International Civil Aviation Organization

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP
SIXTEENTH MEETING (APIRG/16)
(Kigali, Rwanda 19-23 November 2007)

Agenda Item 4: AFI Regional Air Navigation Planning and Implementation Issues

4.2: Communications, Navigation and Surveillance (CNS)

REVIEW OF THE REPORT OF THE SECOND MEETING OF THE CNS SUB-GROUP

(Presented by the Secretariat)

SUMMARY
The report of the Second Meeting of the CNS Sub-group (CNS/SG/2) is presented for review by APIRG.
Action by the meeting is at paragraph 3.
References : [1] – Report of the CNS/SG/2 Meeting (Principal reference) [2] – Report of the CNS/SG/1 Meeting [3] – APIRG/15 Report. *Note: References [1],* [2] *and [3] can be downloaded from:* ***http://www.icao.int****.*
Related ICAO Strategic Objectives: A, D.

1. Introduction

1.1 The Second Meeting of the AFI Planning and Implementation Regional Group (APIRG) Communications, Navigation and Surveillance Sub-group (CNS/SG/2) was held in Dakar, Senegal from 22 to 25 May 2007. It was attended by 57 delegates from 18 States and 3 international organizations. The meeting formulated 17 draft conclusions and 9 draft decisions for consideration by APIRG.

2. Discussion

2.1 Election of the Chairperson and the Vice-Chairperson of the CNS Sub-group

2.1.1 The Sub-group elected Mr. Harry Roberts of South Africa as Chairperson of the meeting.

2.2 Review of the terms of reference, work programme and composition of the CNS/SG Sub-group

2.2.1 Under this agenda item, the CNS Sub-group noted its terms of reference, work programme and composition as established by APIRG/15. 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/15 and CNS/SG/1 Conclusions and Decisions

2.3.1 Under this agenda item, the CNS/SG reviewed progress made in the implementation of conclusions and decisions related to aeronautical communications adopted by APIRG/15.

2.4 Aeronautical Fixed Services

2.4.1 Review of performance and implementation status of the aeronautical fixed telecommunication network (AFTN) in the AFI Region, and identification of deficiencies and remedial action for their elimination.

2.4.1.1 After recalling that, at its first meeting (CNS/SG/1, Dakar, 7-8 April 2005), very low progress had been noted in the implementation of AFTN circuits since APIRG/14 meeting (Yaounde, Cameroon, 23-27 June 2003), the Sub-group reviewed the implementation status and the performance of the AFTN in the AFI Region, and came to the realization that the critical analysis carried out by CNS/SG/1 was still valid. The overall assessment was as follows:

Circuit availability rates

2.4.1.2 Statistical data provided to the meeting showed that the recommended minimum availability rate of 97% (AFI/7 Rec. 9/3 refers) was still far from being met by a large number of AFTN circuits.

Modulation rates

2.4.1.3 The requirement for a minimum modulation rate of 1200 bauds was yet to be met for the following AFTN main circuits: Addis-Ababa/Nairobi, Addis Ababa/Niamey, Cairo/Nairobi, Cairo/Tunis and Johannesburg/Nairobi. In addition, the same requirement was also yet to be met for Addis-Ababa/Djeddah (AFI/MID) and Nairobi/Mumbai (AFI/ASI-APAC) interregional circuits, whereas the inter-regional circuit Johannesburg/Ezeiza had been implemented by Argentina and South Africa using CAFSAT network.

Transit time statistics

2.4.1.4 The requirements of 5 minutes maximum for high priority messages and 10 minutes maximum for other messages was being met progressively as circuits were being upgraded. However, in many cases, prohibitive transit times continued to affect the transmission of flight safety related messages (such as flight plans, NOTAMs, etc.)

Implementation specifications

2.4.1.5 The meeting reviewed the AFI rationalized AFTN current and planned features as prescribed by APIRG/15. These features include the following elements: *category of circuit (main circuit, tributary circuit, station circuit), circuit type (not implemented, landline teletype writer, analogue (LTT/A), landline teletype writer, digital (LTT/D), landline data circuit, analogue (LDD/A), landline data circuit, digital(LDD/D), radio teletype circuit (HF) (RTT), satellite circuit /digital or analogue (SAT/D, SAT/A)), circuit signalling speed circuit protocol (ITU X25), data transfer code (ITA-2 or IA-5), aeronautical network served (AFTN or ATN), implementation target date.*

2.4.1.6 The meeting discussed the relevance of maintaining ITU X25 circuit protocol as an ICAO standardized bit oriented protocol (BOP) in the AFI Region, and recognized that many States had implemented or had planned to implement frame relay (FR) protocol.

2.4.1.7 After noting that the implementation of IPS in the ATN (ground-ground) was already ongoing in North America and Europe, and that the use of Internet Engineering Task Force (IETF) IPS standards was offering solutions for introducing ATN which were expected to offer greater flexibility in implementing ATN on actual requirements (scalability) and growth potential, the meeting reviewed the available draft version of the revised ATN SARPs and the new ATN/OSI Manual on detailed technical specifications.

2.4.1.8 The meeting agreed that AFI States should be encouraged to consider implementing ATN/IPS Standards (even if they are not yet formally adopted by ICAO) in order to avoid, to the maximum extent possible, interoperability difficulties with an ATN/OSI system; and accordingly requested the Secretariat to

inform AFI States on these developments, should they wish to redirect their investments in implementing ATN towards the IPS based ATN.

2.4.1.9 In view of the above, the meeting formulated the following draft Conclusions:

Draft Conclusion 02/01: AFTN implementation specifications

That:

a) AFI AFTN specifications prescribed by APIRG/15 be amended to reflect emerging technologies and new communication bit-oriented protocols; and

b) the further use of X.25 protocol should be discouraged in the AFI Region.

Draft Conclusion 02/02: Implementation of ATN/IPS (TCP/IP)

That, AFI States should implement ATN/IPS* (TCP/IP) Standards to the maximum extent possible, in order to avoid interoperability difficulties with an ATN/OSI system,

Identification of deficiencies

2.4.1.10 The meeting reviewed the list of deficiencies affecting AFTN circuits as updated by the secretariat based on available data. These deficiencies included AFI ANP unimplemented requirements and low performance circuits in terms of availability/stability and transmission speed (namely for main circuits).

Use of VSAT technology

2.4.1.11 The meeting noted that a number of AFI States were considering the use of the implemented or emerging VSAT networks (AFISNET, SADC/2, CAFSAT, and NAFISAT) to solve the current deficiencies affecting the implementation of ANP requirements for AFTN links. In this connection, the meeting was presented with progress reports on the development of SADC/2 and VSAT NAFISAT networks, which were expected to be implemented by the end of September 2007. The development of domestic VSAT networks in Angola, the Democratic Republic of the Congo and Kenya were noted. The following draft Conclusion was formulated:

Draft Conclusion 02/03: Implementation/Interconnection of SADC/2, NAFISAT and AFISNET VSAT Networks

That States and Organizations concerned facilitate the implementation and interconnection of SADC/2, NAFISAT and AFISNET VSAT networks by September 2007, in compliance with the project plan in order to:

a) increase AFS (AFTN and ATS/DS) connectivity and efficiency, thus improving flight coordination and management in the AFI Region; and

b) facilitate the timely implementation of AFI RVSM Programme.

Missing flight plans

2.4.1.12 The meeting took cognizance of draft Conclusion 9/10 of the Ninth Meeting of APIRG ATS/SAR/AIS Sub-group concerning the conduct of a regional survey on missing flight plans in the AFI Region, a safety-related issue, and recommended that AFTN aspects be also investigated during the projected survey to determine the possible impact of AFTN performance on flight plan unavailability within the Region. The following draft Conclusion was therefore formulated:

Draft Conclusion 02/04: Survey on missing flight plans

That the ICAO Regional Offices (Dakar and Nairobi) carry out the necessary coordination to ensure that AFTN technical and operational aspects are included in the survey relating to missing flight plans to be conducted in the AFI Region in furtherance to ATS/SAR/AIS/SG/9 Conclusion 9/10.

Note: The survey on missing flight plans was expected to be conducted no later than 1 August 2007.

Guidelines for VSAT networks

2.4.1.13 The meeting recalled ICAO work on the harmonization of implementation activities relating to the use of VSAT networks. It noted that, as part of thereof and following Conclusion 5/17 of the ALLPIRG/5 Meeting, some guidelines on performance of VSAT networks had been prepared to establish a basis for planning and basic system design of such networks in support of aeronautical ground-ground communications. It also noted that the possibility of extending the notion of required communication performance (RCP) to ground-ground communications was being investigated and that, if proved feasible, the provisions to be developed would further facilitate the implementation of the aeronautical communications infrastructure on the required end-to-end performance. The following draft Conclusion was formulated:

Draft Conclusion 02/05: Guidelines for VSAT networks

That States make use of the guidelines for the performance of VSAT networks provided in Appendix 4A *to the report.*

2.4.2 Review of the performance and implementation of ATS/DS plan, identification of deficiencies and remedial action

2.4.2.1 After recalling that, at its first meeting (CNS/SG/1, Dakar, 7-8 April 2005), very low progress had been noted in the implementation of ATS/DS circuits since APIRG/14 meeting (Yaounde, Cameroon, 23-27 June 2003), the Sub-group reviewed the implementation status and the performance of ATS/DS in the AFI Region. The list of ATS/DS deficiencies reviewed by CNS/SG/2 included AFI ANP unimplemented requirements and low performance circuits in terms of availability and stability.

2.4.2.2 As indicated in Paragraph 2.4.1.13 above, the meeting noted that a number of AFI States were considering the use of the implemented or emerging VSAT networks (AFISNET, SADC1/2, CAFSAT, and NAFISAT) to solve the current deficiencies affecting the implementation of ANP requirements for ATS/DS links. The new VSAT networks (SADC/2 and NAFISAT) were expected to be implemented by the end of September 2007.

2.4.2.3 ASECNA and ATNS (South Africa) provided the meeting with updated information concerning these networks. Concerning AFISNET, the meeting noted that a technical evaluation of this network was conducted by ICAO through a special implementation project (SIP) in 2006, the recommendations of which will be analyzed by the established Satellite Network Management Committee (SNMC). The meeting was also informed of the implementation of a VSAT network in the Democratic Republic of the Congo, using Intelsat Satellite IS 10.02 located at 359 degrees East.

2.4.2.4 After its discussions under this Agenda item, the meeting formulated the following draft Conclusions:

Draft Conclusion 02/06: Implementation of ATS/DS link Accra/Luanda

That Angola, Ghana and ATNS (South Africa) take the necessary steps to implement Accra/Luanda ATS/DS circuit through interconnection between AFISNET and SADC/2 networks.

Draft Conclusion 02/07: Implementation of Las Palmas/Nouadhibou and Las Palmas/Nouakchott ATS/DS links

That Spain (AENA) and Mauritania (ASECNA) expedite the implementation of ATS/DS links between Las Palmas and Nouakchott and between Las Palmas and Nouadhibou by 30 June 2007 in compliance with the project plan.

Draft Conclusion 02/08: Implementation of ATS/DS link Bangui/Gbadolite

That Central African Republic (ASECNA) and Democratic Republic of The Congo explore the possibility of implementing a VSAT link between Bangui and Gbadolite, by interconnecting the existing infrastructure.

Draft Conclusion 02/09: Implementation of ATS/DS links Banjul/Conakry and Bissau/Conakry

That The Gambia, Guinea (Roberts FIR) and Bissau Guinea (ASECNA) expedite the implementation of the ATS/DS links Banjul/Conakry and Bissau/Conakry.

2.4.3 Aeronautical mobile service (AMS)

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

VHF communications

2.4.3.1 The meeting recalled that, in accordance with AFI/7 Rec. 5/12, VHF coverage was required along all ATS routes, and that remote VHF stations should be used where necessary. It also recalled that, at its first meeting (CNS/SG/1), significant progress was noted in the implementation of extended VHF radio coverage using remote stations throughout the AFI Region. After recalling that CNS/SG/1 Meeting identified Luanda and Tripoli FIRs as areas where VHF coverage was critically needed, the Sub-group noted on-going projects aimed at gradually improving the quality of radio communications within Luanda FIR, and the implementation by Kenya of a full VHF coverage of the Nairobi FIR.

2.4.3.2 The meeting was presented with the experience gained by ASECNA in implementing, maintaining and monitoring its twenty eight (28) remote VHF stations throughout the AFI Region, including VHF surveys. It also noted ASECNA plans to improve VHF coverage along its managed ATS routes within Antananarivo, Brazzaville, Dakar, Niamey and N'djamena FIRs. The need for close cooperation between air navigation service providers (ANSPs) at FIR boundaries was emphasized. Such cooperation should include issues such as coordination of frequency assignment, conduct of surveys, interference monitoring.

2.4.3.3 The meeting welcomed IATA's VHF coverage surveys to be conducted in the AFI Region in every 18 months, starting from 3 to 23 September 2007, and called upon States to cooperate and provide their support to the intended surveys.

2.4.3.4 The meeting therefore formulated the following draft conclusions and decision:

Draft Conclusion 02/10: Need for cooperation between neighbouring States in implementing VHF radio coverage extension

That AFI States and Air Navigation Service Providers cooperate in addressing all aspects related to the implementation of VHF coverage facilities at FIR/airspace boundaries, including regulatory, environmental and maintenance aspects, in compliance with AFI/7 Recommendation 5/12c and APIRG Conclusion 12/16.

Draft Decision 02/11: Survey on AMS VHF coverage

That the ICAO Regional Offices (Dakar and Nairobi) coordinate the conduct of a regional survey on AMS/VHF coverage by States and Organizations in order to ascertain that VHF frequencies are free of harmful interference and to initiate remedial action with States concerned as necessary. The form shown at Appendix 4B *to the report* should be used in this connection.

Draft Conclusion 02/12: States participation in IATA VHF coverage surveys

That States cooperate and provide their support to VHF coverage surveys to be carried out by IATA in the AFI Region, initially in every 18 months.

Note: The first IATA VHF survey was scheduled from 3 to 23 September 2007.

HF communications

2.4.3.5 The meeting recognized the need for retaining reliable HF voice communications facilities, taking into consideration the impossibility to ensure total VHF coverage in some areas such as oceanic areas and remote continental areas.

2.5 Aeronautical Radio Navigation Service

2.5.1 Review of the implementation status and performance of the aeronautical radio navigation service, and identification of deficiencies and remedial action.

2.5.1.1 The meeting reviewed the current status of the aeronautical radio navigation service (ARNS) in the AFI Region and related deficiencies as reported by APIRG/15 and updated by the Secretariat based on mission reports and information received from States. It noted that a great number of navigational aids required in the AFI Air Navigation Plan (ANP) had not yet been implemented, whereas some installed facilities were to be repaired. States concerned with ARNS deficiencies were prompted to implement the corrective measures that have to be taken.

2.5.2 Follow-up of APIRG/15 Conclusions on GNSS implementation

2.5.2.1 The meeting was informed that the ANC reviewed the report of the fifteenth meeting of the Africa-Indian Ocean (AFI) Planning and Implementation Regional Group (APIRG/15), held in Nairobi, Kenya, from 26 to 30 September 2005. With regard to GNSS implementation matters discussed under Agenda Item 4.2, the ANC noted the opposition of the International Air Transport Association (IATA) to the implementation of a satellite-based augmentation system (SBAS) in the AFI region, known as the Inter-regional SBAS over AFI (ISA), and the lack of consensus among States, and accordingly instructed the Secretariat to prepare documentation on this subject. Documentation prepared by the Secretariat was reviewed by the Commission. The meeting also noted the outcome of the AFI Interregional SBAS Potential Investors Workshop which was held in Cairo, Egypt from 14 to 15 February 2006, as a follow up to APIRG Conclusion 15/19.

Review of available options

2.5.2.3 The meeting was informed that, mindful of the recommendation in ICAO Doc 9849, Paragraph 1.5.2[1], and taking into account the results of several studies addressing cost-benefit considerations in connection with SBAS implementation in the AFI Region, the ANC considered the following options:

a) Delaying consideration of the ISA until further cost-benefit analysis in coordination with users demonstrates a conclusive need. This option would have the additional advantage that it would benefit from operational experience with the EGNOS system and associated aircraft equipment and procedures that would be gained in the EUR region (the primary service area of EGNOS). This option would result

[1] *GNSS Manual (Paragraph 1.5.2) suggests that, if the cost-benefit analysis conducted as a part of the introduction of a GNSS augmentation system is not conclusive, or is not positive for one of the participants, service providers, regulatory authorities and users should examine the various available options to find the best solution.*

in a prolongation of the current Phase I of the AFI GNSS strategy, which allows the use of Basic GNSS (GPS augmented with ABAS) from en-route down to NPA. The prolongation would be consistent with the fact that Phase I has effectively not been completed properly and uniformly throughout the Region.

b) Introducing the ISA with a reduced infrastructure that would enhance en-route/NPA performance but would not enable APV. This option would enhance the availability of GNSS service compared to the current situation, as the required level of integrity would be available for a greater percentage of time. It would also reduce considerably the ground infrastructure costs, compared to full ISA implementation, as only a small number of monitoring stations would be required, while at the same time it could represent a first step towards full implementation. However, the actual benefits generated by this option would be significantly smaller compared to a full infrastructure, and would still be conditional on the level of aircraft equipage with SBAS receivers, and subject to the related uncertainties;

c) Proceeding with full-scale introduction of the ISA, consistently with Phase II of the AFI GNSS strategy (2006 – 2011), which envisages availability of SBAS APV everywhere in the region.

2.5.2.4 Technical aspects, institutional arrangements and user consensus issues were also considered by the ANC.

2.5.2.5 With regard to cost-benefit considerations, a number of potential benefits have been identified in the studies; however, such benefits depend in a critical manner on the level of aircraft equipage and procedure development. Only rough estimates are currently available for the cost of the ground infrastructure required, whereas the cost of aircraft equipment has not been addressed in most studies. Therefore, the available information is insufficient to support a conclusive cost-benefit analysis.

2.5.2.6 A number of issues exist that raise the level of uncertainty of the overall cost-benefit assessment. They include the impact of the ionosphere on GNSS performance in low-latitude areas, the complexity of the ground infrastructure and of the institutional arrangements required and the lack of user consensus.

2.5.2.7 Based on the above considerations and in light of its discussion of this topic, the Commission is of the opinion that *Option a)* in Paragraph 2.5.2.3 above should be considered as the recommended approach for the AFI Region.

2.5.2.8 Furthermore the issue of SBAS implementation was seen by the Commission as relevant to the meeting that should be convened prior to the 36th Session of the Assembly to discuss a Regional Implementation Plan for the AFI Region, in particular safety-related issues in the region.

2.5.2.9 The CNS Sub-group recognized that en-route use of basic GNSS was not yet approved in a majority of AFI States, and NPA procedures and/or related regulatory texts had not yet been published. Moreover, it noted that the requirement for the recording of GNSS parameters was not met by the States that have approved GNSS-based procedures.

2.5.2.10 After discussions, the meeting formulated the following draft conclusions and decision:

Draft Conclusion 02/13: Implementation of GNSS En-Route and Non-Precision Approach Operations

That AFI States continue their efforts to implement GNSS applications for en-route and non-precision approach operations as part of Phase 1 of AFI GNSS Strategy. In so doing, particular attention should be accorded to meeting all GNSS implementation requirements, including establishment of GNSS legislation, regulatory framework, and approval and monitoring procedures.

Draft Conclusion 02/14: Recording of GNSS Parameters

That AFI States that approve GNSS-based operations should ensure that GNSS data relevant to those operations are recorded as recommended in ICAO Annex 10, Volume I, Chapter 2, § 2.4.3. Particularly, for GNSS core systems, the following monitored items should be recorded for all satellites in view:

a) observed satellite carrier-to-noise density (C/N0) ;
b) observed satellite raw pseudo-range code and carrier phase measurements ;
c) broadcast satellite navigation messages, for all satellites in view ; and
d) relevant recording receiver status information.

Draft Conclusion 02/15: AFI GNSS Implementation Strategy

That the action taken by the Air Navigation Commission on APIRG Conclusions 15/18, 15/19 and 15/20 be referred to the AFI GNSS Implementation Task Force for updating the AFI GNSS Strategy accordingly.

NAVISAT Project

5.3 The CNS Sub-group was presented with a progress report by Egypt on the NAVISAT Project, which provided comprehensive information on the project implementation plan and related activities, including frequency coordination with ITU, attendance to regional/international meetings, establishment of a company called "NAVISAT Middle East and Africa" tasked to carry out a detailed study for the project and to supervise the frequency coordination process and the other activities. The meeting noted that the project was intended to come into operation by 2010. The need to provide assistance to NAVISAT Project studies by providing inputs from AFI States as required was expressed. The meeting formulated the following draft decision:

Draft Conclusion 02/16: NAVISAT Project

That:

a) the progress report on NAVISAT Project submitted to CNS/SG/2 be referred to the AFI GNSS Implementation Task Force for consideration in addressing its work programme as required; and

b) while monitoring the work being done by MIDANPIRG on the NAVISAT Project, the APIRG Secretariat coordinate assistance to project studies requiring inputs from the AFI Region, should the need arise.

2. 6 Aeronautical Surveillance

Review of the implementation status and performance of the aeronautical surveillance, and identification of deficiencies and remedial action for their elimination.

2.6.1 Under this Agenda Item, the CNS Sub-group acknowledged the need to include the status of implementation of the AFI surveillance infrastructure in the review of CNS system performance. It came to the realization that a comprehensive surveillance plan for terminal areas (TMAs) and aerodromes had not been developed for the AFI Region, as was the case for en-route requirements. The Sub-group accordingly formulated the following draft Decisions:

Draft Decision 02/17: Status of implementation of AFI surveillance plan for en-route ACCs

That, the status of implementation of the AFI surveillance plan for en-route, be included in the review of CNS system performance.

Draft Decision 02/18: Development of a surveillance plan for TMAs and aerodromes

That a comprehensive surveillance plan be developed for TMAs and aerodromes.

IATA policy on automatic dependent surveillance – broadcast (ADS-B) Out

2.6.2 The Sub-group took cognizance of IATA draft policy statement[2] on ADS-B Out recommending that, where justified by operational and business cases, ground-based surveillance should migrate towards ADS-B Out and new surveillance implementations should consider ADS-B Out in airports and continental airspaces. IATA particularly indicated its supports to:

a) the global implementation of Mode S 1090 MHz Extended Squitter (1090 ES) ADS-B Out standard for the provision of radar-like service by ATS providers;
b) expeditious implementation of ADS-B Out;
c) the concept that all new systems requiring to interact with aircraft transponders should be interoperable with 1090ES;
d) ATS ground systems that will recognize and provide safety and efficiency benefits to RTCA DO 260 A transponders and to early equippers of DO-260 transponders.

2.6.3 The meeting therefore agreed to establish a Task Force composed of relevant experts to develop an AFI ADS-B implementation plan, and accordingly formulated the following draft Decision:

Draft Decision 02/19: Establishment of an AFI ADS-B Implementation Task Force

That an AFI ADS-B Implementation Task Force be established with the following terms of reference:

1) Identify and quantify near term and long term benefits of ADS-B in meeting surveillance requirements in the AFI Region; and

2) Develop a recommended implementation plan including a recommended target date of implementation taking into account availability of SARPs and readiness of airspace users and ATS providers for a coordinated implementation of service and benefits.

Note:

1. The Task Force, while undertaking the task, should take into account of the work being undertaken by relevant ICAO Panels with a view to avoid any duplication.
2. The Task Force should complete its work and present the result to the next meetings of APIRG and its ATS/AIS/SAR and CNS Sub-groups.
3. In assessing the readiness of airspace users, take into account business aviation usage.

Use of the X bit by unmanned aerial vehicles (UAVs) and interrogator codes (ICs) by mobile interrogators

2.6.4 The meeting held discussions on two surveillance-related issues reported to the Aeronautical Communications Panel (ACP), concerning the X pulse in Mode A reply of SSR transponders and the use of IC code by mobile Mode S interrogators (e.g. those installed on certain military ships or aircraft). **Appendix 6A *to the report*** contains detailed information on these two safety-related problems to be addressed by States and their military authorities. The meeting requested the ICAO Regional Offices to make these known to States and through them to their military authorities; and ask States (and their military authorities through them) to provide ICAO with further comments/input relating to means of identifying UAVs and operation of Mode S interrogators on mobile platforms.

[2] IATA policy statement on ADS-B Out to be made available to airlines, States, ICAO and other aviation partners, was expected to be approved by June 2007.

2.7 Review of Communications, Navigation and Surveillance Systems Implementation Strategies

2.7.1 Under this Agenda item, mindful of its deliberations under Agenda items 4, 5 and 6, the Sub-group reiterated the need for a step-by-step approach in implementing CNS/ATM system elements, by giving priority to solving the deficiencies affecting the current CNS systems. The meeting recalled that many States had not submitted their replies to State letters calling for updates to the list of deficiencies established by APIRG/15, and therefore requested the Secretariat to ensure that proper coordination is carried out with all AFI States and relevant organizations prior to editing an updated list to be reviewed by the next meeting of APIRG. The following draft Conclusion and Decision were formulated:

Draft Conclusion 02/20: Elimination of CNS Deficiencies

That States be reminded of the step-by-step approach to be adopted when implementing CNS/ATM system elements, by giving priority to solving the deficiencies affecting the current CNS systems in accordance with APIRG Conclusion 15/99.

Draft Decision 02/21: Updating of the List of CNS Deficiencies

That the Secretariat coordinate with States and Organizations concerned the updating of the list of CNS deficiencies in the AFI Region to be submitted to APIRG/16 Meeting.

2.7.2 The CNS Sub-group reviewed the implementation strategies adopted by the AFI Region for CNS systems as defined in Doc 003 – AFI CNS/ATM Implementation Plan. **Appendix 7A to *the report*** contains the general principles, objectives and planning targets of the AFI CNS/ATM system implementation strategy.

2.7.3 The Sub-group acknowledged the need for APIRG to update the CNS implementation strategies as contained in the AFI CNS/ATM Implementation Plan (Doc 003) taking due account of the revised ICAO Global Air Navigation Plan (9750) and AFI ATM operational objectives; and to harmonize the target dates of implementation of AFI operational system (e.g. RVSM, RNAV/RNP, ADS-C/CPDLC, ADS-B operations). In this connection, the Sub-group recognized the difficulties encountered in maintaining a consistent CNS/ATM Implementation Plan for the AFI region following the dismantlement in 2003 of the APIRG CNS/ATM Sub-group and Implementation Coordination Groups (ICGs). The following draft Conclusion and Decision were formulated:

Draft Conclusion 02/22: Amendments to AFI CNS Systems Implementation Strategies

That the CNS implementation strategies developed in the AFI CNS/ATM Implementation Plan (Doc 003) be updated taking due account of the revised ICAO Global Air Navigation Plan (9750) and AFI ATM operational objectives.

Draft Decision 02/23: Harmonization of target dates of implementation of AFI operational systems

That:

a) the CNS Sub-group Secretariat should harmonize target dates with ATM/SG Secretariat regarding operational system implementation in the AFI programme; and

b) reference CNS and ATM implementation documents reflecting disparity in dates should be amended accordingly.

2.7.4 The CNS Sub-group called upon AFI air navigation service providers (ANSPs) to adopt a collective approach and speak in a single voice on issues of common interest related to the implementation of CNS elements of the CNS/ATM systems (such as service level agreements with ATN service providers, system availability, etc.), in order to facilitate the implementation of a coordinated and effective CNS infrastructure. The following draft Conclusion was formulated accordingly:

Draft Conclusion 02/24: Need for Collective Approach to CNS/ATM system elements

That air navigation service providers (ANSPs) be encouraged to adopt a collective approach and speak in a single voice on issues of common interest related to the implementation of CNS elements of the CNS/ATM systems (such as service level agreements with ATN service providers, system availability, etc.).

2.8 Review of ICAO position and preparations for the ITU-WRC-2007

2.8.1 The Meeting was informed that ICAO studies had been completed and reviewed at a combined meeting of ACP Working Group F and the Spectrum Sub-group of the NSP in December 2006, and that this combined meeting had agreed that amendments to the ICAO position were necessary particularly on *WRC-07 Agenda items 1.5, 1.6, 1.20 and 7.2.* Accordingly, the Meeting was provided in anticipation with updates to the ICAO position as submitted to ICAO Council[3], in view of the preparatory work and coordination activities in progress throughout the Region.

2.8.2 After noting that APIRG Conclusion 15/26 was still valid, the Meeting reminded States of the need to provide the ICAO Regional Offices with the names and addresses (telephone, fax, electronic mail address) of their designated focal points of contact for ITU matters. The following draft Decision was formulated:

Draft Conclusion 02/25: ICAO Position and preparations for ITU WRCs

That :

a) a Working Group composed of ITU WRC focal points of contact designated by AFI States and Organizations be established under the coordination of the Secretariat in order to implement APIRG Conclusion 15/26 in an efficient manner ;

b) States and Organizations which have not yet done so be reminded to provide the Secretariat with the names, official designation and contact details (telephone, fax and email addresses) of their designated focal points for ITU matters; and

c) the Secretariat monitor and keep States and Organizations abreast of ITU WRC and ATU preparatory activities for the timely planning and coordination of their participation.

2.8.3 The Meeting was apprised on an ASECNA WRC-2007 Preparatory Workshop held in Dakar in February 2007, in cooperation with France, to contracting States. It also noted that the African Telecommunication Union (ATU) had planned to organize an African Preparatory Meeting in Abuja, Nigeria, 25-29 June 2007, to which States were encouraged to actively participate[4].

2.9 Work programme and composition of the CNS Sub-group

2.9.1 Under this Agenda Item, the meeting reviewed and updated the terms of reference, work programme and composition of the CNS Sub-group, based on the discussions held under its Agenda items. The following draft Decision was formulated:

Draft Decision 02/26: Terms of reference, work programme and composition of the CNS Sub-group

That, the terms of reference, work programme and composition of the CNS Sub-group be as defined in Appendix A to *this paper*.

[3] The Council approved the updated ICAO position on 28 May 2007. State Letter xxx refers.
[4] Accordingly, invitation letters were sent to AFI States CAAs by the relevant ICAO Regional Offices.

2.10 Any other business

Development of regional performance objectives in the CNS field

2.10.1 Under this agenda item, the meeting discussed the development of regional performance objectives in implementing the Global Plan Initiatives (GPIs) as described in ICAO Doc 9750, the second amendment of which was prepared in 2006, in light of the Eleventh Air Navigation Conference (AN-Conf/11) in 2003 and the sixth meeting of the Air Navigation Commission Consultation with Industry in May 2004. The second amendment of the Global Air Navigation Plan notably addressed issues such as the work associated with achieving a global ATM system; the Global Plan Initiatives (GPIs); the performance-based approach to measuring success with implementation; and the process of carrying out regional integration and transition.

2.10.2 The meeting noted that ALLPIRG/5 (Montreal, 23 - 24 March 2006), particularly discussed the efforts needed in maintaining consistent global harmonization through harmonized regional implementation of GPIs, and recognized that the evolution continues from a systems-based to a performance-based approach to planning and implementation of the air navigation infrastructure. ALLPIRG/5 Conclusion 5/2 recommended that the regional planning groups review as part of their regular agenda, the progress achieved and challenges identified in the implementation of selected GPIs *that most closely align with the well established implementation plans of their respective regions, and would be most effective in achieving the objectives of the region while ensuring continuation of the work already accomplished, while taking into account the initiatives across regions, to align work programmes and to develop national and regional plans that facilitate achieving a Global ATM system.*

2.10.3 The Sub-group agreed to include the development and validation of regional performance objectives and associated monitoring tools and parameters in addressing the Global Plan Initiatives of relevance to CNS implementation plans in its future work programme to be submitted to APIRG/16.

2.10.4 In this connection, the meeting considered a scheme proposed by the Secretariat to address the development of regional performance objectives (RPOs) pertaining to communications, navigation and surveillance (CNS) systems, and identified the need for a clear statement of RPOs, together with a set of agreed regional performance indicators (RPIs) consistent as much as possible with the key performance indicators being developed by ATMPRP. RPOs may refer to the provisions contained in ICAO Annexes, Documents, AFI Air Navigation Plan, AFI RAN reports or APIRG reports. There was also need to determine ways of assessing and monitoring system performance and reporting procedures. The initial draft regional performance objectives pertaining to communications, navigation and surveillance (CNS) systems prepared by the CNS Sub-group, are shown at **Appendix B to this paper.**

3. Action by APIRG

3.1 The meeting is invited to:

a) Note the report of the CNS/SG/2 Meeting;
b) Note that follow action has already been initiated by the Secretariat in respect of Draft Conclusions 02/02, 02/03, 02/04, 02/05, 02/06, 02/07, 02/08, 02/09, 02/11 and 02/12; and
c) Review and endorse Draft Conclusions 02/01, 02/10, 02/13, 02/14, 02/20, 02/22, 02/24 and Draft Decisions 02/15, 02/16, 02/17, 02/18, 02/19, 02/21, 02/23, 02/25, and 02/26.

Appendix A

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SUB-GROUP (CNS/SG)

1. TERMS OF REFERENCE

a) Ensure the continuing and coherent development of the AFI Regional Air Navigation Plan in the fields of aeronautical communications, navigation and surveillance (CNS), including the development of CNS elements of the AFI CNS/ATM Implementation Plan in the light of new developments, in harmony with the ICAO Global Air Navigation Plan (Doc 9750) and the plans for adjacent regions;

b) Identify, review and monitor deficiencies that impede or affect the provision of efficient aeronautical telecommunications and recommend appropriate corrective action;

c) Prepare, as necessary, CNS/ATM cost/benefit analyses for the implementation options of C, N an S elements; and

d) Study, as necessary, institutional arrangements for the implementation of C, N and S systems in the AFI Region.

2. WORK PROGRAMME

Item	Global Plan Initiatives	Task description	Priority	Target date
Communications				
1.	GPI-22	Follow up and monitor the implementation of VHF coverage in the AFI region in accordance with AFI/7 Rec. 5/12.	A	APIRG/17
2.	GPI-22	Update the AFI AFTN routing directory	A	APIRG/17
3.	GPI-22	In coordination with the ATS/AIS/SAR Sub-group, participate in the development of a communication infrastructure to support an AFI Central AIS Database (AFI CAD)	A	APIRG/17
4.	GPI-17 GPI-22	Follow-up the implementation of suitable communication bit-oriented protocols to improve AFTN performance and to facilitate the introduction of ATN applications.	A	APIRG/17
5.	GPI-17	Monitor the development, and coordinate the implementation of guidance material for service level agreements between air navigations service providers and ATN service providers	A	APIRG/17
6.	GPI-17	Review and update, if needed, the ICAO Register of AMHS managing domains and addressing information pertaining to AFI.	A	Continuing
Navigation				
7.	GPI-21	Analyze and review the Report of the AFI GNSS Implementation Task Force.	A	APIRG/17
8.	GPI-21	Follow up and monitor the implementation of Phase 1 of the AFI GNSS Strategy.	A	APIRG/17
Surveillance				
9.	GPI - 9	Analyze and review CNS aspects of the report of the ADS-B Implementation Task Force.	A	APIRG/17

Item	Global Plan Initiatives	Task description	Priority	Target date
10.	GPI - 9	In coordination with the ATS/AIS/SAR Sub-group, continue the development of the AFI Aeronautical Surveillance Plan.	A	APIRG/17
Communications, Navigation and Surveillance – General matters				
11.	GPI - 9 GPI-17 GPI-21 GPI-22	Analyze, review and monitor the implementation and operation of aeronautical communications, navigation and surveillance (CNS) systems, identify CNS deficiencies and propose measures for their elimination, as required.	A	Continuing
12.	GPI - 9 GPI-17 GPI-21 GPI-22	Give further consideration, as necessary, to the concept of multinational ICAO AFI air navigation facility/service addressed in the AFI/7 Report under Agenda Item 14 (AFI/7, Conclusion 10/6c).	C	Continuing
13.	GPI - 9 GPI-17 GPI-21 GPI-22	In co-ordination with the ATS/AIS/SAR Sub-group, continue the evolutionary and harmonized development of the AFI CNS/ATM Systems Implementation Plan (AFI/7 Concl. 13/1).	A	Continuing
14.	GPI - 9 GPI-17 GPI-21 GPI-22	In co-ordination with the ATS/AIS/SAR Sub-group, develop, as necessary, comprehensive business cases for competing CNS/ATM elements implementation options for the routing areas.	B	Continuing
15.	GPI - 9 GPI-17 GPI-21 GPI-22	Review work being done by MIDANPIRG on the Egyptian initiative for a multi-mission satellite based system dedicated to CNS/ATM services and provide advice thereon.	B	APIRG/17
16.	GPI - 9 GPI-17 GPI-21 GPI-22	Co-ordinate plans developed by States, international organizations, airlines and industry for the implementation of the regional CNS/ATM systems implementation plan; and monitor CNS/ATM systems research and development, trials and demonstrations within the AFI Region and information from other regions.	B	Continuing
17.	GPI - 9 GPI-17 GPI-21 GPI-22	Maintain current the database on CNS elements of CNS/ATM planning and implementation in the AFI Region.	B	Continuing
18.	GPI - 9 GPI-17 GPI-21 GPI-22	Coordinate the implementation of ICAO Global Plan Initiatives pertaining to CNS and develop associated regional performance objectives.	A	Continuous
Aeronautical Spectrum				
19.	GPI-23	Coordinate regional activities aimed at promoting ICAO position for ITU-WRC meetings, and improving aeronautical spectrum management and control in the Region.	A	Continuing

Priority:

A: High priority tasks on which work should be speeded up;

B: Medium priority tasks, on which work should be undertaken as soon as possible, but without detriment to priority A tasks; and

C: Lesser priority tasks, on which work should be undertaken as time and resources permit, but without detriment to priority A and B tasks.

3. COMPOSITION:

Algeria, Angola, Cameroon, Congo, Côte d'Ivoire, D.R. of Congo, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Kenya, Malawi, Mauritius, Morocco, Niger, Nigeria, Senegal, South Africa, Spain, Sudan, Tanzania, Tunisia, Zambia, ACAC, ASECNA, IATA, and IFALPA.

Appendix B

GLOBAL LEVEL			REGIONAL LEVEL			
G P I (ICAO Doc 9750)		**Key Performance Indicator (KPI) (ICAO Doc 9750, ATMPRP)**	**Proposed AFI Regional Performance Objective (RPO)**	**Reference (SARPs, ANP, RAN, APIRG)**	**Proposed Regional Performance Indicator (RPI)**	**Performance Assessment and Monitoring Tool /Reporting Procedure**
1	2	3	4	5	6	7
GPI-9	Situational awareness		Provision of surveillance systems for situational awareness	ANP/FASID	Level of implementation of ASP in FIRs and TMAs Maintenance performance	
GPI-17	Implementation of data link applications				AMHS AIDC ADS/CPDLC Service level agreements	
GPI-21	Navigation systems		Provision of RNAV (GNSS) approach procedures	Annex 10 PANS Doc 8168 AFI/ANP	Level of implementation of GNSS/NPA at aerodromes Maintenance performance	
GPI-22	Communication network infrastructure		Improve performance of ground-to-ground communi-cations	AFI/ANP	Availability rates of AFS circuits AFS Transit times VSAT performance Maintenance performance	
			Improve availability of air-ground communications	AFI/ANP	% of VHF coverage along ATS routes Maintenance performance	
GPI-23	Aeronautical spectrum		Protection of aeronautical spectrum	Annex 10 Doc 9378	Implementation of regional/national frequency management procedures	
