International Civil Aviation Organization
North American, Central American and Caribbean Office (NACC)
Seventh Central American Air Navigation Experts Working Group Meeting (CA/ANE/WG/7)
Ninth Central Caribbean Working Group Meeting (C/CAR/WG/9)
ICAO NACC Regional Office, Mexico City, Mexico, 5 to 9 March 2012

Agenda Item 3 Air Navigation Matters
3.3 Specific Developments in Air Navigation
- **CNS**

ATS INTERFACILITY DATA COMMUNICATION IMPLEMENTATION IN THE CARIBBEAN, NORTH, CENTRAL, AND SOUTH AMERICAN REGIONS

(Presented by United States)

SUMMARY

This paper presents information regarding the use of ATS Inter-facility Data Communications as means for the exchange of notification, coordination, transfer and related data between automated ATS systems.

Strategic Objectives	*This information paper is related to Strategic Objectives A and C.*

1. Introduction

1.1 A communications and data interchange infrastructure significantly reduces the need for verbal coordination between Air Traffic Service Units (ATSUs). ATS Interfacility Data Communications (AIDC), or similar automation, can provide the means by which automated data exchange can be harmonized between ATSUs providing air traffic service in, and adjacent to, the Caribbean region. The impetus of the automation requirement stems from the increasing traffic levels transiting between member State Flight Information Regions (FIRs).

1.2 The Caribbean/South American Regional Planning and Implementation Group (GREPECAS) and the North American and Caribbean Regional Performance-Based Air Navigation Implementation Plan have encouraged States and Air Navigation Service Providers to implement data communication between ATS providers as a means to improve safety and efficiency.

1.3 The increasing traffic demand between FIRs prompts the need to improve efficiency and accuracy for the ATC providers. Developing a harmonized process and defining protocols for exchanging data between multiple States/Territories/International Organizations within and across regions is critical to achieving this objective. As ATS providers develop their automation systems, consideration should be given to meeting the capabilities identified within an interface specification such as an Interface Control Document (ICD). The Interface Control Document for Data Communications between ATS Units in the Caribbean and South American Regions (CAR/SAM ICD) was developed by ICAO. ICAO's ICD was modelled from the one the U.S. previously developed for operational interfaces with Canada and Mexico, entitled the North American Common Coordination Interface Control Document (NAM ICD).

2. Discussion

2.1 The flight plan data system interface provides interoperability among automated systems allowing data exchange between ATSUs that are harmonized to a common standard. The United States, Canada and Mexico created the NAM ICD based on a 1998 Tri-lateral agreement using ICAO 4444 and AIDC messaging as the basis. The described functionality is more adept at supporting radar and mixed domestic transition environments 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. The NAM messaging may be likened to other domestic environments such as in European Online Data Interface (OLDI) which employs less controller interaction than the traditional AIDC. Both NAM and traditional AIDC protocols support the defined notification, coordination and the transfer of communications and control functions to different degrees between ATSUs. 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 definitions within the document as a future goal of cross border capability.

2.2 The U.S. and NAM ICD members have realized automation gains that provide significant safety and efficiency benefits. A recent example is the Miami automation interface with the Havana Area Control Center (ACC) where it has been estimated that a fifty per cent (50%) reduction in workload has been achieved for controllers working the border sectors at the Miami Center. Benefits are summarized as follows:

a) Reduced workload for controllers;
b) Reduction of readback/hearback errors during coordination;
c) Reduced “controller to controller” coordination errors; and language barrier issues
d) Increased in support for performance based navigation initiatives and emerging technologies with automation

2.3 The North American automated flight data message set found in the NAM ICD is used operationally between the United States and Canada, the United States and Mexico, the United States and Cuba, and is due in the near term between Cuba and Mexico. One of the strengths of the NAM message set is the scalability of the functionality.

2.3.1 The NAM ICD allows an automated interface to be constructed with a minimum of two messages, known as Class 1. Class 1 consists of the current flight plan message (CPL) and the acknowledgement message (LAM). More capabilities are available in Class II. By building on the Class 1 foundation, Class II adds pre-departure and post-departure amendment capability, near border departures and specific error information on message failures.

2.3.2 Currently Class 2 interfaces exist between the Canadian ACCs of Vancouver, Edmonton, Winnipeg, Toronto and Moncton employing cross border interfaces with the United States Air Route Traffic Control Centers (ARTCC) in Seattle, Salt Lake, Minneapolis, Cleveland, Boston and Anchorage. Class 1 is used between Houston, Albuquerque and Los Angeles ARTCCs and Mexico’s Merida, Monterrey and Mazatlan ACCs. Class 1 is also being used for the interface between Miami ARTCC and Havana ACC. Both NAM and traditional AIDC messaging are being updated to reflect ICAO 2012 changes per Amendment 1.

2.4 These interfaces vastly improve the capabilities of the facilities and extend of the automation capabilities within North America and more recently in the Caribbean and Gulf of Mexico regions. There is, however, considerable effort and planning involved during development, testing, and implementation of the automation interface. These tasks included airspace and system parameter adaptation, ATC procedure coordination, Letter of Agreement tailoring, communications interoperability and protocol testing and troubleshooting, and controller training. Both non-operational and operational testing was extensively conducted. The telecommunication infrastructure for automated data exchange interfaces consists of NADIN, MEVA II, and other interconnections which support the automated data exchange as well as AFTN messaging.

2.5 While the implementation of the automated data exchange provides significant benefits to the controller, there is one area of concern that needs to be considered. This issue centers around the quality of the flight plans being filed. Flight plans received before the interface was automated were processed manually. Now the flight plans are received by automation systems which are less forgiving with errors in format and data integrity. Many errors in filed flight plans which may have been absorbed for years within a manual system are now problematic to the automation when filed information is not in accordance with defined ICAO guidelines. Additionally, multiple flight plans received for the same flight are being received and must be manually filtered to ensure the correct data is being forwarded by the computer system for upstream facilities. Conflicting information between those filed at the departure airports and those filed by the airlines are often seen. Miami ARTCC has been dealing with these types of flight plan issues for years but they these are new to the Havana ACC automation which has to deal with conflicting data and parsing out flight plan errors. The solution must include quality control initiatives for filers and filing services to improve the transmitted data to conform to ICAO 4444 standards. The solution must be a collaborative effort aimed at reducing the number of flight plans in error and reducing instances of multiple flight plans for the same flight. This transition issue is an indicator of a quality control problem that already existed within the manual system but now is apparent because automation demands greater adherence to standards and is less tolerant in processing incorrect data and data with errors. The impact of the issue is significant and can have safety implications. A collaborative effort will require engaging the help of ICAO, the filers and automated system users in seeking solutions. The solution will not be easy but the result will be a better product for the automated systems which support the global flying environment.

3. Conclusion

3.1 Please note the information presented in this paper when considering plans to develop, test, and implement an automation interface with an adjacent FIR.

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