commission VSAT link	1H 2014	1H 2014
Date to commission ADS-B ground stations	2H 2012	1H 2013
Date to commence testing of ADS-B data from other FIR	1H 2014	1H 2014
Date to complete installation of VHF radio for the other party	1H 2014	1H 2014
Date to commence testing of VHF radio	2H 2014	2H 2014
Date to commence testing of VHF by the other party	2H 2014	2H 2014
Date to commission ADS-B & VHF service	2H 2014	2H 2014

(c) The meeting noted that an ADS-B station at the Nicobar Islands would be beneficial to enhancing safety, efficiency and capacity over the eastern gateway of the Bay of Bengal. The surveillance coverage would also be beneficial to States such as Malaysia and Indonesia. India would explore the possibilities in this regard.

(d) The meeting noted that Sri Lanka and the Maldives would be able to help cover some of the surveillance gaps by installing ADS-B stations and sharing the data (for example, Sri Lanka may like to consider one more ADS-B station at a vantage position in the Eastern side in addition to the proposed ADS-B station at Pidurutalagala to enhance the overall surveillance coverage in the Bay of Bengal and Indian Ocean). The meeting noted that the participation of Sri Lanka and the Maldives would be more fruitful and should be encouraged.

(e) In view of the long lead time for airlines to be equipped with ADS-B to meet the requirements of the ADS-B mandate, the meeting requested IATA to inform its airlines about India's and Myanmar's plans to issue ADS-B mandate effective from 1<sup>st</sup> January 2015.

(f) In view of the long lead time to final the wordings in the data sharing agreements, the meeting urged Myanmar and India to start engaging each other regularly on the data sharing agreement as soon as possible.

(g) Mr Chiang suggested that each State should, as far as possible, depute the same officer(s) to participate in future ADS-B meetings to maintain continuity.

9 The meeting agreed on the following Next Steps:

- (a) CANSO to report on outcome to the ICAO ADS-B SEA/BOB WG and ADS-B SITF
- (b) India and Myanmar to have a follow up meeting before 30<sup>th</sup> September 2012. The meeting is tentative fixed on 5<sup>th</sup> and 6<sup>th</sup> September 2012 in Singapore.
- (c) Myanmar will produce the first draft of the data sharing agreement for India to comment by end of July 2012. If the draft is not ready by then, India will produce the draft for Myanmar to comment by first week of August 2012.

10 In concluding the meeting Mr Chiang thanked all participants for a fruitful meeting. He said that all parties concerned should quickly follow up with their respective bilateral discussions so that they can report on the progress of the ADS-B projects at the next ICAO SEA/BOB WG meeting later this year.

**Participants List**

<b>Name</b>	<b>Title</b>	<b>Organisation</b>	<b>Contact Details</b>
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## ANNEX 2

### ADS-B FOCUS GROUP (SCS EAST) MEETING ON 17 JULY 2012 IN SINGAPORE

#### RECORD OF DISCUSSION

1 The meeting was attended by representatives from the Civil Aviation Authority of Singapore (CAAS), the Civil Aviation Authority of the Philippines (CAAP) and the Civil Air Navigation Services Organisation (CANSO). Mr David Rollo of International Air Transport Association (IATA) extended his apologies for not being able to attend the meeting, as he was away for a mission overseas. The attendance list is at **Appendix A**.

2 Mr Chiang Hai Eng, CANSO's Director for Asia Pacific Affairs welcomed all participants to the ADS-B Focus Group Meeting. He said that this meeting arose from ADS-B SITF/11 which supported a proposal by CANSO to facilitate a two day focus group meeting in Singapore in July 2012 for the parties concerned to focus on specific project deliverables and milestones using the framework/model developed for the initial phase of the South China Sea project. It was agreed that the ADS-B Focus Group would look at details of ADS-B implementation and data sharing over the Bay of Bengal and the eastern part of the South China Sea.

3 Mr Chiang said that this meeting was a response to a call for action by the DGCA's at its last conference in Noumea. He recalled the following Action Item **48/4** of the 48th DGCA Conference:

*Recognizing that the full benefits of ADS-B would only be achieved through harmonized implementation, the Conference urges States and Administrations to expedite ADS-B implementation and share with ICAO Regional Office their implementation plans*

4 Mr Chiang added that the ADS-B Focus Group Meeting for the Bay of Bengal was held on 3-4 July as scheduled and concluded with an agreement by India and Myanmar to share ADS-B data and VHF communications from four ADS-B stations for the Bay of Bengal. However discussions on the Eastern part of the South China Sea involving CAAS and CAAP were rescheduled to 17 July 2012. This would be followed by a separate meeting with DCA Brunei on a date to be fixed as it could not make it to this meeting.

5 Mr Ho Wee Sin from CAAS shared the latest developments for the initial phase of the South China Sea project involving Indonesia, Vietnam and Singapore for the two trunk routes L642 and M771. (See chart at **Appendix B1** and project milestones at **Appendix B2**).

6 Mr Chiang said that the next phase was discussed at several meetings of the ICAO ADS-B SITF and the ADS-B SEA/BOB Working Group and would cover the two trunk routes in the eastern part of the South China Sea viz N884 and M767. He said that this would require the participation of the Philippines and Brunei as the proposal was to install an ADS-B station each at Quezon-Palawan and Brunei (Chart at **Appendix C**)

7 Mr Hermizan of CAAS explained the current situation for flights operating over the eastern part of the South China Sea. He said that with ADS-B stations at Quezon-Palawan and Brunei, end to end surveillance coverage could be achieved and when coupled with DCPC through the sharing of VHF communications, flight safety and efficiency over the two trunk routes would be greatly enhanced. He noted in particular the benefit to airlines operating from Singapore / Brunei to Manila and vice versa

8 Mr Hermizan also added that the surveillance coverage at the FIR boundary will address Large Height Deviation (LHD) issues that have been raised at ICAO forums. With the added surveillance and communication coverage to provide a common situational awareness for controllers on both sides over those areas, these safety issues could be addressed effectively. It would also benefit the crossing routes between Indonesia and Hong Kong through Manila FIR.

9 Mr Yeo Cheng Nam of CAAS added that ADS-B would normally cover further than radar (300Nm vs 200Nm). A radar at Quezon-Palawan may also not be able to detect low flying aircraft up to the boundary of Singapore and Manila FIRs, but the ADS-B may be able to detect them.

10 The other considerations are as follows:

- (a) Aircraft equipage is unlikely to be a problem as the mandate issued by adjacent FIRs, to be effective by end 2013, like Hong Kong and Singapore would require Philippines registered aircraft to be equipped to operate in these areas.
- (b) ADS-B is one of the modules in Block 0 of the ICAO Aviation System Block Upgrades, which means that all the ICAO requirements would ready by 2013.

11 Mr Andrew Basallote of CAAP gave an update on ADS-B developments in the Philippines. He said that currently, the plan was to have ADS-B at Manila only. The overall CNS/ATM project plan is likely to be completed only in early 2015. However, he does not see a problem installing ADS-B and VHF stations at Quezon-Palawan and decouple it from CAAP's CNS/ATM project plan. Under the user pay principle adopted by ICAO, the ADS-B and VHF stations could be funded by the users.

12 The meeting noted that the theoretical surveillance coverage from the Quezon-Palawan site was not optimum in the Southwest direction. The meeting agreed that CAAS, in consultation with CAAP, invite a vendor to study whether the said coverage could be improved.

13 Mr Chew Guang Wei of CAAS shared with the meeting the various financing models and maintenance options that could be used. He said that the data sharing agreements would be adapted from the sample agreement adopted by ICAO.

14 The meeting discussed the ADS-B data and VHF sharing arrangement involving an ADS-B station at Quezon-Palawan. It was agreed that the ADS-B station and VHF communications at Quezon-Palawan would be based on the following financing and maintenance model:

- (a) Option 1: CAAS could supply and install the equipment.
- (b) Option 2: CAAP could supply and install the equipment. CAAS would then lease the service from CAAP.

For both options, CAAP would provide the site, operate and maintain the equipment at the site. The running cost of the facilities, including maintenance charges, would be borne by user. The meeting noted that there is an existing site at Quezon-Palawan with the necessary infrastructure, security and access.

15 CAAS and CAAP agreed in-principle on the timeline in **Appendix D**.

16 In view of the long lead time to finalise the ADS-B data and VHF sharing agreements, meeting agreed that CAAS and CAAP would need to commence bilateral discussions as soon as possible.

17 The meeting agreed on the following Next Steps:

- (a) CANSO to report on outcome to the ICAO ADS-B SEA/BOB WG and ADS-B SITF.
- (b) CAAS to produce the first draft of the data sharing agreement (for both Option 1 and Option 2) by first week of August 2012 for CAAP to comment.
- (c) CAAS and CAAP to have a follow up meeting by early September 2012 in the Philippines or Singapore.

18 Mr Chiang thanked all participants for a fruitful meeting. He said that all parties concerned should quickly follow up on the agreed next steps so that they can report on the progress at the next ICAO ADS-B SEA/BOB WG meeting later this year.

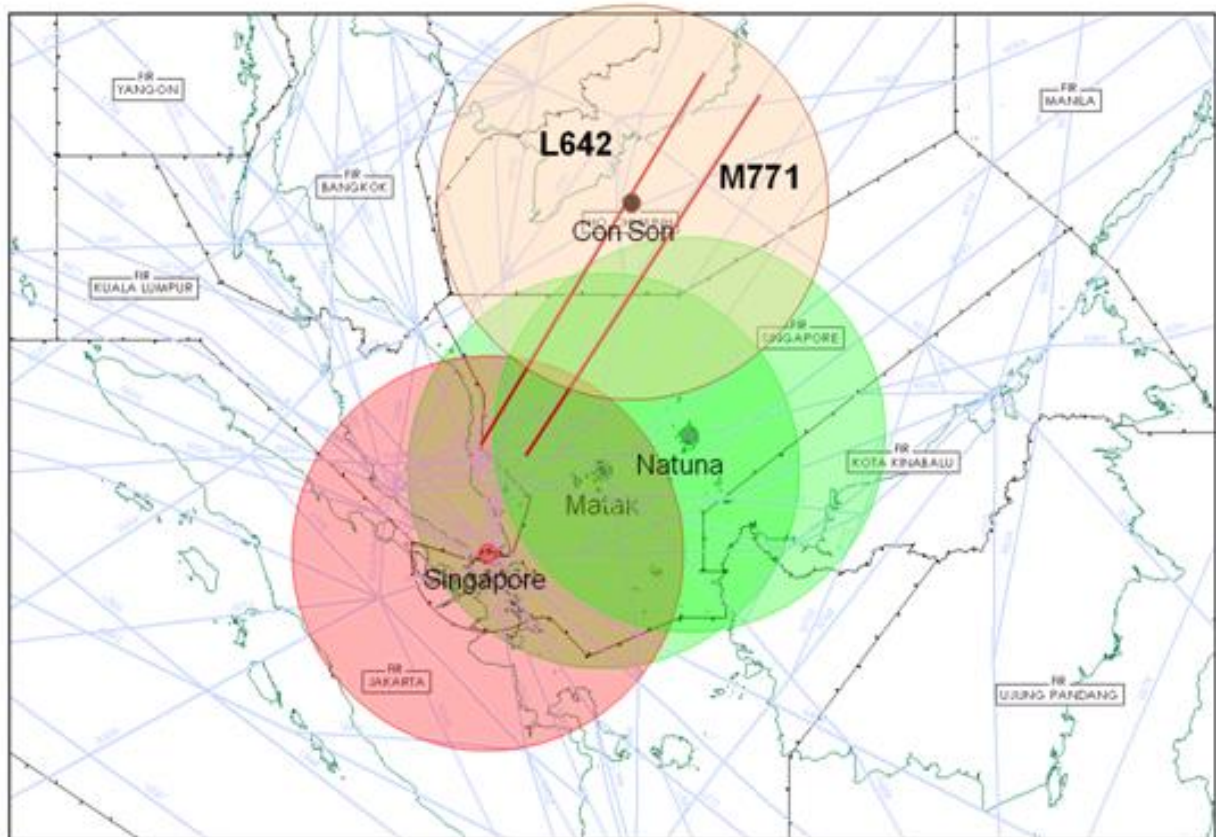
**Appendix A****Participants List**

<b>Name</b>	<b>Title</b>	<b>Organisation</b>	<b>Contact Details</b>
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**Absent with Apologies**

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**Initial Phase of South China Sea Project**

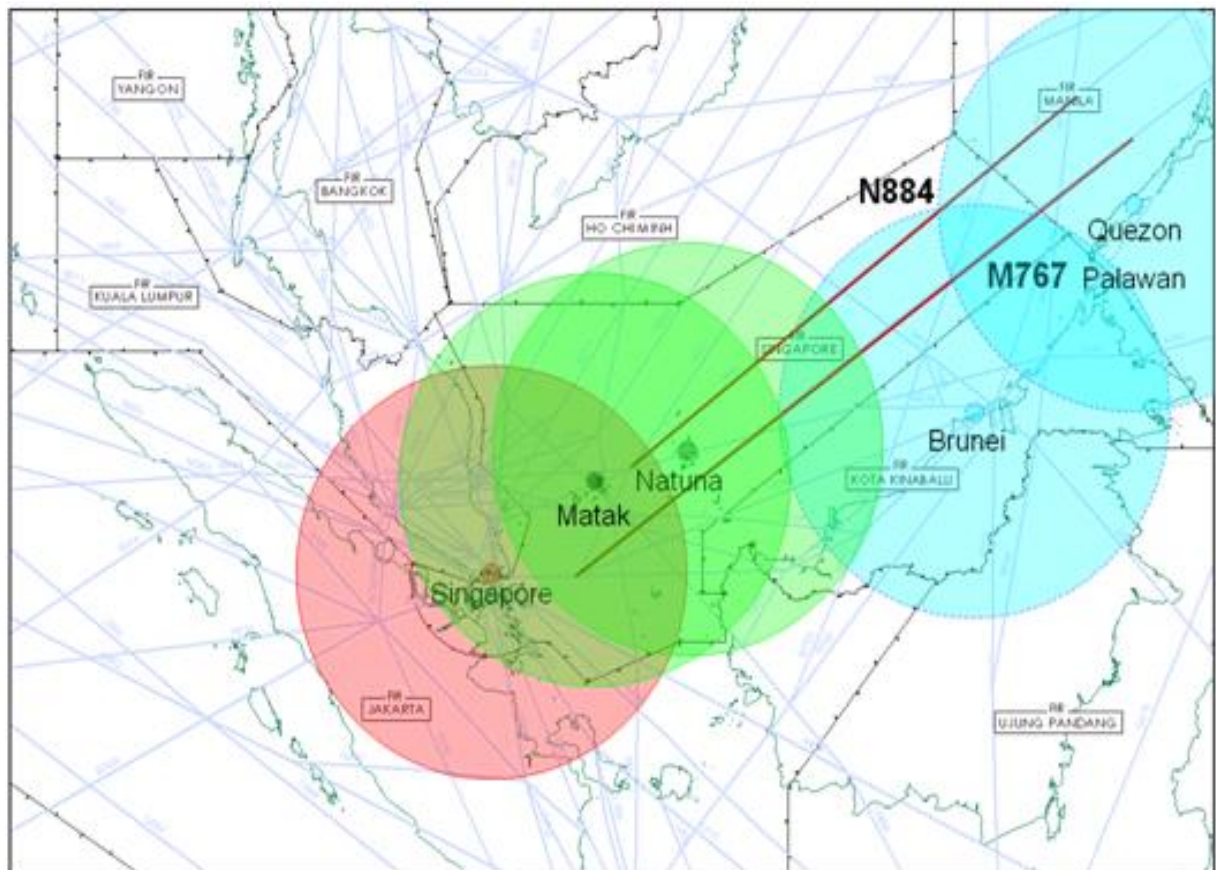


**Appendix B2**

**Implementation Timeline**

<b>Item</b>	<b>Description</b>	<b>Status</b>	<b>Target Completion</b>
A	Installation of ADS-B ground stations and links		
	i) Natuna and Matak	Completed	
	ii) Singapore	Completed	
	iii) Con Son	On-Going	2H2012
B	Installation of VHF station and links		
	i) Natuna	Completed	
	ii) Matak	On-Going	2H2012
	iii) Conson	On-Going	2H2012
C	Signing of ADS-B data and VHF radio facility sharing agreement		
	i) Between Indonesia and Singapore	Completed	
	ii) Between Vietnam and Singapore	Completed	
D	Signing of ATS Operational LOA between Ho Chi Minh and Singapore ACCs		2H2012
E	Issue AIC on aircraft equipage mandate	Completed	
F	Technical Monitoring of ADS-B		2H2012
G	Operational	2H2013	

Appendix C





**Appendix D**

Milestone / Issues	The Philippines	Singapore
Agree in-principle to share data from the Quezon-Palawan site	17 July 2012	17 July 2012
Objectives	<ul style="list-style-type: none"> <li>• Reduce separation through enhanced surveillance / communication coverage</li> <li>• Enhance safety and capacity over crossing routes</li> <li>• Back-up surveillance / communication coverage</li> <li>• Enhancement of surveillance coverage at lower altitude</li> </ul>	
Benefits	<ul style="list-style-type: none"> <li>• End-to-end coverage on N884 and M767</li> <li>• Surveillance on crossing routes between Indonesia and Hong Kong, through Manila FIR</li> </ul>	
Date to sign data sharing agreement	Q1 2013	Q1 2013
Date to issue NOTAM/AIC for ADS-B mandate	TBD	Issue: Q1 2013 Effective: H1 2015
Date to sign operational Letter of Agreement	H1 2014	H1 2014
Date to test inter-FIR VSAT link	H2 2014	H2 2014
Date to commission VSAT link	H2 2014	H2 2014
Date to commission ADS-B ground station	H2 2014	H2 2014
Date to commence testing of ADS-B data from other FIR	H2 2014	H2 2014
Date to complete installation of VHF radio for Singapore	H2 2014	H2 2014
Date to commence testing of VHF radio	H2 2014	H2 2014
Date to commence testing of VHF by CAAS	H2 2014	H2 2014
Date to commission ADS-B & VHF service	H2 2014	H2 2014