



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
WESTERN AND CENTRAL AFRICA OFFICE**

**Twenty-six Meeting of the AFI Satellite Network Management Committee (SNMC/26)
(Ouagadougou, Burkina Faso, 19-23 November 2018)**

**Agenda Item 4: Interconnection and interoperability of AFISNET with its neighbouring networks
(CAFSAT, NAFISAT, SADC2)**

(Presented by ASECNA)

SUMMARY

This paper aims to draw the attention of the meeting on the challenges of the interconnection and the interoperability of the AFI VSAT in view of appropriate policies to support the Air Navigation Safety

Reference: **ALLPIRGs/5**
 SAT 18
 SNMC 24th Report

Action by the meeting in paragraph 3

1. INTRODUCTION

The provision of air navigation services relies on the various regional VSAT networks interconnected and interoperable AFISNET, CAFSAT, SADC, NAFISAT. In order to comply with the current and future aeronautical telecommunications services, as well as the evolution of the satellite technology, each network is developing an upgrade program of its network based on the migration towards IP-based digital communication network.

This migration rises the issue of the safety and security of the critical information flowing in and between the networks. States and ANSP have to address the threats related to IP technology and take measures to contend them in order to ensure a safe operation of the aeronautical VSAT networks.

2. DISCUSSION

2.1. ALLPIRG/5 particularly requested PIRGs to work towards integrated regional/interregional digital communication networks, with a centralized operational control and preferably based on the Internet Protocol (IP) (Conclusion 5/16 refers).

2.2. According to the APIRG/16 conclusion 16/16, ASECNA in cooperation with ATNS implemented successfully the interconnection of SADC-2, NAFISAT and AFISNET VSAT networks. This interconnection allowed to improve the Aeronautical Fixed Service (AFS) between ASECNA centers and the SADC and NAFISAT involved centers. With the technological evolution, these interconnections require to be upgraded with IP protocols capability. ASECNA and ATNS are regularly coordinating on this issue.

The NAFISAT sites that interconnect with AFISNET are indicated below:

NAFISAT & SADC Terminals Connected to AFISNET	AFTN / AMHS	ATS/DS
NAFISAT / SADC	AFISNET	
Tripoli	Niamey N'Djamena	Niamey N'Djamena
Khartoum	N'Djamena	N'Djamena Brazzaville
Addis Ababa	Niamey	
Nairobi	Brazzaville	
Luanda	Brazzaville	Brazzaville Abidjan Dakar
Kinshasa	Brazzaville	Brazzaville
Johannesburg	Dakar	

ASECNA and ATNS agreed to retain the MEMOTEC multiplexers from the NAFISAT and SADC for Interconnexion with AFISNET. This will give ATNS the capacity to maintain the existing links with the AFISNET Network and insure connectivity from the NAFISAT and SADC Networks.

ATNS and ASECNA have agreed in the beginning of April 2018 to deal with the obsolescence of the multiplexers (MEMOTEC CX series) by replacing them with the MEMOTEC Net Performer devices (Level 3) and keep Datum Modem (PSM or M7) devices (Level 2). This will ensure the continuation of the services between the VSAT networks and should restore the availabilities of the services to recommended levels.

In this regards ASECNA lunch the internal process to acquire entire equipment's and the action plan to conduct the modernization process (Installation, test and commissioning) will be share very with ATNS by December 2018.

2.3. The seventeenth SAT meeting, held from 18-20 April, 2012, encouraged concerned Sates/Organizations to realize or complete the interconnection process between neighboring networks in order to implement the remaining interconnection required for ATM operation and pursue their collaboration when modernizing their respective networks components in order to build and harmonized interregional network provided with the capability to support the forthcoming CNS applications.

2.4. With regard to SAT/18 conclusion 3/6, ASECNA in coordination with DGAC (French Guyana), Trinidad and Tobago Civil Aviation Authority (TTCAA) and Brazil, completed the interconnection of AFISNET to REDDIG -2 and CAFSAT trough the implementation of AFISNET nodes in Cayenne (French Guyana, Piarco (Trinidad and Tobago) and Récife (Brazil), with IP capability

The table below summarize the various services implemented:

Node I	Node II	Planned Services	Observations
Dakar	Cayenne	ATS/DS, AIDC	Fully operational since august 2015(ATS/DS)
	Piarco		
Dakar	Recife	ATS/DS AMHS AIDC	ATS/DS implemented, AMHS and AIDC ongoing
Abidjan		ATS/DS, AIDC	ATS/DS implemented between Abidjan and Recife. Implementation of AIDC on going,
Las Palmas			Backup for REDDIG-2 VSAT link
Cayenne			Backup for REDDIG-2 VSAT link
Piarco			Backup for REDDIG-2 VSAT link

2.5. This extension of AFISNET to the SAM region solves deficiencies the Aeronautical Fixed Services affecting the two regions and improves the ATM provision between AFI and SAM regions. It is an opportunity to build an interregional circuit, with the capability to support the forthcoming CNS applications (AMHS and AIDC), in accordance with Required Communication Performance (Doc 9869).

2.6. CAFSAT network is interconnected to AFISNET through Dakar and the Recife AFISNET and CAFSAT nodes with the capability to support IP protocols. The CNMC and the SNMC are respectively in the process to upgrade CAFSAT and AFISNET networks to support IP protocols both.

2.7. However, due to IP-based networks and systems, interconnecting the various ANSP and cyber-security risks, required security measures must be taken by the various ANSP to ensure the safe operation of these systems.

3. ACTION BY THE MEETING

The meeting is invited to:

- Take note of the information provided above, related to the modernization process for interconnection of AFISNET and NAFISAT /SADC2 aeronautical VSAT networks,
- Take note of the upgrade process ongoing and particularly the migration of the aeronautical VSAT networks to IP based networks;
- Take any relevant conclusion/decision, in order to build and AFI seamless network full interconnected to the other regions networks and ensure its safe operation to support the provision of air navigation services.