International Civil Aviation Organization

SPECIAL IMPLMENTATION PROJECT (SIP) ON ATS INTER-FACILITY DATA COMMUNICATION IMPLEMENTATION SEMINAR

Bangkok, Thailand, 12-13 October 2010

Agenda Item 4: Review of experience gained and lessons learned in the implementation of AIDC

REVIEW STATUS OF USE OF ICD FOR AIDC

(Presented by the Secretariat)

SUMMARY

This papers presents implementation status of use of the AIDC ICD in 2007 and the CNS/ATM Implementation Planning Matrix updated by CNS/MET Sub-group in July 2010 for review. It also provides the experience gained by Airservices Australia in the implementation of AIDC presented to the AIDC Task Force meeting in 2007.

1. INTRODUCTION

1.1 The AIDC Task Force meeting held in 2007 reviewed the status of implementation AIDC ICD including experience gained and lessons learned in implementation of AIDC.

1.2 The meeting is invited to note that the implementation of ATS Inter-Facility Data Communication Services (AIDC) is considered as one of the regional performance objective and was adopted by APANPIRG/20 in the Performance Framework Form No. 11 linking to ICAO Strategic Objectives and the Global Plan Initiatives (GPI).

1.3 The meeting also reviewed the AIDC related information as contained in the Appendix A to the report of AIDC Task Force meeting in 2007 which is reproduced and provided in **Attachment A** to this paper and the CNS/ATM Implementation Planning Matrix regularly updated by CNS/MT Sub-group and noted by APANPIRG/21 meeting is provided in **Appendix B** to this paper. The Matrix lists status of implementation of various major CNS/ATM elements within the Region including AIDC. The Matrix is used as a planning tool for monitoring the progress of implementation. States have been encouraged to provide their updates regularly through the contributory bodies of APANPIRG.

2. DISCUSSIONS

2.1 The AIDC Task Force meeting discussed the experience gained and lessons learned in the implementation of the AIDC between several air traffic control centres in the Region.

2.2 It was recalled that Airservices Australia began using AIDC messages during the commissioning of the Australian Advanced Air Traffic System (TAAATS) in 1998. Initially messages were only exchanged domestically between the TAAATS ATC centers located in Melbourne and Brisbane. As other ATSUs in adjoining airspaces have commissioned, interoperability testing has been performed leading to operational use.

2.3 The experience gained by Airservices Australia in the implementation of AIDC including the consideration for initial implementation, system adaptation, interface and interoperability issues provided to the AIDC Task Force meeting in 2007 is reproduced in **Attachment C** to this paper. The information was considered invaluable and could be useful as a reference to other States.

2.4 It was recalled that RASMAG recognized the value of ATS Inter-facility Data Communications (AIDC) between ATS facilities in reducing the potential for ground-ground coordination errors by enabling routine coordination to be undertaken directly between the ATS equipment in respective ATC facilities. This removed the possibility of human readback and hearback errors, resulting in a decrease in coordination errors and associated decrease in LHD occurrences. The meeting also recognized the reduction in ATC workload that resulted from use of AIDC, leaving more time for traffic separating functions and increasing the effective use of airspace.

3. ACTION BY THE MEETING

3.1 The meeting is invited to review the Attachments to this paper and provide updates to the information contained in the CNS/ATM Implementation Planning Matrix. The meeting is also expected to update the status of use of the ICD for AIDC and may consider developing a planner based on the information available.

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AIDC USAGE IN ASIA/PAC REGION

STATE	AIDC IMPLEMENTATION STATUS						
	IN USE (Yes/No)	**NEIGHBOURING STATES/UNITS**	**IMPLEMENTATION DATE**	**PLANNED (Yes/No)**	**NEIGHBOURING STATES/UNITS**	**PLANNED IMPLEMENTATION DATE**	**REMARKS**
Australia	Yes	Brisbane Melbourne New Zealand Mauritius Nadi Auckland	1998 1998 2000 2003 2004 2006	Yes	 South Africa Makassar	 2007 TBD	Designed for V. 2.0
China	Yes	Hong Kong	2007	Yes Yes	Viet Nam Republic of Korea	2007 TBD	Designed for V. 2.0
Hong Kong China	Yes	Sanya	2007	Yes	China (Guangzhou) Philippines Taibei	Late 2007 2008 2012	Designed for V. 2.0 TBD TBD
Cambodia	No	No	No	Yes	Thailand	2010	Designed for V. 2.0
Fiji	No			Yes	Australia USA New Zealand	2003 TBD TBD	
India	No			Yes	TBD	TBD	N/A

STATE	AIDC IMPLEMENTATION STATUS						
	IN USE (Yes/No)	**NEIGHBOURING STATES/UNITS**	**IMPLEMENTATION DATE**	**PLANNED (Yes/No)**	**NEIGHBOURING STATES/UNITS**	**PLANNED IMPLEMENTATION DATE**	**REMARKS**
Japan	Yes	Oakland ARTCC Anchorage ARTCC	Jan. 1998 Jan. 2005	Yes	TBD	TBD	Designed for V. 2.0
Malaysia	No	-	-	Yes		TBD	TBD
New Zealand	Yes	Brisbane Oakland Nadi Tahiti Santiago	June 2000 March 2003 2004 2005 2006				Designed for V.2.0 Designed not for V. 2.0 Partial V. 1.0 Partial V. 1.0
Pakistan	No			Yes	TBD	TBD	N/A
Singapore	No	No	N/A	Yes	TBD	TBD	N/A
Thailand	No	No	N/A	Yes	TBD	TBD	N/A
USA	Yes Yes Yes Yes	Japan/Fukuoaka New Zealand/Auckland ACC USA/Anchorage ARTCC Fiji/Nadi ACC Australia/Brisbane Tahiti/Tahiti ACC	1998 Dec 2002 2006 2006 2006	Yes Yes Yes Yes Yes Yes		2007	
Viet Nam	No	No	No	Yes	TBD	2007	Designed for V.2.0

CNS/ATM Implementation Planning Matrix

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
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 delivering ADS-B data to serve a 5 Nm separations service and fully operational. ADS-B mandate applies from 12/2013 at and above FL290. WAM operating in Tasmania. Commissioned in 2010. WAM being installed in Sydney to serve 3 Nm separation service and PRM application, expected to be operation 2010.	FANS 1/A ADS-C implemented.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
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 2009 and AMHS planned for 2009-2011.								
CAMBODIA	BIS Router and AMHS planned for 2011.	Planned 2009	Planned 2009			Procedure developed for NPA.			
CHINA	ATN Router and AMHS deployed in 2008. Tripartite BBIS trial completed with Bangkok and Hong Kong, China	AIDC between some of ACCs within China has been implemented. AIDC between several other ACCs are being	Implemented to ATS Rout. L888 route, Trial on HF data link conducted for use in	Implemented in certain airspace. L888, Y1 and Y2 routes.	RNAV (GNSS) implemented in certain airports. Beijing, Guangzhou, Tianjin.	Ali, Linzhi and Lhasa airports	ADS-B trial has been conducted in 2006. 5 UAT ADS-B sites are operational and used for flight training of	FANS 1/A based ADS-C implemented. L888 route.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	in Jan. 2003. ATN trial with Hong Kong using XOT over internet conducted in 2006, Further trials planned in 2009. AMHS/ATN technical tests with Macau completed in 2009. ATN/AMHS tests with ROK, India , Hongkong China planned in 2010.	implemented. AIDC between Sanya and Hong Kong put in to operational use in Feb 2007. AIDC between Qingdao and Incheon planned for 2013.	western China.				CAFUC. Another ADS-B project for ATS route between Chengdu and Jiuzhai using 1090ES conducted since 2008. Will be followed by Chengdu – Lhasa and B215 route.		
HONG KONG, CHINA	ATN and AMHS technical trial with Japan conducted in 2003. 64 Kbps ATN Link with Bangkok put into operational use in June 2004. Preliminary ATN/AMHS technical trials with China (Beijing) using VPN over Internet connection	AFTN-based AIDC with Sanya put into operational use in February 2007. AIDC trial with other adjacent ATS authorities planned for end 2009/2010. AIDC technical trial with Taibei to be undertaken in 2010.	FANS 1/A based CPDLC trials completed in 2002. VDL Mode-2 technical trial conducted in 2002. D-ATIS, D-VOLMET and 1-way PDC implemented in 2001. PDC service	Implemented in certain airspace	Implemented in certain airspace	RNAV (GNSS) departure procedures implemented in July 2005. RNP AR APCH procedures for 07L/25R runways implemented in June 2010.	A larger-scale A-SMGCS covering the whole Hong Kong International Airport put into operational use in April 2009. Data collection/ analysis on aircraft ADS-B equipage in Hong Kong airspace conducted on	FANS 1A trials for ADS-C completed in 2002.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	conducted in September 2006. Operational AMHS commissioned in July2009. ATN/AMHS circuit with Macao put into operational use in Dec. 2009. ATN/AMHS interoperability tests with other adjacent communications centres commenced in late 2009, viz Taibei (2009), Beijing (2010), Japan (2012) AMHS trial with Philippines in late 2010. ATN/AMHS into operation in end 2009.	AIDC technical trial with Philippines to be undertaken by end 2010.	upgraded to 2-way data link in June 2008.				quarterly basis since 2004. ADS-B trial using a dedicated ADS-B system was conducted in April 2007. Further ADS-B trial planned for 2010.		
MACAO, CHINA	ATN/AMHS interoperability test with Beijing commenced in Mar 2009.								ATZ within Hong Kong and Guangzhou FIRs. In ATZ full VHF

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	ATN/AMHS circuit with Hong Kong put into operational use in end Dec 2009.								coverage exist. Radar coverage for monitoring purposes.
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 implementation by 4th quarter 2010.	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. Surveillance service will be provided starting from end of 2012	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	ATN BBIS router and AMHS Physical installation over. SAT in May	AFTN Based AIDC Coordinating with Bangladesh	FANS-1 implemented at Kolkata, Chennai,	SBAS Technical development in 2007.			Trial planned for 2006. ASMGCS	FANS 1/A ADS-C implemented at Kolkata,	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	2008, Operational trials being conducted with Singapore with live traffic exchange. Coordinating with China, Thailand , Pakistan and Oman for conduct of test.	and Pakistan and, we are ready.	Mumbai and Delhi.	Implementation planned for 2009.			Implemented at IGI Airport New Delhi.	Chennai, Delhi and Mumbai.	
INDONESIA	ATN BIS Router and AMHS planned for trial in 2009. Trial with Singapore planned. ATNBIS Router and AMHS are still on going trial with Singapore to be finished in 2010 (Part D: AMHS Commission)	Brisbane and Makassar in planned in June 2009. Makasar and Brisbane is still on going trial AIDC, planned operational in 2011	FANS-1/A. CPDLC in Ujung Pandang FIRs already trial start from 2008 and will be implemented in 2009. FANS-1/A CPDLC in Ujung Pandang FIRs is completely trial operational and will be full operational for designated route on September 2010.				27 ADS-B ground stations have been installed in 2009. Upgrading ATC automation at Makasar for ADS-B application capabilities in 2009. Plan to install 3 additional ground stations.	FANS-1/A ADS-C trial planned at Jakarta and Ujung Pandang ACC in 2007. FANS-1/A ADS-C in Ujung Pandang FIRs is completely trial operational and will be full operational in September 2010.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
JAPAN	ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005. Connection test with Taibei 2008 - ongoing. Connection tests with Australia, China, Hong Kong, Singapore, Republic of Korea, Europe and Russian Federation is TBD	AFTN based AIDC implemented with Oakland, Anchorage and Incheon. Planned between Fukoka ATMC and Taibei ACC for 2012.	FANS1/A system Implemented in Fukuoka FIR.	SBAS implemented RNAV5 implemented.	RNAV1 implemented	RNP Approach implemented	Two Multilateration Systems have been implemented at Narita and Haneda airports.	FANS 1/A. ADS-C implemented in Fukuoka FIR.	
KIRIBATI									
LAO PDR	ATN BIS Router and AMHS completed planned for implementation with Bangkok in 2010.	AIDC with Bangkok planned for 2010.		Implemented. Planned for 2011.					
MALAYSIA	ATN BIS Router completed 2007. AMHS planned in 2011	AFTN AIDC planned with Bangkok ACC in 2011.	Implemented for Bay of Bengal in July 2008.	Implemented for Oceanic Routes.	Basic RNAV implemented	NPA at KLIA implemented	Implementation of ADS-B proposed in 2010 - 2015.	FANS 1/A ADS-C already implemented for Bay of Bengal area.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
MALDIVES	ATN BIS Router/AMHS planned for implementation in the 2011.	Planned for 2011.	FANS1/A installed Trials planned in last quarter of 2007.	Trials planed for 2005-2008. Implementation in later 2008.			Trials planned for 2007-2008. Implementation in late 2008.		
MARSHALL ISLANDS						NPA implemented at Majuro Atoll.			
MICRONESIA (EDERATED STATES OF)									
Chuuk				Implemented					
Kosrae				Implemented					
Pohnpei				Implemented					
Yap				Implemented					
MONGOLIA	ATN BIS Router and AMHS planned for 2005 and 2006. Trial with Bangkok conducted.		Function available. Regular trials are conducted.		GPS procedures are being developed and implemented at 10 airports.		ADS-B trial in progress implementation planned for 2006.	FANS 1/A ADS-C implemented since August 1998.	
MYANMAR	Implementation of AMHS to be completed by the end of 2010.	The capability of ATM Automation system to support AIDC by 2011	Implemented since August 1998.				A plan to implement ADS-B by 2011	Implemented since August 1998.	
NAURU									

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
NEPAL	BIS Router and AMHS planned for 2011.	AFTN/AMHS based AIDC between KTM-CAL, KTM-BAN, KTM-LHASA planned for 2011.			GPS departure and approach has been developed for 8 airports and planned for implementation in 2008.		ADS-B feasibility study planned for 2007.		
NEW CALEDONIA							Three ADS-B ground stations implemented in 2009 to cover international traffic at La tontouta airport serving Tontouta ACC & APP.		
NEW ZEALAND	BIS Router and AMHS implementation planned for 2010.	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 (ZQN).	Domestic trial was conducted in New Zealand. Use will be re-evaluated in 2008. Trial of Area MLAT conducted in 2006. ADS-B planned as an element of MLAT at specific sites for domestic use.*	FANS 1/A Implemented	*MLAT being implemented in Auckland (Surface Movement) and Queenstown.

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
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.
PAPUA NEW GUINEA				Implemented		Implemented at certain aerodromes.			
PHILIPPINES	ATN G/G BIS Router/AMHS implemented in 2006. AMHS trials with Singapore by end 2008 and Hong Kong planned in 2009.	Planned for 2011.	CPDLC Planned for 2011.				Two ground stations scheduled for implementation in 2013.	FANS 1/A ADS-C planned for 2011.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
REPUBLIC OF KOREA	ATN BIS Router/AMHS planned for 2011.	AFTN based AIDC implemented between ACC and Fukuoka ATMC. AIDC between Incheon and Qingdao to be implemented.	PDC & D-ATIS implemented 2003.	RNAV 5 to be implemented 2012.	RNAV 1 to be implemented 2012.	APV Baro VNAV to be implemented 2012.	ADS-B implemented 2008 for SMC in Incheon International Airport.	FANS 1/A based ADS-C implemented since 2003 for contingency purpose.	
SINGAPORE	AMHS implemented. ATN BIS Router trial with Malaysia commenced in 2007 and with Indonesia in 2009. ATN/AMHS interoperability trial with India completed in Oct 2009. Commenced pre-ops trial in Dec 2009. Co-ordinating with UK and Australia on ATN/AMHS trial in Q4 2010.	AFTN based AIDC to be implemented	Implemented since 1997. Integrated in the ATC system in 1999.		RNAV SIDS and STARS implemented in 2006.	NPA Procedure implemented in 2005.	The airport M-lat system was installed in 2007 and “far-range” ADS-B sensor was installed in 2009.	FANS 1/A ADS-C implemented since 1997. Integrated with ATC system in 1999.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
SRI LANKA	ATN BIS Router Planned for 2009. AMHS planned along with BIS in 2009.		PDLC in trial operation since November 2000.				ADS-B Trials planned for 2010 and implementation in 2011.	FANS 1 /A ADS-C trial since November 2000.	GPS based domestic route structure being developed.
THAILAND	BBIS/BIS Routers already implemented. Target date for AMHS in 2008.	AFTN based AIDC planned for 2010.	FANS-1/A Implemented.	Under implementation	Implemented at Phuket Airport	Implemented at Phuket	Multilateration implemented in 2006 at Suvarnbhumi Int'l. Airport. ADS-B is planned to be part of future surveillance infrastructure	FANS 1/A ADS-C Implemented.	
TONGA	AMHS planned for 2008.					NPA planned for 2007.	Trial planned for 2010		CPDLC and ADS-C is not considered for lower airspace
UNITED STATES	AMHS implemented. AMHS Atlanta Sept 2009 to serve CAR/SAM,/ North Atlantic/Europe	AFTN based AIDC implemented.	FANS-1/A based CPDLC implemented.	Implemented	Implemented		Being implemented. Fully coverage by end of 2013 for NAS.	Implemented	
VANUATU									

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
VIET NAM	BIS Routers planned for 2009. ATN/AMHS trial in 2010 and operation in 2012.	AFTN based AIDC implemented in 2009. Trial for ATN based AIDC planned in 2010.	CPDLC operational trial conducted in early 2007.	For en-route TBD.	RNAV		TBD	FANS 1/A ADS-C operational trial conducted for oceanic area of Ho Chi Minh FIR since March 2002.	

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

EXPERIENCE GAINED AND LESSONS LEARNED BY A STATE IN IMPLMENTATION OF AIDC

1. Introduction

1.1 Airservices Australia began using AIDC messaging during the commissioning of The Australian Advanced Air Traffic System (TAAATS) in 1998. Initially messages were only exchanged between the TAAATS ATC centres in Melbourne and Brisbane. As other ATSUs in adjoining airspaces have commissioned interoperability testing has been performed leading to operational use.

2. Initial implementation

2.1 The introduction of AIDC required a moderate amount of training for Air Traffic Controllers and a significant amount of training for those managing the flight data system (System Adaptation Specialists and Flight Data Coordinators).

2.2 For initial notification Advanced Boundary Information (ABI) messages are used, followed by an Estimate (EST) message for coordination. Pre-activation (PAC) messages are used occasionally to provide early coordination for flights departing close to airspace boundaries.

2.3 Approaching the FIR boundary, Transfer of Control (TOC) and Assumption of Control (AOC) messages are exchanged.

2.4 TAAATS expects a Logical Acknowledgement Message (LAM) to any transmitted AIDC message. Additionally an Acceptance (ACP) message is expected in response to a transmitted EST message. Non-receipt of an expected response or receipt of an LRM results in an alert or warning message being displayed to the controlling responsible for the aircraft.

2.5 Current Flight Plan (CPL), Emergency (EMG), Coordination Cancellation (MAC), Miscellaneous (MIS), Coordination (CDN) and Rejection (REJ) messages are also supported by TAAATS.

3. System Adaptation

3.1 Adaptation data can be defined and modified offline to allow for different message sending conditions for different flight scenarios using variables such as the FIR being entered, the coordination point being crossed and the assigned level of the aircraft.

3.2 Default message sending parameters can be defined for flights that do not match these specific conditions.

3.3 Message timing and data parameters can be customised to support the different coordination requirements of radar/ADS-B and procedural environments. In the domestic environment, parameters are set so that ABI messages are transmitted 60 minutes before the coordination point (COP) for most flights, and EST messages are sent either 30 minutes before the COP (non-radar airspace), or between 15 and 30 minutes for flights within radar coverage.

4. Interface with external centres

4.1 In Mid 2000 testing commenced with Airways New Zealand with the aim of introducing AIDC messaging between Brisbane and Auckland and the elimination of voice coordination for routine transfers.

4.2 After successful testing and following appropriate modifications to the existing Letter of Agreement (LOA), the operational use of AIDC commenced. The types of AIDC messages exchanged between Auckland and Brisbane are the same as those exchanged between Brisbane and Melbourne, using the message timing(s) specified in the LOA.

4.3 The transition to 'no voice coordination' was staggered so as to ensure that controllers in both centres were comfortable with the AIDC process, and that any messaging errors or unexpected events could be investigated before proceeding.

4.4 The transition process involved the receiving centre contacting the transferring centre when the EST message was received and confirming the crossing conditions by voice.

4.5 After both ATSUs were confident with the use of AIDC messaging, voice coordination was eliminated except in situations where AIDC messaging did not provide adequate support (e.g. Mach Number Technique, block level clearances and weather deviations).

4.6 In late 2002, Auckland and Brisbane centres participated in a trial using CDN, REJ and ACP messages to negotiate amendments to crossing conditions after the EST message has been sent. The operational use of the CDN by Brisbane to propose changes to previously coordinated estimates and levels was introduced in early 2003. Because of TAAATS HMI limitations, the receipt of CDN messages from Auckland has been delayed until the introduction of software changes (expected by Q2 2007).

4.7 Since 2003, AIDC messaging has been introduced between several new FIR pairs:

- Brisbane and Nadi; (AIDC replaces routine voice coordination)
- Brisbane and Oakland; (AIDC replaces routine voice coordination) and
- Melbourne and Mauritius (AIDC used to align the ATS flight plans between the two ATSUs)

In addition, discussions have been held with South Africa with the aim of introducing an AIDC trial between Melbourne and Johannesburg during 2007.

4.8 Limited AIDC testing has been conducted between Brisbane and Ujung. A number of interoperability issues have been identified and as yet no firm date for trialling AIDC has been determined.

4.9 Statistical information on AIDC messages exchanged in a day between TAAATS and other ATSUs is included in Attachment A to this working paper.

5. Interoperability issues

5.1 As the number of ATSUs with which AIDC messages are exchanged has increased, the number of interoperability problems has also increased. The main problems are described below:

DOF/

TAAATS does not currently support the DOF/indicator in Field 18. Receipt of this indicator will result in an LRM application response being transmitted to the ATSU sending the original message. A software enhancement for TAAATS to support DOF/ is expected to be delivered Q3-Q4 2007.

Field 10
TAAATS currently supports a limited number of characters in Field 10. If more than this number of characters are received in an AIDC message, an LRM application response (due syntax) will be transmitted to the ATSU sending the original message. A software enhancement for TAAATS to increase the number of characters supported in Field 10 is expected to be delivered Q3-Q4 2007.

Field 18
An adjacent ATSU supports a limited number of characters in Field 18. Receipt of an AIDC message from TAAATS containing more than this number of characters results in an LRM application response being transmitted back to TAAATS.

5.2 A summary of LRMs received and/or transmitted by TAAATS in a day is included in Attachment B to this working paper.

6. Lessons learned

6.1 Flight Plan database accuracy

6.1.1 The accuracy of the flight plan database must be maintained at all times. Controllers and flight data officers/assistants must ensure that the flight plan information accurately represents the cleared route and level. As the use of RVSM and RNP becomes more widespread, flight plan ancillary information accuracy is also important.

6.1.2 There have been occasions where erroneous data has been exchanged between ATSUs leading to confusion in a downstream centres' airspace. The main errors observed have been deletion of "unknown" waypoints in the airspace of a downstream ATSU, or the incorrect truncation of the flight planned route of the aircraft.

6.2 Lead time for database or procedure changes

6.2.1 Since commencing operations in TAAATS, it has become clear that there is a need to allow sufficient time to coordinate with adjacent units before considering the implementation of data changes. Even minor changes such as the re-naming of a waypoint within your own airspace can have consequences for adjoining units. Time must be allowed for adjacent units to consider the changes, implement their own changes and perform staff training if necessary.

6.3 Staff training

6.3.1 Initial AIDC training for Airservices Australia staff was significant due to the fact that no automated messaging system was in use prior to TAAATS. Training needed to encompass basic messaging rules, errors that could occur, as well as procedures to be followed. Flight data coordinators received additional training dealing with regard to processing message errors and flight plan database management. Adaptation specialists were trained on the adaptation capabilities of TAAATS as well as any limitations for defining AIDC messaging conditions.

6.4 System failures

6.4.1 Procedures were required to deal with the possibility of system failures; either of TAAATS, adjacent systems or the AFTN. The workload increase associated with a failure of AIDC messaging is significant as voice coordination must be re-established.

6.5 Human Factors Issues

6.5.1 It has been noted that with the removal of voice coordination controllers must compensate for the lack of prompting that voice coordination provides. Controllers must also be aware of what information is being sent and when it is being sent so as to ensure that the coordination information is correct.

6.6 Reduced coordination errors

6.6.1 Operational statistics have shown that the use of AIDC messages between centres has reduced the number of routine coordination errors that occur. This is primarily due to the fact that information is composed and transmitted automatically.

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