



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**  
**NINTH MEETING OF THE NAFISAT SUPERVISORY COMMITTEE**  
**(NAIROBI, KENYA, 18-20 MARCH 2014)**

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**Agenda Item 8 iv): Upgrade of NAFISAT Network**

*(Presented by ATNS)*

**SUMMARY**

This working paper provides information on the implementation of the NAFISAT Network upgrade and the methodology that will be followed

References:

- Report of the 8<sup>th</sup> NAFISAT Supervisory Committee meeting.
- Report of APIRG/18 and 19.

**1. BACKGROUND**

1.1 The NAFISAT network was commissioned on 1 April 2008 after which a 12 months Period of Beneficial commenced. The VSAT network is based on Memotec multiplexer equipment as a Frame relay Access device (FAD) and ND Satcom IDU5000 modem equipment. At the time that the network was implemented this was the preferred and most cost effective offer complying with all technical requirements as per the tender.

1.2 During the course of operation ATNS was informed by Memotec that the manufacture of their CX900/950s/960e/2000 products have reached End of Life (EOL). In view of this ATNS purchased additional spares to mitigate the risk of service interruptions. ND Satcom also informed ATNS that the manufacture of the IDU5000 will be terminated in 2012 and although the IDU500 will still be supported, all new VSAT networks offered by ND Satcom will be based on their new IDU7000 modem equipment.

1.3 The upgrade solution that was presented by ATNS at the 8<sup>th</sup> NAFISAT Supervisory Committee was therefore based on the new ND Satcom IDU7000 technology platform. This solution by ATNS was approved by the Supervisory Committee for a 7 year extension to ensure sustainability of the NAFISAT VSAT network, to support the continued and effective provision of air traffic management (ATM) services and interconnections with the neighboring SADC VSAT II and AFISNET.

**2. DISCUSSION**

**2.1 Technology Platform for Upgrade.**

2.2 As indicated above, when the Supervisory committee approved the network upgrade the solution was based on the ND Satcom IDU7000 and Netperformer equipment. ND Satcom has now developed a new 5G modem which will be capable of addressing IP based applications more efficiently in future.

ND Satcom develop/introduces new SkyWAN modems more or less in 5 year periods. For example the IDU5000 reached end-of-life in 2012 i.e. 5 years after the introduction of the ID7000 in 2007. The new SkyWAN 5G was introduced at the end of 2013. It is therefore expected that the IDU7000 will reach EOL by about 2018, which is 4 years before termination of the new contract, while the 5G will only reach EOL by 2023. Although ND Satcom still support their equipment after EOL, no new equipment of that model is manufactured any more. From an operational point of view it will be sensible to base the network upgrade on the state-of-the-art satellite modem equipment developed by ND Satcom.

## **2.3 Upgrade arrangement**

### **2.3.1 Schedule**

The attached Annexure A shows the planned implementation schedule for the upgrade of the NAFISAT and SADC upgrades. It is planned to award the contract for the upgrade by July 2014. It is expected that the work will be finalized in May 2015 which will be followed by a 12 months period of beneficial use.

### **2.3.2 Training Requirements**

The project will commence with the upgrading of the training facility at the ATNS Training Academy in Johannesburg. On completion our maintenance technicians will undergo in-depth training to prepare them for maintenance tasks and also for training of technicians of the NAFISAT States. This pre-installation theoretical and practical training is planned to commence by the end of October 2014 up to the beginning of December 2014, as indicated in the upgrade schedule.

In addition on-site operation and maintenance training will be conducted during the installation and commissioning of each terminal upgrade.

### **2.3.3 Standard Remote Site Upgrade.**

- Replace the RFT with 60 Watt equipment/power supply
- Inspection of the RF protection switches to establish whether to replace or refurbish these switches
- Replacement of waveguide moisture canisters
- Sealing/re-sealing of cable all connectors
- Inspection, testing and refurbishment of the antenna earth system to supplier's specification, where required
- Refurbishment of antenna, feed horn cover, inspection of mechanical supports, re-sealing of all cable conduits, etc.
- Replacement of current platform with the latest ND Satcom MF-TDMA SKYWAN technology platform, installed in a new 19" equipment rack.
- Replacement of current obsolete Memotec CX2000/950 Multiplexer equipment with the SKYWAN FAD 9220 Access Devices to provide interfacing with ATS/DS, AFTN, VHF and Radar applications
- New engineering voice circuits between remote VSAT nodes and the Fault Reporting Centre (FRC)
- At remote terminals that interface with AFISNET terminals the Memotec CX950 Multiplexer equipment will be retained.

- The existing UPS requirements will be evaluated and upgraded where required
- On-site training will be provided at the time of the installation of the individual remote sites.

#### **2.3.4 Site Surveys**

In order to establish the condition and specific requirements of each site and to finalize the site upgrade specifications, it is planned to conduct individual site surveys.

The site specific upgrade specifications shall be developed and drafted from the site detail as recorded in the site survey reports.

#### **2.3.5 Upgrade Procedure Requirements**

The NAFISAT VSAT network is an operational network and special care should be taken to reduce interruptions in services to a minimum during the upgrade. Where it is unavoidable to interrupt services for upgrade work, a suitable time shall be coordinated and agreed to with the local Civil Aviation Authorities to do required the work. The upgrade of each terminal will be done in two phases:

- The replacement of components and work that will not affect the operation with interconnected sites e.g. the RFT replacements that is common to the existing and upgrade network, refurbishment where applicable, etc.
- The second part of the upgrade installation process will involve the installation and commissioning of the new ND Satcom SKYWAN equipment, replacement of Memotec Multiplexer equipment, installation of the new Network Management System, UPS upgrade, etc. The upgrade equipment will be installed in a new 19” rack cabinet. The upgrade will be developed in parallel to the existing network by utilizing existing or newly supplied active splitter and combiner equipment. This will be followed by the preparation of all cabling required for the transfer of the operation from the existing equipment to the new upgrade equipment.

#### **2.3.6 Transition of Services.**

Transition of services will be coordinated will take place on suitable date and time. It is essential that all States will be part of this process to ensure that the transfer is smooth and with a minimum of interruptions.

### **3. SUGGESTED ACTION TO BE TAKEN BY THE MEETING**

The meeting is requested to take note of:

The progress made to date with the upgrade of the SADC VSAT II network; and  
Important information provided in this working paper.

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SADC VSAT and NAFISAT Upgrade: Brief Schedule				2014					2015					2016												
Task Name	Duration	Start	Finish	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
<b>SADC2 and NAFSAT Upgrade</b>	<b>473 days</b>	<b>Mon 14/07/14</b>	<b>Wed 16/05/04</b>																							
Award of Contract	0 days	Thu 14/07/03	Thu 14/07/03																							
ATA Training Equipment Upgrade	26 days	Wed 14/07/30	Wed 14/09/03																							
Commencement of OEM Training	30 days	Thu 14/09/04	Wed 14/10/15																							
Central Training (States)	28 days	Mon 14/10/27	Wed 14/12/03																							
Site Surveys	48 days	Wed 14/07/30	Fri 14/10/03																							
Manufacturing	49 days	Mon 14/10/06	Thu 14/12/11																							
Packing	31 days	Fri 14/12/12	Fri 15/01/23																							
Delivery	45 days	Fri 15/01/02	Thu 15/03/05																							
Implementation and testing	55 days	Fri 15/01/23	Thu 15/04/09																							
Transition process	15 days	Fri 15/04/10	Thu 15/04/30																							
Final Network Acceptance	7 days	Fri 15/05/01	Mon 15/05/11																							
Period of Beneficial Use	262 days	Tue 15/05/12	Wed 16/05/11																							

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