INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ATS Inter-Facility Data Communication (AIDC) IMPLEMENTATION AND OPERATIONS GUIDANCE DOCUMENT

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Chapter 1: INTRODUCTION

1.1 Introduction

1.1.1 The ATS Inter-Facility Data-Communication (AIDC) Implementation and Operations Guidance Document (IGD) is the result of the task entrusted to the Asia/Pacific ATS Inter-Facility Data-Link Coordination Task Force (APA/TF) by APANPIRG. This main objective of this document is to provide guidance, complementing relevant ICAO standards, on AIDC implementation within the APAC region. The ultimate goal is that countries within APAC region are able to meet the regional AIDC targets according to APAC seamless ATM plan and continue to advance on Flight and Flow Information for a Collaborative Environment (FF-ICE) according to GANPs ASBU.

1.1.2 The Communications, Navigation, Surveillance and Air Traffic Management (CNS/ATM) environment is an integrated system including physical systems (hardware, software, and communication network), human elements (pilots, controllers and engineers), and the operational procedures for its applications.

1.1.3 Recognized by ICAO under its Global Air Navigation Plan (GANP) and Aviation System Block Upgrades (ASBU) framework as an effective tool to reduce manual intervention and ground-ground coordination errors between adjacent ATSUs, the ATS Inter-facility Data Communications (AIDC) is a data link application that provides the capability to exchange data between air traffic service units during the notification, coordination and transfer of aircraft between flight information regions. It is an automated system that facilitates routine coordination by providing a reliable and timely data exchange between ATSUs in which accurate information can be derived directly from the system, thus effectively reducing controllers' workload and hence human errors.

1.2 The Arrangement of AIDC IGD

The AIDC IGD will define the following:

Chapter 1	Introduction
Chapter 2	Abbreviations
Chapter 3	Reference Documents
Chapter 4	AIDC Messages – Message sets to be used for AIDC Implementation
Chapter 5	AIDC Implementation Considerations – Information to support the implementation activities including checklist and how to handle implementation issues.
Chapter 6	Harmonization Framework for AIDC Implementation – Information on the harmonization framework on AIDC implementation activities and plan.
Chapter 7	AIDC Performance Monitoring and Validation – Information on the infrastructure supporting the AIDC implementation including performance criteria, validation, monitoring, etc.
Chapter 8	AIDC Training – Guidance on operations and technical training to support effective implementation

1.3 Document History and Management

This document is managed by the APANPIRG. It was introduced as draft to the First meeting of the ATS Inter-facility Data Communication Task Force Working Group on AIDC Implementation Guidance Document (APA IGD WG/1) in Bangkok in December 2016, at which it was agreed to develop the draft to an approved working document that provides guidance for States in the APAC region for effective implementation of AIDC . The first edition was presented to APANPIRG for adoption in September 2017. It is intended to supplement SARPs, PANS and relevant provisions contained in ICAO documentation and it will be regularly updated to reflect evolving provisions.

Chapter 2: ABBREVIATIONS

2.1 Introduction:

When the following abbreviations are used in the present document they have the following meanings. Where the abbreviation has "(ICAO)" annotated, the term has already been decoded in ICAO DOC 8400 (*PANS-ICAO Abbreviations and Codes, Eighth Edition-2010*).

Abbreviations	
ABI	Advance Boundary Information (AIDC Message)
ACC	Area Control Centre
ACI	Area of Common Interest
ACP	Acceptance (AIDC Message)
AFTN	Aeronautical Fixed Telecommunication Network
AIDC	ATS Inter-Facility Data Communication
AMSS	Automatic Message Switching System
ANSP	Air Navigation Service Providers
AOC	Acceptance of Control (AIDC Message)
APAC	Asia and Pacific Office
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrades
ASM	Application Status Monitor (AIDC Message)
ATM	Air Traffic Management
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
CDN	Coordination Negotiation (AIDC Message)
COP	Change Over Point
CPL	Current Flight Plan (AIDC Message)
CRC	Cyclic Redundancy Check
CRV	Common aeRonautical Virtual private network
CWP	Air Traffic Controller Work Position
DBM	Data Base Management
EMG	Emergency (AIDC Message)
EST	Coordination Estimate (AIDC Message)

FDPS	Flight Plan Data Processing System
FF-ICE	Flight and Flow Information for a Collaborative Environment
FPL	Flight Plan
GANP	Global Air Navigation Plan
GPS	Global Positioning System
HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IGD	Implementation and Operations Guidance Document
LAM	Logical Acknowledgement Message (AIDC Message)
LHD	Large Height Deviation
LOA	Letter of Agreement
LRM	Logical Rejection Message (AIDC Message)
LTO	Logical Time Out Response
MAC	Cancellation of Notification and/or Coordination (AIDC Message)
MDT	Mean Down Time for the System
MTBF	Mean Time Between Failure
OEM	Original Equipment Manufacturer
ORCAM	Originating Region Code Allocation Method
PAC	Preliminary Activate (AIDC Message)
PANS-ATM	Procedures for Air Navigation Services – Air Traffic Management
PCA	Profile Confirmation Acceptance (AIDC Message)
PCM	Profile Confirmation Message (AIDC Message)
REJ	Rejection (AIDC Message)
SOP	Standard Operating Procedures
TF	Task Force
TOC	Transfer of Control (AIDC Message)
TRU	Track Update (AIDC Message)
UTC	Coordinated Universal Time
VVIP	Very Very Important Person

Chapter 3: REFERENCE DOCUMENTS

No.	Name of the Document	Reference	Date	Origin	Domain
i.	PAN-ATM (Doc 4444/ATM501)	Fifteen Edition including Amendment 4 applicable on 15/11/12	2007	ICAO	
ii.	Pan Regional (NAT and APAC) Interface Control Document for ATS Interfacility Data Communications (PAN ICD AIDC)	Version 1.0	September 2014	ICAO	
iii.	Asia/Pacific Regional Interface Control Document (ICD) for ATS Interfacility Data Communications (AIDC)	Version 3.0	September 2007	ICAO APAC	
iv.	Manual of Air Traffic Services Data Link Applications (Doc 9694-AN/955)	First Edition	1999	ICAO	
v.	Safety Management Manual (Doc 9859-AN/474)	Third Edition	2013	ICAO	
vi.	ICAO Abbreviations and Codes (Doc 8400)	Eighth Edition	2010	ICAO	

Chapter 4: AIDC MESSAGES

4.1 Introduction

4.1.1 This chapter describes the permitted fields and formats of AIDC messages. AIDC message fields conform to ICAO definitions contained in PANS-ATM Appendix 3 except as described below for ICAO flight plans Fields 14 and 15, as well as a "Text" field that is used in some AIDC messages.

4.1.2 ATS data in AIDC messages is enclosed between parentheses. Only one ATS message is permitted to be included in each transmission.

4.1.3 Unless specified otherwise by the ATSU, the optional elements in the AIDC message fields defined in the relevant AIDC ICD versions should be made available in the system by the manufacturer and be user configurable. An example of the elements available is shown in Table 4-13 (PAN ICD AIDC Version 1.0).

4.2 Message Field Requirements

Fields in AIDC messages do not always require the full contents of the defined ICAO message field. This section specifies the usage of specific elements from message fields defined in the PANS-ATM as well as additional information that may be included in Fields 14 and 15.

4.2.1 Field 3 requirements.

4.2.1.1 All AIDC messages should use Field 3a (Message type) only.

4.2.1.2 Fields 3b (Message number) and 3c (Message reference data) are not used, since in AIDC messages the reference numbers contained in these fields are included in the Optional Data Field (ODF), option 2 and 3. See PAN ICD AIDC Version 1.0, Chapter 3, Para 3.2.3.2.

4.2.2 Field 7 requirements.

4.2.2.1 Where Field 7 is required in an AIDC message, Field 7a (Aircraft Identification) must be included. Fields 7b (SSR Mode) and 7c (SSR Code) are optional but should be included if the information is available and applicable.

4.2.3 Field 13 requirements.

4.2.3.1 Where Field 13 is required in an AIDC message only Field 13a (Departure aerodrome), is required. Field 13b (Departure time) is not to be transmitted. The use of ZZZZ in Field 13 is supported.

4.2.4 Field 14 requirements

4.2.4.1 The following section describes the allowed contents of Field 14 (Estimate data), as well as providing examples of how Field 14 data can be incorporated in an AIDC message.

4.2.4.2 Field 14 may contain a number of mandatory and optional items. The following Table 4-1 provides an overview on the type of information that may be included in Field 14.

Table 4-1: Contents of Field 14

Data	**Example**	**Mandatory/Optional**	**Comment**
Position (14a)	0034S10413E 0017S10452E ANITO	M	Normally a waypoint or system calculated position on or near the FIR or ACI boundary as agreed to through bilateral agreement. Field 14a is followed by an oblique stroke "/"
Estimated time (14b)	2200	M	The estimate for the position in 14a
Level (14c)	A090 F330 F330F370	M	The coordinated level of the aircraft While 14c is mandatory, the support for the block level format is Optional
Supplementary crossing data (14d)	A120 F350	Included when applicable	Use in conjunction with 14e to indicate that an aircraft may be on climb or descent at, or within tolerances of, the FIR boundary

Crossing condition (14e)	Example (A) Example (B) Example (C)	Included when applicable	(A) The aircraft may be on climb from the level specified in 14d (B) The aircraft may be on descent from the level specified in 14d (C) The aircraft is cruise climbing from the level specified in 14d. The support for the cruise climb format is optional
Mach Number	GM084 EM076 LM083	O	Used when a Mach Number speed restriction has been assigned to the aircraft by ATC.
Offset and weather deviation	W25R W100E O30L	O	When an offset or weather deviation is in effect, the position in14a should be a position on the flight planned route, rather than the offset route

Note1. Each item of optional information in Field 14 is separated from the previous item by an oblique stroke "/";

Note2. The order that the item is included in Field 14 is the order in which it is listed in Table 4-1. For example, if an AIDC message were to include an assigned Mach cc as well as a weather deviation, the Mach number information would precede the weather deviation information in Field 14.

4.2.4.3 Supplementary Crossing Data and Crossing Conditions in Field 14

4.2.4.3.1 Field 14 may contain information that an aircraft is on climb, descent or cruise climb to the specified level. This is achieved by including supplementary crossing data and crossing conditions in Field 14.

4.2.4.3.2 The inclusion of cruise climb information in AIDC messages should only be made following bilateral agreement.

Table 4-2: Field 14 Crossing Information examples

Field 14	Explanation
ANITO/2130F310F290A	The aircraft is estimating ANITO at 2130, assigned F310 and is climbing from (or "above") F290.
0034S10413E/0215F310F330B	The aircraft is estimating 30N160W at 0215, assigned F310 and is descending from (or "below") F330.
PARDI/1547F360F340C	The aircraft is estimating PARDI at 1547 and is cruise climbing from F340 to F360.

4.2.4.4 Block level information in Field 14

4.2.4.4.1 Field 14 may contain information that an aircraft is operating in a block level clearance. It is permissible to include supplementary crossing data and a crossing condition with a block level, but if this occurs the supplementary information may only be a single level (i.e. it cannot be a block level).

Table 4-3: Field 14 Block Level examples

Field 14	Explanation
DUDIS/2125F320F340	The aircraft is estimating DUDIS at 2125, and is operating in a block of levels between F320 and F340 (inclusive).
0700N10533E/0244F310F350F290A	The aircraft is estimating 0700N10533E at 0244, and has been assigned a block of levels between F310 and F350 (inclusive) and is climbing to the cleared block and will be at or above F290 at 0700N10533E.

4.2.4.4.2 The AIDC format does not support a cruise climb into a block clearance.

4.2.4.4.3 The inclusion of block level information in AIDC messages should only be made following bilateral agreement.

4.2.4.5 Mach Number information in Field 14

4.2.4.5.1 Field 14 may contain information that an aircraft has been assigned a speed restriction (Mach number). When included in an AIDC message, any Mach number information should always follow directly after the level information and be separated from the level information by an oblique stroke "/".

Table 4-4: Field 14 Mach Number examples

Field 14	Explanation
AKMON/0349F350/GM085	The aircraft is estimating AKMON at 0349 at F350 and has been instructed to maintain M0.85 or greater
0145N10354E/0215F310/EM076	The aircraft is estimating 0145N10354E at 0215 at F310 and has been instructed to maintain M0.76

4.2.4.5.2 The absence of speed information in Field 14 of an AIDC message provides advice that any previously notified speed has been cancelled.

Table 4-5: Field 14 Mach Number removed example

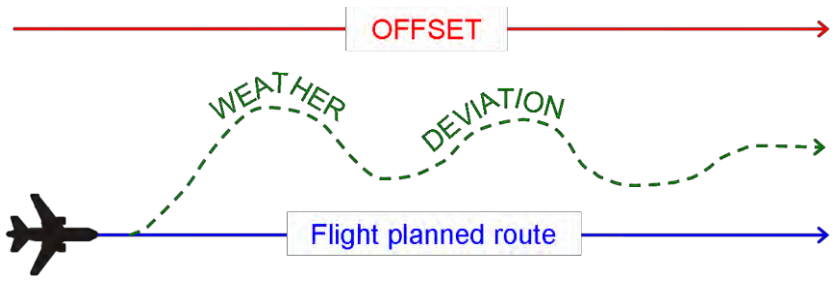
Field 14	Explanation
ESPOB/1237F310F330B/LM083	The aircraft is estimating ESPOB at 1237, assigned F310 and will cross ESPOB at or below F330, maintaining M0.83 or less.
Subsequently followed by: ESPOB/1238F310	The aircraft is now estimating ESPOB at 1238, is maintaining F310 (i.e. no longer on descent at ESPOB), and the Mach Number restriction has been cancelled.

4.2.4.5.3 The inclusion of Mach number information in AIDC messages should only be made following bilateral agreement.

4.2.4.6 Offset and Weather Deviation Information in Field 14

4.2.4.6.1 Field 14 may contain information that an aircraft is subject to either a weather deviation or offset clearance. When included in an AIDC message, any offset and weather deviation information should always be the last information in Field 14, and should be separated from preceding information by an oblique stroke "/".

4.2.4.6.2 It is important that the difference between an offset and a weather deviation is correctly understood. This difference is depicted in the diagram below.



4.2.4.6.3 An offset is a flight trajectory that is parallel to the original route, offset by a specified distance and direction. Once an aircraft is established on the offset, separation may be applied solely based on the offset path.

4.2.4.6.4 A weather deviation permits an aircraft to operate anywhere between the original route and the specified distance and direction from the original route. Separation must therefore be applied to the entire airspace in which the aircraft has been cleared to operate in.

4.2.4.6.5 The following examples show various combinations of weather deviations and offsets, combined with other optional information allowed in Field 14.

Table 4-6: Offset Weather Deviation example

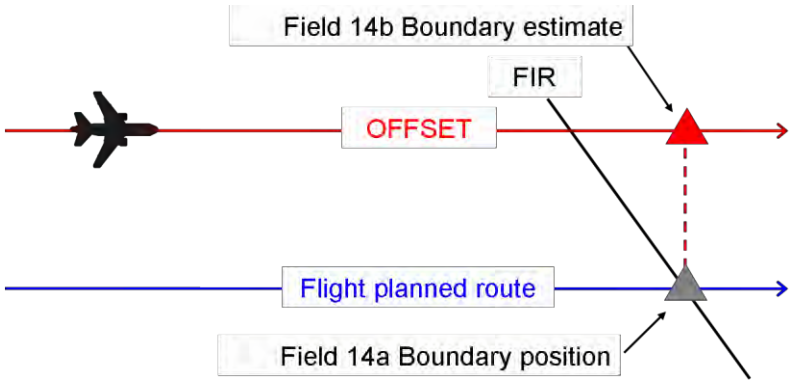
Field 14	Explanation
0856N11551E/0140F330/W20L	The aircraft is estimating 0856N11551E at 0140, maintaining F330, and has been cleared to deviate up to 20NM to the left of route.
TEGID/2330F310/GM084/O30R	The aircraft is estimating TEGID at 2330, maintaining F310, instructed to maintain M0.84 or greater, and has been cleared to offset 30NM to the right of route.
0949N11448E/0215F310F330/W25E	The aircraft is estimating 0949N11448E at 0215, is operating in a block of levels between F310 and F330 (inclusive), and has been cleared to deviate up to 25NM either side of route.
LAXOR/0215F310F350F370B/W100L	The aircraft is estimating LAXOR at 0215, and has been assigned a block of levels between F310 and F350 (inclusive), will cross LAXOR at or below F370, and has been cleared to deviate up to 100NM to the left of route.

4.2.4.6.6 The absence of offset or weather deviation in Field 14 of an AIDC message provides advice that any previously notified off-track information has been cancelled.

Table 4-7: Offset Weather Deviation removed example

Field 14	Explanation
0042N10216E/1519F330/W15R Subsequently followed by: 0042N10216E /1520F330	The aircraft is deviating up to 15NM right of track. The aircraft is back on track (and one minute later than previously coordinated).

4.2.4.6.7 When an aircraft is offsetting or deviating, the coordination point included in Field 14a should be a position based on the flight planned route rather than the offset route. The estimate included in Field 14b shall be the estimate for the "abeam" position for the position included in Field 14a.



4.2.4.6.8 The inclusion of offsets and weather deviation information in AIDC messages should only be made following bilateral agreement. Depending on their operational requirements, some ATSUs may choose to only implement the weather deviation format. If applicable, this should also be specified in bilateral agreements.

4.2.5 Field 15 requirements

4.2.5.1 The following section describes the allowed contents of Field 15 (Route), as well as providing examples of how Field 15 data can be incorporated in an AIDC message.

4.2.5.2 A number of different AIDC messages (e.g. ABI, PAC, CPL, CDN and PCM) may contain Field 15 (Route) information. Depending on the AIDC message being used, this route information may be either the current cleared route of the aircraft, or a proposed amendment to it.

4.2.5.3 While Field 15 may be optional in an AIDC message (refer Table 4-13), if it is included, all Field 15 sub-fields (15a, b and c) must also be included.

Table 4-8: Contents of Field 15

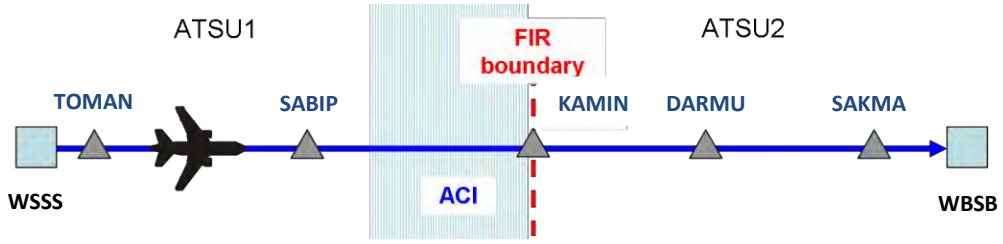
Data	Example	Mandatory /Optional	Comment
Speed (15a)	M084 N0488	M	(Included in a flight plan as the initial requested speed for a flight). In AIDC messaging: • if a speed has been specified in Field 14c, then the speed in Field 15a should be the same value; otherwise, • it should represent the expected speed of the aircraft at the coordination point included in Field 14a.
Level (15b)	F310	M	(Included in a flight plan as the initial requested flight level for a flight). In AIDC messaging: • if a block level has been specified in Field 14, then the level in Field 15a should be a single level within the block; otherwise, • it should be the level specified in Field 14c.

Data	Example	Mandatory /Optional	Comment
Route (15c)	• LAXOR • VMR • WSSS • 094937N1144829E • 033341N1065534E • L625, N884 • SJ235100 • M080F350 • M084 • F370 • M084F370 • 1230 • T • DCT	M	The route (or proposed route) of flight. It may contain any or all of the following elements: • Waypoint • Navigation aid • Aerodrome • Latitude/longitude • Latitude/longitude • ATS route • Place/bearing/distance • Speed/level changes (See Note 2) • Speed restriction • Level restriction • Speed/Level restriction (See Note 2) • Time associated with a restriction. May include a suffix of "A", "B" or "L" • Truncation indicator ('T') • Direct to

Note 1: The contents of Field 15c are defined in PANS-ATM Appendix 3, with the exception of level/time/speed restrictions which are described in PAN ICD AIDC Version 1.0 under paragraph 2.4 **Restriction Formats**. Planned speed/level changes from the filed FPL are included in some AIDC implementations although they do not reflect the current cleared profile of the aircraft.

Note 2: Flight planned speed/level changes and level/time/speed restrictions as defined in 2.4 **Restriction Formats** of PAN ICD AIDC Version 1.0, cannot both be included in Field 15 because in some cases they both use the same format. ATSUs should specify in bilateral agreements which group of information (if any) will be supported.

4.2.5.4 At the minimum, Field 15 in an AIDC message should commence at a position prior to the ACI associated with the adjacent FIR. Some ATSUs may include route information commencing at the Departure aerodrome.



4.2.5.5 Field 15 information transmitted by ATSU1 to ATSU2 should commence at (or before) SABIP. This permits ATSU2 to calculate the profile of the aircraft commencing at the ACI boundary.

4.2.5.6 ATS Route

4.2.5.6.1 An ATS route may only be preceded and followed by a waypoint that is defined to be on that ATS route.

4.2.5.7 Latitude/Longitudes

4.2.5.7.1 Latitude and longitude in Field 15 must either be both in whole degrees, or both in degrees and minutes.

4.2.5.8 Flight Planned Speed/Level Changes

4.2.5.8.1 Some ATSUs may include flight planned speed/level changes in Field 15c although they do not reflect the current cleared profile of the aircraft. An ATSU receiving Field 15c data containing planned FPL level speed changes should accept the information. However, the receiving ATSU may choose not to use the planned FPL level speed changes to update their flight plan, and may choose not to forward it in any subsequent AIDC messages.

4.2.5.9 Time/Speed/Level Restrictions

4.2.5.9.1 While the information in Field 14 defines the conditions for crossing the ACI or FIR boundary, ATSU1 may include in Field 15 time/speed/level restrictions that have been issued in a clearance to an aircraft. These clearances may include a requirement for an aircraft to cross a position at a specific time or to change level and/or speed at or by a specific time or position.

4.2.5.10 Truncation Indicator

4.2.5.10.1 While it is desirable for Field 15 to describe the entire route to destination, on occasions this may not be possible. If it is not possible to define the route to destination, it is necessary to truncate (delete the remainder of the route) and insert a truncation indicator ('T').

4.2.5.10.2 Bilateral agreements should define the use and meaning of the truncation indicator. For example the truncation indicator may represent:

i. the point at which the route in Field 15 rejoins the original flight planned route, or
ii. the end of the oceanic cleared route.

4.2.5.10.3 The truncation indicator should only follow a significant point in Field 15 and should not follow an ATS Route, or "DCT".

Note: A significant point also refers to a significant point followed or preceded by:

i. A speed/level change; or
ii. A speed and/or level and/or time restriction

Table 4-9: Field 15 examples

SY L521 AA	Navaid, ATS Route Note that both "SY" and "AA" are defined on airway L521
SY L521 GEROS 3425S16300E LUNBI AA	Navaid, ATS Route, waypoint, lat/long (ddmm)
SY GEROS GEROS045100 ESKEL L521 AA	Place/bearing/distance
SY L521 GEROS/M085F370 L521 AA DCT BB	Speed/level change, DCT
SY L521 LUNBI T SY L521 GEROS 3425S16300E T SY L521 LUNBI/M085F370 T	Truncation indicator
SY L521 GEROS/F370 L521 F370/LUNBI AA SY GEROS/2245L ESKEL/M085F390 AA SY L521 M084F350/GEROS/1230A ESKEL/M083 L521 AA	Restrictions

4.2.6 Field 16 Requirements

4.2.6.1 Where Field 16 is required in an AIDC message, only Field 16a (Destination aerodrome), is required. Field 16b (Total estimated elapsed time) and Field 16c (Alternate aerodrome/s) are not to be transmitted. The use of ZZZZ in Field 16 is supported.

4.2.7 Field 18 Requirements

4.2.7.1 Field 18 should contain other information from the current flight plan and is used to update the flight plan at the receiving ATSU.

4.2.7.2 When transmitting Field 18 in an AIDC message, all Field 18 indicators should be included, even if the change only affects data in an individual Field 18 indicator. However, ATSUs may agree by bilateral agreement to omit specific indicators (e.g. EET/) if required. If omitting indicators, ATSUs should have due regard to the potential effect to downstream ATSUs.

4.2.7.3 The contents of Field 18 in AIDC messages should be specified in bilateral agreements between ATSUs.

Note: Some legacy implementations allowed provision for the modification of individual sub fields by communicating only that specific subfield. This is not recommended practice.

4.2.7.4 In some AIDC messages, Field 18 may contain only a RMK/ indicator which is used to convey free text data information. This applies to the MAC, EMG, LRM and MIS messages.

4.3 AIDC Message Groups

4.3.1 From a technical and operational perspective it is advantageous to standardize AIDC implementation to the full extent possible. This document identifies a group of messages as a "core" message set in Table 4-10 (based on PAN ICD AIDC Version 1.0) which is recommended to be supported by all ATSUs. This will aid standardization of system and procedure development.

4.3.2 It is nevertheless acknowledged that even a limited message set implementation, such as only CPL and ACP, can bring significant benefits to ATSUs. Some ATSUs may, due to technical, financial, or operational reasons, have a need to gradually implement the AIDC message set or may even determine that not all messages in the core message set are required.

4.3.3 Unless specified otherwise by the ATSU, the non-core messages shown in Table 4-10 should be supported by the manufacturer in ground systems and their availability be configured by the ATSU as required.

4.3.4 The specific AIDC messages to be used between ATSUs should be included in bilateral agreements.

Table 4-10: AIDC Messages (PAN ICD AIDC Version 1.0)

Core	Non-core	Message Class	Message
X		Notification	ABI (Advance Boundary Information)
X		Coordination	CPL (Current Flight Plan)
X		Coordination	EST (Coordination Estimate)
	X	Coordination	PAC (Preliminary Activate)
X		Coordination	MAC (Coordination Cancellation)
X		Coordination	CDN (Coordination Negotiation)
X		Coordination	ACP (Acceptance)
X		Coordination	REJ (Rejection)
	X	Coordination	PCM (Profile Confirmation Message)
	X	Coordination	PCA (Profile Confirmation Acceptance)
	X	Coordination	TRU (Track Update)

Core	Non-core	Message Class	Message
X		Transfer of Control	TOC (Transfer of Control)
X		Transfer of Control	AOC (Acceptance of Control)
X		General Information	EMG (Emergency)
X		General Information	MIS (Miscellaneous)
X		Application Management	LAM (Logical Acknowledgement Message)
X		Application Management	LRM (Logical Rejection Message)
	X	Application Management	ASM (Application Status Monitor)
	X	Application Management	FAN (FANS Application Message)
	X	Application Management	FCN (FANS Completion Notification)
	X	Surveillance Data Transfer	ADS (Surveillance ADS-C)

4.4 Core AIDC Messages

4.4.1 This section lists down the basic core AIDC messages for the initial implementation phase (ABI, EST, ACP, AOC and TOC) that are recommended to be adopted. These messages are also identified are part of the ASBU B0 recommendations pertaining to AIDC implementation

4.4.2 The complete list of AIDC messages, their purpose, message format and examples can be found in the relevant "AIDC Messages" chapter of the various versions of AIDC ICD.

Table 4-11: Core AIDC Messages

AIDC Message	Purpose	Message format
ABI	• An ABI message is transmitted to provide information on a flight to the receiving ATSU. The purpose of the ABI is to synchronize the flight plan information held between two ATS Units. • The transmission of the initial ABI will normally be triggered at an agreed time or position prior to the common boundary or ACI, or possibly by a change in flight state. Before coordination occurs, amendments to information contained in a	ICD documents can be referred to for the required message format and examples.

AIDC Message	Purpose	Message format
	previously transmitted ABI should be notified by the transmission of another ABI.	
EST	• An EST message is used to initiate coordination for a flight. • The transmission of the EST message is used in conjunction with (and generally following) an ABI message and is triggered at an agreed time or position prior to the common boundary or ACI, or possibly by a change in flight state. • The only valid response to an EST message is an ACP message, which closes the coordination dialogue.	Respective ICD documents can be referred to for the required message format and examples.
ACP	• An ACP message is used to confirm that the coordination proposed in a received CPL, CDN, EST or PAC message is acceptable and to close the coordination dialogue. The agreed coordination conditions are updated in accordance with the proposed coordination. • An ACP message is linked to the original AIDC message using message identifier and reference identifier information described in the PAN ICD AIDC Version 1.0, section 3.2 Message Headers, Timers and ATSU Indicators.	Respective ICD documents can be referred to for the required message format and examples.
TOC	• The TOC message is sent to propose executive control of a flight to the receiving ATSU.	Respective ICD documents can be referred to for the required message format and examples.
AOC	• The AOC message is transmitted in response to a received TOC message to indicate acceptance of executive control of a flight.	Respective ICD documents can be referred to for the required message format and examples.

4.5 Application Management Messages

Table 4-12: Application Management Messages

AIDC Message	Purpose	Message format
LAM	• The LAM is transmitted in response to each AIDC message (except for another LAM or LRM) that has	Respective ICD documents can be referred to for the required

AIDC Message	Purpose	Message format
	been received, and found free of syntax and semantic errors. • A LAM is linked to the original AIDC message using message identifier and reference identifier information described in the PAN ICD AIDC Version 1.0, Chapter 3 Communications and Support Mechanisms. • Non-receipt of a LAM may require local action.	message format and examples.
LRM	• The LRM is transmitted in response to each AIDC message not eligible for a LAM to be sent. • An LRM is linked to the original AIDC message using message identifier and reference identifier information described in the PAN ICD AIDC Version 1.0, Chapter 3 Communications and Support Mechanisms. • The LRM will identify the first message field found that contains invalid information if this field information is available. • Receipt of an LRM may require local corrective action.	Respective ICD documents can be referred to for the required message format and examples.
ASM	• The ASM message is transmitted to an adjacent ATSU to confirm that end-to-end messaging is available with that ATSU. • The transmission of an ASM message normally occurs when no AIDC messages (including Application messages) have been received from the adjacent ATSU within a specified time as defined in bilateral agreement.	Respective ICD documents can be referred to for the required message format and examples.

Table 4-13: PAN ICD AIDC Version 1.0 Messages and their Field Composition

Message	**3** **a b c**	**7** **a b c**	**8** **a b**	**9** **a b c**	**10** **a b**	**13** **a b**	**14** **a b c d e**	**15** **a b c**	**16** **a b c**	**18**	**19**	**20**	**21**	**22**						
														8 **a b**	**9** **a b c**	**10** **a b**	**14** **a b c d e**	**15** **a b c**	**18**	**Text**
ABI	M - -	MOO				M -	MMMOO		M - -					OO	MMM	OO		MMM	O	
CPL	M - -	MOO	MM	MM M	MM	M -	MMMOO	MMM	M - -	M										
EST	M - -	MOO				M -	MMMOO		M - -											
PAC	M - -	MOO				M -	MMMOO		M - -					OO	OOO	OO		OOO	O	
MAC	M - -	MOO				M -			M - -								OOOOO		O	
CDN	M - -	MOO				M -			M - -							OO	OOOOO	OOO	O	O
ACP	M - -	MOO				M -			M - -											
REJ	M - -	MOO				M -			M - -											
PCM	M - -	MOO				M -	MMMOO		M - -					OO	OOO	OO		OOO	O	
PCA	M - -	MOO				M -			M -											
TRU	M - -	MOO				M -			M - -											M
TOC	M - -	MOO				M -			M - -											

Message	**3** **a b c**	**7** **a b c**	**8** **a b**	**9** **a b c**	**10** **a b**	**13** **a b**	**14** **a b c d e**	**15** **a b c**	**16** **a b c**	**18**	**19**	**20**	**21**	**22**						
														8 **a b**	**9** **a b c**	**10** **a b**	**14** **a b c d e**	**15** **a b c**	**18**	**Text**
AOC	M - -	MOO				M -			M - -											
EMG	M - -	MOO								M										
MIS	M - -	MOO								M										
LAM	M - -																			
LRM	M - -									M										
ASM	M - -																			
FAN	M - -	MOO				M -			M - -											M
FCN	M - -	MOO				M -			M - -											M
ADS	M - -	MOO				M -			M - -											M

Legend:

M: Mandatory
O: Optional

Chapter 5: AIDC IMPLEMENTATION CONSIDERATIONS

5.1 Introduction

5.1.1 The effectiveness of AIDC functionality depends on many factors, including ATM automation systems, manufacturer of the equipment, Communication network, weather-related factors, operational and technical training, Airspace design, Coordination procedures between different ATSU's, etc. Some problems/difficulties observed during implementation/testing of AIDC procedures are of common nature irrespective of different OEM's and different States. Such problems, their possible cause and their solution evolved over time may be of great help to States in the process of implementing AIDC.

5.1.2 Every effort should be made to avoid common errors through sharing of experiences of ATSUs, who have successfully implemented AIDC.

5.1.3 All States/Administrations have been requested to designate a focal point for AIDC implementation. The updated list is available on ICAO APAC website. In case of any issues, support can be requested through these focal points.

5.2 Pre-implementation Checklist

5.2.1 Prior to the implementation of AIDC, following may have to be considered by ATSUs. ATSUs can choose to adopt these recommendations with their counterparts based on the local requirements.

No.	Considerations	Yes / No	Remarks, if any
i.	AIDC Version	N/A	Version of AIDC ICD adopted by ATSU
ii.	The communications network (e.g. AFTN, etc.) is able to support AIDC operations effectively without overloading the existing infrastructure.		
iii.	List of AIDC messages applicable between the two ATSUs (ABI, EST, CPL, etc.) and parameters are agreed.		AIDC parameters to be included in the LOAs.
iv.	AIDC parameters of ATM automation systems have been configured for the AIDC connection (e.g. parameters for Coordination messages, Enable/Disable AIDC etc.).		
v.	ATM automation systems and associated sub-systems are time synchronized (GPS / UTC).		

No.	Considerations	Yes / No	Remarks, if any
vi.	Comprehensive tests with AIDC use cases completed with pairing ATSUs to ensure correct implementation and avoid unexpected responses.		
vii.	Check and ensure that the Change Over Point (COP) is consistent between the two ATSUs.		
viii.	Procedures to revert to Voice coordination have been defined by ATSUs in cases where deviations from COP cannot be handled by ATM automation systems.		
ix.	Contingency procedures have been published to cover AIDC failures. This procedure shall also address any increase in additional workload as a result of AIDC failure.		
x.	Operational and technical personnel are trained to handle AIDC.		
xi.	Communication network performance latency is monitored and recorded.		
xii.	Standard Operating Procedures (SOPs) for AIDC operations are published. Special cases where AIDC is not applicable have been identified (e.g. VVIP movements).		
xiii.	A Safety Assessment for the implementation of AIDC is carried out.		

5.3 Human Machine Interfaces

5.3.1 ANSPs should clearly specify requirements regarding Human Machine Interface (HMI) for a new ATM automation system or an upgrade. Generally, the following points may be considered:

i. *User friendliness*: choice of presentation in harmony with intended operators' environment (ATC centre), homogeneous and systematic presentation of interactions (similar actions required for similar inputs and similar feedbacks given, in all sub-elements/windows of the displays) ;

ii. *Ergonomics*: fatigue due to postural or musculoskeletal discomfort and eye focal length discomfort should be minimized, and adequate colours, font size, symbols, contrasts and brightness configured;

iii. *Efficiency*: efficient dialogues and guidance for inputs provided by the system, timely and appropriate feedback regarding operators' inputs and errors, efficient and appropriate alert and warning management avoiding unnecessary overload of the operator or the system (the latter due to non-acknowledged alerts/warnings);

iv. *Ease of Learning*: consistency and homogeneity of operators' actions through HMI.

5.3.2 With regard to AIDC, most interactions should be conducted through the label (air situation display) or electronic flight strip. It should not be done via a dedicated message box or flight plan presentation where actions to take/feedbacks/alerts could be overlooked and mis-association of the messages for flights could occur. The AIDC coordination status should also be displayed in Electronic Flight Progress Strips to increase situational awareness regarding the status of flight coordination. Any need to revert to voice communications should be clearly indicated.

5.4 Handling Implementation Issues

5.4.1 Over a period of time during testing and implementation of AIDC across ICAO-APAC region, several error messages and issues were encountered by different concerned ATSUs. Some of these issues are of common nature and some of them may be unique for a particular ATSU. Such messages compiled from various ATSUs are provided in Table 5-1 below, with a brief description of the errors, possible causes and recommended actions. These AIDC issues are not exhaustive and listed as reference only.

Table 5-1: Table of Common AIDC Issues

No.	Fault Category	Fault Description	Cause	Recommended Actions
i.	ATM Automation system	Rejection of AIDC messages by receiving system due to Error message 61, Cyclic Redundancy Check (CRC) Error.	Error is likely because sending ATM automation system is generating extra undesirable spaces	This error can be overcome by making changes in sender ATM automation system so as not to generate any extra spaces while transmitting AIDC messages.
ii.	ATM Automation/AFTN system	Coordination protocol dialogue timeout	Likely non-synchronization of time in the pairing ATM automation/AFTN systems	Automatic time synchronization through GPS servers in ATM automation/AFTN systems at both receiving and sending system is required to be done for smooth exchange of AIDC messages.
iii.	Communication Network	a) Latency in communication network (AFTN	If due to network latency, no automatic system response is received by the sender	Expand the bandwidth of existing AFTN link or increase the message

No.	Fault Category	Fault Description	Cause	Recommended Actions
		link), resulting in message time-out errors b) Message timeout errors due to possible re-routing of messages in case of failure of direct AFTN link.	system in a fixed time, then the sender system generates a LTO (time out response).	time-out parameter for all messages to avoid generation of time ou response.
iv.	Airspace Design/ Procedures	ABI messages of some of the aircrafts are not correlated with Flight plan available in ATM automation system	Rejection of ABI messages exchanged between system due to route error and mismatch in coordination timing. ATM automation system may reject the incoming ABI message because of unrecognised route portion (depends on how common airways are defined in the pairing systems - Some airways may be defined up to a certain extent in next FIR, while others may be defined only up to the FIR boundary)	Modification in airways (like imaginary points) may be considered in the database of both pairing ATSUs ATM systems for effective acceptance of AIDC messages.
v.	AIDC message format	AIDC messages in pre-2012 format		ATM system to be modified to support ICAO FPL 2012 format
vi.	AIDC message format	Some ATM automation systems rejected latitude/longitude represented up to seconds (041627N0733138E).	As per AIDC-ICD seconds is not part of the standard LAT/LONG format	ATM automation system may conform to AIDC ICD
vii.	AIDC message format /training	Incorrect route truncation. Truncated routes are not getting accepted by receiving ATSU.	ICAO route truncation indicator is not supported by many receiving ATSUs. The Asia/Pacific ICD clearly states the rules required for	Manufacturer and States must ensure that ATM automation system must be designed/ changed as per APAC ICD

No.	Fault Category	Fault Description	Cause	Recommended Actions
			truncating a route after the last known significant route point. If these rules are not followed there are significant risks associated with the transmission of incorrect route information to the receiving ATSU. While the majority of instances investigated are the result of human error, there have been occasions when the ATM automation system behaved unexpectedly. With the increasing use of route modifications, the accuracy of route handling and transmission between automated systems need to be ensured.	mandated by ICAO. To avoid human errors, a comprehensive training backed up by regular refresher training is required to be imparted to controllers/system operators.
viii.	AIDC message flow	Non-receipt of ACP messages within designated time span results in unnecessary LRM messages	In some of the ATM automation systems, there is no provision of automatic acceptance of EST messages and messages are accepted manually at receiving ATSU.	It is recommended that AIDC messages like EST are accepted automatically to avoid frequent LRM messages.
ix.	AIDC message flow	Even after sending a rejection (REJ) or counter coordination message (CDN) by receiving ATSU, the transmitting ATSU continues to send the CDN message	Unnecessary/ multiple generation of automatic CDN messages by transmitting ATSU, without waiting for an acknowledgement, might be due to system getting into some loop or may be due to some other system problem	As per PAN-ICD protocol, transmitting system must wait to receive response for a CDN message. This response may be ACP, REJ or CDN. The temporary solution may be to stop automatic generation of CDN messages by the system.

5.5 HMI Considerations

ATSUs should consider the following recommendations for configuration of the ATM automation systems for AIDC HMI presentation:

i. AIDC HMI should allow some flexibility to initiate or respond to AIDC messages (if required).

ii. The ATM automation system should allow to define the mode of Message exchange off-line for AIDC i.e. fully automatic or manual. For example automatic/manual responses for the messages like EST, CPL, PAC, CDN, etc.

iii. Dedicated AIDC message exchange window to display readily the current status and actual content of messages exchanged should be considered. In addition, AIDC message exchange status may preferably be considered to be displayed via the data block of individual aircraft on the Air Situation Display.

iv. ATM automation system should allow the creation of flight data record on receipt of an ABI message, if a flight data record is not available to minimize the possibility of LRM messages in case flight plan is not available in the receiving ATSU.

v. The use of colour to distinguish the various states of AIDC process may be considered.

Chapter 6: HARMONIZATION FRAMEWORK FOR AIDC IMPLEMENTATION

6.1 Introduction

6.1.1 This chapter describes the steps that should be taken to harmonize AIDC implementation between ATSUs. As the successful transmission and reception of AIDC messages are dependent on various external factors, the need to harmonize implementation plans and timelines if AIDC implementation is to be successful.

6.1.2 AIDC messages can be transmitted through existing AFTN networks or by the use of dedicated data channels between ATSUs. There may be a need to upgrade existing infrastructure to cater for sufficient bandwidth for handling AIDC messages.

6.1.3 The framework details and template are described in greater detail in the next section.

6.2 Harmonization Framework

The various items that will require harmonization between ATSUs are listed below. These are the minimum required and individual ATSUs may choose to include additional items as required. A coordinated approach to implementing AIDC is crucial to allow ATSUs to improve on coordination efficiency and remove associated errors that could arise with manual voice coordination.

6.2.1 Bilateral Agreements

6.2.1.1 The use of AIDC messages in the provision of ATC services will usually require harmonization of ATC procedures to allow ATSUs to take advantage of the message automation. This will require an update to existing bilateral agreements between ATSUs with regards to the coordination process and the various AIDC-related arrangements.

6.2.2 ATC Procedures

6.2.2.1 With the introduction of AIDC messages for use in the provision of ATC services, existing ATC procedures may need to be reviewed or modified to incorporate these AIDC messages as part of the ATC procedures. E.g.: the use of EST for coordination may reduce the need for voice coordination between ATSUs.

6.2.3 ATS Routes

6.2.3.1 AIDC messages are used to improve the coordination processes between ATSUs. These messages can be used selectively on specific ATS routes/waypoints as agreed by the ATSUs involved. The various ATS routes and coordination waypoints will need to be defined and agreed between the ATSUs to facilitate AIDC implementation.

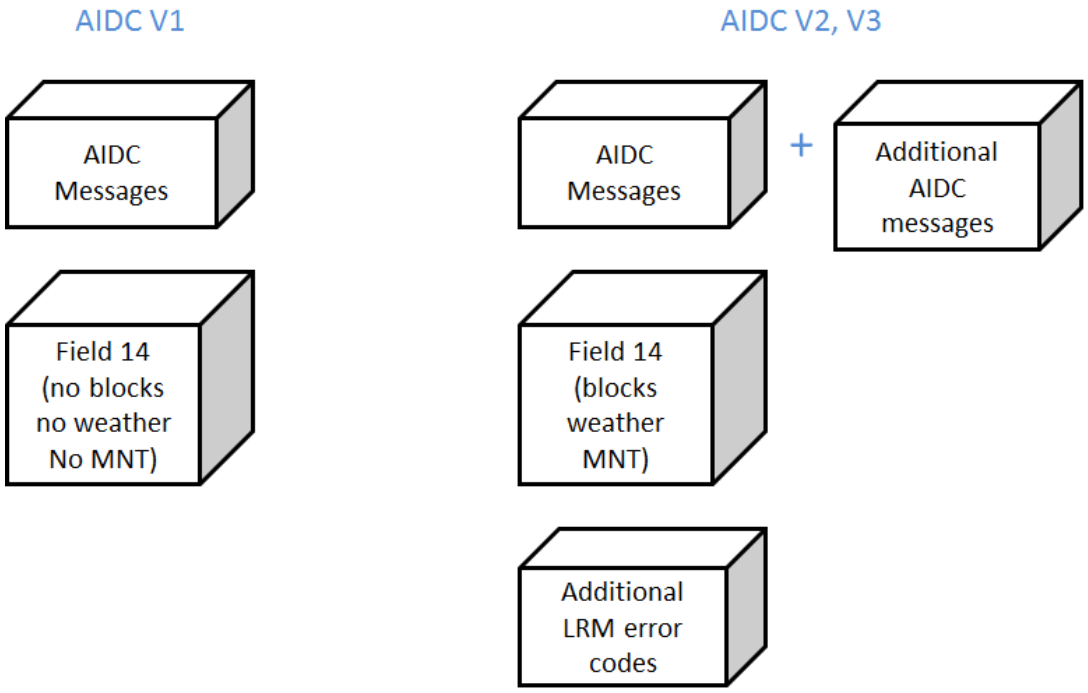
6.2.4 AIDC Version

6.2.4.1 Even though the latest AIDC version is backward compatible to a large extent, there may be instances where certain version-specific messages may result in errors between two ATM automation systems. Ideally both ATSUs should use the same AIDC version. If however different versions are deployed, the ATSUs should coordinate closely and reach an agreement for operating AIDC using a common set of messages.

6.2.4.2 The enhancements introduced during the development of AIDC ICD Version 2 and 3 were designed to permit continued interoperability with AIDC ICD Version 1. For example, when a block level format was defined for Field 14, it was explicitly stated that this was an optional format only to be used with agreement between the two ATSUs.

6.2.4.3 The following diagram depicts the significant differences between AIDC Version 1 and the subsequent AIDC versions. Compatibility of AIDC versions is covered in PAN ICD Version 1.0.

Figure 6-1: Differences between Versions of AIDC



6.2.4.4 The diagram shows that AIDC messages supported in AIDC Version 1 is included in AIDC V2 and V3. As such, an AIDC V1 ATSU is interoperable with an AIDC V2 or 3 ATSU. The additional messages in AIDC V2 and V3 are not supported by AIDC V1. However, this could easily be controlled procedurally by simply not sending these messages.

6.2.5 AIDC Messages

6.2.5.1 The implementation of AIDC does not require the use of all the defined AIDC messages. ATSUs will need to define the specific AIDC messages to be used for ATC services and also the related parameters that will be configured for these messages

6.2.6 Communication Network

6.2.6.1 The carriage of AIDC messages is facilitated through existing communication network (e.g. AFTN, AMHS, etc.). The type of network that will be used for AIDC message exchange will need to be defined, including the appropriate recovery/ contingency actions that will be adopted in abnormal situations.

6.3 Template of Harmonization Framework for AIDC Implementation

Table 6-1: Harmonization Framework for AIDC Implementation between ATSU1 and ATSU2

No.	Harmonization items	Description	Remarks
1	Bilateral agreements	• Date of implementation to be stated in bilateral agreement e.g. LOA or MOU between ATSUs. • AIDC messages and parameters to be implemented • ATS routes /coordination points to be determined • Agreed fallback procedures in the event of unsuccessful message exchanges • AIDC suspension conditions • Communication network for AIDC messaging (e.g. AFTN, dedicated line, etc.)	Sample LOA/MOU are available in Appendix A
2	ATC Procedures	• Agreed AIDC message parameters and activation conditions by both ATSUs. • Fallback procedures in the event of AIDC failure.	

No.	Harmonization items	Description	Remarks
3	ATS Routes	• ATS routes • Coordination points	
4	AIDC Version	• AIDC version to be used by ATSUs	If different versions are deployed, the ATSUs should coordinate closely and reach an agreement for operating AIDC using a common set of messages.
5	AIDC Messages	• List of AIDC messages to be exchanged	List of core messages
6	Communication Network	• Infrastructure required (e.g. communications connection) • Alternate/backup links in the event of failure of primary transmission channel.	

Chapter 7: AIDC PERFORMANCE MONITORING AND VALIDATION

7.1 Introduction

7.1.1 AIDC is recognized as an effective tool to foster better collaborative air traffic management between concerned ATSUs of adjacent FIRs, supporting the ICAO ASBU Module B0-FICE, identified as one of the regional priority modules under the ICAO Asia/Pacific Seamless ATM Plan.

7.1.2 In addition, safety issues relating to human errors in ATS transfer were identified by the 18th and 20th Meetings of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/18 and RASMAG/20 meetings) where AIDC was considered as an important means of mitigating Large Height Deviation (LHD*[Note 1]).

7.1.3 The procedures described in this section aim to ensure system performance by validation, reporting and tracking of possible problems revealed during system monitoring with appropriate follow-up actions.

**Note 1*: Large Height Deviation (LHD) means any vertical deviation of 90m/300ft or more from the flight level expected to be occupied by the flight.

7.2 AIDC Performance Criteria

7.2.1 The efficiency gained by adopting AIDC is significant. With continued growth in ATC traffic, higher efficiency and benefits from the introduction of AIDC can be anticipated.

7.2.2 However, if AIDC messages are not transmitted and received in a timely manner between ATM automation systems, potentially there will be increased risk if AIDC does not meet the performance criteria as aircraft might cross boundaries without coordination or transfer of control responsibility taking place.

7.2.3 In order to effectively use the AIDC application for the interchange of ATC coordination data, performance requirements need to be specified. These specified performance requirements need to be mutually agreed between neighbouring ATSUs implementing AIDC. The following are recommended performance parameters for application response time and operational response time

7.2.4 Application Response

7.2.4.1 Every AIDC message received by an ATSU, except a LAM or LRM, shall be responded to with a LAM or LRM. While no LAM is generated for a valid LRM, an ATSU may choose to respond to an invalid LRM with an LRM. Such a response is termed an Application Response, and is generated automatically by the ATM automation system. A LAM shall be transmitted when the receiving ATM automation system found the received message to be syntactically correct and the message data was accepted for further processing or presentation. Otherwise, an LRM message shall be transmitted.

7.2.4.2 The timeout value T_{alarm} associated with an application response should typically be less than 180 seconds measured from the transmission time of the original message and may be specified by bilateral agreement, corresponding to the nominal value associated with the accountability timer.

7.2.4.3 The transmission of an application response should be triggered after the semantic and syntactic checks have been performed on the incoming message. This is because the purpose of an application response is to indicate that a received AIDC message has both been received and is semantically and syntactically correct. Failure to receive an expected application response (i.e. a LAM or LRM) within Tr seconds ($\leq T_{alarm}$) shall result in a re-transmission (up to a maximum number Nr) of the original message. The timeout timer Tr shall be reset upon re-transmission. Failure to receive an application response within T_{alarm} seconds from the original transmission of the message shall result in a warning being issued.

7.2.4.4 The transmission of a LAM or LRM shall be triggered by the ATC application process, not the communications process. This is because an application response indicates that the received message was examined by the ATC application process(s), not just the communications functions. Note the distinction between an ATC application process, which implements a critical ATC function such as Coordination or Transfer of Control, and a communications process, which is responsible for the reliable delivery of data, but not data interpretation.

7.2.4.5 Receipt of an LRM should cause the ATSU to take a corrective action before re-transmitting the rejected message with a new message identification number. This corrective action may be automatic or manual.

7.2.5 Operational Response

7.2.5.1 Several AIDC messages require a response, in addition to the normal application response, by another AIDC message. Such a response is termed an Operational Response.

Table 7-1 below indicates the required response to a received message. AIDC messages not listed in Table 7-1 have no operational response.

Table 7-1: Required Operational Response

Received Message	**Required Operational Response**
CPL	ACP or CDN[Note]
EST	ACP
PAC	ACP
CDN	ACP,CDN, or REJ[Note]
PCM	PCA
TOC	AOC

Note.: An REJ is not available in an Initial Coordination Dialogue initiated by a CPL, EST or PAC. An REJ is only available in a CDN dialogue while an REJ is not a valid response to a CDN message within an Initial Coordination Dialogue.

7.2.5.2 Failure to receive a response within an adapted operational response timeout period T_{op} shall result in a warning being issued.

7.2.5.3 The value of T_{op} is dependent on whether manual processing is required to generate the operational response. In general, T_{op} should be less than a value when a manual action is required to trigger the operational response.

7.2.5.4 For example, the performance requirements specified in Asia/Pacific Regional Interface Control Document (ICD) v3.0 are as follow:

Table 7-2: Performance Figures

T_{alarm}	180 seconds
T_{op}	≤600 seconds

7.2.5.5 The performance of the AIDC will also rely on the performance of the communication network: AMHS/AFTN, and communication layer such as Common IP-based networks. In this connection, the following end-to-end communication requirements based on Common aeRonautical Virtual Private Network (CRV) may be considered between any two AIDC peers:

Maximum One-Way Latency (ms): 300 ms

Maximum Round Trip Time (ms): 600 ms

Normally, the latency of the communication network (in msec) is sufficient to support to the application of AIDC (in second), for example, each AIDC message sent will result in at least one technical response (LAM or LRM), and where necessary an operational response (e.g. EST/ACP, TOC/AOC). Some AIDC application timeout with reference to the agreed ICD as mentioned above is required to be set based on performance of the communications circuit.

7.2.6 Reliability

7.2.6.1 Reliability is a measure of how often a system fails and is usually measured as Mean MTBF expressed in hours. Continuity is a measure equivalent to reliability, but expressed as the probability of system failure over a defined period. In the context of this document, failure means inability to deliver AIDC messages to the adjacent ATSUs. This includes the failure of AIDC functions only. For the other factors such as the failures of communication link and the counterpart AIDC functions are not counted in this document. The reliability performance requirement of AIDC is given in ICAO Doc 9694 “Manual for Air Traffic Services Data Link Applications” (99.9%).

7.2.7 Availability

7.2.7.1 Availability is a measure of how often the system is available for operational use. It is usually expressed as a percentage of the time that the system is available.

7.2.7.2 Planned outages are often included as outages because the efficiencies provided to the Industry are lost, no matter what the cause of the outage. However, some organisations do not include planned outages because it is assumed that planned outages only occur when the facility is not required.

7.2.7.3 Availability is calculated as

Availability (Ao) = MTBF/(MTBF+MDT)

where MTBF= Mean Time Between SYSTEM Failure
MDT = Mean Down Time for the SYSTEM

The MDT includes Mean Time To Repair (MTTR), Turn Around Time (TAT) for spares, and Mean Logistic Delay Time (MLDT)
NB: This relates to the failure of the system to provide a service, rather than the time between individual equipment failures. Some organizations use Mean Time Between Outage (MTBO) rather than MTBF.

7.2.7.4 Availability is directly a function of how quickly the SYSTEM can be repaired, that is directly a function of MDT. Thus availability is highly dependent on the ability & speed of the support organisation to get the system back on-line. The availability performance requirement of AIDC is given in ICAO Doc 9694 "Manual for Air Traffic Services Data Link Applications" (99.996%).

7.3 AIDC Performance Monitoring

States/Administrations are encouraged to submit identified issues using the AIDC issues form to the ICAO Regional Office for consolidation.

7.3.1 The Monitoring Process

7.3.1.1 When problems/issues are discovered, the initial analysis should be performed by the organization(s) identifying the problem/issues. In addition, the problem/issue should be logged in the AIDC issues table. As some problems or abnormalities may involve more than one organization, the originator should be responsible for follow-up action to rectify the problem and take lead to record the information in the AIDC issues table. It is essential that all information relating to the problem/issue is documented and recorded and resolved in a timely manner.

7.3.1.2 The following groups should be involved in the monitoring process and problem/issue tracking to ensure a comprehensive review and analysis of the collected data:

i. ATS Providers;
ii. Organizations responsible for ATS system maintenance (where different from the ATS provider);
iii. Relevant State regulatory authorities; and
iv. Communication Service Providers being used (if appropriate).

7.3.1.3 To quantify the safety benefits of AIDC implementation, number of LHDs prior to and post AIDC implementation should be noted and recorded for analysis.

7.4 AIDC Validation

7.4.1 Validation Guidelines

7.4.1.1 ATSUs should conduct a validation process before introduction of their new AIDC functionality and procedures. Such processes shall include before and during implementation:

i. A system safety assessment for new implementations is the basis for defining system performance requirements. Where existing systems are being modified to utilize additional services, the assessment shall demonstrate that the ATS Provider's system will meet safety objectives;
ii. Integration test results confirming interoperability for operational use of AIDC messages; and
iii. Establishment of the Operational Instruction (OI)/ Letter of Agreement (LOA) or Memorandum of Understanding (MOU) between ATSUs and mutual agreement on the associated parameters for the set of AIDC messages to be implemented.

7.4.2 Safety assessment

7.4.2.1 In accordance with the provisions of ICAO SMS manual (Doc9859), the objective of the system safety assessment is to ensure the ATSUs that the introduction and operation of AIDC is safe. The safety assessment should be conducted for initial implementation as well as any future enhancements and should include:

i. Identifying failure conditions;
ii. Assigning levels of criticality;
iii. Determining risks/ probabilities for occurrence;
iv. Identifying mitigating measures and fall back arrangements;
v. Categorizing the degree of acceptability of risks; and
vi. Operational hazard ID process
vii. HMI verification

7.4.2.2 Following the safety assessment, ATSUs should institute measures to offset any identified failure conditions that are not already categorized as acceptable. This should be done to reduce the probability of their occurrence to a level as low as reasonably practicable. This could be accomplished through system automation or manual procedures.

7.4.3 Integration test

7.4.2.3 ATSUs should conduct AIDC trials (both operational and technical) with adjacent ATSUs to ensure they meet the operational and technical requirements stated in the agreed test procedure. Examples of Interoperability tests and Technical trials are provided in Appendix A and B respectively.

7.4.3 Agreement for Validation

7.4.3.1 States should coordinate with pairing ATSUs to confirm that their tests procedures ensure harmonization of procedures during testing.

7.4.4 Distribution of information

7.4.4.1 It is important that information that may have an operational impact on other parties be shared by States/Administrations and distributed by the ICAO Regional Office, as soon as possible. In this way, each party is made aware of problems already encountered by others, and may be able to contribute further information to aid in the solution of these problems.

Chapter 8: AIDC TRAINING

8.1 Introduction

8.1.1 Training is one of the key elements for preparing operators on AIDC and to provide guidance on both AIDC technical and operational procedures. A comprehensive training program will ensure operational and technical personnel have a better understanding on how AIDC works, interface between AIDC and ATS system and skills required to operate AIDC. Training program should be reviewed and updated when changes are planned.

8.1.2 Air traffic controller training is defined with specified regulations, international and domestic, that prescribe minimum requirements for organizations certified for such a training. These requirements include creation of the:

i. Implementation Plan
ii. Operations Manual
iii. Technical Manual
iv. Training Program

8.1.3 In order to provide safe, orderly and efficient flow of air traffic and to ensure harmonized training process, each country needs to provide a sufficient AIDC training. This training should increase the performance of operational and technical personnel and improve overall air traffic safety and efficiency.

8.2 Training Objectives

8.2.1 Taking into consideration that operational and technical trainees come from various backgrounds and different levels of competency, a structured training program/module is recommended incorporating AIDC objectives. This would enable operational and technical personnel to have the acceptable level of understanding on how AIDC work. The objectives would be:

i. To instil knowledge by imparting AIDC concepts, , skills and techniques. To educate trainees on the benefits of AIDC and how it can reduce controller's workload.
ii. To increase efficiency and reduce human errors by incorporating AIDC automation.

8.3 Training Principles and Techniques

8.3.1 The following should be taken into consideration prior to conducting AIDC training:

i. Operational and technical personnel may come with different levels of experience, knowledge, skill, attitude and age.
ii. AIDC training includes theoretical and practical training.
iii. Participant evaluation/feedback for each training session is important to ensure trainees fully understand the principles and objectives of AIDC.

8.4 Training Procedure

8.4.1 It is recommended that following training procedure should be used as a guidance for AIDC training:

i. Instructor should be competent in AIDC as well as instructional techniques. On the basis of AIDC analysis and description, progressive lesson plan should be prepared.

ii. Human factors with regard to introduction of AIDC should be covered during the training. Trainees should be prepared to accept changes in their working environment. The loss of cognitive functions with the introduction of AIDC automation as compared to voice coordination should be emphasized.

iii. The training program with respect to structure, flow and sequence of AIDC functions should be clearly presented.

iv. All relevant documents such as appropriate version of AIDC ICD, local AIDC procedures, AIDC technical manuals etc., should be made available before conducting AIDC training session.

v. During the AIDC training, assessment of operational and technical personnel's competency in AIDC should be conducted.

8.5 Scope of Training

8.5.1 The scope of training would depend upon the categories of personnel to be trained. Training is a continuous process and not only needed for operational personnel but also for technical personnel involved in AIDC. The level of training will differ as operational personnel will focus more on operational aspects and technical personnel will focus more on technical aspects of AIDC.

8.5.2 Basic cross learning of operational and technical elements of AIDC will help both operational and technical personnel to identify and respond to any abnormality that may arise during AIDC operations.

Table 8-1: Scope of Operational and Technical Training

No	Scope of training	Operational Personnel		Technical Personnel	
		Theory	Practical	Theory	Practical
i	Introduction to AIDC	Essential	Essential	Essential	Essential
ii	AIDC phases, message flow and functions	Essential	Desirable	Recommended	Essential
iii	Communication network	Recommended	Desirable	Essential	Essential
iv	AIDC parameters	Essential	Desirable	Essential	Essential
v	AIDC outages.	Recommended	Desirable	Essential	Essential
vi	Contingency procedures	Essential	Essential	Essential	Essential

8.5.3 AIDC operations training should normally cover the following for both Theory and Practical. Practical training on AIDC HMI and message flow may be conducted on ATM automation system simulator or procedure trainer.

8.5.3.1 Introduction to AIDC:

i. AIDC reference documentation should be made available in advance prior to the training.
ii. Highlight the benefits of introduction of AIDC.
iii. Human factors with regard to introduction of AIDC.
iv. Highlight the contingency procedures in the event of AIDC failure/suspension..

8.5.3.2 AIDC phases, message flow and functions:

AIDC is divided into three different phases:

i. Notification phase (including pre-notification),
ii. Coordination phase and
iii. Transfer phase and each phase will operate with different AIDC messages.

Understanding of these phases will help operational and technical personnel to differentiate the usage of each AIDC message. Appropriate versions of ICDs may be referred to for detailed description of different AIDC phases and message flow. Practical training of AIDC functions on a simulator may be considered as appropriate.

8.5.3.3 Communication Network:

ATSUs use ATS Message Handling System (AMHS), Aeronautical Fixed Telecommunication Networks (AFTN) and/or any other medium as appropriate for exchanging data. Accordingly, the structure and routing details of the communication network should be made available during training for better understanding for both operational and technical personnel.

8.5.3.4 AIDC parameters:

Each AIDC message has its own parameters which will be based on mutual agreement between the participating ATSUs. Operational personnel should know the relevant AIDC message parameters to be configured. . Technical personnel should be able to understand and configure these parameters.

8.5.3.5 AIDC outages:

Reasons of common AIDC outages should be highlighted. Operational personnel should be able to recognize and react to the issue appropriately. Problems may be caused by hardware and/or software. Once AIDC issue is reported, technical personnel should follow recommended procedures to resolve the issue. Appropriate flow chart for fault isolation and resolution needs to be developed by the individual ATSUs.

8.5.3.6 Contingency procedures:

AIDC recovery and contingency procedures shall be the part of AIDC training program. Contingency procedures should be applied when any of the following conditions are faced:

i. ATM automation system outages
ii. AIDC connection issues,
iii. Adverse weather conditions,
iv. Any other conditions as agreed in the LOA.

Voice coordination is required if there is a tactical requirement to a particular aircraft such as 10 minutes separation with no closing speed, imposed Mach number to a particular aircraft etc.

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Appendix A

Sample Letter of Agreement (LOA) /Memorandum of Understanding (MOU)

Auckland Oceanic – Brisbane ATS Centre

Letter of Agreement

Coordination – General

Transfer of Control Point	The Transfer of Control Point (TCP) should be either on receipt of an Acceptance of Control (AOC) to a Transfer of Control (TOC) or the common FIR boundary, whichever occurs first. The TCP should also be the point of acceptance of primary guard. All ATS units should coordinate an estimate for the FIR boundary at least thirty (30) minutes prior to the boundary. Such coordination constitutes an offer of transfer of responsibility. After the estimate for the FIR boundary has been sent, units should coordinate any revised estimate that varies by 3 minutes or more.
Communication Systems	Use of communications systems coordination between adjacent units should be in the following order of priority: a. ATS Interfacility Data Communication (AIDC) b. AIDC messages and procedures are specified in the following sections; c. ATS direct speech circuits; d. International telephone system; e. Any other means of communication available.
AIDC Messages	AIDC message format will be in accordance with the Pan Regional Interface Control Document (PAN ICD) for AIDC, as amended from time to time, unless described otherwise in the LOA. Successful coordination via AIDC occurs on receipt of an ACP message in response to an EST message. Each centre should advise the other of any known equipment outage that affects AIDC.
AIDC Message Parameters	The following table details the AIDC parameters and message to be used.

Message	**Parameter**	**Notes**
ABI	EUROCAT: 5-60 minutes prior to COP (Note: An updated ABI will	ABI is sent automatically and is transparent to controller. ABI automatically updates flight plan.

Message	Parameter	Notes
	not be sent once an EST has been sent) OCS: 40 minutes prior 50nm expanded boundary	
EST	EUROCAT: 40 minutes prior to COP OCS: 40 minutes prior 50mn expanded boundary	Any changes to EST level or estimate conditions as detailed in LOA to be notified by voice after initial coordination completed. See notes below on voice procedures. EST is required to track generation in EUROCAT.
ACP	EUROCAT: Sends automatic ACP on receipt of EST OCS: Sends automatic ACP on receipt of EST	EUROCAT: If ACP not received within 4 minutes the sending controller is alerted. Sending controller will initiate voice coordination if ACP is not received within 4 minutes of sending EST. Receiving controller will initiate voice coordination if proposed EST conditions are not acceptable. OCS: If ACP is not received within 5 minutes the sending controller is alerted. Sending controller will not initiate voice coordination if ACP is not received within 5 minutes of sending EST. Receiving controller will initiate voice coordination if proposed EST conditions are not acceptable.
TOC	EUROCAT: Sent automatically 5 minutes prior to boundary OCS: Sent automatically 2 minutes prior to boundary	
AOC	EUROCAT: Sent automatically on controller acceptance of a TOC OCS: Sent automatically on receipt of a TOC	
CDN	EUROCAT: Manually by the controller when required	• Responses to the CDN should be ACP or REJ only – there will be no CDN negotiations. • CDN messages will be sent by Brisbane only to revise coordination on eastbound flights. • CDN messages may be used to coordinate changes to estimate or assigned altitude only.

Message	Parameter	Notes
		• Only on CDN dialogue may be open per aircraft at any time. • Not to be used if the aircraft will not be maintaining the assigned altitude 10 minutes prior to the TCP.
MAC	As per ICD	
LRM	As per ICD. Controller alerted on receipt	
LAM	As per ICD. Controller alerted on non-receipt	

Amendment to Flight Data Record

Route amendment – routes/waypoints may be added/deleted as long as they do not change the original intent or integrity of the flight plan information.

Truncation – where route amendment outside the FIR unavoidable:

a. Terminate the route details at the farthest possible 'flight planned' point of the flight outside the FIR and enter "T" immediately following this.

b. If insufficient 'flight planned' point exist outside the FIR for truncation, insert the first 'defined' point in the adjoining FIR and enter "T" immediately following this.

c. The minimum acceptable truncation point must be at least the first point in the adjoining FIR.

d. Every effort is to be made to truncate the route at a minimum of one point beyond the adjacent international FIR to provide an entry track in to that FIR.

Address Forwarding and Next Data Authority

Brisbane ATSC and Auckland OAC should send automatic Next Data Authority (NDA) and Address Forwarding (CAD) for data link aircraft as per the following table:

Brisbane ATSC	Auto NDA sent 22 minutes prior to the FIR boundary Auto CAD sent 20 minutes prior to the FIR boundary
Auckland OAC	Auto NDA sent 40 minutes prior to the FIR boundary Auto CAD sent 35 minutes prior to the FIR boundary

Voice Coordination

Voice coordination is not required when AIDC messaging has been successful to offer and accepts transfer of control.

However, the receiving controller will initiate voice coordination if the

proposed AIDC EST conditions are not acceptable.

If AIDC messaging is not to be sent following voice coordination, it should be stated as part of the voice coordination by use of the phrase "AIDC messaging will not be sent". A read back is required.

Voice Coordination is required for aircraft operating under any of the following conditions:

- block level clearance;
- weather deviations;
- offset track; or
- Mach Number technique.

Read backs should comprise all elements of the voice coordination passed by the transferring controller. Read back by the receiving unit confirms acceptance of the offer of transfer of control subject to any other conditions negotiated.

Hemstitch Flights

A hemstitch flight is any flight that will remain within the New Zealand FIR for less time than the NDA VSP (40 minutes) prior to the flight entering the Brisbane FIR.

Auckland AOC should voice coordinate any hemstitch flight.

Near Boundary Operations

ATS units should relay significant details of any flight which is, or intends operating within fifty nautical miles (50NM) of the common FIR boundary.

HF Frequencies

Brisbane ATC and Auckland ATC should update each other as to the current voice backup frequency for use by ATC data link equipped aircraft.

Appendix B

Sample of AIDC Interoperability Tests

Between Hong Kong New ATMS and Manila ATMS

1. Background

The Hong Kong new ATM System (ATMS) comes with fully integrated AIDC functionality. Hong Kong would like to arrange with Manila ACC to conduct AIDC technical and interoperability test prior to the new ATMS being put into live operation.

Subject to test result and mutual agreement, a plan for the commissioning of AIDC operations between Hong Kong and Manila can be formulated.

2. Scope

AIDC interoperability test for Hong Kong new ATMS with Manila ATMS is to be conducted. Selected AIDC messages (EST, ACP, LAM and LRM) are to be tested, using live or pseudo data, matching with both ACC's concept of operation.

3. Prerequisite

Technical test between Hong Kong new ATMS and Manila ATMS has been completed to ensure CRC algorithm is matched and connection is established. The full set of AIDC messages supported by the ATMS/Manila ATMS other than those selected for operation use will also be covered in the technical test.

4. Test Configuration

AFTN Address for AIDC Test

Hong Kong ATMS **VHHH**[redacted]

Manila ATMS **RPHI**[redacted]

CRC-CCITT Scheme

XMODEM (NULL_INIT)

Protocol and Message Type

AIDC Version: Version 3.0

Message Type: **EST, ACP, LAM, LRM**

Note: Block Level and Speed should not be used in EST

Figure 1 below summaries the AIDC interoperability test configuration:

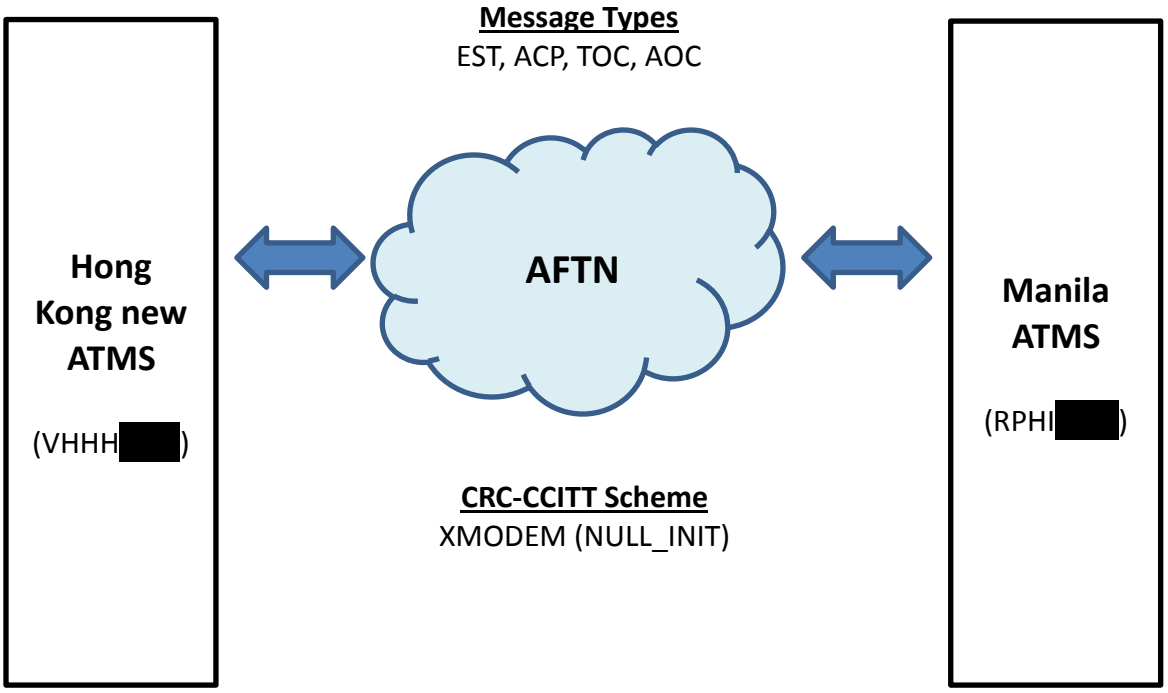

Figure 1 – AIDC Interoperability Test Configuration

5. Hong Kong New ATMS AIDC Operation and Parameters

- Accountability Timer (Application Response Time Out): 45 seconds
- No. of Retransmission upon Application Time Out: 2
- EST is sent automatically, at an adaptable time prior to Estimate Time Over (ETO) the FIR boundary fix for the flight. For test purposes, this adaptable time will be set to 16 minutes and the system check cycle is 1 minute , therefore it can be expected that the EST will be sent between 15 to 16 minutes prior to the flight's ETO the transfer fix.
- Upon receiving an EST, the system will respond with an ACP if the details match with a valid flight plan, otherwise a LRM will be sent.
- 'Revision' and coordination (such as weather deviation, non-FLAS/non-standard level requests etc.) are expected to be conducted verbally through the IASC circuit as per the current practice.

- Hong Kong would like to bring up the following scenarios and the corresponding proposed procedures for discussion. The aim is to reach consensus between Hong Kong and Manila for a mutually agreed operation procedure which could match both systems capability and mode of operation.

  (a) For a flight towards Manila ACC, if prior coordination is required (e.g. HK requests to use a non-standard level) before an EST is sent to Manila, HK will coordinate with Manila using IASC. If the request is approved by Manila, HK prefers to 'transfer' the flight to Manila verbally and no EST would be sent. Would this proposed workflow be acceptable to Manila?

  (b) In reverse, for a flight towards HK ACC, if prior coordination is required before an EST is sent to HK, if the request is approved by HK, HK prefers Manila to 'transfer' the flight to HK verbally and HK would manually enter the 'transfer' information into HK's new ATMS. Is it feasible for Manila not to send any EST to HK in this case?

6. Propose Test Schedule

Technical Test: 28 December 2015

Interoperability Test: 29 December 2015 (also as a backup for Technical Test)

7. Contact Points

Interoperability Test

	Hong Kong
Name	[redacted]
Telephone	[redacted]
Mobile	[redacted]
Email	[redacted]

	Manila	
Name	[redacted]	[redacted]
Telephone	[redacted]	[redacted]
Mobile	[redacted]	[redacted]
Email	[redacted]	[redacted]

Technical

	Manila
Name	[redacted]

Telephone	[redacted]
Mobile	[redacted]
Email	[redacted]

	Hong Kong	
Name	[redacted]	[redacted]
Telephone	[redacted]	[redacted]
Mobile	[redacted]	[redacted]
Email	[redacted]	[redacted]

8. Interoperability Test Procedure

- The test scenarios include inbound, outbound and overflights via NOMAN, SABNO and ASOBA under various situations.

- The proposed test scenarios use pseudo flight plans. Hong Kong new ATMS has live flight plan and surveillance data feeds and would prefer to use target of opportunity at the time of testing. If target of opportunity is not available, Hong Kong can still use pseudo flight plans as detailed in the test cases below.

- The Test Conductor / Point of Contact (POC) of Manila and Hong Kong shall log in the remarks box the time (HHMMSS in UTC) of each message being sent or received for AIDC messages latency checking.

- Effective and instantaneous communication is required during the AIDC test.

- Hong Kong suggests using generally available instant message applications such as Whatsapp (most prefer), Line, WeChat, Skype etc. between the POCs during the AIDC test for communication. As per Manila's suggestion, viber will be used.

8.1 Departure from VHHH to RPLL via NOMAN

Event Triggered by VHHH ACC	Event Triggered by Manila ACC	Confirmation	Remarks/Result
(FPL-TEST1-IS-A333/H-SDE3GHIJ4J5RWYZ/HB1-VHHH0200 -N0483F370 OCEAN V4 NOMAN A461 AVMUP W16 OLIVA OLI1A-RPLL0131 RPLC -PBN/A1B1C1D1O1S1 NAV/GBAS COM/CPDLC DOF/xxxxxx REG/RPC3343 EET/RPHI0029 SEL/LQEG PER/C)			
8.1.1 EST sent to MNL ACC		Coordinate with MNL's POC if **EST** message was received.	
	8.1.2 LAM sent to VHHH.	Coordinate with VHHH's POC if **LAM** message was received.	
	8.1.3 ACP sent to VHHH ACC	Coordinate with VHHH's POC if **ACP** message was received.	
8.1.4 LAM sent to MNL ACC		Coordinate with MNL's POC if **LAM** message was received.	

8.2 Departure from RPLL to VHHH via NOMAN

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST2-IS-A320/M-SDFGHIRWY/H-RPLL0200 -N0451F340 CAB1A CAB A461 NOMAN V531 BETTY-VHHH0152 VMMC -PBN/A1B1C1D1O1S2 NAV/GBAS SBAS DOF/xxxxxx REG/RPC3271 EET/VHHK0103 SEL/LSJP PER/C RMK/TCAS EQUIPPED)			
	8.2.1 EST sent to VHHH ACC	Coordinate with VHHH's POC if **EST** message was received.	
8.2.2 LAM sent to MNL ACC		Coordinate with MNL's POC if **LAM** message was received.	
8.2.3 ACP sent to MNL ACC		Coordinate with MNL's POC if **ACP** message was received.	
	8.2.4 LAM sent to VHHH ACC	Coordinate with MNL's POC if **LAM** message was received.	

8.3 Overflight Transiting VHHK and RPHI via SABNO

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST3-IS-A320/M-SDFGHIRWYZ/LB1-ZGSZ0200 -N0465F350 SIERA DCT ROCCA DCT SKATE V5 SABNO/N0461F370 A583 AKOTA M754 VINIK M522 NODIN DCT ALBIT DCT KAPRI DCT UBMIK DCT VJN DCT-WBKK0249 WBKL WBKS -PBN/A1B1C1D1O1T1 NAV/ABAS COM/AMDS DOF/xxxxxx REG/9MAQN EET/VHHK0004 ZGZU0005 VHHK0010 RPHI0049 WSJC0212 WBFC0215 SEL/ELQR CODE/7502AD PER/C RMK/TCAS EQUIPPED)			
8.3.1 EST sent to MNL ACC		Coordinate with MNL's POC if **EST** message was received.	
	8.3.2 LAM sent to VHHH.	Coordinate with VHHH's POC if **LAM** message was received.	
	8.3.3 ACP sent to VHHH ACC	Coordinate with VHHH's POC if **ACP** message was received.	
8.3.4 LAM sent to MNL ACC		Coordinate with MNL's POC if **LAM** message was received.	

8.4 Overflight Transiting RPHI and VHHK via ASOBA

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST4-IS-A332/H-SDE2E3FGHIJ2J4M1RWXYZ/LB1-WIII0100 -N0477F360 AMBOY P648 OSUKA/N0471F300 M772 ASISU/M077F300 M772 ASOBA/N0464F300 M772 DULOP/N0451F260 M771 DUMOL J103 PICTA DCT CH B330 TAMOT/K0837S0790 W68 IDUMA IDUO1A-ZGGG0422 ZSAM -PBN/A1B1D1L1 NAV/AUSEP DOF/xxxxxx REG/PKGPJ EET/WBFC0114 WSJC0156 RPHI0228 VHHK0325 ZGZU0406 SEL/GMCL OPR/GARUDA PER/C RMK/TCAS EQUIPPED)			
	8.4.1 EST sent to VHHH ACC	Coordinate with VHHH's POC if **EST** message was received.	
8.4.2 LAM sent to MNL ACC		Coordinate with MNL's POC if **LAM** message was received.	
8.4.3 ACP sent to MNL ACC		Coordinate with MNL's POC if **ACP** message was received.	
	8.4.4 LAM sent to VHHH ACC	Coordinate with VHHH's POC if **LAM** message was received.	

8.5 Departure from RPLL to VHHH, EST sent by Manila, HK has no FPL and returns LRM.

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST5-IS-A320/M-SDFGHIRWY/H-RPLL0200 -N0451F340 CAB1A CAB A461 NOMAN V531 BETTY-VHHH0152 VMMC -PBN/A1B1C1D1O1S2 NAV/GBAS SBAS DOF/xxxxxx REG/RPC3271 EET/VHHK0103 SEL/LSJP PER/C RMK/TCAS EQUIPPED)			
	8.5.1 EST sent to VHHH ACC	Coordinate with VHHH's POC if **EST** message was received.	
8.5.2 LRM sent to MNL ACC		Coordinate with MNL's POC if **LRM** message was received.	

8.6 Departure from VHHH to RPLL, RPLL has no FPL and returns LRM.

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST6-IS-A333/H-SDE3GHIJ4J5RWYZ/HB1-VHHH0200 -N0483F370 OCEAN V4 NOMAN A461 AVMUP W16 OLIVA OLI1A-RPLL0131 RPLC -PBN/A1B1C1D1O1S1 NAV/GBAS COM/CPDLC DOF/xxxxxx REG/RPC3343 EET/RPHI0029 SEL/LQEG PER/C)			
8.6.1 EST sent to MNL ACC		Coordinate with MNL's POC if **EST** message was received.	
	8.6.2 LRM sent to VHHH.	Coordinate with VHHH's POC if **LRM** message was received.	

8.7 Departure from RPLL to VHHH via NOMAN, Manila sends EST with a SSR code duplicates with a SSR code in-use in HK. [HK will accept the EST and assign another SSR to the flight concerned internally.]

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST7-IS-A320/M-SDFGHIRWY/H-RPLL0200 -N0451F340 CAB1A CAB A461 NOMAN V531 BETTY-VHHH0152 VMMC -PBN/A1B1C1D1O1S2 NAV/GBAS SBAS DOF/xxxxxx REG/RPC3271 EET/VHHK0103 SEL/LSJP PER/C RMK/TCAS EQUIPPED)			
	8.7.1 Request a SSR code in-use by HK	Coordinate with HK's POC to obtain a SSR code in-use by HK	

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
	8.7.2 EST (with a SSR code in-use by HK) sent to VHHH ACC	Coordinate with VHHH's POC if **EST** message was received.	
8.7.3 LAM sent to MNL ACC		Coordinate with MNL's POC if **LAM** message was received.	
8.7.4 ACP sent to MNL ACC		Coordinate with MNL's POC if **ACP** message was received.	(HK to check internally for duplicate SSR code alert and SSR code assigns to the flight)
	8.7.5 LAM sent to VHHH ACC	Coordinate with VHHH's POC if **LAM** message was received.	

8.8 Departure from VHHH to RPLL, HK sends EST with a SSR code duplicates with a SSR code in-use in Manila [*For Manila to consider whether this test case is deemed necessary and match with Manila's concept of operation. In this case, would Manila return a LRM or LAM+ACP?]*

Event Triggered by VHHH ACC	Event Triggered by MNL ACC	Confirmation	Remarks/Result
(FPL-TEST8-IS-A333/H-SDE3GHIJ4J5RWYZ/HB1-VHHH0200 -N0483F370 OCEAN V4 NOMAN A461 AVMUP W16 OLIVA OLI1A-RPLL0131 RPLC -PBN/A1B1C1D1O1S1 NAV/GBAS COM/CPDLC DOF/xxxxxx REG/RPC3343 EET/RPHI0029 SEL/LQEG PER/C)			
8.8.1 Request a SSR code in-use by MNL		Coordinate with MNL's POC to obtain a SSR code in-use by MNL	
8.8.2 EST (with a SSR code in-use by MNL) sent to MNL ACC		Coordinate with MNL's POC if **EST** message was received.	
	8.8.3 LAM sent to VHHH.	Coordinate with VHHH's POC if **LAM** message was received.	Or would MNL return a LRM instead?
	8.8.4 ACP sent to VHHH ACC	Coordinate with VHHH's POC if **ACP** message was received.	Should skip this step if MNL returns a LRM in step 8.8.3
8.8.5 LAM sent to MNL ACC		Coordinate with MNL's POC if **LAM** message was received.	Should skip this step if MNL returns a LRM in step 8.8.3