



INTERNATIONAL CIVIL AVIATION ORGANIZATION
TENTH MEETING OF THE NAFISAT SUPERVISORY COMMITTEE
(SHARM EL-SHEIKH, EGYPT, 21-24 APRIL 2015)

Agenda Item 9 AFI VSAT Networks Integration

(Presented by Egypt)

SUMMARY

The purpose of this WP paper is to encourage the meeting to continue the coordination to enhance the interconnection between NAFISAT and other three VSAT AFI networks (CAFSAT, AFISNET, SADC/2) on the focus of the new upgrade of NAFISAT network.

Reference:

- (1) Report of APIRG/16: *Conclusion 16/16 implementation/interconnection of SADC/2, NAFISAT and AFISNET VSAT Networks*
- (2) Report of SNMC/17
- (3) Report on SNMC/18
- (4) Report on APIRG/19
- (5) Report of Fifth Meeting of APIRG Communications, Navigation and Surveillance Sub-group (CNS/SG/5, Nairobi, Kenya, 16-19 September 2013)

1 Introduction

1.1 In order to realize the implementation of AFI planned Aeronautical Fixed Service (ATS-DS & AFTN) NAFISAT was to be interconnected with its neighboring networks (CAFSAT, AFISNET, SADC/2). This interconnection is aiming to ensure a seamless interoperability for the provision of CNS & ATS services.

1.2 The meeting is reminded of the four major AFI VSAT networks:

- NAFISAT: Northeastern AFI VSAT Network;
- SADC VSAT: Southern African Development Community VSAT Network.
- AFISNET: AFI Satellite Telecommunication Network;
- CAFSAT: Central Atlantic Flight Information Regions Satellite Network;

1.3 The network interconnection with its neighbors had to ensure:

- Full operational applications and systems interoperability through the networks;
- End to end continuity of all services;

- Required Quality of AFS in line with ICAO SARPs (Annex 10, Volumes II and III, Doc 4444);
- Smooth and continuous integration of CNS new components (implementation of ATN to support ground application)

1.4 To comply with these requirements a close coordination of interconnection operations was necessary. In this framework many regional meetings called for such coordinating operation for the integration of regional sub networks.

1.5 The great need to strength the framework to harmonize those VSAT Networks operations in order to ensure an end to end interoperability.

1.6 As a matter of coordination between these various interconnected networks, the Special AFI/RAN meeting adopted Recommendation 6/19 that calls for all entities involved with planning, implementation and operation of Very Small Aperture Terminal (VSAT) networks in the AFI Region to hold regular joint meetings under the auspices of ICAO regional offices.

1.7 NAFISAT member states shall pursue the work done by the AFI Aeronautical VSAT Networks Managers towards the continuous development of an AFI integrated aeronautical telecommunication infrastructure, in accordance with APIRG/18 Decision 18/28.

2 Important facts about the four AFI VSAT network

The technical solution for the ATN overlay integrated AFI VSAT network was based on the following fundamental criteria:

- All four networks have made substantial investment in existing infrastructure, which must be retained and utilized.
- Three of the four networks (NAFISAT, AFISNET & SADC2) operate on the same satellite i.e. IS 1002 which will ensure seamless operation.
- A single satellite access method is proposed for the technical solution to ensure interoperability.
- Although the ATN network will mainly support IP based applications, legacy protocols must continue to be supported.
- The overlay network must be secure, i.e. independent of terrestrial services, etc.
- Enhance the aviation safety in AFI Region.

3 Status of Integration of the AFI VSAT networks

3.1 Integration between NAFISAT, SADC2 and AFISNET:

The integration of NAFISAT with AFISNET and SADC/2 networks was the result of a Balanced interconnection exercise comprising:-

- Four NAFISAT nodes (Tripoli, Khartoum, Addis Ababa and Nairobi)
- Two SADC/2 nodes (Luanda, Johannesburg)
- Five AFISNET nodes (Abidjan, Accra, Brazzaville, N'Djamena, Niamey).

3.2 **Integration between AFI VSAT networks and EUR Region**

- The interconnection between NAFISAT and AFISNET will help of AFI region to extend its interconnection to **EUR Region**.
- AFISNET has already been expanded in Europe with the Toulouse and Las Palmas nodes.
- This can help the continuous flow for AFTN and AIS messages from Johannesburg to EUR area through Brazzaville, Niamey and Algiers as requested by AFI Air Navigation Plan for AFS.

3.3 **Integration between CAFSAT and AFISNET**

- The two Networks are integrated thanks to the installation of a CAFSAT Network in Nouakchott and the installation of an AFISNET node in Las Palmas.
- The integrated network supports ATS/DS and AFTN services with available capability to support others ATN applications.
- During the last SAT meetings (Las Palmas 2012, Dakar 2013), the establishment of an ATS/DS circuit between Abidjan and Recife was considered.
- During the SAT 19 Meeting in Buenos Aires, the Secretariat facilitated informal meetings between representatives of ASECNA, Brazil and Trinidad & Tobago. These discussions led to a proposal from ASECNA to offer three AFISNET VSATs respectively to Brazil, French Guyana and Trinidad & Tobago.

4 **Implementation of Best Practice for VSAT network**

4.1 APIRG/18 Meeting had urged the NAFISAT networks participating States and the Network Provider (Air Traffic and Navigation Services of South Africa and IATA) to establish administrative and funding arrangements in a timely manner in order to ensure continuity of supported services (APIRG/18 Conclusion 18/27 refers), mindful of the anticipated termination of the related funding arrangements in 2014 and 2015.

4.2 The concerned States had taken the necessary steps to ensure the sustainability of this network through seven year-extension of existing arrangements from the initial termination dates. The arrangement for the NAFISAT Supervisory Committee had established a Study to develop consequential amendments to the NAFISAT Memorandum of Understanding to be endorsed by the concerned States during the first quarter of 2015.

4.3 In line with APIRG/18 recommendation to monitor and take advantage of lessons learnt by other ICAO regions' experience in implementing integrated regional communications networks, the CNS Sub-Group noted the information provided by France (DGCA) on the South American (SAM) Region project to implement an aeronautical Internet Protocol (IP)-based VSAT network, and recognized the importance of timely consideration of issues related to system safety, security appropriate technologies and system management.

4.4 AFI ATN Architecture Plan adopted by the APIRG/18 Meeting called for developing an action Plan taking into consideration the latest developments related to ATN, including:

- ICAO Standards and Recommended Practices (SARPs) contained in Annex 10, Volumes II and III;
- Relevant guidance material in ICAO Doc 9880 (Manual on Detailed Technical Specifications for the ATN using ISO/OSI Standards and Protocols) and Doc 9896 (Manual on the ATN using Internet Protocol Suite (IPS) Standards and Protocols);
- ICAO Aviation System Block Upgrades (ASBUs) and supporting Technology Roadmaps for Communications, Navigation and Surveillance (CNS), Information Management (IM) and Avionics;
- Alignment of regional air navigation plans (ANPs) and regional supplementary procedures (SUPPs) in accordance with Recommendation 6/11 of the ICAO Twelfth Air Navigation Conference; and
- Status of implementation by States of the ATN infrastructure and supported applications.

5 Spare and maintenance Strategy

The following spares & maintenance options can be discussed and selecting the best one according to the similar projects in ICAO regions. :

- i) Option 1: Total centralized maintenance and one set of spares per network
- ii) Option 2: Total decentralized maintenance and one set of spares per VSAT node.
- iii) Option 3: Hybrid system consisting of De-centralized and Centralized maintenance techniques.
- iv) The aspect of maintenance across all networks should be managed as part of the individual contracts with the applicable service providers in terms of the agreements in place in the AFISNET, CAFSAT, NAFISAT and SADC VSAT agreements as amended when necessary. This should include but not be limited to:
 - Service level agreement
 - Support plan

6 Action required by the meeting

- a) Take note of the above information.
- b) Encourage concerned States/Organizations to realize/complete the interconnection process between NAFISAT and the neighboring networks in order to complete the remaining interconnection required for ATM operation.;
- c) Pursue the collaboration during handling of modernizing the NAFISAT VSAT nodes in order to build a harmonized AFI VSAT network provided with the capability to support the forthcoming CNS applications.
- d) Encouraging the members states of the four VSAT networks to trace the way of Europe to fulfill the dream of Africa region to be a Single African Sky “SAS”.