



SPECIAL AFRICA-INDIAN OCEAN (AFI) REGIONAL AIR NAVIGATION (RAN) MEETING

Durban, South Africa, 24 to 29 November 2008

Agenda Item 6: Development of a set of comprehensive work programmes in the air navigation field, aimed at improving efficiency of the air navigation system (Efficiency Committee)

HARMONIZATION AND INTEGRATION OF VSAT NETWORKS IN AFRICA

(Presented by South Africa)

SUMMARY

SADC/2 and NAFISAT are Regional projects to improve aeronautical fixed communication in Africa. It consists of two Networks that will provide ATS/DS and AFTN aeronautical fixed communications for air traffic services in the participating countries. The paper discusses implementation, interconnection, maintenance and additional value added services that can be provided by the two networks to improve communication services in the AFI Region

1. INTRODUCTION

1.1 As far back as 1996, ATNS South Africa made a decision to coordinate the upgrading of the fixed aeronautical telecommunications infrastructure used for providing Air Traffic Services/Direct Speech (ATS/DS) and Aeronautical Fixed Telecommunication Networks (AFTN) voice and data services in the SADC Region.

1.2 ATNS and the International Air Transport Association (IATA) devised a financial support and recovery plan to eradicate the deficiencies that existed at that time and entered into bilateral agreements between the individual states for providing these services based on VSAT technology.

1.3 In 1998 ATNS established a VSAT network in Southern Africa (known as SADC VSAT I) which operated successfully until 2007 when it has reached its economical "end-of-life".

1.4 In 2006 ATNS, IATA and the SADC states agreed on the replacement of SADC VSAT I with a new network, based on new more efficient and reliable technology. During the same time, as a result of the leading role of ATNS in eradicating the aeronautical fixed VSAT network in SADC, ICAO and states in North East Africa and the Indian Ocean accepted an offer from ATNS and IATA to implement a similar network to address the aeronautical deficiencies in that region.

1.5 As far as interfacing with other networks the SADC/2 and NAFISAT networks interconnect with ASECNA Afisnet and make ATS/DS and AFTNS communication possible with aviation networks in Senegal, Brazzaville Congo, Chad and Niger. An interconnection with Ghana is also being planned.

2. DISCUSSION

2.1 The two networks comprise the implementation of the SADC VSAT II replacement network and the NAFISAT network in the north East Africa and Indian Ocean region. This enables reliable voice and data communication messages between the following States:

SADC/2 Network

South Africa	Mozambique	Lesotho
Zimbabwe	Zambia	Angola
Rwanda	Swaziland	Tanzania
Burundi	Botswana	Malawi
Mauritius	Namibia	Madagascar
Democratic Republic of the Congo		

NAFISAT Network

Seychelles	Saudi Arabia	Egypt
Kenya	Uganda	Libya
Djibouti	Eritrea	Somalia
Ethiopia	Yemen	Sudan

Afisnet, SADC/NAFISAT Interconnections

Dakar	Brazzaville	N'djamena
Niamey		

2.2 Implementation

2.2.1 Although installation of a VSAT terminal is relatively easy, proper planning is essential for the successful implementation of large extended networks. Installation of the SADC replacement network commenced on 9 July 2006 and was completed on 8 October 2007 – transfer of operations from SADC VSAT I to SADC VSAT II was successfully completed on 24 October 2007, while The NAFISAT network was implemented on 1 April 2008. The planning for these networks already started before 2006 – time to completion is therefore normally about 2 years or longer. Typical problems encountered were:

- Licensing issues by the local Telecommunication Authorities
- Local Custom clearance and pre-shipment inspections required by certain countries
- Coordination during commissioning (language, local time differences etc.)

2.2.2 Presently both networks are operating reliably, providing aeronautical services between Air Traffic Control Centers in 32 States in Africa. To demonstrate the success and the importance of the two networks, typically during the month of August 08 a total of 66,404 calls were made between the various States.

2.3 Maintenance

2.3.1 A network is only successful if it operates reliably over its entire operational life. To ensure this a proper maintenance system must be put in place. In SADC and NAFISAT we have two system available:

- A centralized system where the network is monitored and maintained from a central site. The advantage of this system is that less spares are required and with today's reliable equipment this can be implemented effectively.
- A de-centralized system where the state is responsible for its own maintenance. It is more expensive to keep a set of spares at each site, but the advantage is quicker response times.
- In the case of SADC and NAFISAT states were given the opportunity to select their preferred maintenance option and we therefore have a hybrid system with a combination of centralized and decentralized maintenance. The table below compares centralized and de-centralized maintenance options.

Centralized	De-centralized
• All spares kept at central pool (MMC) • Network Service Provider responsible for maintenance actions: • On-Site maintenance • Spares holding • Spares repair • NSP responsible for SLA	• Full set of spares are kept at remote site • State responsible for maintenance actions: • On-Site maintenance • Spares holding • Spares repair • State enter into SLA with NSP

2.4 Interconnectivity

2.4.1 Domestic networks implemented by States often utilizes different incompatible technologies, operate on different satellites etc. which complicate interconnectivity between States.

2.4.2 During the planning of SADC/2 and NAFISAT special efforts have been made to interconnect these networks with the ASECNA Afisnet. Although all three networks operated on the same satellite, the Afisnet utilizes MCPC technology that is not compatible with the TDMA technology platform used by SADC/NAFISAT. The solution implemented is based on utilizing the same outdoor equipment and adding the MCPC modems on the SADC/NAFISAT terminals to allow communication with the Afisnet terminals. This is a cost effective solution.

2.4.3 If satellite spectrum is not available, two terminals operating on different satellites may be the only answer – ATS/DS and AFTN interfacing is accomplished at baseband level. From a cost point of view this is not the best solution.

2.4.4 It is recommended that the technology used by SADC/NAFISAT is considered when upgrading and planning new networks in the AFI Region, assuming spectrum is available on the same satellite.

2.5 Business Models

2.5.1 Basically two Models exist for Network Provision:

2.5.1.1 No Network Operator, States provide their own terminals

- Similar to the AFISNET, CAFSAT and Reddig Networks
- Extremely Complex Bilateral and Service Level Agreements, if any
- No single entity responsible for network performance

- Each State is responsible for implementation and operational costs

2.5.1.2 A Network Operator, States form part of the network operator

- Similar to the SADC, NAFISAT Networks
- Network Operator reports to the Supervisory Board (Members of all States)
- Single Bilateral and Service Level Agreements between Network Operator and individual States
- Single entity responsible for network performance
- Cost Recovery for implementation and operation is per Network (Distance Model, FIR Crossing Model) It makes provision for Over/Under recovery modelling.

In the case of SADC and NAFISAT a Business model based on a single service provider was opted for. This model has been proven to be successful and has been in operation in SADC since 1998.

2.6 Additional Services

2.6.1 ATNS is presently exploring value added service that will utilize the existing VSAT infrastructure. Typical examples are the following:

2.6.1.1 Delivery of Weather Information via a Self Extracting Application. The application contains all the weather detail (Current and Predicted) for a particular Aerodrome in the SADC Region and the subscribing Aerodrome can then have access to the file on a twice daily basis. ATNS is currently running tests to evaluate the delivery of this service via the VSAT network and to determine the most suitable delivery strategy in terms of “What-time-of the-day “and “What-is-the-fastest-delivery-speed-attainable”.

2.6.1.2 The SADC and NAFISAT networks currently make provision for future ATN (Aeronautical Telecommunication Network) services, but this capacity is not utilized as yet. It is also not certain whether any ATN services will be implemented in the SADC and North East African Region in the foreseeable future. Consequently ATNS is investigating the possible implementation of limited ATN services via an AHMS (Aeronautical Message Handling System).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) take note of the information provided in this Information Paper;
- b) utilize the information in the development of communication programmes for the AFI Region; and
- c) recommend that the AFI Region consider standardization of a VSAT technology platform in the region, taking into account the technology platform used by SADC/NAFISAT, when upgrading and planning new networks in the AFI Region.

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