

Agenda Item 7.2 - Network Upgrades and Future Developments of the NAFISAT VSAT Networks

(Presented by ATNS)

19th NAFISAT VSAT II Supervisory Board Meeting

Mogadishu, Somalia, 14 - 17 October 2024

SUMMARY
<p>This working paper presents an overview of the NAFISAT VSAT network upgrades and future developments. The network, established in 2007 and upgraded in 2016, plays a critical role in supporting Air Traffic Services (ATS) and aeronautical information exchange in the AFI region. The paper discusses the two-phase approach for sustaining the network until 2029, details the life extension and modernization efforts, and explores the potential adoption of new satellite technologies and internet protocol-based infrastructure to enhance network efficiency and interoperability.</p> <p>Action by Meeting under paragraph 3</p>
<p>REFERENCE(S):</p> <ul style="list-style-type: none"> ▪ NAFISAT VSAT II Bilateral Agreement

1. INTRODUCTION

- 1.1 The existing network platform for the NAFISAT VSAT networks was established in 2007 with the following configuration:
 - 1.1.1 Satellite Access Method: MF TDMA
 - 1.1.2 Network Topology: Star/Mesh
 - 1.1.3 Satellite: IS1002, positioned at 359 degrees East.

- 1.2 In 2016, the network underwent an upgrade to address obsolescence, incorporating the following components:
 - 1.2.1 Outdoor Unit: Increased RFT capacity to 60W
 - 1.2.2 Indoor Unit: Transition from SkyWAN 5000 to SkyWAN 7000
 - 1.2.3 Multiplexer (MUX): Upgrade from Memotec CX series to FAD 92X0 / FAD 8400
 - 1.2.4 Extended Network Management System (NMS): Enabled local monitoring and generation of traffic statistics.

- 1.3 The impact of the COVID-19 pandemic on the aviation industry necessitated a strategy to sustain the network until 2029. A following two-phased approach was proposed:
 - 1.3.1 Network Life Extension from 2022 to 2024
 - 1.3.2 Network Modernization from 2025 to 2029

- 1.4 This approach received approval from the Supervisory Board in July 2022.

2. DISCUSSION

- 2.1 **Network Life Extension**
 - 2.1.1 The Network Life Extension phase focuses on managing network spare inventory and addressing the obsolescence of equipment, particularly concerning indoor units. The following equipment / components have been identified for part of the network life extension:
 - 2.1.1.1 **Modem Equipment 7000 Master**

2.1.1.2 Modem Equipment 2570

2.1.1.3 DELL POWEREDGE R450 Server 19" RAID 1+0

2.1.1.4 Frame Relay Access Device 91X0

2.1.1.5 Frame Relay Access Device 8400

2.1.2 The centralized spare inventory system will remain operational to ensure network support.

2.1.3 Progress to Date

2.1.3.1 All necessary indoor spares and support for the Network Life Extension have been identified, and a proposal has been finalized with the original equipment manufacturer.

2.2 Network Modernization

2.2.1 The Network Modernization phase targets the outdoor units, specifically addressing the obsolescence of the RFT5060.

2.2.2 To mitigate the obsolescence of the RFT5060 until modernization is completed, IVSAT RFT5060 units have been refurbished to ensure adequate spare parts availability.

2.2.3 ATNS has completed the modernization of the IVSAT, and the insights gained will be applied to the broader network.

2.2.3.1 Terrasat iBUC-2, 60W have been deployed and their performance is still under assessment.

2.2.3.2 New LNBS with 5G rejection have been deployed and the performance still under assessment.

2.2.4 A condition assessment of the network's outdoor units is scheduled for completion by March 2025, after which a proposal for modernization will be developed.

2.3 Beyond 2029

2.3.1 Adoption of New Satellite Technology

2.3.1.1 Considering the network platform established in 2007 and upgraded in 2016, and the integration of ATN backbone and tributary circuits for services such as AMHS, Voice-over-IP, CAD, and SWIM, an exploration of new satellite technologies is warranted.

2.3.1.2. This includes alternative satellite constellations, High Throughput Satellites (HTS), and new modulation techniques like DVB-S2, to meet future civil aviation requirements.

2.3.2 Alternative Technologies

2.3.2.1 Internet Protocol-Based Infrastructure

2.3.2.1.1 Research into new network infrastructure based on Internet Protocol (IP) is currently underway. This approach leverages commercial off-the-shelf (COTS) products, offering the potential to simplify deployment, reduce costs, and enhance interoperability with other IP-based systems.

2.3.2.2 This IP-based solution has already been implemented on an interim basis in Luanda, Sudan, South Sudan, and Sanaa.

3. ACTIONS BY THE MEETING

3.1 The meeting is invited to:

- a) **Note** the progress made in the network upgrades and the strategies implemented to sustain the SADC/NAFISAT VSAT networks until 2029.
- b) **Consider** the proposed recommendations for further development, including the exploration of new satellite technologies and IP-based infrastructure to meet future civil aviation requirements.
- c) **Encourage** continued collaboration among stakeholders to ensure the seamless life extension and modernization of the networks.

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