INTERNATIONAL CIVIL AVIATION ORGANIZATION

**SECOND MEETING OF THE
AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG)
COMMUNICAICATIONS, NAVIGATION AND SURVEILLANCE SUB-GROUP
(CNS/SG/2)**

(Dakar, 22 – 25 May 2007)

REPORT

Prepared by the ICAO Western and Central African Office

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AFI Planning and Implementation Regional Group (APIRG) Communications,
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Glossary of Terms

ACC	Area Control Centre
ADS	Automatic Dependent Surveillance
AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIDC	ATS interfacility data communications
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical Information Service
ACP	Aeronautical Communications Panel
AMHS	ATS message handling system
AMS(R)S	Aeronautical Mobile-Satellite (R) Service
AMSS	Aeronautical Mobile-Satellite Service
APANPIRG	ASIA/PAC Air Navigation Planning and Implementation Regional Group
AR	Area of Routing
ASECNA	Agency for the Safety of Aerial Navigation in Africa and Madagascar
ATC	Air Traffic Control
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATNP	Aeronautical Telecommunication Network Panel
ATS	Air Traffic Services
BIS	Boundary Intermediate System
BBIS	Backbone Boundary Intermediate System
CIDIN	Common ICAO Data Interchange Network
CNS	Communications, Navigation, and Surveillance
CPDLC	Controller pilot data link communications
CSP	Communication Service Provider
DME	Distance Measuring Equipment
EGNOS	European Geostationary Navigation Overlay System
ES	End System
EUROCONTROL	European Organization for the Safety of Air Navigation
FAA	Federal Aviation Administration
FIR	Flight Information Region
FM	Frequency Modulation
FMC	Flight Management Computer
FMS	Flight Management System
GLONASS	Global Orbiting Navigation Satellite System (Russian Federation)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System (United States)
HF	High Frequency
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INS	Inertial Navigation System
IRS	Inertial Reference System
IS	Intermediate System
ISO	International Organization for Standardization
ITU	International Telecommunication Union
JAA	Joint Aviation Authorities

LAAS	Local Area Augmentation system
LEO	Low Earth Orbit
MLS	Microwave Landing System
MODE S	Mode S - SSR Data Link
MSAW	Minimum safe altitude warning system
MTSAT	Multi-Functional Transport Satellite (Japan)
OSI	Open Systems Interconnection
RAIM	Receiver Autonomous Integrity Monitoring
RD	Routing Domain
RNAV	Area Navigation
RNP	Required Navigation Performance
SARPs	Standards and Recommended Practices
SATCOM	Satellite Communication
SITA	Société Internationale de Télécommunications Aéronautiques
SSR	Secondary Surveillance Radar
TCP/IP	Transport Control Procol/Internet Protocol
TMA	Terminal Control Area
VDL	VHF Data Link
VHF	Very High Frequency
VOR	VHF Omnidirectional Radio Range
WAAS	Wide Area Augmentation System
WGS-84	World Geodetic Reference System - 1984
WRC	World Radiocommunication Conference

History of the meeting

## 1.	Duration and Venue of the Meeting

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.

## 2.	Officers and Secretariat

2.1	Mr. Prosper Zo'o–Minto'o, Regional Technical Officer Communications, Navigation and Surveillance (RO/CNS) of ICAO Western and Central Office, Dakar, was the Secretary of the Sub-group. He was assisted by Mrs. Mary A. Obeng, RO/CNS, both from the ICAO Eastern and Southern African Office, Nairobi.

2.2	Mr. Harry Roberts of South Africa chaired the meeting.

2.3	 Mr. Amadou Ousmane Guitteye, ICAO Regional Director for Western and Central Africa, opened the meeting. In his address he emphasized the expectations of the APIRG from the work of the CNS Sub-group meeting, the agenda items of which included issues such as : review of the implementation status and the performance of the aeronautical telecommunications facilities in the AFI Region, elimination of identified deficiencies in these fields, assessment of progress made in the development and interconnection of VSAT networks and extension of VHF radio coverage, implementation strategies for CNS elements of CNS/ATM systems including GNSS operations, or automatic dependent surveillance – broadcast (ADS-B) as key enablers to the Global ATM operational concept..

2.4	Mr. Mam Sait Jallow, ICAO Deputy Regional Director also attended the meeting.

## 3.	Attendance

3.1	The meeting was attended by 57 delegates from 18 States and 3 international organizations.

3.2	The list of participants is at **Appendix A** to this part of the Report (page ii-1).

## 4.	Working Languages

4.1	English and French were used as the working languages and documentation was issued in these languages.

## 5.	Agenda

5.1	The Meeting adopted the following Agenda:

Agenda Item 1:	Election of Chairman and Vice-Chairman of the Sub-Group Meeting

Agenda Item 2:   Terms of reference, work programme and composition of the Communications, Navigation and Surveillance Sub-group as defined by APIRG/15

Agenda Item 3:   Follow up of APIRG/15 and CNS/SG/1 Conclusions and Decisions

Agenda Item 4:   Communication Systems

Agenda Item 4.1:   Aeronautical Fixed Service (AFS)

- Review of the implementation and performance of the Aeronautical fixed telecommunication network (AFTN) performance in the AFI Region, identification of deficiencies and remedial action for their elimination

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

- ATN planning and implementation issues

Agenda Item 4.2:   Aeronautical Mobile Service (AMS)

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

- Extension of VHF Radio coverage in the AFI Region

Agenda Item 5:   Aeronautical Radio Navigation service (ARNS)

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

- GNSS planning and implementation issues

Agenda Item 6:   Aeronautical Surveillance

- Review of the implementation of the Aeronautical Surveillance plan in the AFI Region

- ADS-B planning and implementation issues

Agenda Item 7:   Review of Communications, Navigation and Surveillance Systems Implementation Strategies

Agenda Item 8:   Review of ICAO position and preparations for the ITU WRC - 2007

Agenda Item 9:   Future work programme and composition of the CNS/SG

Agenda Item 10:   Any other business

6.   Conclusions and Decisions

6.1   The Meeting records its action in the form of draft Conclusions and draft Decisions with the following significance:

6.2   **Draft Conclusions**

6.2.1   Draft Conclusions deal with matters which directly merit the attention of States, or on which further action will be initiated by ICAO in accordance with established procedures after approval by APIRG.

6.2.2   **List of Draft Conclusions**

No.	Title and text	Page
02/01	**AFTN implementation specifications**	4-2
	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.	
02/02	**Implementation of ATN/IPS (TCP/IP)**	4-2
	That AFI States implement ATN/IPS* (TCP/IP) Standards in order to avoid, to the maximum extent possible, interoperability difficulties with an ATN/OSI system. *(*) Note: ATN/IPS (TCP/IP) is in the process of being standardized by ICAO.*	
02/03	**Implementation/Interconnection of SADC/2, NAFISAT and AFISNET VSAT Networks**	4-3
	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.	
02/04	**Survey on missing flight plans**	4-3
	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 should be conducted no later than 1 August 2007.*	
02/05	**Guidelines for VSAT networks**	4-4
	That States make use of the guidelines for the performance of VSAT networks provided in Appendix 4A to this part of the report.	
02/06	**Implementation of ATS/DS link Accra/Luanda**	4-4
	That Angola, Ghana and South Africa (ATNS) take the necessary steps to implement Accra/Luanda ATS/DS circuit through interconnection between AFISNET and SADC/2 networks.	

No.	Title and text	Page
02/07	**Implementation of Las Palmas/Nouadhibou and Las Palmas/Nouakchott ATS/DS links**	4-4
	That Spain (AENA) and Mauritania (ASECNA) expedite the implementation of ATS/DS links between Las Palmas and Noukchott and between Las Palmas and Nouadhibou by 30 June 2007 in compliance with the project plan.	
02/08	**Implementation of ATS/DS link Bangui/Gbadolite**	4-4
	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 facilities.	
02/09	**Implementation of ATS/DS links Banjul/Conakry and Bissau/Conakry**	4-4
	That The Gambia, Guinea (Roberts FIR) and Bissau Guinea (ASECNA) expedite the implementation of the ATS/DS links Banjul/Conakry and Bissau/Conakry.	
02/10	**Need for cooperation between neighbouring States in implementing VHF radio coverage extension**	4-5
	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.	
02/11	**Survey on AMS VHF coverage**	4-5
	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 should be used in this connection.	
02/12	**States participation in IATA VHF coverage surveys**	4-6
	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 has been scheduled from 3 to 23 September 2007.*	
02/13	**Implementation of GNSS En-Route and Non-Precision Approach Operations**	5-3
	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.	

No.	Title and text	Page
02/14	**Recording of GNSS Parameters**	5-3
	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.	
02/20	**Elimination of CNS Deficiencies**	7-1
	That States continue to accord high priority to solving the deficiencies that still affect the current communications, navigation and surveillance (CNS) systems, in accordance with APIRG Conclusion 15/99.	
02/22	**Amendments to AFI CNS Systems Implementation Strategies**	7-1
	That the CNS systems 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 (Doc 9750) and AFI ATM operational objectives.	
02/24	**Need for Collective Approach to CNS/ATM system management**	7-1
	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, system reliability, etc.).	

6.3   **Draft Decisions**

6.3.1   Draft Decisions deal with matters of concern to the CNS Sub-group and the APIRG.

6.3.2   List of Draft Decisions

No.	Title and text	Page
02/15	**AFI GNSS Implementation Strategy**	5-3
	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.	

No.	Title and text	Page
02/16	**NAVISAT Project**	5-3
	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.	
02/17	**Status of implementation of AFI surveillance plan for en-route ACCs**	5-4
	That the status of implementation of the AFI surveillance plan for en-route be included in the review of CNS system performance.	
02/18	**Development of a surveillance plan for TMAs and aerodromes**	6-2
	That a comprehensive surveillance plan be developed for TMAs and aerodromes.	
02/19	**Establishment of an AFI ADS-B Implementation Task Force**	6-2
	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 expected 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.*	
02/21	**Updating of the List of CNS Deficiencies**	7-1
	That the Secretariat coordinate with States and Organizations concerned the necessary updates to the list of deficiencies affecting CNS systems in the AFI Region, to be submitted to APIRG/16 Meeting.	
02/23	**Harmonization of target dates of implementation of AFI operational systems**	7-1
	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.	

No.	Title and text	Page
02/25	**ICAO Position and preparations for ITU WRCs**	8-1
	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 and ATU preparatory activities related to WRCs for the timely planning and coordination of their participation.	
02/26	**Future terms of reference, work programme and composition of the CNS Sub-group**	9-1
	That the terms of reference of the CNS Sub-group be as defined in **Appendix 9A.**	

AFI Planning and Implementation Regional Group (APIRG) - Communications, Navigation and Surveillance Sub-Group Second Meeting
Deuxième réunion du Sous-groupe Communications, Navigation et Surveillance du groupe régional AFI de planification et de mise en œuvre (APIRG)
(CNS/SG/2)
(Dakar, Senegal, 22 – 25/05/ 2007)

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Agenda Item 1:   **Election of the Chairperson and the Vice-Chairperson of the CNS Sub-group**

1.1   The Sub-group unanimously elected Mr. Harry Roberts from Ghana as Chairperson of the meeting. The Sub-group did not elect a Vice-chairperson.

Agenda Item 2:   **Review of the terms of reference, work programme and composition of the CNS/SG Sub-group**

2.1   Under this Agenda Item, the Sub-group reviewed its terms of reference, work programme and composition as established by APIRG/15 and as shown in **Appendix 2A** to this part of the report.

2.2   Concerning its Task No.4 dedicated to the *Analysis and review of the report of the ATN Planning Task Force on the transition from the AFTN to the ATN,* the Sub-group concurred with the Secretariat's viewpoint that due to the lack of significant developments/material, the convening of a meeting of the AFI ATN Task Force did not appear to be relevant prior to CNS/SG/2.

Appendix 2A

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

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 Global Air Navigation Plan for CNS/ATM Systems 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	Task description	Priority	Target date
1	Analyze, review and monitor the implementation and operation of the aeronautical fixed service (AFTN, ATS/DS), mobile service (AMS) and radio navigation service (ARNS), identify deficiencies affecting aeronautical telecommunications and propose measures for their elimination, as required.	A	Continuing
2	Follow-up the integration/interoperability of VSAT networks in the AFI Region	A	Continuing
3	Follow up and monitor the implementation of VHF coverage in the AFI region in accordance with AFI/7 Rec. 5/12.	A	APIRG/16
4	Analyze and review the report of the ATN Planning Task Force on the transition from the AFTN to the ATN.	A	APIRG/16
5	Follow-up the upgrading of the transmission speed and the implementation of bit-oriented protocols for main AFTN circuits.	A	APIRG/16
6	Coordinate and follow-up the ICAO position for the ITU-WRC meetings.	A	Continuing
7	Continue, in co-ordination with the ATM Sub-group, the evolutionary development of the AFI CNS/ATM Systems Implementation Plan (AFI/7 Concl. 13/1).	A	Continuing

Item	Task description	Priority	Target date
8	In co-ordination with the ATM Sub-group, develop, as necessary, comprehensive business cases for competing CNS/ATM elements implementation options for the routing areas.	B	Continuing
9	Co-ordinate plans developed by States, international organizations, airlines and industry for the implementation of the regional CNS/ATM systems implementation plan.	B	Continuing
10	Update on a regular basis, Chapter 2 and the tables of Part. II of the Global Plan (Doc 9750).	B	Continuing
11	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/16
12	Monitor CNS/ATM systems research and development, trials and demonstrations within the AFI Region and information from other regions.	B	Continuing
13	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
14	Maintain current the database on CNS elements of CNS/ATM planning and implementation in the AFI Region.	B	Continuing
15	Continue the development of the AFI Aeronautical Surveillance Plan, and monitor its implementation	A	APIRG/16

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.

Agenda Item 3:   **Follow up of APIRG/15 and CNS/SG/1 Conclusions and Decisions**

3.1   Under this agenda item, the meeting reviewed and noted the follow up actions on APIRG/15 and CNS/SG/1Conclusions and Decisions as shown in **Appendix 3A** to this report.

FOLLOW-UP ACTION ON APIRG/15 MEETING CONCLUSIONS AND DECISIONS

Conc. No.	Title	Comments
15/09	Implementation of the AFI AFTN Routing Directory	States advised of the conclusion.
15/10	Synchronization of AFTN switch clocks	States advised of the conclusion. Implementation in progress.
15/11	Implementation of ATS/DS circuits	States advised of the conclusion. Implementation in progress.
15/12	Sustainability of AFISNET Network	States advised of the conclusion. ICAO Special Implementation Project on Technical Evaluation of AFISNET implemented in 2006.
15/13	Interoperability of VSAT networks	States advised of the conclusion. Implementation in progress through SADC/2 and NAFISAT projects.
15/14	Draft AFI ATN routing architecture	States advised of the conclusion.
15/15	Air/ground communications in Luanda FIR	Angola advised of the conclusion. Implementation in progress.
15/16	Air/ground communications in Tripoli FIR	Libya advised of the conclusion. Implementation in progress.
15/17	Amendment to AFI FASID, Table CNS-3	Amendment process in progress.
15/18	Proposed Institutional Structure for the Inter-regional SBAS over the AFI Region	To be considered in light of ANC review of APIRG Report and recommendations therefrom.
15/19	Meeting of Investors in the ISA	Meeting of Potential Investors in the ISA held in Cairo, 14-15 February 2006. To be considered in light of ANC review of APIRG Report and recommendations therefrom.
15/20	Revised AFI GNSS Implementation Strategy	To be considered in light of ANC review of APIRG Report and recommendations therefrom.
15/21	Amendment to AFI FASID, Tables CNS-4A and CNS-4B	Amendment process in progress.
15/22	ADS-C/CPDLC trials	IATA and AFRAA advised of the conclusion.
15/24	Initial ADS-B data link in the AFI Region	States advised of the conclusion.
15/25	Cooperative Approach to CNS Maintenance	States advised of the conclusion.
15/26	ICAO position and preparations for the ITU WRC-2007	States advised of the conclusion.
15/99	Elimination of Deficiencies affecting the CNS field	States advised of the conclusion. Implementation in progress.
Dec. No.	Title	Comments
15/23	FANS1/A operational manual	Coordinated with ATS/AIS/SAR/SG Secretariat.
15/103	Membership to APIRG Contributory Bodies	Letters sent to Uganda, Algeria, Ghana and Sudan accordingly.

FOLLOW-UP ACTION ON APIRG/15 MEETING CONCLUSIONS AND DECISIONS

Conc. No.	Title	Comments
15/09	Implementation of the AFI AFTN Routing Directory	States advised of the conclusion.
15/10	Synchronization of AFTN switch clocks	States advised of the conclusion.
15/11	Implementation of ATS/DS circuits	States advised of the conclusion. To be discussed under Agenda Item 4.
15/12	Sustainability of AFISNET Network	States advised of the conclusion.
15/13	Interoperability of VSAT networks	States advised of the conclusion. To be discussed under Agenda Item 4.
15/14	Draft AFI ATN routing architecture	States advised of the conclusion.
15/15	Air/ground communications in Luanda FIR	Angola advised of the conclusion.
15/16	Air/ground communications in Tripoli FIR	Libya advised of the conclusion.
15/17	Amendment to AFI FASID, Table CNS-3	Amendment in progress.
15/18	Proposed Institutional Structure for the Inter-regional SBAS over the AFI Region	Subject to ANC review and recommendations. To be discussed under Agenda Items 5 and 7.
15/19	Meeting of Investors in the ISA	Meeting held in Cairo, 14-15 February 2006
15/20	Revised AFI GNSS Implementation Strategy	Subject to ANC review and recommendations. To be discussed under Agenda Items 5 and 7.
15/21	Amendment to AFI FASID, Tables CNS-4A and CNS-4B	Amendment in progress
15/22	ADS-C/CPDLC trials	IATA and AFRAA advised of the conclusion.
15/24	Initial ADS-B data link in the AFI Region	States advised of the conclusion.
15/25	Cooperative Approach to CNS Maintenance	States advised of the conclusion. To be discussed under Agenda Item 4.
15/26	ICAO position and preparations for the ITU WRC-2007	States advised of the conclusion. To be discussed under Agenda Item 8.
15/99	Elimination of Deficiencies affecting the CNS field	States advised of the conclusion. To be discussed under Agenda Items 4, 5 and 6.
Dec. No.	Title	Comments
15/23	FANS1/A operational manual	Coordinated with ATM/SG Secretariat
15/103	Membership to APIRG Contributory Bodies	Letter sent to Uganda State letter sent to Algeria, Ghana and Sudan.

Agenda Item 4:   Aeronautical Fixed Services

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.

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

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

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
- Johannesburg/Nairobi

4.1.4   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

4.1.5   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

4.1.6   The meeting reviewed the AFI rationalized AFTN current and planned features as prescribed by APIRG/15. These features include the following elements:

1) *Terminal I and Terminal II.*
2) *Category of circuit (main circuit, tributary circuit, station circuit)*
3) *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))*
4) *circuit signalling speed*

    5) *circuit protocol (ITU X25)*

    6) *data transfer code (ITA-2 or IA-5)*

    7) *Aeronautical network served (AFTN or ATN)*

    8) *Implementation target date*

4.1.7   The meeting discussed at length 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.

4.1.8   Additionally, the Secretariat informed the meeting of the progress made by the Aeronautical Communications Panel (ACP) on the introduction in Annex 10 of SARPs for the ATN based on the standards for the IPS from the Internet Engineering Task Force (IETF). The meeting noted that ACP/1 particularly recommended the incorporation of a set of draft SARPs into ICAO Annex 10 and, when the Air Navigation Commission agrees, relevant amendment proposals will be sent to States.

4.1.9   The meeting acknowledged that the implementation of IPS in the ATN (ground-ground) was already ongoing in North America and Europe, and that the use of IETF standards IPS was offering solutions for introducing ATN which were expected to offer greater flexibility in implementing ATN on actual requirements (scalability) and growth potential.

4.1.10   The meeting reviewed the available draft version of the revised ATN SARPs and the new ATN/OSI Manual on detailed technical specifications, and 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. Accordingly, the Secretariat was requested to inform AFI States on these developments, should they wish to redirect their investments in implementing ATN towards the IPS based ATN.

4.1.11   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:

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

(*) Note: ATN/IPS (TCP/IP) is in the process of being standardized by ICAO.

Identification of deficiencies

4.1.12   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). After noting that many States had not submitted their replies to State letters calling for updates to the list of deficiencies established by APIRG/15, the meeting 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.

Use of VSAT technology

4.1.13   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 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

4.1.14   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

4.1.15   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 (See **Appendix 4A** to this part of the report). 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 this part of the report.

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

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.

4.2.2   As indicated in Paragraph 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.

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.

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.

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

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), the Sub-group had noted significant progress in the implementation of extended VHF radio coverage using remote stations within the following FIRs: Algiers (Annaba, El Oued, El Bayadh, In Amenas, Bechar, Constantine, Ghardaia, In Salah, Hassi Messaoud, Tindouf and Djanet), Khartoum (Damazin, Dongola, El Fasher, El Obeid, Juba, Khartoum, Malakal, Nyala , Port Sudan and Wau), Kinshasa (Kinshasa, Kisangani and Lubumbashi), Accra (Tamale, Niamtougou, and Sao Tome), and Lusaka (Chipata, Kasana, Lusaka, Mongu and Ndola). After recalling that CNS/SG/1 identified Luanda and Tripoli FIRs as areas where VHF coverage was critically needed, the Sub-group was apprised of on-going projects aimed at gradually improving the quality of radio communications within Luanda FIR. The Sub-group also noted that Kenya had implemented a full VHF coverage of the Nairobi FIR, using VHF extended range stations located at Ngong Hills, Mombasa, Poror and Wajir linked to Jomo Kenyatta International Airport.

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.

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.

4.3.4   Following its discussions under this Agenda item, the meeting 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 this part of 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

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.

Appendix 4A

Guidelines on Performance of VSAT Networks

1. Introduction

1.1   Digital communication networks based on very small aperture terminal (VSAT) are being increasingly used in the provision of aeronautical ground-ground communications in areas where terrestrial communication systems are unavailable, unreliable or uneconomical. VSAT networks are generally flexible, scalable, versatile, easy to implement/operate and cost-effective in certain areas, terrains or conditions.

1.2   On the other hand, a wide variety of often incompatible architectures, configurations, access techniques, management, operation schemes and protocols are used in different VSAT networks. Moreover, almost all VSAT networks available in the market employ some proprietary products. As a result, in general, non-identical VSAT networks are not interoperable.

1.3   There are no international standards specifically governing VSAT networks. A number of International Telecommunication Union (ITU) Recommendations relating to radio frequency or other aspects of communication systems are applicable to VSATs and are often complied with by VSAT vendors. Such compliance should not, however, be interpreted as an indication of compatibility with other products.

1.4   ICAO has not standardized the physical layer of communications, therefore there are no provisions for VSATs, nor for terrestrial-based systems-like cable, microwave relay system or optical fibre.

1.5   Noting the above, States or organizations that plan to implement VSAT networks for the provisions of aeronautical ground-ground communications, are advised to:

       a) ascertain that VSAT is in fact the preferred and most cost-effective means of communications in the geographical area (s) of interest;

       b) take into consideration Conclusion 5/16 of ALLPIRG/5; and

       c) use the performance requirements stated in the ensuing paragraph as a guide to planning, system design and evaluation activities.

2. Performance requirements

2.1   Many factors influence the architecture, configuration and system design of a VSAT network. The end user is however mainly interested in the quality or performance of the communication service that is being provided and not so much in the technical details. As such, the user should state the desired basic performance requirements at the very early stage of planning to enable VSAT system design to proceed accordingly. Such performance requirements, once agreed upon by all parties concerned, would be used as a basis for further evaluation and continuing monitoring of the network.

2.2   In general, there is a direct relationship between performance and cost. This is particularly important for VSAT networks as there are also many parameters involved in achieving a given performance level. For example, insisting on higher availability implies duplicate terminals using different satellites. Similarly, a very low bit error rate requires large earth station antennas, high power transmitters and large satellite transponder bandwidth. All those directly translate to significantly higher acquisition and operation costs.

2.3   The minimum performance targets stated below are generally suitable for aeronautical ground-ground communication and can be achieved with "reasonable" resources and cost. The stated performance parameters apply to the overall communication service as seen by the end user of a digital VSAT network.

Availability $>= 99.8\%$
(See Note 1)

Bit error rate (BER) $<= 1$ in 10^7
(See Note 2)

One-way latency (for voice communications) < 400 ms
(See Note 3)

Call blocking probability $<= 2.5 \times 10^{-3}$ (or 1 in 400 attempts)
(See Note 4)

Call set-up time $<= 2$ s

Note 1. The above shows the required overall availability of the communication service to the end user. It includes the consideration of all scheduled/non-scheduled maintenance and sun outages.

Note 2. BER is applicable to the physical layer of communications. Forward error correction (FEC) may be employed to achieve this figure.

Note 3. The above implies that for voice communications, only a single satellite hop should be used. The major contributor to the latency is the propagation delay of approximately 240 ms (a single hop). Voice compression and encoding also introduce additional delays.

Note 4. The above applies to a normal switched voice communications environment. In certain operational scenarios, it may be necessary to guarantee the availability of a voice circuit upon demand by employing priority/pre-emption techniques or dedicated satellite resources.

VHF COVERAGE SURVEY

Centre o f:

Date :

Identification		Record1						Reception Quality				Record 2					Reception Quality				Record 3					Reception Quality			
Type	Flight Number	Freq. (MHZ)	Flight Level	Route	Position	Time	Ground		Air		Freq. (MHZ)	Flight Level	Route	Position	Time	Ground		Air		Freq. (MHZ)	Flight Level	Route	Position	Time	Ground		Air	
							Clarity	Strength	Clarity	Strength						Clarity	Strength	Clarity	Strength						Clarity	Strength	Clarity	Strength

Reception Clarity   *0 : Nil   1 : inaudible   2 : Chopped   3 : Medium   4 : Good   5 : Excellent*

Reception Strength   *0 : Nil   1 : Bad   2 : Poor   3 : Medium   4 : Good   5 : high*

Agenda Item 5:   **Aeronautical Radio Navigation Service**

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

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.

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

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

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 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.

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[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.*

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

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.

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.

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 5.2.3 above should be considered as the recommended approach for the AFI Region.

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.

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.

5.2.10   The meeting therefore 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

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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.**

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Agenda Item 6:   Aeronautical Surveillance

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

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.

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

6.2   The Sub-group took cognizance of IATA draft policy statement[1] 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.

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.

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[1] 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.

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

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** contains detailed information on these two safety-related problems to be addressed by States and their military authorities. The meeting's viewpoint was that the ICAO Regional Offices should be requested 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.

Appendix 6A

1. Use of X pulse

1.1 It has been reported to the Aeronautical Surveillance Panel (ASP) of ICAO that in some cases, the X pulse in Mode A reply by secondary surveillance radar (SSR) transponders is being used to distinguish unmanned aerial vehicles (UAVs) from other aircraft. As stated in Annex 10, Volume IV, Chapter 3, Paragraph 3.1.1.6.2 and the following note, the position of the X pulse has been specified as a technical standard to safeguard possible future use. The actual evolution of the SSR has been through Mode S and as a result, no use of the X pulse has been/will be necessary.

1.2 Moreover, the presence of a pulse in the X pulse position has the effect of invalidating Mode A replies in systems used by some States. As such, any air vehicle transmitting the X pulse (e.g. a UAV) may therefore not be visible to the ground surveillance radar (use for air traffic control (ATC)) if this method of operation is adopted. This is a flight safety issue.

1.3 As such, the X pulse should not be used for the identification of UAVs or any other purposes. A proposal to amend Annex 10 for the purpose of forbidding the use of X pulse is being prepared. Furthermore, a number of technical options (based on Mode S) are available to enable the distinction between UAVs and other aircraft. Based on requests from States and international organizations, ICAO will consider the further development of the aforementioned technical options.

2. Use of IC by mobile platforms

2.1 It has also been reported that Mode S interrogators installed on some mobile platforms (including those operating in high seas) use interrogator codes (ICs) other than zero. Such operations (even on high seas), specially when not properly coordinated with civil aviation authorities, could severely interfere with ground-based Mode S radars used for civil and military ATC and defence operations.

2.2 The current provision in Annex 10 concerning mobile platforms is shown below:

3.1.2.11.7 MOBILE INTERROGATORS

Recommendation.— *Mobile interrogators should acquire, whenever possible, Mode S aircraft through the reception of squitters.*
Note.— Passive squitter acquisition reduces channel loading and can be accomplished without the need for coordination.

2.3 By default, mobile Mode S interrogators (e.g. military ships or aircraft) should not be allocated a distinct interrogator code. They should instead use a special mode of target acquisition, using interrogator code II=0, defined in ICAO Annex 10 Volume IV Chapter 3. Alternative means are possible to acquire targets thus avoiding the need for the interrogator to use lockout protocol. For example, acquisition squitter (as per the above-mentioned Recommendation) and angle of arrival techniques can be used to determine the azimuth angle and address of aircraft. Also, with greater use of extended squitter, fewer interrogations would be required.

Agenda Item 7:   **Review of Communications, Navigation and Surveillance Systems Implementation Strategies**

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 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.

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 this part of the report contains the general principles, objectives and planning targets of the AFI CNS/ATM system implementation strategy.

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. 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.**

7.4   Finally, in order to facilitate the implementation of a coordinated and effective CNS infrastructure, 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.). 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.).

CNS/ATM IMPLEMENTATION STRATEGY
(AFI Doc 003)

1.1 Introduction

a) The provider, user States and Organizations concerned acknowledge that the AFI Region stands to derive great benefits from the introduction of the new integrated ICAO CNS/ATM System. It is recognized that it is only with the full coordination of implementation activities that the complete benefits of CNS/ATM will be realized.

b) Consequently, and in order to ensure a coherent, timely, co-ordinated, cost-effective, operationally oriented implementation of the integrated ICAO CNS/ATM system in the AFI Region, the approach and strategy contained in this document are adopted at the AFI Regional level for use and compliance by provider and user States and Organizations concerned.

c) In deciding the possible introduction at regional level of new elements of the integrated CNS/ATM system requiring the carriage of additional equipment on-board aircraft, APIRG will take into consideration the need of airspace users to be given adequate advance notice for major new equipment fittings.

1.2 General Principles

1.2.1 The AFI Region shall aim at taking advantage in a timely manner, of those individual elements of the CNS/ATM systems for which positive benefit in relation to overall cost has been demonstrated or recognized by those concerned.

1.2.2 It is recognized that the full implementation of all ATM objectives with their CNS requirements will take time. The AFI Region, therefore, will adopt a step by step approach starting with the ATM objectives which can be achieved within the short term with minimum CNS requirements or relatively low cost.

1.2.3 The introduction of individual elements of the new integrated CNS/ATM concept in the AFI Region shall be carried out in a co-ordinated and coherent manner, under the aegis of the AFI Planning and Implementation Regional Group (APIRG). In this context it is essential to ensure that:

> a) adjacent systems shall interface in such a way that airspace boundaries between control sectors, Flight Information Regions, or Air Navigation Regions, are transparent.

> b) systems must remain responsive to operational requirements at every step of development, avoiding to the extent possible, discontinuities in evolution likely to cause disturbances to the operational environment.

1.2.4 At least in the short and medium term, the difference in equipage between the domestic and regional operators on the one hand, and the transcontinental operators on the other hand, will be significant. The transcontinental operators will be fully equipped to operate in regions such as Europe and will certainly value taking advantage of their capabilities to obtain more economic flight profiles. As far as the domestic and regional operators are concerned, because they would not operate in other regions with the new CNS/ATM requirements for equipage/approval, they may not derive a positive cost/benefit from equipping. In light of the foregoing, long haul operators which are adequately certified and/or approved should be given timely full benefit and the domestic and regional operators be allowed to choose either to equip (approved or certified) or to fly segregated airspace.

1.2.5 The seamless airspace, which is indispensable for total benefit, will not be achieved without close co-ordination among providers and between providers and users. It is then more and more necessary and important that providers and users agree before any decision on implementation is taken. In this regard the following should be kept in mind:

> • **Communications**

> > The objective of the region is full deployment of an ATN environment with the possibility to accommodate FANS1/A and the highest degree of functionality possible.

- **Navigation**

    The ultimate objective of the Region is a navigation system based on satellite as a sole means of navigation for all phases of flight. As far as augmentation is concerned, any deployment should be in line with the regional policy as defined and approved by APIRG.

- **Surveillance**

    Even if the Region is recognized as a valid candidate for ADS, enough caution is necessary at all levels in order to avoid ground equipage with prototypes and/or systems without operational benefits.

1.2.6 All planned operations, including domestic, civil and military operations to the extent that they may influence the ATS system, should be taken into account when system capacity is defined to meet the requirements.

1.3 The objectives

1.3.1 The future system must evolve from the present system so as to meet user needs to the maximum extent possible while taking the potential benefits from the application of new system technologies.

1.3.3 Priority should be given to the implementation of systems or functions specifically aimed at the attainment of any of these stated objectives.

1.4 Planning Targets

1.4.1 Under Section III the Implementation Plan identifies target dates, by which individual tasks are required to be accomplished. These are in line with the following milestones:

- 1999 Uniform application of 10 minutes longitudinal separation in the upper airspace;
- 1999 Provision of area control service in upper airspaces;
- 1999 Pursue the implementation of fixed RNAV routes contained in the AFI ANP;
- 1999 Implementation of WGS-84;
- 1999 Data exchange between Flight Data Processing Systems (FDPS) in selected Air Traffic Control Centres;
- 1999 Progressive introduction of Controller pilot data link communications (CPDLC) with full capacity in 2005;
- 1999 Complete implementation of all AFTN and ATS/DS circuits;
- 1999 Extension of VHF coverage at all operationally significant altitudes;
- 1999 Progressive provision of SSR in selected airspaces;
- 2000 Progressive reduction of lateral separation minima in selected airspaces from 100 NM to 50 NM (in RNP 10 environment) and eventually to 30 NM (in RNP 5 environment) as dictated by operational requirements;
- 2000 Progressive introduction of Automatic Dependent Surveillance (ADS) Service with full ground capability by 2005;
- 2000 Continuation of introduction of Random RNAV routes in oceanic airspaces;
- 2000 Progressive introduction of random RNAV routes above FL 350 in continental airspaces;
- 2000 Progressive introduction of GNSS-based procedures;
- 2000 Progressive introduction of RNP 5 in selected upper airspaces;
- 2001 Progressive introduction of Longitudinal RNAV/RNP separation minima of 10
- minutes and / or 80NM RNAV derived distance in selected airspaces;
- 2005 Progressive introduction of AIDC with completion by 2008;
- 2002 Progressive Implementation of 1000 FT Vertical Separation Minima (RVSM) between FL290 and FL410 in selected airspaces.

Agenda Item 8:   Review of ICAO position and preparations for the ITU-WRC-2007

8.1. Introduction

8.1.1   The Meeting recalled that the Council approved the ICAO position for the World Radiocommunication Conference (2007) (WRC-07) on 14 June 2005. Thereafter, the ICAO position was circulated to States and international organizations (State letter E 3/5-05/85 dated 12 August 2005 refers), and was made available on the ICAO Website (**www.icao.int/icaonet**). The ICAO position was submitted to the Conference Preparatory Meeting (CPM) held in 2006.

8.1.2   The Meeting also recalled that when the ICAO position for WRC-07 was established, studies, in particular on the protection of the microwave landing system (MLS) from interference as well as the assessment of spectrum required for future communication systems, were still ongoing in ICAO's Navigation Systems Panel (NSP) and Aeronautical Communications Panel (ACP), in ITU and in regional telecommunication organizations.

8.1.3   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[1], in view of the preparatory work and coordination activities in progress throughout the Region.

8.1.4   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 Decision 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.

8.1.5   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[2].

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

Agenda Item 9:   Work programme and composition of the CNS Sub-group

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 Agenda items 1 through 8. 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…to this part of the report.

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
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	Analyze, review and monitor the implementation and operation of	A	Continuing

Item	Global Plan Initiatives	Task description	Priority	Target date
	GPI-17￼GPI-21￼GPI-22	aeronautical communications, navigation and surveillance (CNS) systems, identify CNS deficiencies and propose measures for their elimination, as required.		
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.

Agenda Item 10 : Any other business

Development of regional performance objectives in the CNS field

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. It noted that, among other issues, the second amendment of the Global Air Navigation Plan notably addressed 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.

The Sub-group was apprised of Conclusion 5/2 adopted by the Fifth Meeting of ALLPIRG/Advisory Group (ALLPIRG/5, Montreal, 23 - 24 March 2006), which particularly discussed the efforts needed in maintaining consistent global harmonization through harmonized regional implementation of GPIs. ALLPIRG/5 Conclusion 5/2 reads as follows:

Conclusion 5/2: – Implementation of Global Plan Initiatives (GPIs)

That, recognizing that the evolution continues from a systems-based to a performance-based approach to planning and implementation of the air navigation infrastructure, the regional planning groups:

> a) Note that the Global Plan is a significant component in the development of regional and national plans and that, together with the global ATM operational concept, provide an effective architecture for achieving a harmonized and seamless Global ATM system;
> b) Identify GPIs that most closely align with the well established implementation plans of their respective regions;
> c) Select GPIs that would be most effective in achieving the objectives of the region while ensuring continuation of the work already accomplished;
> d) Implement GPIs that take into account the Initiatives across regions, to align work programmes and to develop national and regional plans that facilitate achieving a Global ATM system;
> e) Utilize the planning tools as the common planning and implementation mechanism, thereby ensuring proper coordination and global integration; and
> f) Review, at each PIRG meeting as a part of its regular agenda, the progress achieved and challenges identified in the implementation of GPIs using a common template.

In view of the above, the Sub-group 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.

Appendix 10A to this part of the report contains draft regional performance objectives pertaining to communications, navigation and surveillance (CNS) systems as prepared by the Secretariat.

The Sub-group was of the view that the development and validation of regional performance objectives and associated monitoring tools/parameters in addressing the Global Plan Initiatives of relevance to CNS implementation plans, should be included in its future work programme to be submitted to the next meeting of the APIRG.

Appendix 10A

GLOBAL LEVEL		REGIONAL LEVEL			
GPI (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 communications	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	