INTERNATIONAL CIVIL AVIATION ORGANIZATION

Sixth Meeting of the APIRG Communications Sub-Group
(Nairobi, 24 - 26 September 2002)

Agenda Item 4: Aeronautical Fixed Services

Update on implementation and upgrading of AFISNET network.

(Presented by the Secretariat)

SUMMARY

This paper provides an update on the implementation of the AFI satellite telecommunication network (AFISNET), for consideration by the meeting.

Reference:

- APIRG/13 Report

1. Introduction

1.1 The meeting will recall that AFI LIM RAN (1988) recommended the use of satellite technology as an effective means of eliminating deficiencies in the field of aeronautical telecommunication (AFTN, ATS/DS) in the Region. ICAO therefore promoted and co-ordinated the implementation of AFISNET[1], the first aeronautical satellite telecommunication network in Africa – Indian Ocean Region, with eight (8) participating countries initially in western and central Africa.

2. Discussion

AFISNET coverage

2.1 The network has been operational since 1995 and extended to other countries in the sub-region. Presently, its membership list includes the following countries: Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Cote d'Ivoire, Equatorial Guinea, Ghana, Mali, Madagascar, Mauritania, Niger, Nigeria and Senegal. The network comprises a total of 38 VSAT nodes. Three (3) AFTN main centres : Brazzaville, Dakar and Niamey are included in the area covered by AFISNET. A coordinating body - the Satellite Network Management Committee (SNMC) which meets at least once a year - has been established in order for participating States to discuss and find out solutions to matters of common interest.

2.2 AFISNET is also instrumental in extending VHF radio coverage within flight information regions (FIRs) by means of remote VSAT/VHF stations at suitable locations.

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[1] AFISNET: Aeronautical satellite telecommunication network for the AFI Region. It was formerly referred to as AEROSATEL or SATCOM network.

Network characteristics:

2.2 AFISNET main characteristics are summarized in the following Table :

Satellite	Transponder/ Coverage	Polarisation/ Band	Operations	Transmission mode	Topology	Protocols
INTELSAT IS903@325.5°E	105/105 south-east zone	B/C	IBS	MCPC SCPC	Star-shaped and meshed	Data: Frame relay, X25, V24 Voice: over Frame relay
	20/20 hemispheric	A/C	FASTCOM[2]	MCPC SCPC	Star-shaped and meshed	
INTELSAT IS707@359°E	86/86 global	A/C	FASTCOM	MCPC SCPC	Star-shaped and meshed	

Interface links

2.3 AFISNET interface links are as follows:

- **AFI/North interface:** AFISNET is linked to the northern part of the AFI Region through *Casablanca/Dakar* AFTN main circuit which operated at 50 baud. The other interface link *Alger/Niamey* which is also an AFTN main circuit - is currently unserviceable.

- **AFI/East interface:** AFISNET is linked to the eastern part of the Region through *Addis-Ababa/Niamey* AFTN main circuit. *Brazzaville/Nairobi* AFTN main circuit will be the second interface link when it is implemented.

- **AFI/West**: AFISNET is linked to Robertsfield FIR VSAT network through the circuit *Conakry/Dakar*.

- **AFI/South interface:** The interface with the southern part of the Region is achieved through *Dakar/Johannesburg* AFTN main circuit. The AFTN main circuit *Brazzaville/Johannesburg* and the tributary circuit Brazzaville/Luanda will serve as additional interface links with AFI/South.

- **AFI/SAM (SAT) Interface:** A CAFSAT VSAT node implemented in *Dakar* provides for the link between AFISNET area and SAT area.

Operational status:

2.4 AFISNET circuits are operating at 2400 bps, with the exception of circuits involving Accra and Kano, which are operating at 50 bauds. These AFISNET low speed circuits are generating bottlenecks due to the volume of traffic, and therefore need to be upgraded to a minimum speed of 1200 bit/s.

[2] Alcatel.

Based on AFTN statistical data available for the past 12 months, availability rates of AFISNET circuits are rather satisfactory though, at times, these rates are unsteady for some of them.

2.5 Moreover, as shown in *para. 2.3* above, most of the interface circuits[3] between AFISNET area and the other sub-regions are not implemented or do not work properly (as is the case for Addis-Ababa/Niamey operated at 50 bauds), with the exception of Dakar centre, the network western outlet. In effect, traffic flow to/from AFI/North, AFI/East and AFI/South is rerouted and concentrated on a single node, resulting in network congestion and very long transit times, which adversely affects the global performance and efficiency of the AFTN.

Developments

2.6 It is expected that the interconnection of/interoperability between AFISNET and the other sub-regional VSAT networks will contribute to improving matters significantly by eliminating most of AFTN lingering deficiencies. As far as AFISNET is concerned, interface connections with adjacent centres need to be implemented, for instance by extending this network to States concerned such as *Algeria, Angola, The Gambia, Guinea Bissau, Kenya and Sao Tome and Principe*, if practicable.

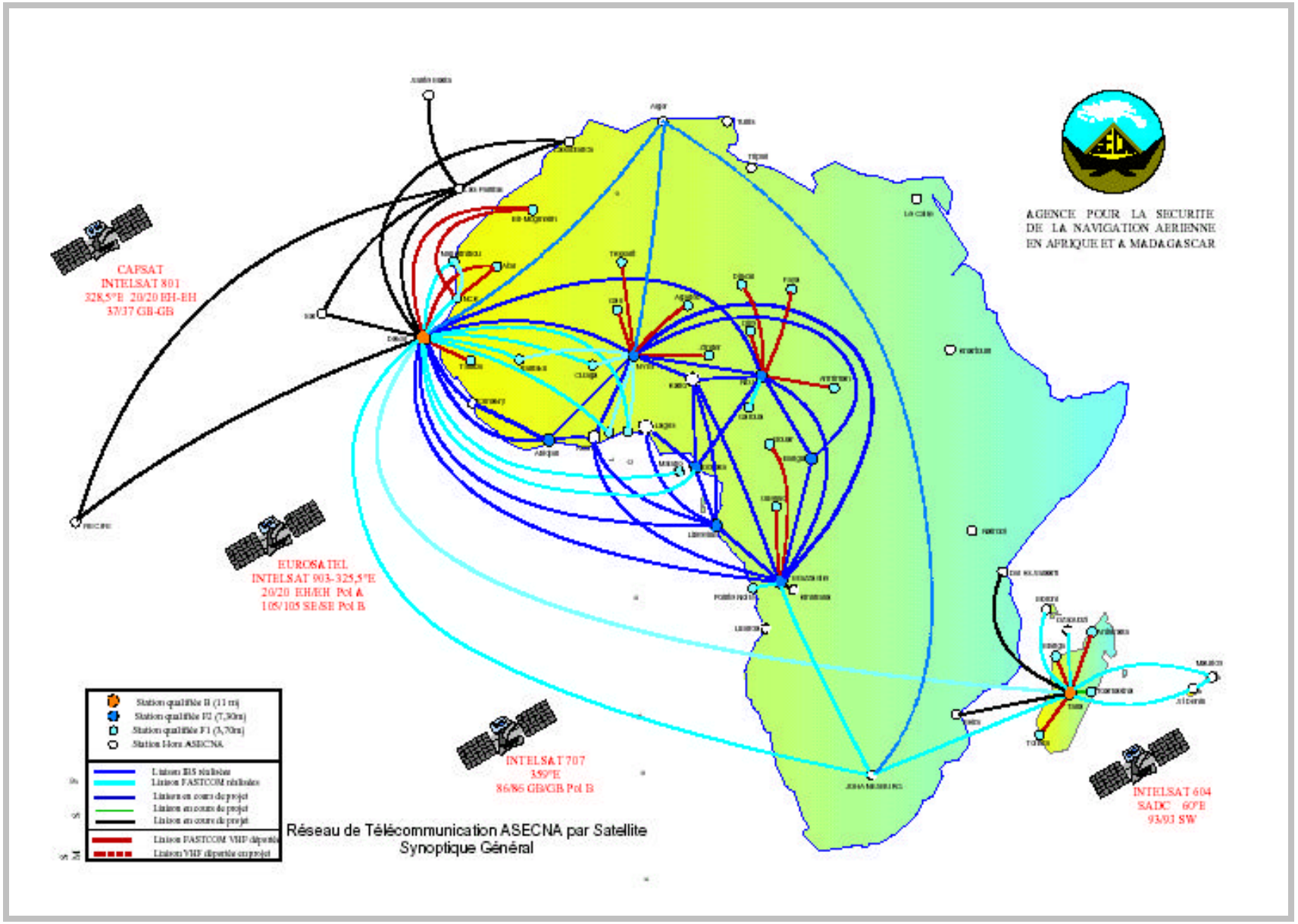
2.7 Moreover, the network digitalization has been achieved by most of participating States, with the exception of Ghana and Nigeria. The objective of this development is to provide AFISNET with an adequate bandwidth and error check functionalities for ensuring data integrity.

3. Action by the COM Sub-group:

3.1 The meeting is invited to:

- take note of the information provided in this paper;
- encourage States concerned for their efforts in implementing, maintaining and upgrading AFISNET ;
- discuss possibilities of extending AFISNET network to *Algeria, Angola, The Gambia, Guinea Bissau, Kenya and Sao Tome and Principe* as ones of remedial solutions for the elimination of AFTN deficiencies and the improvement of its performance and efficiency in the AFI Region; and
- take a conclusion (as appropriate) in this respect.

[3] Most of them being AFTN main circuits.


AGENCE POUR LA SECURITE
DE LA NAVIGATION AERIENNE
EN AFRIQUE ET A MADAGASCAR
CAFSAT
INTELSAT 801
328,5°E 20/20 EH-EH
37/37 GB-GB
EUROSATEL
INTELSAT 903-325,5°E
20/20 EH&H Pol A
105/105 SE/SE Pol B
INTELSAT 707
359°E
86/86 GB/GB Pol B
INTELSAT 604
SADC 60°E
93/93 SW
Station qualifiée II (11 m)
Station qualifiée I2 (7,30m)
Station qualifiée I1 (3,70m)
Station Hors ASECNA
Liaison IES réalisée
Liaison FASTCOM réalisées
Liaison en cours de projet
Liaison en cours de projet
Liaison en cours de projet
Liaison FASTCOM VHF déportée
Liaison VHF déportée en projet
Réseau de Télécommunication ASECNA par Satellite
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