International Civil Aviation Organization

AERONAUTICAL TELECOMMUNICATION NETWORK IMPLEMENTATION COORDINATION GROUP – EIGHTH WORKING GROUP MEETING (ATNICG WG/8)

Christchurch New Zealand
28 September – 1 October 2010

Agenda Item 12: Review newly developed AIDC Implementation Plan and review global AIDC ICD

GLOBAL AIR TRAFFIC SERVICE INTER-FACILITY DATA COMMUNICATIONS (AIDC) INTERFACE CONTROL DOCUMENT (ICD)

(Presented by the Secretariat)

SUMMARY

Benefits of early implementation of AIDC to reduce errors in coordination between ATS units across FIR have been recognized globally. ICAO Regions have developed ICDs to standardize AIDC implementation. To meet the requirement of standardizing AIDC implementation across regions, need for a global ICD has been felt. This paper presents draft global ICD developed by USA.

This paper relates to:

Strategic Objectives: A-Safety; D-Efficiency

Global Plan Initiative:
GPI – 17 Data-link applications
GPI – 22 Communication Infrastrucutre

1. Introduction

1.1 Automation of flight data exchange between Oceanic Air Control Centers (OACs) using On-Line Data Interchange (OLDI) was started in the North Atlantic region in 1971. Subsequently, an Interface Control Document (ICD) was developed by the North Atlantic Systems Planning (NAT SPG) developed and adopted an ICD in the end of 1991to standardize the exchange of data format etc. ICAO OPLINKP adopted ATS Inter-facility Data Communication (AIDC) message set and published it as a guidance material.

1.2 In the Asia/Pacific Region, work on the development of inter-facility message exchange between automation systems was started in 1994. Document produced as an outcome of this effort by APANPIRG has been amended at regular intervals to accommodate changes in the requirement.

1.3 Benefits of accelerating AIDC implementation to reduce inter air traffic control (ATC) coordination error have been recognized globally. To support AIDC, ICAO regions have created their own Interface Control Documents (ICDs), which utilize the message set defined in the PANS – ATM (Doc 4444) provisions. Requirement of adopting a global AIDC ICD has been felt to facilitate implementation of inter-regional AIDC.

1.4 The benefits to be accrued from a common global ICD for AIDC were recognized by APANPIRG in its Twentieth Meeting (September 2009) and the meeting agreed to support the work undertaken by USA in developing a global ICD and adopted following Decision.

Decision 20/14 – Support for Global ICD for AFTN AIDC

That, recognizing the benefits to be gained from globally harmonized interface arrangements for AIDC, APANPIRG supports the work being undertaken by the United States to coordinate a global Interface Control Document (ICD) for AFTN AIDC and invites the Asia/Pacific Regional Office to act as the regional point of contact for this work.

1.5 In line with the deliberations in APANPIRG/20 meeting on the subject, USA presented the draft *Global Interface Control Document (ICD) for ATS Inter-facility Data Communications (AIDC)* to the ATM/AIS/SAR SG/20 meeting.

2. Discussion

2.1 AIDC provides a base line document for the implementation of AIDC in a uniform manner so that interfacing of systems located in different geographical regions becomes possible. Specifically ICD defines the following:

a) Basic communications and support required to coordinate implementation of AIDC;

b) Common boundary agreements between all the area/oceanic control centers concerned;

c) Implementation guidance material; and

d) Relationship to the ICAO Operational Data Link Panel (OPLINKP) AIDC message set and NAT/Europe ATS interface messages

The ICD also describes a configuration management process which will ensure stability in the design and implementation of the messages.

2.2 To facilitate implementation of inter-regional AIDC, a need was felt have a common global AIDC ICD, so that the implementation could be harmonized. To integrate ICD used in NAT Region and APAC Region, it is felt that following issues should be taken into consideration:

a) Formation of an Ad Hoc Working (WG). The WG comprising of representatives from NAT and APAC regions, ICAO HQ, industry, special interest groups and other interested parties should coordinate for the Terms of Reference and a Work Programme to develop a Global ICD;

b) Efforts should be made to involve other regions to expand the scope of application of the ICD developed;

c) Take into account lessons learnt in all the regions, global implications and guidance on recent initiatives;

d) Method of distribution for review;

e) Change control mechanism;

f) Coordination with ICAO Regional Offices to determine the tasks necessary for the NAT SPG and APANPIRG to conclude on endorsing the global ICD.

2.3 *Global Interface Control Document (ICD) for ATS Inter-facility Data Communications (AIDC)* developed by FAA is the first effort in this direction. A copy of the draft documents is placed as an **Attachment** to this paper. United States has asked NAT CNSG members and the members of Informal Pacific ATC Coordinating Group (IPACG) to review the document and provide comments. The document was also presented to ATM/AIS/SAR/SG with a request to provide comments. ATNICG is also request to review the document and provide comments to Ms. Karen Chiodini (e-mail: Karen.L.Chiodini@faa.gov) at the earliest.

3. Recommended Action

3.1 The meeting is invited to:

a) Review the draft *Global Interface Control Document (ICD) for ATS Inter-facility Data Communications (AIDC)* placed at **Attachment** to this paper and provide comments at the earliest; and

b) Recommend actions for speedy implementation of AIDC in the region.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

GLOBAL INTERFACE CONTROL DOCUMENT (ICD) FOR ATS INTERFACILITY DATA COMMUNICATIONS (AIDC)

Version 0.1 January 2010

EXECUTIVE SUMMARY

1.1 The Global Interface Control Document (ICD) for Air Traffic Services Interfacility Data Communications (AIDC) is based on the work undertaken by the North Atlantic Systems Planning Group (NAT SPG) to the interfacility message exchanges (ground/ground data link) needed to support oceanic automation in the North Atlantic (NAT) Region. The NAT SPG agreed that the ground/ground data interchange should be in accordance with the procedures specified in a common ICD but that the common ICD should identify and detail any regional differences considered necessary.

1.2 The purpose of the ICD is to ensure that data interchange between units equipped with automated air traffic services (ATS) systems used for air traffic management (ATM) is to a common base standard, and that the evolutionary development is coordinated and implemented globally. Therefore, the Global ICD was developed to preserve the common base standard set out in the Automatic Dependent Surveillance (ADS) Panel Guidance Material, while allowing for regional differences as required.

1.3 There is a requirement for a communications and data interchange infrastructure to significantly reduce the need for verbal coordination between Oceanic and Domestic Area Control Centres. AIDC standards, as defined in this document, provide a harmonised means for data interchange between ATS units during the notification, coordination, and transfer of control phases of operations.

1.4 The message sets and procedures described in the ICD have been designed for use with the existing Aeronautical Fixed Telecommunications Network (AFTN) and the future Aeronautical Telecommunication Network (ATN). In the interest of global standardisation, ICAO agreed methods and messages were used wherever possible. Where ICAO methods and messages do not meet requirements, new messages were identified using existing ICAO field definitions to the extent possible. Specifically, the ICD defines the following:

a. Basic communications and support required to coordinate implementation of AIDC;

b. Common boundary agreements between all the area/oceanic control centres concerned;

c. Implementation guidance material; and

d. Relationship to the ICAO Operational Data Link Panel (OPLINKP) AIDC message set and NAT/Europe ATS interface messages.

1.5 The ICD also describes a configuration management process which will ensure stability in the design and implementation of the messages described herein. This process as well as the Global ICD should be adopted by all States.

1 Background

1.1 In 1971, States in the NAT Region initiated action to begin the automation of flight data exchanges between Oceanic Area Control Centres (OACs) using On-Line Data Interchange (OLDI) techniques. OLDI was defined as a system to system interchange of data with controller notification and presentation when necessary. It was not seen as a means whereby controllers could effectively send and receive electronic mail. The techniques were not standard, nor even compatible, and it was agreed that to get full benefits from the application of OLDI, regional standardisation must be achieved.

1.2 At its twenty-fifth meeting (Paris, September 1988), the NAT SPG established a Task Force to develop a future ATS system concept for the whole of the NAT Region (NAT SPG/25, Conclusion 25/11 refers).

1.3 By 2009, there were two types of OLDI in use, one known as European OLDI and the other known as NAT OLDI. The message sets differed to some degree, with the European OLDI being simpler and oriented toward minimal controller interaction. The NAT OLDI message set included messages which required manual intervention.

1.4 At its twenty-seventh meeting (Paris, June 1991), the NAT SPG noted that the draft ICD was sufficiently mature to be used for planning purposes and therefore agreed that States should endeavor to replace existing agreements with the common ICD by the end of 1991. Subsequent work within the NAT SPG upgraded the ICD to better match automation and communications transition requirements.

1.5 On the basis of the above, the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), at its fifth meeting in 1994, undertook the task of developing the inter-facility message exchanges needed to support automation in the region.

1.6 The ICAO OPLINKP adopted the AIDC message set and published it as guidance material.

1.7 At the thirteenth meeting of APANPIRG (Bangkok, September 2002) Decision 13/9 was made to reconvene the AIDC Task Force to undertake the review and update of the Asia Pacific (APAC) AIDC Interface Control Document (ICD).

1.8 The APANPIRG AIDC Review Task Force met in Brisbane, Australia 27-28 March 2003. Discussions within the Task Force revealed inconsistencies between existing AIDC ICDs containing the same version number. The Task Force decided to baseline a document based on the original printed ICAO document.

1.9 As a result of this meeting the ASIA/PAC Regional ICD for AIDC was updated to include:

a. additional clarification of certain message types;

b. improved consistency of the terminology used in the document;

c. incorporation of recent changes to the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM) and the *Manual of Air Traffic Services Data Link Applications* (Doc 9694), regarding additional optional sub-fields in ICAO Field 14; and

d. proposed additional message types, namely the Application Status Monitor (ASM), the FANS Application Notification (FAN) and the FANS Completion Notification (FCN).

2 Introduction

2.1 The Global ICD is structured into the following Parts:

a. PART I - PURPOSE, POLICY AND UNITS OF MEASUREMENT provides an overall philosophical view of the ICD, general information concerning the units that are used and information on data that is applicable to all Air Traffic Services Units (ATSUs); and

b. **PART II - COMMUNICATIONS AND SUPPORT MECHANISMS** which describes the technical and other requirements needed to support AIDC. It also indicates that a longer term strategy for the transition to the ATN needs to be developed.

c. APPENDICES include, inter alia, implementation guidelines which are relevant for software engineers, a cross-reference to the ICAO OPLINKP AIDC message set, descriptions of messages used to exchange ATS data between automated ATS systems, a list of error messages, and a Glossary of Terms.

3 List of Acronyms

ACC	Area Control Centre
ADS	Automatic Dependent Surveillance
AFTN	Aeronautical Fixed Telecommunications Network
AIDC	ATS Interfacility Data Communications
AOC	Airline Operational Control (also stands for Assumption of Control)
APAC	Asia/Pacific
APANPIRG	Asia Pacific Air Navigation Planning and Implementation Regional Group
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications Network
ATS	Air Traffic Services
ATSU	Air Traffic Service Unit
C-ATSU	Controlling ATSU
COMA	Communications and Automation
CRC	Cyclic Redundancy Check
D-ATSU	Downstream ATSU
FDPS	Flight Data Processing System
FIC	Flight Information Centre
FPPS	Flight Plan Processing System
IA-5	International Alphabet 5
ICD	Interface Control Document
MLF	Master List of Fixes
OAC	Oceanic Area Control Centre
ODF	Optional Data Field
OLDI	On-Line Data Interchange
OPLINKP	Operational Data Link Panel
OSI	Open System Inter-connection
PANS-ATM	Procedures for Air Navigation Services – Air Traffic Management
R-ATSU	Receiving ATSU
UTC	Coordinated Universal Time
WGS-84	World Geodetic System 1984

PART I - PURPOSE, POLICY AND UNITS OF MEASUREMENT

1 PURPOSE

1.1 The purpose of this document is to ensure that data interchange between ATSUs providing air traffic services is harmonised to a common standard and to ensure that evolutionary development is encouraged and coordinated centrally. It also provides a description of the message types and methods of communication.

1.2 In the context of this document, the definition of AIDC is as follows:

a. The AIDC application supports information exchanges between ATC application processes within automated ATS systems located at different ATSUs.

b. In the interest of global standardisation, ICAO agreed methods and messages are used wherever possible. Where ICAO methods and messages do not meet requirements, new messages were identified using existing ICAO field definitions to the extent possible.

2 SCOPE

2.1 This document specifies the facilities and messages to be used for the exchange of notification, coordination, transfer and related data between automated ATS systems.

2.2 The messages defined in this document are used during the active phase of flight. Though outside the scope of the AIDC application, the Emergency, Flight Planning and Supplementary Message Categories as defined in ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM) Appendix 3 will continue to be used to perform functions not provided by the AIDC application.

2.3 In particular, the Flight Planning function is required and will be required in the future to support operations. The ICAO messages FPL (Filed Flight Plan), CHG (Modification), DLA (Delay), DEP (Departure), ARR (Arrival), CNL (Cancel) and RQP (Request Flight Plan) will be used to support this function.

3 POLICY

3.1 The application of AIDC shall be based on a step-by-step data distribution scheme comprising three phases: NOTIFICATION, COORDINATION and TRANSFER OF CONTROL. In support of all the operational phases, application management messages are required to support application level dialogue between automated ATS systems.

3.2 A functional address, which refers to a function within an OAC/ACC (e.g. an ATC watch supervisor), may be substituted in certain messages for the aircraft identification found in Field 7. Where such an address is used, it is preceded by an oblique stroke (/) to differentiate it from an aircraft identification.

3.3 The capability to revert to manual coordination shall be retained.

3.4 Flight plans shall continue to be filed in accordance with existing procedures.

4 UNITS OF MEASUREMENT

4.1. In general the AIDC ICD messages support different units of measurement. Bilateral agreements should determine the units to be transmitted.

4.2. Data conventions shall be in accordance with PANS-ATM Appendix 3, with the following exceptions for level and speed information applying to Field 14 only.

Block level information

4.3. In certain circumstances, a vertical range of levels may be transmitted. Where a vertical range of levels is used, it shall be specified as a lower level followed by the upper level.

> *Example 1:* MINNY/2125F320F340
> The aircraft is operating in a block of levels between F320 and F340 (inclusive).

4.4. When transmitting a level restriction, only a single level may be included within the restriction.

> *Example 2*: ELMER/0244F310F350F290A
> The aircraft is cleared to operate in a block of levels between F310 and F350 and will cross ELMER at or above F290.

4.5. The coordination of a vertical range of levels by AIDC should only be made following bilateral agreement.

Speed and Mach Number Technique information

4.6. The boundary estimate may contain additional clearance information describing a Mach Number that has been assigned to an aircraft. This information shall contain a single character providing advice as to whether an aircraft will be maintaining the notified Mach Number or less (L), the notified Mach Number or greater (G), or exactly the notified Mach Number (E); and the notified Mach Number.

> *Example 1:* BUGGS/0349F350F370/GM085
> The aircraft is operating in a block of levels between F350 and F370 (inclusive) maintaining M0.85 or greater.

> *Example 2:* PLUTO/0215F310/EM076
> The aircraft is maintaining M0.76

4.7. The absence of speed information in the boundary estimate data of an AIDC message indicates that the previously assigned speed has been cancelled.

> *Example 3:* SPEDY/1237F310F330B/LM083
> The aircraft is cleared to F310 and will cross SPEDY at or below F330, maintaining M0.83 or less; subsequently followed by:

> *Example 4:* SPEDY/1238F310
> The aircraft will no longer be on descent at SPEDY, and has resumed normal speed (and one minute later than previously coordinated)

4.8. The format described for the notification and coordination of Mach Number in this section applies to Field 14 – boundary estimate data – only. It may be transmitted in any AIDC message containing Field 14.

4.9. The coordination of Mach Numbers by AIDC should only be made following bilateral agreement

Offset and weather deviation information

4.10. The boundary estimate may contain additional clearance information describing an offset or weather deviation that has been issued to an aircraft. This information shall contain:

a. a single character providing advice as to whether the clearance is an offset (O) or a weather deviation (W); and

b. an off track distance associated with this clearance; and

c. a direction, indicating left (L), right (R) or either side of track (E).

Example 1: GOOFY/2330F310/GM084/O30R
The aircraft is offsetting 30NM right of track, maintaining M0.84 or greater.

Example 2: DAFFY/0215F310F350/W25E
The aircraft is operating in a block of levels between F310 and F350 (inclusive) deviating up to 25NM either side of track.

4.11. The absence of offset or weather deviation data in the boundary estimate data of an AIDC message indicates that the off track clearance no longer applies.

Example 3: MICKY/1519F330/W15R
The aircraft is deviating up to 15NM right of track subsequently followed by:

Example 4: MICKY/1520F330
The aircraft is back on track (and one minute later than previously coordinated).

4.12. The off-track clearance format described in this section applies to Field 14 – boundary estimate data – only. It may be transmitted in any AIDC message containing Field 14.

4.13. When an aircraft is offsetting or deviating, the coordination point shall be the coordination point based on the nominal route rather than the offset route.

4.14. When coordinating an Offset, the direction “E” (either side of track) shall not be used.

4.15. The coordination of offsets and weather deviations by AIDC should only be made following bilateral agreement.

Functional addresses

4.16. A functional address, which refers to a function within an OAC/ACC (e.g. an ATC watch supervisor), may be substituted in the MIS and EMG messages for the aircraft identification found in Field 7. Where such an address is used, it is preceded by an oblique stroke (/) to differentiate it from aircraft identification.

5 RESTRICTION FORMATS

Level and speed restrictions

5.1. Use of restrictions is not mandatory. If they are used, the following convention shall be used.

5.2. Route, speed and level information contained in the Route field (ICAO ATS Field 15) represent the current cleared profile. Where a clearance requires a speed/level change subsequent to a route point, then the ICAO convention of route point followed by an oblique stroke and the new speed/level will be used:

Example: 60N010W/M084F350

5.3. Where a clearance requires a speed/level change to be completed by a route point, then the items will be reversed:

Example: M084F350/62N020W

5.4. A combination of these two conventions will describe a clearance with a defined starting and completion point:

Example: 60N010W/M084F350/62N020W

Time restrictions

5.5. There are three types of time restrictions describing when an aircraft should arrive at a fix:

a. AT/ (UNTIL);

b. AT OR BEFORE; or

c. AT OR LATER.

5.6. A suffix will be added to the four digit time to denote the restriction type, as follows:

a. AT: 'A', e.g. 1230A;

b. AT OR BEFORE: 'B', e.g., 1230B; or

c. AT OR LATER: 'L', e.g., 1230L.

5.7. The restriction itself will begin with a slash (/), e.g., /1230B, and will appear after the fix with which it is associated. For example, 49N050W/1230L signifies that the aircraft should arrive at 49N 50W at or later than 12:30 P.M.

5.8. A time restriction may be used in conjunction with speed/level restrictions as follows:

60N010W/M084F350/1230L
M084F350/62N020W/1230A
60N010W/M084F350/62N020W/1230B

5.9. Time restrictions may only appear in the Route field (Field 15).
5.10. The use of time restrictions shall be bilaterally agreed between ATS providers.

Coordination and the further route of flight

5.11. Field 15 shall include subfields 15a, 15b and 15c. It shall describe the cleared route, beginning with the last route point preceding the coordination point. It will contain all known cleared route information. As a minimum, it shall contain the first route point in the adjacent ATSU's airspace. If the cleared route of flight is not known completely to destination, the truncation indicator shall appear after the last known cleared route point.

Field 3 Requirements

5.12. All messages shall use Field 3a only.

5.13. Fields 3b and 3c are not used since, for AIDC, these reference numbers are included in ODF, option 3. See Part 2, para 2.1.4.

6 BOUNDARY POSITIONS IN MESSAGES

6.1. Where a message requires the inclusion of a boundary position and the flight plan does not contain that position, then the previous route point shall be substituted as the boundary position.

PART II -COMMUNICATIONS AND SUPPORT MECHANISMS

1 INTRODUCTION

1.1 Coordination communications are divided into two areas: one addresses the need for voice communications between ATSUs, whereas the other addresses the need for data communications. It is anticipated that the continuing implementation of automated data communications between ATSUs will result in a reduction in the utilisation of voice communications.

1.2 Existing wide-area networks (e.g. X.25 packet-switched network) may be used if the speed, capacity, and security characteristics are verified as adequate to support the interface.

1.3 In cases where speed, capacity, and/or security require it, a direct line interface may be used between facilities.

1.4 The IA-5 character set shall be used for all application message content. Certain characters have special meanings and must only be used as indicated below:

a. Open parenthesis "(" and close parenthesis ")" shall be used only to begin and terminate the application message.

b. A single hyphen "-" shall be used only as a field separator and shall not be used within any field.

2 MESSAGE HEADERS, TIMERS AND ATSU INDICATORS

Message Headers

2.1 The AFTN IA-5 Message Header, including the use of the Optional Data Field defined in ICAO Annex 10, Vol II and herein, will be employed for the exchange of all ATS data. The AFTN priority indicator FF shall normally be used for all data exchanges.

2.2 The **optional data field** provides a flexible way to convey information from end-to-end, undisturbed by the communication processes along the path. Since the information is optional it is necessary to specify a unique number and ending for each defined use. Option 1 has already been allocated for additional addressing use, and will be found in ICAO Annex 10, Vol II in due course. Option numbers 2 and 3 have been defined for computer applications to convey message/data unit identification and message/data unit reference information, respectively, and are adopted in this ICD. Other options can be defined and added as the need arises. The proposed encoding would have no impact on AFTN switching centers as they ignore this part of the origin line.

2.3 The **Source and Destination addresses** of the AFTN header convey the direction and logical identity of the application processes exchanging AIDC data information. The application process must be aware of the AFTN addresses that are used for this function. The first four characters form the location, while the next three characters specify an office/agency or a processor at the given location. The eighth character of the address indicates the end system application and details of the naming assignment are contained in Appendix C. This approach allows up to 26 multiple applications to be co-hosted in the same processor, each having its own unique address. This implementation will make the addressing consistent with Open System Inter-connection (OSI) parameters and simplify the transition to the ATN.

2.4 The **message/data identification number** is a six digit number, taken from a single application pool of available numbers. The identification of the sending and receiving units would use the normal eight character addresses of the AFTN header.

2.5 The message/data identification number is encoded and conveyed in the AFTN message header Optional Data Field (ODF), option 2. The AFTN implementation provides functionality consistent with the OSI primitive/parameter structure.

2.6 A message/data identification number will be assigned to each message/data unit requiring confirmation of receipt by the initiating processor. This number will be assigned by the application process basis in such a way as to guarantee a unique identification number for a period of time as specified in paragraph 2.12 below. For messages/data not requiring confirmation the message/data identification parameter shall not be used.

2.7 The **message/data reference information** is a way of linking a message/data unit to a previously sent message. This function is encoded and conveyed in the AFTN ODF, option 3. This implementation would make the linking information consistent with the abstract OSI protocol primitive/parameter structure. The reference information consists of the message/data identification number of the previously sent message/data unit being referenced. As the previous message being referenced could have been originated by either processor, the location indicator of the message source shall be used as a prefix to the reference number.

2.8 The **time stamp** is expressed as 12 digits in year, month, day, hours, minutes, and seconds (YYMMDDHHMMSS). The precision of the time stamp will support computation of transmission delays. This data item is conveyed as option 4 of the ODF.

2.9 The **Cyclic Redundancy Check (CRC)** is a four digit hexadecimal number that is used to ensure end-to-end message integrity. The CRC employed is the CRC-CCITT. The CRC is computed over the message text, from the beginning left parenthesis to the closing right parenthesis, inclusive. Non printable characters such as line feeds and carriage returns shall be excluded from the CRC calculation. This data item is conveyed as option 5 of the ODF.

Timers

2.10 In order to guarantee the uniqueness of the message/data identification number, and yet allow for the efficient reuse of the numbers in the pool, two timers are required for each message/data unit requiring confirmation: accountability and reuse.

2.11 The **accountability timer** determines the maximum period of time for the responding application to confirm receipt of a given message/data unit. The default value for this timer nominally shall be three minutes. If there is no valid response from the responding application, the initiating processor shall retransmit the message/data unit and reset the timer, or initiate local recovery procedures. When local procedures allow retransmission, a maximum value, such as three, must be determined before local recovery procedures are initiated. The accountability timer shall be cancelled by the receipt of any message with the appropriate message/data reference identifier, which will typically be a LAM or LRM. Retransmissions use the same message/data identification number as the original message/data unit.

2.12 The **reuse timer** function employs two timers that determine the minimum period of time during which a message/data identification number is guaranteed to be unique. Reuse timer A shall be set for exchanges not involving dialogues between processors. The range for reuse timer A shall be from 1 to 30 minutes, in one minute increments. The default value for reuse timer A shall be 5 minutes, or as agreed by the concerned ATSUs. Reuse timer B shall be set for exchanges where a dialogue is involved in the exchange. The range for reuse timer B shall be 2 to 90 minutes, in one minute increments. The default value for reuse timer B shall be 10 minutes, or as agreed for communicating applications by the concerned administrations. A given message/data identification number can be reused when an ACP, AOC, or REJ response message is received or the reuse timer has expired.

2.13 In the event of system failure, the accountability and reuse timers will be reset and resume timing upon completion of system recovery.

2.14 The following examples depict two Core Messages encoded in accordance with the previous procedures. The second message is a reference to the first message. SOH, STX, message ending and ETX characters are omitted for clarity, as are the alignment functions.

> FF NFFFZOZO
> 122145 KZOAZOZO 2.000033-4.940412214523-5.A34B
> (CPL-UAL714-IS-B747/H-S/C-KLAX-05S179W/2220F370-M082F370(route data) -YSSY-0)
>
> **Explanation:** Sending an initial coordination message (number 000033 from Oakland Air Route Traffic Control Center (KZOAZOZO) to Nadi ACC (NFFFZOZO) at time 940412 214523.
>
> FF KZOAZOZO
> 122147 NFFFZOZO 2.000044-3.KZOA000033-4.940412214703-5.DE6A
> (ACP-UAL714-KLAX-YSSY)
>
> **Explanation:** Nadi ACC (NFFFZOZO) accepts the proposed coordination condition received from Oakland Air Route Traffic Control Center (KZOAZOZO) by sending message number 000044 from NFFFZOZO to KZOAZOZO at 940412214703. The message refers to message 000033 sent earlier by KZOAZOZO

2.15 ICAO location indicators must be used by automated ATSUs in AIDC messages.

3 ENGINEERING CONSIDERATIONS

3.1 The future data communications infrastructure should be compatible with the ICAO ATN. Until the ATN becomes available, the engineering details needed to implement the exchange of messages contained in Appendix A will need to be agreed to bilaterally and identified in Appendix D.

3.2 The AFTN will provide the underlying communications network and services in the near-term. Communication services provided by the ground element of the ATN will be eventually employed by the AIDC application.

3.3 It is important that a consistent AFTN addressing convention be employed to support the AFTN-to-ATN transition.

Performance Criteria

3.4 If AIDC messages are not transmitted and received in a timely manner between automation systems, aircraft can potentially cross boundaries without coordination or transfer of control responsibility taking place. The benefits of AIDC are reduced if link speeds and transit times are inadequate.

3.5 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 agreed to by neighboring states implementing AIDC. Recommended performance figures are specified in Appendix D.

Response Time

3.6 For flight planning messages, controllers require indication of an unsuccessful message transmission within 60 seconds of the message being sent. Therefore, the response time from the time a message is sent until an LAM (or LRM) is received shall be under 60 seconds at least 99% of the time under normal operations. A faster response time is desirable, and will result in operations that are more efficient.

3.7 For messages involving transfer of control and surveillance data (e.g. RTI, RTA, and RTU) the data must be transmitted in time for the receiving system to display the track position with acceptable accuracy. Communication across the interface shall be less than 6 seconds.

Availability / Reliability

3.8 The hardware and software resources required for providing service should be developed such that the inherent reliability will support interface availability which is at least equal to the end systems of that interface.

Capacity and Growth

3.9 Before implementing this interface between two ATSUs, an analysis of the traffic expected between the centers shall be performed and the proposed communications links verified for appropriate capacity. Traffic estimates should consider current and future expected traffic levels.

3.10 For initial planning purposes the following estimates of message size and messages per flight are provided in Table 1.

Table 1. Expected Message Rates and Sizes

Message	Avg. per Flight	Avg. Size[1]	Comments
Messages per near-border departure flight:			
FPL	1	240	
CHG	0.5	160	Assumed 1 of 2 flights amended after coordination, before departure.
EST	1	120	
MOD	0.5	120	Assumed 1 of 2 flights amended after coordination.
Messages per non near-border departure flight:			
CPL	1	250	
MOD	0.5	120	Assumed 1 of 2 flights amended after coordination.
Messages per every flight:			
CNL	0.01	100	Assumed 1 in 100 flight plans are cancelled.
RTI	1	150	
RTU	5	140	Assumed 1 RTU every 6 seconds for 30 seconds.
RTA	1	110	
MIS	0.1	130	
Responses (not per flight):			
LAM/RLA	Sum of all above except RTU	80	
LRM		100	

[1] The average message size includes an estimated 50 bytes of communications header added to each application message. Average message size estimates are based on a combination of specification analysis, and review of sample data. In particular the route, other information, and nav/comm equipment elements were estimated based on approximately 200 FPLs filed in Houston Center in 1998.

3.11 The hardware and software developed for the interfaces shall be capable of asynchronously exchanging the messages defined in Part II, section 3, simultaneously with up to _____ automated system

4 RECORDING OF AIDC DATA

4.1. The contents and time stamps of all AIDC messages shall be recorded in both end systems in accordance with the current requirements for ATS messages.

4.2. Facilities shall be available for the retrieval and display of the recorded data.

5 ASSOCIATED AUTOMATION FUNCTIONALITY

5.1. Each ATS service provider participating in this interface must have a supporting automation system. The supporting automation shall:

a. Error check all inbound messages for proper format and logical consistency;

b. Ensure only messages from authorized senders are accepted and processed;

c. As required, alert the responsible controller(s) of flight data that has been received; and

d. Notify the responsible personnel when any message sent is rejected or not acknowledged within a variable system parameter (VSP) period of time.

6 FAILURE AND RECOVERY SOLUTIONS

6.1. Automation systems may have different failure avoidance and failure recovery mechanisms. Each participating system shall have the following characteristics:

a. If the recovery process preserves the current message number in the sequence with each facility, no notification is necessary.

b. If the recovery process requires reset of the sequence number to 000, a means of notifying the receiving facility that the message numbers have been reset is required. This may be procedural rather than automated.

c. The recovery process shall not automatically re-send any CPL for which an LAM had been received. This is relevant if the system was able to recover state information about which flight plans have been coordinated, and did not need to reset the message sequence numbers.

7 DATA REQUIREMENTS

7.1. Certain data must be defined and maintained to support all features of the interface. Depending on the data, it should be coordinated on a National, Regional, or Local (facility) basis. Data requirements are identified in Table 2 below.

Table 2. Summary of Data Definitions Needed to Support the Interface

Field	Data	Purpose	Source	Coordination
03	Facility Identifiers	Identify the sending/receiving facility.	ICAO Doc. 7910 (first four characters) and local definition (second four characters)	Local
07	Functional Address	Agree on functional addresses to be used in MIS messages.	Local Data	Local
09	Aircraft Type exceptions	Identify aircraft type designators and wake turbulence categories that are not listed in ICAO Doc. 8643.	***FAA, NAV CANADA, SENEAM publications***	***National***
10	Equipment Codes	Identify ATS-specified equipment qualifiers that are not specified in ICAO Doc. 4444.	***FAA, NAV CANADA, SENEAM publications***	***National***
14	Boundary Point	Identify the coordination fixes to be sent for each airway.	Local Data	Local
15	Adapted Routes and Fixes	Identify airway and fix information that is adapted by both systems.	Local Data	Local
18	Requirements for other data to be included	Identify any requirements for data that must be included in Field 18.	***FAA, NAV CANADA, SENEAM publications***	National

8 SECURITY CONSIDERATIONS

Privacy

8.1 This ICD does not define mechanisms that guarantee privacy. It should be assumed that any data sent over this interface may be seen by unintended third parties either through interception of the message or through disclosure at the receiving facility.

8.2 Any communications requiring privacy must be identified and appropriate communications and procedures defined.

Authentication

8.3 Each system shall authenticate that messages received are from the source that is identified in Field 03.

Access Control

8.4 Each system participating in the interface shall implement eligibility checks to ensure that the source of the message is eligible to send the message type and is the appropriate authority for the referenced flight.

9 TEST CONSIDERATIONS

9.1 Before an automated flight data interface becomes operational between any two facilities, the following set of tests shall be completed:

a. Off-line tests using development or test (i.e. non-operational) systems. These may include both test systems at non-operational facilities, and operational systems that are in an offline mode.

b. Tests using the operational systems in operational mode in which manual coordination verifies each flight data message sent.

c. For diagnostic purposes, each side of the interface should be able to isolate the source of interface problems.

APPENDIX A - ATS COORDINATION MESSAGES

1 INTRODUCTION

1.1. The following sections describe those messages used by ASIA/PAC/NAT/CAR/SAM ATS systems for OLDI . These core messages are a selection from the AIDC message set developed by the ICAO OPLINKP panel. Unless otherwise indicated in this document, message fields will conform to ICAO field definitions in PANS -ATM, and are referred to by field number. All ATS data shall be enclosed between parentheses. Only one ATS message shall be included within a transmission. An overview of core messages and their composition can be found in Table 2.

2 MESSAGE GROUP

2.1. The core messages shown in the table below are to be supported by all ATS Providers using automated data interchange. Optional messages maybe supported by ATS providers. Such messages will be detailed in bilateral agreements.

Table A-1. AIDC Messages

Core	Opt	**Message Class**	**Message**
X		Notification	ABI (Advance Boundary Information)
X		Coordination	CPL (Current Flight Plan)
X			EST (Coordination Estimate)
X			MAC (Coordination Cancellation)
	X		PAC (Preactivation)
X			CDN (Coordination)
X			ACP (Acceptance)
X			REJ (Rejection)
X		Transfer of Control	TOC (Transfer of Control)
X			AOC (Assumption of Control)
X		General Information	EMG (Emergency)
X			MIS (Miscellaneous)
			NAT (Organized Tracks)
	X		TDM (Track Definition Message)
X		Application Management	LAM (Logical Acknowledgement Message)
X			LRM (Logical Rejection Message)
	X		ASM (Application Status Monitor)
	X		FAN (FANS Application Message)
	X		FCN (FANS Completion Notification)
	X	Surveillance Data Transfer	TRU (Surveillance General
	X		ADS (Surveillance ADS)

Notification messages

2.2. The **Advance Boundary Information** (ABI) message is used to give advance information on flights and shall be transmitted at a bilaterally agreed time or position (Variable System Parameter) before the common boundary. Changes to a previously transmitted ABI shall be communicated by means of another ABI. Changes to the cleared route of flight will result in the retransmission of an ABI.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
14	Boundary estimate data
16	Destination aerodrome
22	Amendment

Field 22 shall contain as a minimum the following fields:

9	Number, type of aircraft and wake turbulence category
15	Route (see PART I paragraph 5.3.1)

Field 22 may also optionally include any or all of the following fields:

8	Flight rules
10	Equipment
18	Other information. Note that this field shall contain information as received by the sending centre or a subset thereof as agreed between the parties

Example

(ABI-THA179-EGLL-15N0090E/0700F330
-VTBD-8/IS-9/B747/H-10/S/C-15/14N093W 13N097W YAY T-18/0)

Coordination messages

2.3. The **Current Flight Plan** (CPL) message is used to initiate initial coordination dialogue between automated ATS systems for a specific flight.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification
8	Flight rules
9	Aircraft type
10	Navigation equipment
13	Departure aerodrome
14	Boundary estimate data
15	Route (see PART I paragraph 5.3.1)
16	Destination aerodrome
18	Other information

Example

(CPL-QFA811-IS-B767/H-S/C-WSSS -20N070E/1417F350 M080F350 30N060E 40N090E YAY T-EGLL-0)

2.4. The **Coordination Estimate** (EST) message is used to inform the receiving centre of the crossing conditions for a flight and to indicate that the conditions are in compliance with agreements between the two parties. An ACP message shall be transmitted to complete the coordination process.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
14	Boundary estimate data
16	Destination aerodrome

Example

(EST-QFA811/A2277-WSSS-20N070E/1417F350-YAYT)

2.5. The **Preactivation** (PAC) message is used to inform the receiving centre of the crossing conditions for a flight which has not yet departed and to indicate that the conditions are in compliance with agreements between the two parties. Normally it is used when the departure point is close to the FIR boundary and preflight coordination is required. Whilst no receiving centre controller acceptance is required, an ACP message is required to be transmitted to complete the coordination process.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
14	Boundary estimate data
16	Destination aerodrome
22	Amendment (optional field)

Field 22 may optionally include any or all of the following fields

8	Flight rules
9	Number, type of aircraft and wake turbulence category
10	Equipment
15	Route (see PART I paragraph 5.3.1)
18	Other information. Note that this field shall contain information as received by the sending centre or a subset thereof as agreed between the parties

Example

(PAC-QFA811/A2277-WSSS -20N070E/1417F350-YAYT-10/S/C)

2.6. The **Coordination Cancellation** (MAC) message is used specifically to indicate to a receiving centre that all notification and/or coordination received for a flight is no longer relevant to that centre. This message is not to be considered as a CNL message.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
16	Destination aerodrome
22*	Amendment (optional field)

*Field 22 may only contain the following fields:

14	Boundary Estimate Data
18	Other Information

Field 14 is transmitted containing the boundary estimate data previously transmitted. It may be used if required, to correctly identify the flight concerned by the MAC, when appropriate.

Examples

(MAC-BCA789-RJAA-KLAX)
(MAC-ICE234-RPMM-WSSS)

2.7. The **Coordination/Modify** (CDN/MOD) message is used to propose changes to the coordination conditions agreed to in a previously transmitted CPL, EST, PAC or CDN message. Only one CDN dialogue can be active per flight at any given time between the same two units (refer App D paragraph 3.2.5). The initial coordination dialogue is always terminated by an ACP message;

otherwise a unit receiving a CDN can indicate that the coordination conditions should be left as previously agreed by transmitting an REJ message. CDN dialogues should be closed prior to the Transfer of Control occurring.

2.8. ATSUs should ensure that appropriate procedures are defined in bilateral Letters of Agreement for dealing with CDN messages containing a number of revisions (e.g. a revised estimate and level). There may be occasions when the receiving ATSU can accept one of the amendments but not the other.

Message Format

ATS fields	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
16	Destination aerodrome
22 *	Amendment

*Field 22 may only contain fields 14, 15 and 18.

Example

(CDN/MOD-NWA36-NFFN-RJTT-14/20N150E/0446F370)

2.9. The **Acceptance** (ACP) message is used to confirm that the contents of a received CPL, CDN, EST or PAC message are accepted. ACP messages may be generated automatically or manually.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
16	Destination aerodrome

Example

(ACP-ACA860-NZAA-KSFO)

2.10. The **Rejection** (REJ) message is used to reject a clearance proposed by a CDN to a previously coordinated flight and terminate the coordination dialogue. The clearance remains as was previously agreed.

Message Format

ATS Field	Description
3	Message Type
7	Aircraft Identification
13	Departure Aerodrome
16	Destination Aerodrome

Example

(REJ-AAL780-KSFO-RJAA)

Transfer of control messages

2.11. The **Transfer of Control** (TOC) message is used to offer the receiving centre executive control of a flight.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification, SSR Mode and Code where applicable
13	Departure aerodrome
16	Destination aerodrome

Example

(TOC-TAP451/A2217-YMML-NZCH)

2.12. The **Assumption of Control** (AOC) message is sent in response to a TOC to indicate acceptance of executive control of a flight.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification, SSR Mode and Code where applicable
13	Departure aerodrome
16	Destination aerodrome

Example (AOC-TAP451/A2217-NFFF -PHNL)

General information messages

2.13. The **Emergency** (EMG) message is used at the discretion of ATSUs when it is considered that the contents require immediate attention. Normally the information would be presented directly to the controller responsible for the flight or to the controller expecting to receive responsibility for the flight. When the message does not refer to a specific flight, a functional address shall be used and the information presented to the appropriate ATS position. Where such an address is used it is preceded by an oblique stroke (/) to differentiate it from an aircraft identification. The following are some examples of circumstances which could justify the use of an EMG message:

a. Reports of emergency calls or emergency locator transmission reports;
b. Messages concerning hi-jack or bomb warnings;

c. Messages concerning serious illness or disturbance among passengers;

d. Sudden alteration in flight profile due to technical or navigational failure; or

e. Communications failure

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification or functional address
18	Free text

Examples

(EMG-UAL123-RMK/Free Text)
(EMG-/ASUP-RMK/Free Text)

2.14. The Miscellaneous (MIS) message is used to transmit operational information which cannot be formatted to comply with any other message type, and for plain language statements. Normally the information would be presented directly to the controller responsible for the flight or to the controller expecting to receive responsibility for the flight. When the message does not refer to a specific flight, a functional address shall be used and the information presented to the appropriate ATS position. Where such an address is used it is preceded by an oblique stroke (/) to differentiate it from an aircraft identification.

Message Format

ATS Field	Description
3	Message type
7	Aircraft identification or functional address
18	Free text

Examples

(MIS-NWA456-RMK/Free Text)
(MIS-/ASUP-RMK/Free Text)

2.15. The **Track Definition Message** (TDM) is used to distribute track information to affected Area Control Centres (ACCs) and Aeronautical Operational Control Centres (AOCs) for flight planning. The message contains track definition and activity time periods.

TDM Message Format

1. Message Identifier. The message begins with a "(TDM " and ends with ")". Fields within the message are separated by a space (i.e. " ").

2. Track Name. The track name consists of two fields. The first field is always TRK. The second field is the track identifier. The track identifier consists of 1 to 4 alphanumeric characters.

3. General Information. Contains:

   a. Date and time the track was generated and message number for that particular track in YYMMDDHHMMNN format where NN represents the message number. The initial TDM date/time message number group will look like: 941006134501. Message numbers 02 to 99 indicate TDM amendments or revisions. Note that zero padding may be required to provide the correct number of digits.

b. Track status- Blank field for initial message or "AMDT" for amendment.

4. Activity Time Interval. This field consists of two date/time pairs, separated by a blank character, in the following format: YYMMDDHHMM YYMMDDHHMM

   The first date/time pair represents the track activation, while the second is the track termination date/time.

   Example: 9410070300 9410071500.

   This example represents an activation date/time of October 7, 1994, at 0300 UTC and a termination date/time of October 7, 1994 at 1500 UTC.

5. Track Waypoints. This field contains the set of waypoints defining the track from the ingress fix to the egress fix. Waypoints are represented as latitude/longitude or named en route points. Waypoints are separated from each other by a blank space. Note that zero padding may be required. For example:

   60N150W 60N160W, or NORML NUMMI, or FINGS 5405N13430W, etc.

6. Optional Fields

   a. Level: This optional field will not be used in the Pacific operations since levels are published in separate documents, e.g. Pacific Ocean Supplements. However, the field will be retained for possible future use. If used in the future, track levels lists may be specified for the east and westbound directions of flight and a track levels list would contain the complete list of levels available on the track for the specified direction of flight. The levels would apply to all waypoints in the track waypoint list.

   b. Connecting routes (RTS): The RTS field is an optional field not normally used by automated ATS systems. When used, it is located after the waypoint list (before the remarks field) and begins with the keyword "RTS/" at the beginning of a line. Each line of the RTS field contains a single connecting route (to the ingress fix or from the egress fix).

7. Remarks. The Remarks subfield is a free text field that can contain additional comments. If there are no remarks a zero (0) is inserted as the only text. The remarks subfield begins with "RMK/".

Examples

The following TDM describes a route connecting Honolulu and Japan and would look similar to:

```
(TDM TRK A 940413124001
9404131900 9404140800
 LILIA 27N170W 29N180E 31N170E 32N160E MASON
 RTS/ PHNL KEOLA2 LILIA
MASON OTR15 SMOLT OTR16 SUNNS OTR20 LIBRA RJAA RMK/0)
```

The following TDM amendment describes a revision to the TDM shown above.

(TDM TRK A 940413131502 AMDT
9404131900 9404140800
LILIA 27N170W 29N180E 30N170E 32N160E MASON
RTS/ PHNL KEOLA2 LILIA
MASON OTR15 SMOLT OTR16 SUNNS OTR20 LIBRA RJAA RMK/0)

In the second example above, the message number (as delineated by the last two digits of the message generation date/time group) indicates it as the second ("2") message for the track. This is followed by "AMDT" to signify the previous message has been amended.

2.16. The NAT Organized Track Structure (NAT) message is used to publish the NAT organized track structure and the levels available. The message may be divided into several parts to meet the size constraints of Annex 10.

NAT Message Format

ATS Field	**Description**
3 a)	Message type
Text	Structured Text

1.
NAT Structured Text Format

2.17. It is required to adhere strictly to the syntax described hereafter in order to facilitate automated processing of NAT messages.

2.18. In the tables below, text between angle brackets should be understood to represent characters by their ASCII name. E.g. <sp> stands for 'space character', <cr> stands for 'carriage return', <lf> for 'line feed', and any combination <crlf> is the same as <cr><lf>... No control character shall be inserted in the message text unless specified as in the tables below, this restriction of course applies to <cr> and <lf> as well as any other control character.

2.19. It shall be noted that NAT Track messages shall otherwise follow current AFTN syntax requirements as expressed in ICAO Annex 10, Chapter II, 1995, e.g. that the alignment function within the message text, header and trailer is composed of a single <cr> followed by a single <lf>. However modern systems shall also be able to process the older alignment function composed of a double <cr> followed by a single <lf> as if it were a single <cr> followed by a single <lf> for backward compatibility reasons and to facilitate transition.

2.20. Characters in bold underlined in the Message Text (syntax) column are to be replaced or dealt with as explained in the Description column.

2.21. The structured text is first composed of a NAT message header, as follows:

Id	**Message Text (syntax)**	**Description (semantics)**
1	(NAT-**a**/**b**<sp> TRACKS<sp>	**a** designates the part number in the **b** parts of the NAT message (**a** and **b** are one decimal digit)
2	FLS<sp>**nnn**/**mmm** <sp>INCLUSIVE	**nnn** and **mmm** designating the minimum and maximum concerned flight levels in hundreds of feet (three decimal digits)

Id	Message Text (syntax)	Description (semantics)
3	<crlf>	Validity time with:
4	**month**<sp>**d1/h1m1**Z <sp>TO<sp> month<sp>d2/h2m2Z	**month**: for the month of validity full month name in letters **d1/h1m1**: beginning time of validity **d2/h2m2**: ending time of validity(day / hour minute, 2 digits each, no space, leading zero required if number is less than 10)
5	<crlf>	
6	PART<sp>**a** <sp>OF<sp> **b**<sp>PART**S**-	**a** and **b** textual numbers (ONE, TWO, THREE, FOUR) or one decimal digit. Both numbers shall represent the same digits as referred to in item Id 1 above. Terminal character **S** may be omitted if **b** is ONE.
7	<crlf><crlf>	

2.22. Following the NAT message header is a repeat of the following structure for each North Atlantic Track part of the message. If the resulting NAT message text is longer than 1800 characters, it must be separated into as many parts as necessary. Separation must happen between individual North Atlantic Track descriptions, not within an individual description.

Id	Message Text (syntax)	Description (semantics)
8	**L**	letter designating the name of the NAT track. One of: ABCDEFGHJKLM for Westbound tracks. The most northerly Track of the day is designated as NAT Track Alpha, the adjacent Track to the south as NAT Track Bravo, etc, NPQRSTUVWXYZ for Eastbound tracks The most southerly Track of the day is designated as NAT Track Zulu, the adjacent Track to the north as NAT Track Yankee, etc, Tracks must be defined in sequence starting at any letter in the appropriate set, each following track using the immediately following letter in that set e.g.UVWXYZ or ABCDE etc.. The first track in the message shall be the most northerly one and each subsequent track shall be the next one towards the south.
9	<sp>	
10	**list of points**	Each point, separated by a space, is either significant points (named points from the published ICAO list of fixes) or a LAT/LONG given in degrees or degrees and minutes. At present only whole degrees are used.

Id	Message Text (syntax)	Description (semantics)
		Acceptable LAT/LONG syntaxes are: ➢ xx/yy ➢ xxmm/yy ➢ xx/yymm ➢ xxmm/yymm Where xx is the north latitude, yy the west longitude, and mm the minutes part of the latitude or longitude
11	<crlf>	
12	EAST LVLS<sp>	**List**_____ list the allowed flight levels for eastbound flights. This list can contain of allowed levels NIL if there is no allowed level or a list of numbers (3 decimal digits) for each allowed level separated by a space
13	<crlf>	
14	WEST LVLS<sp>	**List**____ list the allowed flight levels for westbound flights. This list can contain **of allowed levels** NIL if there is no allowed level or a list of numbers (3 decimal digits) for each allowed level separated by a space.
15	<crlf>	
16	EUR<sp>RTS<sp> WEST<sp>**XXX**<sp> VIA<sp>**RP** Or EUR<sp>RTS<sp>	(optional field) Note that the indentation does not indicate the presence of space ____ characters, it is a presentation mechanism to highlight two variant syntaxes for this field. Or Description of European links to the tracks, this description will be WEST<sp>NIL given separately for Eastbound and/or Westbound flights XXX designating the Irish/UK route structure linked to the NAT track. RP designating the point recommended to be overflown by westbound flights for joining the NAT track. The text "VIA<sp>RP" is optional. Or There is no European link.
17	<crlf>	
18	NAR<sp>**list**	(optional) Or Description of North American links to the tracks list : list of North NAR<sp>NIL American airways recommended to be overflown by flights for joining or leaving the

Id	Message (syntax)	Text	Description (semantics)
			NAT track Or There are no recommended North American airways.
19	–		
20	<crlf><crlf>		

2.23. And to terminate the NAT message is composed of a trailer

Id	Message (syntax)	Text	Description (semantics)
21	<crlf>		
22	REMARKS<crlf>**text**-<crlf>		This field is optional and can only be present in the last part of a multipart NAT message, or in the unique part in case of a mono–part NAT message. The remark text must contain the Track Message Identifier (TMI). It is recommended to consistently place the TMI in the first remark. The syntax for the TMI is as follows. Any text may precede the keywords that identify the TMI. The TMI is recognised as the first occurrence of the string (without the quotes) "TMI<sp>IS<sp>**xxx**" or "TMI<sp>IS<sp>**xxxa**" where "**xxx**" is the TMI and "**a**" the optional track message revision letter. To facilitate automated processing, this string shall be followed by a space character before any subsequent remark text is inserted in the track message. The TMI shall be the Julian calendar day in the year – i.e. starting at one (001) on the first of January of each year, 002 for second of January etc.
23	END<sp>OF<sp>PART<sp>PART**S**)		**a** and **b** textual numbers (ONE, TWO, THREE, FOUR) or one decimal <sp>**a**<sp>OF<sp>**b** Both numbers must be the same as in field 6 above. Terminal character **S** may be omitted if **b** is ONE.

Example of a westbound message set

(NAT-1/3 TRACKS FLS 310/390 INCLUSIVE
JULY 01/1130Z TO JULY 01/1800Z
PART ONE OF THREE PARTS-

A 57/10 59/20 61/30 62/40 62/50 61/60 RODBO
EAST LVLS NIL
WEST LVLS 320 340 360 380
EUR RTS WEST NIL
NAR N498C N4996C N484C-

B 56/10 58/20 60/30 61/40 60/50 59/60 LAKES
EAST LVLS NIL
WEST LVLS 310 330 350 370 390
EUR RTS WEST 2
NAR N434C N428C N424E N416C-

C 55/10 57/20 59/30 60/40 59/50 PRAWN YDP
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR N322B N326B N328C N334C N336H N346A N348C N352C N356C N362B-

D MASIT 56/20 58/30 59/40 58/50 PORGY HO
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST DEVOL
NAR N284B N292C N294C N298H N302C N304E N306C N308E N312A-

E 54/15 55/20 57/30 57/40 56/50 SCROD VALIE
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST BURAK
NAR N204C N248C N250E N252E N254A N256A N258A N260A-

END OF PART ONE OF THREE PARTS)

(NAT-2/3 TRACKS FLS 310/390 INCLUSIVE
JULY 01/1130Z TO JULY 01/1800Z
PART TWO OF THREE PARTS-

F 53/15 54/20 56/30 56/40 55/50 OYSTR STEAM
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST DOLIP
NAR N220B N228B N230C N232E-

G 49/15 48/20 46/30 43/40 40/50 36/60 BALOO
EAST LVLS NIL
WEST LVLS 320 340 360
EUR RTS WEST GUNSO
NAR NIL-

END OF PART TWO OF THREE PARTS)

(NAT-3/3 TRACKS FLS 310/390 INCLUSIVE
JULY 01/1130Z TO JULY 01/1800Z
PART THREE OF THREE PARTS-

H BANAL 43/20 44/30 44/40 43/50 JEBBY CARAC
EAST LVLS NIL
WEST LVLS 310 350 370
EUR RTS WEST DIRMA
NAR N36E N44B-

REMARKS:

1. TMI IS 182 AND OPERATORS ARE REMINDED TO INCLUDE THE TMI NUMBER AS PART OF THE OCEANIC CLEARANCE READ BACK.
2. OPERATORS ATTENTION IS DRAWN TO CZUL NOTAM A2152/01
3. OPERATORS ATTENTION IS DRAWN TO UK NOTAMS A1098/01 AND G0120/01
4. MNPS AIRSPACE EXTENDS FROM FL285 TO FL420. OPERATORS ARE REMINDED THAT SPECIFIC MNPS APPROVAL IS REQUIRED TO FLY IN THIS AIRSPACE. IN ADDITION, RVSM APPROVAL IS REQUIRED TO FLY BETWEEN FL310 AND FL390 INCLUSIVE.
5. EIGHTY PERCENT OF GROSS NAVIGATION ERRORS RESULT FROM POOR COCKPIT PROCEDURES. ALWAYS CARRY OUT PROPER WAY POINT CHECKS.-

END OF PART THREE OF THREE PARTS)

Example of an eastbound message

(NAT-1/1 TRACKS FLS 310/390 INCLUSIVE
JULY 01/0100Z TO JULY 01/0800Z
PART ONE OF ONE PART-

V YAY 53/50 54/40 55/30 56/20 56/10 MAC
EAST LVLS 310 320 330 340 350 360 370 380 390
WEST LVLS NIL
EUR RTS WEST NIL
NAR N125A N129B-

W DOTTY 52/50 53/40 54/30 55/20 55/10 TADEX
EAST LVLS 310 320 330 340 350 360 370 380 390
WEST LVLS NIL
EUR RTS WEST NIL
NAR N109B N113B-

X CYMON 51/50 52/40 53/30 54/20 54/15 BABAN
EAST LVLS 310 320 330 340 350 360 370 380 390
WEST LVLS NIL
EUR RTS WEST NIL
NAR N93B N97B-

Y YQX 50/50 51/40 52/30 53/20 53/15 BURAK
EAST LVLS 310 320 330 340 350 360 370 380 390
WEST LVLS NIL
EUR RTS WEST NIL
NAR N77B N83B-

Z VIXUN 49/50 50/40 51/30 52/20 52/15 DOLIP
EAST LVLS 310 320 330 340 350 360 370 380 390
WEST LVLS NIL
EUR RTS WEST NIL
NAR N61B N67B-

REMARKS:
1. TMI IS 182 AND OPERATORS ARE REMINDED TO INCLUDE THE
TMI NUMBER AS PART OF THE OCEANIC CLEARANCE READ BACK.
2. CLEARANCE DELIVERY FREQUENCY ASSIGNMENTS FOR AIRCRAFT OPERATING FROM MOATT TO BOBTU INCLUSIVE: MOATT - SCROD 128.7
OYSTR - DOTTY 135.45 CYMON - YQX 135.05 VIXUN - COLOR 128.45
BANCS AND SOUTH 119.42
3. PLEASE REFER TO INTERNATIONAL NOTAMS CZUL A2152/01
4. MNPS AIRSPACE EXTENDS FROM FL285 TO FL420. OPERATORS ARE REMINDED THAT MNPS APPROVAL IS REQUIRED TO FLY IN THIS AIRSPACE. IN ADDITION, RVSM APPROVAL IS REQUIRED TO FLY WITHIN THE NAT REGIONS BETWEEN FL310 AND FL390 INCLUSIVE.
5. 80 PERCENT OF GROSS NAVIGATIONAL ERRORS RESULT FROM POOR COCKPIT PROCEDURES. ALWAYS CARRY OUT PROPER WAYPOINT CHECKS.
6. REPORT NEXT WAYPOINT DEVIATIONS OF 3 MINUTES OR MORE TO ATC.
7. EASTBOUND UK FLIGHT PLANNING RESTRICTIONS IN FORCE. SEE NOTAMS A1098/01. - END OF PART ONE OF ONE PART)

Application Management Messages

2.24. The **Logical Acknowledge** (LAM) message is sent for each message (except for another LAM or LRM) that has been received, processed, found free of errors and, where relevant, is available for presentation to a control position. Non-receipt of an LAM may require local action. The message identifier and reference identifier are found in the message header, which is defined in Part II.

Message Format

ATS Field	Description
3	Message type

Example

(LAM)

2.25. The **Logical Rejection** (LAM) message is used to reject a message which contains invalid information. The message identifier and reference identifier are found in the message header, which is defined in Part II.

Message Format

ATS Field	Description
3	Message type
18	Other Information

Field 18 will only use the RMK/ sub-field. It will comprise an error code, supporting text and the ICAO field number where applicable. The following format is used to report errors: <error code>/<field number>/<invalid text> A catalogue of error codes and supporting text is contained in Appendix B.

Example

(LRM-RMK/27/15/130S165E)

This message denotes an invalid lat/long in Field 15.

2.26. The **Application Status Monitor** (ASM) message is sent to an adjacent centre to confirm that the ad jacent centre's ATC application system is online. It is transmitted when no other application messages have been received within an adaptable time. The periodic interval between transmissions of this message should be determined based on the needs of the operational environment. Typical values may be between 5 and 30 minutes.

Message Format

ATS Field	Description
3	Message Type

Example

(ASM)

2.27. The **FANS Application Message** (FAN) is transmitted by the controlling ATSU to provide the receiving ATSU with the required Context Management information necessary to establish CPDLC and/or ADS connections.

2.28. A free text field is used in this message to transfer the CPDLC and ADS application version numbers which are separated by a "/". If a transferring ATSU wishes to transmit a FAN message to permit a downstream ATSU to establish ADS contracts, the CPDLC application version number shall be transmitted as a zero.

Message Format

ATS fields	Description
3	Message type
7	Aircraft identification
13	Departure aerodrome
16	Destination aerodrome

Text Application and address data (to be determined but will include ICAO 24 bit code)

Example

(FAN-QFA43-YSSY-NZAA-Application and address data)

ATSUs should ensure that at least two of the ACID, REG, or CODE fields are used to ensure that the Context Management information is associated with the correct flight data record.

2.29. The **FANS Completion Notification** (FCN) is transmitted by the receiving ATSU to the transferring ATSU as an operational response to a FAN message. The free text “Connection Flag field” is set to zero if the receiving ATSU was unable to establish a CPDLC connection with the aircraft, otherwise it is set to one. It is used to provide assurance to the transferring unit that a successful CPDLC transfer should occur.

Message Format

ATS fields	Description
3	Message type
7	Aircraft identification
Text	Free text

Example

(FCN-QFA43-RMK/0)

(FCN-ANZ15-RMK/1)

Surveillance Data Transfer Service Messages

2.30. The **Surveillance General** (TRU) message is used to transfer track data (a flight's position, ground speed and track angle) to an adjacent ATSU.

Message Format

ATS Field	Description
3	Message type
7	Aircraft Identification
13	Departure Aerodrome
16	Destination Aerodrome
Text	Track Data (to be determined)

Example

(TRU-UAL73-NTAA-KLAX-TRACKDATA)

2.31. The **Surveillance ADS** (ADS) message is used to transfer ADS data over ground-to-ground links.

Message Format

ATS Field	Description
3	Message type
7	Aircraft Identification
13	Departure Aerodrome

16	Destination Aerodrome
Text	ADS Data (to be determined)

Example

(ADS-UAL73-NTAA-KLAX-ADS Data)

Radar Handover Messages

2.32. The **Radar Transfer Initiate** (RTI) message is used to initiate the transfer of radar identification for a flight.

Message Format

ATS Field	Description
3	Message Type
7	Aircraft Identification
13	Departure Aerodrome
16	Destination Aerodrome
31	Facility Designator
32	Time of Day

Example

(RTUKZMP/CZWG000KZMP/CZWG801-DLH499/A3407-KMSP-CYOW-13242934462034N0720521WN043327629F349)

2.33. The **Radar Transfer Accept** (RTA) message is used as an application response to an RTI. Also used to retract the handover.

Message Format

ATS Field	Description
3	Message Type
7	Aircraft Identification
13	Departure Aerodrome
16	Destination Aerodrome
31	Facility Designator

Example

Handover Accepted
(RTACZWG/KZMP438KZMP/CZWG812-DLH499/A4222-KZMP-CYOW-CZWG33)

Handover retraction
(RTAKZMP/CZWG222KZMP/CZWG812-DLH499/A4222-KZMP-CYOW-KZMP42)

Table A-2. AIDC Messages and their Field Composition

CORE	OPT	MESSAGE	MESSAGE ACRONYM	ICAO FIELDS											NON ICAO FIELD
				3	7	8	9	10	13	14	15	16	18	22	
X		Advance Boundary Information	ABI	X	X				X	X		X		X 8,9,10,15,18	
X		Current Flight Plan	CPL	X	X	X	X	X	X	X	X	X	X		
X		Coordination Estimate	EST	X	X				X	X		X			
X		Coordination Cancellation	MAC	X	X				X			X		X 14, 18	
	X	PreActivation	PAC	X	X				X	X		X		X 8,9,10,15,18	
X		Coordination	CDN	X	X				X			X		X 14,15,18	
X		Acceptance	ACP	X	X				X			X			
X		Rejection	REJ	X	X				X			X			
X		Transfer of Control	TOC	X	X				X			X			
X		Assumption of Control	AOC	X	X				X			X			
X		Emergency	EMG	X	X								X		
X		Miscellaneous	MIS	X	X								X		
	X	Track Definition Message	TDM	X											X
X		Logical Acknowledgement Message	LAM	X											
X		Logical Rejection Message	LRM	X									X		
	X	Application Status Monitor	ASM	X											

APPENDIX B - ERROR CODES

1 INTRODUCTION

1.1. A set of error codes has been developed for those messages contained in the ASIA/PAC Core message set. A list of the codes and error text is contained in the table below.

1.2. Error codes for incorrect message sequences, such as attempting a change in coordination conditions (CDN) while a transfer of control is in progress (TOC) have not yet been developed.

Table B-1. Error Codes

Error Code	Field Number	Error Text
1	Header	INVALID SENDING UNIT (e.g., AFTN Address)
2	Header	INVALID RECEIVING UNIT (e.g., AFTN Address)
3	Header	INVALID TIME STAMP
4	Header	INVALID MESSAGE ID
5	Header	INVALID REFERENCE ID
6	7	INVALID ACID
7	7	DUPLICATE ACID
8	7	UNKNOWN FUNCTIONAL ADDRESS
9	7	INVALID SSR MODE
10	7	INVALID SSR CODE
11	8	INVALID FLIGHT RULES
12	8	INVALID FLIGHT TYPE
13	9	INVALID AIRCRAFT MODEL
14	9	INVALID WAKE TURBULENCE CATEGORY
15	10	INVALID CNA EQUIPMENT DESIGNATOR
16	10	INVALID SSR EQUIPMENT DESIGNATOR
17	13, 16, 17	INVALID AERODRO ME DESIGNATOR
18	13	INVALID DEPARTURE AERODROME
19	16	INVALID DESTINATION AERODROME
20	17	INVALID ARRIVAL AERODROME
21	13, 16, 17	EXPECTED TIME DESIGNATOR NOT FOUND
22	13, 16. 17	TIME DESIGNATOR PRESENT WHEN NOT EXPECTED
23	13, 14, 16, 17	INVALID TIME DESIGNATOR
24	13, 14, 16, 17	MISSING TIME DESIGNATOR

25	14	INVALID BOUNDARY POINT DESIGNATOR
26	14, 15	INVALID ENROUTE POINT
27	14, 15	INVALID LAT/LON DESIGNATOR
28	14, 15	INVALID NAVAID FIX
29	14, 15	INVALID LEVEL DESIGNATOR
30	14, 15	MISSING LEVEL DESIGNATOR
31	14	INVALID SUPPLEMENTARY CROSSING DATA
32	14	INVALID SUPPLEMENTARY CROSSING LEVEL
33	14	MISSING SUPPLEMENTARY CROSSING LEVEL
34	14	INVALID CROSSING CONDITION
35	14	MISSING CROSSING CONDITION
36	15	INVALID SPEED/LEVEL DESIGNATOR
37	15	MISSING SPEED/LEVEL DESIGNATOR
38	15	INVALID SPEED DESIGNATOR
39	15	MISSING SPEED DESIGNATOR
40	15	INVALID ROUTE ELEMENT DESIGNATOR
41	15	INVALID ATS ROUTE/SIGNIFICANT POINT DESIGNATOR
42	15	INVALID ATS ROUTE DESIGNATOR
43	15	INVALID SIGNIFICANT POINT DESIGNATOR
44	15	FLIGHT RULES INDICATOR DOES NOT FOLLOW SIGNIFICANT POINT
45	15	ADDITIONAL DATA FOLLOWS TRUNCATION INDICATOR
46	15	INCORRECT CRUISE CLIMB FORMAT
47	15	CONFLICTING DIRECTION
48	18	INVALID OTHER INFORMATION ELEMENT
49	19	INVALID SUPPLEMENTARY INFORMATION ELEMENT
50	22	INVALID AMENDMENT FIELD DATA
51		MISSING FIELD nn
52		MORE THAN ONE FIELD MISSING
53		MESSAGE LOGICALLY TOO LONG
54		SYNTAX ERROR IN FIELD nn
55		INVALID MESSAGE LENGTH
56		NAT ERRORS

57		INVALID MESSAGE
58		MISSING PARENTHESIS
59		MESSAGE NOT APPLICABLE TO zzzz OAC
60	3	INVALID MESSAGE MNEMONIC (i.e., 3 LETTER IDENTIFIER)
61	Header	INVALID CRC
62		UNDEFINED ERROR
63		MSG SEQUENCE ERROR: ABI IGNORED
64		MSG SEQUENCE ERROR: INITIAL COORDINATION NOT PERFORMED
65		MSG SEQUENCE ERROR: EXPECTING MSG XXX; RECEIVED MSG YYY
66-256		RESERVED FOR FUTURE USE

APPENDIX C -ATM APPLICATION NAMING CONVENTIONS

1 Eight character AFTN addresses will be used by the ASIA/PAC AIDC application to identify automated ATS end-systems. The first four characters identify the ATS unit location, while the last four characters identify an organization, end-system, or application process at the given location
.

2 The table below describes a proposed naming convention, developed by the ATN Panel, for identifying ATM end-systems and applications. The last (eighth) character of the end-system's or application's AFTN address should be selected in accordance with the table.

8th	ATM ground system application process
A	Air space management
B	Unassigned
C	Unassigned
D	Dynamic track generation
E	Unassigned
F	Flight data processing (processor routes to appropriate control sector based on internal configuration information.)
G	Reserved for State use
H	Reserved for State use
I	Reserved for State use
J	Reserved for State use
K	Reserved for State use
L M	Reserved for State use OPMET data bank
N	AIS data bank
O	Oceanic data processing
P	Unassigned
Q	Unassigned
R	Radar data processing (processor routes to appropriate control sector based on internal configuration information.)
S	System management
T	Air traffic flow management
U	Unassigned
V	Unassigned
W	Unassigned
X	Default value
Y	Service function
Z	Unassigned

APPENDIX D - IMPLEMENTATION GUIDANCE MATERIAL

1 INTRODUCTION

1.1. The AIDC Message set described in Appendix A of the ICD for ATS Interfacility Data Communications supports six ATS-related functions:

1. Notification;
2. Coordination;
3. Transfer of Control;
4. General (Text) Information Interchange;
5. Surveillance Data Transfer; and
6. Application Management.

1.2. This appendix contains Implementation Guidance Material (IGM) of an explanatory nature. Information on how the message set as a whole is intended to be used is provided, with particular emphasis on the first three functions. The objective is to provide useful information and guidance to software engineers responsible for implementing the ASIA/PAC Message set within an automated ATS system.

1.3. ALTHOUGH OUTSIDE THE SCOPE OF THE ICD, FLIGHT PLANNING MESSAGES PLAY AN IMPORTANT ROLE WITHIN THE REGION, AND WILL CONTINUE TO DO SO IN THE FUTURE.

2 PRELIMINARIES

2.1 The following assumptions have been made:

a. The material described below applies only to data transfers between two automated ATS systems. Though most of it also applies to the general case of Notification and Coordination between more than two automated ATS systems, certain multi-ATSU Coordination problems have not yet been solved;

b. It must be possible to revert to manual intervention of the Notification, Coordination, and Transfer of Control processes at any time;

c. Exceptional conditions, such as loss of communications between two ATSUs, are not addressed and are subject to local procedures; and

d. An ATSU’s Area of Common Interest (ACI) is defined as the airspace for which the ATSU is responsible, i.e., an FIR, and surrounding border regions just outside the FIR. These surrounding border regions are usually determined by the required separation minima.

e. The material described below applies only to data transfers between two ATS Units. Though most of it also applies to the general case of Notification, Coordination, and Transfer of control between more than two ATS Units, certain multi-unit Coordination problems have not yet been solved.

F. IT MUST BE POSSIBLE TO REVERT TO MANUAL INTERVENTION OF THE NOTIFICATION, COORDINATION, AND TRANSFER OF CONTROL PROCESSES AT ANY TIME.

G. EXCEPTIONAL CONDITIONS, SUCH AS LOSS OF COMMUNICATIONS BETWEEN TWO ATS UNITS, ARE NOT ADDRESSED.

AFTN Message Header

2.2 Every message transmitted shall contain an AFTN header, as specified in the ICD. This header shall contain the optional AFTN data fields described.

2.3 MESSAGE IDENTIFIER NUMBERS (AFTN OPTIONAL DATA FIELD 2) SHALL BE SEQUENTIAL. RECEIPT OF AN OUT OF SEQUENCE MESSAGE SHALL RESULT IN A WARNING BEING ISSUED.

2.4 A CHECK FOR DUPLICATE MESSAGE IDENTIFIER NUMBERS SHALL BE MADE. IN GENERAL, SINCE 1,000,000 NUMBERS ARE AVAILABLE, NO DUPLICATES SHOULD BE PRESENT.

2.5 Message identifier numbers shall begin at 0, proceed through 999,999, and then rollover to 0. The same sequence shall be repeated when necessary.

2.6 EACH UNIQUE ATSU-TO-ATSU INTERFACE SHALL SELECT MESSAGE IDENTIFIER NUMBERS FROM ITS OWN POOL OF NUMBERS. EACH POOL SHALL ENCOMPASS THE ENTIRE POSSIBLE RANGE, I.E., INCLUDE ALL NUMBERS FROM 0 TO 999,999.

3 RESPONSE MESSAGES

APPLICATION RESPONSE

3.1 Every AIDC message received by an ATSU, except an LAM or LRM, shall be responded to the automation system. A LAM shall be transmitted when the receiving 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.

3.2 The timeout value T alarm associated with an application response shall be 180 seconds, corresponding to the nominal value associated with the accountability timer described in Part II.

3.3 Failure to receive an expected application response (i.e. an LAM or LRM) within Tr seconds (T alarm) shall result in a re-transmission (up to a maximum number Nr) of the original message, using the same information contained in optional data fields 2 and 3 found in the original message header. The timeout timer Tr shall be reset upon re-transmission. Failure to receive an application response within Talarm seconds from the original transmission of the message shall result in a warning being issued.

3.4 The transmission of an 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. This approach conforms to the OSI Reference Model.

3.5 Receipt of an LRM shall cause the receiving ATSU to take a corrective action before re-transmitting the message. This action may be automatic, as in a CRC error being indicated, or manual, as in an incorrect route element format. Once this action has been taken, the message shall be re-transmitted with a new message identifier number.

Operational Response

3.6 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. The table below indicates the required response to a received message. AIDC messages not listed in Table D-2.1 have no operational response.

Note: An REJ is not available in an Initial Coordination Dialogue

3.7 Failure to receive a response within an adapted operational response timeout period Top shall result in a warning being issued.

3.8 The value of Top is dependent on whether manual processing is required to generate the operational response. In general, Top should be less than 600 seconds when a manual action is required to trigger the operational response.

3.9 An operational response shall employ the AFTN header optional data field 3 to reference the original message being responded to. A dialogue, which is initiated by one message and contains a sequence of message exchanges, shall always reference the original message which triggered the dialogue. For example, one ATSU may initiate a coordination dialogue by transmitting a CPL message to an adjacent ATSU. A sequence of CDN messages may ensue, terminated by an ACP message. The CDN and ACP messages would all reference the original CPL message.

4 APPLICATION MANAGEMENT

4.1 Every message possessing an associated message identification number (other than an LAM or LRM) must be responded to by the addressee with an (1) LAM if the message was processed and no errors were found by the receiving Air Traffic Control (ATC) application; otherwise an (2) LRM if the message was not accepted due to errors.

4.2 The generation of LAM and LRM messages must be triggered at the application level, not at the communications front-end level. This is because LAM and LRM messages indicate that previously received data has been analyzed by the ATC application(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 service, which is responsible for the reliable delivery of data, but not its interpretation.

4.3 The ASM message is used to confirm that the ATC application on the other end is on-line.

This message is sent by ATSU A to (adjacent) ATSU B if, after a mutually agreed time, no communication has been received from ATSU B. ATSU B responds, if the ATC application is active and functioning, by sending a LAM to ATSU A. If ATSU A does not receive a response LAM from ATSU B within a specified time, local contingency procedures should be executed. This message would normally be sent automatically, but may be sent manually for testing purposes.

4.4 The FAN message may be used to transfer a data link aircraft's logon information from one ATSU to another. Implementation of this message obviates the need to utilise the five step "Address Forwarding" process that was developed for the initial implementation of FANS. The message contains all the information that is required to establish ADS and/or CPDLC connections with the aircraft. In the event that only an ADS connection will be required, the transferring ATSU should include ADS information only. If a FAN message is transmitted containing ADS information only, there should be no expectation of receiving an FCN (see below) response. If a FAN message is received containing ADS information only, there should be no attempt to establish a CPDLC connection.

4.5 The FCN message, where used, provides advice to the transferring ATSU that the receiving ATSU has established an (inactive) CPDLC connection with an aircraft. The FCN is transmitted by the receiving ATSU in response to a FAN after the Connection Confirm has been received from the aircraft being transferred.

5 PHASES OF FLIGHT

5.1 From an ATSU's perspective, a flight is considered to progress through several phases. The IGM is principally concerned with three phases: Notification, Coordination, and Transfer of Control.

Notification Phase

5.2 An ATSU receives information during the Notification phase on a flight which will at some future time enter its ACI.

5.3 **Notification Dialogue**. ABI messages shall be used to transfer notification information. The sending ATSU transmits an ABI to the downstream ATSUs (D-ATSUs) (including the next Receiving ATSU - the R-ATSU) with which it must coordinate the flight. The sending ATSU is responsible for determining which D-ATSUs must be notified.

5.4 **Re-Route Notification**. All D-ATSUs to the destination aerodrome shall be notified when a re-route has been made. Re-route dissemination shall be performed as a minimum capability on a stepwise (i.e., from one DATSU to the next D-ATSU) basis. In stepwise dissemination, an ATSU receiving an ABI is responsible for passing it on to any other affected D-ATSUs at the appropriate time.

5.5 **Route to Destination**. The above procedure requires the C-ATSU to acquire the complete route to destination. Initially, this information is found in the route field of the Filed Flight Plan (FPL). As re-routes occur, the filed route must be updated by the C-ATSU, and transmitted to D-ATSUs. In cases where this is not possible, the route field shall be terminated after the last known point or ATS route with the ICAO truncation indicator, which is the letter "T".

5.6 **Notification Cancellation**. A notification can be cancelled using a MAC message. Receipt of a MAC by an ATSU means that any notification data previously received for that flight is no longer relevant. Filed flight plan information (and any modifications) shall continue to be held, in accordance with local ATSU procedures.

Coordination Phase

5.7 Coordination between adjacent ATSUs occurs when the flight approaches a shared FIR boundary. An initial coordination dialogue can be automatically initiated a parameter time or distance from the boundary, as documented within a bi-lateral agreement, or it can also be manually initiated. There are several types of coordination dialogues which may occur, depending on where the aircraft is and what previous dialogues have occurred.

5.8 **Initial Coordination Dialogue**. This coordination dialogue (or an Abbreviated Initial Coordination dialogue) is always required to be successfully completed before later coordination dialogues are initiated. The C-ATSU transmits a CPL to the R-ATSU. The R-ATSU then responds with either an ACP, which signifies acceptance of the coordination conditions contained within the CPL, or a CDN which proposes a modification to the conditions contained in the CPL. If a CDN is the R-ATSU's response to the CPL, a sequence of CDNs may be exchanged between the two ATSUs. This dialogue is eventually terminated by the ATSU which last received a CDN transmitting an ACP to the other ATSU. Transmission of an ACP indicates that coordination conditions are mutually acceptable, and an initial coordination has been achieved.

5.9 **Abbreviated Initial Coordination Dialogue**. An Abbreviated Initial Coordination dialogue may be used in place of an Initial Coordination Dialogue when it is known apriori (e.g., by letters of agreement) that a flight's coordination data is mutually acceptable to both the C-ATSU and R-ATSU, accurate route information is available at the R-ATSU (e.g., from either an ABI or FPL message), and both ATSUs have agreed to permit the use of this dialogue. The C-ATSU transmits an EST or PAC to the R-ATSU. The R-ATSU then responds with an ACP, which signifies acceptance of the coordination conditions (i.e., boundary crossing data) contained within the EST or PAC. Either this dialogue or a full (i.e., CPL-based) Initial Coordination dialogue shall be successfully completed before any later coordination dialogues are initiated. Note that negotiation via CDNs is not permitted within this dialogue.

> PAC is only used when coordination is required before departure. This normally only occurs when the FIR boundary is close to the departure airport. PAC signals to the R-ATSU that the departure is imminent as well as initiating coordination.

5.10 **Re-Negotiation Dialogue**. This is an optional dialogue used to propose new coordination conditions after the initial dialogue has been completed. Either ATSU may initiate this dialogue by transmitting a CDN (in contrast to a CPL in the Initial Coordination Dialogue) to the other ATSU. The dialogue then proceeds with an exchange of additional CDNs as necessary. Either ATSU may terminate the dialogue in one of two ways: (1) with an ACP, indicating that the coordination proposal contained in the latest CDN is acceptable; or (2) with an REJ, indicating that the previously agreed upon coordination conditions remain in effect.

5.11 **Active CDN**. For a given flight, only one CDN may be active between any pair of ATSUs. Note, however, that coordination between more than two ATSUs (for the same flight) may have a total number of active CDNs greater than one, though each pair of ATSUs is still restricted to a maximum of one active CDN per flight. In the exceptional (rare) case where a C-ATSU and D-ATSU both simultaneously transmit CDNs, the C-ATSU shall transmit an REJ to the D-ATSU, cancelling the D-ATSU's CDN.

5.12 Note that CDNs are only proposals; no changes are made in a flight's profile until an ACP is sent and acknowledged.

5.13 **Cleared Flight Profile Update**. The cleared flight profile (which is used for control purposes) shall only be updated after successful completion of a coordination dialogue, i.e., an ACP has been sent and acknowledged. This will require temporarily storing a proposed flight profile undergoing coordination separate from the cleared flight profile. The cleared flight profile shall then be updated using the newly coordinated profile upon successful completion of the coordination dialogue.

5.14 **Coordination Cancellation**. Coordination can be cancelled using a MAC message. Receipt of a MAC by an ATSU means that any coordination (or notification) data previously received for that flight is no longer relevant. Filed flight plan information (and any modifications) shall continue to be held, in accordance with local ATSU procedures.

5.15 **Coordination and the ACI**. ATSU A may need to coordinate with or provide information to ATSU B on all aircraft that enter ACI B, even if they do not enter *FIR B*. Consider the case of aircraft A in FIR A and aircraft B in *FIR B*, both flying near the *FIR A - FIR B* boundary but never penetrating the other FIR's airspace. The maintenance of adequate separation between these two aircraft may require coordination between or the provision of information to adjoining ATSUs.

Transfer of Control Phase

5.16 **Transfer Dialogue**. This phase occurs when the C-ATSU is ready to relinquish control of the flight to the R-ATSU, normally just before the FIR boundary crossing. The C-ATSU transfers a TOC message to the R-ATSU, which responds with an AOC message. The R-ATSU then becomes the C-ATSU once an application response for the AOC has been received.

5.17 **Transfer of Control and the ACI**. Note that the Transfer of Control process will not occur for all flights. Some flights fly near an FIR boundary, and may require coordination or the provision of other information, but do not actually enter the FIR.

6 FLIGHT STATE TRANSITIONS

6.1. **Notifying States**. Consider an aircraft that is currently within an FIR (*FIR A*) controlled by ATSU A (i.e., the C-ATSU) progressing towards the next FIR, *FIR B* (i.e., the R-ATSU). The aircraft is several hours from the boundary between the two FIRs. The flight is initially in a Pre-Notifying state from ATSU B’s perspective. ATSU B usually will have previously received a Filed Flight Plan (an FPL message), possibly with later amendments (as contained in CHG messages). ATSU A will employ a Notification dialogue to transfer information to ATSU B. (This transfer occurs either a system parameter time (e.g., 60 minutes) or distance prior to the flight crossing the *FIR A -FIR B* boundary.) This places the flight in a Notifying state from ATSU B’s perspective. Additional Notification dialogues may be invoked by ATSU A as needed to inform ATSU B of flight changes. If the aircraft for some reason, such as a change in route, is no longer expected to penetrate ACI B, ATSU A sends a MAC message to ATSU B, causing the flight to be placed back in a Pre-Notifying state from ATSU B's perspective.

6.2. **Initial Coordination States**. An Initial Coordination Dialogue is employed to effect the initial coordination. ATSU A transmits a CPL to ATSU B when the aircraft is at a mutually agreed upon predetermined time (e.g., thirty minutes) or distance from the *FIR A - FIR B* boundary. The flight is now in a Negotiating state from both ATSU A’s and ATSU B’s perspectives. ATSU B can accept the conditions specified in the CPL "as is" by transmitting an ACP message to ATSU A, or it can propose modifications using the CDN message. Negotiations between the two ATSUs are carried out using the CDN until a mutually acceptable flight profile is achieved. This acceptance is signaled by one ATSU sending an ACP, as before, to the other ATSU. This establishes the initial coordination conditions. The flight is now in a coordinated state, from both ATSUs’ perspective.

6.3. For an Abbreviated Initial Coordination, ATSU A transmits an EST to ATSU B when the aircraft is at a mutually agreed upon predetermined time (e.g., 30 minutes) or distance from *FIR A - FIR B* boundary. The flight is now in a Coordinating state. ATSU B responds with an ACP, which places the flight in a Coordinated State. This sequence of messages corresponds to an Abbreviated Initial Coordination Dialogue.

6.4. **Re-Negotiation State**s. The initial coordination is typically the final coordination. However, in certain situations, it may be desirable, or necessary, to re-open the coordination dialogue after initial coordination has been completed. A Re-Negotiation dialogue is employed to effect profile changes. The dialogue is re-opened when one ATSU (either A or B) transmits a CDN to the other ATSU, causing the flight to be in a Re-Negotiating state. The dialogue proceeds as above using CDN messages until either an ACP or REJ is sent. Either ATSU can close the dialogue by issuing an ACP or REJ. An ACP closes the dialogue with a new, mutually agreed upon flight profile. An REJ, however, immediately terminates the dialogue with the previously accepted coordination conditions in effect. Any proposed changes are null and void. Transmission of an ACP or REJ places the flight back into the Coordinated State.

6.5. **Transfer States**. Transfer of control is supported by the Transfer dialogue. ATSU A sends a TOC to ATSU B when the aircraft is about to cross the boundary. Alternatively, ATSU A can send a TOC when it is ready to relinquish control, even if the aircraft will remain in *FIR A* airspace several minutes before entering *FIR B*. The flight is now in a Transferring state from both ATSU A's and ATSU B's perspectives. ATSU B responds by transmitting an AOC to ATSU A, signaling acceptance of control responsibility. The flight is now in a Transferred state from ATSU A's perspective.

6.6. **Backward Re-Negotiating State**. A flight's profile may occasionally require a change after a Transfer of Control has been completed, but the aircraft is still within ATSU A's ACI. A Re-Negotiating dialogue is employed to effect profile changes after transfer has been completed. This places the flight in a Backward Re-Negotiating State, from both ATSUs' perspectives. Completion of this dialogue returns the aircraft to the Transferred state.

6.7. Several flight states are identified in the above discussion. These states are listed in Table D-1.

6.8. A flight state transition diagram is shown in Figure D-1. This diagram depicts graphically how the flight transitions from one state to the next. It is seen that the ASIA/PAC AIDC messages act as triggers, forcing the necessary state transitions. A description of the allowable flight state transitions, along with the message event that triggers the transition, is given in Table D-2.

Table D-1. Flight States

Flight State	Description
Pre-Notifying Notifying	Flight plan information may have been received. Any previously received notification and coordination information for the given flight cancelled by a MAC is no longer relevant. The aircraft's progress is being monitored by one or more non-controlling ATSUs, in addition to the controlling ATSU.
Negotiating	Coordination data is being exchange between the controlling ATSU and the receiving ATSU as part of the initial coordination dialogue.
Coordinating	Abbreviated coordination data has been sent to the receiving ATSU.
Coordinated	Coordination of the boundary crossing conditions is completed.
Re-Negotiating	Coordination data is being exchange between the controlling ATSU and the receiving ATSU as part of a later coordination dialogue.
Transferring	Air traffic control responsibility for the aircraft is in the process of being transferred to the receiving ATSU.
Transferred	Air traffic control responsibility for the aircraft has been transferred to the receiving ATSU.
Backward- Re-Negotiating	The aircraft is now under the control of the receiving ATSU, but still near the boundary. Changes are being proposed to the coordination conditions while the aircraft is still in the vicinity of the boundary.

7 MESSAGE SEQUENCING

7.1. The preceding section identified the flight states and showed how the aircraft transitions from one state to the next, based on the receipt of AIDC messages by ATSU B. In this section, a table of two-message sequences is constructed, as shown in Table 3. These sequences identify the allowable messages (the next message column) that may correctly follow a given, just received message (the first column). Application Management messages (LAM and LRM) are not shown, but must be sent in response to any received Notification, Coordination, or Transfer of Control messages

Figure D –1
Flight State Transitions Diagram

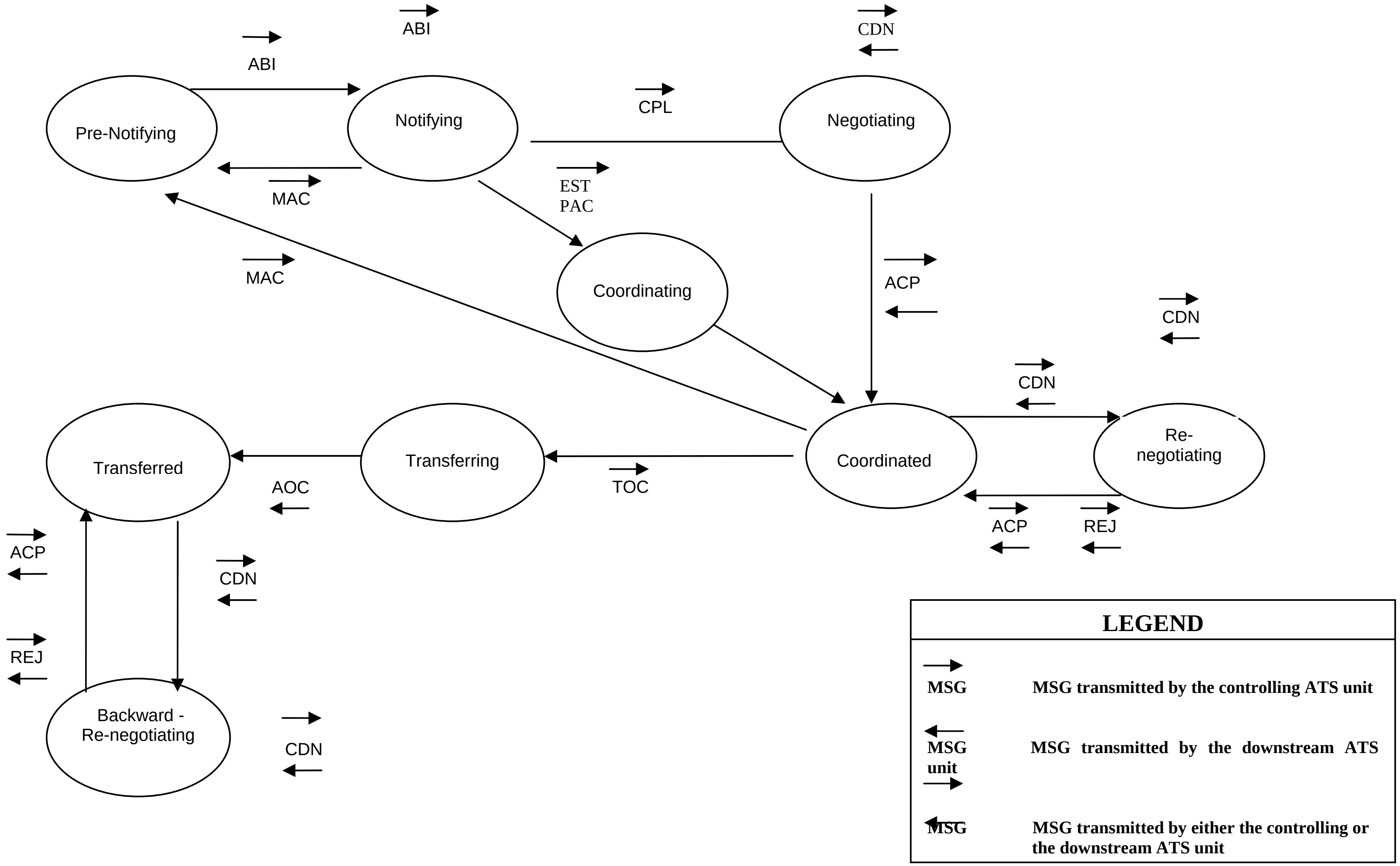

Figure D-2 Flight State Transition Diagram

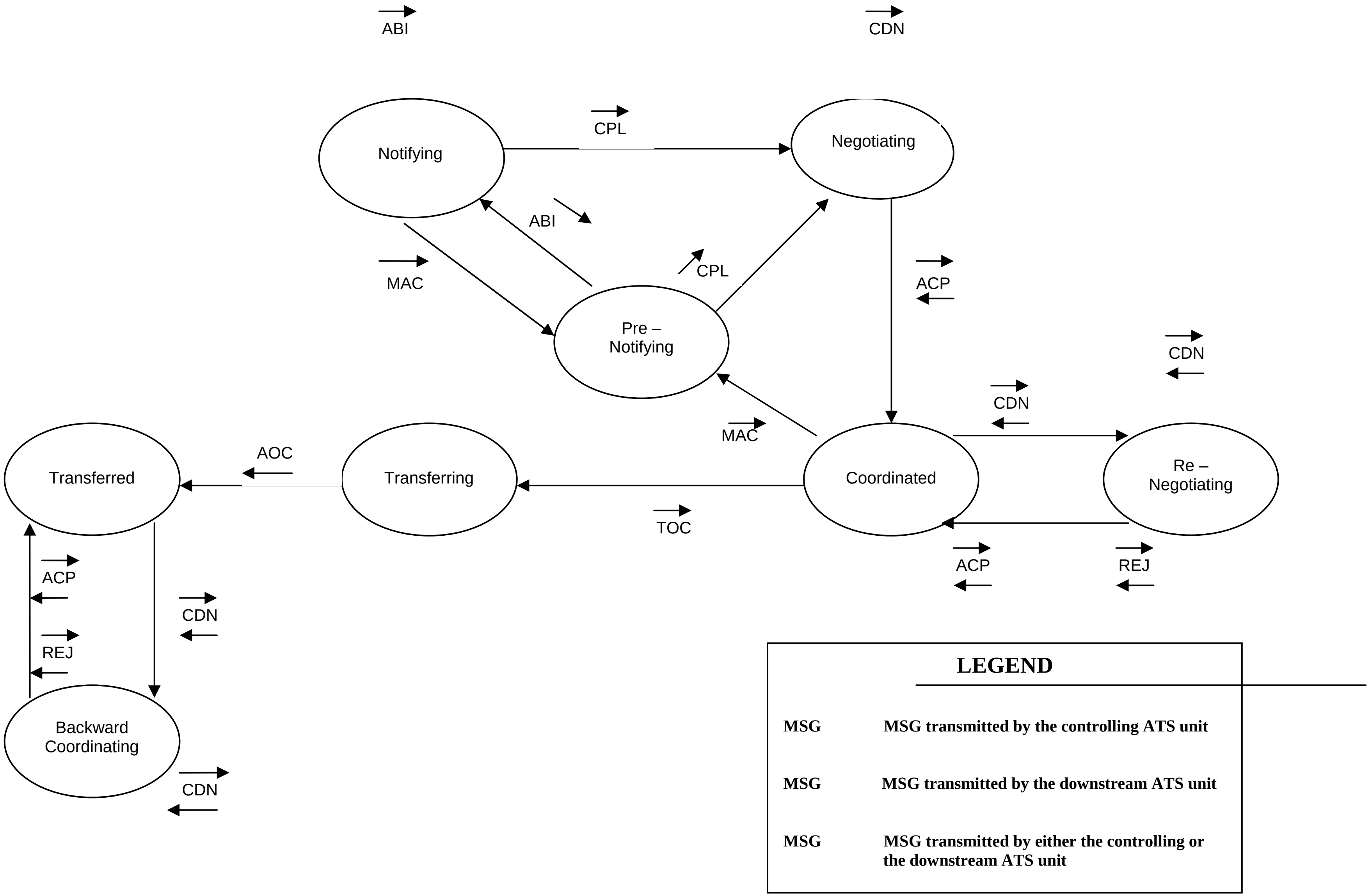

Table D-2. Flight State Transitions

State Transition	Message Trigger	Description
Pre-Notifying/ Notifying	ABI	An initial ABI begins the Notification phase.
Notifying/ Notifying	ABI	An ABI updates the information a downstream ATSU maintains on a flight that is expected to enter its ACI at some future time. This data can be sent hours in advance of the actual entry.
Notifying/ Pre-Notifying	MAC	A flight that was expected to enter a downstream ATSU's ACI will no longer do so.
Notifying/ Negotiating	CPL	A CPL is used to initiate the Coordination process for an aircraft that will enter the downstream ATSU's ACI. A CPL contains the current clearance to destination.
Notifying/ Coordinating	EST	An EST is used to initiate an Abbreviated Coordination process for an aircraft that will enter the downstream ATSU's ACI.
Notifying/ Coordinating Negotiating/ Negotiating	PAC CDN	A PAC is used to initiate an Abbreviated Coordination process for an aircraft, not yet airborne, that will enter the downstream ATSU's ACI. If the downstream ATSU does not like the current clearance (and boundary crossing conditions), a Negotiation process is carried out using CDNs.
Negotiating/ Coordinated	ACP	The negotiation process is terminated when one ATSU signals its acceptance of the coordination conditions using an ACP.
Coordinating/ Coordinated	ACP	The Abbreviated Coordination dialogue is terminated by the receiving ATSU transmitting an ACP.
Coordinated/ Re-Negotiating	CDN	The coordination dialogue can be re-opened at any time after the initial coordination and before the initiation of the transfer of control procedure.
Re-Negotiating/ Re-Negotiating	CDN	Either ATSU may attempt to change the previously agreed upon coordination conditions any time after the initial coordination dialogue has been completed.
Re-Negotiating/ Coordinated	ACP REJ	An ACP terminates a re-negotiation dialogue, with a new mutually agreed upon profile in effect. An REJ immediately terminates the dialogue, with the coordination conditions remaining as previously agreed (which is usually, but not necessarily, the initial coordination conditions).
Coordinated/ Transferring	TOC	A TOC is sent after Coordination occurs but (usually just) before the boundary is crossed to the accepting ATSU. The TOC informs the accepting ATSU that it knows has control authority for the aircraft.
Coordinated/ Pre-Notifying	MAC	A flight that was expected to enter a downstream ATSU's ACI will no longer do so.
Transferring/ Transferred	AOC	The formerly downstream ATSU is now the controlling ATSU.
Transferred/ Backward Re-Negotiating	CDN	An attempt is made (by either the previous or new controlling ATSU) to change the coordination conditions while the aircraft is near the common boundary.
Backward Re-Negotiating/ Backward Re-Negotiating	CDN	Either ATSU may attempt to change the previously agreed upon coordination conditions any time after transfer of control has been completed, but while the aircraft remains in the common boundary region.

Backward Re-Negotiating/ Transferred	ACP REJ	Similar to a Re-Negotiation/Coordinated state transition. An ACP terminates a backward coordination dialogue, with a new mutually agreed upon profile in effect. An REJ immediately terminates the dialogue, with the coordination conditions remaining as previously agreed (which is usually, but not necessarily, the initial coordination conditions).

Table D-3. Message Sequences

Received Message	Next Valid Message	Comments
		Notification Sequences
ABI	ABI	Update the flight information.
	MAC	Indicates that the flight is no longer expected to enter the downstream ATSU’s ACI.
	CPL	Receipt of the ABI signals the beginning of the Notification phase for a particular flight. Coordination will take place when the aircraft is within a parameter distance/time of the boundary.
	EST	Receipt of the ABI signals the beginning of the Notification phase for a particular flight. Coordination will take place when the aircraft is within a parameter distance/time of the boundary.
		Coordination Sequences
CPL	ACP	The aircraft's current clearance is acceptable.
	CDN	The aircraft's current clearance is not acceptable to the receiving airspace and must be modified.
EST	ACP	The boundary crossing conditions are in accordance with the agreement that exists between the two ATSUs.
PAC	ACP	The boundary crossing conditions are in accordance with the agreement that exists between the two ATSUs.
CDN	ACP	The negotiated clearance is acceptable to both ATSUs.
	CDN	The proposed clearance modification is not acceptable to one of the airspaces and a new proposal is submitted.
	REJ	The last clearance agreed to by both airspaces must be honoured.
ACP	CDN	A request for modification of a previously accepted clearance is submitted.
	TOC	The aircraft is at or near the boundary.
	MAC	Indicates that the flight is no longer expected to enter the downstream ATSU's ACI.
		Transfer of Control Sequences
TOC	AOC	The aircraft is at or near the boundary.
AOC	CDN	A request for modification of a previously accepted clearance is submitted.

Table D-4 lists the messages which are valid for each state. The ATSU which can transmit the message is also identified.

Table D-4. Valid Messages by ATSU

Flight State	Message	Sent by
Notifying	ABI	Controlling ATSU
Notifying	MAC	Controlling ATSU
Notifying	CPL	Controlling ATSU
Notifying	EST	Controlling ATSU
Notifying	PAC	Controlling ATSU
Negotiating	CDN	Either ATSU
Negotiating	ACP	Either ATSU
Coordinating	ACP	Receiving ATSU
Coordinated	CDN	Either ATSU
Coordinated	TOC	Controlling ATSU
Coordinated	MAC	Controlling ATSU
Re-Negotiating	CDN ACP	Either ATSU Either ATSU
Re-Negotiating	REJ	Either ATSU
Transferring	AOC	Receiving ATSU
Transferred	CDN	Either ATSU
Backward Re-Negotiating	CDN	Either ATSU
Backward Re-Negotiating	ACP REJ	Either ATSU Either ATSU

8 OTHER MESSAGES

8.1 The previous sections have discussed the use of Notification, Coordination, Transfer of Control, and Application Management messages. There are two remaining message subgroups in the ASIA/PAC AIDC Messages: (1) General Information messages; and (2) Surveillance Data Transfer messages. All messages within these two subgroups require an application response; no operational response is defined.

General Information Messages.

8.2 **EMG and MIS Messages**. These messages support the exchange of text information between ATSUs. A communicator (usually a person, but a computer or application process is also permitted) in one ATSU can send a free text message to a functional address at another ATSU. Typical functional addresses could be an area supervisor or an ATC sector. If further EMG or MIS messages are transmitted in response to a previously received EMG or MIS, the later messages shall include the original message identifier within field 3 of the AFTN header. The EMG shall have an AFTN emergency priority (SS).

8.3 The NAT message is generated once every twelve hours and disseminated to all ATS Units in the NAT. It is also sent to AOC centers, where it is used for flight planning purposes. This message contains, in a structured text format, the NAT track definitions and the time when they are active.

8.4 Track Definition Message. The TDM is generated and disseminated to all affected ATSUs. It is also sent to Airline Operational Control (AOC) Centers, where it is used for flight planning purposes. This message contains, in a structured text format, the track definition and the time when it is active.

8.5 Surveillance Data Transfer Messages. The TRU and ADS messages support the transfer of general surveillance and ADS data, respectively, between ATSUs. The TRU message is used to transfer track data (a flight's position, ground speed and track angle) to an ATSU. The ADS message is used to transfer ADS data, including optional data blocks, to an ATSU.

9 EXAMPLES

Standard Coordination

9.1 Brisbane transmits a notification message (ABI) to Auckland forty five minutes prior to the time that QFA108 is expected to cross the FIR boundary (1209). The destination of the flight is Christchurch.

9.2 The abbreviated coordination message (EST) is transmitted by Brisbane thirty minutes prior to the boundary estimate (which is now 1213). Auckland accepts the proposed coordination conditions by responding with an ACP.

9.3 Brisbane transfers ATC responsibility approaching the FIR boundary by transmitting a TOC. Auckland accepts ATC responsibility by responding with an AOC.

Brisbane	***Auckland***
(ABI-QFA108-YBBN-33S163E/1209F350 -NZCH-8/IS-9/B744/H-10/SDHIWRJ -15/M084F350 35S164E 36S165E ...) *(EST-QFA108-YBBN-33S163E/1213F350-NZCH)*	
	(ACP-QFA108-YBBN-NZCH)
(TOC-QFA108-YBBN-NZCH)	
	(AOC-QFA108-YBBN-NZCH)

Note. The timing of the transmission of these messages is defined in bilateral agreements between the two units.

Example 1

Negotiation of coordination conditions

9.4 Brisbane transmits a notification message (ABI) to Auckland 45 minutes prior to the time that QFA56 is expected to cross the FIR boundary (1209). The destination of the flight is Christchurch.

9.5 The coordination message (CPL) is transmitted by Brisbane 30 minutes prior to the boundary estimate (which is now 1213).

9.6 Auckland responds with a negotiation message (CDN) requesting a change in the boundary crossing altitude to F390. Brisbane responds with an ACP, indicating that the revised altitude is acceptable.

9.7 Brisbane transfers ATC responsibility approaching the FIR boundary by transmitting a TOC. Auckland accepts ATC responsibility by responding with an AOC.

> *Note*. The timing of the transmission of these messages is defined in bilateral agreements between the two units.

Example 2

Brisbane	***Auckland***
(ABI-QFA56-YBBN-33S163E/1209F350 -NZCH-8/IS-9/B744/H-10/SDHIWRJ -15/M084F350 35S164E 36S165E ...)	
(CPL-QFA56-IS-B744/H-SDHIWRJ-YBBN -33S163E/1213F350-M084F350 35S164E 36S165E NZCH -0.)	
	(CDN -QFA56-YBBN-NZCH -14/33S163E/1213F390)
(ACP-QFA56-YBBN-NZCH)	
(TOC-QFA56-YBBN-NZCH)	
	(AOC-QFA56-YBBN-NZCH)

Re-negotiation rejected

9.8 Brisbane transmits a notification message (ABI) to Auckland forty five minutes prior to the time that QFA108 is expected to cross the FIR boundary (1209). The destination of the flight is Christchurch.

9.9 The coordination message (CPL) is transmitted by Brisbane thirty minutes prior to the boundary estimate (which is now 1213). Auckland accepts the proposed coordination conditions without modification by responding with an ACP.

9.10 Sometime after the initial coordination process has been completed, but before the start of the Transfer of Control process, Auckland requests an amendment to the boundary crossing altitude by transmitting a negotiation message (CDN). Brisbane cannot accept the proposed change due to conflicting traffic in its FIR, and therefore rejects the request (REJ).

9.11 Brisbane transfers ATC responsibility approaching the FIR boundary by transmitting a TOC. Auckland accepts ATC responsibility by responding with an AOC.

THE TIMING OF THE TRANSMISSION OF THESE MESSAGES IS DEFINED IN BILATERAL AGREEMENTS BETWEEN THE TWO UNITS.

Brisbane	***Auckland***
(ABI-QFA108-YBBN-33S163E/1209F350 -NZCH-8/IS-9/B744/H -10/SDHIWRJ -15/M084F350 35S164E 36S165E ...)	
(CPL -QFA108-IS-B744/H-SDHIWRJ-YBBN -33S163E/1213F350-M084F350 35S164E 36S165E NZCH-0 ...)	
	(ACP-QFA108-YBBN-NZCH)
	(CDN-QFA108-YBBN-NZCH -14/33S163E/1213F390)
(REJ-QFA108-YBBN-NZCH)	
(TOC-QFA108-YBBN-NZCH)	
	(AOC -QFA108-YBBN-NZCH)

Example 3

Abbreviated coordination

9.12 Several minutes before AAA842's departure time (eg at taxi time), coordination between Bali and Brisbane is effected by Bali transmitting a coordination message (PAC). This message alerts Brisbane that the flight is pending, and indicates a boundary estimate of 1213 at F290. Brisbane accepts the coordination conditions without modification by responding with an ACP.

9.13 On departure, the aircraft's actual estimate differs from that coordinated by more than the value specified in bilateral agreements. The new estimate is coordinated to Brisbane by Bali transmitting a CDN message to Brisbane. Brisbane accepts this revised estimate by responding with an ACP message.

9.14 Bali transfers ATC responsibility approaching the FIR boundary by transmitting a TOC. Brisbane accepts ATC responsibility by responding with an AOC.

> *Note*. The timing of the transmission of these messages is defined in bilateral agreements between the two units.

Example 4

Bali	***Brisbane***
(PAC-AAA842/A4534-IS-B737/M -WRRR --OGAMI/1213F290-YPPH ...)	
	(ACP-AAA842/A4534-WRRR -YPPH)
(CDN-AAA842/A4534-WRRR-YPPH-14/OGAMI/1219F290)	*(ACP-AAA842/A4534-WRRR -YPPH)*
(TOC-AAA842/A4534-WRRR-YPPH)	
	(AOC-AAA842/A4534-WRRR -YPPH)

Multiple notifications + AIDC cancellation

9.15 Brisbane transmits a notification message (ABI) to Auckland forty five minutes prior to the time that QFA11 is expected to cross the FIR boundary (1105). The destination of the flight is Los Angeles.

9.16 Prior to transmitting the coordination message, a modification to the cleared flight level is made resulting in the transmission of another notification message. This ABI contains the latest boundary information on the aircraft, showing that the current boundary estimate is now 1107.

9.17 The abbreviated coordination message (EST) is transmitted by Brisbane thirty minutes prior to the boundary estimate (which is now 1108). Auckland accepts the proposed coordination conditions by responding with an ACP

9.18 Due to weather QFA11 requests, and is issued, an amended route clearance that will now no longer affect Auckland. To advise of the cancellation of any previously transmitted AIDC messages, a MAC message is transmitted to Auckland.

> *Note*. The timing of the transmission of these messages is defined in bilateral agreements between the two units.

Brisbane	***Auckland***
(ABI-QFA11-YSSY-31S163E/1105F290 -KLAX-8/IS-9/B744/H-10/SDHIWRJ -15/M085F290 33S158E 30S168E ...)	
(ABI-QFA11-YSSY-31S163E/1107F310 -KLAX-8/IS-9/B744/H-10/SDHIWRJ -15/M084F290 33S158E 30S168E ...)	
(EST-QFA11-YSSY-31S163E/1108F310-KLAX)	
	(ACP-QFA11-YSSY-KLAX)
(MAC-QFA11-YSSY-KLAX)	

Example 5

Multiple negotiations

9.19 Brisbane transmits a notification message (ABI) to Auckland forty five minutes prior to the time that QFA108 is expected to cross the FIR boundary (1209). The destination of the flight is Christchurch.

9.20 The abbreviated coordination message (EST) is transmitted by Brisbane thirty minutes prior to the boundary estimate (which is now 1213). Auckland accepts the proposed coordination conditions by responding with an ACP

9.21 QFA108 requests F370. The bilateral Letter of Agreement between Brisbane and Auckland requires that prior coordination is required before issuing a change of level after initial coordination. Brisbane transmits a negotiation message (CDN) proposing a change of level to F370. This level is not available in Auckland's airspace but an alternative level is available. Auckland therefore responds with a negotiation message proposing F360. Brisbane responds with an ACP, indicating that this level is acceptable to Brisbane (and to QFA108).

9.22 Brisbane transfers ATC responsibility approaching the FIR boundary by transmitting a TOC. Auckland accepts ATC responsibility by responding with an AOC.

> *Note1*. The timing of the transmission of these messages is defined in bilateral agreements between the two units.

> *Note2*. Complex re-negotiations may be more easily solved by voice communication

Example 6

Brisbane	***Auckland***
(ABI-QFA108-YBBN-33S163E/1209F350 -NZCH-8/IS-9/B744/H-10/SDHIWRJ -15/M084F350 35S164E 36S165E ...)	
(EST-QFA108-YBBN-33S163E/1213F350-NZCH)	
	(ACP-QFA108-YBBN-NZCH)
(CDN-QFA108-YBBN-NZCH -14/33S163E/1213F370)	*(CDN -QFA108-YBBN-NZCH -14/33S163E/1213F360)*
(ACP-QFA108-YBBN-NZCH)	
(TOC-QFA108-YBBN-NZCH)	
	(AOC-QFA108-YBBN-NZCH)

APPENDIX E – NAT COMMON BOUNDARY AGREEMENTS

1. INTRODUCTION

1.1 Due to the individual nature of operations in the vicinity of OCA boundaries some divergence from the common ICD are required. These differences and other procedures are defined in the following sections. The long term aim should be to adopt the contents of Parts 1,2 and 3 of the ICD with only variable system parameters.

2. INTERFACES

REYKJAVIK/SHANWICK INTERFACE

2.1 General

2.1.1 On-line message transfer will be effected by discrete links, but may eventually be superseded by the AFTN subject to the latter satisfying the required standards as to integrity and response.

2.1.2 All messages listed in Part 2 - Paragraph 2 - except RPT and TAM will contain Data Transfer Numbers consisting of a two letter directional indicator followed by a three digit serial number. The direction indicators will be 'RO' for Reykjavik to Shanwick and 'OR' for Shanwick to Reykjavik.

2.1.3 A TAM will be sent by each unit for every message received with ATS Field 3 syntactically correct. If a TAM is not received within 3 minutes of a message being transmitted, the message will be repeated. If, after a further 1 1/2 minutes a TAM has still not been received, the message will be repeated for the second time. If, 1 1/2 minutes later a TAM has still not been received, notification will be output locally for manual intervention.

2.1.4 The systems must be capable of altering the time intervals mentioned if required, the adaptable parameters (from the time of the initial transmission being:

lst repeat	-	1 to 4 minutes
2nd repeat	-	1 1/2 to 6 minutes
Local notification	-	2 to 8 minutes

2.1.5 The automatic acknowledgement and repeat of messages should be able to be suppressed.

2.2 Notification of Organized Track Structure and elapsed times

2.2.1 The NAT messages will be transmitted by Shanwick for the day track structure, with tracks designated 'A' to 'M' inclusive (except 'I').

2.2.2 Tables of elapsed times (ETAF's) for tracks infringing the Reykjavik OCA will be transmitted on the discrete line as a MIS message. See Part I, Appendix B for the layout of this message. For each requested track, the output will contain the estimate elapsed times for each segment of the track in both directions at speeds of mach 0.80. 0.82 and 0.84 for each flight level declared available for the track.

2.3 Clearance Messages

2.3.1 Automatic Data Transfer (ADT) will be effected for all flights in both directions which cross, fly along or touch 61 N between 10 W and 30 W inclusive. lnitially ADT may be restricted to eastbound flights from Reykjavik to Shanwick and westbound flights from Shanwick to Reykjavik with full implementation at a later date. Data transfer for these flights will be in the form of CLR messages.

2.3.2 Transmission of the CLR message in either direction will take place 60 minutes (adaptable) before 61 N whether the flight has a route point coincident with 61 N or not.

2.3.3 The first route point stated in a CLR will be the route point prior to 61 N, and may be a lat/long or a fix identifier in UK domestic airspace or Icelandic airspace. For flights operating wholly on an organised track, the remainder of the route will be specified by the appropriate track designator (eg NATA). For random flights, details of the cleared route to landfall will be transmitted, but OAC FDPS currently does not hold route details beyond 70 N and/or 80 W.

2.3.4 Once a CLR has been transmitted, no further CLR's will be issued for the same flight while the original flight plan remains valid.

2.3.5 The flight level stated in the CLR will be the final level known to the originating system at the time of ADT.

2.4 Repeat Messages

2.4.1 RPT messages will be sent manually by the receiving centre when missing serial numbers are detected, or when a message received containing a serial number is found to contain text errors. OAC FDPS is capable of actioning an RPT request for messages up to 6 hours preceding the time of input of the RPT message.

2.5 Cancellation Messages

2.5.1 A CNL message will be generated only when a flight plan is cancelled subsequent to a CLR being sent.

2.6 Miscellaneous Messages

2.6.1 The MIS message will be used to transmit plain language statements or queries between the two centres, and also the transmission of organised track elapsed times.

2.7 System or Line Failures

2.7.1 Basic communication facilities between the two centres will be available in the event of system failures. The actions to be taken will be defined in the current version of the Letter of Agreement between Shanwick OAC and Reykjavik ACC.

GANDER/SHANWICK INTERFACE

2.8 General

2.8.1 On-line message transfer is currently effected by discrete links, which may eventually be superseded by the AFTN/CIDIN, subject to the latter satisfying the required standards as to integrity and response.

2.8.2 All messages listed in Part 2 - Paragraph 2 - except RPT and TAM, contain Data Transfer Numbers consisting of a two letter directional indicator followed by a three digit serial number. The direction indicators are "GO" for Gander to Shanwick and "OG" for Shanwick to Gander.

2.8.3 A TAM is sent by each unit for every message received with ATS Field 3 syntactically correct. If a TAM is not received within three minutes of a message being transmitted, the message will be repeated. If, after a further 1 1/2 minutes a TAM has still not been received, the message will be repeated for the second time. If, 1 1/2 minutes later a TAM has still not been received, notification will be output locally for manual intervention.

2.8.4 The system must be capable of altering the time intervals mentioned if required – the variable system parameters (from the time of the initial transmission) being:

First repeat	-	1 to 4 minutes
Second repeat	-	1 1/2 to 6 minutes
Local notification	-	2 to 8 minutes

2.8.5 The automatic repetition of messages may be terminated by agreement.

2.9 Notification of Organized Track Structure and elapsed times

2.9.1 The NAT message is transmitted by Shanwick for the day structure and by Gander for the night structure.

2.9.2 The tracks stored by either centre shall be activated, altered or deleted - depending on operational requirements - by appropriate local action.

2.9.3 Day tracks are designated "A" to "M" inclusive (except "I") and Night tracks "N" to "Z" (except "O").

2.9.4 When requested, tables of elapsed times (ETAFs) will be transmitted on the discrete line as a MIS message by the centre responsible for the establishment of the track structure.

2.9.5 ETAFs can be output for Organised, SST and Contingency Tracks and will consist of the following:

a) For each Organised or Contingency Track, the estimated elapsed times for each segment of the track for flights in both directions at speeds of Mach 0.80, 0.82 and 0.84 for each Flight Level declared available on the track;

b) For SST fixed routes, the times for each segment at Mach 2.02 at FL530.

2.9.6 Contingency tracks will be designated by two numerics commencing at "01". SST tracks will be designated by two letters.

2.10 Clearance Messages

2.10.1 Automatic Data Transfer (ADT) is effected for flights in both directions which cross 30 W between 45 and 61 N inclusive at FL060 (adaptable) or above. Data transfer for these flights will be in the form of CLR messages.

2.10.2 Transmission of the CLR message in either direction will take place 60 minutes (adaptable) before 30 W.

2.10.3 Each system will action the content of any CLR message received, either by processing in accordance with local procedures, or by intimation of text failure to a local position.

2.10.4 For flights operating wholly on Organised Tracks, the first position stated in the CLR will be 20 W or 40 W as dictated by the direction of flight, with the route being specified by the appropriate track designator (eg NATB). In the case of Random flights, full route details from or after 20 or 40 W will be transmitted. Both systems will be capable of transmitting the entire Oceanic route if this becomes an operational requirement.

2.10.5 Once a CLR has been transmitted, no further CLRs will be issued for the same flight whilst the original flight plan remains valid.

2.10.6 In order to work towards compatibility of the application of "deemed" separation standards, each unit should be aware of the special separations incorporated in each others conflict algorithm.

2.10.7 The flight level stated in the CLR will be the final cleared level known to the originating system at the time of ADT.

2.11 Repeat Messages

2.11.1 "RPT" messages will be sent by the receiving centre when missing serial numbers are detected, or when a message received containing a serial number is found to contain text errors. The RPT message will be input manually and actioned by the computer at the centre to which it is sent.

2.11.2 Each computer is capable of actioning a RPT request for any or all of the 64 messages immediately preceding the latest message issued. The message repeated will be an exact copy of the message originally issued under the Data Transfer Number quoted in the RPT.

2.12 Cancellation Messages

2.12.1 A "CNL" message will be generated when re-routing necessitates the cancellation of a previously sent CLR message. This will occur when the flight's route will now no longer traverse airspace as defined in paragraph 3.3.1.

2.13 Miscellaneous Messages

2.13.1 The "MIS" message will be used to transmit plain language statements or queries between the two centres. However, the MIS message will also be used for the transmission of NAT elapsed times incorporating the information in paragraph 3.2.5.

Gander/Reykjavik interface

Gander is responsible for the boundary. The interface is currently manual.

Gander/New York interface

The interface is currently manual.

New York/Santa Maria interface

The interface is currently manual.

Gander/Santa Maria interface

The interface is currently manual.

Shanwick/Santa Maria interface

The interface is currently manual

Bodo/Reykjavik interface

The interface is currently manual.

APPENDIX F - RELATIONSHIP TO ICAO AIDC MESSAGES

1 The AIDC message set can be tailored to satisfy regional requirements. The OPLINKP documentation defining the AIDC data link application provides three means for achieving regional adaptation of the AIDC messages:

1.1. Regions select an AIDC subset that will support their regional operational procedures;

1.2. The selected messages are tailored by mandating the usage of optional components into one of three classes:

- **A. THE OPTIONAL COMPONENT THAT MUST ALWAYS BE USED;**
- **B. THE OPTIONAL COMPONENT THAT MUST NEVER BE USED;**
- **C. THE OPTIONAL COMPONENT IS TRULY OPTIONAL;**

1.3. For interim, pre-ATN implementations, encoding rules may be specified by a region. The most frequently used encoding rules today employ ICAO ATS fields and messages. The default encoding rules are the ISO Packed Encoding rules.

1.4. Using the regional tailoring procedures stated above, the ASIA/PAC has established Core messages related to a subset of the AIDC messages. As an example, these are shown in Table E-1.

Table F –1 ASIA/PAC AIDC/OPLINKPAIDC Relationship

OPLINKP AIDC Message	ASIA/PAC Message	Status	OPLINKP AIDC Mandatory Data Field	AIDC Optional Data Field	AIDC Optional Data Field Usage
Notify	ABI	Core	Flight ID Aircraft	Flight Rules	Optional
			Departure Aerodrome Destination Aerodrome Estimate		
				Equipment	Optional
				Route	Optional
				Other Information	Optional
Coordinate Initial	CPL	Core	Flight ID Aircraft	Flight Rules	Always Used
			Departure Aerodrome Destination Aerodrome Estimate		
				Equipment	Always Used
				Route	Always Used
				Other Information	Optional
Coordinate Initial	EST	Core	Flight ID Aircraft (NOT USED)	Flight Rules	Never Used
			Departure Aerodrome Destination Aerodrome Estimate		
				Equipment	Never Used
				Route	Never Used
				Other Information	Never Used
Coordinate Initial	PAC	Option	Flight ID Aircraft (NOT USED) Departure Aerodrome Destination Aerodrome Estimate	Flight Rules	Optional
				Equipment	Optional
				Route	Optional

-END-