



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

Agenda Item 6: Review States' activities and interregional issues on trials and implementation of ADS-B and multilateralism

CNS/ATM IMPLEMENTATION AND PLANNING MATRIX

(Presented by the Secretariat)

SUMMARY

This paper presents the Regional CNS/ATM Implementation and Planning Matrix for review and update by the Meeting.

1. Introduction

1.1 The CNS/ATM Implementation Matrix lists status of implementation of various major CNS/ATM elements within the Region such as ATN/AMHS, AIDC, CPDLC, NAVIGATION, ADS-C and ADS-B. The matrix provides a good overview of the planning and implementation status of CNS elements. It also serves as a planning tool for monitoring the progress of implementation. States have been encouraged to provide their updates regularly through the Sub-group and Task Force meetings.

2. Discussion

2.1 The CNS/MET SG/16 meeting reviewed the updated CNS/ATM Implementation and Planning matrix. CNS/ATM Implementation Matrix was initially developed in accordance with APANPIRG Conclusion 11/37. The matrix was appended to APANPIRG/23 report (Appendix R) under agenda item 3.4.

3. Action by the Meeting

3.1 The meeting is invited to review and update the relevant items in CNS/ATM Implementation and Planning Matrix provided in the Attachment.

CNS/ATM Implementation Planning Matrix

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	Navigation*			ADS-B/ Multilateration	ADS-C	Remarks
				En-route	Terminal	Approach			
AFGHANISTAN									
AUSTRALIA	ATN tests were conducted. BIS Router and Backbone BIS Router and AMHS implemented.	AFTN based AIDC Implemented between Brisbane and Melbourne, Auckland, Nadi and Auckland. AIDC is also in use between Melbourne and Mauritius.	Implemented and integrated with ATM systems to support FANS1/A equipped aircraft.	Implemented	Implemented		A total of 29 UAP and 14 WAM stations are used to provide a 5 Nm separation service and operational. ADS-B mandate applies from 12/2013 at and above FL290. Mandates for additional flight level are considered for 2015 & 2017. WAM operating in Tasmania. Commissioned in 2010. WAM being installed in Sydney to provide 3 Nm separation service and PRM which is expected to be operational 2011. ADS-B data sharing with Indonesia operational since 2/2011.	FANS 1/A ADS-C implemented.	

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State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	Navigation*			ADS-B/ Multilateration	ADS-C	Remarks
				En-route	Terminal	Approach			
AUSTRALIA (Cont'd)							ASMGCS using multilateration operational in Melbourne & Sydney in 2010. Brisbane and Perth being installed.		
BANGLADESH	BIS Router and AMHS planned for 2011.	AIDC between Dhaka and CTG, Dhaka and Sylhet planned for 2011.		Not yet planned	Not yet planned		Not yet planned	Not yet planned	
BHUTAN	ATN BIS Router and UA service 2011.					Procedures developed for NPA.			
BRUNEI DARUSSALAM	ATN BIS Router planned for 2012 and AMHS planned for 2012.								
CAMBODIA	BIS Router and AMHS planned for 2011.	Planned 2009	Planned 2009			Procedure developed for NPA.			

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State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	Navigation*			ADS-B/ Multilateration	ADS-C	Remarks
				En-route	Terminal	Approach			
CHINA	<p>ATN Router and AMHS deployed in 2008.</p> <p>Tripartite BBIS trial completed with Bangkok and Hong Kong, China in Jan. 2003.</p> <p>ATN trial with Hong Kong using XOT over internet conducted in 2006, Further trials planned in 2009.</p> <p>AMHS/ATN technical tests with Macau completed in 2009.</p> <p>ATN/AMHS circuit with ROK put into operational use in June 2011.</p> <p>ATN/AMHS tests with India are on-going.</p> <p>Plan for ATN/AMHS implementation with Hong Kong, China (2013).</p> <p>Plan for ATN/AMHS implementation with Macau, China (2013).</p> <p>ATN and AMHS technical trial with Mongolia is TBD.</p>	<p>AIDC between some of ACCs within China has been implemented.</p> <p>AIDC between several other ACCs are being implemented.</p> <p>AIDC between Sanya and Hong Kong put in to operational use in Feb 2007.</p> <p>AIDC between Qingdao and Incheon planned for 2013.</p>	<p>Implemented to ATS Rout.</p> <p>L888 route,</p> <p>Trial on HF data link conducted for use in western China.</p>	<p>Implemented in certain airspace.</p> <p>L888, Y1 and Y2 routes.</p> <p>Total distance of air route with PBN is around 10.4 thousand km. which is approximately 7% of national route distance in China.</p> <p>4RNP10 routes have been implemented in Sanya FIR.</p> <p>RNP4 has been implemented in Lhasa to Ali, Xining to Yushu and Europe-Asia route.</p>	<p>RNAV (GNSS) implemented in certain airports.</p> <p>Beijing, Guangzhou, Tianjin.</p>	<p>Ali, Linzhi and Lhasa airports</p>	<p>5 UAT ADS-B sites are used for flight training of CAFUC.</p> <p>Chengdu-Jiuzhai project finished in 2008 with 2 ADS-B stations and additional site is planned to enhance the surveillance coverage.</p> <p>Chengdu - Lhasa route surveillance project completed with 5 ADS-B stations using 1090ES since 2010. Trials planned from May 2011.</p> <p>1 ADS-B site installed in Sanya FIR since 2008. 3 additional ground stations planned, Trial planned for Jun, 2011.</p>	<p>FANS 1/A based ADS-C implemented.</p> <p>L888 route.</p>	

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State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	Navigation*			ADS-B/ Multilateration	ADS-C	Remarks
				En-route	Terminal	Approach			
	<p>Plan for test with Russian Federation (TBD)</p> <p>Connection tests with Thailand is 2014</p> <p>Connection tests with Nepal is 2013</p>								
HONG KONG, CHINA	<p>ATN and AMHS technical trial with Japan conducted in 2003.</p> <p>64 Kbps ATN Link with Bangkok put into operational use in June 2004.</p> <p>Preliminary ATN/AMHS technical trials with China (Beijing) using VPN over Internet connection conducted in September 2006.</p> <p>Operational AMHS commissioned in July 2009.</p> <p>ATN/AMHS circuit with Macao put into operational use in Dec. 2009.</p> <p>ATN/AMHS interoperability tests with other adjacent communications centres commenced in late 2009, viz</p>	<p>AFTN-based AIDC with Sanya put into operational use in February 2007.</p> <p>AIDC trial with other adjacent ATS authorities for new ATC system to be commissioned by 2013.</p> <p>AIDC technical trial with Taipei conducted in 2010 and completed in 2012 and put into operational use in Nov. 2012.</p>	<p>FANS 1/A based CPDLC trials completed in 2002.</p> <p>VDL Mode-2 technical trial conducted in 2002.</p> <p>D-ATIS, D-VOLMET and 1-way PDC implemented in 2001.</p> <p>PDC service upgraded to 2-way data link in June 2008.</p>	<p>Implemented in certain airspace</p> <p>RNP4 Enroute (>FL290 in 2014)</p>	<p>Implemented in certain airspace</p> <p>Basic RNP-1 for SIDs and STARs in 2013.</p>	<p>RNAV (GNSS) departure procedures implemented in July 2005.</p> <p>RNP AR APCH procedures for 07L/25R runways implemented in June 2010.</p>	<p>A larger-scale A-SMGCS covering the whole Hong Kong International Airport put into operational use in April 2009.</p> <p>Data collection/analysis on aircraft ADS-B equipage in Hong Kong airspace conducted on quarterly basis since 2004.</p> <p>ADS-B trial using a dedicated ADS-B system completed in 2007. ADS-B out operations over PBN routes L642 and M771 at or above FL 290 within HK FIR</p>	<p>FANS 1A trials for ADS-C completed in 2002.</p>	

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State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	Navigation*			ADS-B/ Multilateration	ADS-C	Remarks
				En-route	Terminal	Approach			
	<p>Taibei (2009), Beijing (2010), Thailand (2012), Japan (Planned Q3/2016), Philippines (Planned Q2/2015) and Viet Nam (Planned Q4/2014)</p> <p>Plan for ATN/AMHS implementation with China (2013) and Taibei (2013).</p>						<p>are planned in December 2013 and within HK FIR at or above FL 290 in December 2014</p> <p>ADS-B trial using ADS-B signal provided by Mainland China to cover southern part of Hong Kong FIR commenced in 2010.</p>		
MACAO, CHINA	<p>ATN/AMHS interoperability test with Beijing commenced in March 2009.</p> <p>ATN/AMHS circuit with Hong Kong put into operational use in end Dec. 2009.</p>								<p>ATZ within Hong Kong and Guangzhou FIRs. In ATZ full VHF coverage exist. Mode SMSSR coverage available for monitoring purposes.</p>

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State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	Navigation*			ADS-B/ Multilateration	ADS-C	Remarks
				En-route	Terminal	Approach			
COOK ISLANDS									
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	The ATN BIS Router and AMHS to be implemented in 2011.	With neighboring ACCs to be implemented TBD		Implemented in certain ATS routes G711, B467		RNAV (GNSS) Non-precision approach to be implemented in 2011.	ADS-B has been used as back-up surveillance of SSR since 2008.		
FIJI	ATN BIS Router and AMHS implemented	AFTN based AIDC implemented between Nadi, Brisbane, Auckland and Oakland.	Implemented and integrated with ATM systems to support FANS1/A equipped aircraft.	Implemented		Implemented	ADS- B /multilateration ground stations installed. Situations awareness service will be provided in 2013.	FANS 1/A ADS-C implemented.	
FRANCE (French Polynesia Tahiti)		Implementation of limited message sets with adjacent centres under discussion.	FANS-1. Implemented since 1996.					FANS 1/A ADS-C implemented since March 1999.	
INDIA	MUMBAI – SINGAPORE – BBIS – Circuit Implemented MUMBAI – PAKISTAN – BIS – Operational Trial Completed MUMBAI – CHINA – BBIS – Under operational trials	AIDC with Dhaka /Muscat – TBD Mumbai/Karachi under trial operations	FANS-1 implemented at Kolkata, Chennai, Mumbai and Delhi.	SBAS (GAGAN project) likely to operational in the year 2013	PBN based SIDs & STARS implemented at Delhi, Mumbai, Chennai, Ahmadabad, Hyderabad and Kolkata		ASMGCS with MLAT commissioned at Delhi, Hyderabad and Bangalore Mumbai and Chennai ASMGCS	FANS 1/A ADS-C implemented at Kolkata, Chennai, Delhi and Mumbai.	

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				En-route	Terminal	Approach			
	<p>MUMBAI – OMAN – BIS -Presently AFTN over TCP/IP</p> <p>MUMBAI – THAILAND – BBIS -Awaiting readiness from Thailand</p> <p>MUMBAI AMHS – Commissioned in APRIL 2011</p>						installed		
INDONESIA	<p>ATN BIS Router and AMHS planned for trial in 2009.</p> <p>Trial with Singapore planned.</p> <p>ATNBIS Router and AMHS are still on going trial with Singapore planned to complete by 2012. (Part D: AMHS Commission)</p>	<p>Brisbane and Makassar in planned in June 2009.</p> <p>Makasar and Brisbane is still on going trial AIDC, planned operational in 2011</p>	<p>FANS-1/A. CPDLC in Ujung Pandang FIRs already trial start from 2008 and will be implemented in 2009.</p> <p>FANS-1/A CPDLC in Ujung Pandang FIRs is completely trial operational and will be full operational for designated route on September 2010.</p>				<p>30 Ground Station successfully installed.</p> <p>Since 2009, ATC Automation in MATSC has capabilities to support ADS-B application.</p> <p>ADS-B Task Force team established to develop planning and action concerning ADS-B Implementation within Indonesia FIR</p>	<p>FANS-1/A ADS-C trial planned at Jakarta and Ujung Pandang ACC in 2007.</p> <p>FANS-1/A ADS-C in Ujung Pandang FIRs is completely trial operational and will be full operational in September 2010.</p>	

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				En-route	Terminal	Approach			
JAPAN	<p>ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005.</p> <p>ATN BBIS router (to apply to Dual Stack) and AMHS (to upgrade in 2015. The connection test with each country which is not currently connecting is started after update.</p>	<p>AFTN based AIDC implemented with Oakland, Anchorage, Incheon and Taipei. Planned between Fukuoka ACC and Shanghai ACC for 2014.</p>	<p>FANS1/A system Implemented in Fukuoka FIR.</p>	<p>SBAS implemented RNAV5 implemented. RNP AR Approach implemented</p>	<p>RNAV1 implemented Basic RNP implemented</p>	<p>RNP Approach implemented</p>	<p>Two Multilateration Systems have been implemented at Narita and Haneda airports.</p> <p>Multilateration Systems have been implemented at five airports and are being implemented at three airports.</p> <p>PRM (WAM) is planned to be implemented at Narita Airport. (Operation will start in 2014).</p>	<p>FANS 1/A. ADS-C implemented in Fukuoka FIR.</p>	
KIRIBATI									
LAO PDR	<p>ATN BIS Router and AMHS completed planned for implementation with Bangkok in 2010.</p>	<p>AIDC with Bangkok planned for 2010.</p>		<p>Implemented. Planned for 2011.</p>					

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				En-route	Terminal	Approach			
MALAYSIA	ATN BIS Router completed 2007. AMHS planned in 2012.	AFTN AIDC planned with Bangkok ACC – TBD. AIDC between Kuching and KK FIR already implemented. For Kuala Lumpur FIR, will be implemented by end of 2013.	On trial since July 2008. On 7 oceanic ATS routes i.e. P628, L510, L645, L627, N571, B466 and P574 within the Kuala Lumpur FIR. Implemented in 2011.	Implemented for Oceanic Routes. RNAV-5 domestic Routes implementation in progress and partially implemented.	Basic RNAV implemented	RNP AR APCH for WMKP and WBGG in progress, will be implemented by middle 2013. Other airports next.	Malaysia planned to start mandate ADS-B requirement in KL FIR in 2018 and ADS-B implementation on 2020. Implementation of ADS-B proposed in 2010 - 2015.	FANS 1/A ADS-C already implemented for Bay of Bengal area. Implemented since July 2008 on 7 oceanic ATS routes within KL FIR.	
MALDIVES	Implementation planned for 2013	ATM system software already upgraded to support AIDC. Trials with neighbouring ACC's planned in Sept. 2012.	New software upgrade in progress. Trials to be started in Aug. 2012.	Planned for completion in 2012	PBN based SIDS and STARS implemented.	RNP approach implemented at Ibrahim Nasir Int'l Airport	Implementation in progress. System to be commissioned in 2012.	Implemented since 2008. New software upgrade in progress and planned for completion in Aug. 2012	
MARSHALL ISLANDS						NPA implemented at Majuro Atoll.			
MICRONESIA (EDERATED STATES OF)									
Chuuk				Implemented					
Kosrae				Implemented					
Pohnpei				Implemented					
Yap				Implemented					

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				En-route	Terminal	Approach			
MONGOLIA	<p>AMHS/AFTN gateway is implemented in first quarter of 2012.</p> <p>ATNBIS router will be implemented in 2013.</p> <p>Coordinating with China on ATN/AMHS connection technical trial target date TBD.</p>	<p>ATM automation system supports AIDS and OLDI.</p> <p>Coordinating with Russia on OLDI connection in target date TBD.</p> <p>Coordinating with China on AIDC connection technical trial target date TBD.</p>	<p>Function available. Regular trials are conducted.</p>		<p>GPS procedures are being developed and implemented at 10 airports.</p>		<p>Five ADS-B ground station for combination with SSR will be implemented first quarter of 2013.</p> <p>Full coverage for surveillance gaps will be implemented by 2015-2016.</p>	<p>FANS 1/A ADS-C implemented since August 1998.</p>	
MYANMAR	<p>AMHS implemented Nov. 2011</p>	<p>Plan to support AIDC to the ATM automation system at 2013</p>	<p>Implemented since August 1998.</p> <p>Software upgrading and integration to ATC automation will be completed in 2012.</p>	<p>Three new DVOR installation have been completed by 2012 and plan to operate in 2013.</p>	<p>New ILS system at YGN Int'l AP finished installation by 2012 and plan to operate in 2013.</p>		<p>Plan to implement two ADS-B ground stations at the end of 2012.</p>	<p>Implemented since August 1998.</p> <p>Software upgrading and integration to ATC automation will be complete in 2012.</p>	
NAURU									
NEPAL	<p>BIS Router and AMHS planned for 2011.</p>	<p>AFTN/AMHS based AIDC between KTM-CAL, KTM-BAN, KTM-LHASA planned for 2011.</p>			<p>GPS departure and approach has been developed for 8 airports and planned for implementation in 2008.</p>		<p>ADS-B feasibility study planned for 2007.</p>		

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				En-route	Terminal	Approach			
NEW CALEDONIA	New router and AMHS planned at the end of 2013 with Nadi				Arrival GNSS based RNAV procedures have been developed by for La Tontouta Airport		Three ADS-B ground stations commissioned in 2010 to cover international traffic at La tontouta airport serving Tontouta ACC & APP. It is used for Situation awareness and SAR.		
NEW ZEALAND	AMHS implementation planned for 2012 using IPS links.	AFTN based AIDC implemented between New Zealand, Australia, Fiji, Tahiti, Chile and USA.	FANS-1/A. Implemented	Will be implemented as required.	RNAV procedures being implemented as developed.	RNP AR APCH implemented at Queenstown (NZQN).	MLAT being used in Queenstown area (WAM) and Auckland (airport surface movements). ADS-B data available from all MLAT & SSR sites.	FANS 1/A Implemented	
PAKISTAN	ATN/AMHS considered as Phase II implemented since 2010.	Implemented between Karachi and Lahore ACCs Plan to implement AIDC with Mumbai and Muscat for December 2010	Implementation planned from 2005-2010.	Planned for 2005-2010.	RNAV arrival and departure procedure being developed.	NPA (RNP) procedure are being developed and under flight inspection.	Feasibility study for using ADS-B is in hand. One station was installed at ACC Karachi and evaluation is in progress.	Planned for 2005-2010.	Existing Radar system being upgraded.

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				En-route	Terminal	Approach			
PAPUA NEW GUINEA	Plans to create a newly duplicated digital communications line connecting with existing and new sites and replacing AFTN switch with a AMHS before 2015	Implemented with Australia in April 2011	Plans for new ATM system supporting CPDLC by 2015	Implemented	GNSS based RNAV procedures have been developed by for five airports.	GNSS NPA approach implemented at 22 aerodromes.	Legislation mandating ADS-B and guidelines for aircraft equipage and operational approval to be issued by 31/12/2011 with target mandatory date by mid-2015 and plans to provide ADS-B service above FL245 within Port Moresby FIR and also in specific higher traffic areas domestically.	Plans for new ATM system with ADS-C within UTA airspace by 2015	
PHILIPPINES	ATN G/G BIS Router/AMHS installed in 2006. Pending AMHS Interoperability tests moved to Q3/2015 both for Singapore and Hong Kong. AMHS trials with Singapore by end 2012 and Hong Kong planned in 2012.	Planned for 2013.	CPDLC Planned for 2011. Trials on-going.	New ACC on test.	RNAV routes of MLA. MACTAN for FLT validation.		Two ground stations scheduled for implementation in 2013.	FANS 1/A ADS-C planned for 2013.	

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				En-route	Terminal	Approach			
REPUBLIC OF KOREA	<p>ATN/AMHS circuit with China put into operational use in June 2011.</p> <p>ATN/AMHS test with Japan to be conducted</p>	<p>AFTN based AIDC implemented between ACC and Fukuoka ATMC.</p> <p>AIDC between Incheon and Qingdao to be implemented.</p>	<p>PDC & D-ATIS implemented 2003.</p>	<p>Two RNAV5 routes were implemented in 2011. More RNAV5/2 routes will be implemented gradually.</p>	<p>RNAV1 SID/STAR were partially implemented at GIMPO and INCHEON airports.</p> <p>More SIDs/STARs will be implemented gradually</p>	<p>RNP approaches with Baro were implemented at GIMPO airport in 2011.</p> <p>More RNP approaches with Baro will be implemented gradually</p>	<p>ADS-B implemented 2008 for SMC in Incheon International Airport.</p>	<p>FANS 1/A based ADS-C implemented since 2003 for contingency purpose.</p>	
SINGAPORE	<p>AMHS implemented.</p> <p>ATN Router trial with Malaysia completed in 2007</p> <p>On-going ATN/AMHS trial with Indonesia and planned to complete by 2012.</p> <p>ATN/AMHS circuit with India put into operational use in March 2011.</p> <p>Completed ATN/AMHS trial using VPN over internet with Bahrain in 2011.</p> <p>On-going ATN/AMHS trial with Thailand and planned to complete by 2012.</p>	<p>AFTN based AIDC to be implemented</p>	<p>Implemented since 1997. Integrated in the ATC system in 1999.</p>		<p>RNAV SIDS and STARS implemented in 2006.</p>	<p>NPA Procedure implemented in 2005.</p>	<p>The airport M-lat system was installed in 2007 and “far-range” ADS-B sensor was installed in 2009.</p>	<p>FANS 1/A ADS-C implemented since 1997. Integrated with ATC system in 1999.</p>	

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				En-route	Terminal	Approach			
	ATN/AMHS circuit with UK put into operational use in March 2012.								
SRI LANKA	ATN BIS Router Planned for 2013. AMHS (Domestic) and AMHS/AFTN Gateway to be implemented by Oct. 2011.	Trials with Male' planned in 2013.	Implemented (FANS 1/A based)	14RNAV10 routes already established. 05 RNAV5 routes to be established in 2013. Upgrade airspace above FL225 to RNAV10 and introduce RNP4 routes in a phased manner within 2013-2016.	GNSS based RNAV-1 SIDS and STARS trials being conducted. To be implemented in a phased manner within 2013-2016.	Introduction of RNP APCH (with Baro-VNAV) in a phased manner with 2013-2016. GNSS based Precision Approaches planned beyond 2016.	ADS-B Trials planned for 2012 and implementation in 2013.	Implemented (FANS 1/A based) .	Information pertaining to Navigation are based on the PBN Implementation plan of Sri Lanka .
THAILAND	BBIS/BIS Routers already implemented. AMHS has been implemented. Trial with other BBIS States; Singapore, India and Hong Kong are on going. ATN/AMHS operational links for Singapore, India and Hong Kong, China are planned for completion by Q4 2013	AFTN based AIDC planned for TBD. (as a part of new ATM system)	FANS-1/A Implemented.	Under implementation	Implemented at Phuket Airport	Implemented at Phuket	Multilateration implemented in 2006 at Suvarnabhumi Int'l. Airport. ADS-B is planned to be part of future surveillance infrastructure.	FANS 1/A ADS-C Implemented.	

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				En-route	Terminal	Approach			
TONGA	AMHS planned for 2008. The provider is linked to the New Zealand AFTN				RNAV procedures planned for 2013-2014	NPA planned for 2007. RNP AR APCH planned for 2013-2017	Trial planned for 2017		CPDLC and ADS-C is not considered for lower airspace
UNITED STATES	AMHS implemented. (Salt Lake City & Atlanta)	AFTN based AIDC implemented.	FANS-1/A based CPDLC implemented.	Implemented	Implemented		Status as of March 31, 2011 81 Radio Stations under construction or in Final Design (77 in CONUS; 4 in AK) 342 Radio Stations constructed (313 in CONUS; 29 in Alaska) 326 Radio Stations Reporting on the SBS Network (297 in CONUS; 29 in AK) 275 Operational Radio Stations WAM implemented in areas of Colorado for 5nm separation services and coming to Juneau in 2011	Implemented	

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				En-route	Terminal	Approach			
VANUATU									
VIET NAM	<p>BIS Routers planned for 2009.</p> <p>ATN/AMHS trial in 2010 and operation in 2012.</p> <p>ATN BIS Router AMHS in 2013</p>	<p>AFTN based AIDC implemented in 2009.</p> <p>Trial for ATN based AIDC planned in 2010.</p> <p>Trial for AIDC in 2012. Plan to implement in 2013</p>	<p>CPDLC operational trial conducted in early 2007.</p> <p>Implemented in 2007</p>	<p>For en-route TBD.</p>	<p>RNAV</p>	<p>GBAS 2015</p>	<p>2013</p>	<p>FANS 1/A ADS-C operational trial conducted for oceanic area of Ho Chi Minh FIR since March 2002.</p> <p>FAN 1/A implemented in 2007</p>	

* Navigation – Navigation including Performance Based Navigation (PBN), APV and precision approach