International Civil Aviation Organization
North American, Central American and Caribbean Office
Twenty First Meeting of Directors of Civil Aviation of the Eastern Caribbean (21st E/CAR DCA)
Tortola, British Virgin Islands 11 to 14 February 2008

Agenda Item 3: Air Navigation Issues

3.4 E/CAR CNS Committee Report

SPECIFIC AIR NAVIGATION ACTIVITIES AND DEVELOPMENTS – COMMUNICATION, NAVIAGATION AND SURVEILLANCE

(Presented by Rapporteur of the CNS Committee E/CAR WG)

SUMMARY

This Working Paper advises the 21st E/CAR/DCA Meeting of activities in the Eastern Caribbean toward improving CNS in the Region

References

- Report of the First Caribbean Working Group (CAR/WG/1), 21-23 June 2007, Trinidad & Tobago
- Report Surveillance Task Force (SUR/TF/1), 20-21 June 2007, Trinidad & Tobago
- Report of the CNS/ATN/TF/3, 20-22 March 2007, Miami, United States
- Report Fourth MEVA/REDDIG II Coordination Meeting (MR/4), 7-9 March 2007, Lima, Peru
- Report of the 20th DCA Meeting, 4-7 December 2006, Miami, United States
- Report of the Fifth Meeting of the ATM/CNS Subgroup (ATM/CNS/SG/5), 13-17 November 2006, Lima, Peru
- Summary of Discussions and Conclusion 30th Eastern Caribbean Working Group Meeting, 7-11 August 2006, Saint Lucia.
- ALLPIRG/5 Conclusion 5/16

1. Introduction

1.1 The CNS Committee of the E/CAR WG last met in Castries, Saint Lucia, 7-11 August 2006 but at the First Caribbean Working Group (CAR/WG/1), 21-23 June 2007 held in Trinidad & Tobago, an ad-hoc group was created with participants from Antigua, Barbados, Cuba, Haiti, IFATCA, Trinidad & Tobago and the United States. This paper presents updated status information on items from both meetings and the relevant CNS task forces.

2. **Agenda Item 3.1: Follow-up on the status of the E/CAR AFS and MEVA II digital networks and their related inter and intra-regional interconnection/integration.**

2.1 **Aeronautical Fixed Services (AFS) - AFTN**

2.1.1 At the 20th E/CAR DCA Meeting, December 4-7 2006 held in Miami, United States the CNS Committee reported on a proposed solution to the E/CAR AFTN problems of unreliable aging hardware and obsolete software as presented by Trinidad and Tobago in IP/06 at the 30th E/CAR WG. In keeping with this plan Trinidad and Tobago embarked on a total AFTN E/CAR end user solution. In the first phase of the project the AFTN hardware, inclusive of printers and uninterruptible power supplies, and AIS software on the islands of Anguilla, Antigua, Barbados, Dominica, Grenada, Montserrat, Nevis, Saint Lucia (2 sites), St. Kitts and Saint Vincent were successfully replaced over the period 28/01/07 – 26/02/07. Technical first level maintenance was conducted by TTCAA with the Cable & Wireless personnel and the local Information Technology/CAA technical staff. AIS operators' training was also conducted on site by a trained AIS officer from the TTCAA.

2.1.2 The second phase comprised the addition of a Flight Plan Management (FPL) Module to the Trinidad and Tobago AFTN/AMHS switch. This FPL module was added to improve the efficiency of transmission and reception of flight plans and Pre-flight Information Bulletins (PIB) in the region. The second phase was accomplished over the period 31/01/07 - 22/02/07.

2.1.3 The third phase was the introduction of the ICAO format templates to the AIS software. This was a software build at the specific request of Trinidad & Tobago in response to the needs of the E/CAR AIS. The templates allow user-friendly insertion of flight plan information in the format that is familiar to ATS users. The enhanced AIS software was successfully installed on the ten (10) E/CAR islands on 13/08/07 – 05/09/07. Operator training on the use of the enhanced software was also conducted on site.

2.1.4 The TTCAA continues to provide proactive maintenance support for the AFTN by telephone follow-up with on site technical support and/or on-site maintenance as necessary.

2.2 **AFS – Solutions for the network infrastructure**

2.2.1 Trinidad and Tobago participated in the Third CNS Committee ATN Task Force (CNS/ATN/TF/3) Meeting in Miami, United States, 20-22 March 2007. The ATN/TF reviewed a working paper presented by the ATN Task Force Group Coordinator proposing the modification of the existing Initial Transition Plan for the Evolutionary Development of the ATN in the CAR/SAM Regions and incorporating the CAR/SAM ATN Ground/Ground and AMHS Transition Plans. The AMHS Transition Plan will address issues of network incompatibility, timely coordination and management of the AMHS addressing scheme, upgrading of backbone circuits and the network along with security management.

2.2.2 The ATN/TF/1 reported that the use of AMHS over TCP/IP for this region was adopted by the CAR/SAM Regional ATN Task Force and recommended the initial use of IPv4 since AMHS applications do not yet support IPv6 internally in their communication stacks although IPv6 is available. IPv4 is recommended during the initial period within the CAR/SAM region and IPv6 should be used for Inter-Region AMHS connection. During the transition phase dual stack (IPv4 and IPv6) applications will be introduced. Eventually a full transition to IPv6 will be implemented.

2.2.3 At the 30/ECAR/WG the CNS Committee agreed that the existing E/CAR AFS network did not fulfill the requirements to transport AMHS/ATN protocol IP v6. IP/07 presented by Trinidad and Tobago at that Meeting proposed possible solutions to the resolve the network infrastructure problems. After regional discussion it was agreed that the best solution would be the replacement of the existing terrestrial based E/CAR network with a VSAT network. In this regard Trinidad & Tobago utilized the information from the contracted survey design report and drafted a Request for Proposal (RFP) to provide a VSAT solution for the Eastern Caribbean. Initially the RFP invited an outright purchase, own and maintain philosophy with Trinidad and Tobago as the System Administrator and owner of the network. This philosophy has since been revised for economical, logistical and managerial reasons. The RFP is now being redrafted for a service provider type of network, that is, the successful bidder will own and maintain the hardware and software and provide network and bandwidth management facilities which will be maintained and verified by contractual arrangements.

2.2.4 ALLPIRG/5 Conclusion 5/16 discourages the proliferation of VSAT networks in any region that already has a VSAT network that may be expanded to provide the necessary coverage and urges States to work towards integrated regional/interregional digital communication networks with a single centralized operational control to avoid costly interconnection/interconnectivity issues. The CNS Committee has taken note of this information and at the same time needs to ensure that the eventual replacement network service satellite fulfills the coverage requirements of the E/CAR

2.2.5 Trinidad and Tobago signed a Labour and Equipment Maintenance Agreement for the existing E/CAR AFS and VHF Aeronautical Mobile Services (AMS) networks, with Telecommunications Services of Trinidad and Tobago (TSTT) for maintenance of the AMS, AFTN interface and voice equipment on the E/CAR islands. The Agreement was deemed to have commenced on 1st January 2006 for an initial period of twenty-four (24) months to be thereafter automatically extended by successive twelve (12) month periods unless terminated.

2.2.6 Until replacement, Trinidad and Tobago has a responsibility to maintain the existing network at a reliable operational level. To ensure this reliability a set of recommended spares for the AFS was purchased and are in the possession of TSTT. A RFP was recently invited to provide two additional VHF frequencies for the Piarco ACC and spares for the current configured AMS.

2.3 Fault reporting and resolution procedures

2.3.1 Fault reporting and resolution procedures agreed at the E/CAR WG/29 continue to be implemented. Quarterly reports of E/CAR AFS failures are emailed to States by the TTCAA based on fault reports received. States are advised to complete the fault report forms as indicated on the form in the required format for institutional information of date, time, fault number, designator, etc. The statistics generated from these reports are only as accurate as the information received.

2.4 Automatic Message Handling System programs and interconnection activities between the FAA and the E/CAR AFS digital network.

2.4.1 Work between the Trinidad and Tobago Civil Aviation Authority and the United States Federal Aviation Administration to reconfigure the Piarco/Atlanta Aeronautical Fixed Telecommunications Network (AFTN) connection to direct X.25 protocol has not progressed significantly from the last meeting. A follow up meeting with FAA/TTCAA is tentatively planned for the first quarter of this year to progress this activity.

2.5 The provision of support structure for CNS/ATM

2.5.1 One of the problems encountered on most Eastern Caribbean States is the unreliability of the commercial power being supplied to airports. Operational reliability of air navigation services is adversely affected by fluctuations and disruptions in commercial power. While individual uninterruptible power system (UPS) may be provided to support the end user equipment, if commercial power is interrupted for over two hours, the UPS batteries, depending on the capacity, may become depleted at which time the equipment is no longer powered and becomes unserviceable. Power surges may even damage a UPS. States are urged to provide standby electrical generating systems with conditioned uninterruptible power systems to ensure that air navigation services and its associated ATM/CNS support are provided with reliable power.

2.5.2 Manufacturers recommend that electronic equipment be housed in a dust free, static and climate controlled environment to obtain optimal operating parameters for Mean Time Between Failures (MTBF) and life cycle management of the equipment. Most of the AFS/AFTN equipment is housed in environments that are not ideally recommended. States are urged to re-examine the environmental conditions under which air navigation services equipment is housed and operated and rectify as necessary.

2.6 GREPECAS Conclusion 14/52 – Review for the adoption of the memorandum of understanding and implementation of the action plan for the MEVA II/REDDIG interconnection.

2.6.1 Trinidad and Tobago has no operational requirement to interconnect the Piarco REDDIG node to the MEVA II network. REDDIG consists of sixteen (16) nodes located in Argentina, Bolivia, Brazil (3), Chile, Colombia, Ecuador, Guyana, French Guyana, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela. The MEVA II VSAT Network provides modern voice and data services between 11 States of the Central Caribbean region: The Bahamas (Nassau and Freeport), Netherlands Antilles (Curacao and St Maarten), Aruba, Dominican Republic, Haiti, Cuba, Jamaica, Cayman Islands, Panama, and COCESNA (a Central American Air Navigation Service Provider) and the United States (Miami and San Juan).

2.6.2 Presently Bogota, Colombia has operational requirements to communicate with Curacao, Aruba and Puerto Rico. Caracas, Venezuela has operational requirements to communicate with Curacao, Jamaica, Panama, and COCESNA (Tegucigalpa, Honduras). The aspects of possible solutions to the interconnectivity are under discussion via the MEVA II/REDDIG Coordination Group. This interconnectivity interests Trinidad and Tobago with regards to the cost sharing as part of the REDDIG cooperative project and future interconnectivity of E/CAR /MEVA II.

3. Agenda Item 3.2 and 3.3: Development of voice and data air-ground communication and Development of ground-ground communications

3.1 HF AMS

3.1.1 Trinidad and Tobago procured through ICAO Procurement Section in Montreal a HF AMS system with SELCAL to meet the responsibilities of the Piarco FIR/UIR for HF Communications. The complete system was to have been delivered and commissioned in eighteen (18) months with a then projected date in the first quarter of 2004. Deficiencies relating to the tendered technical specifications were identified and the equipment was not accepted until the deficiencies were rectified. In October 2005, a Supplementary SAT was conducted and the TTCAA signed the SAT certificate and accepted the equipment. The TTCAA was advised to record the performance of the HF AMS and forward these records to ICAO for analysis.

3.1.2 Some shortcomings with reception of aircraft at various flight levels within the Piarco FIR were noted to ICAO. After discussions the supplier agreed to replace the receive antenna with a more powerful and sensitive antenna. The antenna was replaced in May 2007 and after successful operational tests the Piarco HF AMS resumed operational status in June 2007.

3.2 **FASID**

3.2.1 The CAR/WG/1 CNS Committee reviewed and updated the Regional Plan for the implementation of the air-ground data links and recommended the following modifications to the CAR/SAM FASID Table CNS 2A:

3.2.1.1 Combine columns 4 (VHF data), 6 (HF data), 8 (Satellite data) and 9 (Mode S) into one column titled A/G data communication; and

3.2.1.2 A completion date of 2015.

3.3 **AMHS AND AIDC implementation national plans**

3.3.1 ATS operational requirements do not necessitate total E/CAR AMHS implementation. The consensus based on operational and economical reasons is that only Trinidad and Tobago as the service provider and administrator of the AFTN/AMHS switch to the Eastern Caribbean will implement AMHS services to adjacent Switching Centres, namely, Atlanta and Caracas. AFTN services will continue within the Eastern Caribbean States. The initial date of 2007 for Trinidad and Tobago AMHS implementation as per Appendix G of CAR/WG/1, WP/11 has now been re-estimated to 2009 for completion.

3.3.2 Trinidad and Tobago with responsibility for the Flight Information Region (FIR) has plans to implement AIDC between one of its adjacent ATS unit, New York, not before the last quarter of 2009. Appendix H of CAR/WG/1, WP/11 ‘Plan for the follow-up and implementation of air-ground and ground-ground communications’ will be reviewed and completed accordingly.

3.4 To alleviate the problems experienced with the existing AFS voice network plans are underway to implement dedicated leased 64 Kbps ATS speech circuits between Martinique/Piarco and Guadeloupe/Piarco. The AFS network is set up as ‘bandwidth on demand’ which means that if the full bandwidth of the network is in use then a call cannot be established until bandwidth is freed by another caller releasing his call. The problem identified was given by an example that a circuit may be unsuccessful for the first three to ten tries and then a connection may be established on the fourth or eleventh try or the circuit may be established on the first try. In addition to AFS unreliability it was noted that sometimes this inability to establish a call also occurred with PSTN lines for example office telephones and fax numbers between Trinidad and the French Antilles. TSTT advised that there are a limited number of international trunk lines between Trinidad and the French Antilles. This situation is to be addressed by TSTT.

4 **Agenda Item 3.4: Global Navigation Satellite System (GNSS) Implementation**

4.1 As reported at the 20th DCA Meeting the GNSS Task Force/2 of the ATM/CNS/SG after analysis of trials agreed that SBAS solution with APV 1 Performance for the CAR/SAM region is technically feasible. Conclusion CNS/5/7 of the ATM/CNS/SG/5, invites all States to subscribe to the Project RLA/03/902 – SACCSA in order to get full advantage from this GNSS project. The E/CAR WG CNS Committee recommendation that Trinidad and Tobago subscribe to this project has not been progressed.

4.2 **FASID TABLE CNS 3**

4.2.1 The CAR/WG/1 Committee forwarded the following recommendations:

4.2.1.1 That the CAR/SAM ANP –FASID Table CNS 3 be modified to reflect the following:

- Column 10 ‘GBAS’ should be changed to ‘Basic GNSS’ only; and
- Column 11 ‘SBAS’ should be changed to ‘GNSS with Augmentation’.

4.2.1.2 of contact That ICAO request from States a point of contact and that States should provide a point regarding updating information of Table CNS 3.

4.2.1.3 That States update the FASID Table CNS 3.

4.3 **Progressive de-activation of NDB**

4.3.1 The work to develop a regional plan on ATM/CNS/SG/5 Conclusion CNS/5/11 recommendation on the progressive deactivation of NDBs in light of other aids as VOR/DME and GNSS-RNAV with reference to aircraft capacity and equipage that operate in the respective airspace through the E/CAR WG CNS Committee has not been progressed. Emails were sent in the third quarter of 2007 to the CNS representatives of the Eastern Caribbean requesting information. So far information has been received from Barbados. The Committee agreed that the E/CAR region should use the same timeline for completion of NDB deactivation as recommended by GREPECAS of no later than 2018. The plan will be forwarded to the ICAO Regional office as and when information is received.

5. Agenda Item 3.5: Review of the planning and implementation of surveillance systems

5.1 The CNS/SUR/TF chaired by Trinidad and Tobago held its first meeting on 20-21 June 2007 and comprised members from Brazil, Colombia, Cuba, Trinidad and Tobago, United States, IATA, SITA and Thales. The SUR/TF was tasked with the development of a strategy for the evolution of aeronautical surveillance in the CAR/SAM Regions and examined the following surveillance systems: SSR Mode S 1090 MHz (ES), ADS-C for oceanic Region, ADS-B for surface and air movements, and multilateration.

5.2 The work of the Task Force has thus far been progressed via email. A draft strategy presented by Brazil was circulated to members for comments. The SUR/TF/2 is scheduled for May 9-10 in Lima, Peru.

5.3 The E/CAR Region is planning on conducting Automatic Dependent Surveillance – Broadcast (ADS-B) trials within the near future in the airspace West of 56º in the Piarco FIR with the purpose to improve the knowledge on ADS-B and evaluate benefits for air traffic management in the CAR/SAM Regions. The United States has offered their assistance with planning, technical expertise, analysis of data and the loan of ADS-B equipment. A letter formally requesting Trinidad and Tobago's participation in the CAR/SAM ADS-B data collection effort including the long term loan of ADS-B ground stations and FAA assistance with the analysis of the data that is collected is to be sent to the FAA. The FAA would then document the plan in an annex to an existing FAA/CAA bilateral Memorandum of Agreement. The annex would include how many stations the FAA will lend to the effort and would also identify the FAA and CAA responsibilities.

5.4 SITA was identified as a possible provider of the medium to transport the data from the ground stations to the display(s). For trial purposes SITA would utilize existing infrastructure. The number of ground stations and the number of sites required have yet to be determined.

5.5 The meeting agreed that ADS-C was widely deployed in Australia and recently in the United States and other parts of the world. Trinidad and Tobago wishes to implement ADS-C in the oceanic portion of the Piarco FIR. The details of this project are being handled by the SUR/TF to coincide with the timelines of the delivery of the new ATM system for Piarco. IATA offered to provide assistance to the CAR/SAM Regions and share information based on their experience with ADS-C trials carried out in a portion of the Pacific and North Atlantic.

5.6 Based on the information received during the surveillance seminar (18-20 June 2007, Trinidad and Tobago) interest was expressed in conducting trials in the Eastern Caribbean portion of the Piarco FIR where there currently exists limited surveillance coverage. It was generally agreed that the CNS/SUR/TF would not look at surface movement multilateration but focus on wide area multilateration (WAM). Discussions revealed that many helicopter platforms are examining the use of multilateration to provide low-level coverage and air traffic services in an environment where secondary radar is not possible. Brazil indicated that they were interested in studying the implementation of multilateration sensors as a transition path to ADS-B in their offshore area for the oil platform operation. Active Multilateration provides immediate coverage with existing on-board avionics and will decode ADS-B when installed in the future with the existing multilateral sensors.

5.7 The United States agreed to provide information on their projects in Colorado on multilateration techniques and Juneau, Alaska on ADS-B conducted since 2001 and continuing. Cuba informed their plans to perform multilateration trials in the Havana International Airport. ICAO cautioned that separation and safety standards have not yet been established for multilateration and the process for individual States to individually carry out these types of exercises would be time consuming and costly and added that trials in this area for WAM would be costly and further advised that this should be placed in the near future for consideration trials.

6 Agenda Item 3.6: Radar data sharing among neighboring ATS units

6.1 Trinidad and Tobago recently awarded a contract for a full ATM system. The system will have the ability to display single, multiple or merged radar images. Further to the work of the Radar Sharing Task Force and WP/26 presented by Trinidad and Tobago at the 29th E/CAR WG Meeting Letters of Agreements for the remoting of RADAR information from Barbados and France (combined Martinique and Guadeloupe radars) to Trinidad and Tobago were signed on 17/11/06 and 04/10/07 respectively.

6.2 The request for dedicated leased 64Kbps circuits was made to TSTT, Cable & Wireless and France Telecoms and coordination is being made with the Barbados civil aviation authority and the French SNA/AG. Installation of circuits, radar interface equipment on Barbados and Martinique and ATM equipment is being coordinated with a tentative timeframe of third quarter of 2008.

6.3 The dedicated leased 64Kbps circuits for radar remoting between Martinique and Saint Lucia (Hewanorra and George Charles), were installed in Martinique and St. Lucia. It was noted that while the lines and the equipment were installed, Saint Lucia has not been utilizing the remoted radar data. The LOA between Saint Lucia and SNA/AG provided for technical training but not ATC training. Saint Lucia is responsible for providing the appropriate radar training. SNA/AG will support the system for one year from the date of the LOA and then Saint Lucia would assume the responsibility. Saint Lucia's technical staff was trained to support the equipment. The dedicated leased circuits are billed to the TTCAA.

7. **Consideration on the support of communications to the migration to the BUFR-coded OPMET format**

7.1 The plan for the migration from the traditional alphanumeric format to a coded format based on bit-oriented tables (BUFR *Binary Universal Form for the Representation of Meteorological data*) for the transmission of OPMET meteorological information was approved at the 14th Congress of the World Met Organization (WMO) held in Geneva, Switzerland on 5-23 May 2003. A plan of action is under development in conjunction with the MET office and the Trinidad and Tobago AFTN supplier for timely transition to BUFR code.

8. States are urged to forge closer relationships in the sharing and harmonizing of national plans for the upgrade of ATM/CNS systems. This approach will provide greater economical and operational advantages for the region and promote a smooth transition to a fully automated ATM system in the region. The collation of strategies and plans should involve the expertise of the CNS Committee which is composed of all the Eastern Caribbean States. The CNS Committee of the E/CAR WG was created for this purpose and ought to be utilized to its fullest for the benefit of all States.

9. **Suggested action**

9.1 The Meeting is invited to:

- note the information presented in this working paper; and
- recommend other actions to improve the E/CAR CNS initiative as appropriate.

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