International Civil Aviation Organization
North American, Central American and Caribbean Office

WORKING PAPER

E/CAR/NTG/7 & E/CAR/RD/5 — WP/07
11/10/16

Seventh Eastern Caribbean Network Technical Group (E/CAR/NTG/7) and Fifth Eastern Caribbean Radar Data Sharing Ad hoc Group (E/CAR/RD/5)

Basseterre, St. Kitts and Nevis, 17 – 18 October 2016

Agenda Item 3: E/CAR Aeronautical Fixed Service (AFS) Network Performance and Operation
3.1 Network performance and general aspects

NETWORK PERFORMANCE AND GENERAL ASPECTS

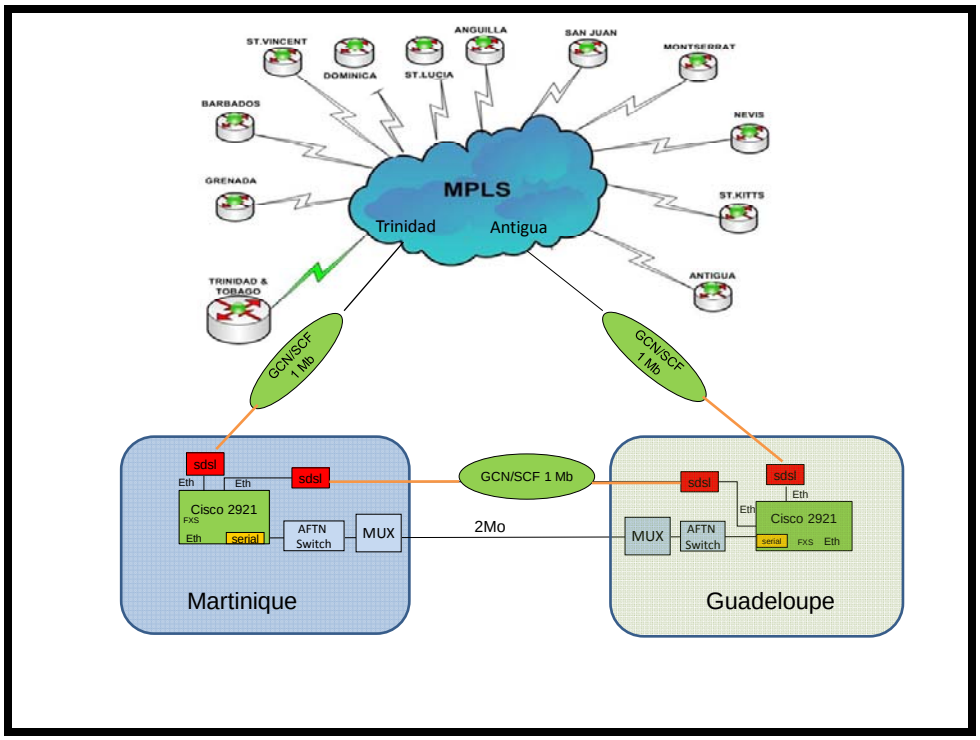
(Presented by France)

EXECUTIVE SUMMARY	
The new E/CAR AFS network has significantly improved its performance. This paper identifies possible improvements.	
Action:	The suggested actions are presented in Section 4
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Sixth Eastern Caribbean Network Technical Group (E/CAR/NTG/6) and Fourth Eastern Caribbean Radar Data Sharing Ad-hoc Group (E/CAR/RD/4) Meetings, Miami, United States, 13 - 14 July 2015

1. Introduction

1.1 The E/CAR/AFS network is globally compliant with operational requirements, but some improvements may be needed, both in technical and procedural aspects.

1.2 The connection of FWI to E/CAR/AFS network is shown below:



2. Status of the FWI Nodes

2.1 Guadeloupe hardware:

- Only one (1) router is on site. Backup was faulty and sent to Trinidad, but has still not been replaced

2.2 Martinique hardware:

- Martinique has two routers fully equipped. One faulty fan tray was replaced on October 6, 2016

2.3 Securing local connections

- In Martinique and Guadeloupe, availability of E/CAR services has significantly decreased. One reason is due to Mediasev bad performances (Mediaserv is the telecom operator that provides local connections)
- New local connections are being set up by DIGICEL telecom operator, with a better redundancy
- Ongoing work is performed to have one (1) link on copper cable and one (1) link on optical fiber, on each site (Martinique and Guadeloupe)
- This work is done under TTCAA contract with SCF (Southern Caribbean Network)

2.4 Backup routing is not functioning properly for FWI nodes:

- As the routers are not connected directly to MPLS, a backup line has been set up between Martinique and Guadeloupe (see picture above)
- In case of failure of the direct link (i.e. Guadeloupe – Antigua), all services should be available through alternate path (i.e. Guadeloupe-Martinique and Martinique-Trinidad links). Until now, this automatic backup routing is not functioning, nor for Martinique nor for Guadeloupe

2.5 Trials achieved with TSTT to improve phone communications:

- A difficulty was found in the interoperability of FWI VCCS (Ineo, VCS called Raiatea) and E/CAR network, with result that ATCO has difficulties to answer an E/CAR call. E/CAR router uses different lines in “hunting” Cisco mode: if one call does not receive answer within a given time, the call is sent to another line, and so on. Another mode consists in grouping several lines.
- After trials, a new setup was found beginning October 2016 (increasing time before switching to another line) that seem to satisfy ATCOs.

2.6 Cisco 2921 configuration:

- Preliminary information is required before configuration changes on routers or Switches
- French law requests that for ATS systems, every configuration is stored with period of validity. FWI propose to have this quality control on configuration changes done by TTCAA, unless FWI would manage that traceability but in that case need to be informed and to receive the modified configuration

2.7 Performances (extracted from Metro-e):

2015 July	**Martinique**	**Guadeloupe**
Availability / 1 year	98.7 %	95.7%
Average response time (night)	34 ms	38 ms
Average packet /sec	4 by night, peaks to 28	Min : 4 + 20 pps peaks 28 +20
2016 October	**Martinique**	**Guadeloupe**
Availability / 1 year	90.1 %	92.3%
Average response time (night)	34 ms	39 ms
Average packet /sec	Not available	Not available

2.8 Maintenance Procedures and Fault Reporting:

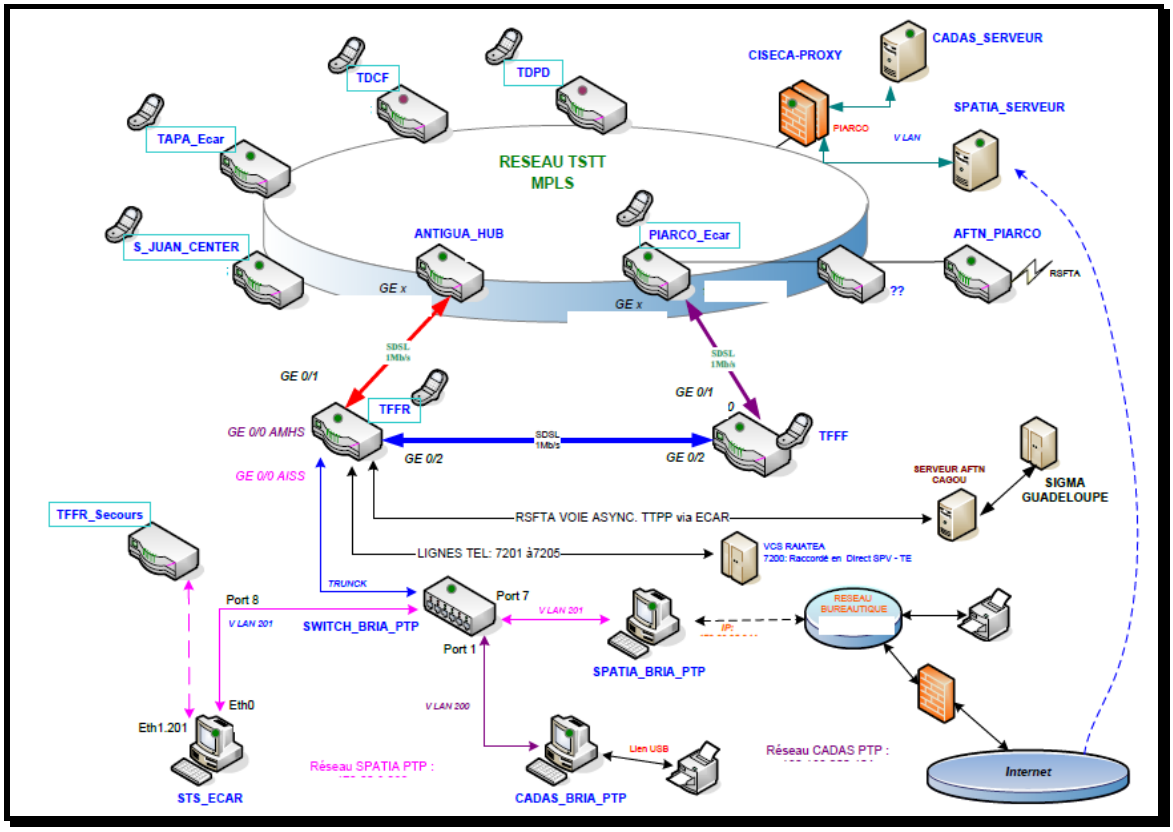
a) FWI still supports the setup of a common maintenance agreement for E/CAR network and associated tools (SPATIA and CADAS);

b) FWI appreciate TTCAA/TSTT visits on site to check systems and to align configurations if necessary;

c) FWI requires that preliminary information is mandatory prior to any remote maintenance operation.

2.9 Supervision Developed by Guadeloupe:

- A basic tool has been developed by Guadeloupe maintenance team to improve E/CAR monitoring information given to users
- Today, users can only have access to MetroE overview that is network oriented
- The basic tool developed by Guadeloupe gives more comprehensive information as far as systems and services are concerned
- Tool is based on Linux computer using NAEMON freeware and a web interface to display the status of E/CAR equipment
- Tool is very limited due to lack of rights to go further (i.e. using SNMP from router, that would allow getting much more information as high temperature alarm, fans malfunction and so on)
- A demonstration was achieved during E/CAR/NTG6
- In accordance with conclusion E/CAR/NTG/6-RD/4/3/ c), SNA/AG still support the demand to integrate this basic monitoring tool into the E/CAR web portal



2.10 Cyber protection:

- Due to increased number of cyber-attacks on systems, SNA/AG suggests performing a cyber security and safety case on E/CAR network and connected applications
- In the same field, due to the basic initial logins and passwords given for each ANSP to use both Spatia and Spatia Web, in accordance with TTCAA, the Guadeloupe and Martinique login and password have been changed to more complex

2.11 E/CAR evolution

- Future ATC systems will be full IP. For instance VCCS using VOIP could be connected to ECAR with direct IP connection. SNA/AG suggests that studies could start to handle these future technological changes and support information about these changes.

3. Conclusion

3.1 The ECAR2 network is globally operating correctly in FWI, and improvements are proposed:

- To complete Guadeloupe routers hardware;
- To complete E/CAR local connections upgrade in FWI;
- To complete and integrate Guadeloupe E/CAR monitoring tool into E/CAR under TTCAA responsibility;
- To complete the setup of a new Orange/C&B IP line between Martinique and Trinidad for Radar;
- To improve communication with end users and enhance communication prior to TSTT maintenance operations;
- To complete a maintenance procedure;
- To organize the management of configurations (access to online version, traceability); and
- To perform an E/CAR network and connected tools cyber vulnerability assessment

4. Suggested Actions

4.1 The Meeting is invited to:

a) Take in consideration FWI feedback regarding the E/CAR AFS Network performance;
b) Take action for completing the E/CAR AFS Network actions for FWI;
c) Define actions to complete the pending agreed actions on Maintenance Procedure and SLA;
d) Decide whether a configuration management to perform traceability of changes in router configurations is needed or not;
e) Decide whether cyber vulnerability assessment would be necessary or not; and
f) Decide whether communication about VOIP on E/CAR is needed or not.

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