



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**  
**AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP**  
**FIFTEENTH MEETING (APIRG/15)**

(Nairobi, Kenya, 26 – 30 September 2005)

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**Agenda Item 4.2: Communications, navigation and surveillance**

**REVIEW OF THE REPORT OF THE FIRST MEETING OF THE CNS SUB-GROUP**

(Presented by the Secretariat)

**SUMMARY**

The report of the CNS/SG/1 Meeting is presented for review by APIRG.

Action by the Group is at paragraph 3

References:

- [1] - Report of the CNS/SG/1 Meeting (*Principal reference*)
- [2] - Report of the Second meeting of the AFI ATN Planning Task Force
- [3] - APIRG/14 Report

*Note: References [1] and [2] can be downloaded from:*

[http://www.icao.int/cgi/goto\\_m.pl?icao/en/conf/index.html](http://www.icao.int/cgi/goto_m.pl?icao/en/conf/index.html)

**1. Introduction**

1.1 The First meeting of the Communications, Navigation and Surveillance Sub-group (CNS/SG/1) was held in Dakar from 7 to 8 April 2005. It was attended by 57 participants from 19 States and 3 international organizations. The meeting formulated 11 draft conclusions and 2 draft decisions for consideration by APIRG.

**2. Discussions**

**2.1 Election of a Chairman**

2.1.1 The Meeting elected Mr. Simon Allotey of Ghana as Chairman.

**2.2 Terms of reference, work programme and composition as defined by APIRG/14**

2.2.1 Under this agenda item, the CNS Sub-group noted its terms of reference and work programme as adopted by APIRG/14. Amendments to the work programme were agreed. These are shown in the future work programme of the Sub-group.

**2.3 Follow up of APIRG Conclusions and Decisions related to aeronautical telecommunications**

2.3.1 Under this Agenda Item, the CNS Sub-group reviewed progress made in the implementation of Conclusions and Decisions related to aeronautical communications adopted by APIRG/14.

## 2.4 Aeronautical Fixed Service (AFS)

### Review of AFTN performance

2.4.1 In reviewing AFTN performance, the meeting noted that it was still affected by a number of weaknesses such as low circuit availability in certain areas (e.g. circuits within core AFISNET area), low-speed main and interregional circuits and low level of implementation of bit-oriented protocols.

2.4.2 The CNS Sub-group noted that not all AFTN COM centers had implemented the 14<sup>th</sup> Edition of the AFI AFTN Routing Directory. It underscored the importance for all AFTN centres to implement the routing requirements therein and therefore urged those AFI COM centres that had not yet done so to comply. Another issue of importance was the need to harmonize time reference by synchronizing AFTN switch clocks on the Global Positioning System (GPS) time, considering its global coverage. The following draft Conclusions were adopted:

#### **Draft Conclusion 1/2: Implementation of the AFI AFTN Routing Directory**

**That AFI COM centres that have not yet done so, urgently implement the AFI AFTN Routing Directory (14<sup>th</sup> Edition, 2004).**

#### **Draft Conclusion 1/3: Synchronization of AFTN switch clocks**

**That States and air navigation service providers that have not yet done so, synchronize the clocks of their automated AFTN switches with Global Positioning System (GPS) time.**

### Status of implementation of the AFTN

2.4.3 The CNS Sub-group noted that only 8 AFTN circuits (2 main circuits and 6 tributary circuits) remained to be implemented for complete implementation of the AFTN Plan. The meeting updated the *AFI AFTN Implementation Specifications* as defined by APIRG/14 under its Conclusion 14/8. (Cf. **Appendix 4A** of [1]).

### Identification of AFTN deficiencies and remedial actions

2.4.4 The CNS Sub-group updated the list of AFTN deficiencies in the AFI Region, including unimplemented ANP requirements and low performance circuits in terms of availability, reliability and transmission speed (namely for main circuits). The updated list of AFTN deficiencies is shown in **WP/11** of this meeting.

2.4.5 Among the remedial actions considered by the CNS/SG for the elimination of AFTN deficiencies, were:

- enhancing maintenance capabilities for some AFISNET circuits in the Gulf of Guinea);
- making use of VSAT technology;
- achieving interoperability between aeronautical VSAT networks in accordance with APIRG Conclusion 14/12.

## **2.5 Review of the Report of the Second Meeting of the ATN Planning Task Force (Dakar, Senegal from 5 to 6 April 2005)**

### **ATN routing architecture**

2.5.1 The meeting reviewed a draft AFI ATN architecture, shown at **Appendices 2A, 2B** and 2C of [2], which was developed by the ATN Planning Task Force. The CNS Sub-group agreed that draft should be circulated to AFI States for comments. The following Draft Conclusion was adopted:

#### **Draft Conclusion 1/5: Draft AFI ATN routing architecture**

**That the draft ATN routing architecture as developed by the ATN Planning Task Force be circulated to States for comments and completion of the tables.**

### **ATN addressing plan for the AFI Region**

2.5.2 The meeting reviewed a draft ATN network service access point (NSAP) addressing plan, whose objectives are to provide guidance in the specifications of NSAP addresses; and of routing domain identifiers (RDI) for Routing Domains (RD) and Routing Domain Confederations (RDC). However, the Task Force felt that it should develop more guidance material on the assignment of the ARS, LOC and SYS fields of the NSAP address, before adoption of the addressing plan.

## **2.6 Use of VSAT technology to cater for AFS requirements**

### **Communications between Accra, Brazzaville, Dakar Oceanic (Abidjan Sector), Kinshasa and Luanda FIRs**

2.6.1 The CNS Sub-group noted that the meeting proposed by APIRG/14 Conclusion 14/11 between Accra, Brazzaville, Dakar Oceanic (Abidjan Sector), Kinshasa and Luanda FIRs was held. However, the conclusion of that meeting regarding the installation of a VSAT terminal at Luanda was not implemented. The Sub-group urged States and Organizations concerned to implement the required VSAT facilities. The meeting welcomed the implementation of a VSAT network established on INTELSAT Satellite 10-02 in the Democratic Republic of the Congo.

### **Consolidation of VSAT networks**

2.6.2 The CNS Sub-group noted the successful migration of AFISNET network (a network comprising 55 VSAT terminals covering Ghana, Nigeria, Mauritius, La Reunion, Sao Tome and Principe, South Africa, ASECNA States, Roberts FIR States) onto Satellite IS 10-02 in October/November 2004 in accordance with APIRG Conclusion 14/12. The meeting commended all States and organizations concerned for this achievement. Mindful of the potential benefits and savings that would be derived from the consolidation of existing and planned VSAT networks, the Sub-group confirmed the necessity for the other VSAT networks (namely CAFSAT, NAFISAT and SADC/2) to be established as planned on the same satellite/transponder as soon as possible. It accordingly recommended that concerned States and the Secretariat take the necessary steps with INTELSAT to have the required bandwidth secured.

## **Interoperability of VSAT networks**

2.6.3 The CNS Sub-group agreed that “interoperability” between VSAT networks was necessary to achieve an integrated and seamless network. It reviewed ways of achieving this objective. After thorough discussions and taking into consideration peculiarities inherent to satellite-based systems, the CNS Sub-group adopted the following draft conclusion:

### **Draft Conclusion 1/6: Interoperability of VSAT networks**

#### **That the States concerned:**

- a) **Agree to pursue the process of establishing CAFSAT, MID VSAT, NAFISAT, SADC/2 networks on Satellite IS 10-02@359°E, Transponder 20/20 EHA;**
- b) **Be encouraged to take advantage of new VSAT Technology platform functionalities in terms of network spectrum usage, flexibility, quality of service management, etc.;**
- c) **Make effort to achieve interoperability at baseband level where access techniques differ due to the application of emerging VSAT technologies, taking cognizance of agreed performance and quality of service requirements for the aeronautical fixed and mobile services (including data link services); and**
- d) **Carry out necessary coordination on a case-by-case basis in order to anticipate end-to-end interoperability requirements prior to implementing VSAT systems.**

## **Updates on VSAT networks**

2.6.4 The CNS Sub-group was updated on the implementation status and plans for the development of AFISNET, SADC, CAFSAT and NAFISAT VSAT networks.

- ***AFISNET Network***

2.6.5 New VSAT stations have been installed within Accra FIR (Benin, Ghana and Togo) and in Sao Tome to support AFS and AMS (extended VHF coverage). A VSAT station was installed in Algiers to support AFS links with Dakar and Niamey, and also a bilateral ATS/DS circuit Algiers/Ndjamena. It was noted that AFISNET members were considering a collective approach to auditing and re-engineering the network.

- ***CAFSAT Network***

2.6.6 It was noted that Argentina was in the process of installing a CAFSAT node in Ezeiza to be connected to Johannesburg and Canary Islands, and that Morocco was developing a national VSAT network to be established on CAFSAT operated Satellite IS-801@328.5° East.

- ***SADC and NAFISAT Networks***

2.6.7 The CNS Sub-group noted that the SADC VSAT-2 replacement network was launched. It was informed that participating States in the North Eastern AFI VSAT network (NAFISAT) had accepted a proposal by ATNS and IATA to provide it. A memorandum of understanding (MoU) on the implementation of the NAFISAT was signed by Djibouti, Egypt, Eritrea, Libya, Kenya, Somalia (CACAS), Seychelles, Sudan, Uganda, Tanzania, Yemen ATNS and IATA. Two States are still to sign the NAFISAT MoU: Ethiopia and Saudi Arabia. Ethiopia has confirmed its participation.

Information provided to the Secretariat indicates that Saudi Arabia is going to join the NAFISAT. It is planned that both NAFISAT and SADC VSAT-2 will be operational in the first quarter of 2007.

## **2.7 Review of the implementation status and performance of the Air Traffic Services Direct Speech (ATS/DS) network in the AFI Region, identification of deficiencies and remedial action for their elimination**

### **Implementation status and identification of deficiencies**

2.7.1 The CNS Sub-group reviewed the implementation efforts since the last meeting and noted that 22 ATS/DS circuits have been implemented by 27 States, whilst 1 State has not yet implemented any of 3 required ATS/DS circuits. Out of 227 ATS/DS circuits required in the AFI air navigation plan (ANP), there are 37 non-implemented circuits, or 17.2% of the required circuits. The CNS Sub-group therefore updated the list of ATS/DS deficiencies in the AFI Region as shown in **WP/11** of this meeting.

2.7.2 The Sub-group noted that while several VSAT solutions are being implemented, States concerned should be advised to use satellite telephone or public switched telephone network (PSTN) to satisfy the ATS/DS requirements in accordance with APIRG Conclusion 12/15. The following draft Conclusion was formulated:

#### **Draft Conclusion 1/7: Implementation of ATS/DS circuits**

**That the following centres use, as a temporary measure, satellite telephones for ATS coordination with relevant adjacent centres, pending the availability of the planned VSAT connections: Abidjan, Accra, Brazzaville, Khartoum, Kinshasa, Luanda and N'djamena.**

## **2.8 Review of the implementation status and performance of the Aeronautical Mobile Service in the AFI Region, identification of deficiencies and remedial action for their elimination**

### **Extension of VHF coverage**

2.8.1 The CNS Sub-group acknowledged the efforts made by a number of States to extend VHF coverage on ATS routes using remote VHF stations, in accordance with AFI/7 Recommendation 5/12. It particularly noted recent achievements in the following FIRs:

FIR Accra: Three (3) VHF relay stations using VSAT implemented at Tamale, Niamtougou, and Sao Tome.

FIR Algiers: Sixteen (16) VHF relay stations using VSAT implemented at Adrar, Algiers, Annaba, Bechar, Constantine, Djanet, El Golea, Ghardaia, Illizi, In Salah, Hassi Messaoud, Oran, Tamanrasset, Tiaret, Tindouf and Zarzaitine.

FIR Antananarivo: Three (3) VHF relay stations using VSAT implemented at Moroni, Toamasina and Tolagnaro.

FIR Brazzaville: Two (2) remote VHF relay stations using VSAT implemented at Bria, Makokou and Pointe Noire.

FIR Dakar:	Two remote VHF relay stations using VSAT implemented at Nema and Taoudenit.
FIR Khartoum:	Ten (10) remote VHF stations using VSAT implemented at Damazin, Dongola, El Fasher, El Obeid, Juba, Khartoum, Malakal, Nyala , Port Sudan and Wau,. This programme covers all the ATS routes in FIR Khartoum, except for a 300 NM segment from ORNAT to El Obeid in the northwest part of the FIR.
FIR Kinshasa:	Six (6) remote VHF stations using VSAT implemented at Ilebo, Kamina, Kinshasa, Lubumbashi, Mbandaka and Mbujimayi. Seven (7) other stations are to be implemented between July 2005 and February 2006 at Bukavu, Bunia, Buta, Gbadolite, Kalemie, Kisangani and Tshikapa. When the project is completed, three (3) ACCs will be established at Kinshasa, Kisangani and Lubumbashi.
FIR Lusaka:	Three remote VHF stations implemented at Lusaka, Mongu and Ndola. Two other stations are being implemented at Chipata and Kasama.
FIR N'djamena:	One remote VHF relay station using VSAT implemented at Bria.
FIR Niamey:	Two (2) VHF relay stations using VSAT implemented at Taoudenit and Tombouctou.

2.8.2 The CNS Sub-group reviewed the VHF coverage charts prepared by the Secretariat and noted that the areas where VHF coverage was critically need are FIR Luanda and FIR Tripoli. IATA informed the meeting that a survey of AMS communications would be conducted in the AFI Region during the third quarter of 2005.

### **Identification of deficiencies**

2.8.3 The CNS Sub-group was informed of ATS incidents due to lack of HF communications in the oceanic part FIR Luanda. It reviewed the list of AMS deficiencies and updated it as shown in **WP/11** of this meeting. The following draft Conclusions were adopted:

**Draft Conclusion 1/8: Air/ground communications in Luanda FIR**

**That, in view of the increasing number of ATS incidents in its airspace, Angola, as a matter of urgency, assign the highest priority to extend VHF coverage over continental FIR and the provision of efficient HF communications over the oceanic part of Luanda FIR.**

**Draft Conclusion 1/9: Air/ground communications in Tripoli FIR**

**That Libya assign a high priority to extend VHF coverage in Tripoli FIR.**

### **2.9 Review of the implementation status and performance of the aeronautical radio navigation service, and identification of deficiencies and remedial action for their elimination.**

2.9.1 The CNS Sub-group reviewed the implementation efforts since the last meeting and noted that 41 navigational aids (of which 24 VORs, 13 DMEs and 4 ILSs) required in the AFI Air navigation Plan (ANP) had not yet been implemented, whereas 14 installed facilities (8 VORs, 5

DMEs and 1 ILS) were to be repaired. Most of the reported deficiencies (84%) were related to en-route operations.

2.9.2 The CNS Sub-group therefore updated the list of ARNS deficiencies in the AFI Region as shown in **WP/11** of this meeting. The effort by the Democratic Republic of the Congo in implementing new navigation aids (VOR, DME, ILS) at Kinshasa/Ndjili and Lubumbashi airports was noted. Concerning Cameroon, it was agreed that the AFI FASID should be amended to replace the non-implemented VOR/DME of Foumban with that operating at Bafoussam (27 NM away). The following draft Conclusion was formulated:

**Draft Conclusion 1/10: Amendment to AFI FASID, Table CNS-3**

**That the AFI FASID be amended to replace the VOR/DME of Foumban with that of Bafoussam.**

**EGNOS Test Beds in Central, Southern and Eastern Africa**

2.9.3 The CNS Sub-group was briefed on the AFI EGNOS Test Bed trials in progress in Central, Southern and Eastern Africa.

**2.10 Surveillance**

2.10.1. Under this Agenda Item, the CNS Sub-group reviewed the status of implementation of the AFI aeronautical surveillance plan, ADS/CPDLC trials and implementation and ADS-B data link issues. The meeting was provided with information on surveillance implementation by Algeria, ASECNA, Ghana and South Africa.

2.10.2. The Sub-group, based on the information provided and its discussions, updated Table CNS 4A – *Surveillance Systems* and Table CNS 4B – *ATS Automation Systems* as shown in **Appendix 7A** and **Appendix 7B** of [1].

**ADS/CPDLC trials and implementation in the AFI Region**

2.10.3. The meeting was informed of on-going ADS/CPDLC trials in Algiers FIR. The system will be used to improve air-ground communications and to provide surveillance in the southern part of FIR Algiers, which is not covered by radar.

2.10.4. South Africa informed the meeting that, following successful trials, ADS/CPDLC is being used as a primary means of surveillance and communication in the Johannesburg Oceanic airspace. Mandatory carriage, however, was not yet being promulgated.

2.10.5. During the discussions, the meeting noted the need for more participation by airlines in the ADS/CPDLC trials and the development by the AFI ATM Sub-group of an ADS/CPLC operation manual. The following draft conclusion and decision were adopted.

**Draft Conclusion 1/11: ADS-C/CPDLC trials**

**That operators that are already ADS-C equipped participate in the various ADS-C/CPDLC trials underway in the AFI Region.**

**Draft Decision 1/12: FANS1/A operational manual**

**That the ATM/SG prepare a FANS1/A operational manual for use in the AFI Region.**

### **ADS-B data link in the AFI Region**

2.10.6. The meeting was apprised of the functions and operational benefits of automatic dependent surveillance broadcast (ADS-B). ASECNA advised the meeting of its plans to conduct ADS-B trials. The Sub-group discussed the ADS-B data links: Mode S extended squitter, VHF data link (VDL) Mode 4 and universal access transceiver (UAT). The Sub-group was informed of Recommendation 7/1 of the Eleventh Air Navigation Conference. After extensive discussions, taking into account the need for global interoperability, the meeting decided to recommend the adoption of Mode S extended squitter as the initial data link for introduction of ADS-B in the AFI Region. The following draft conclusion was adopted.

**Draft Conclusion 1/13: Initial ADS-B data link in the AFI Region**

**That the SSR Mode S extended squitter be the initial data link the introduction of ADS-B in the AFI Region.**

### **2. 11 Review of ICAO position and preparations for the ITU-WRC-2007**

2.11.1 Under this agenda item, the meeting reviewed the *Draft ICAO position for WRC 2007*. Attention was drawn to WRC-07 Agenda Items 1.5 and 1.6 and their direct effect on expansion of ICAO CNS/ATM systems. States were urged to participate in country and regional ITU WRC preparatory meetings (namely those of the African Telecommunications Union (ATU)) so that the ICAO position is reflected in their country's and the ATU submissions to the ITU. The following draft Conclusion was formulated:

**Draft Conclusion 1/14: ICAO position and preparations for the ITU WRC-2007**

**That States and air navigation service providers:**

- a) **continue their efforts on implementation of the relevant elements of ICAO Assembly Resolution A32-13 and in particular, participate in the preparatory work of the ITU and the ATU for WRC-07;**
- b) **continue to assign high priority to the tasks relating to the protection and availability of radio frequency spectrum allocated to aeronautical services and in particular actively participate in the relevant activities of the ITU-R and the ATU; and**
- c) **that have not yet done so, provide their focal contact person for ITU matters.**

### **2. 12 Future work programme and composition of the CNS/SG**

2.12.1 The CNS Sub-group reviewed and updated its work programme and composition as shown in **Appendix 9A** of [1]. The following draft decision was formulated:

**Draft Decision 1/15: Future work programme and composition of the CNS Sub-group**

**That the work programme and composition of the CNS Sub-group be as shown at Appendix ... to the report.**

## **2.13 Any other business**

### **CNS aspects of the ICAO Universal Safety Oversight Audit Programme (USAOP) Systems Approach**

2.13.1 The meeting took cognizance of Assembly Resolution 35-6 on the expansion of the ICAO Universal Safety Oversight Audit Programme (USOAP) to include the safety-related provisions in all safety-related Annexes to the Convention on International Civil Aviation (Doc 7300) and the transition to a comprehensive systems approach for safety audits under USOAP, as of January 2005.

## **3. Action by the APIRG**

3.1 The APIRG is invited to:

- a) Note the report of the CNS/SG/1 Meeting; and
- b) Review and adopt Draft Conclusions 1/2, 1/3, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/13, 1/14 and Draft Decisions 1/12, 1/15.

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