North American (NAM) Common Coordination Interface Control Document (ICD)

Area Control Center (ACC) to ACC

NAS –IC – 21009205
Revision E
15 April 2016

North American, Central American and Caribbean Automation Systems Interface

CHANGE HISTORY

Date	Rev.	Action
1 August 2000	--	Initial Draft for C/M/U Review
26 January 2001	--	Draft Sent for ICAO Review
21 March 2002	--	Incorporate NCP 23326 - NAM ICD - Approved Changes (02-03, 02-04, 02-05, 02-07, 02-08, 02-09, 02-10, 02-11, 02-12, 02-13, and 02-14)
12 September 2008	A	Incorporate NCP 32074, ATO0E-NAS-1001 to address technical and editorial changes that have been pre-coordinated with NAV Canada and SENEAM.
05 April 2011	B	Incorporate changes to NAM ICD which include ICAO 2012 Amendment 1 and to address technical and editorial changes pre-coordinated with NAV Canada and SENEAM.
5 December 2011	C	Version update adds Cuba as the fourth NAM ICD interface member.
20 January 2012	D	Version update adds Cuba/Mexico Interface Attachment
15 April 2016	E	Version ‘E’ update incorporates Point Out messages into Class 3 and upgrades several messages categorized as ‘future’ to ‘current’ for optional use within ANSP bilateral agreed on procedural interfaces. Adds COCESNA as an interface member state.

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FOREWORD

1 Historical

Within the North American Aviation Trilateral (NAAT/5), Canada, Mexico, and the United States agreed to cooperate on development of a seamless interface between automation systems, focusing on automated exchange of ICAO flight data. In June 1998, the Trilateral Commission formed a working group to address Air Traffic flight data exchange via automation. Canada's Air Traffic Service provider, NAV CANADA, Mexico's Air Traffic Service provider, SENEAM and the United States' Air Traffic Service provider, the Federal Aviation Administration, began discussions which culminated in a plan to achieve cross-border automation. These discussions evolved to include a message-set and support requirements being identified for initial implementation of interface processing, which provides electronic exchange of air traffic flight data. This group was responsible for defining common interface standards for the NAM region, based as closely as possible on ICAO Doc. 4444, Procedures for Air Navigation Service – Air Traffic Management (PANS-ATM). The endeavor resulted in operational flight data interfaces being implemented between Canada and the United States in 2009 with the fielding of the Canadian Automated Air Traffic System (CAATS) and the Host En Route Automation System (EAS). Mexico's air traffic control automation system, called EUROCAT, was first interconnected with the United States in 2005. HOST EAS and Mexico's EUROCAT X upgrade was completed in 2009, providing continued support for automated flight data exchange.

In June 2008, ICAO announced Amendment 1 Doc 4444 15th edition. This document revision reflects Amendment 1 changes.

In October 2011 the FAA at Miami ARTCC (KZMA) and the Instituto de Aeronautica Civil de Cuba (IACC) Havana ACC successfully implemented an automation interface between the two air traffic control facilities, modeled after the U.S.-Mexico Class I cross border interface. The effort culminated eighteen months of technical and operational coordination, testing and problem solving to achieve automated flight data exchange. This initiative extended the NAM automation flight data exchange capability well into the Caribbean, achieving system goals and advancing ICAO milestones for both countries. In February 2012, building on the foundation of automated data exchange between Miami and Havana, SENEAM and the IACC implemented a NAM interface between Merida and Havana. The interface extends the automation compatibility of the North American region well into the Caribbean and the Gulf of Mexico and also lays the foundation for eventual interconnection between adjacent member states automation systems.

The FAA developed NAM ICD capability for the US Advanced Technologies and Oceanic Procedures (ATOP) System. This system provides automation support to U.S. oceanic air traffic controllers in the Oakland (ZOA), New York (ZNY), and Anchorage (ZAN) Air Route Traffic Control Centers (ARTCCs). The ATOP is primarily a procedure-based system whose investment and integration of the NAM ICD capabilities will serve to better support oceanic operations and transition to adjacent international domestic airspace. The new capabilities harmonize with the international vision to support continued growth, new functionality, and changes to better support trajectory based operations, international interface improvements, and coordination among controllers. Several optional procedural-based messages are defined as Supplemental and are not considered Class 1, 2 or 3 messages.

Class 3 is enhanced in NAM ICD Version 'E' to include point out coordination messages in support of close proximity border operations, supplementing but not dependent on radar handoff's transfer phase capabilities.

1.1 About the Document

1.1.1 Part I- Purpose, Policy, and Units of Measurement

This section provides an overall philosophical view of the Interface Control Document (ICD) and general information concerning the measurement units that are used. It also describes the process by which changes to this document are to be managed.

1.1.2 Part II- NAM ATS Coordination Messages

This section describes in detail all the messages that may be used to exchange ATS data between NAM Air Traffic Services (ATS) Units. In this version of the document, message formats have been defined.

1.1.3 Part III- Communications and Support Mechanisms

This section describes the technical and other requirements needed to support NAM ATS message exchange.

1.1.4 Appendices

The appendices include a list of error messages and implementation guidance for the message set.

1.1.5 Attachments

Each attachment describes a specific common boundary agreement, noting the level of the interface that is supported and any deviations from the core message definitions.

2 Glossary

Active Flight	A flight that has departed but has not yet landed. Note: This ICD assumes any flight with an entered actual departure time in the flight plan is active.
Adapted Route	A route whose significant points are defined in an automation system and associated with a name for reference purposes. Adapted routes normally include all ATS routes, plus non-published routes applied to flights by the system or by controllers.
Adapted Route Segment	Two significant points and the name of the adapted route connecting them.
Aircraft ID	A civilian or military call sign (e.g. UAL101 or SALLY72) or the registration number, e.g., XBNBA, CGHFM, N19880, of an aircraft.
Air Traffic Services Provider	The FAA, SENEAM, NAV CANADA or IACC.
Airway	A route that is defined and published for purposes of air navigation.
Altitude	A level of constant atmospheric pressure related to a locally measured atmospheric pressure, which is used to express an assigned or filed altitude below flight level 180. A level of constant atmospheric pressure related to reference datum of 29.92 inches of mercury (or 1,013.2 hPa), which is used to express an assigned or filed altitude at or above flight level 180. (See Flight Level.)
Area Control Center	An Air Traffic Services facility used for control of en route air traffic. Also known as an Air Route Traffic Control Center (ARTCC) in the United States.
Assigned Beacon Code	A beacon code that has been assigned by an ATC facility to a flight. The flight may or may not be squawking this code. See Established Beacon Code.
ATS Route	A route that is defined and published for purposes of air navigation.
Beacon Code	A Mode 3/A transponder code consisting of four octal digits.
Boundary Crossing Point	An intersection point between a route of flight and a control boundary.
Boundary Crossing Time	The time at which a flight is predicted to reach its Boundary Crossing Point.

Boundary Point	An agreed point on or near the control boundary at which time and altitude information is provided for purposes of coordination.
Character	A letter from A-Z or number from 0-9.
Control Boundary	The boundary of the Area Control Center (ACC) as defined in the local automation system. This is typically close to, but not the same as, the FIR boundary.
Direct Route Segment	A route segment defined solely by two significant points. The path between the points is implied and depends on the navigation system used.
Element	Within a numbered field of an ICAO message there may be several sub-fields, called elements. These are referred to by sequential letters a, b, c, etc. For example Field 03 has elements a, b, and c.
Established Beacon Code	The Mode 3/A beacon code that a flight is now squawking.
Field	A numbered logical portion of a message. All references to fields in this document are to message fields defined in ICAO Doc. 4444 unless otherwise specified.
Fix-radial-distance	A method of specifying a geographic point. It includes the name of a fix, followed by a direction from the fix in degrees and then a distance in nautical miles.
Flight ID	The combination of aircraft ID (from Field 07) and most recent message number (from ICAO Field 03(b)) in which uniquely identifies a flight.
Flight Level	A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury (1,013.2 hPa). Each is stated in three digits that represent hundreds of feet. For example, flight level 250 represents a barometric altimeter indication of 25,000 feet with the altimeter set to 29.92.
EUROCAT	The SENEAM En Route Automation System (EAS), a Thales ATM system.
Letter	A letter from A-Z.
Numeric	A number from 0-9.
Off-Block Time	The time at which an aircraft expects to push back or has pushed back from the gate.

Procedural Environment	Per ICAO 4444 a procedural environment exists in those areas surveillance coordination procedures are not available because at least one of the coordinating ATS units does not have surveillance capability
Proposed Flight	A flight that has a flight plan but has not departed.
Reject	When this term is used, it means that an incoming message is not to be processed further and should be output to a specified location (either the message source, or a local adapted device or position). The message must be re-entered in total (after correction) in order for it to be processed.
Point Out/Radar Point Out	A radar/surveillance environment coordination operation to identify traffic operating in close proximity to a common ATS boundary
Reported Altitude	The latest valid Mode C altitude received from an aircraft or the latest reported altitude received from a pilot.
Route	A defined path consisting of one or more ordered route segments with successive segments sharing a common end/start point. (See also Adapted Route, Direct Route, Flight Plan (or Filed) Route, Route Segment, Direct Route Segment, and Adapted Route Segment).
Route Segment	Two significant points and the path between them, with the order of the points indicating the direction of flight. (See Adapted and Direct Route Segments.)
Selective Calling System	Techniques or procedures applied to radio communications for calling only one of several receiving stations guarding the same frequency.
Service	In the context of this interface, a service refers to type of interface service provided: message transfer, file transfer, data base query, etc.
Standard Arrival Route	A published route from a designated significant point to an aerodrome. This is also known as a Standard Terminal Arrival (STAR) in the United States and Canada.
Standard Departure Route	A published route from an aerodrome to the first significant point on a route. This is known as a Standard Instrument Departure (SID) in Canada and an Instrument Departure Procedure (DP) in the United States.
Significant Point	A specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigation and ATS purposes.
Standard Metric Level	The same as Flight Level, but expressed in tens of meters instead of hundreds of feet.

Surveillance Environment	Per ICAO 4444, an environment where ATS surveillance system is in use and allows a controller to positively identify aircraft using radar/and or ADS-B and are available to controllers on both sides of a common boundary for display
Symbol	Any of the symbols used within messages, including space " ", oblique stroke "/", single hyphen "-", plus "+", open bracket "(",and closed bracket ")".
Transaction	The exchange of a message and the associated response.

Note: Definitions applicable for the purpose of this ICD

3 List of Acronyms

ABI	Advance Boundary Information
ACC	Area Control Center
ACID	Aircraft ID Note: The first character must be a letter.
ACP	Acceptance Message
ADF	Automatic Direction Finder
AFTN	Aeronautical Fixed Telecommunications Network
AMHS	ATS Message Handling System
ANSI	American National Standards Institute
AOC	Acceptance of Control
ARTCC	Air Route Traffic Control Center (see Area Control Center)
ASCII	American Standard Code for Information Interchange
ASM	Application Status Monitor
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications Network
ATS	Air Traffic Services
ATOP	Advanced Technologies and Oceanic Procedures System
ATSU	Air Traffic Services Unit
bps	Bits Per Second
CAATS	Canadian Automated Air Traffic System
CHG	Proposed flight modification message
CMNPS	Canadian Minimum Navigation Performance Specifications
C/M/U ASI/TF	Canada/Mexico/United States Automation System

	Interfaces Task Force
CNL	Flight Plan Cancellation message
CNS	Communications, Navigation, Surveillance
CPL	Current Flight Plan
DOF	Date of Flight
EAS	En Route Automation System
EST	Estimate message
FAA	Federal Aviation Administration
FDP	Flight Data Processing
FDPN	Flight Data Processing Network
FIR	Flight Information Region
FPL	Filed Flight Plan message
FSAS	Flight Services Automation System
FSS	Flight Service Station
IACC	Instituto de Aeronautica Civil de Cuba
ICD	Interface Control Document
ICAO	International Civil Aviation Organization
ID	Identification
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IRQ	Initialization Request message
IRS	Initialization Response message
ISO	International Standards Organization
KB	Kilobyte (= 1024 bytes)
LAM	Logical Acknowledgement message
LRM	Logical Rejection message
MIS	Miscellaneous Information message
MNPS	Minimum Navigation Performance Specification
MOD	Active flight modification message
MSN	Message Switched Network
NADIN	National Airspace Data Interchange Network
NAM	ICAO North American Region
NAS	National Airspace System
NAAT	North American Aviation Trilateral
NAT	ICAO North Atlantic Region
OTP	On Top
PAC	ICAO Pacific Region

PAN ICD	Pan Regional Interface Control Document (PAN ICD) for ATS Interfacility Data Communications (AIDC)
PANS	Procedures for Air Navigation Services
PLA	Point Out Logical Acknowledgement
POA	Point Out Approval
POI	Point Out Initiate
POJ	Point Out Denial
PSN	Packet Switched Network (synonymous with PSDN)
PSDN	Packet Switched Data Network (synonymous with PSN)
RDP	Radar Data Processing
RLA	Radar Logical Acknowledgement
RNP	Required Navigation Performance
RTF	Radio Telephone
RTA	Radar Transfer Accept
RTI	Radar Transfer Initiate
RTU	Radar Track Update
RVSM	Reduced Vertical Separation Minimum
SELCAL	Selective Calling System
SENEAM	Servicios A La Navegación En El Espacio Aéreo Mexicano (Navigation Services for Mexican Airspace)
SID	Standard Instrument Departure
SSR	Secondary Surveillance Radar
STAR	Standard Terminal Arrival
TBD	To Be Determined
TOC	Transfer of Control
TRQ	Termination Request message
TRS	Termination Response message
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omni-directional Range
VSP	Variable System Parameter
WJHTC	William J Hughes Technical Center

4 References

Document ID	Document Name
ICAO Doc. 4444	Procedures for Air Navigation Services-Air Traffic Management, Fifteenth Edition, current version
ICAO Doc 9694-AN/955	Manual of Air Traffic Services Data Link Applications
PAN ICD	Pan Regional Interface Control Document (PAN ICD) for ATS Interfacility Data Communications (AIDC)
ICAO Annex 10, Volume II	Aeronautical Telecommunications
ICAO Doc. 8643	Aircraft Type Designators
ICAO Doc. 7910	Location Indicators
Amendment 1	Amendment 1 to the PANS-ATM (ICAO Doc 4444 15th Edition)

PART I – PURPOSE, POLICY, AND UNITS OF MEASUREMENT

1 Purpose

The purpose of this document is to ensure that data interchange between ATS units providing Air Traffic Services in the NAM region conforms to a common standard, and to provide a means to centrally coordinate changes to the standard.

2 Policy

2.1 Configuration Management

The contents of this ICD are to be approved by the members of the Canada/Mexico/Cuba/United States Automation Systems Interface Task Force (C/M/U ASI/TF). Proposed changes to this document will be submitted to the C/M/U ASI/TF secretariat, currently the United States Federal Aviation Administration (FAA).

The secretariat of the task force will coordinate review through a designated representative for each country. When all parties have agreed to a change, the document will be amended and distributed by the secretariat.

This document identifies the standards to be followed when the defined messages are implemented. A separate agreement between each pair of countries will define which messages are currently implemented.

"ICAO Doc. 4444", when used in this document, refers to the ICAO Doc 4444 Procedures for Air Navigation Services-Air Traffic Management, Fifteenth Edition, current edition.

2.2 System Philosophy

The automation of flight data exchange between neighboring Air Traffic Services Units (ATSU) will follow the standards set by ICAO Doc. 4444 as closely as possible. The guidance material specifies the messages to be used for the exchange of notification, coordination, transfer of control, and related data in the operational environment found in North America between automated Air Traffic Service (ATS) systems. In constructing the interface, it was recognized that the ICAO standards address neither all required messages nor all required details of message content, and that existing ATS procedures and automation systems are not always fully compatible with parts of the ICAO standard. Therefore, this document supplements ICAO Doc. 4444 as needed to meet the needs of the NAM ATS providers. While the surveillance environment is the standard for NAM ICD operations, it is recognized that procedural environments exist and the application of ATC units to apply standardized automation is consistent with the coordination and transfer of control procedures to reduce the need for verbal coordination per ICAO 4444, Chapter 10, Section 10.1. In these procedural environments NAM ICD supplemental messaging may be used to support efficiency by reducing manual/verbal operations and optimizing data exchange as detailed in bilateral agreements.

This document addresses messages exchanged between Air Navigation Service Providers (ANSP) or Area Control Centers (ACCs) for IFR aircraft[1]. Within the NAM ICD ATC units shall forward from unit to unit, as the flight progresses, necessary flight plan and control information. NAM ICD usage supports the Notification, Coordination, Transfer of Control phases outlined within the ICAO Doc. 4444.

[1] Including composite flights that are IFR at the control boundary.

Interfaces with Flight Service Stations (FSSs) and with airspace users for IFR and VFR flights are not addressed. Note that a message (e.g. FPL) from a user or FSS to an ACC may have different requirements than those sent from ACC to ACC.

In addition, several levels of implementation have been defined. Each level is a subset of the entire message set, and represents a complete operational capability with attendant procedures. This allows for incremental implementation of the capability.

2.2.1 Flight Data Coordination

The first phase of the NAM ICD automation is Class 1 which exchanges active flight plans using a CPL message. Changes to a previously transmitted CPL and all other coordination (including transfer of control) are accomplished manually. While the FPL is normally used to record a flight plan in the notification phase of ATS systems operations, the NAM ICD primarily uses the FPL in the coordination phase, as described in Class II messaging below. When mutually agreed upon between ATS units, the automation may also include the exchange of proposed flight plans using the FPL message. Manual acceptance via the ACP message (see ICAO Doc. 4444, Section 9) is not implemented.

The second phase of the automation is Class 2 which adds the following capabilities:

a) Exchange of Filed Flight Plan (FPL) and Estimate (EST) messages.

b) Modification of a CPL or of a FPL that was activated by an EST message (MOD).

c) Modification of FPL messages (CHG).

2.2.2 Logical Acknowledgement Message (LAM)

The Logical Acknowledgement Message (LAM) signifies that a message was received correctly. During Class 1, each system must determine if a message was rejected or lost, or if the interface failed by timing-out receipt of an LAM for each message sent. During the Class 2 phase, the Logical Rejection Message (LRM) provides the reason a message was rejected.

2.2.3 Flight Data Coordination

A Class 2 interface adds the following capabilities to a Class 1 interface:

a) Modification of a CPL or FPL that was activated by an EST message (MOD).

b) Exchange of Filed Flight Plan (FPL) and Estimate (EST) messages.

c) Cancellation of a previously sent FPL or CPL (CNL).

d) Modification of FPLs (CHG).

e) General Information (MIS) capability.

2.2.4 Interface Management

Class 2 Interface Management adds the following capabilities:

a) Logical Rejection Messages (LRM).

b) Interface management (IRQ, IRS, TRQ, TRS, ASM).
When implemented between two ATSUs, the messages which make up the interface management message set are selected by bilateral agreement based on operational need.

The third phase of the automation is Class 3 which adds the following capabilities:

a) Radar Handoff

b) Radar Pointout

2.2.5 Radar Handoff/Point Out

2.2.5.1 Radar Handoffs

An automated handoff involves the exchange of computer-generated messages to support voiceless transfer of control of aircraft. This surveillance/radar transfer category of messages includes a transfer-initiate and a transfer-accept message as well as track update message. Automated handoffs using these messages are not supported in procedural environments. Class 3 transfers include the capability to perform a radar/surveillance handoff using the RTI, RTU, RTA, and RLA messages. The format of these messages is consistent with ICAO standards, and the content was developed based on the TI, TU, and TA messages used in FAA inter-center radar handoffs. The RLA message was introduced as a logical acknowledgement to an RTI, instead of LAM, because it needs to transmit information back to the sender. The class 3 radar handoff messages are:

a) Radar Transfer Initiate (RTI)
b) Radar Track Update (RTU)
c) Radar Transfer Accept (RTA)
d) Radar Logical Acknowledgement (RLA)

2.2.5.2 Radar Point Outs

The radar/surveillance environment coordination messages have no ICAO precedent. A point out is a radar/surveillance environment coordination operation to identify traffic operating in close proximity to a common ATS boundary with the adjacent ATSU. The class 3 radar point out messages are:

a) Point Out Initiate (POI)
b) Point Out Approval (POA)
c) Point Out Denial (POJ)

The **Point Out - Basic** capability version provides flight data to supplement verbal cross border point outs. Point out automation procedures must be defined in bilateral ATS agreements which describe data information and/or supplemental text to be used. No automation requests, approvals or conditional denials are supported in the Basic NAM Point Out capability.

The following computer response messages are used with the Point Out – Basic capability:

a) PLA – Logical Acknowledgement used in response to a POI message that is error free, has not been logically rejected by the receiving system, and is defined to contain any response data that needs to be passed back to the initiating system
b) LRM – Logical Reject used to indicate that a POI message contains an error and has been logically rejected by the receiving system

The Point Out - Enhanced capability provides an opportunity to build on Point Out - Basic messaging to allow cross border operation to include approval options contained within the POI message. Use of Text based point out options must be defined in bilateral ATS agreements with specific procedures which allow requests (POI) and approvals (POA), or denials (POJ) to be detailed. Automation point out negotiation will not be supported within NAM ICD Point Out messaging.

The following Supplemental Messages to support procedural environment notification/coordination and transfer **are not part of Class 1, 2 or 3 messaging.**

a) Notification / Coordination (ABI)
b) Transfer of jurisdiction (TOC, AOC)

2.2.6 Candidate Messages for Future Implementation

The following capabilities are under consideration for future implementation:

a) Notification / Coordination (CDN, ACP, REJ)
b) Alerting messages (ALR, RCF.)
c) Arrival and departure notification (ARR, DEP).
d) Flight plan request (RQP).
e) Clearance request/accept (CRQ, CAK, CLR). Note: These messages have no ICAO precedent.
f) Special Use Airspace status (SUA). Note: This message has no ICAO precedent.
g) Delay (DLA).
h) Supplemental flight plan (SPL, RQS).
i) General Information (MIS) capability

3 Units of Measurement and Data Conventions

3.1 Time and Date

All times shall normally be expressed in UTC as four digits, with midnight expressed as 0000. The first two digits must not exceed 23 and the last two digits must not exceed 59.

If higher precision is needed, then a field specification may designate additional digits representing seconds and then fractions of seconds (using decimal numbers) may be added. For example,

- 092236 is 9 hours, 22 minutes, and 36 seconds.
- 11133678 is 11 hours, 13 minutes, and 36.78 seconds.

When used, dates shall be expressed in the form YYMMDD where YY is the last two digits of the year (e.g. 01 is 2001), MM is the month (e.g. 05 for May), and DD is the day of the month (e.g. 29).

3.2 Geographic Position Information

Geographic position information shall be expressed in one of the following forms. Items a) through d) are consistent with ICAO Doc. 4444 Appendix 3, section 1.6.3; and item e) was added because the standard ICAO definition of Latitude/Longitude did not provide enough precision for exchange of radar identification.

a) From 2 to 5 characters, being the coded designator assigned to an en route point;
b) 4 numerics describing latitude in degrees and minutes, followed by “N” (North) or “S” (South), followed by five numeric’s describing longitude in degrees and minutes, followed by “E” (East) or “W” (West). The correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. “4620N07805W”.
c) 2 numeric’s describing latitude in degrees, followed by “N” (North) or “S” (South), followed by three numeric’s describing longitude in degrees, followed by “E” (East) or “W” (West). Again, the correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. “46N078W”.
d) 2 to 5 characters being the coded identification of a significant point, followed by three decimal numerics giving the bearing from the point in degrees magnetic followed by three decimal numerics giving the distance from the point in nautical miles. The correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. a point at 180° magnetic at a distance of 40 nautical miles from VOR “FOJ” would be expressed as “FOJ180040”.
e) When surveillance information with higher precision is necessary, use six numerics describing latitude in degrees, minutes, and seconds, followed by “N” (North) or “S” (South), followed by seven numerics describing longitude in degrees, minutes, and seconds followed by “E” (East) or “W” (West). The correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. “462033N0780556W”.

3.3 Route Information

All published routes shall be expressed as two to seven characters, being the coded designator assigned to the route to be flown.

3.4 Level (Altitude) Information

All altitude information shall be specified as flight level(s) or altitude(s) in one of the following formats (per ICAO Doc. 4444Appendix 3, Section 1.6.2):

a) F followed by three decimal numerics, indicating a Flight Level number.
b) A followed by three decimal numerics, indicating altitude in hundreds of feet.
c) S followed by four decimal numerics, indicating a Standard Metric Level in tens of meters.
d) M followed by four decimal numerics, indicating altitude in tens of meters.

All levels at or above 18,000 feet shall be expressed as a flight level, prefixed with an "F" (e.g. F240). Any level below 18,000 feet shall be expressed as an altitude, prefixed with an "A" (e.g. A170).

Each message description identifies which of these formats may be used.

3.5 Speed Information

Speed information shall be expressed as true airspeed or as a Mach number, in one of the following formats (per ICAO Doc. 4444, Appendix 3):

a) N followed by four numerics indicating the true airspeed in knots.
b) M followed by three numerics giving the Mach Number to the nearest hundredth of unit Mach.
c) K followed by four numerics giving the true airspeed in kilometers per hour.

Each message description identifies which of these formats may be used.

3.6 Heading Information

Heading information shall be expressed as degrees and hundredths of degrees relative to true north using five digits and inserting zeroes as necessary to make up five digits, e.g. "00534" is 5.34 degrees relative to true north.

3.7 Functional Addresses

A functional address, which refers to a function within an ATS Unit, may be substituted in the MIS message for the aircraft identification found in Field 07. The functional address shall contain between one and six characters and shall be preceded by an oblique stroke (/), for a total length of two through seven characters.

3.8 Facility Designators

Facility designators shall consist of four letters except where noted in a boundary agreement. If an ICAO Doc. 7910 location identifier exists for the facility, it shall be used.

PART II – NAM ATS COORDINATION MESSAGES

1 Introduction

The following sections describe those messages used by NAM ATS systems for exchange of information. Messages and fields conform generally to ICAO Doc 4444, and differences are noted.

2 Message Fields

Table 1 provides a summary of all fields used in messages described by this document. The remainder of this section describes the format of each field element. Section 3 describes which elements should be included in each ATS message type, and Appendix B describes rules for the semantic content of each field.

Table 1 Summary of Message Fields

Field	Element (a)	Element (b)	Element (c)	Element (d)	Element (e)
03	Message Type Designator	Message Number	Reference Data		
07	Aircraft Identification	SSR Mode	SSR Code		
08	Flight Rules	Type of Flight			
09	Number of Aircraft	Type of Aircraft	Wake Turbulence Category		
10	Radio, Comm., Nav., and Approach Aid Equipment and Capabilities	Surveillance Equipment and Capabilities			
13	Departure Aerodrome	Time			
14	Boundary Point	Time at Boundary Point	Cleared Level	Supplementary Crossing Data	Crossing Condition
15	Cruising Speed or Mach Number	Requested Cruising Level	Route		
16	Destination Aerodrome	Total Estimated Elapsed Time	Alternate Aerodrome(s)		
18	Other Information				
22	Field Indicator	Amended Data			
31	Facility Designator	Sector Designator	Optional Text		
32	Time of Day	Position	Track Ground Speed	Track Heading	Reported Altitude

2.1 Field 03, Message Type, Number and Reference Data

Field 03(a) format shall be per ICAO Doc. 4444 except that:

Only the message identifiers identified in Section 3 shall be permitted in element (a).

Field 03(b) and Field 03(c) format shall be per ICAO Doc. 4444 except that:

The ATS unit identifier in elements (b) and (c) shall be exactly 4 letters except where noted in a boundary agreement. The ATS unit identifier should correspond to the first four letters of the ICAO Doc. 7910 location identifier for the ATS unit, e.g. CZYZ for the Toronto ACC.

2.2 Field 07, Aircraft Identification and Mode A Code

Field 07(a) format shall be per ICAO Doc. 4444 except that:

a) The aircraft ID shall begin with a letter and be at least two characters long.
b) Aircraft IDs that begin with "TTT" shall be used only for test flight plans.
c) In an MIS message, a functional address may be substituted for the flight ID.

Field 07(b) and Field 07(c) format shall be per ICAO Doc. 4444, with the clarification that each number in Field 07(c) must be an octal digit. Note that elements 07(b) and 07(c) are either both present or both absent.

2.3 Field 08, Flight Rules and Type of Flight

Field 08(a) format shall be per ICAO Doc. 4444.

Field 08(b) format shall be per ICAO Doc. 4444.

2.4 Field 09, Number and Type of Aircraft and Wake Turbulence Category

Field 09(a) format shall be per ICAO Doc. 4444.

Field 09(b) format shall be per ICAO Doc. 4444 except that:

The list of allowable aircraft type designators will include those in ICAO Doc. 8643 and any others agreed to between countries implementing the interface. Additional aircraft types must start with a letter.

Field 09(c) format shall be per ICAO Doc. 4444.

2.5 Field 10, Equipment and Capabilities

Field 10(a) format shall be per ICAO Doc. 4444.

Field 10(b) format shall be per ICAO Doc. 4444.

2.6 Field 13, Departure Aerodrome and Time

Field 13(a) format shall be per ICAO Doc. 4444.

Field 13(b) format shall be per ICAO Doc. 4444.

2.7 Field 14, Estimate Data

Field 14(a) format shall be per ICAO Doc. 4444.

Field 14(b) format shall be per ICAO Doc. 4444.

Field 14(c) format shall be per ICAO Doc. 4444 except that:

The designators "S" and "M" used for metric altitude will not be permitted.

Field 14(d) format shall be per ICAO Doc. 4444 except that:

The designators "S" and "M" used for metric altitude will not be permitted.

Field 14(e) format shall be per ICAO Doc. 4444.

2.8 Field 15, Route

Field 15(a) format shall be per ICAO Doc. 4444 except that:

The designator "K" used for kilometers per hour will not be permitted.

Field 15(b) format shall be per ICAO Doc. 4444 except that

The designators "S" and "M" used for metric altitude will not be permitted.

Field 15(c) format shall be per ICAO Doc. 4444. (Note that even though metric altitude and speed information will not be permitted in other fields, they are permissible in elements (c4) and (c6).

2.9 Field 16, Destination Aerodrome and Total Estimated Elapsed Time, Destination Alternate Aerodrome(s)

Field 16(a) format shall be per ICAO Doc. 4444.

Field 16(b) format shall be per ICAO Doc. 4444.

Field 16(c) format shall be per ICAO Doc. 4444.

2.10 Field 18, Other Information

Field 18(a) format shall be per ICAO Doc. 4444, except that

a) Indicators other than those shown in ICAO Doc. 4444 may be used. This reflects the reality that flight plans are filed with indicators other than those defined by ICAO (e.g. EUR/ to identify EURCONTROL specific indicators). Handling of non-standard indicators should be annotated in the respective boundary agreement.
b) ICAO issued a clarification on the use of Field 18 in CHG, CNL, DLA, DEP and RQS messages and their use in advance filing. The messages included in this document refer only to flights operating within the current 24 hour period; therefore DOF may be sent but is not required in messages. Cross-border deviations from ICAO guidance for the required DOF/ Field 18 format (DOF/YYMMDD or -0) should be annotated in the respective boundary agreements.
c) ICAO Doc. 4444 does not address the validity/invalidity of using multiple indicators; however, instances of filed plans which use the same indicator multiple times have been identified. For example, "RMK/AGCS EQUIPPED RMK/TCAS EQUIPPED RMK/RTE 506". Because the other indicators, for example DEP/, often must be used for successful processing of the flight plan in these cases multiple instances should not be permitted. Boundary agreements should document the specific multiple indicator conventions if allowed.

2.11 Field22, Amendments

Field 22(a) format shall be per ICAO Doc. 4444.

Field 22(b) format shall be per ICAO Doc. 4444.

2.12 Field 31—Facility, Sector Designators and Optional Text

Field 31(a) shall contain a four-letter designator of the destination facility that is to receive the handoff/Point Out. Note that this facility ID can be for a terminal facility for which the parent en-route system provides routing. The four-letter designator should be the facility location identifier (from ICAO Doc. 7910) if one exists. If a location identifier does not exist, one should be assigned by mutual agreement between the implementing countries.

Field 31(b) shall contain a two character alphanumeric designator of the sector that is to receive the handoff/point out. Sending facility should insert "00" (zero, zero) if no sector is designated. If "00" is designated, or the field element is not included, the receiving system is to determine the appropriate sector.

Example: CZEG00
Field 31(c) Optional Text is reserved for informational use as defined in bilateral agreements to supplement cross border operations. The element is limited to 20 alphanumeric characters.

2.13 Field 32—Aircraft Position and Velocity Vector

Each element of field 32 is fixed length; there is no separator between elements.

Field 32(a) shall contain the time of day that the position is valid for expressed in eight digits: HHMMSSDD where HH is hours from 00 to 23; MM is minutes from 00 to 59; SS is seconds from 00 to 59 and DD is hundredths of seconds from 00 to 99.

Field 32(b) shall contain the position of the referent flight expressed in Latitude/Longitude to the nearest second, in ICAO Doc. 4444 format extended to include seconds (e.g. 462034N0780521W).

Field 32(c) shall contain the ground speed of the flight expressed in knots, per ICAO Doc. 4444 format (e.g. N0456).

Field 32(d) shall contain five digits, from 00000 to 35999, which is the heading of the flight expressed in degrees and hundredths of a degree, relative to true north.

Field 32(e) shall contain the reported altitude expressed in ICAO Doc. 4444 format for a level (e.g. F330).

3 NAM Core Message Set

The NAM core message set is summarized in the table below.

Table 2 NAM Core Message Set

Category	Msg.	Message Name	Description	Priority	Source
Coordination of pre-departure (near-border) flights	FPL	Filed Flight Plan	Flight plan as stored by the sending ATS unit at the time of transmission. Used only for proposed flights.	FF	ICAO Doc. 4444
	CHG	Change	Changes previously sent flight data (before estimate data has been sent).	FF	
	EST	Estimate	Identifies expected flight position, time and altitude at boundary.	FF	
Coordination of active flights	CPL	Current Flight Plan	Flight plan as stored by the sending ATS unit at the time of transmission, including boundary estimate data. Used only for active flights.	FF	ICAO Doc. 4444
	CNL	Cancellation	Cancels an FPL or a CPL.	FF	
	MOD	Modify	Changes previously sent flight data (after estimate data has been sent).	FF	New message, format per CHG.
	ABI	Advance Boundary Information -Supplemental	Message transmitted to provide information on a flight to the receiving ATSU	FF	PAN ICD
General Information	MIS	Miscellaneous	Free-format text message with addressing options.	FF	PAN ICD
Interface Management	IRQ	Initialization Request	Initiates activation of the interface.	FF	Based on existing CAATS protocols.
	IRS	Initialization Response	Response to an IRQ.	FF	
	TRQ	Termination Request	Initiates termination of the interface.	FF	
	TRS	Termination Response	Response to a TRQ.	FF	
	ASM	Application Status Monitor	Message to confirm adjacent center's ATC system is online	FF	
Radar Handoff	RTI	Radar Transfer Initiate	Initiates a radar handoff.	FF	New messages based on existing FAA protocols and ICAO Doc. 4444 format
	RTU	Radar Track Update	Provides periodic position updates for a track in handoff status.	FF	
	RLA	Radar Logical Acknowledgement	Computer acceptance of an RTI message.	FF	
	RTA	Radar Transfer Accept	Accepts or retracts a handoff.	FF	
Point Out	POI	Point Out Initiate-Basic /Enhanced	Initiates a Point Out	FF	
	PLA	Point Out Logical Acknowledgement-Basic	Computer acceptance of a POI message	FF	
	POA	Point Out Approval-Enhanced	Controller approval of a Point Out	FF	
	POJ	Point Out Denial-Enhanced	Controller denial of a Point Out	FF	
Transfer	TOC	Transfer of Control-Supplemental	Initiates procedural transfer of control	FF	PAN ICD
	AOC	Acceptance of Control-Supplemental	Indicates procedural acceptance of control	FF	
Acknowledgements (included in each of the above services)	LAM	Logical Acknowledgement	Computer acceptance of a message.	FF	ICAO Doc. 4444
	LRM	Logical Rejection	Computer rejection of an invalid message.	FF	PAN ICD

3.1 Coordination of Pre-Departure (near-border) Flights

3.1.1 FPL (Filed Flight Plan)

3.1.1.1 FPL Purpose

An FPL for a proposed flight may be sent from ATS unit to ATS unit under agreed conditions (e.g. for near border departures, when the flight time to the boundary is less than the normal advance time for sending a CPL). The FPL sent contains the latest flight plan information as entered by Air Traffic Control and is not the original FPL filed by the user.

3.1.1.2 FPL Format

Table 3 Filed Flight Plan Format

FPL Field	Required Elements	Optional Elements	Comments
03	a, b		
07	a	b, c	Beacon code is only sent if one is (already) assigned and the aircraft is so equipped.
08	a	b	Element (b) is included per requirements of the boundary agreement.
09	b, c	a	
10	a, b		
13	a, b		
15	a, b, c		
16	a, b	c	
18	a, other info.		Element (a) will contain -0 (zero) if no other information is included. Either element (a) OR other information (but not both) must be included.

3.1.1.3 FPL Examples

This flight plan was sent from Montreal Center (CZUL) to Boston Center (KZBW). The flight is from Sherbrooke Airport to Montpelier, VT. Because the departure airport is at the border between Canada and the United States, an FPL will be sent before departure.

(FPLCZUL/KZBW043 -N12345 -IG -C172/L -SD/C -CYST2055 -N0120A070 CYSC DCT YSC V447 MPV DCT KMPV –KMPV0053-EET/KZBW0003)

This flight plan is from Duluth (KDLH) to Amsterdam (EHAM). It crosses into Winnipeg Center from Minneapolis Center.

(FPLKZMP/CZWG223 –DAL56-IS -B742/H-SXWDHGRZJ3M1/SB2 -KDLH0255 -N0492F330 DCT DLH J533 YQT DCT YDP/M084F330 DCT PRAWN/M084F370 DCT 59N050W 58N040W 57N030W 56N020W 55N010W UN551 TADEX/N0485F370 UN551 BEL UB3 IOM UL603 BLUFA4 -EHAM0721 EBBR-PBN/D2 NAV/RNVD1E2A1 REG/N642NW EET/CZWG0032 CZYZ0113 CZUL0126 CZQX0226 59N050W0328 58N040W0404 EGGX0441 56N020W0521 EGPX0603 EGTT0623 SEL/CMAD TALT/KMSP**)**

3.1.2 CHG (Change)

3.1.2.1 CHG Purpose

A CHG is used to transmit a change to one or more fields of previously sent flight data for a flight that has not had boundary estimate data sent. When boundary estimate data has been sent (via CPL or FPL followed by EST), a MOD message must be used for flight data changes.

3.1.2.2 CHG Format

Table 4 Change Format

CHG Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall contain the reference number of the first message (FPL or CPL) sent for this flight.
07	a	b, c	If a beacon code has been assigned and sent in a previous CHG, it should be included. Fields 07, 13, and 16 must contain the values of these fields before the flight data was changed.
13	a, b		
16	a		
18	a		
22	a, b		

3.1.2.3 CHG Examples

This amendment changes the equipment and capabilities in Field 10 and the Other Information in Field 18.

(CHGKZHU/MMZT776KZHU/MMZT603-UAL1021-KIAD1905-MMEX-DOF/121115-10/SFGHRWXZ/SB2-18/PBN/D2 NAV/RNVD1E2A1 EET/MMZT0023 MMEX0057 RMK/TCAS EQUIPPED)

OR

(CHGKZHU/MMZT776KZHU/MMZT603-UAL1021-KIAD1905-MMEX-0-10/SFGHRWXZ/SB2-18/PBN/D2 NAV/RNVD1E2A1 EET/MMZT0023 MMEX0057 RMK/TCAS EQUIPPED) This amendment changes the ACID of a flight from AAL72 to AAL73. Note that when Field 07(a) is changed, it is the only change allowed in the message.
(CHGKZMP/CZWG776KZMP/CZWG603-AAL72-KSEA-CYOW-07/AAL73)

3.1.3 EST (Estimate)

3.1.3.1 EST Purpose

An EST is used to provide boundary estimate information for a flight when the basic flight plan information was previously transmitted via an FPL (instead of a CPL). Note that the EST is sent only when a flight becomes active.

3.1.3.2 EST Format

Table 5. Boundary Estimate Format

EST Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall contain the reference number of the first message (FPL or CPL) sent for this flight.
07	a	b, c	Beacon code is only sent if one is (already) assigned and the aircraft is so equipped. Aircraft ID and beacon code sent in an EST message must match the values previously sent in the FPL or the last CHG that modified the FPL.
13	a		Departure aerodrome must match the value previously sent in the FPL or the last CHG that modified the FPL.
14	a, b, c	d, e	
16	a		Destination aerodrome must match the value previously sent in the FPL or the last CHG that modified the FPL.

3.1.3.3 EST Examples

This message was sent from Minneapolis Center to Winnipeg Center upon departure of DAL122. It indicates that the flight is expected to cross the coordination fix Humboldt (HML) at 2042UTC, and that the flight has been cleared to flight level 350.

(ESTKZMP/CZWG992KZMP/CZWG991 -DAL122/A4322 –KFAR-HML/2042F350 -CYOW)

3.1.4 CNL (Cancel)

3.1.4.1 CNL Purpose

A CNL is used to notify the receiving ATS unit that a flight, for which an FPL or CPL was sent earlier, is no longer relevant to that ATS unit.

3.1.4.2 CNL Format

Table 6 Cancel Format

CNL Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall contain the reference number of the first message (FPL or CPL) sent for this flight.
07	a		Elements (b) and (c) are not used in this context.
13	a,	b	Implemented as optional to preclude rejection in those cases where an EOBT time is not available.
16	a		
18	a		

3.1.4.3 CNL Examples

This message was sent from Houston Center to Mazatlan Center to indicate that flight UAL1021 from Houston to Mexico City will no longer be entering Mazatlan Center airspace.
(CNLKZHU/MMZT776KZHU/MMZT603-UAL1021-KIAD0818-MMEX-0)

3.2 Coordination of Active Flights

3.2.1 CPL (Current Flight Plan)

3.2.1.1 CPL Purpose

A CPL is used to inform the receiving center of the cleared flight plan and boundary estimate information for coordination purposes. This message may only be sent as the initial transmission of an active flight plan (i.e. a flight that has departed and for which a boundary estimate based on the actual departure time is available).

3.2.1.2 CPL Format

Table 7. Current Flight Plan Format

CPL Field	Required Elements	Optional Elements	Comments
03	a, b		
07	a	b, c	Beacon code is only sent if one is (already) assigned and the aircraft is so equipped.
08	a	b	Element (b) is included per requirements of the boundary agreement.
09	b, c	a	
10	a, b		
13	a		
14	a, b, c	d, e	
15	a, b, c		
16	a		
18	a, other info	.	Element (a) is included only if no other information is included. Either element (a) OR other information (but not both) must be included.

3.2.1.3 CPL Examples

This flight is from Houston to Mexico City. It passes from Houston Center (KZHU) to Monterrey Center (MMTY).

(CPLKZHU/MMTY005-UAL1021/A2173-IX-A320/M-SE3HIRWXZ/SB2-KIAD-MAM/2042F350-N0420F350 MAM UJ35 AVSAR DCT-MMMX-PBN/D2 NAV/RNVD1E2A1 DOF/121130)

3.2.2 MOD (Modify)

3.2.2.1 MOD Purpose

A MOD is used to transmit a change to one or more fields of previously sent flight data after boundary estimate data has been sent. The MOD is therefore used for any flight data changes after a CPL or an EST has been sent.

3.2.2.2 MOD Format

Table 8. Modify Format

MOD Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall contain the reference number of the first message (FPL or CPL) sent for this flight.

MOD Field	Required Elements	Optional Elements	Comments
07	a	b, c	Beacon code is only sent if one is (already) assigned and the aircraft is so equipped. Fields 07, 13, and 16 must contain the values of these fields before the flight data was changed.
13	a		
16	a		
22	a, b		

3.2.2.3 MOD Examples

In this example fields 10 and 18 have been amended via a MOD message. Note that all of Field 18 is sent, even though likely only one part of it changed.

(MODKZHU/MMTY776KZHU/MMTY720-UAL1021–KIAD –MMEX-10/SE3HIRWX/S-18/PBN/D2 NAV/RNVD1E2A1 REG/N431UP EET/MMTY0312 MMEX0338 SEL/EFPQ)

3.2.3 ABI (Advance Boundary Information)

3.2.3.1 ABI Purpose.

An ABI message is transmitted to provide information on a flight to the receiving ATSU. The purpose of the ABI is to synchronize the flight plan information held between two ATSUs.

The transmission of an ABI will normally be triggered at an agreed time or position prior to the common boundary. Before coordination occurs, amendments to information contained in a previously transmitted ABI should normally be notified by the transmission of a CPL. An ABI is not transmitted after a CPL.The ABI is acknowledged with a LAM.

3.2.3.2 ABI Format Check

Table 9. Advance Boundary Information Format

ABI Field	Required Fields	Optional Fields	Required Elements	Optional Elements	Comments
03			a, b		Per PAN ICD
07			a	b, c	
13			a		
14			a,b,c	d,e	
16			a		
22	9,15	8, 10 18	a, b, c		
8				a,b	
9			a,b,c		
10				a,b	
15			a,b,c		
18					

8 *Flight rules and type of flight*
9 *Number, type of aircraft and wake turbulence category*
10 *Equipment*
15 *Route*
18 *Other information*

3.2.3.3 ABI Example

An ABI message containing the minimum contents of Field 22, with full route details to destination.

(ABIKZWY/CZQM005-IBE6175/A2537-LEMD-41N040W/0700F330-CYUL-9/B744/H -15/M084F350 41N030W 41N040W 41N050W 40N060W 38N065W DANER A699 MAPLE DCT GOALL)

3.3 General Information Messages

3.3.1 MIS (Miscellaneous)

3.3.1.1 MIS Purpose

A MIS is used to transmit a free text message to a specific functional position, or to the position responsible for a specific flight, at another facility.

3.3.1.2 MIS Format

Table 10. Miscellaneous Format

MIS Field	Required Elements	Optional Elements	Comments
03	a, b		
07	a		Note that element (a) in the MIS may contain a flight ID or a functional address
18	RMK/ followed by free text		

3.3.1.3 MIS Examples

In this example Salt Lake Center (KZLC) has forwarded information regarding flight DAL1311 to Winnipeg Center.
(MISKZLC/CZWG876 –DAL1311 -RMK/DAL1311 ABLE 350 AT 1322Z)

In this example Moncton Center (CZQM) has notified a supervisory position (S1) in Boston Center (KZBW) that sectors 21 and 22 are going to be combined.
(MISCZQM/KZBW999 -/S1 -RMK/COMBINING SECTOR 21 INTO 22 AT 1415Z)

3.4 Interface Management Messages

3.4.1 IRQ (Initialization Request)

3.4.1.1 IRQ Purpose

An IRQ is used to request transition of an interface from a non-operational to an operational state.

3.4.1.2 IRQ Format

Table 11. Initialization Request Format

IRQ Field	Required Elements	Optional Elements	Comments
03	a, b		

3.4.1.3 IRQ Examples

In this example Moncton Center (CZQM) has sent a request to Boston Center (KZBW) to initialize the interface.
(IRQCZQM/KZBW491)

3.4.2 IRS (Initialization Response)

3.4.2.1 IRS Purpose

An IRS is used as a response to an IRQ message.

3.4.2.2 IRS Format

Table 12. Initialization Response Format

IRS Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) should contain the reference number of the previously sent IRQ.

3.4.2.3 IRS Examples

In this example Boston Center has responded to a request from Moncton Center to initialize the interface.
(IRSKZBW/CZQM232CZQM/KZBW491)

3.4.3 TRQ (Termination Request)

3.4.3.1 TRQ Purpose

A TRQ is used to request transition of an interface from an operational to a non-operational state.

3.4.3.2 TRQ Format

Table 13. Termination Request Format

TRQ Field	Required Elements	Optional Elements	Comments
03	a, b		
18		a, other info.	Element (a) is included only if no other information is included. Either element (a) OR other information (but not both) must be included. Other information, if included, must include RMK/ followed by free text.

3.4.3.3 TRQ Examples

In this example Vancouver Center (CZVR) has notified Seattle Center (KZSE) that Vancouver Center needs to terminate the interface.
(TRQCZVR/KZSE491-RMK/SHUTDOWN FOR SOFTWARE CHANGE)

3.4.4 TRS (Termination Response)

3.4.4.1 TRS Purpose

TRS is used as a response to a TRQ message.

3.4.4.2 TRS Format

Table 14. Termination Response Format

TRS Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) should contain the reference number of the previously sent TRQ.
18		a, other info.	Element (a) is included only if no other information is included. Either element (a) OR other information (but not both) must be included. Other information, if included, must include RMK/ followed by free text.

3.4.4.3 TRS Examples

In this example Seattle Center (KZSE) has acknowledged the Termination Request (TRQ) sent by Vancouver Center (CZVR).
(TRSKZSE/CZVR232CZVR/KZSE491-0)

3.4.5 ASM (Application Status Monitor)

3.4.5.1. ASM Message Purpose

The ASM message is sent to an adjacent center to confirm that the adjacent center's ATC application is online. The ASM is transmitted when no other application messages have been received within an adaptable time. The periodic interval between transmissions of the ASM message should be determined based on the needs of the operational environment.

3.4.5.2 ASM Message Format

Table 15. Application Status Monitor Format

ASM Field	Required Elements	Optional Elements	Comments
03	a, b, c		Interface Management

3.4.5.3 ASM Message Description

The ASM message is used to confirm that the ATC application between interfaced ACCs is on-line. The ASM message is transmitted by ACC A to (adjacent) ACC B. If, after a mutually agreed time, no communication has been received from ACC B, ACC B responds to the ASM message, confirming the ATC application is active and functioning, by sending a LAM to ACC A. If ACC A does not receive a response LAM from ACC B with a specified time, local contingency procedures should be executed. The ASM message is normally sent automatically, but may be sent by a manual entry.

3.5 Acknowledgements

3.5.1 LAM (Logical Acknowledgement)

3.5.1.1 LAM Purpose

A LAM is sent from ACC to ACC to indicate that a message has been received and found free of syntactic and semantic errors. It does not indicate operational approval by a controller. Element (c) contains the reference number (i.e. element 3(b)) of the message being responded to.

3.5.1.2 LAM Format

Table 16. LAM Message Format

LAM Field	Required Elements	Optional Elements	Comments
03	a, b, c		

3.5.1.3 LAM Examples

This is an example where Houston Center (KZHU) has accepted message number 021 from Monterrey Center (MMTY) to Houston Center.
(LAMKZHU/MMTY035MMTY/KZHU021)

3.5.2 LRM (Logical Rejection)

3.5.2.1 LRM Purpose

An LRM is used to indicate that a message sent from ATS system to ATS system contained an error and has been rejected by the receiving system.

3.5.2.2 LRM Format

Table 17. Logical Rejection Message Format

LRM Field	Required Elements	Optional Elements	Comments
03	a, b, c		
18	text as shown in Comments		Describes the error code and the error per Appendix A guidelines: after RMK/, include ⇒ two digits comprising the error code; (note that error code 57 will be used for any error that is not field specific and that is not identified in Appendix A - Error Codes.) ⇒ two digits comprising the field in error (or 00 if the error is not field-specific); ⇒ and the erroneous text, i.e. the contents of the message that caused the error when the error is field specific. When the error is non-field specific, a descriptive error message shall be included. Separate the above items by an oblique stroke (/).

3.5.2.3 LRM Examples

This LRM was generated because the ACID in Field 07 was illegal (eight characters is too long)
(LRMKZLC/CZWG035CZWG/KZLC021-RMK/06/07/AAL98295)

This LRM is an example of a non-field specific error.
(LRMCZYZ/KZOB001KZOB/CZYZ210-RMK/53/00/MESSAGE LOGICALLY TOO LONG)

3.6 Radar Handoff /Point Out Messages

3.6.1 RTI Message (Radar Transfer Initiate)

3.6.1.1 RTI Purpose

An RTI message is sent from one ATS unit to another to initiate the transfer of radar identification for a flight. Logical acknowledgement of an RTI is an RLA or LRM. Alphanumeric or no sector ("00") designators may need to be supported depending on the interfaced systems conventions.

3.6.1.2 RTI Format

Table 18. RTI Message Format

RTI Field	Required Elements	Optional Elements	Comments
03	a, b, c		
07	a, b, c		Must include ACID and established beacon code
13	a		
16	a		
31	a	b	If no sector designated or sector 00 is designated, then receiving system determines
32	a, b, c, d, e		

3.6.1.3 RTI Examples

This is an example of a handoff initiated by KZMP to CZWG. No sector is designated, so CZWG will determine who should receive it.
(RTIKZMP/CZWG812KZMP/CZWG801-DLH499/A3407-KMSP–CYOW–CZWG
-13242934462034N0780521WN043327629F349)
This is an example of a handoff directed to sector 08 in Boston Center, from Toronto Center.
(RTICZYZ/KZBW123CZYZ/KZBW102-ACA202/A2201-CYYZ–KIAD–KZBW08
-13242934444055N0752756WN043327629F350)

3.6.2 RLA Message (Radar Logical Acknowledgement)

3.6.2.1 RLA Purpose

The Radar Logical Acknowledgment message is used to acknowledge computer receipt of an RTI message. The facility sending this message is indicating that the referenced message has been received and has no format or logic errors, and to indicate which sector the handoff was routed to. The RLA is an acknowledgement message in response to RTI and therefore is not responded to. Alphanumeric or no sector ("00") designators may need to be supported depending on the interfaced systems conventions.

3.6.2.2 RLA Format

Table 19. RLA Message Format

RLA Field	Required Elements	Optional Elements	Comments
03	a, b, c		

RLA Field	Required Elements	Optional Elements	Comments
31	a, b		

3.6.2.3 RLA Examples

In this example Boston Center has indicated to Montreal Center that it has received a handoff and routed it to sector 53.
(RLAKZBW/CZUL202CZUL/KZBW445-KZBW53)

In this example Boston Center has indicated to Montreal Center that it has received a handoff and routed it to sector 1A at the TRACON serving the Burlington, Vermont airport. In this case KBTV is an adapted identifier for the TRACON, since there are no ICAO location identifiers for U.S. TRACONs.
(RLAKZBW/CZUL202CZUL/KZBW445-KBTV1A)

3.6.3 RTU Message (Radar Track Update)

3.6.3.1 RTU Purpose

An RTU message may be sent from one ATS unit to another to update the radar position of a flight during transfer of radar/surveillance identification. RTU messages are sent periodically after an RTI, until an RTA is received or the handoff is retracted. There is no logical acknowledgement of an RTU.

3.6.3.2 RTU Format

Table 20. RTU Message Format

RTU Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall refer to the message number of the RTI message that initiated the handoff.
07	a , b, c		Include established beacon code.
13	a		
16	a		
32	a, b, c, d, e		

3.6.3.3 RTU Examples

This is an example of an RTU message initiated by KZMP to CZWG. The message KZMP/CZWG801 was the RTI message that initiated the handoff.
(RTUKZMP/CZWG000KZMP/CZWG801-DLH499/A3407-KMSP-CYOW
-13242934462034N0720521WN043327629F349)

3.6.4 RTA Message (Radar Transfer Accept)

3.6.4.1 RTA Purpose

An RTA message may be sent from one ATS unit to another as an application response to an RTI. This message signifies that a controller has accepted radar/surveillance identification of a flight. An RTA is also sent by the facility that initiated a handoff to retract the handoff. Logical (computer) acknowledgement of an RTA is an LAM or LRM. Alphanumeric or no sector (“00”) designators may need to be supported depending on the interfaced systems conventions.

3.6.4.2 RTA Format

Table 21. RTA Message Format

RTA Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) refers to the message number of the RTI that is being responded to.
07	a, b, c		Include assigned beacon code (i.e. code assigned by the accepting center).
13	a		
16	a		
31	a, b		

3.6.4.3 RTA Examples

This is an example of a handoff accepted by CZWG. Handoff was initiated by KZMP.
(RTACZWG/KZMP438KZMP/CZWG812-DLH499/A4222-KZMP-CYOW-CZWGAA)

This is an example of a retraction by KZMP:
(RTAKZMP/CZWG222KZMP/CZWG812-DLH499/A4222-KZMP-CYOW-KZMP42)

3.7 Point Out Messages

3.7.1 POI Message (Point Out Initiate) Basic/Enhanced

3.7.1.1 POI Purpose

A POI message is sent from one ATS unit to another to initiate the point out for a flight. Logical acknowledgement of a POI message is a PLA or rejected with the LRM (Basic)/POJ (Enhanced) message. In Point Out - Basic operations, verbal coordination is required. Any point out text is information only and does not constitute procedural dependencies or approval requests. Alphanumeric or no sector ("00") designators may need to be supported depending on the interfaced systems conventions. Note: Field 31 consists of, a. Facility Designator, b. Sector Designator, and c. optional point out 'Text'.

3.7.1.2 POI Format

Table 22. POI Message Format

POI Field	Required Elements	Optional Elements	Comments
03	a, b		
07	a, b, c		Must include ACID and established beacon code
13	a		
16	a		
31	a	b, **c**	If no sector designated or sector 00 is designated, then receiving system determines. Element (c) refers to optional text field reserved for supplemental point out messaging in Point Out – Enhanced Operations

POI Field	Required Elements	Optional Elements	Comments
32	a, b, c, d, e		

3.7.1.3 POI Examples

This is an example of a point out initiated by KZOB to CZYZ. No sector is designated, so CZYZ will determine who should receive it.
(POIKZOB/CZYZ812-DLH499/A3407-KROC–KBOI–CZYZ
-13242934462034N0780521WN043327629F349)
The same point out is initiated by KZOB to CZYZ sector AA. Alphanumeric sector designators may need to be supported.
(POIKZOB/CZYZ812-DLH499/A3407-KROC–KBOI–CZYZAA
-13242934462034N0780521WN043327629F349)

This is an example of a point out directed to sector 08 in Boston Center, from Toronto Center.
(POICZYZ/KZBW123-ACA202/A2201-CYYZ–CYQB–KZBW08
-13242934444055N0752756WN043327629F350)

3.7.2 PLA Message (Point Out Logical Acknowledgement) – Basic/Enhanced

3.7.2.1 PLA Purpose

The Point Out Logical Acknowledgment message is used to provide computer receipt of a POI message. The facility sending this message is indicating that the referenced message has been received and has no format or logic errors, and may indicate to which sector the point out was routed. The PLA is a logical acknowledgement message in response to POI and therefore is not responded to. Alphanumeric or no sector ("00") designators may need to be supported depending on the interfaced systems conventions. Note: Field 31 consists of a. Facility Designator, b. Sector Designator and element c. Optional Point Out 'Text'

3.7.2.2 PLA Format

Table 23. PLA Message Format

PLA Field	Required Elements	Optional Elements	Comments
03	a, b, c		
31	a, b	c	

3.7.2.3 PLA Examples

In this example Boston Center has indicated to Montreal Center that it has received a point out and routed it to sector 53.
(PLAKZBW/CZUL202CZUL/KZBW445-KZBW53)

3.7.3 Point Out Approval Message (POA) -Enhanced

3.7.3.1 POA Purpose

The Point Out Approval message is used by the controller to approve a Point Out (POI) message in future Point Out - Enhanced Operations. The facility sending this message is indicating that the referenced message has been received, displayed to the controller, and acknowledged by the controller. The POA is an acknowledgement message in response to POI and normally requires no response.

3.7.3.2 POA Format

Table 24. POA Message Format

POA Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) refers to the message number of the POI that is being responded to.
07	a, b, c		Include assigned beacon code (i.e. code assigned by the accepting center).
13	a		
16	a		
31	a, b	c	Element (c) refers to optional text field reserved for Point Out - Enhanced Operations

3.7.3.3 POA Examples

In this example Winnipeg Center has indicated to Minneapolis Center that it has received a Point Out and routed it to sector BB. Alphanumeric or no sector designators may need to be supported depending on the capabilities of the interfaced systems

(PLACZWG/KZMP438KZMP/CZWG812-DLH499/A4222-KSLC-KBUF-CZWGBB)

3.7.4 Point Out Denial Message (POJ) - Enhanced

3.7.4.1 POJ Purpose

The Point Out Denial message is used by the controller to deny a Point Out request (POI). If implemented the facility sending this message is indicating that the referenced message was received, displayed to the controller, and subsequently disapproved by the controller. The POJ is an acknowledgement message in response to POI and therefore is not responded to.

3.7.4.2 POJ Format

Table 25. POJ Message Format

POJ Field	Required Elements	Optional Elements	Comments
03	a, b, c		
18	Text as shown in comments		Describes the error code /reason per defined guidelines

3.7.4.3 POJ Examples

This is an example of a Point Out – Enhanced Operations, Denial by CZWG. A point out was initiated by KZMP.

(POJCZWG/KZMP438KZMP/CZWG812 -RMK /00/Unable PO Request)

In this example Boston Center has indicated to Montreal Center that it has received a point out and disapproved it. No reason is provided.

(POJCZWG/KZMP438KZMP/CZWG812-0)

3.8 Transfer of Control (Procedural) - Supplemental

3.8.1 TOC (Transfer of Control) Message

3.8.1.1 TOC Purpose

The procedural environment TOC message is sent to propose the transfer of control of a flight to the receiving ATSU. This transfer of control message is normally used between ATSU facilities where procedural separation is being used and radar handoff is not a viable option for interfacility transfers of jurisdiction per ICAO 9694 guidance. Bilateral agreements will outline TOC/AOC in operational use to include transfer of control point.

3.8.1.2 TOC Message Format

Table 26. TOC Message Format

TOC Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall contain the reference number of the first message sent for this flight.
07	a	b, c	
13	a, b		
16	a		

3.8.1.3 TOC Examples

(TOCPAZA/CZVR776PAZA/CZVR720-AAL451- RJTD0122-CZVR)

(TOCKZAK/CZVR115KZAK/CZVR278-QFA135/A2217-PHNL0344-CZVR)

3.8.2 AOC Message (Acceptance of Control) - Supplemental

3.8.2.1 AOC Purpose

The AOC procedural environment message is transmitted in response to a received TOC message to indicate controller acceptance of procedural control of a flight as specified in a bilateral agreement.

3.8.2.2 AOC Message Format

Table 27. AOC Message Format

AOC Field	Required Elements	Optional Elements	Comments
03	a, b, c		Element (c) shall contain the reference number of the first message sent for this flight.
07	a	b, c	
13	a, b		
16	a		

3.8.2.3 AOC Examples

(AOCPAZA/CZVR776PAZA/CZVR720-AAL451- RJTD0122-CZVR)
(AOCKZAK/CZVR115KZAK/CZVR278-QFA135/A2217-YMML2200-CZVR)

PART III – COMMUNICATIONS AND SUPPORT MECHANISMS

1 Introduction

The communications protocols and physical path are not dictated by this ICD. This ICD addresses only the application message content.

2 Telecommunications Requirements and Constraints

2.1 Use of Aeronautical Fixed Telecommunications Network (AFTN)

AFTN may be used for the flight data interface in Class 1 or Class 2, subject to verification of performance. Any interface exchanging radar/surveillance position data, including radar handoffs and point outs, shall not use AFTN.

When AFTN is used as the communications mechanism:

a) The AFTN IA-5 Header as described in ICAO Annex 10, Aeronautical Telecommunications (Amendment 71) will be used for exchange of messages.

b) ATS messages will be addressed to each ATS unit using an eight-character facility address where the first four characters are the appropriate location indicator from ICAO Doc. 7910, and the last four characters are routing indicators defined by the ATS unit in accordance with ICAO Annex 10.

Each message shall be sent with the priority indicated in Table 2 of Part II.

2.2 Use of a Wide-Area Network

Use of existing wide-area networks (e.g. using TCP/IP protocol) may be used if the speed, capacity, and security characteristics are verified as adequate to support the interface.

2.3 Use of Direct Lines

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

2.4 Character Set

The IA-5 character set shall be used for all application message content. Certain characters have special meaning 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.

c) Elements within a field shall be separated by an oblique stroke ‘/’ only where so prescribed in ICAO Doc 4444, Appendix 3.

3 Engineering Considerations

3.1 Associated Automation Functionality

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.

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

3.2 Failure and Recovery Solutions

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.

3.3 Data Requirements

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 3 below.

Table 28. 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, IACC ,COCESNA publications	National
10	Equipment and Capabilities Codes	Identify ATS-specified equipment qualifiers that are not specified in ICAO Doc. 4444.	FAA, NAV CANADA, SENEAM, IACC , COCESNA 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, IACC publications	National
31	Facility designators	Identify facility designations and alphanumeric sector requirements	Local Data	Local
32	Time, position, speed, heading, altitude	Identify elements as defined in ICAO Doc 4444	Local Data	Local

4 Security Considerations

4.1 Privacy

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.

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

4.2 Authentication

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

4.3 Access Control

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.

5 Test Considerations

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.

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

6 Performance Considerations

6.1 Response Time

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.

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 six seconds maximum. Procedural transfer of control messages (e.g. AOC and TOC) operate under the same response requirements as flight planning messages.

6.2 Availability / Reliability

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

6.3 Capacity and Growth

Before implementing this interface between two centers, 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.

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

Table 29. Expected Message Rates and Sizes

Message	Avg. per Flight	Avg. Size[2]	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	
POI	.01	250	
PLA	.01	110	
POA	.01	80	
POJ	.01	100	
TOC	1	150	
ABI	1	250	
MIS	0.1	130	
Responses (not per flight):			
LAM/RLA	Sum of all above except RTU	80	
LRM		100	
AOC	1	80	

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 four NAM peer systems.

[2] 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.

APPENDIX A ERROR CODES

The error codes for use with LRM messages are defined in Table A-1 below.

Table A-1 LRM Error Codes and Explanations

Error Code	Field Number	Supporting 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	07	INVALID ACID
7	07	DUPLICATE ACID
8	07	UNKNOWN FUNCTIONAL ADDRESS
9	07	INVALID SSR MODE
10	07	INVALID SSR CODE
11	08	INVALID FLIGHT RULES
12	08	INVALID FLIGHT TYPE
13	09	INVALID AIRCRAFT MODEL
14	09	INVALID WAKE TURBULENCE CATEGORY
15	10	INVALID CNA EQUIPMENT DESIGNATOR
16	10	INVALID SSR EQUIPMENT DESIGNATOR
17	13, 16	INVALID AERODROME DESIGNATOR
18	13	INVALID DEPARTURE AERODROME
19	16	INVALID DESTINATION AERODROME
20	17	INVALID ARRIVAL AERODROME
21	13, 16	EXPECTED TIME DESIGNATOR NOT FOUND
22	13, 16	TIME DESIGNATOR PRESENT WHEN NOT EXPECTED
23	13, 14, 16	INVALID TIME DESIGNATOR
24	13, 14, 16	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

Error Code	Field Number	Supporting Text
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 SIGNFICANT 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	Two numerics (field indicator if present)	MISSING FIELD (two numerics)
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 ACC[3]
60	03	INVALID MESSAGE MNEMONIC (i.e., 3 LETTER IDENTIFIER)
61	Header	INVALID CRC
62		MESSAGE REJECTED, MANUAL COORDINATION REQUIRED
63		INVALID DATE OF FLIGHT
64		INCONSISTENT ITEM 10 AND 18
65		INVALID ADS-B EQUIPMENT DESIGNATOR
66		INVALID ADS-C EQUIPMENT DESIGNATOR
67		ICAO FORMAT MIXED IN MESSAGE A message was received containing ICAO data fields in which there was a mixture of both Present and New format of ICAO data.
68		MUST ENTER NEW ICAO FORMAT A message was received containing ICAO data in the Present format, but the ERAM is only accepting the New format. Only ICAO data in the New format is permitted.
69		Deleted NAM Version 'E'-MUST ENTER OLD ICAO FORMAT A message was received containing ICAO data in the New format, but the ERAM is only accepting the Present format. Only ICAO data in the old (Present) format is permitted.
70		ICAO FORMAT CANNOT BE CHANGED

Error Code	Field Number	Supporting Text
		A CHG or MOD message was received in which there was a mismatch between some of the received ICAO data and the stored ICAO format of the flight.
71	10	DUPLICATE EQP EQUIP DESIGNATOR EQP contains repetition of values.
72	10	DUPLICATE SRV EQUIP DESIGNATOR SRV contains repetition of values.
73	10	INVALID EQP EQUIP DESIGNATOR EQP contains invalid values
74	10	INVALID SRV EQUIP DESIGNATOR SRV contains invalid values
75	10	INVALID EQP EQUIP DESIGNATOR COMBINATION EQP contains invalid combination of values.
76	10	INVALID SRV EQUIP DESIGNATOR COMBINATION SRV contains invalid combination of values.
77	18	INVALID PBN Data PBN/ contains invalid values
78	10a	EQP EQUIP DESIGNATOR EXCEEDS 50 CHR
79	10b	SRV EQUIP DESIGNATOR EXCEEDS 20 CHR
80	13/18	DEP/ NOT FOUND FOR ZZZZ
81	15/10a	NO RVSM STATUS
82	16/18	DEST/ NOT FOUND FOR ZZZZ
83	18	INVALID ELEMENT ON STS/
84	18	PBN/ VALUE EXCEEDED OR INVALID (MORE THAN 8)
85	18	INVALID EET DATA
86	18	PBN VALUE INCONSISTENT WITH ITEM 10
87	16	ALTERNATE AERODROME PRESENT WHEN NOT EXPECTED
88		FPL IS ACTIVE (a message is received after a FPL become active) In CPL cases no CPL flag has been marked)
89		Deleted –NAM ICD Version E. DUPLICATED MESSAGE
90	9/18	TYP/ NOT FOUND FOR ZZZZ
91	10a/18	INCONSISTENT ITEM 10 and 18 (R, G, Z with no specification in field 18)
92-255		Reserved for future use.

Error Code 57 shall be used for any error that is not field-specific and is not identified in the table.
Each country may propose additional error codes as needed.

APPENDIX B IMPLEMENTATION GUIDANCE MATERIAL

B.1 Use of the Core Message Set

B.1.1 Filed Flight Plan Messages

The format and content of the FPL is subject to the rules of the receiving country and is not defined by this ICD.

Within the NAM ICD usage, the main Notification requirement within the Notification, Coordination, and Transfer of Control phases, as outlined within the ICAO Doc. 4444, is accomplished by filing of the FPL.

It is expected that an FPL will be filed by an airspace user, and a subsequent CPL will be received from an adjacent ATS unit. It is the responsibility of each country to design their automation to ensure that an FPL or CPL from an adjacent ATS unit always takes precedence over a user-filed FPL for the flight so that second-order flight data messages are applied to the ATS unit-supplied flight plan and not the user-filed flight plan.

B.1.2 Coordination of Active Flights

Normally, a specified VSP number of minutes before a flight reaches a control boundary the sending ATS unit will send a CPL message to the receiving ATS unit.

The normal computer response to a CPL is an LAM sent by the receiving automation system to signify that the plan was found to be free of syntactic and semantic errors. Controller acceptance is implied (i.e. the ACP message defined in ICAO Doc. 4444 is not implemented). This is permitted per ICAO Doc. 4444, Part IX, section 4.2.3.5.1 and Part VIII, section 3.2.5. If the receiving computer cannot process a CPL then an LRM will be returned for interfaces implementing Class 2.

ICAO Doc. 4444 states, in Part IX, section 4.2.3.2.5 “A CPL message shall include only information concerning the flight from the point of entry into the next control area or advisory airspace to the destination aerodrome”. However, ICAO Doc. 4444 provides no guidelines for choosing the exact point at which the CPL should start. The nature of ATC automation systems is that they have differing requirements for the starting point of a route relative to the facility boundary, necessitating some agreement on allowable route tailoring. The relationship between the start of the route in Field 15 and the coordination fix in Field 14 must also be established so that the receiving center can accurately process the route. Agreements on these points are provided in the attached boundary agreements for each country.

B.1.3 Changes after Coordination

Any change to a flight plan after initial coordination requires a message that can be mapped to the correct flight plan. Every message sent after an initial CPL should have the same Aircraft ID, departure point, and destination point. The message reference data should point to the first message flight plan message (FPL or CPL) which began the sequence of messages of which this message is a part. For example, if the CPL message number is KZMP/CZWG035 then the reference data for the first MOD sent after the CPL should be KZMP/CZWG035. The second MOD sent for that flight should also refer to the initial message number of the CPL in the sequence. The messages that represent valid changes to the original flight plan include CHG, EST, MOD, RTI, and RTA (when used for retraction; see Section B.1.8).

If a flight for which a CPL has been sent will no longer enter the recipient’s airspace, a CNL message should be sent.

Any change to flight data for a flight that has been coordinated (i.e. a CPL or EST has been sent) must be forwarded via a MOD message. The MOD message is identical to the ICAO CDN message in format and content, but does not require an ACP response (only LAM or LRM).

The expected computer response to a CNL, CHG, EST, or MOD is an LAM or LRM for interfaces implementing Class 2.

Each system should implement rules as to whether an amendment on a particular flight should be accepted from a neighboring ACC. For example, an amendment from the sending ACC typically is not accepted once transfer of control has been initiated.

It is expected that the content of a field sent in a flight data change message (e.g. CHG or MOD) will completely replace the content of the field currently stored in the receiving center. So, for example, if Field 18 is amended the entire contents of the field should be sent and not only the changed elements.

An aircraft placed into a hold without an Expect Further Clearance (EFC) time should result in a MOD being sent to the downstream facility with the estimated boundary crossing time in Field 14 changed by an adapted amount. An aircraft placed into a hold with an EFC time should result in a MOD being sent for the estimated boundary crossing time in Field 14. After release from hold if the new projected boundary crossing time is different by more than a parameter time (per facility LOA; nominally 3 minutes), the hold cancellation should result in a Field 14 MOD message reflecting the new expected boundary crossing time.

After acceptance of a CNL message the receiving system should not accept any changes regarding the subject flight.

In surveillance supported transfer of control upon acceptance of an RTI message the receiving system should accept only an RTA, RTU, or MIS message for the flight. If an RTA signifying retraction is accepted, then the system may once again accept a MOD message. Upon receipt of a logical acknowledgement to an RTA message signifying handoff acceptance, the sender of the RTA should not accept any messages regarding the subject flight.

Although listed as core messages ABI and TOC/AOC are included as supplemental messages in the NAM ICD. These messages are used in traditional procedural operational environments. These AIDC messages are offered for use in the NAM ICD only if adjacent ANSPs deem them beneficial for development to enhance the procedural operational environment. These are not Class I, II or III messages but are supplemental NAM messages. The ABI message does not normally require verbal intervention in initiation or response in NAM ICD usage, making it consistent with established AIDC operational procedural conventions in notification and coordination messaging. The TOC/AOC message pair within NAM ICD interfaces offers an AIDC-like transfer of control option as identified in ICAO Document 9694 in procedural environments. Manual user intervention to initiate and accept jurisdiction control for TOC/AOC maintains the consistency with NAM ICD radar/surveillance for handoff and transfer of control conventions. TOC/AOC transfer of control messaging for procedural operations requires manual initiation and acceptance as outlined in interfaced ATSU bilateral agreements.

B.1.4 Near Border Departures

ATS units implementing either Class 1 or Class 2 Flight Data Coordination may also exchange FPLs to coordinate flights pre-departure when the flight time from the departure point to the boundary point is less than the normal CPL notification time.

If the estimated flying time from the departure point to the boundary is less than the normal CPL notification time, or the relevant ATS units have agreed to coordinate all flights from a specified airport pre-departure:

a) ATS units implementing CPLs will manually coordinate the flight upon departure. Additional coordination procedures may be defined in a facility Letter of Agreement.
b) ATS units implementing FPLs will send an EST message (Basic flight data will have already been communicated via an FPL sent pre-departure).

If an FPL has been sent and changes are subsequently made, then a CHG message should be used to modify the changed fields. Only the ATS unit that sent an FPL message may send a CHG message (i.e. the receiving unit cannot send a CHG back to the sending unit). Once an EST message is sent, a MOD must be used instead of a CHG for transmission of flight data changes.

The expected computer response to an FPL is an LAM or LRM.

If a previously sent FPL is to be cancelled, a CNL message should be sent.

B.1.5 Interface Management

ATS units implementing phase one of Interface Management will nominally be expected to accept messages at any time the system is available. Each system is responsible for providing the capability of inhibiting received messages, if needed. Each system is expected to be able to inhibit outgoing messages. Manual coordination between facilities will be needed for one facility to request the other to inhibit messages.

B.1.6 Interface Management Implementation

ATS units implementing Interface Management candidate messages will request initialization or termination of the interface via automated messages. Only when an initialization request has been sent and responded to affirmatively, will each system be expected to accept messages.

Any message received when the interface is not initialized shall be ignored (i.e. not processed and not responded to), except for IRQ.

To request initialization one system shall send an IRQ message to the other. The IRQ may be repeated a predetermined number of times if no response is received, with each repeated IRQ receiving the same message number.

If the receiving system is ready to communicate (i.e. it has already sent an IRQ) when it receives an IRQ, it shall send an IRS in response. There is no LAM or LRM response to an IRQ. The reference number in Field 03 should refer to the message number of the IRQ being responded to. Each system becomes active when it receives an IRS from the other system. There is no response to an IRS.

If no response to an IRQ is received and the maximum number of retries exceeded, the interface is considered failed by the initiating system.

A system requests orderly termination of the interface by sending a TRQ message. After sending a TRQ, a system shall accept only a TRS or TRQ message. There is no LAM or LRM response to a TRQ. Upon receipt of a TRS the interface shall be deactivated. There is no response to a TRS. Upon receipt of a TRQ the system shall respond with a TRS and deactivate the interface immediately (even if a TRQ is outstanding). When messages are exchanged between two ATS units that cause successful termination of the interface, the two systems shall not send or accept any messages on the interface until a successful initialization transaction has been completed. The ASM message provides a ‘heartbeat’ for status monitoring of interfaced systems. The ASM 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.

B.1.7 Error Checking, Responses, and Resends

Upon receiving a message, the receiving system shall check that the format and content of each field are in accordance with this ICD. Other logic checks may be performed per the rules defined by the ATS provider.

Whenever a message is received and passes all syntactic and semantic checks an LAM (or RLA for handoff initiation) shall be returned to the sender for those messages designated for LAM/LRM responses.

B.1.7.1 Interface Management (Class 1)

ATS units implementing the first phase of Class 1 Interface Management will not send any response to the sender when a message fails a syntactic or semantic check. Because the implementation does not use LRM messages, message rejection is inferred by the failure to receive an LAM. ATS units will mutually agree on a maximum operationally acceptable time-out value (from the time a message is sent to receipt of an LAM).

ATS units implementing the Class 1 of interface management cannot productively use message resend as a technique, since the lack of an LAM may infer a lost message or message rejection.

B.1.7.2 Interface Management (Class 2)

ATS units implementing the second phase of Interface Management, Class 2, will send an LRM when a received message fails a syntactic or semantic check, using the error codes in Appendix A. In the case of a radar handoff initiation (see B.1.8) an RLA is used instead of an LAM. In the case of radar point out initiation message a PLA is used instead of a LAM.

When no response to a message is received within a VSP period of time a unit may optionally choose to resend the original message—using the same message number—a VSP number of times before declaring failure. The same message number should be used so that the receiving station can easily distinguish exact duplicates should the same message be received more than once.

B.1.8 Radar Handoffs/Point Outs (Class 3)

B.1.8.1 RTI Message

An RTI shall be used to initiate a transfer of radar/surveillance identification from a controller in one ACC to a controller in another ACC. An RLA or LRM shall be returned in response to an RTI, based on acceptance checks by the receiving computer.

If no logical response (RLA or LRM) to an RTI is received after a specified number of retries, the handoff should be marked as failed to the initiating controller.

Upon acceptance of an RTI message the receiving system should not accept any flight data messages regarding the subject flight except for an RTA, RTU, or MIS.

B.1.8.2 RTU Message

The transferring center shall begin sending RTU messages once an RLA is received for an RTI.

RTU messages shall be sent once every tracking cycle. The expected track update rate must be coordinated between the implementing countries.

An RTU message should not be sent when current track data is not available for a flight, e.g. if the flight enters a coast mode.

Upon retraction of the transfer or receipt of an RTA from the receiving center the sending of RTUs shall stop. There will be no response to an RTU (i.e. no LAM, RLA, or LRM).

B.1.8.3 RTA Message

An RTA message shall be sent by the receiving center in response to an RTI when the receiving controller has accepted the transfer. An RTA message shall be sent by the sending center when the initiating controller

retracts a previously issued RTI. An LAM or LRM shall be returned in response to an RTA, based on acceptance checks by the receiving computer. If no response is received within a VSP period of time, the transfer shall be considered failed and the accepting controller notified.

If the sending center receives an RTA after retracting a handoff, it shall reject the RTA by returning an LRM.

If the receiving center receives an RTA after accepting a handoff, it shall reject the RTA by returning an LRM.

After an RTA is rejected, the controller that attempted to accept or retract control shall be notified that the handoff failed. Note that it is possible for accept and retract to be entered simultaneously; resulting in both RTA messages being rejected.

B.1.8.4 POI Message

Cross Border radar point out capability is categorized with NAM ICD Class 3 and is complementary to radar handoff functionality. This capability will be an aid to provide flight data to an adjacent ATSU, in surveillance environments, in those instances where an aircraft will not transit through the adjacent airspace but whose track will pass within close proximity to an adjacent ACC boundary. A radar point out may be used to send data to allow display of the full data block of a track to a cross border controller by an adjacent, cross border system. The Basic Point Out message set includes POI, PLA, and LRM and requires manual coordination as defined in bilateral agreements. The Enhanced Point Out message set consists of the POI, PLA, POA, LRM and POJ messages and will be targeted at future development of automated coordination based on request and acceptance using non-verbal coordination.

A POI message is sent from one ATSU to another to initiate the point out for a flight. Logical acknowledgement or rejection of a POI message is via a PLA or LRM message respectively. If a logical response to a POI message is not received after a specified number of retries, the point out should be indicated as failed to the initiating controller.

In an operational cross border environment where an aircraft transits a portion of the adjacent ATSU then returns to the original ATSU's airspace, it is often referred to as an 'in-out-in'. A point out may be a potential solution to identifying traffic to another facility when the automation would not allow data to be passed, processed then returned successfully due to the close proximities and times involved. Cross border point out in lieu of radar/surveillance transfer of control would need to be supported by operational bilateral agreement and by system processing to substitute for normal CPL messaging.

B.1.8.5 POA Message

The Point Out Approval (POA) message is a controller response used to approve a Point Out (POI) message, in Point Out - Enhanced Operations. The facility sending this message is indicating that the referenced message has been received, displayed to the controller, and approved by the controller. The POA is an acknowledgement message in response to POI and requires no response.

In a future Enhanced Point Out environment, operations could build on basic point out capabilities to propose and approve/deny a point out without verbal intervention with procedures outlined in bilateral agreements.

B.1.8.6 POJ Message

In Point Out – Enhanced Operations, the controller uses the Point Out Denial (POJ) message to disapprove a Point Out (POI) message. The responding facility sending this message is indicating that the referenced message has been received, displayed to the controller, but disapproved by the controller. The POJ is an acknowledgement message in response to POI and therefore is not provided a response. The POJ would be used in Point Out - Enhanced operations only, and would disapprove the point out and provide a reason (optional) for the denial as outlined in bilateral agreements.

B.1.8.7 PLA Message

The Point out Logical Acknowledgment message is in both the Basic and Enhanced point out message sets. This message constitutes computer logical response acceptance in both message sets, functioning much like the LAM in Class I and II messaging. The PLA is the logical response message used to verify computer acceptance of the POI message. Unsuccessful computer acceptance of the POI message would be indicated with the LRM logical response reject message. The Basic and Enhanced point out message sets both use the POI –PLA message pairs. The Basic point out functionality also requires a phone call for coordination between controllers and does not process any automation requests, approvals, or conditional denials. The Enhanced capability builds on the basic capability to allow cross border operation to include approval options contained within the POI message.

B.1.9 MIS Message

The MIS message can be addressed to either a functional address, or to an aircraft ID. The functional addresses to use will be exchanged between adjacent centers. Each functional address will map to a workstation or set of workstations, and the types of information that should be sent to each address should accompany the exchange of addresses.

When an MIS message is addressed to a flight ID, the receiving system shall route the message to the sector that currently controls the flight. If no sector controls the flight the message shall be rejected. The intent is that an MIS message does not modify the flight record for the subject flight (i.e. it is not treated as an amendment to Field 18 for that flight).

B.2 Development of Field Content

The following sections provide implementation notes on the expected semantic content of each field, how to generate the fields and how to interpret the fields.

B.2.1 Field 03

Each message sent to each interface should receive an incrementally higher number. Thus, a system must maintain a separate sequence for each facility with which it interfaces.

The message following number 999 will be 000, and then the number sequence repeats.

The message number in Field 03 and the Aircraft ID in Field 07 combined must be unique for any CPL or FPL. A flight plan received that has the same message number and ACID as a previously received plan shall be rejected. Note that it is possible to have duplicate message numbers if the sending computer system fails and is restarted in a cold start mode (i.e. no previous state data is retained). In this case the message numbers would restart and may repeat.

Implementers of the interface should consider a check for out-of-sequence messages (i.e. a message received has a message number that is not one greater than the previous message number). Since messages may be resent if a response is not received within a VSP period of time, it may also be possible to receive a message more than once. Therefore implementers should consider a check for duplicate messages based on the message number. Any such checks should also consider the behavior after a system failure/restart.

B.2.2 Field 07

If the aircraft does not have Mode A capability, omit elements (b) and (c) and the preceding oblique stroke. Also omit these elements if the aircraft has Mode A capability but the code is unknown (or not assigned).

B.2.3 Field 09

When the aircraft type is “ZZZZ”, there may be no certificated maximum take-off weight. In this case the pilot and/or controller are expected to determine what the value should be per the ICAO guidelines and the estimated weight of the aircraft.

Allowable values for the aircraft type should include any type designator in ICAO Doc. 8643, and any type designator agreed to by the implementing countries.

Note that implementers may choose to validate the wake turbulence category based on the aircraft type, since these are published in ICAO Doc. 8643.

B.2.4 Field 10

Agreement on ATS-prescribed indicators is to be specified in separate implementation agreements.

B.2.5 Field 13

The aerodrome in Field 13 must match a location indicator in ICAO Doc. 7910, or must match one that is agreed to per the relevant boundary agreement, or agreed to by the implementing facilities.

If ZZZZ or AFIL is used, then additional information should be present in Field 18 per ICAO Doc. 4444. This ICD imposes no specific requirements on the content of DEP/.

B.2.6 Field 14

Field 14(a) contains a Boundary Point, which is an agreed point on or near the control boundary.

The boundary agreement between implementing countries identifies any specific requirements governing the choice of boundary point.

B.2.7 Field 15

A CPL, per ICAO Doc. 4444, Chapter 11, Section 4.2.3.2.5 “shall include only information concerning the flight from the point of entry into the next control area or advisory airspace to the destination aerodrome”. The route information for a MOD message will include the same information as the CPL message. In practical terms, each automation system generally has restrictions on the starting point of the route.

Each boundary agreement will define where the route of flight shall begin so as to meet the above requirement.

After the initial point, Field 15(c) should contain the remainder of the route of flight.

B.2.8 Field 18

In an FPL or CPL, all Field 18 content must be delimited by elements constructed as shown in ICAO Document 4444, each of which a three to four- letter identifier is followed by an oblique stroke “/”.

Field 18 shall not contain the character “-”, which is used to delineate fields in the message.

When used in an LRM, only the RMK/ element should be identified; only the text of the rejection message shall be included.

B.2.9 Field 31

Required by this ICD to support radar Hand Off and Point Out system coordination, the elements which make up this unique field are consistent with conventions in ICAO Doc. 4444 with Field 31 (a), (b) , (c) , (d) and (e) conventions detailed in Part II, 2.12 of this ICD.

B.2.10 Field 32

Required by this ICD to support radar Hand Off and Point Out system coordination, the elements which make up this unique field are consistent with conventions in ICAO Doc. 4444 with Field 31 (a), (b) , (c) , (d) and (e) conventions detailed in Part II, 2.13 in this ICD.

B.3 Summary of Expected Responses to Messages

Table 6 identifies the expected responses to each message. The computer logical responses represent acceptance or rejection based on computer checks for message validity. An application response is a response that is initiated by a person or the application software to provide semantic response to a message. Note that an LRM can be sent in response to a message with no computer response identified if the message ID (e.g. RTU) cannot be determined by the receiving computer.

Table B-1. Summary of Expected Message Responses

Msg	Computer Logical Response		Application Response
	Accept	Reject	
FPL	LAM	LRM	None
CHG	LAM	LRM	None
EST	LAM	LRM	None
CPL	LAM	LRM	None
CNL	LAM	LRM	None
MOD	LAM	LRM	None
ABI	LAM	LRM	None
TOC*	LAM	LRM	AOC
AOC*	LAM	LRM	None
MIS	LAM	LRM	None
IRQ	None	None	IRS
IRS	None	None	None
TRQ	None	None	TRS
TRS	None	None	None
ASM	LAM	None	None

Msg	Computer Logical Response		Application Response
	Accept	Reject	
RTI	RLA	LRM	RTA
RTU	None	None	None
RLA	None	None	None
RTA	LAM	LRM	None
POI (Basic)	PLA	LRM	None
PLA (Basic)	None	None	None
POI (Enhanced)	PLA	LRM	POA or POJ
PLA (Enhanced)	None	None	None
POA (Enhanced)	LAM	LRM	None
POJ (Enhanced)	LAM	LRM	None
LAM	None	None	None
LRM	None	None	None

* Note: It is recognized that within ATSU oceanic operations, transition to domestic operations, non-verbal procedural transfer of control may be a viable option for NAM ICD messaging. However, it is not considered an operational option for TOC/AOC to be used in cross border surveillance operations where radar handoffs would normally be used to support transfer of control per ICAO 9694.

Attachment 1 MEXICO/UNITED STATES BOUNDARY AGREEMENT

1. Introduction

This section documents the Class 1 interface planned between the SENEAM and FAA en route automation systems. The initial interface will have limited message capability. Future evolutions are expected to include additional messages.

2. Message Implementation and Use

2.1 Messages Implemented

The initial interface between the SENEAM and FAA EASs will be based on a Class 1 implementation of the Flight Data Coordination and Interface Management.

Thus, the interface will include CPL and LAM messages. A CPL will be sent when a flight departs, or when it is within a VSP flying time from the boundary, whichever occurs later. Each CPL that is received and successfully checked for syntactic and semantic correctness is responded to with an LAM.

2.2 Error Handling

A LAM will be sent in response to each CPL unless the receiving EAS detects an error. The EAS that sent the CPL will wait a VSP period of time for an LAM, and if none is received within the time parameter, it will notify the appropriate position that a failure occurred. Automatic retransmission of the message will not be attempted.

A LAM is sent in response to each CPL unless the receiving EAS detects an error. The EAS that sent the CPL waits a VSP period of time for an LAM, and if none is received within the time parameter, it notifies the appropriate position that a failure occurred. Automatic retransmission of the message will not be attempted.

2.3 Changes to a CPL

All changes to a previously sent CPL will be coordinated manually between the sending and receiving sectors.

2.4 Field 08, Flight Rules and Type of Flight

Regardless of the value in Field 08(a), all CPLs sent on this interface will be assumed to be IFR at the boundary between FAA and SENEAM airspace. Each center is only to send flight plans for flights that are IFR at the boundary. The FAA EAS processes only the IFR portion of the route in any flight plan, and does not forward flight plans to Flight Service Stations. Therefore any composite flight plan is expected to be filed by the user with both Flight Service and En Route Air Traffic Control.

2.5 Field 09, Number and Type of Aircraft and Wake Turbulence Category

When a specific aircraft type is used, the wake turbulence indicator sent to EUROCAT must match the value stored for the aircraft type in the EUROCAT database. When “ZZZZ” is used as the aircraft type, the wake turbulence category may be H, M, or L as appropriate.

2.6 Field 14, Estimate Data

Flights on direct routes are not to be sent across the interface. In the future, expansion of the interface to allow direct routes is expected. Enforcement of this requirement is expected to be procedural (i.e. the automation will forward a direct route if one is entered). The following statements regarding direct routes indicate the expected content of a message should a direct route be mistakenly sent.

For flights from Mexico to the United States:

a) If a flight is on an adapted route segment when it crosses the control boundary, Field 14(a) will reference the last significant point in the sending center's airspace.
b) If a flight is on a direct route segment when it crosses the control boundary Field 14(a) will reference the last significant point in the sending center's airspace.
c) If there is no significant point between the departure aerodrome and the boundary, the departure aerodrome will appear in Field 14(a).

All flights are expected to cross the boundary in level flight, at the altitude in Field 14(c). Elements (d) and (e) will not be used, and manual coordination will be required for any flight not in level flight at the boundary. Note that the FAA EAS will accept information in elements (d) and (e), but will discard that information when it is included without performing any error checks of the information.

For flights from the United States to Mexico:

a) If a flight is on a non-adapted direct route segment and the coordination fix is adapted per ERAM direct route crossing the control boundary Field 14(a) will reference the first significant point in the sending center's airspace.

b) If a flight is on a non-adapted direct route segment and the coordination fix is not adapted per ERAM direct route crossing the control boundary Field 14(a) will reference the last significant point in the sending center's airspace

2.7 Field 15, Route

Element type (c6) will not be used on this interface.

Element 15(c) will be constructed the same way whether the flight is from Mexico or from the United States:

a) If a flight is on an adapted route segment when it crosses the control boundary then Field 15(c) will begin with the same significant point as is in Field 14(a).
b) If a flight is on a direct route segment when it crosses the control boundary:
    1) Field 15(c) will begin with the last significant point in the sending center's airspace, if one exists.
    2) If there is no significant point between the departure aerodrome and the boundary then Field 15(c) will begin with "DCT".
c) After the initial point, Field 15(c) will contain the remainder of the route of flight.

The FAA EAS will pass the assigned altitude (same as in Field 14(c)) in element 15(b). Note that in the future the FAA plans to store and pass the requested altitude received in element 15(b). This boundary agreement will be updated when that change is implemented.

3. Physical Interface

Messages will be exchanged across this interface between the following facilities:

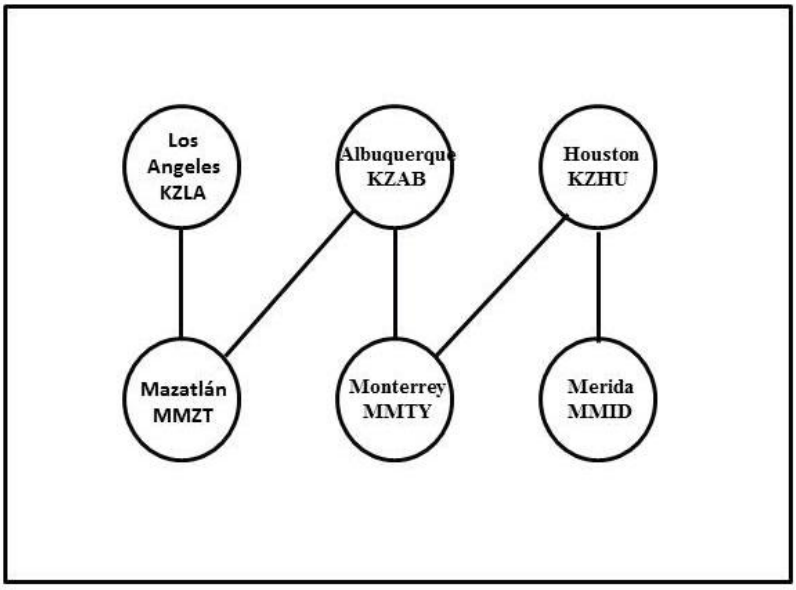


Figure 3-1. Mexico/US Interface Diagram

Attachment 2 CANADA/UNITED STATES BOUNDARY AGREEMENT

1. Introduction

This section documents the interface established between NAV CANADA and FAA en route automation systems.

2. Message Implementation and Use

2.1 Messages Implemented

This boundary agreement addresses conditions for exchange of all flight data messages, LAM and LRM, and handoff messages.

2.2 Conditions for Exchange

Flight plan messages (CPL or FPL) are exchanged between en route centers for flights that are IFR at the boundary. This includes the cases shown in Table Att. 2-1 below:

Table 2- 1 Summary of Flight Plan Routing in FAA and NAV CANADA Systems

Direction of Flight	Flight Rules *	Flight Data Routing	FAA Routing
Canada to U.S.	I	CAATS to FAA EAS	none.
	V	CAATS to FAA FSS	none.
	Y (VFR after bdry)	CAATS to FAA EAS	EAS to FSS
	Y (VFR before bdry)	CAATS/ to FAA FSS	none.
	Z (IFR after bdry)	CAATS to FAA FSS	FSS to EAS
	Z (IFR before bdry)	CAATS to FAA EAS	none.
U.S. to Canada	I	FAA EAS to CAATS	none.
	V	FAA FSS to CAATS	none.
	Y (VFR after bdry)	FAA EAS to CAATS	none.
	Y (VFR before bdry)	FAA FSS to CAATS	none.
	Z (IFR after bdry)	FAA FSS to CAATS	none.
	Z (IFR before bdry)	FAA EAS to CAATS	FSS to EAS.

*** NOTE: FAA EAS and Canada will prohibit the transmission of composite flight plans procedurally. FAA EAS will determine the flight rules letter based upon the assigned or requested altitude. Therefore, flight plan messages from the FAA EAS to Canada will be based on the assigned or requested altitude.**

2.3 Aerodrome Designators (Fields 13 and 16)

Between NAV CANADA and the FAA, aerodrome designators in Fields 13 and 16 may be any four characters, provided the first is a letter. For FPLs filed by users, if ZZZZ is entered, NAV CANADA requires that the Lat/Long of the departure and/or destination aerodrome be entered in field 18 after the DEP/ or DEST/ designator. This information will be entered by the entity filing the flight plan. For FPLs transmitted by FAA

EAS, if "ZZZZ" is entered, FAA EAS will include a fix name, Fix Radial Distance (FRD), or Lat/Long after the DEP/ or DEST/ indicator in field 18.

2.4 Fix Radial Distance

A significant point expressed as a Fix Radial Distance (FRD) may include any two to five character fix name provided the first character is a letter.

2.5 CPL Field 14(a) Implementation

For flights from Canada to the United States:

Field 14(a) will contain the Lat/Long of the boundary crossing point. Note that since the FAA will adapt the Lat/Long of each boundary crossing point, any changes to boundaries or routes will require changes to the adaptation.

For flights from the United States to Canada:

a) If a flight is on an adapted route segment when it crosses the control boundary, Field 14(a) will reference the last point in the sending center's airspace.
b) If a flight is on a direct route segment when it crosses the control boundary, Field 14(a) will reference the last point in the sending center's airspace.
c) If there is no significant point between the departure aerodrome and the boundary, the departure aerodrome will appear in Field 14(a).

2.6 CPL Field 14(c) Implementation

For flights from Canada to the United States the cleared level may include, in addition to the ICAO formats:

a) OTP
b) Block altitude, in one of the following formats:
    1) AnnnBmmm, where nnn and mmm are altitudes in hundreds of feet
    2) FnnnBmmm, where nnn and mmm are flight levels in hundreds of feet

For flights from the United States to CAATS the cleared level may include, in addition to the ICAO formats:

a. OTP
b. Block altitude, in one of the following formats:
    i. AnnnBmmm, where nnn and mmm are altitudes in hundreds of feet
    ii. FnnnBmmm, where nnn and mmm are flight levels in hundreds of feet

2.7 CPL Field 14(d) and 14(e) Implementation

The crossing altitude and crossing condition may be included in a message to meet the ICAO format. This information shall not be used for control purposes in the initial implementation. Future use of these elements will be subject to mutual agreement by both parties.

2.8 CPL Field 15 (Route) Implementation

For flights from the United States, Field 15(c) will be constructed as follows:

a) If a flight is on an adapted route segment when it crosses the control boundary, Field 15(c) will begin with the same significant point as is in Field 14a.
b) If a flight is on a direct route segment when it crosses the control boundary, Field 15(c) will begin with the same significant point as is in Field 14a.
c) If there is no significant point between the departure aerodrome and the boundary, Field 15(c) will begin with "DCT".

d) After the initial point, Field 15(c) will contain the remainder of the route of flight.

For flights from Canada, Field 15(c) will be constructed as follows:

a) If a flight is on an adapted route segment when it crosses the control boundary, Field 15(c) will begin with the last significant point in the sending center's airspace.

b) If a flight is on a direct route segment when it crosses the control boundary, Field 15(c) will begin with the last significant point in the sending center's airspace.

c) If there is no significant point between the departure aerodrome and the boundary, Field 15(c) will begin with "DCT".

d) After the initial point, Field 15(c) will contain the remainder of the route of flight.

The FAA EAS will pass the requested altitude that was received in the flight plan. If an active flight plan with no requested altitude was entered, the assigned altitude at the time the CPL was constructed will be used as the requested altitude.

The FAA EAS can accept elements 15(c4) and 15(c6); however, when present, these elements are not processed and are removed from the route of flight. Therefore no CPL from the FAA will contain these elements.

2.9 Flight Rules (Field 08)

Regardless of the value in Field 08(a), all CPLs sent on this interface will be assumed to be IFR at the border. The FAA EAS processes only the IFR portion of the route in any flight plan, and does not forward flight plans to Flight Service Stations. Therefore any composite flight plan is expected to be filed by the user with both Flight Service and En Route Air Traffic Control.

3.0 Physical Interface

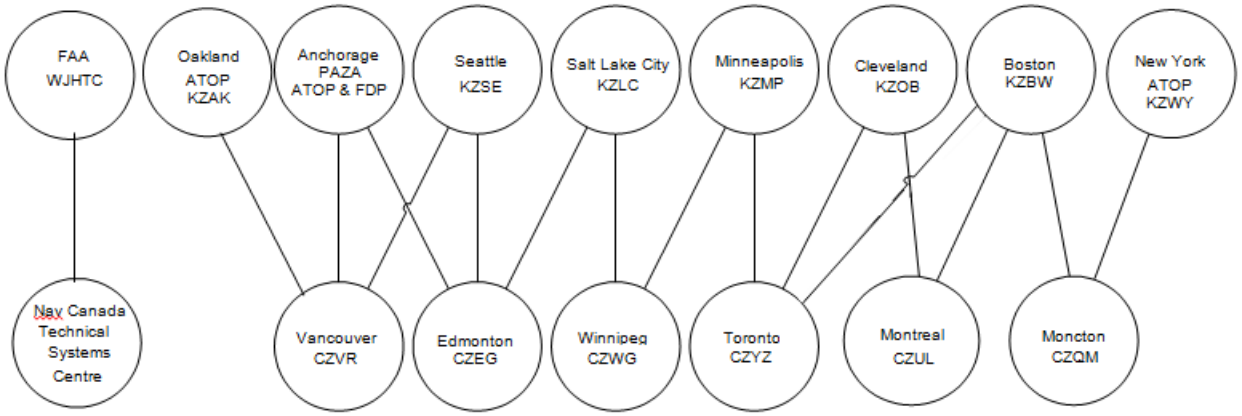


Figure 3-1. Canada/US Interface Diagram

4.0 Radar Handoff/Point Out

The FAA and Nav Canada (NC) have reached an agreement on moving forward with the Class III Automated Radar Handoff capability which has been defined in the NAM ICD since its early versions. Automated Class III Point Out will supplement automated Handoff capabilities. Agreement specifics cite the following:

a) Radar handoff messages defined in the NAM ICD

b) direct telecommunications interconnectivity

c) the interface management messages to include the ASM message

d) automated handoff will support ACC to ACC capability only

e) BASIC Point Out messages defined in the NAM ICD

The Cross Border radar point out capability is also associated with NAM ICD Class 3 Handoff. This capability will be an aid to provide flight data to an adjacent ATSU in a surveillance environment where an aircraft may not transit through the adjacent airspace. A radar point out may be used to provide the data to allow display to another controller of the full data block of a track. In an expanded environment where an aircraft will transit a portion of the adjacent ATSU then return to the original ATSU's airspace, a point out can be used to highlight traffic to another facility when the automation would not otherwise allow data to be passed then returned successfully.

An initial Point-Out solution has been agreed to, using a BASIC Point Out capability employing the new POI and PLA NAM ICD messages proposed in FAA – NC discussions. The original bilateral agreement for this solution will provide the functionality to resolve existing issues such as lack of flight plan data for aircraft that operate in close proximity to border airspace. This BASIC Point Out functionality uses the LRM as the error response message. Verbal coordination is used with this functionality. This capability is considered as a preliminary step toward evolving to an ENHANCED Point Out capability and would be developed in future NC and FAA efforts. The future ENHANCED capability is envisioned as building on the BASIC Point Out functionality to evolve toward voiceless coordination in line with voiceless Class 3 Handoff and CPDLC tenets of operation.

5.0 FAA ATOP – NAV Canada CAATS

The FAA and NAV Canada have successfully tested the integration of the NAM ICD into the ATOP Oceanic systems which border CAATS domestic ACCs. Implementation was accomplished in 2015 between Vancouver and Oakland.

Reserved

Attachment 3 CUBA/UNITED STATES BOUNDARY AGREEMENT

1. Introduction

This section documents the Class 1 interface between the IACC and FAA en route automation systems. The initial interface has limited message capability. Future evolutions are expected to include additional messages.

2. Message Implementation and Use

2.1 Messages Implemented

The initial interface between the IACC and FAA EASs will be based on a Class 1 implementation of the Flight Data Coordination and Interface Management.

Thus, the interface includes CPL, LAM and LRM messages. A CPL will be sent when a flight departs, or when it is within a VSP flying time from the boundary, whichever occurs later. Each CPL that is received and successfully checked for syntactic and semantic correctness is responded to with a LAM. LRM messages will be sent in response to failed CPLs and will contain the reason for rejection.

2.2 Error Handling

A LAM is sent in response to each CPL unless the receiving EAS detects an error. The EAS that sent the CPL waits a VSP period of time for a LAM, and if none is received within the time parameter, it notifies the appropriate position that a failure occurred. Automatic retransmission of the message will not be attempted.

2.3 Changes to a CPL

All changes to a previously sent CPL will be coordinated manually between the sending and receiving sectors.

2.4 Field 08, Flight Rules and Type of Flight

Regardless of the value in Field 08(a), all CPLs sent on this interface will be assumed to be IFR at the boundary between Miami Center's airspace and Havana Center's airspace. Each center is only to send flight plans for flights that are IFR at the boundary. The FAA EAS processes only the IFR portion of the route in any flight plan, and does not forward flight plans to Flight Service Stations. Therefore any composite flight plan is expected to be filed by the user with both Flight Service and En Route Air Traffic Control.

2.5 Field 09, Number and Type of Aircraft and Wake Turbulence Category

When a specific aircraft type is used, the wake turbulence indicator sent to the IACC system must match the value stored for the aircraft type in the IACC system database. When "ZZZZ" is used as the aircraft type, the wake turbulence category may be H, M, or L as appropriate.

2.6 Field 14, Estimate Data

Flights on direct routes are not to be sent across the interface. In the future, expansion of the interface to allow direct routes is expected. Enforcement of this requirement is expected to be procedural (i.e. the automation will forward a direct route if one is entered). The following statements regarding direct routes indicate the expected content of a message should a direct route be mistakenly sent.

a) For flights from Cuba to the United States: If a flight is on an adapted route segment when it crosses the control boundary, Field 14(a) will reference the last significant point in the sending center's airspace.
b) If a flight is on a direct route segment when it crosses the control boundary Field 14(a) will reference the last significant point in the sending center's airspace.

c) If there is no significant point between the departure aerodrome and the boundary, the departure aerodrome will appear in Field 14(a).

All flights are expected to cross the boundary in level flight, at the altitude in Field 14(c). Elements (d) and (e) will not be used, and manual coordination will be required for any flight not in level flight at the boundary. Note that the FAA EAS will accept information in elements (d) and (e), but will discard that information when it is included without performing any error checks of the information.

For flights from the United States to Cuba

a) If a flight is on a non-adapted direct route segment and the coordination fix is adapted per ERAM direct route crossing the control boundary, Field 14(a) will reference the first significant point in the sending center's airspace.

b) If a flight is on a non-adapted direct route segment and the coordination fix is not adapted per ERAM direct route crossing the control boundary Field 14(a) will reference the last significant point in the sending center's airspace

2.7 Field 15, Route

Element type (c6) will not be used on this interface.

Element 15(c) will be constructed as follows for flight plans from United States to Cuba

a) If a flight is on an adapted route segment when it crosses the control boundary then Field 15(c) will begin with the same significant point as is in Field 14(a).

b) If a flight is on a direct route segment when it crosses the control boundary:

1) Field 15(c) will begin with the last significant point in the sending center’s airspace, if one exists.

2) If there is no significant point between the departure aerodrome and the boundary then Field 15(c) will begin with “DCT”.

c) After the initial point, Field 15(c) will contain the remainder of the route of flight.

Element 15(c) will be constructed as follows for flight plans from Cuba to United States

a) If a flight is on an adapted route segment when it crosses the control boundary then Field 15(c) will begin with the last significant point in the sending center’s airspace which is the published fix into the adapted route segment and not the same as Field 14(a).

b) IACC does not pass direct route segments (at the time of its addition to the NAM/ICD).

Cuba IACC will pass the assigned altitude (Field 14(c)) and the requested altitude in element 15(b), which may or may not be the same. Host/ERAM does not act on the requested altitude sub-field.

3. Physical Interface

Figure 3-1 Messages will be exchanged across this interface between the following facilities:

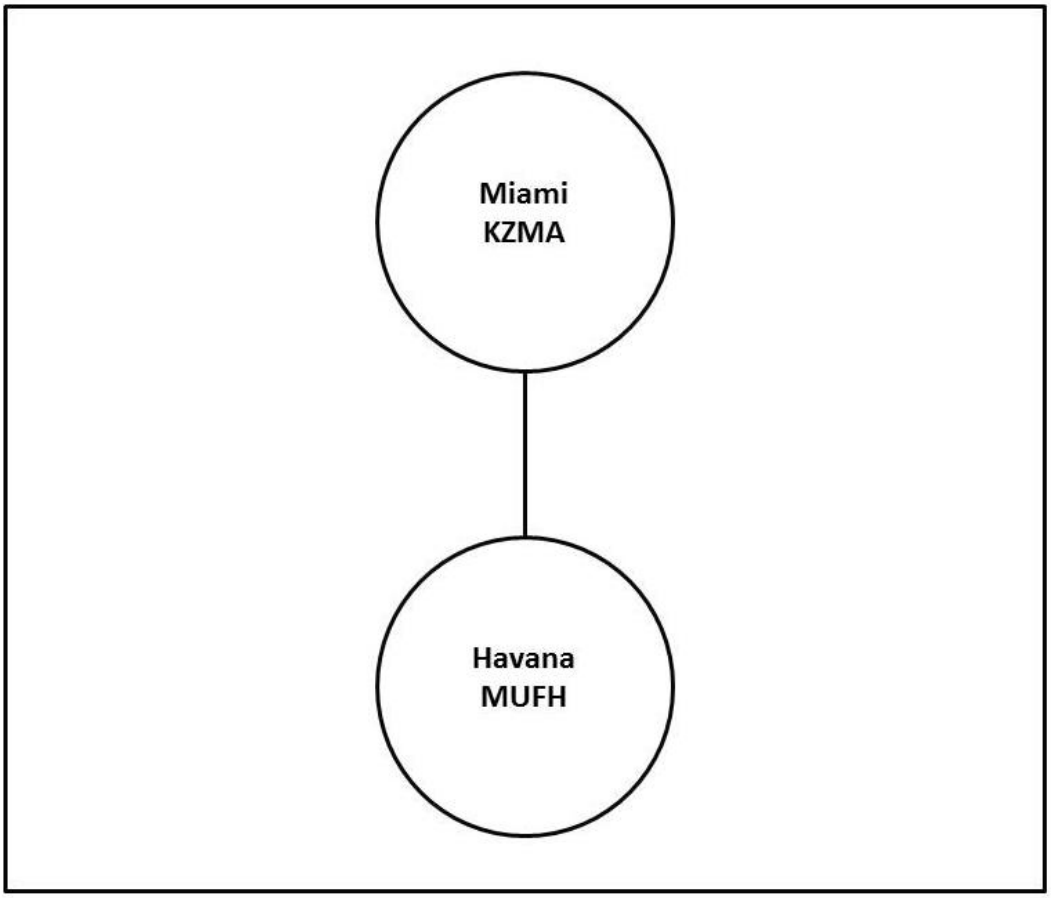


Figure 3-1. Cuba/US Interface Diagram

Attachment 4 CUBA/MEXICO BOUNDARY AGREEMENT

1. INTRODUCTION

This section documents the Class 1 interface implemented between the IACC (Havana) and SENEAM (Merida) en route automation systems. The initial interface has limited CPL – LAM message capability. Future evolutions are expected to include additional messages.

2. Message Implementation and Use

2.1 Messages Implemented

The initial interface between the SENEAM (Merida) and IACC (Havana) will be based on a Class 1 implementation of the Flight Data Coordination and Interface Management.

Thus, the interface will include CPL and LAM messages. A CPL will be sent when a flight departs, or when it is within a VSP flying time from the boundary, whichever occurs later. Each CPL that is received and successfully checked for syntactic and semantic correctness is responded to with an LAM.

2.2 Error Handling

A LAM is sent in response to each CPL unless the receiving EAS detects an error. The EAS that sent the CPL will wait a VSP period of time for an LAM, and if none is received within the time parameter, it will notify the appropriate position that a failure occurred. Automatic retransmission of the message will not be attempted.

2.3 Changes to a CPL

All changes to a previously sent CPL will be coordinated manually between the sending and receiving sectors.

2.4 Field 08, Flight Rules and Type of Flight

Regardless of the value in Field 08(a), all CPLs sent on this interface will be assumed to be IFR at the boundary between Cuba and SENEAM airspace. Each center is only to send flight plans for flights that are IFR at the boundary.

2.5 Field 09, Number and Type of Aircraft and Wake Turbulence Category

When a specific aircraft type (ICAO) is used, the wake turbulence indicator sent must match the ICAO 8643 Document. When "ZZZZ" is used as the aircraft type, the wake turbulence category may be H, M, or L as appropriate. and, the type of aircraft preceded by TYP/ specified in Item 18.

2.6 Field 14, Estimate Data

All Flights will be coordinated at established Boundary points (in accordance with the LOA); Flights on direct routes are not to be sent across the interface. In the future, expansion of the interface to allow direct routes is expected. Enforcement of this requirement is expected to be procedural (i.e. the automation will forward a direct route if one is entered).

2.7 Field 15, Route

The Route of flight sent in the CPL message will begin from the initial point; Field 15(c) will contain the remainder of the route of flight until the airport destination.

The Route of flight sent in the CPL message will begin with the last significant point in the sending center's airspace; Field 15(c) will contain the remainder of the route of flight until the airport destination

2.8 Field 18.

Field 18(a) will be constructed as follows for flight plans from Cuba to México

a) The total size will be limited to 250 characters
b) Format shall be per ICAO Doc. 4444.
c) All elements will be checked for syntax and correctness.
d) Multiple indicators will not be allowed. Only the first one will be admitted.

There are no special requirements in this field for flight plans from Mexico to Cuba (at the time of its addition to the NAM/ICD).

3. Physical Interface

Messages will be exchanged across this interface between the following facilities:

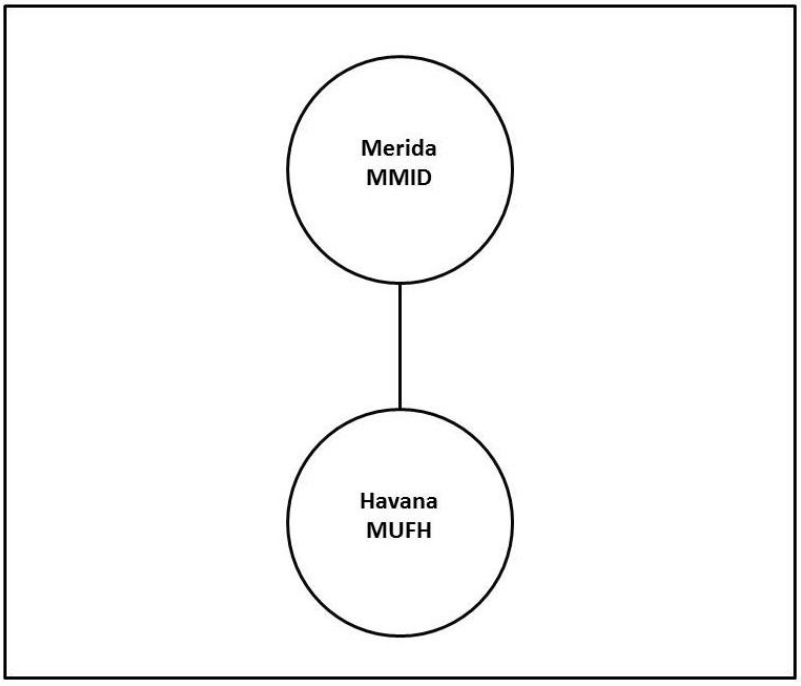


Figure 3- 1. Cuba/Mexico Interface Diagram

ATTACHMENT 5 CUBA/CENTRAL AMERICA ACC FIR BOUNDRY AGREEMENT

1 Introduction

This section documents the Class 1 interface between the IACC and COCESNA en route automation systems. The initial interface has limited message capability. Future evolutions are expected to include additional messages.

2 Message Implementation and Use

2.1 Messages Implemented

The initial interface between the IACC and COCESNA will be based on a Class 1 implementation of the Flight Data Coordination and Interface Management.

Thus, the interface includes CPL, LAM and LRM messages. A CPL will be sent when a flight departs, or when it is within a VSP flying time from the boundary, whichever occurs later. Each CPL that is received and successfully checked for syntactic and semantic correctness is responded to with a LAM. LRM messages will be sent in response to failed CPLs and will contain the reason for rejection.

2.2 Error Handling

A LAM is sent in response to each CPL unless the receiving EAS detects an error. The EAS that sent the CPL waits a VSP period of time (60 seconds) for a LAM, and if none is received within the time parameter, it notifies the appropriate position that a failure occurred. Automatic retransmission of the message will not be attempted.

2.3 Changes to a CPL

All changes to a previously sent CPL will be coordinated manually between the sending and receiving sectors.

2.4 Field 08, Flight Rules and Type of Flight

Regardless of the value in Field 08(a), all CPLs sent on this interface will be assumed to be IFR at the boundary between CENAMER Center's airspace and Havana Center's airspace. Each center is only to send flight plans for flights that are IFR at the boundary.

2.5 Field 09, Number and Type of Aircraft and Wake Turbulence Category

When a specific aircraft type is used, the wake turbulence indicator sent to the IACC system must match the value stored for the aircraft type in the IACC system database. When "ZZZZ" is used as the aircraft type, the wake turbulence category may be H, M, or L as appropriate.

2.6 Field 14, Estimate Data

Flights on direct routes are not to be sent across the interface. In the future, expansion of the interface to allow direct routes is expected. Enforcement of this requirement is expected to be procedural (i.e. the automation will forward a direct route if one is entered).

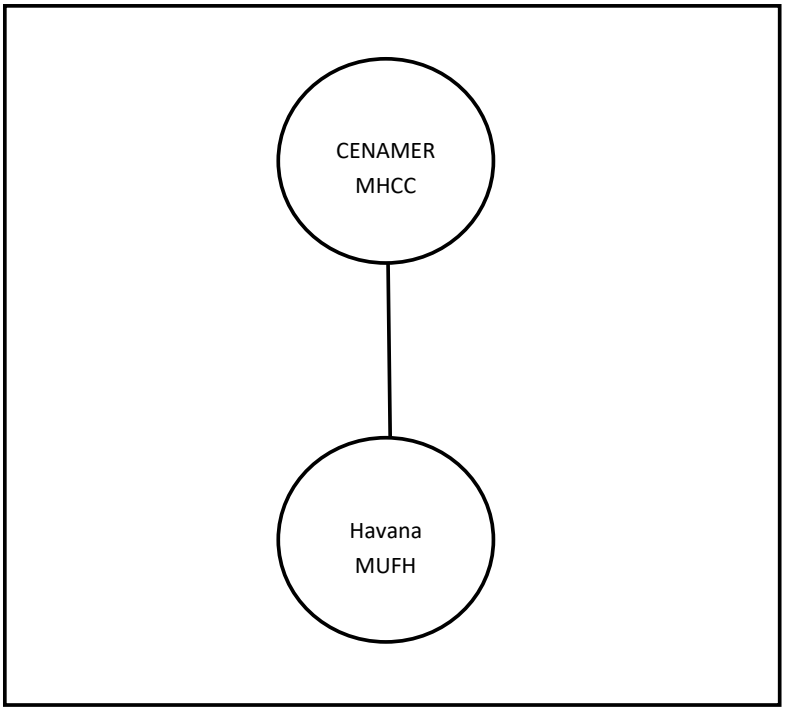
2.7 Field 15, Route

The Route of flight sent in the CPL message will begin from the initial point; Field 15(c) will contain the remainder of the route of flight until the airport destination.

The Route of flight sent in the CPL message will begin with the last significant point in the sending center's airspace; Field 15(c) will contain the remainder of the route of flight until the airport destination.

3 Physical Interface

Figure 3-1 Messages will be exchanged across this interface between the following facilities:



ATTACHMENT 6 MEXICO/CENTRAL AMERICAN ACC FIR BOUNDARY AGREEMENT

1 Introduction

This section documents the Class 1 interface under validation phase between the SENEAM (Merida ACC) and COCESNA en route automation systems. The initial interface has limited CPL / LAM message capability. Future evolutions are expected to include additional messages.

2 Message Implementation and Use

2.1 Messages Implemented

The initial interface between the SENEAM (Merida ACC) and COCESNA will be based on a Class 1 implementation of the Flight Data Coordination and Interface Management.

Thus, the interface includes CPL and LAM. A CPL will be sent when a flight departs, or when it is within a VSP flying time (1200 seconds from COCESNA to Mérida) from the boundary, whichever occurs later. Each CPL that is received and successfully checked for syntactic and semantic correctness is responded to with a LAM.

2.2 Error Handling

A LAM is sent in response to each CPL unless the receiving EAS detects an error. The EAS that sent the CPL waits a VSP period of time (120 seconds from COCESNA to Mérida) for a LAM, and if none is received within the time parameter, it notifies the appropriate position that a failure occurred. Automatic retransmission of the message will not be attempted.

2.3 Changes to a CPL

All changes to a previously sent CPL will be coordinated manually between the sending and receiving sectors.

2.4 Field 07, Aircraft Identification and SSR mode and Code

Shall never be more than 7 alphanumeric characters, without hyphens, blank spaces or special symbols. SSR code shall be as per ICAO Doc. 4444.

2.5 Field 08, Flight Rules and Type of Flight

Regardless of the value in Field 08(a), all CPLs sent on this interface will be assumed to be IFR at the boundary between CENAMER Center's airspace and Merida Center's airspace. Each center is only to send flight plans for flights that are IFR at the boundary.

2.6 Field 09, Number and Type of Aircraft and Wake Turbulence Category

When a specific aircraft type (ICAO) is used, the wake turbulence indicator sent must match the ICAO 8643 Document. When "ZZZZ" is used as the aircraft type, the wake turbulence category may be H, M, or L as appropriate. and, the type of aircraft preceded by TYP/ specified in filed 18.

2.7 Field 10, Equipment and Capabilities

Fields 10(a) and 10(b) shall be as per ICAO Doc. 4444. All elements will be checked for syntax and correctness.

2.8 Field 13 and 16, Departure/Arrival Aerodrome and Time.

Insert ICAO 4 letter location of departure aerodrome as specified in Doc 7910 (Location Identifiers); if no location indicator, insert "ZZZZ. then, insert location of aerodrome including a fix name, Fix Radial Distance (FRD), or Lat/Long; preceded by DEP/ or DEST/ indicator in field 18. Time format shall be as per ICAO Doc. 4444.

2.9 Field 14, Estimate Data

All Flights will be coordinated at established Boundary points (in accordance with the LOA); Flights on direct routes are not to be sent across the interface. In the future, expansion of the interface to allow direct routes is expected. Enforcement of this requirement is expected to be procedural (i.e. the automation will forward a direct route if one is entered).

2.10 Field 15, Route

The Route of flight sent in the CPL message will begin from the initial point; Field 15(c) will contain the remainder of the route of flight until the airport destination.

The Route of flight sent in the CPL message will begin with the last significant point in the sending center's airspace; Field 15(c) will contain the remainder of the route of flight until the airport destination.

2.11 Field 18.

Field 18(a) will be constructed as follows for flight plans from CENAMER to Merida

a) The total size will be limited to 250 characters
b) Format shall be per ICAO Doc. 4444.
c) All elements will be checked for syntax and correctness.
d) Multiple indicators will not be allowed. Only the first one will be admitted.

There are no special requirements in this field for flight plans from Merida to CENAMER (at the time of its addition to the NAM/ICD).

3 Physical Interface

Messages will be exchanged across this interface between the following facilities:

Figure 3-1. MERIDA/CENTRAL AMERICA ACC Interface Diagram