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WORKING PAPER

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)

AFISNET STATUS AND PERFORMANCES

(Presented by Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Equatorial Guinea, France, Gabon, Guinea-Bissau, Madagascar, Mali, Mauritania, Niger, Senegal, Togo, ASECNA Member States, NAMA and GCAA)

SUMMARY

This paper presents the AFI Satellite Network (AFISNET) status and performances, recalls the on going actions undertaken in a cooperative approach by concerned SNMC members (mainly ASECNA, NAMA, GCAA, Roberts FIR) under ICAO WACAF leadership to overcome current dysfunctions with regard to their experience in providing the Aeronautical Fixed Service, the technological evolution, the results of the SNMC specialized technical meetings' conclusions on the subject. It calls SNMC member States and ANSP to increase their current common effort for the improvement of the network.

Action by the meeting is in paragraph 3.

1. INTRODUCTION

1.1 To improve the quality of the provision of Air Aviation safety in the Western and central Africa region, ICAO developed between 1986 and 1987 a plan for the deployment and exploitation of a satellite telecommunications network called AEROSATEL. Eight stations were planned for Nigeria, one for Ghana and six for ASECNA countries.

1.2 The plan was adopted for implementation and subsequently funded by the European Commission in 1992.

1.3 Afterwards, the network was widened with the implementation of additional stations as follows:

a) in countries already having AEROSATEL stations (ASECNA and Ghana); and

b) in other countries and areas which were not originally provided with AEROSATEL stations such as:

Roberts FIR (VSAT)

SAL FIR , CANARIAS, ATLANTICO and CASABLANCA FIRs (CAFSAT network)
Indian Ocean (Mauritus, Ile de la Réunion)
Johannesburg FIR (SADC 1 network)
Alger FIR (VSAT)
Sao Tome, Banjul

1.4 The AEROSATEL network was later renamed AFISNET.

1.5 In order to monitor the network's performance and ensure service availability at all times, a Satellite Network Management Committee (SNMC) was set up under ICAO WACAF leadership to manage its operations.

1.6 This committee (SNMC) meets yearly and is hosted alternatively by a SNMC member State or by ICAO-WACAF.SNMC is thus an informal organization of the states hosting the network nodes and it works closely with WACAF in ensuring air navigation safety within the areas of AFI where it operates. SNMC is not a specialized AFI/RAN or APIRG instrument.

1.7 AFISNET is currently equipped with more than Seventy (70) Ground Earth Stations whose antenna aperture sizes vary from 11m (Intelsat Standard B) to 3.7m (Intelsat F1 type or VSAT). Basically therefore, AFISNET is a mixed VSAT (F1) and INTELSAT Standard B and F2 size Network.

1.8 Initially operating on two satellites, the network migrated in 2005 onto the new INTELSAT IS-10.02@359°E satellite which provides more efficient Saturated Flux Density and allows more flexibility. This migration was coordinated and carried out mutually by SNMC member States.

1.9 The network is still growing with two new stations coming on board. These are Aix (France) which is to interconnect with Algiers and Las Palmas (Spain) to interconnect with Nouadhibou.

2. DISCUSSION

2.1 Services supported by AFISNET

2.1.1 The services supported by AFISNET are mainly operational communications.

2.1.2 Aeronautical fixed service (AFS)

a) AFTN links and circuits have been implemented in the frame of AFI rationalized plan reviewed by APRIG meetings. One may note that several bilateral circuits have been implemented in order to have backup links to provide AFTN availability following AFI routing plans, in normal and contingency routing context; and

b) ATS/DS links and circuits implementation follows the same principles with bilateral circuits, taking into account the real needs of coordination between ATC and traffic growth. In order to provide ATS with ground/ground coordination communications tools, backup circuits are used. The backup circuits for ATS/DS are INMARSAT Geolink and PSTN phones; and

c) GTS is also supported within ASECNA and GCA by AFISNET in the frame of WMO transmission plan.

2.1.3 Aeronautical mobile service (AMS)

2.1.3.1 On the other hand AFISNET supports AMS with extended VHF coverage in NAMA (Nigeria), GCAA (Ghana), Roberts and ASECNA FIRs.

2.1.3.2 This mobile service is now the main requirement of the air traffic crews and airlines particularly in the frame of RVSM implementation in the AFI Region (IATA to confirm).

2.1.3.3 This AMS infrastructure is also ready to support ADS-B and GNSS augmentation signals in the frame of CNS/ATM and particularly ATN implementation in the AFI Region.

2.1.3.4 Thus, AFISNET performance and availability must be analyzed taking into account:

a) the width of the network with particular reference to the number of States involved;

b) the various components of the network (equipments, topology, protocols);

c) the supported services; and

d) the strategy of implementation of whole CNS/ATM components in the AFI Region.

2.2 AFISNET availability and performances

2.2.1 Availability and performance of AMS

2.2.1.1 The first AMS ER VHF stations using AFISNET were implemented in the Kano FIR with analogue remote VHF stations (1993-1994). This was followed by ASECNA with its first station in Dakar Fir (1996), Roberts Fir followed suit. GCAA's AMS ERVHF stations are deployed on a VSAT network operating within AFISNET.

2.2.1.2 The aim of these stations was to extend the VHF coverage in order to increase the **QoS** of voice communications between Air traffic Controllers and airlines Crews (in flight).

2.2.1.3 IATA strongly supports this project and the VHF coverage width and quality have been improved from year to year (IATA to confirm).

2.2.1.4 The recent VHF coverage survey conducted by IATA and some SNMC member states in July 2008 with the view of establishing whether suitable air-ground communications facilities were available for RVSM, gave encouraging results. For instance in the ASECNA Brazzaville FIR, it was noted by IATA that "Out of a *total of 99 communications reports provided by airlines and pilots, 83 were made by VHF. Analysis of the data indicates that* ***no flight crossed the FIR without contact with ATC. Compared to the Survey conducted in September 2007 by IATA, there has been increased use of VHF***" (*cf IATA July 2008 survey Report*).

2.2.1.5 AMS supported by AFISNET presents more and more Quality of Service as SNMC ANSP technical teams become more experienced in monitoring and maintaining the remote extended range VHF stations. Theses results must be maintain an consolidated.

2.2.2 Availability and performances of AFS

2.2.2.1 Built in order to overcome lack of communications around the Benin Gulf, AFISNET plays a key role in coordination between ATC.

2.2.2.2 Currently the performances of the circuits are not at the same level from one station to another.

2.2.2.3 While some main links and circuits (Dakar/Roberts, Dakar/Algiers, Niamey Algiers, Accra/Lomé, Accra/Cotonou, Lagos/Cotonou, Kano/N'Djamena, Dakar/Niamey, Niamey N'djamena, Maidiguri/N'Djamena) are operating properly, others (Lagos/Douala, Lagos/Libreville, Kano/Douala, Kano/Libreville, Accra/Lagos) have been unserviceable for a long time.

2.2.2.4 This situation is well known by SNMC member states and their causes were pointed out by regular and specialized technical SNMC meetings since SNMC 13 (Libreville, Gabon 13-16 January 2004). At the time of presenting this report, the Accra/Lagos link has been re-established (5 October 2008).

2.2.2.5 In order to provide reliable AFS services, backup solutions have been found particularly for ATS/DS service continuity so that ATC can coordinate flights and ensure the safety of air navigation.

2.3 Action taken by SNMC member States to restore the performances of the current failing circuits and future prospects for AFISNET

2.3.1 Coordinating actions for AFISNET management

2.3.1.1 Basically SNMC is the committee set up by AFISNET member states to yearly review the network availability and performance and discuss in a cooperative approach on the issue of the improvement of the network.

2.3.1.2 ICAO WACAF has always supported SNMC during the organisation of major activities meant to ensure the smooth operation and functioning of the network.

2.3.1.3 At times, specialized technical meetings are held to harmonize positions taken by individual SNMC Administrations and Organizations in order to find a balanced way to overcome the dysfunctions of the network.

2.3.1.4 SNMC 13, held in Libreville, Gabon from 13-16 January 2004, drew two important conclusions (**Conclusion 13/4 &13/10**) dealing with the necessity to ensure the network's sustainability and to finalize the Term of References for an audit of the network.

2.3.1.5 The following sessions of SNMC (**SNMC 14** held in Accra, Ghana from 17-21 January 2005 with conclusions 14/5; 14/6, 14/12; **SNMC 15** held in Abuja, Nigeria from 13-17 March 2006 with conclusion15/1, 15/2, 15/5, 15/7) further expanded on with these ideas and made progress in the formalization of the methodology for AFISNET improvement and re-engineering.

2.3.1.6 The ideas of Technical and Operational Personnel exchanges and training, **J**oint **T**echnical **A**udit of AFISNET, **S**hort **T**erm Enhancement **P**roject (**STEP**), AFS survey, Re-engineering AFISNET were deeply discussed, developed and adopted.

2.3.1.7 Conclusion 15/9 of SNMC 15 asked "AFISNET STATES AND ORGANIZATIONS to make appropriate arrangements and adopt appropriate technologies to achieve full integration of regional aeronautical VSAT network (AFSINET, SADC AND NAFISAT) in order to meet short medium and long term requirements for aeronautical fixed communications".

2.3.1.8 This task has been properly carried out because AFISNET is fully interconnected with CAFSAT, SADC2 and NAFISAT by using the appropriate technologies.

2.3.1.9 In a prospective context, Conclusion 15/10 of SNMC 15 encouraged SNMC member states to use AFISNET for CNS/ATM applications.

2.3.1.10 During **SNMC 16**, Dakar, Senegal, 17-19 December 2007 Administrations/Organizations were informed by ICAO that an ICAO appointed Consultant had conducted an Evaluation from Montreal.

2.3.1.11 After deliberations on the issue, the meeting could not adopt any conclusions related to the report of this evaluation for the main reasons that:

a) the evaluation was not based on the real case of the whole network because it was done without any visit by the Consultant to the sites hosting the network; and

b) the conclusions and proposals could not be analyzed fruitfully within the short time of the meeting.

2.3.1.12 On the other hand during this meeting, the main principles adopted by SNMC Administration/Organization related to AFISNET enhancement are:

a) Member States must coordinate their activities to quickly restore the current failing circuits. This work has already started with Accra/Ouagadougou (restored on March 2006), Lagos/ Cotonou (restored on June 2008), N'Djamena /Maidiguri, N'Djamena/Kano (restored on September 2008) and Accra/Lagos (restored on 5 October 2008). At the date of preparing this paper the other links will be restored in an on going cooperative process inside SNMC;

b) SNMC operational and maintenance personnel have the background of the network and must at first evaluate the end to end **QoS** of all the services supported by AFISNET, including aeronautical mobile services. This task is currently being carried out and the agenda of SNMC includes the review of AFS. AMS performance also is usually measured in coordination with IATA;

c) the request for the services of an external consultant for the re-engineering of the network would be finalised after the SNMC **J**oint **T**echnical **T**eam has carried out its survey and presented its report (SNMC 16 Conclusion 16/07) to SNMC Administrations/Organizations; and

d) the designation of project focal points of contact to coordinate the internal actions in each Administration/organization (Conclusion 16/08).

2.3.1.13 Following SNMC 16, an SNMC Coordination Meeting held in Dakar, Senegal on the 26 March 2008 adopted the Terms of Reference for the Joint Technical Evaluation, reviewed the Team of Experts lists for each Administration/Organization and set up a work programme to be followed until the end of March 2009.

2.3.1.14 Thus, in this way, SNMC member states have developed more practically the road map for final actions related to AFISNET evaluation and re-engineering.

2.3.2 Future prospects for AFISNET

2.3.2.1 Future prospects for AFISNET are based on the methodology of survey of the network:

a) as experts from the individual SNMC member states and organisations become involved in site visits and surveys and share their experiences and knowledge

among themselves, the sustainability and future growth of the network will be assured. The experience gained in the day to day engineering, maintenance and operation of AFISNET has already been recognized by **APIRG 13** (Sal Cap Cert, 25-29 July 2001 Conclusion 13/6);

b) as SNMC member states work more closely with each other, network availability and reliability will improve. This will give airlines greater confidence in flying within our FIRs. SNMC members are committed to this cause; and

c) SNMC members are collaborating with ICAO-WACAF in practical ongoing actions regarding he enhancement and the modernization of AFISNET. Such cooperative relationships assure us that AFISNET has a bright future and this should be encouraged and the experience shared.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) take note of the information provided above;

b) commend the SNMC cooperation mechanism and member Administrations/Organizations (particularly NAMA, ASECNA, GCAA, Roberts FIR) efforts under ICAO WACAF office leadership, aimed to enhance and upgrade AFISNET as required taking into account the experience and the skills of their operational and technical staff;

c) recommend that States/Administrations concerned pursue their efforts to meet the agreed requirements for fixed and mobile communications performance in terms of capability, availability, traffic delays, and interoperability through regional and interregional cooperation between interconnected/balanced networks; and

d) draw a suitable conclusion reflecting the current and future situation.

— END —