

**INTERNATIONAL CIVIL AVIATION ORGANIZATION  
WESTERN AND CENTRAL AFRICAN OFFICE**



**EIGHTEENTH MEETING OF AFI SATELLITE NETWORK  
MANAGEMENT COMMITTEE (SNMC/18)**

**FINAL REPORT**

**Ouagadougou, Burkina Faso, 01-04 June 2010**

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## **PART I – HISTORY OF THE MEETING**

### **1. Introduction**

1.1 The Eighteenth Meeting of the AFI Satellite Network Management Committee (SNMC/18) was held at the Splendid Hotel in Ouagadougou, Burkina Faso, from 01 to 04 June 2010, at the kind invitation of ASECNA.

1.2 The meeting was opened by Mr. **Mathieu BOUDA**, Deputy Minister of Transport of Burkina Faso. He welcomed the participants and pointed out the interest SNMC members States have in the outcome of the meeting and expressed that AFISNET has become a good example of cooperation to ensure a cost effective provision of reliable Telecommunications Service for Air Navigation in the AFI region. He outlined SNMC member states achievements, in particular, those pertaining to ASECNA in the field of satellite based communications to support its ATM objectives. He expressed his conviction that with SNMC/18, AFISNET management should reach maturity after 20 years of experience. He recalled the Special AFI/RAN meeting conclusion 6/18 calling for AFISNET evaluation and re-engineering as an opportunity for the participants to further analyze the necessary adjustments to be implemented in the AFISNET network in order to improve communication for Air Navigation purposes. He wished the meeting successful deliberations and declared it opened.

### **2. Officers and Secretariat**

2.1 Mr. **François Xavier SALAMABANGA**, RO/CNS, WACAF served as Secretary of the meeting and therefore prepared the working and information papers to be presented accordingly.

### **3. Attendance**

3.1 The meeting was attended by forty (40) participants from eight (8) States (Burkina Faso, Cameroun, Côte d'Ivoire, Ghana, Kenya, Madagascar, Nigeria and Niger) and two (2) International/Interregional Organizations namely ASECNA and Roberts FIR. One supplier (INEO France) and the Burkina Faso National Telecommunication Regulator attended the meeting.

The list of participants is given at **Appendix A** to this report.

### **4. Working Language**

4.1 The meeting was conducted in the English language with summaries provided in French during the deliberation on the most important topics.

### **5. Agenda**

5.1 The following Agenda was adopted:

**Agenda Item 1: Follow up on SNMC/17 Conclusions**

**Agenda Item 2: Review of operational statistics of availability for AFISNET-supported links**

**Agenda Item 3: Review of AFISNET earth stations performance**

**Agenda Item 4: Review/Updating of AFISNET nodes**

**Agenda Item 5: Implementation of Special AFIRAN meeting recommendations 6/18 and 6/19**

**Agenda Item 6: Review of the report of the Joint Technical Team**

**Agenda Item 7: AFISNET modernization and re-engineering**

**Agenda Item 8: AFISNET band width re-engineering;**

**Agenda Item 9: Review of the CNS/SG/3 conclusion related to AFISNET**

**Agenda Item 10: AFISNET integration with other AFI regional networks (CAFSAT, NAFISAT, SADC/2)**

**Agenda Item 11: Required Communication Performance for AFISNET**

**Agenda Item 12: Updating SNMC Form of Agreement.**

**Agenda Item 13: Any other business**

## **6. Summary of Conclusions**

**Agenda Item 1: Follow up of SNMC/17 Conclusions**

**Conclusion 18/01: Implementation of SNMC/17 outstanding conclusions**

That:

SNMC member States/Organizations are urged to implement SNMC/17 outstanding conclusions presented in **Appendix B** and pertaining to corrective actions to be undertaken in order to:

- a) Restore and stabilize AFISNET reliability and availability as required;
- b) Improve maintenance coordination and monitoring procedures.

**Conclusion 18/02: Maintenance Personnel exchange and Training**

That:

SNMC States/Organizations reinforce maintenance personnel exchange and training including language proficiency and develop a maintenance personnel training programme based on the common facilities by the end of December 2010 and ICAO coordinates the finalization of this programme.

**Conclusion 18/03: Follow up on the status of implementation of SNMC conclusions**

That:

1. SNMC member States forward, quarterly, to the current coordinating State/Organization the status of implementation of SNMC meeting conclusions for compilation and reporting to all stakeholders; and
2. ICAO continues to support States/organizations bilateral arrangements for their implementation.

**Agenda Item 2: Review of operational statistics of availability for AFISNET-supported links**

**Conclusion 18/04: Improvement of Operational availability of AFISNET**

That:

SNMC member States/organizations endeavor to clear out all the pending identified AFS deficiencies by the end of year 2010.

**Agenda Item 3: Review of AFISNET earth stations performance**

**Conclusion 18/05: AFISNET earth station Performance Data Collection Form**

That:

ASECNA and Ghana CAA develop and submit an Earth Stations Performance Data Collection Form (PDCF) to facilitate collection of stations availability data, taking into consideration the most sensitive components of the network.

**Agenda Item 4: Review/Updating of AFISNET nodes**

**Conclusion 18/06: Updating AFISNET nodes**

That:

States/Organizations update their nodes list with their coordinates, the frequency plan and report to ICAO not later than 15 July 2010 and for ICAO to circulate a consolidated file to the stakeholders.

**Agenda Item 5: Implementation of Special AFIRAN meeting recommendations 6/18 and 6/19**

**Conclusion 18/07: Implementation of Conclusion 6/19 of SP AFI RAN**

That:

- a) SNMC members States/Organization participate in the AFI VSAT managers meeting called for by Conclusion 6/19 of the SP AFI RAN meeting on the basis of representative (s) from each SNMC members Sate/Organization (ie: NAMA, GCAA, Roberts FIR, ASECNA);

- b) ICAO regional Offices (WACAF and ESAF) initiate suitable arrangements for the venue of the first meeting during which the Terms of Reference and frequency of meetings will be defined;
- c) APIRG indicates the body to which reports of these global meetings will be addressed.

**Agenda Item 6: Review of the report of the Joint Technical Team**

**Decision 18/01: Adoption of the Report of the first meeting of the Joint Technical Evaluation and Re-engineering Team**

That;

The Conclusions of the first meeting of the Joint Technical Evaluation and Re-engineering Team be adopted as presented in **Appendix C**.

**Agenda Item 7: AFISNET Modernization and Re-engineering**

**Conclusion 18/08: Implementation of the recommendations of the Joint Technical Team for AFISNET Evaluation and Re-engineering**

That:

States/Organizations have urged to implement the recommendations of the report of the AFISNET Joint Technical Evaluation and Re-engineering Team as presented in **Appendix D** by focusing their efforts on the following items:

- a) Clearing current malfunctions;
- b) Upgrade of Multiplexers;
- c) Upgrade of Automatic Messages Switching Systems
- d) Upgrade of VCSS
- e) Redundancy of modems and multiplexers
- f) Calibration of test equipments

**Conclusion 18/09: Sharing of technical data**

That:

All Administrations/Organizations send relevant technical data on current and intended Automatic Messages Switching and Voice Communication Switching Systems upgrades to ICAO WACAF Office for tabulation and further remittance to administration for their study.

**Conclusion 18/10: Continuity of AFTN Service**

That:

When upgrading/replacing Automatic Messages Switching Systems, Administrations/Organizations should consider backward integration with existing messages switches with the emerging technology (AMHS) in order to ensure the continuity of AFTN service within the transition (AFTN/AMHS) time.

**Conclusion 18/11: ATS-Voice Numbering Plan**

That:

When upgrading/replacing Voice Communication Switching Systems Administrations/Organizations should take into consideration the need of an ATS-Voice numbering plan for AFI.

**Décision 18/02: Need of a calibration center for AFISNET Test Equipments**

That:

A common calibration center for test equipments be established in the WACAF region for the benefit of members States/Organizations as well as external client.

**Conclusion 18/12: AFISNET Maintenance Human Factors**

That:

AFISNET Administrations /Organizations provide AFISNET maintenance structures with adequate personnel with appropriate training:

- a) Training workshops should be performed in partnership with industry (Satellite Service Providers, facilities vendors....) in order to take benefit from their expertise in the current and emerging technologies;
- b) Training should be in line with ICAO ATSEPS recommended programme followed by licensing of qualified personnel.

**Decision 18/03: Updating the mandate of the Joint Technical Evaluation and Re-engineering Team**

That:

The Joint Technical Evaluation and Re-engineering Team pursues the task assigned to it by SNMC/17 and completes the study for AFISNET re-engineering by the end of October 2010.

This study will focus on the following items taking into consideration advantages/disadvantages, cost-effectiveness, reliability and safety risks aspects:

- a) AFISNET topology;
- b) AFISNET components;
- c) AFISNET base band and satellite access; and
- d) AFISNET bandwidth optimization.

Meanwhile, States/organizations take the urgent appropriate actions to clear out the pending current deficiencies before the end of year 2010.

**Agenda Item 8: AFISNET band width re-engineering;**

**Conclusion 18/13: Conversion of IBS Band to leased band**

That:

States/organizations pursue and complete the implementation of conclusion of SNMC17/10 by adopting the following process:

- a) IBS carrier status of stations be forwarded to ASECNA for compilation and transmission to INTELSAT; and
- b) A Technical/financial meeting be held by SNMC members with INTELSAT to ensure the conversion of IBS band to a leased band.

**Agenda Item 9: Review of the CNS/SG/3 conclusions related to AFISNET**

**Conclusion 18/14: Implementation of CNS/SG/3 draft conclusions related to AFISNET**

That:

SNMC members States/Organizations are urged to implement the draft conclusions of CNS/SG/3 related to AFISNET as presented in **Appendix E**;

When updating the current deficiencies status for submission to APIRG/17, ICAO deletes the operating Accra/ Luanda link from the list of AFS deficiencies.

**Agenda Item 10: AFISNET integration with other AFI regional networks (CAFSAT, NAFISAT, SADC/2)**

**Conclusion 18/15: Interconnection between AFISNET with neighboring Networks**

That:

The concerned States/Organizations are urged to complete the interconnection exercise of AFISNET with neighboring networks, in particular ASECNA, to take the appropriate actions in coordination with RVA (DRC) in order to realize the interconnection between the following nodes by the end of year 2010:

- a) Brazzaville/Kinshasa
- b) Bangui/G'Badolite



ICAO WACAF supports the bilateral arrangements between ASECNA and RVA.

**Agenda Item 11: Required Communication Performance for AFISNET**

**Conclusion18/16: RCP for AFISNET**

That:

SNMC members take the advantage of RCP requirements stated in ICAO Doc 9869 to improve the provision of VSAT based Aeronautical Mobile Services and ensure the availability of AFISNET hubs and remote VHF stations accordingly.

**Agenda Item 12: Updating SNMC Form of Agreement.**

**Conclusion18/17: Form of agreement and Terms of Reference of AFISNET**

That:

The Form of Agreement and the Terms of Reference of AFISNET be circulated by SNMC secretariat as soon as possible;

States/Organizations forward their comments and remarks not later than 3 September 2010;

ICAO compiles and forwards the amended Form of Agreement and Terms of Reference of the SNMC to be signed by the end of December 2010.

**Agenda Item 13: Any other business**

**Conclusion18/18: Audit of AFISNET.**

That:

In the framework of the implementation of SP AFI RAN conclusion 6/18 and to consolidate the recommendations within the report of the Joint Technical Evaluation and Re-engineering Team, an AFISNET global audit be conducted in this regards.

- a) ASECNA is to circulate a draft Terms of Reference for the Audit not later than end of September 2010;
- b) SNMC members are to update the draft report and forward to ICAO; and
- c) ICAO is to compile and finalize the Terms of Reference for a call for Tenders.

**PART II: REPORT ON AGENDA ITEMS****Agenda Item 1: Follow up on SNMC/16 Conclusions**

1.1 The meeting reviewed the status of implementation of the twelve (12) SNMC /17 Conclusions. It was noted that some conclusions have been partially implemented while others need to be implemented. The status of implementation of SNMC/17 conclusions is presented in **Appendix B**. The following conclusion was formulated:

**Conclusion 18/01: Implementation of SNMC/17 outstanding conclusions**

**That:**

**SNMC member States/Organizations are urged to implement SNMC/17 outstanding conclusions presented in Appendix B and pertaining to corrective actions to be undertaken in order to:**

- a) Restore and stabilize AFISNET reliability and availability as required; and**
- b) Improve maintenance coordination and monitoring procedures.**

1.2 Under this agenda the meeting also discussed the issue of maintenance and operational Personnel exchange and training. It was noted that although some efforts have been made by stakeholders, namely: Ghana, Roberts and ASECNA, the rate of Personnel exchange and training remains low compared to the technical challenge experienced by such Personnel. The meeting found that it should be of benefit that member States build a common training programme based on the common components of AFISNET Stations. In this regard, the following conclusion was formulated:

**Conclusion 18/02: Maintenance Personnel exchange and Training**

**That:**

**SNMC States/Organizations reinforce maintenance personnel exchange and training including language proficiency and develop a maintenance personnel training programme based on the common facilities by the end of December 2010 and ICAO coordinates the finalization of this programme.**

1.3 The meeting also recognized that between two SNMC meetings the follow up of the status of implementation of the current conclusions is not formally planned. It was proposed that the current coordinating State/Organization be nominated for such task in accordance with the updated SNMC Terms of Reference. The following conclusion was therefore formulated:

**Conclusion 18/03: Follow up of the status of implementation of SNMC conclusions**

**That:**

1. SNMC member States forward, quarterly, to the current coordinating State/Organization the status of implementation of SNMC meeting conclusions for compilation and reporting to all stakeholders; and
2. ICAO continues to support States/organizations bilateral arrangements for their implementation.

**Agenda Item 2: Review of operational statistics of availability for AFISNET-supported links**

2.1. Under this agenda item the meeting examined the statistics of availability of the links supported by AFISNET presented by the secretariat.

2.1.1 The meeting noted that in a bid to satisfy new ATM requirements involving re-organization of airspace, AFTN bilateral circuits have been realized and should be taken into account when updating the AFI Com chart.

2.1.2 ASECNA presented a comprehensive status of Network availability in its airspace. When reviewing the performance of the AFTN circuits supported by the main AFI centers, the meeting noted important improvement around the Dakar and Niamey main centers while Brazzaville is experiencing a weak availability rate, less than the recommended target value of 97%.

2.1.3 The meeting also noted that the new flight plan format, the requirements of RVSM space management, the automation of flight data processing (including flight plans) and the automation of AIS (including NOTAM messages), recommend that States/Organizations continue their efforts to increase AFS AFTN performance in particular for those current failing circuits.

In this regard, the following conclusion was formulated:

**Conclusion 18/04: Improvement of Operational availability of AFISNET**

**That:**

**SNMC member States/organizations endeavor to clear out all the pending identified AFS deficiencies by the end of year 2010.**

**Agenda Item 3: Review of AFISNET earth stations performance**

3.1 When discussing this item the meeting agreed that many factors have to be taken into consideration for the assessment of MTBF. It also noted the lack of a common form with a consolidated list of components to be evaluated. The meeting discussed at length the parameters to be considered, and concluded that it was necessary to develop an assessment form to be circulated among member states and adopted. ASECNA and GCAA were tasked to provide SNMC members with a draft form. The meeting therefore reached the following conclusion:

**Conclusion 18/05: AFISNET earth station Performance Data Collection Form**

**That:**

**ASECNA and Ghana CAA develop and submit an earth stations Performance Data Collection Form (PDCF) to facilitate collection of station availability data taking into consideration the most sensitive components of the network.**

**Agenda Item 4: Review/Updating of AFISNET nodes**

4.1 The meeting discussed the updating of AFS nodes in terms of location, geographical coordinates, and frequency plan. It was stated that these data have been collected in the past and the meeting encouraged the stakeholders to update the data including those related to the new VSAT stations.

4.2 The meeting also recognized that all these data are available and could be sent quickly to the secretariat for compilation.

The following conclusion was arrived at:

**Conclusion 18/06: Updating AFISNET nodes**

**That:**

**States/Organizations update their nodes list with their coordinates, the frequency plan and report to ICAO not later than 15 July 2010 and for ICAO to circulate a consolidated file to the stakeholders.**

**Agenda Item 5: Implementation of Special AFIRAN meeting recommendations 6/18 and 6/19**

5.1 The meeting decided to examine under agenda item 7, the status of implementation of SP AFI/RAN *Conclusion 6/18* that calls for AFISNET Evaluation and Re-engineering.

5.2 The meeting examined the status of implementation of AFI/RAN *Conclusion 6/19: Planning, implementation and operation of very small aperture terminal (VSAT) networks in the AFI Region* that calls for regular meetings of all AFI network managers.

5.3 The secretariat provided the meeting with the ongoing information pertaining to the neighboring Networks that may be involved in such regular meetings (CAFSAT, NAFISAT, SADC/3...) called for by SP AFI RAN.

5.4 In particular, the meeting noted that the SAT/15 meeting (Lisbon, Portugal, 19-21 May 2010) has set up the CAFSAT Network Management Committee (CNMC) based on the SNMC model so that the similar management exercise of the two networks will be a step towards institution of the global regular meetings called for by SP AFI RAN. The meeting discussed at length the best way for a fruitful participation of SNMC in such meetings.

5.5 It was stated that in order to ensure good participation, consolidated Terms of Reference should be developed for the management of the meetings of each AFI local Sub-

Network. The outcome of those meetings, which can be of common interest to all stakeholders, should serve as inputs for the regular AFI global meetings.

5.6 The meeting also raised concern over of the body to which such meetings should report.

The following conclusion was formulated.

**Conclusion 18/07: Implementation of conclusion 6/19 of SP AFI RAN**

**That:**

- a) **SNMC member States/Organizations participate in the AFI VSAT managers meeting called for by conclusion 6/19 of the SP AFI RAN meeting on the basis of representative (s) from each SNMC members Sate/Organization (i.e. NAMA, GCAA, Roberts FIR, ASECNA);**
- b) **ICAO regional Offices (WACAF and ESAF) initiate suitable arrangements for the venue of the first meeting during which the Terms of Reference and frequency of meetings will be defined; and**
- c) **APIRG indicates the body to which reports of those global meetings will be addressed.**

**Agenda Item 6: Review of the report of the Joint Technical Evaluation Team**

6.1 The secretariat presented the status of implementation of **Conclusion 17/02 of SNMC/17: AFISNET Network Joint Technical Evaluation and Re-engineering** that set up a Joint Technical Team for the Evaluation and the Re-engineering of AFISNET.

6.2 It was noted that the joint technical Team held its first coordinating meeting in Dakar from 13 to 14 April 2010. This meeting developed the practical framework to conduct the evaluation including (Templates, Report frame, List of earth station components to be evaluated, etc.). The meeting approved the conclusions of the joint Technical meeting presented in **Appendix C** through the following decision:

**Decision 18/01: Adoption of the Report of the first meeting of the AFISNET Joint Technical Evaluation and Re-engineering Team**

**That;**

**The Conclusions of the first meeting of the AFISNET Joint Technical Evaluation and Re-engineering Team be adopted as presented in Appendix C.**

**Agenda Item 7: AFISNET modernization and re-engineering**

7.1 The meeting discussed the implementation of SP AFI/RAN Conclusion 6/18: AFISNET Technical Evaluation and re-engineering, that calls for AFISNET Evaluation and re-engineering through the actions undertaken on the subject since SNMC/17.

7.2 The meeting noted that the joint technical evaluation and re-engineering exercise was successfully conducted from 01 to 30 June 2010, as stated in the relevant report presented in **Appendix D**.

7.3 Roberts FIR and ASECNA, nominated to coordinate preparation of the final Report of the Joint Technical Evaluation and re-engineering exercise submitted the report to the meeting for discussion and further action.

7.4 The recommendations of the report stated that AFISNET dysfunctions are mainly caused by failure of Automatic Messages Switch Systems, failure or incompatibility between VCSS, lack of calibration of test equipments, and lack of redundancy of modems. The meeting therefore formulated the following conclusion:

**Conclusion 18/08: Implementation of the recommendations of the Joint Technical Team for AFISNET Evaluation and Re-engineering**

**That:**

**States/Organizations are urged to implement the recommendations of the report of the AFISNET Joint Technical Evaluation and Re-engineering Team as presented in Appendix D by focusing their efforts on the following items:**

- a) **Clearing current malfunctions;**
- b) **Upgrade of Multiplexers;**
- c) **Upgrade of Automatic Messages Switching Systems**
- d) **Upgrade of VCSS**
- e) **Redundancy of modems and multiplexers**
- f) **Calibration of test equipments**

7.5 The secretariat informed the meeting that some SNMC neighboring centers, namely SAT states are modernizing their end users interface facilities and that exercise required regional coordination for end to end compatibility and interoperability. It was noted that for the current and forthcoming Messages or Voice Switching systems coordination should be undertaken to ensure their compatibility and interoperability.

7.6 The meeting therefore raised the necessity to collect compile and circulate the technical data to facilitate the interoperability of the systems. In this regard the following conclusion was formulated.

**Conclusion 18/09: Sharing of technical data**

**That:**

**All Administrations/Organizations send relevant technical data on current and intended Automatic Messages Switching and Voice Communication Switching Systems upgrades to ICAO WACAF Office for tabulation and further remittance to administration for their study.**

7.7 The secretariat provided the meeting with the status of implementation of new messages switches in WACAF and its neighboring centers and informed the meeting that CNS/SG/3 took a draft conclusion asking APIRG/17 to create an AFI AMHS implementation Task Force. The meeting examined the status of implementation of the upgrade/replacement of AFTN messages Switches in SNMC centers and recognized that some progress is ongoing in the view of the implementation of AMHS as part of ATN.

7.8 Moreover, the meeting discussed in length the transition (from AFTN to AMHS) exercise and stated on the necessity to ensure AFS/AFTN continuity of service during this transition period. The meeting therefore formulated the following conclusion.

**Conclusion 18/10: Continuity of AFTN Service**

**That:**

**When upgrading/replacing Automatic Messages Switching Systems, Administrations/Organizations should consider backward integration with existing messages switches with the emerging technology (AMHS) in order to ensure the continuity of AFTN service within the transition (AFTN/AMHS) time.**

7.9 The secretariat provided the meeting with the conclusion of SAT/15 meeting which deals with the issue of ATS-Voice numbering Plan in accordance to the ICAO Manual on ATS Ground-Ground Voice Switching and Signaling (**Doc 9804, Chapter 2 Section 2.3**). It was noted that some SAT States have been conducting trials on ATS-Voice switching which needs ATS-Voice numbering Plan.

7.10 It was recognized that the implementation of the Voice Switching in SNMC centers, requires a close coordination between ANSPs.

7.11 The meeting supported the SAT/15 meeting conclusion that calls **APIRG** to create an AFI Working Group to conduct the technical study for the development of a global ATS voice numbering plan for AFI Region and harmonize its implementation frame.

The following conclusion was therefore formulated.

**Conclusion 18/11: ATS-Voice Numbering Plan**

**That:**

**When upgrading/replacing Voice Communication Switching Systems Administrations/Organizations should take into consideration the need of an ATS-Voice numbering plan for AFI.**

7.12 Ghana Civil Aviation Authority drew the participants attention on the need to calibrate the AFISNET Test Equipments in order to ensure the reliability of the parameters measured during maintenance operations. The meeting also noted that in a RVSM managed space context and to comply with SMS requirements, the maintenance operations must obey to some referential rules.

7.13 However the investment for the realization of a Test Equipments Calibration Center is costly for individual ANSP in regard with the number of Test Equipments to be calibrated. The meeting agreed that SNMC members effort can be joined for the creation of a common calibration center for Test Equipments through the following conclusion.

**Decision 18/02: Need of a calibration center for AFISNET Test Equipments**

**That:**

**A common calibration center for test equipments be established in the WACAF region for the benefit of members States/Organizations as well as external client.**

7.14 AFISNET Maintenance Personnel management was deeply discussed by the meeting. It was stated that all the SNMC Maintenance structures are facing lack of either adequate teams or suitable training courses for the maintenance Personnel.

7.15 It was also noted that real opportunities could be taken through partnership with satellite Providers and facilities Vendors for the provision of updated courses.

7.16 The meeting also recommended that the training mechanism be built in line with ICAO ATSEPs recommended programme followed by licensing of qualified Personnel. The following conclusion was formulated.

**Conclusion 18/12: AFISNET Maintenance Human Factors**



**That:**

**AFISNET Administrations /Organizations provide AFISNET maintenance structures with adequate personnel with appropriate training:**

- a) Training workshops should be performed in partnership with industry (Satellite Service Providers, facilities vendors....) in order to take benefit from their expertise in the current and emerging technologies;**
- b) Training should be in line with ICAO ATSEPS recommended programme followed by licensing of qualified personnel.**

7.17 The meeting discussed at length to find the best way to realize the re-engineering of the network based on the joint technical evaluation. It was agreed to update the mandate of the Joint Technical Team tasked to pursue the technical study for the re-engineering. The study should focus on AFISNET topology, components, base-band and satellite access, and bandwidth optimization.

7.18 Meanwhile, the meeting agreed that States/Organizations take the urgent appropriate actions to clear the pending current deficiencies before the end of year 2010.

Thus the following conclusion was formulated.

**Decision 18/03: Update the mandate of the Joint Technical Evaluation and Re-engineering Team**

**That:**

**The Joint Technical Evaluation and Re-engineering Team pursues the task assigned to it by SNMC/17 and complete the study for AFISNET re-engineering by the end of September 2010.**

**This study will focus on the following items taking into consideration advantages/disadvantages, cost/effectiveness, reliability and safety risks aspects:**

- a) AFISNET topology;**
- b) AFISNET components;**
- c) AFISNET base band and satellite access; and**
- d) AFISNET bandwidth optimization.**

**Meanwhile, States/organizations are to take the urgent appropriate actions to clear out the pending current deficiencies before the end of year 2010**

7.19 Nigeria provided the meeting with its ongoing domestic VSAT project to support Aeronautical Mobile Service and Surveillance Data transmission. The meeting was moreover

informed that NAMA is modernizing its AFTN system with an option of AMHS compatibility.

7.20 The secretariat informed the meeting that CNS/SG/3 has called for a Task Force to be established in order to coordinate AMHS Implementation in the AFI Region and invited SNMC members to take this information into consideration when planning and implementing their AFS systems.

7.21 It was also noted that the SAT/15 meeting discussed the issue of ATS-Voice numbering plan for AFI and called on APIRG to create an AFI Working Group to conduct the technical study for the development of a global ATS voice numbering plan for the AFI Region and harmonize its implementation frame.

**Agenda Item 8: AFISNET band width re-engineering;**

8.1 The secretariat presented WP/9 which stated that the obsolete base-band components of AFISNET have been gradually replaced by other modems in the framework of coordinated arrangements between ASECNA, NAMA and Ghana.

8.2 Thus, the major part of the spectrum allocated to the IBS system is currently unused, while States/Organizations continue to be charged for unused IBS bandwidth.

8.3 The meeting examined the status of implementation of Conclusion 17/10 of SNMC/17 calling for IBS band conversion and noted that it has not been implemented. The meeting agreed that each State/Organization should update the current status of usage of IBS frequencies for a technical/financial meeting with INTELSAT.

The following conclusion was formulated:

**Conclusion 18/13: Conversion of IBS Band to leased band**

**That:**

**States/organizations pursue and complete the implementation of conclusion 17/10 of SNMC17 by adopting the following process:**

- a) IBS carrier status of stations be forwarded to ASECNA for compilation and transmission to INTELSAT; and**
- b) A Technical/financial meeting be held by SNMC members with INTELSAT to ensure the conversion of IBS band to a leased band.**

**Agenda Item 9: Review of CNS/SG/3 conclusions related to AFISNET**

9.1 The meeting provided an opportunity to address the participants on the AFISNET related conclusions of the CNS/SG/3 meeting (Nairobi, Kenya, 26-30 April 2010). The secretariat presented WP/10 that summarized the concerned conclusions and draw the attention of the participants on the fact that these conclusions will be submitted to the APIRG/17 meeting,

9.2 It was noted that the CNS/SG/3 meeting developed three draft conclusions dealing with the provision of Aeronautical Fixed Service (ATS/DS & AFTN) through AFISNET and one draft conclusion related to AFISNET Evaluation and re-engineering as follows:

- Conclusion 03/2 for AFTN links
- Conclusion 03/7& 03/9 for ATS/DS links
- Conclusion 03/11 for AFISNET Network evaluation and re-engineering

9.3 The Ghana Civil Aviation Authority informed the meeting that the Luanda/Accra ATS/DS link has been successfully established.

9.4 For the improvement of Aeronautical Mobile Service (AMS) in the AFI Region the meeting noted that CNS/SG/3 developed the following two draft conclusions that address VHF coverage in airspace of SNMC member States/Organizations and encourage AFI States to cooperate with IATA during the AMS (VHF/HF) Coverage surveys:

- Conclusion 03/14 calling for the completion and the improvement of VHF coverage; ASECNA and NAMA are concerned.
- Conclusion 03/15 urging AFI States to cooperate with IATA during the AMS (VHF/HF) coverage surveys; the forthcoming survey is planned from 7 to 25 June 2010.

These conclusions are presented in **Appendix E**.

9.5 The meeting noted that these CNS/SG/3 meeting conclusions are to be taken into account by SNMC members in order to clear the current deficiencies. The following conclusion was formulated:

**Conclusion 18/14: Implementation of CNS/SG/3 draft conclusions related to AFISNET**

**That:**

**SNMC member States/Organizations are urged to implement the draft conclusions of CNS/SG/3 meeting related to AFISNET as presented in Appendix E pending APIRG/17 approval;**

**When updating the current deficiencies status for submission to APIRG/17 ICAO deletes the operating Accra/ Luanda link from the list of AFS deficiencies.**

**Agenda Item 10: AFISNET integration with other AFI regional networks (CAFSAT, NAFISAT, SADC/2)**

10.1 The meeting was provided with the status of interconnection between AFISNET and its neighboring Networks (CAFSAT, NAFISAT, and SADC/3) and noted that the interconnection was completed as planned. AFISNET is now linked to CAFSAT, NAFISAT and SADC/3 through a balanced interconnection procedure.

10.2 However, in order to clear some remaining unimplemented circuits the interconnection of AFISNET (Brazzaville & Bangui) with stations located in DRC (Kinshasa & G'badolite) should be undertaken.

The following conclusion was formulated:

**Conclusion18/15: Interconnection between AFISNET and neighboring Networks**

**That:**

**The concerned States/Organizations are urged to complete the interconnection exercise of AFISNET with neighboring networks and in particular for ASECNA to take the appropriate actions in coordination with RVA (DRC) to realize the interconnection between the following nodes by the end of year 2010:**

- a) **Brazzaville/Kinshasa**
- b) **Bangui/G'Badolite**

**ICAO WACAF supports the bilateral arrangements between ASECNA and RVA.**

**Agenda Item 11: Required Communication Performance for AFISNET**

11.1 Under this agenda the secretariat briefed the meeting with the concept of Required Communication Performance (RCP) to support Aeronautical Mobile Service provision through satellite based remote VHF stations.

11.2 The meeting took note of this information and concluded that this concept is a helpful tool for the provision of AMS in the framework of RVSM and SMS requirements. The following conclusion was then formulated:

**Conclusion18/16: RCP for AFISNET**

**That:**

**SNMC members take advantage of RCP requirements stated in ICAO Doc 9869 to improve the provision of VSAT based Aeronautical Mobile Service and ensure the availability of AFISNET hubs and remote VHF stations accordingly.**

**Agenda Item 12: Updating SNMC Form of Agreement.**

12.1 The secretariat provided the meeting with a draft Form of Agreement and Terms of Reference for AFISNET through WP/13. This form is presented in **Appendix F**.

12.2 The meeting decided that this proposal should be circulated for input before its final approval.

Therefore the following conclusion was formulated:

**Conclusion18/17: Form of agreement and Terms of Reference of AFISNET**

**That:**

- a) **The draft Form of Agreement and Terms of Reference of AFISNET be circulated by SNMC secretariat as soon as possible;**

- b) States/Organizations forward their comments and remarks not later than 3 September 2010; and
- c) ICAO compiles and forwards the amended Form of Agreement and Terms of Reference of the SNMC to be signed by the end of December 2010.

**Agenda Item 13: Any other business**

**Technical Audit of AFISNET**

13.1 The meeting was informed by ASECNA that the Agency plans to conduct an external technical audit of AFISNET nodes located in its centers.

13.2 The meeting applauded this exercise and noted that in order to reach successful results such audit should be global and should involve the whole AFISNET nodes.

13.3 ASECNA was invited to circulate the draft Terms of Reference of the audit for inputs and compilation by the secretariat.

The following conclusion was formulated:

**Conclusion 18/18: Technical Audit of AFISNET.**

**That:**

**In the framework of the implementation of SP AFI RAN conclusion 16/18 and in order to consolidate the recommendations within the report of the Joint Technical Evaluation and Re-engineering Team, an AFISNET global technical audit be conducted.**

**In this regard:**

- a) ASECNA is to circulate draft Terms of Reference for the Technical Audit not later than 30 September 2010;
- b) SNMC members are to review the draft report and forward comments to ICAO; and
- c) ICAO to compile and finalize the Terms of Reference for a call for Tenders.

**SNMC Next Meeting**

1. Since its inception, SNMC meetings are hosted by States/Organizations successively with no formal schedule. In view of the expected future Terms of Reference the meeting tasked the secretariat to develop a draft schedule of future meetings over the next 5 years. This template is presented in **Appendix G**.

2. The meeting welcomed the offer of Ghana to host the next SNMC/19 meeting. ICAO will coordinate with Ghana on the precise venue and dates, and SNMC members notified in due course.

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**APPENDIX B: Follow up SNMC/17 Conclusions.**

Conclusions	Implementation Status	Remarks
<p><b>Conclusion 17/01: Implementation of outstanding conclusions</b></p> <p>That AFISNET Administrations and Organizations pursue implementation of, or endeavour to implement, outstanding conclusions from SNMC previous meetings concerning, <i>inter alia</i>:</p> <ul style="list-style-type: none"> <li>c) the implementation of a corrective action plan to restore system reliability and availability as required;</li> <li>d) the exchange of personnel between centres;</li> <li>e) the training of personnel, including language proficiency ;</li> <li>f) the implementation of coordination and monitoring procedures ;and</li> <li>g) cooperative actions regarding the AFS circuits implementation/improvement; the following circuits should be considered:</li> </ul> <p>ACCRA – KANO, BRAZZAVILLE-KANO, OUAGADOUGOU -NIAMTOUGOU</p>	<ul style="list-style-type: none"> <li>a) Still valid</li> <li>b) Still valid</li> <li>c) Still valid</li> <li>d) Still valid</li> <li>e) Pending</li> </ul>	
<p><b>Conclusion 17/02: AFISNET Network Joint Technical Evaluation and Re-engineering</b></p> <p>That:</p> <p>The Joint Technical Team for AFISNET Network Evaluation and Re-engineering</p> <ul style="list-style-type: none"> <li>• be established in three groups as per <b>Appendix B</b> to this report</li> <li>• conduct its tasks in accordance with the terms of reference and work programme agreed to at the SNMC Coordinating Meeting held in Dakar, Senegal on 26 March 2008 and shown in <b>Appendix C</b> to this report;</li> <li>• carry out the evaluation from 15<sup>th</sup> August to 15<sup>th</sup> October 2009</li> <li>• meet in Dakar under ICAO auspices in the first week of November 2009 to finalize its report and establish an action plan for the re-engineering of the</li> </ul>	<ul style="list-style-type: none"> <li>Completed</li> <li>On going</li> </ul>	

<p>AFISNET network</p> <p>Each State/Administration should nominate two experts to participate in the Joint Technical Team, and forward their names to the ICAO Regional Office.</p>	<p>Deadline delayed</p> <p>Meeting held on 13-14 April 2010</p> <p>Completed</p>	
<p><b>Conclusion 17/03: Analysis of operational statistics of availability</b></p> <p>That</p> <p>a) AFISNET Centres endeavour to submit their monthly AFTN availability statistics to the ICAO Regional office</p> <p>b) the operational statistics of availability be submitted to SNMC meetings by AFISNET Administrations and Organizations, for review and remedial actions to be implemented for the improvement of the availability of the links.</p>	<p>Completed</p> <p>Completed</p> <p>Completed</p>	<p>NAMA to send regularly the data</p>
<p><b>Conclusion 17/04: Facility mean time between failure (MTBF)</b></p> <p>That AFISNET Administrations and Organizations determine the mean time between failure (MTBF) for their relevant AFISNET facilities using the guidance material concerning reliability and availability of radio-communications aids contained in ICAO Annex 10, Volume I, Attachment F, and report to SNMC meetings.</p>	<p>Still Valid</p>	
<p><b>Conclusion 17/05: Updating the AFI COM chart</b></p> <p>That AFISNET Administrations and Organizations submit to ICAO updates of the COM chart and the associated table attached at <b>Appendix D</b> to this report, including AFTN protocol and links transmission speed.</p>	<p>Still Valid</p>	
<p><b>Conclusion 17/06: Geographical data for AFISNET nodes</b></p>	<p>Still Valid</p>	

<p>That AFISNET Administrations and Organizations provide the ICAO Regional Office for Western and Central Africa with detailed information on their managed network nodes, including location, geographical coordinates, frequency of operation, coverage/range (as appropriate) for aeronautical fixed services (AFS) and aeronautical mobile services (AMS) stations as soon as possible, but not later 30<sup>th</sup> August 2009.</p>		
<p><b>Conclusion 17/07: Basic parameters exchange</b></p> <p>That the AFISNET members exchange the parameters for all managed links, as per <b>Appendix E</b> to this report.</p>		Status to be provided by states /Organizations
<p><b>Conclusion 17/08: Guidelines on performance for VSAT networks</b></p> <p>That AFISNET Administrations and Organizations make use of the guidelines for the performance of VSAT networks as agreed to at the SP AFIRAN 08 meeting and provided in <b>Appendix F</b> to this report.</p>	On going	
<p><b>Conclusion 17/09: Interconnection of AFISNET, SADC/2 and NAFISAT networks</b></p> <p>That        Ghana to implement the circuit Accra- Luanda by <b>July 31, 2009</b> to complete AFISNET and SADCII interconnection        Concerned AFISNET Administrations and Organizations coordinate to migrate IBS links to new generation technology means in order to improve the reliability and the availability of the links.</p>	Pending Still valid	Depending on the Joint Technical evaluation exercise results
<p><b>Conclusion 17/10: IBS carriers bandwidth conversion</b></p> <p>That States/Organizations coordinate to lease with INTELSAT for the conversion of IBS initial bandwidth into lease band to be affected to each SNMC member according to its quota part.</p>	Still Valid	

<p><b>Conclusion 17/11: Attendance to INTELSAT training meeting in Dakar</b></p> <p>That each administration in AFISNET should endeavour to attend the training on IBS being organized by INTELSAT in Dakar Senegal in July 20 – 21<sup>st</sup>, 2009.</p>	Completed	
<p><b>Conclusion 17/12: Follow-up of SP AFI RAN 08 recommendation 6/19</b></p> <p>That, in accordance with recommendation 6/19 of the SP AFI RAN 08 meeting, ICAO convene as soon as possible all entities involved with planning, implementation and operation of VSAT networks in the AFI Region a joint meeting for the purpose of harmonization and eventual realization of a seamless AFI communication network supporting all present and future CNS systems.</p>	Still valid	<p>CAFSAT Network is now provided with a CAFSAT Network Management Committee. Arrangement to be made for this meeting</p>



INTERNATIONAL CIVIL AVIATION ORGANIZATION  
WESTERN AND CENTRAL AFRICAN OFFICE

**AFISNET JOINT TECHNICAL EVALUATION AND RE-ENGINEERING  
TEAM LEADERS MEETING**

(Dakar, Senegal, 13-14 April 2010)

**Draft Conclusions**

**Conclusion 1:** Implementation of the previous regional meetings conclusions (APIRG/16 Report, SPI/AFI/RAN Report, SNMC/16 & 17 Reports)

That:

SNMC States/organization endeavor to implement the joint Technical evaluation and re engineering pertaining to AFISNET in the framework of the conclusions of APIRG, SPI/AFI/RAN, SNMC/16 & 17) before the next SNMC/18 meeting scheduled for 1-3 June 2010.

**Conclusion 2:** Terms of Reference and work programme of AFISNET Joint Technical Team

That:

The joint technical team conducts the evaluation of AFISNET as agreed in the reviewed Terms of reference and work programme as presented in appendix XXX.

**Conclusion 3:** Evaluation charts

That:

The joint technical evaluation be conducted using the charts presented in Appendix xxx in order to harmonize the evaluation process of the teams.

**Conclusion 4 :** Evaluation Report Framework

That:

The joint technical evaluation be conducted using the report framework adopted as Appendix xxx in order to harmonize the reports of the evaluation teams.

**Conclusion 5:** Evaluation planning

That:

The joint technical evaluation be conducted within the plan adopted as Appendix xxx and to adhere to the given time frame.

**Conclusion 6:** Expert availability for the evaluation period

That:

SNMC States/Organization should take the appropriate actions to ensure the availability of the experts within the stated time frame.

**Conclusion 7:** Evaluation funding

That:

Each SNMC State/Organization funds their experts for their participation to the evaluation process as mandated by the regional and sub regional meetings (APIRG, SPI/AFI/RAN, SNMC) within the stipulated plan as presented in appendix xxxx

**Conclusion 8:** Final Report Meeting

That:

The Joint Technical Team should meet in Dakar WACAF on the 17<sup>th</sup> & 18<sup>th</sup> of May 2010 in order to harmonize and finalize their findings for submission to the next SNMC meeting scheduled for 1-3 June 2010.

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ASECNA/GCAA /NAMA/ROBERTS FIR

# JOINT TECHNICAL EVALUATION OF AFISNET

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## DRAFT REPORT

May 2010



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## GLOSSARY

**8-PSK** 8- Phase Shift Keying

### A

**AAC** Aeronautical Administrative Communications  
**AFISNET** Africa Indian Sub NETwork ocean area  
**AFTN** Aeronautical Fixed Telecommunication Network  
**AMSS** Aeronautical Message Switching System  
**ANSP** AeroNautical Service Provider  
**ASR** Air Safety Report  
**ASECNA** Agency for the Safety of Air Navigation in Africa and Madagascar  
**ATN** Aeronautical Telecommunications Network  
**ATS** Air Traffic Services

### B

**BW** Bandwidth  
**BER** Bit Error Rate

### F

**FDMA** Frequency Division Multiple Access  
**FTDMA** Frequency Time Division Multiple Access  
**FEC** Forward Error Coding

### G

**GCAA** Ghana Civil Aviation Authority  
**GNSS** Global Navigation Satellite System

### I

**ICAO** International Civil Aviation Organization  
**INTELSAT** INTernational TELEcommunication SATellite

### M

**MF-TDMA** Maintained Frequency – Time Division Multiple Access  
**MCPC** Multiple Channel Per Carrier  
**MOL2P** Multiplexeur Optimisant la Liaison avec Priorité à la Parole

### N

**NAFISAT** North Eastern AFI VSAT network  
**NAMA** Nigeria Airspace Management Agency  
**NMS** Network Management System

### O

**OPMET** Operational Meteorological data exchanges

### P

**PEP** Performance Enhancing Proxies

### Q

<b>QoS</b>	Quality of Service	
<b>QPSK</b>	Quadrature Phase Shift Keying	<b>R</b>
<b>RS</b>	Reed Solomon Error Correction Code	<b>S</b>
<b>SADC</b>	Southern African Development Community	
<b>SCPC</b>	Single Channel Per Carrier	<b>T</b>
<b>TCP</b>	Transmission Control Protocol	
<b>TDMA</b>	Time Division Multiple Access	<b>V</b>
<b>VCSS</b>	Voice Communication Switching System	
<b>VSAT</b>	Very Small Aperture Terminal	

## **1 PREAMBLE**

### **1.1 BACKGROUND**

In order to improve Air Navigation Safety in the Western and central Africa region, the satellite based Telecommunications network called AEROSATEL (renamed AFISNET) was conceived between 1986 and 1987 by ICAO and funded by European Union in 1992. At the beginning eight stations for Nigeria, one for Ghana and six for ASECNA countries (Cameroon, Central Africa, Congo, Gabon, Niger and Chad) were implemented by ALCATEL.

Afterwards, the network was widened with the implementation of new stations in Dakar, Abidjan, Roberts FIR, Antananarivo and in other countries in western, Central, southern and northern Africa, Indian ocean (Maurice Island, Ile de la Reunion) and in Europe (Las Palmas, Toulouse).

As of today AFISNET comprises more than seventy (70) earth stations of B standard (11m), F2 (7.30m), F1 (3.7-4.5m) operating mainly in FDMA / SCPC mode in mesh/star topology.

AFISNET migrated successfully from satellite IS-903@325.5° East to satellite IS-10-02@359° East and is currently operating on transponders 20 EH/ 20 EH and 23 EH/ 23 EH and is fully interconnected to NAFISAT and SADC-2.

In the meantime, some domestic networks are using different protocols, satellite access as appeared in Ghana (FTDMA), Nigeria (TDMA), ASECNA (TDMA) and Roberts FDMA.

### **1.2 PURPOSE OF THE EVALUATION**

- Evaluate the physical and operational performances of AFISNET
- Take corrective action in addressing malfunctioning of AFISNET nodes
- Preparation of the AFISNET audit

### **1.3 ASSIGNED OBJECTIVES**

In accordance with the term of reference, the main objectives of the network evaluation are to:

- Identify its deficiencies and non-ICAO, WMO and ITU compliant elements/features;
- make the appropriate recommendations and proposals regarding the short-term, mid-term and long-term solutions and strategies to be implemented using appropriate modern technologies for achieving an enhanced, efficient, high performance, secure, CNS/ATM capable and cost-effective network, meeting interoperability and seamlessness requirements; and
- evaluate the anticipated costs in view of a comprehensive project document to support a collective financing mechanism

### **1.4 METHODOLOGY**

In accordance with the conclusions 16/07 and 17/02 and the SP RAN AFI/8 the SNMC established a joint technical team in order to conduct a comprehensive assessment of the network potential for current and future requirements and applications.

The first meeting of the joint technical Evaluation and Re-engineering team leaders was held in WACAF (Dakar 13-14 April 2010) and adopted the evaluation framework including the charts, the planning and the technical subgroups.

The joint technical team comprising representatives from ASECNA (Agency for the Safety of Air Navigation in Africa and Madagascar), NAMA (Nigeria Airspace Management Authority), GCAA (Ghana Civil Aviation Authority), Roberts FIR carried out the evaluation of AFISNET.

Samples of eleven (11) earth stations were identified for the evaluation process.