

# North American (NAM) Common Coordination Interface Control Document (ICD) Version 'E' Update

**Presented To: ICAO ANI/WG3**

**By: Dan Eaves, AJV-724**

**Date: April 2016**



**Federal Aviation  
Administration**



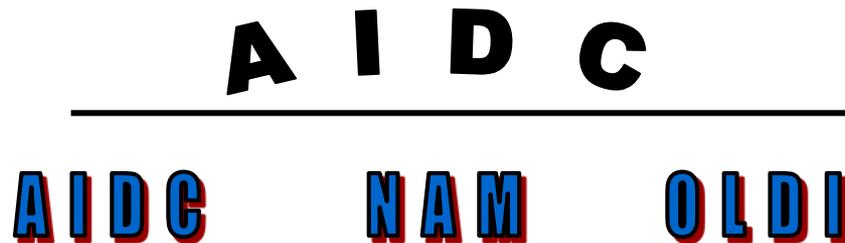
# ATS Interfacility Data Communication (AIDC)

- The ATS Interfacility Data Communication (AIDC) NAM ICD Version 'E' document change addresses messages exchanged between Air Navigation Service Providers (ANSP) or Area Control Centers (ACCs) for IFR aircraft. Within the NAM ICD, ATC operations units 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, Pan Regional Interface Control Document (PAN ICD) for ATS Interfacility Data Communications and (AIDC) ICAO Doc 9694-AN/955 Manual of Air Traffic Services Data Link Applications.
- The described functionality is adept at supporting radar and mixed domestic transition environments more than the traditional AIDC message set which is more attuned to oceanic operations where more controller interaction is required. In most NAM interoperability environments, radar is the operational norm and non-radar the exception where in traditional AIDC non-radar is more the norm and radar is the exception.



## ATS Interfacility Data Communication (AIDC)

- AIDC is the overarching technology for automated data exchange between Air Navigation Service Providers (ANSP) in the world. Under the AIDC Functionality mantle there exists three distinct protocols for Flight Information Region (FIR) interfacility data exchange.
- **AIDC, NAM ICD and European Online Data Interface (OLDI) applications under AIDC Functionality**



- In the North American, Central American and Caribbean (NACC) Region NAM and AIDC protocols are used in AIDC Technology and automated data exchange interfaces.
- Both NAM and traditional AIDC protocols support the defined notification, coordination and the transfer of communications and control functions to different degrees between ATSU's. Full AIDC capability also supports extended equipment capabilities in time and distance based operations where different separation minima are being used in adjacent airspace. The NAM ICD has included automated radar handoff messaging within the document as a future goal of cross border capability.



# ATS Interfacility Data Communication (AIDC)

- In the North American, Central American and Caribbean (NACC) Region **AIDC** and **NAM protocols** are used in AIDC Technology interfaces.



- The **NAM ICD** is the subject of this update.



# North American Common Interface Control Document (NAM ICD)

- NAM ICD Cross Border Automation has been implemented between 5 member states and 23 NACC FIRs in US, Mexico, Canada, Cuba and Honduras (COCESNA) providing the opportunity for seamless interfaces between adjacent ATC systems. Operational NAM ICD Interfaces Include:
  - **Canada – US 14**
    - North America Domestic 11
    - Alaska 2
    - Oakland Oceanic (ATOP) - Vancouver ACC
  - **Mexico - 7**
    - US -Mexico 5
    - Cuba
    - COCESNA
  - **Cuba – 3**
    - US -Miami
    - Mexico (Merida)
    - COCESNA
  - **COCESNA - 2**
    - Mexico (Merida)
    - Cuba (Havana)



# North American Common Interface Control Document (NAM ICD) History

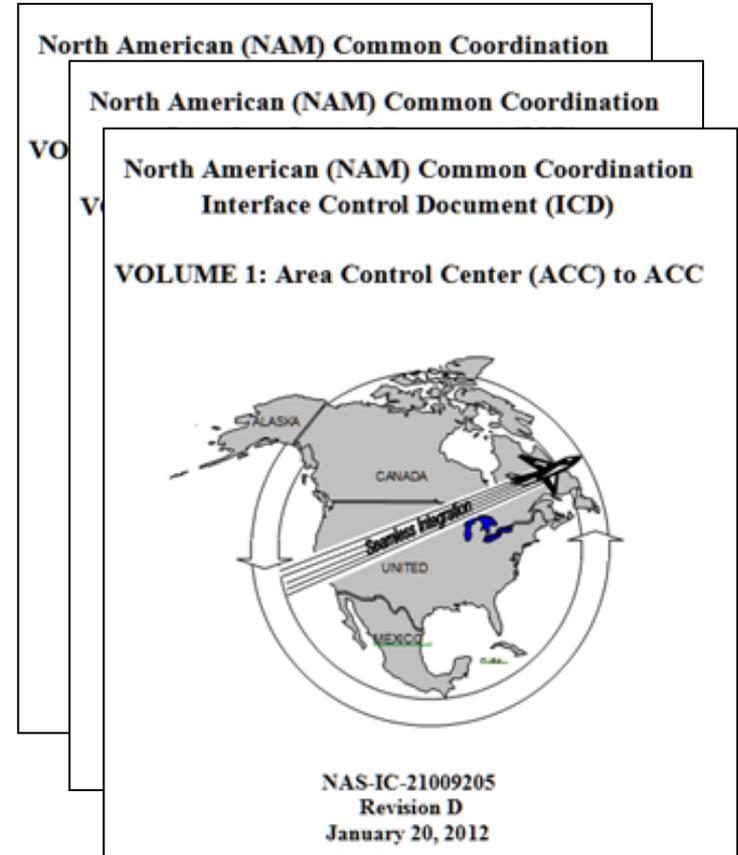
- Within the North American Aviation Trilateral (NAAT/5) Canada, Mexico, and US agreed to cooperate on development of a seamless interface between automation systems, focusing on automated exchange of ICAO flight data. Radar/surveillance operations is the key environment targeted by the NAM ICD protocol
  - NAM ICD was based on ICAO 4444, North Atlantic Common Coordination ICD and Pacific Common Coordination ICD
  - ICD outlines current and long-term guidelines for harmonized development of automation systems
  - ICD is designed as a living document that will be updated to reflect the needs of the member states
- Automation interfaces in Mexico, Canada and Cuba offered opportunity for utilizing enhanced interfaces to FAA's En Route Automation Systems



# NAM ICD Evolved from 4444, AIDC ICDs

ICAO 4444 →

PAN ICD (NAT & PAC)  
AIDC ICDs →



# NAM ICD Version 'E'

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

### VOLUME 1: Area Control Center (ACC) to ACC



NAS-IC-21009205

Revision **E**

28 February 2015



Federal Aviation  
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## NAM ICD Update – Version E

- **The NAM ICD Version ‘E’ (NAM ICD-E) update does not change the automated data exchange conventions for any existing operational interface. Existing NAM ICD member states do not have to implement any changes in support of NAM ICD-E.**



# NAM ICD Continues to Evolve with Version 'E'

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

### 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
28 February 2015	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.

DRAFT



# NAM ICD Version E Has Been Drafted & Is Under Review

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

VOLUME 1: Area Control Center (ACC) to ACC

ICAO 4444



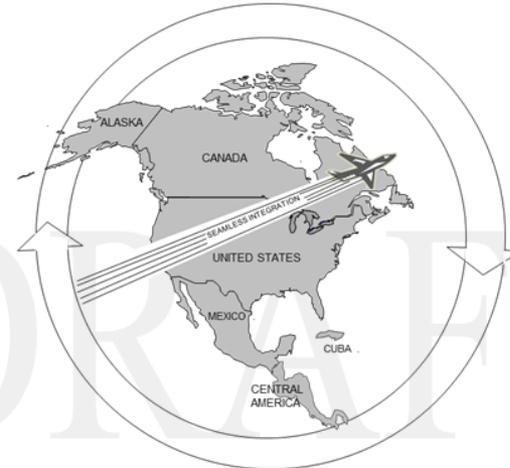
ICAO 9694



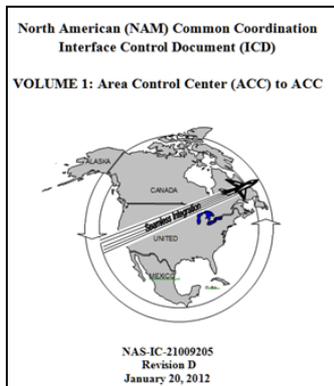
PAN



AIDC ICD



NAS-IC-21009205  
Revision E  
28 February 2015

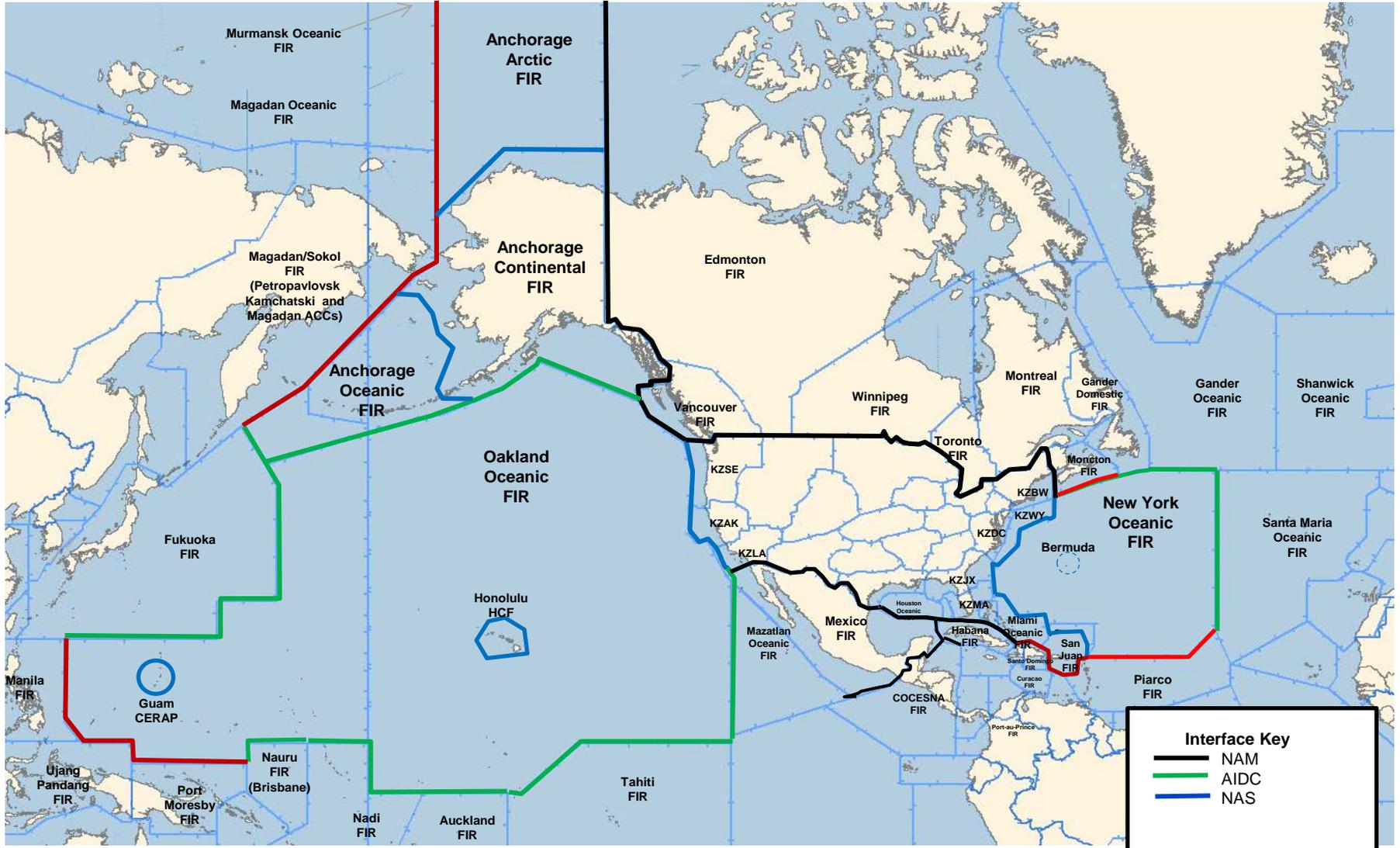


# NAM ICD and Automation Task Force

- Within North American Aviation Trilateral (NAAT/5) Canada, Mexico & U.S. agreed to cooperate on development of seamless interface between countries and automation systems
  - Focus on automated exchange of ICAO flight data with goal being ‘voiceless’ handoff
- NAM ICD defines message formats for implementation of interfaces between automation systems:
  - U.S. & Mexico 2008
  - U.S. & Canada 2009
  - Cuba added in Dec 2011
  - COCESNA added two interfaces 2015
- Same standard used as guide for Caribbean flight data automation compatibility
- International neighbors installing new systems and look to maximize benefits of their automation investment



# Automated International Boundaries



# ICAO 4444 Coordination Environments

## NAM ICD and AIDC

- ATC procedures vary significantly, depending on the surveillance capabilities of the coordinating ATS units in a given boundary environment. For the purpose of ICAO 4444 Appendix 6, the coordination environments are identified as **either surveillance or procedural**.
- In some instances the same type of message may require the inclusion of different or additional data to accommodate the demands of differing environments. Depending on the environment, the timing of the transmission of these messages may also vary. The environment may also affect whether the AIDC message is automatically processed, or displayed to the controller for manual processing.

A **surveillance environment** is an environment where an ATS surveillance system is in use, and allows controllers to positively identify the traffic. Radar and/or ADS-B are available to the controllers at sector positions on both sides of a common boundary, and traffic is identified by information presented on a situation display. Such facilities permit surveillance coordination procedures to be used.

- A **procedural environment** exists in those areas where surveillance coordination procedures are not available because at least one of the coordinating ATS units does not have a surveillance capability, or the surveillance capabilities differ. For example, surveillance in oceanic and remote areas is often achieved with ADS-C, CPDLC or voice position reports; in such areas, coordination procedures differ from those used in a surveillance environment.



## North American (NAM) Common Coordination Interface Control Document (ICD) Revision E

- The NAM ICD Version 'E' 28 February 2016 document change addresses messages exchanged between Air Navigation Service Providers (ANSP) or Area Control Centers (ACCs) for IFR aircraft. Within the NAM ICD, ATC operations units 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, Pan Regional Interface Control Document (PAN ICD) for ATS Interfacility Data Communications and (AIDC) ICAO Doc 9694-AN/955 Manual of Air Traffic Services Data Link Applications.



## NAM ICD Version 'E' Overview

- While the **surveillance environment is the standard for NAM ICD operations**, it is also recognized that **procedural environments exist** between some Air Traffic Service Units (ATSU).
- Providing ATC units the ability for voiceless **radar handoff and radar point out** as well as message support for **procedural transfer of control** progresses the application's ability to apply standardized automation in both radar/surveillance and procedural environments.
  - This approach is consistent with the goal to reduce the need for verbal coordination per ICAO Doc 4444, Chapter 10, in Section 10.1.



# NAM ICD Version 'E'

## Overview (continued)

- Radar Handoff messaging and Interface Management Support
  - US – Canada to Initiate Radar Handoff/Point Out messaging development to support existing domestic interfaces
  - US – Canada Boundary Agreement will reflect Handoff implementation specifics
  - Implementing Interface Management Messages, ASM message added
  - Identification/support of Direct Communication requirement for Handoff/Point Out
- Radar Point Out messages added as Class 3 capability
  - Point Out – Basic Added/Identified for Implementation
  - Point Out – Enhanced Added for Future Implementation
- New York , Oakland and Anchorage ATOP facilities being added as emerging US NAM ICD facilities interfacing with Canada CAATS
- COCESNA added as member state
- Supplemental Messages ABI, TOC/AOC messages defined
- Appendix 'A' Error Codes Expanded
- Corrections identified and corrected
- COCESNA Boundary agreements with Havana and Merida ACCs added



## NAM ICD Version 'E' Handoff and Point Out Overview (Continued)

- In continuing support for the **radar/surveillance efficiency and migration toward non-verbal ANSP to ANSP automation** within current and future interfaces, NAM ICD-E update will support system development of radar handoff messages. **Radar Handoff** messaging has been defined in the NAM ICD since its inception as well as the direct communication interface requirement to support the capability
- Additionally, NAM ICD-E will incorporate radar **Point Out messages into Class 3**. By enhancing Class 3 to include point out messages the operational boundaries between ATSU's are better served by incorporating more options for surveillance supported coordination capabilities within the context of the NAM ICD.
- In keeping with the NAM ICD philosophy to provide incremental 'stepping stone' functionality options, the NAM ICD-E lays the foundation for both **Basic and Enhanced Point Out**. The US and Canada have agreed to implement **Point Out - Basic** messaging capability to provide the automated flight data to accompany verbal cross border point outs. Point Out automation procedures must be defined in bilateral ATS agreements which describe data information and/or any supplemental automation text to be used with verbal point outs.



# NAM ICD Version Comparison

## Version E

## Version D

### 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	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	NAT ICD/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	Initiates a Point Out	FF	PAN ICD	
	POA	Point Out Accept	Computer acceptance of a POI	FF		
	POJ	Point Out Reject	Computer rejection of a POI	FF		
Transfer	TOC	Transfer of Control	Initiates procedural transfer of control	FF	PAN ICD	
	AOC	Acceptance of Control	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	NAT ICD/PAN ICD	

### 3. NAM Core Message Set

The NAM core message set is summarized in Table 2 below.

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	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.
General Information	MIS	Miscellaneous	Free-format text message with addressing options.	FF	NAT ICD	
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	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		
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	NAT ICD	



# NAM ICD Version 'E' Boundary Agreement Additions

NAS-IC-21009205  
Rev E - 28 February 2015

## ATTACHMENT 5 - CUBA/CENTRAL AMERICAN ACC FIR BOUNDARY AGREEMENT

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NAS-IC-21009205  
Rev E - 28 February 2015

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## ATTACHMENT 6 - MEXICO/CENTRAL AMERICAN ACC FIR BOUNDARY AGREEMENT

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### 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

2.2

#### 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.

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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.

2.3

#### 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.

All

#### 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



# Support for Automated Handoffs

- Class III Handoff
  - Proposing development with Canada for CAATS – ERAM handoffs and technical processing specifics
  - Includes NAS-like cross-border handoffs
- Class III handoff utilizes messaging capabilities of Class I & II developed in Host and ported to ERAM
- Handoff messages will mirror NAS messages and include:
  - Radar Transfer Initiate (RTI)
  - Radar Logical Acknowledgement (RLA)
  - Radar Track Update (RTU)
  - Radar Transfer Accept (RTA)
- Handoff capabilities require integrating technical & operational aspects of automated aircraft transfer with support of RDP processing



## NAM ICD Version 'E' Enhancements

- **Notification, Coordination and Transfer of control**
- The capability to revert to verbal coordination and manual (or implicit) transfer of control shall be retained.
- Notification – FPL, ABI
- Coordination – CPL LAM , enhanced: MOD, EST , FPL, LRM  
POI,POA,POJ
- Transfer of Control – Manual Handoff/Automated Handoff
  - Automated Handoff
    - Radar Transfer Initiate (RTI)
    - Radar Logical Acknowledgement (RLA)
    - Radar Track Update (RTU)
    - Radar Transfer Accept (RTA)
  - Automated Transfer
  - Transfer of Control (TOC)
  - Acceptance of Control (AOC)



# NAM ICD Version 'E' Changes

- **Changes, activations and corrections which will make up the NAM ICD-E activities include:**
- Radar Handoff messaging and Interface Management Support
  - Radar Handoff/Point Out messaging development to support existing domestic interfaces
  - Boundary Agreement would reflect Handoff implementation specifics
  - Implementing Interface Management Messages, ASM message added
  - Identification/support of Direct Communication requirement for Handoff/Point Out
- Radar Point Out messages added as Class 3 capability
  - Point Out – Basic Added/Identified for Implementation
  - Point Out – Enhanced , Added for Future Implementation
- Supplemental Messages ABI, TOC/AOC messages defined
- Appendix 'A' Error Codes Expanded
- Corrections identified and corrected



# NAM ICD Version 'E'

## Detailed

- While the surveillance environment is the standard for NAM ICD operations, it is also recognized that procedural environments exist between some Air Traffic Service Units (ATSU).
- In continuing support for the radar/surveillance efficiency and migration toward non-verbal ATSU to ATSU automation within current and future interfaces, NAM ICD-E update will support system development of radar handoff messages. Radar Handoff messaging has been defined in the NAM ICD since its inception as well as the direct communication interface requirement to support the capability.
- Automated radar Handoff can be supported by implementing existing Interface Management Messages with the addition of a 'system heartbeat message', also used in AIDC.
- Additional codes to better identify errors in cross border automated data exchange have been proposed for the Appendix 'A' Error Message Table amendment when LRMs are used.



# NAM ICD Version 'E'

## Detailed – Supplemental Messages

- Several NAM ICD messages previously categorized as 'future' will be upgraded to 'current' for optional development. The ABI, TOC and AOC messages borrowed from AIDC message set will be **categorized as 'supplemental'** and may be used to support procedural or hybrid interfaces.
- The NAM ICD-E supplemental messages are anticipated to be used in traditional procedural-based operational environments. These messages are not considered Class I, II or III messages but are supplemental NAM messages only developed by cross border FIRs when specifically agreed to address specific interface goals. These are not normal operations type messages.
- The ABI message is a notification phase message 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 TOC and AOC are procedural environment messages sent to propose the transfer of control of a flight to the receiving ATSU who accepts the non-verbal transfer with the AOC. 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 i transfers. Bilateral agreements will outline TOC/AOC operational use.



# Extending the US Automation Standard

- Compatibility management between existing/emerging international automation systems essential to optimize capabilities & meet user needs
- U.S. centralized geographic position requires taking the lead to assure compatibility is maintained between member states
- FAA also participates in Caribbean & South American (CARSAM) ATC automation ICD development
- Near term countries with interface/ enhance interface initiatives pending
  - US - Dominican Republic
  - US - Bahamas
  - US – Cuba
  - COCESNA – Mexico (Merida)
  - COCESNA - Cuba (Havana)



# Cross Border Communication

- Upgrade current AFTN to Internet Protocol (IP) and AMHS service
  - Direct IP service through NADIN MSN Replacement required
  - AMHS/FTI/NADIN is scheduled to extend the IP support for the other ERAM – CAATS interfaces to NAV CANADA and SENEAM interfaces within the near term; waterfall currently being worked
  - MEVA III is being looked at to support enhanced capabilities between the US and NACC partners for future interface support



# CONCLUSION

- Substantial progress has been made in interfacing between the NACC neighbor countries but more can be done to increase automation compatibility and efficiency . NAM ICD Version 'E' updates the region's automation interface capabilities and adds future messaging possibilities for mixed environment support
- Candidates for next steps include but are not limited to the following:
  - New Interfaces between adjacent ANSPs
  - Improving Interfaces between adjacent ANSPs
  - More advanced message sets
  - More support for direct routes across boundaries
  - Involvement of ATC system vendors to increase compatibility
  - Integration of compatible NACC automation
  - Handoff/Point Out
- This automation activity has a direct benefit on our collective ability to provide more efficient and seamless service to our users.

