INTERNATIONAL CIVIL AVIATION ORGANIZATION

SUMMARY OF CONCLUSIONS

Fifteenth Meeting of the AFI Satellite Network (AFISNET) Management Committee

(SNMC/15)

(Abuja, Nigeria, 13 – 17 March 2006)

Prepared by ICAO Western and Central African Office

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1. GENERAL

1.1. **Introduction**

1.1.1.　　　　The meeting was held in the Conference Room of Rockview Hotels, Abuja from 13 to 17 March 2006, at the kind invitation of the Nigerian Airspace Management Agency (NAMA).

1.2 **Objectives**

1.2.1　　　　The main objectives of the meeting were to assess the performance of AFISNET satellite network, coordinate the implementation of the Short-Term Enhancement Programme agreed upon at the Coordination Meeting on the network sustainability convened by ICAO Regional Office and held in Dakar in May 2003 (APIRG Conclusion 15/12 refers), coordinate preparations for the Joint Technical Audit of AFISNET in coordination with ICAO in view of the re-engineering of the network as part of an integrated regional VSAT infrastructure.

1.3. **Attendance**

1.3.1.　　　　The meeting was attended by ninety four (94) participants from Angola, Ghana, Nigeria, ASECNA representing seventeen (17) States, Roberts FIR representing three (3) States and one (1) AFISNET network supplier: INEO (France).   A list of participants is at **Appendix A** to this report.

1.4. **Organization**

Secretariat

1.4.1.　　　　The meeting's Secretariat was composed of representatives from ASECNA, GCAA, Ghana, NAMA and Roberts FIR. They were assisted by Mr. Prosper Zo'o Minto'o, Regional Technical Officer, Communications, Navigation and Surveillance from the Western and Central African Office of ICAO, as Coordinator. Mr. Masoud Paydar, Technical Officer, CNS from ICAO Headquarters also attended.

Opening

1.4.2.　　　　The welcome address was given by Mr. Roland Iyayi, Managing Director of NAMA. He welcomed the participants and expressed his gratitude to the ICAO Secretariat for assisting in the coordination of SNMC activities and meetings, and providing guidance as required. He expressed his conviction that SNMC/15 offered an opportunity for the participants to further analyze the adjustments to be implemented in aeronautical communications using new technologies, including the implementation of CNS/ATM applications. He also outlined NAMA plans for CNS/ATM systems.

Working language and documentation

1.4.3.　　　　The discussions were conducted in English and the meeting documentation was issued in English language.

1.5. **Agenda**

1.5.1.　　　　The meeting adopted the following agenda:

1) Follow up on SNMC/14 Conclusions

2) Review of operational statistics from Administrations/Organizations

3) Turnaround times statistics by Administrations/Organizations

4) Sustainability of AFISNET network

    a) Implementation of a coordinated short term enhancement programme

    b) Implementation of a joint technical audit of the network and network re-engineering

    c) Projects update

5) VSAT networks integration

6) New Form of Agreement

7) Any other business

    a) CNS/ATM implementation

    b) Presentations by the Industry

    c) Venue and date of next meeting

    d) ICAO support to SNMC

1.6. List of conclusions

1.6.1.   The conclusions formulated by the meeting are listed in **Appendix B** to this report.

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2. REPORT ON DISCUSSIONS

2.1.   Report on Agenda Item 1: Follow up on SNMC/14 Conclusions

2.1.1   The meeting reviewed follow-up action taken by AFISNET Administrations/Organizations on SNMC/14 Conclusions. It particularly noted that, in line with SNMC Conclusion 14/01, Ghana (GCAA) sent two technical personnel to Nigeria (Lagos) in November 2005 for two weeks. Nigeria (NAMA) is yet to reciprocate with this requirement but intends to send four technical personnel to Accra. Also, it strongly advocated for proper training and re-training of personnel with reasonable period of training duration encouraged. Learning of French and English languages as applicable for proper coordination was also solicited. The following conclusion was formulated:

CONCLUSION 15/01:   FOLLOW-UP ON CONCLUSIONS FROM PREVIOUS SNMC MEETINGS

THAT CONCERNED AFISNET MEMBER STATES AND ORGANIZATIONS IMPLEMENT SNMC OUTSTANDING CONCLUSIONS ON THE FOLLOWING:

a) **IMPLEMENTATION OF A COORDINATED SHORT-TERM ENHANCEMENT PROGRAMME (STEP);**

b) **EXCHANGE OF PERSONNEL BETWEEN CENTRES ;**

c) **TRAINING OF PERSONNEL, INCLUDING LANGUAGE PROFICIENCY (ENGLISH/FRENCH);**

d) **DEVELOPMENT OF COMMON MAINTENANCE MONITORING AND PERFORMANCE ASSESSMENT TOOL, INCLUDING SIGNING OF LETTERS OF AGREEMENT ;**

e) **IMPLEMENTATION OF A JOINT TECHNICAL AUDIT OF THE NETWORK ; AND**

f) **ESTABLISHMENT OF SNMC TECHNICAL WORKING GROUP.**

2.2   Report on Agenda Item: Review of operational statistics from Administrations/Organizations and performance of stations

Review of operational statistics

2.2.1.   When reviewing statistical data provided by Administrations and Organizations on AFS circuit availability rates, the meeting acknowledged that with few exceptions, there were still problems on several links supported by AFISNET. It noted that Accra/Lagos and Accra/Kano links were re-established only in December 2005 due to a switch problem in Lagos since 2004, and that similar problems were being encountered on the Kano/Douala, Lagos/Douala and N'djamena/Kano links. Also, some poor statistics under investigations were recorded many links within ASECNA and Roberts FIR administrative areas.

2.2.2   The meeting expressed concerns at the persistence of zero availability in Lagos with international stations. This situation was traced to the faulty aeronautical message switch (AMS) in Lagos centre. Kano AMS is also overdue for replacement as it remains Nigeria's only gateway to international stations. The meeting therefore called upon NAMA as a matter of urgency to replace the AMS in Lagos and Kano so as to guarantee continuous operation of aeronautical fixed services with all international links.

> **CONCLUSION 15/02:   CIRCUIT AVAILABILITY**
>
> **THAT ASECNA, GCAA AND NAMA ENDEAVOUR TO RESTORE STABILITY AND RELIABILITY OF THE FOLLOWING LOW PERFORMANCE LINKS BY 31 MAY 2006:**
>
> > a)   **ACCRA/BRAZZAVILLE;**
> > b)   **KANO/ACCRA;**
> > c)   **KANO/DOUALA;**
> > d)   **KANO/LIBREVILLE;**
> > e)   **LAGOS/ACCRA**
> > f)   **LAGOS/DOUALA; AND**
> > g)   **LAGOS/LIBREVILLE**

> **CONCLUSION 15/03:   REPAIR OF FAULTY NAMA AFTN MESSAGE SWITCHES (AMS)**
>
> **THAT, AS A MATTER OF URGENCY, NAMA ENSURE THAT THE INTERNATIONAL AMS EQUIPMENT IN NIGERIA ARE REPLACED TO RESTORE AFTN TRAFFIC FLOW WITH ALL CORRESPONDENT STATIONS.**

Performance of stations and contractors' systems

2.2.3.   Reports generally indicated that not many problems were experienced with contractors' systems and equipment as most Administrations had replaced some problematic components with newer systems. The only complains raised were on the frequency of resetting the MOL2P. This is a problem which is affecting most sites and which CORIS is to look into for a possible solution by 31st May 2006.

2.3   Report on Agenda Item 3: Turnaround time statistics by Administrations/Organizations

2.3.1.   The meeting reviewed turnaround time statistics compiled by ASECNA from 2001 to 2004 concerning their suppliers as shown in self-explanatory tables below, confirming the need for replacing ageing equipment in a number of AFISNET stations [Note1]:

COST (EUROS)										
	AE2I	ALCATEL	BECKER	CORIS	DEGREANE	GS COM	MEGA	NAVCONTR	SAGEM	SEEE	THALES
2001	1063	2489	423	1888	1524	1826	418	227	279	594	2253
2002	941	3825	374	1679	1418	741	659	676	833	479	1201
2003	657	3090	314	1131	1605	925	882	450	770	1732	957
2004	1022	3654	441	1578	1511	883	877	1085	972	1267	2105

TIME (MONTHS)										
	AE2I	ALCATEL	BECKER	CORIS	DEGREANE	GS COM	MEGA	NAVCONTR	SAGEM	SEEE	THALES
2001	4,5	6,3	2,9	4,6	6,8	4,1	2,5	3,2	1,8	3,8	6,6
2002	4,4	5,5	3,1	3,8	3	2	1,2	4,1	3,8	3,7	5,3
2003	2,4	3,2	2,9	4,2	4,7	2,3	1,4	5,4	3,1	2,7	3
2004	2,2	2,8	3	4,2	5,6	1	1	2,1	1,1	2,5	1,6

QUANTITY OF SPARE PARTS										
	AE2I	ALCATEL	BECKER	CORIS	DEGREANE	GS COM	MEGA	NAVCONTR	SAGEM	SEEE	THALES
2001	4	60	18	14	11	17	17	7	79	22	19
2002	24	64	15	32	8	10	15	6	47	27	6
2003	30	60	14	6	16	4	42	2	67	16	7
2004	20	48	17	14	8	18	21	13	34	13	28

2.3.2   The following conclusion was formulated:

CONCLUSION 15/04:   TURNAROUND TIME STATISTICS

THAT:

A) AFISNET ADMINISTRATIONS AND ORGANIZATIONS SUBMIT THEIR TURNAROUND TIME STATISTICS TO SNMC MEETINGS; AND

B) ASECNA ADVISE AFISNET ADMINISTRATIONS AND ORGANIZATIONS BY 31 MAY 2006 ON COMMON EQUIPMENT PARTS THEY ARE CAPABLE OF REPAIRING, WITH A VIEW TO BOOSTING COOPERATION AND FURTHER CUTTING TURNAROUND TIMES DOWN.

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[1] Note : AEROSATEL component.

2.4 Report on Agenda Item 4: Sustainability of AFISNET network

Implementation of a coordinated short term enhancement programme

2.4.1. The meeting reviewed the list of the deficiencies affecting aeronautical fixed services (AFTN and ATS/DS) in AFISNET flight information regions established in Western and Central Africa, and noted that a great number of key AFTN and ATS/DS circuits were yet to be implemented (See **Appendix C** to this report), which resulted in lack of coordination between some air traffic services units, and of ATS, AIS and OPMET messages.

2.4.2. The meeting was informed that APIRG/15 expressed concerns at the continuous degradation of AFISNET performance in terms of availability, efficiency and maintainability over the past three years, namely in the Gulf of Guinea. In this connection, APIRG/15 therefore urged Ghana, Nigeria, ASECNA and Roberts FIR to implement an enhancement programme in order to restore the stability and reliability of the ageing network (APIRG Conclusion 15/12 refers).

2.4.3. The meeting observed that the IBS system in the network was at its end of life and that the sustainability was difficult due to long turnaround times and difficulties in sourcing spares. It therefore re-iterated the need for a short-term enhancement programme (STEP), the implementation of which had been called upon since May 2003.

2.4.4. The meeting recognized that the exchange of technical personnel between Administrations/Organizations had been demonstrated to be very useful and as such should be continued. In this connection, Ghana was able to send its personnel to Lagos and Dakar in 2005 and will send some more personnel this year. It noted that NAMA was expected to also send its personnel from Lagos and Kano to Ghana before the end of May 2006. Likewise, ASECNA was expected to send some of its staff to GCAA and NAMA by July 2006. When and where the need arises, Administrations should call for technical assistance from others who should dispatch experts with the requisite knowledge to assist them. The tickets, boarding and lodging and sustenance for such experts should be borne by the requesting Administrations.

2.4.5. All Administrations should prepare and exchange data on available common network spares (IBS) by 31 May 2006. When a critical need arises, such spares could be loaned to an Administration/Organization that has need of them.

2.4.6 Apart from areas where there is the critical need to replace faulty or malfunctioning equipment with new units, Administrations were urged to maintain healthy units in operation until the re-engineering is initiated and completed. This is to ensure that we do not spend money on replacements now only to scrap them a few years down the line.

2.4.7. The following conclusion was formulated:

CONCLUSION 15/05: COORDINATED SHORT-TERM ENHANCEMENT PROGRAMME (STEP)

THAT, IN IMPLEMENTING THE COORDINATED SHORT-TERM ENHANCEMENT PROGRAMME, CONCERNED AFISNET ADMINISTRATIONS AND ORGANIZATIONS SHOULD:

a) GIVE HIGH PRIORITY TO THE REPLACEMENT OF ALL AGEING IBS MODULATORS/DEMODULATORS AND TO THE INVENTORY OF COMMON SPARE PARTS. ACCORDINGLY, THEY SHOULD PREPARE AND EXCHANGE DATA ON AVAILABLE COMMON NETWORK SPARES (IBS) BY 31 MAY 2006. WHEN A CRITICAL NEED ARISES, SUCH SPARES COULD BE LOANED TO AN ADMINISTRATION THAT HAS NEED OF THEM; AND

      b) **WHEN AND WHERE THE NEED ARISES, CALL FOR TECHNICAL ASSISTANCE FROM OTHERS WHO SHOULD DISPATCH EXPERTS WITH THE REQUISITE KNOWLEDGE TO ASSIST THEM. IN SO DOING, TICKETS, BOARDING AND LODGING AND SUSTENANCE FOR SUCH EXPERTS SHOULD BE BORNE BY THE REQUESTING ADMINISTRATIONS.**

2.4.8.   The meeting took note of the need to have standard maintenance procedures well coordinated at each centre. The maintenance personnel of adjacent FIRs were therefore required to list out contact persons and telephone numbers for each centre to enable coordinated maintenance procedures.

Implementation of a joint technical audit of the network and network re-engineering

Joint Technical Audit

2.4.9.   Mindful of APIRG/15 deliberations on AFISNET calling upon Ghana, Nigeria, ASECNA and Roberts FIR to take the necessary steps to expedite the conduct of a joint external technical audit in view of the network re-engineering (Conclusion 15/12 refers), the meeting agreed on the necessity of implementing the required Joint Technical Audit as a matter of urgency.

2.4.10.   In this connection, the meeting took cognizance of an ICAO Council approved Special Implementation Project (SIP) on the technical audit of AFISNET network and commended ICAO for the significant support so provided. Considering the limited resources available, views were therefore exchanged on ways and means of coordinating ICAO and AFISNET members' efforts and carrying out the audit in an efficient and timely manner. It was agreed that STEP coordinators from AFISNET Administrations and Organizations and the selected network auditor were to embark upon a Joint Technical Audit of the network by visiting selected sites. The meeting concluded that the Regional Office of ICAO for Western and Central Africa (WACAF) will carry out the necessary coordination of AFISNET audit related activities.

2.4.11.   The meeting agreed that the Terms of Reference for AFISNET Joint Technical Audit should be finalized within one month of ending SNMC 15 i.e. by 30th April 2006. It was suggested that an appropriate advertisement should thereafter be posted on the ICAO website for interested companies/consultants with the requisite experience and competence to submit proposals [Note 2]. Concerned AFISNET members will have to fund their representatives (one each from NAMA, ASECNA, GCAA and ROBERTS FIR) who would be involved in the technical audit of AFISNET. All the arrangements related to the Joint Technical Audit should be finalized by June 2006, and the exercise should be completed within one month as only selected sites within the network will be sampled. The following conclusion was formulated:

    CONCLUSION 15/06:   **JOINT TECHNICAL AUDIT AND RE-ENGINEERING OF AFISNET IN VIEW OF VSAT NETWORK INTEGRATION**

    THAT, IN COORDINATION WITH THE ICAO REGIONAL OFFICE, AFISNET STATES AND ORGANIZATIONS:

      a) **REVIEW AND AMEND AS NECESSARY THE TERMS OF REFERENCE FOR THE JOINT TECHNICAL AUDIT OF THE NETWORK; AND**

      b) **IMPLEMENT THE JOINT TECHNICAL AUDIT IN VIEW OF THE RE-ENGINEERING OF THE NETWORK AND ITS INTEGRATION WITH SADC/2 AND NAFISAT NETWORKS.**

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2 Note: At the time of writing this report, ICAO has already selected a consultant for the Special Implementation Project (SIP) on the audit of AFISNET.

Projects update

2.4.12. The following information was provided to the meeting:

- GCAA has since the 1st week of March 2005, installed a VSAT terminal in Sao Tome which is being used to provide ATS/DS, AFTN and Extended Range VHF over the southern oceanic portion of the Accra FIR.

- The installation at Ouagadougou of another VSAT terminal by GCAA has still not been given the clearance by ASECNA. Further discussions are to be held on the issue for a possible installation this year.

- NAMA has replaced traveling-wave tubes high power amplifiers (TWT HPAs) at Kano, Lagos and Abuja Earth Stations with solid state power amplifiers (SSPAs). Additionally, the modulators/demodulators and up/down converters at Ilorin have been upgraded.

- NAMA has implemented total VHF coverage within Kano FIR region. However, interference and echo problems in the air-ground down link were being experienced.

2.5   Report on Agenda Item 5: VSAT networks integration

Integration at sub-regional level (AFISNET area)

2.5.1.   The meeting recognized that the use of proprietary systems by various member Administrations was to a large extent a limiting factor to AFISNET internal connectivity. It noted that connectivity could be achieved at baseband level in some cases.

2.5.2.   The meeting however concluded that direct links between centres be established as and where deficiencies still exist, they should be eliminated as soon as practicable.

> CONCLUSION 15/07:   IMPROVEMENT OF AFISNET CONNECTIVITY
>
> THAT, IN ORDER TO IMPROVE AFISNET CONNECTIVITY, CONCERNED STATES AND ORGANIZATIONS EXPLORE ALL AVENUES TO IMPLEMENT THE FOLLOWING AFS LINKS:
>
> a)   ACCRA/OUAGADOUGOU;
> b)   ACCRA/BOBO-DIOULASSO;
> c)   BRAZZAVILLE/LUANDA;
> d)   BRAZZAVILLE/SAO TOME; AND
> e)   LIBREVILLE/SAO TOME.

Integration at regional level (AFI Region)

2.5.3.   A comprehensive presentation by the ICAO Secretariat provided the meeting with an overview of the issues associated with the implementation, operation and evolution of the communication networks that are based on very small aperture terminal (VSAT) technology and are used in some ICAO Regions mainly to support the provision of the aeronautical fixed service (AFS). A summary of the presentation is provided in the following paragraphs.

Interconnection problems

2.5.4.   Interconnection between two VSAT networks is in general more complex, especially if the networks use different satellites, access schemes and protocols. In general, interconnection of VSAT networks increases complexity/cost and degrades the overall performance (especially for voice communications). As such, ideally where there is proper satellite coverage over a certain area, efforts should be made to implement a single VSAT network. Unfortunately, in practice this principle has not always been followed mainly on non-technical grounds. Hence the need for a solution to the growing problem of interconnection between neighbouring digital networks, especially if one or more are VSAT- based.

Use of Internet Protocol (IP) technology

2.5.6.   It was the view of the Secretariat that Internet Protocol (IP) based networks, provide the optimum means of establishing regional/inter-regional aviation intranets that would enable access by all users to vast resources available on the Internet (e.g. aeronautical meteorology and other data bases).

2.5.7.   Another point considered was the need to exploit all the possibilities that modern technology offers. For example, the exchange of OPMET data by table-driven codes that will be phased in through amendments to Annex 3 — *Meteorological Service for International Air Navigation* between 2007 and 2016*)* cannot be accomplished by AFTN protocols. As such, the use of the Internet Protocol Suite (IPS) and associated Internet-based software (e.g. e-mail) should

be further encouraged.

Standardization issues

2.5.8.   The choice of the medium (e.g. terrestrial or satellite) for the provision of the AFS has never been the subject of Standardization by ICAO. The interconnection between two digital networks is a local matter that involves recovery of the bit streams from one and reformatting them for transmission over the other. In this regard, it would be fair to say that it is not practical for ICAO to develop provisions covering all possible types of physical and protocol interfaces. However, certain performance-based provisions could be developed to govern the end-to-end requirements and to narrow the choices for technologies employed.

2.5.8.   In addition to ICAO's work on provisions relating to the use of the IP, Internet and related protocols for aeronautical applications [Note3], it should be noted that provisions have already been developed to use an IP network as a subnetwork of the aeronautical telecommunication network (ATN).

2.5.9.   In summary, although not yet standardized by ICAO, IP is the most widely method of networking that provides global connectivity in the most economical manner. Moreover, all indications are that IP will (in the form of IP Version 6 with its enhanced security features) continue to be the dominant technology of the foreseeable future. Therefore, where available and cost effective, the alternative of leasing an IP-based virtual private network (VPN) for aeronautical applications should be duly considered. Again, a universally agreed set of end-to-end performance requirements would greatly facilitate the formulation and administration of contracts for obtaining such services *(Sixth Meeting of APIRG Communications Sub-group - September 2002 -, Conclusion 6/9 refers)*. The following conclusion was formulated:

CONCLUSION 15/08:   IMPLEMENTATION OF INTERNET PROTOCOL SUITE

THAT:

1) AFISNET STATES AND ORGANIZATIONS:

   a) WORK TOWARDS SEAMLESS REGIONAL/INTER-REGIONAL DIGITAL COMMUNICATION NETWORKS BASED ON THE INTERNET PROTOCOL SUITE (IPS); AND

   b) GIVE DUE CONSIDERATION TO MANAGED NETWORK SERVICES (E.G. A VIRTUAL PRIVATE NETWORK (VPN)) SUBJECT TO AVAILABILITY AND COST-EFFECTIVENESS.

2) ICAO BE REQUESTED TO EXPEDITE ITS WORK ON:

   a) THE STANDARDIZATION OF THE INTERNET PROTOCOL SUITE FOR THE STATES AND ORGANIZATIONS TO IMPLEMENT IT IN CONFORMITY WITH ARTICLE 28 OF THE CHICAGO CONVENTION; AND

   b) THE ESTABLISHMENT OF A UNIVERSALLY AGREED SET OF END-TO-END PERFORMANCE REQUIREMENTS TO FACILITATE THE FORMULATION AND ADMINISTRATION OF CONTRACTS FOR OBTAINING MANAGED NETWORK SERVICES.

2.5.10.   The meeting considered the characteristics of regional/interregional VSAT networks involving AFI States (i.e. AFISNET, SADC, NAFISAT and CAFSAT) as summarized in Table below:

Characteristics of VSAT Networks involving AFI States

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[3] *Note : ICAO Doc 9855 – Use of Public Internet for Aviation Applications.*

Region	Designation	States/Area served	Satellite used	Topology	Access technique	Year of Comple-tion	Remarks
AFI	AFISNET	26 States (mainly in West Africa)	Intelsat 10-02	Mesh	FDMA, SCPC	1995	
	SADC/1	16 States in South African subregion	Intelsat 604	Hybrid	FDMA, DAMA	1999	To be decom-missioned after SADS/2
	SADC/2	As above	Intelsat 10-02	Mesh	MF-TDMA or MCPC F.R.	2007 (planned)	To replace SADC/1
	NAFISAT	16 States in N.E. Africa and Middle East	Intelsat 10-02	Mesh	MF-TDMA or MCPC F.R.	2007 (planned	Similar to SADC/2
Inter-Regional (SAT)	CAFSAT	8 States (in AFI, EUR and SAM)	Intelsat 801	Mesh	SCPC and MCPC	2000	

2.5.11. Due to dissimilarities between VSAT systems characteristics, 18 or so ANP requirements for AFS links concerning AFISNET centres have not yet been implemented (or implemented satisfactorily) as shown in Table below:

ATS/DS		AFTN	
Links	Networks	Links	Networks
1. Abidjan/Luanda	AFISNET/SADC	1. Brazzaville/Nairobi	AFISNET/NAFISAT
2. Accra/Luanda	AFISNET/SADC	2. Brazzaville/Luanda	AFISNET/NAFISAT
3. Accra/Bobo Dioulasso	AFISNET/AFISNET	3. Niamey/Addis Ababa	AFISNET/NAFISAT
4. Accra/Ouagadougou	AFISNET/AFISNET	4. Brazzaville/Sao Tome	AFISNET/AFISNET
5. Algiers/Tripoli	AFISNET/NAFISAT		
6. Brazzaville/Khartoum	AFISNET/NAFISAT		
7. Brazzaville/Luanda	AFISNET/SADC		
8. Libreville/Sao Tome	AFISNET/AFISNET		
9. N'djamena/Khartoum	AFISNET/NAFISAT		
10. N'djamena/Tripoli	AFISNET/NAFISAT		
11. Niamey/Tripoli	AFISNET/NAFISAT		
12. Nouadhibou/Las Palmas	AFISNET/CAFSAT		
13. Nouakchott/Las Palmas	AFISNET/CAFSAT		

2.5.12. The meeting therefore recognized that the integration of VSAT systems will help achieve full connectivity. It also recognized that migration of AFISNET services onto Intelsat Satellite IS 10-02 in 2004 marked a significant step towards VSAT networks integration and that, considering SADC/2 and NAFISAT projects [Note4], some further steps were required, including making a clear decision on the technologies and management policy to be implemented to ensure full integration with SADC/2 and NAFISAT.

2.5.13. In view of the above, the meeting formulated the following conclusion.

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[4] *Note : Although they are governed by separate institutional arrangements, the two networks have similar specifications and are intended to operate as a single network.*

CONCLUSION 15/09:   VSAT INTEGRATION

THAT AFISNET STATES AND ORGANIZATIONS MAKE APPROPRIATE ARRANGEMENTS AND ADOPT APPROPRIATE TECHNOLOGIES TO ACHIEVE FULL INTEGRATION OF REGIONAL AERONAUTICAL VSAT NETWORKS (AFSINET, SADC AND NAFISAT) IN ORDER TO MEET SHORT, MEDIUM AND LONG TERM REQUIREMENTS FOR AERONAUTICAL FIXED COMMUNICATIONS.

2.6   Report on Agenda Item 6: New Form of Agreement

2.6.1.   After further analysis, the meeting noted that institutional arrangements were included in the Terms of Reference of the Joint Technical Audit for the re-engineering of AFISNET and that, subsequently, the issue of a new form of agreement should not be considered until the audit recommendations are made available.

2.7   Report on Agenda Item 7: Any other business

CNS/ATM implementation

Automatic Dependent Surveillance – Broadcast (ADS-B)

2.7.1.   The Secretariat provided the meeting with a presentation on ADS-B which is *a means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode*.

2.7.2.   The presentation focused on 1090 MHz extended squitter (ES) recognized as the most common element in early implementations of ADS-B (11th Air Navigation Conference, Rec.7/1), standardized by ICAO (Annex 10, Volumes III and IV supplemented by a new manual), with certified airborne equipment and ground stations (for air-to-ground ADS-B) commercially available. The need for a proper ground infrastructure to ensure timely delivery of ADS-B messages to ATS units was underscored (proper availability, integrity, transit time, etc, in order for the data to be operationally useful). The meeting noted further steps to be addressed by ICAO, including:

-         general ADS-B performance requirements,
-         SARPs for ES ground stations,
-         provisions for merging and sharing of surveillance data (including ADS-B),
-         a roadmap for the evolution of air-ground and air-air surveillance,
-         a report on other emerging surveillance techniques (e.g. multilateration), and
-         a report on 1030/1090 RF pollution problem.

Use of VSAT technology to support GNSS applications

2.7.3.   ASECNA provided a presentation on the use of AFISNET in GNSS trials (EGNOS Test Bed), showing that GNSS data transmission was performing satisfactorily (in less than a second) between a RIMS installed in Dakar and the EGNOS Central Processing Facility located in Norway (Honefoss) via an ASECNA-owned AFISNET node in Toulouse (France). After discussions, the meeting adopted the following conclusion:

> CONCLUSION 15/10:   USE OF AFISNET FOR CNS/ATM APPLICATIONS
>
> THAT AFISNET ADMINISTRATIONS AND ORGANIZATIONS HOLD MONTHLY STATISTICS ON MAINTENANCE PARAMETERS (MTBF, MTTR) CONCERNING THEIR VSAT NODES, IN VIEW OF CNS/ATM APPLICATIONS WITHIN THEIR MANAGED FLIGHT INFORMATION REGIONS (NEED FOR PROPER COMMUNICATIONS INFRASTRUCTURE TO SUPPORT RNP5, RVSM, GNSS AND ADS-B OPERATIONS).

Presentations by the Industry

2.7.4.   A network supplier, INEO (France) provided the meeting with a useful presentation on general considerations on telecommunications and CNS/ATM systems, for use when addressing AFISNET re-engineering. Another presentation was made by SOLACOM Corporate. The two presentations were distributed to the participants.

ICAO support to AFI Satellite Network Management Committee (SNMC)

2.7.5   SNMC members expressed their gratitude to ICAO for its continuous support since the inception of the Management Committee, by coordinating AFISNET related activities, facilitating and participating in SNMC meetings, and providing technical guidance and advice as necessary, through WACAF Office.

2.7.6   They particularly acknowledged the tremendous effort made by ICAO in arranging for a Headquarters Technical Officer's attendance to SNMC/15, thus confirming the importance accorded at the highest level of the Organization to constantly provide assistance to States and Regions in improving the air navigation infrastructure, in the interest of safety and efficiency of air transport operations. As an experienced Secretary to ICAO technical panels, TO/CNS helped participants better understand the *state of art* in new aeronautical communications concepts and technologies, and related planning and implementation strategies at regional and global level.

2.7.7   SNMC members also re-iterated their gratitude to ICAO Council for approving a special implementation project for the audit of AFISNET.

Venue and date of Next Meeting

2.7.8.   The meeting welcomed Roberts FIR's offer to host the next meeting of the Committee (SNMC/16) in Conakry, Guinea, in the first quarter 2007. Further coordination will be carried out between Roberts FIR and the ICAO Regional Office concerning the exact date of the meeting.

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3. APPENDICES

APPENDIX A

LIST OF PARTICIPANTS				
STATE/ ORGANIZATION	**NAME**	**ADDRESS**		
			ELECTRONIC MAIL	**TEL**
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SNMC/15 Report

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APPENDIX B – SUMMARY OF CONCLUSIONS	
Conclusions	**Follow up action by**

Conclusion 15/01: **Follow-up on Conclusions from previous SNMC Meetings**
 	
 That concerned AFISNET member States and Organizations implement SNMC outstanding Conclusions on the following:
    a) Implementation of a coordinated short-term enhancement programme (STEP);
    b) Exchange of personnel between centres ;
    c) Training of personnel, including language proficiency (English/French);
    d) Development of common maintenance monitoring and performance assessment tool, including signing of letters of agreement ;
    e) Implementation of a Joint Technical Audit of the Network ; and
    f) Establishment of SNMC Technical Working Group.
	ASECNA, GCAA (Ghana), NAMA (Nigeria) and Roberts FIR
	
	 All members
	
	 All members
	
	 ASECNA, GCAA (Ghana), NAMA (Nigeria), Roberts FIR and ICAO Regional Office

Conclusion 15/02: **Circuit Availability**
 	
 That ASECNA, GCAA and NAMA endeavour to restore stability and reliability of the following low performance links by 31 May 2006:
    a) Accra/Brazzaville;
    b) Kano/Accra;
    c) Kano/Douala;
    d) Kano/Libreville;
    e) Lagos/Douala; and
    f) Lagos/Libreville
	ASECNA, GCAA and NAMA

Conclusion 15/03: **Turnaround Time Statistics** That: a) AFISNET Administrations and Organizations submit their turnaround time statistics to SNMC meetings; and b) ASECNA advise AFISNET Administrations and Organizations by 31 May 2006 on common equipment parts they are capable of repairing, with a view to boosting cooperation and further cutting turnaround times down.	All members ASECNA

APPENDIX B – SUMMARY OF CONCLUSIONS	
Conclusions	**Follow up action by**

Conclusion 15/04:   **Coordinated Short-term Enhancement Programme (STEP)**
 	
That, in implementing the coordinated Short-term enhancement programme, concerned AFISNET Administrations and Organizations should:
 	
   a) give high priority to the replacement of all ageing IBS modulators/demodulators and to the inventory of common spare parts. Accordingly, they should prepare and exchange data on available common network spares (IBS) by 31 May 2006. When a critical need arises, such spares could be loaned to an Administration that has need of them; and
 	
   b) when and where the need arises, call for technical assistance from others who should dispatch experts with the requisite knowledge to assist them. In so doing, tickets, boarding and lodging and sustenance for such experts should be borne by the requesting Administrations.
	ASECNA, GCAA (Ghana), NAMA (Nigeria) and Roberts FIR

Conclusion 15/05: **Repair of faulty NAMA AFTN Message Switches (AMS)** That, as a matter of urgency, NAMA ensure that the international AMS equipment in Nigeria are replaced to restore AFTN traffic flow with all correspondent stations.	NAMA (Nigeria)

Conclusion 15/06:   **Joint Technical Audit and Re-engineering of AFISNET in view of VSAT network integration**
 	
That, in coordination with the ICAO Regional Office, AFISNET States and Organizations:
 	
   a) Review and amend as necessary the terms of reference for the joint technical audit of the network; and
 	
   b) Implement the Joint Technical Audit in view of the re-engineering of the network and its integration with SADC/2 and NAFISAT networks.
	Audit: ASECNA, GCAA (Ghana), NAMA (Nigeria), Roberts FIR, ICAO Regional Office
	Re-engineering: All members

APPENDIX B – SUMMARY OF CONCLUSIONS	
Conclusions	**Follow up action by**

Conclusion 15/07:   **Improvement of AFISNET Connectivity**
 	
That, in order to improve AFISNET connectivity, concerned States and Organizations explore all avenues to implement the following AFS links :
 	
   a)   Accra/Ouagadougou;
   b)   Accra/Bobo-Dioulasso;
   c)   Brazzaville/Luanda;
   d)   Brazzaville/Sao Tome; and
   e)   Libreville/Sao Tome.
	ASECNA, ENANA (Angola), ENASA (Sao Tome and Principe) and GCAA (Ghana)
	
	ASECNA and GCAA to pursue discussions on ways of interconnecting their VSAT systems to implement Accra/Ouagadougou link.

Conclusion 15/08:   **Implementation of Internet Protocol Suite**
 	
That:
   1) AFISNET States and Organizations:
 	
     a)   Work towards seamless regional/inter-regional digital communication networks based on the Internet Protocol Suite (IPS); and
     b)   Give due consideration to managed network services (e.g. a virtual private network (VPN)) subject to availability and cost-effectiveness.
   2) ICAO be requested to expedite the work on:
     a)   Standardization of the Internet Protocol Suite for the states and organizations to implement it in conformity with Article 28 of the Chicago Convention;
     b)   Establishment of a universal agreed set of end-to-end performance requirements to facilitate the formulation and administration of contracts for obtaining managed network services.
	All members
	
	ICAO Regional Office

Conclusion 15/09: **VSAT Integration** That AFISNET Administrations and Organizations make appropriate arrangements and adopt appropriate technologies to achieve full integration of regional aeronautical VSAT networks, in order to meet short, medium and long term requirements for aeronautical fixed communications.	All members
Conclusion 15/10: **Use of AFISNET for CNS/ATM Applications** That AFISNET Administrations and Organizations hold monthly statistics on maintenance parameters (MTBF, MTTR) concerning their VSAT nodes, in view of CNS/ATM applications within their managed flight information regions (proper communications infrastructure to support RNP5, RVSM, GNSS and ADS-B operations).	All members

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APPENDIX C: AFS (AFTN AND ATS/DS) DEFICIENCIES
(MARCH 2006)

Nb of AFTN deficiencies

Nb of ATS_DS deficiencies