INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF

THE SEVENTEENTH MEETING OF THE AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG/17)

(Ouagadougou, Burkina Faso, 2-6 August 2010)

PREPARED BY THE SECRETARY OF APIRG SEPTEMBER 2010

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PART I - HISTORY OF THE MEETING

1. VENUE AND DATE

1.1 The seventeenth meeting of the AFI Planning and Implementation Regional Group (APIRG/17) was held in Ouagadougou, Burkina Faso, from 2 to 6 August 2010, at the kind invitation of the Government of Burkina Faso.

2. OFFICERS AND SECRETARIAT

2.1 The meeting elected Mr. John T. Kagoro from Uganda as Chairperson; Mr. Dieguimde Moumouni from Burkina Faso as first Vice-Chairperson and Mr. Pape Atoumane Fall from Senegal as second Vice-Chairperson. Paragraph1.1, under Agenda Item 1 of this report refers.

2.2 Mr. Geoffrey Moshabesha, Regional Director, ESAF Office, Nairobi, served as the Secretary to the meeting. He was assisted by Mr. Amadou Guitteye, Regional Director, WACAF Office, Dakar; Mr. Gustavo De Leon, Regional Programme Officer, Air Navigation Bureau; and Mr. Drazen Gardilcic Technical Officer ATM Section, Air Navigation Bureau, Montreal; and by the following Officers from the Dakar and Nairobi Regional Offices:

Mr. M. S. Jallow	Deputy Regional Director, Dakar
Mr. B. M. Sekwati	Deputy Regional Director, Nairobi
Mr. L. Ndiwaita	Regional Officer, Aerodromes & Ground Aids, Nairobi
Ms. N. Onyedim	Technical Cooperation Officer, Nairobi
Mr. P. Zo'o Minto'o	Regional Officer, Communications, Navigation and Surveillance, Nairobi
Mr. A. B. Okossi	Regional Officer, Meteorology, Dakar
Mr. S. M. Machobane	Regional Officer, Air Traffic Management, Nairobi
Mr. S. Marafa	Regional Officer, Air Traffic Management, Dakar
Mr. F. Salambanga	Regional Officer, Communications, Navigations and Surveillance, Dakar
Mr. G. Y. Baldeh	Regional Officer, Aeronautical Information Service, Dakar
Mr. M. Chakira	Safety Officer, ACIP, Nairobi

2.3 The discussions were conducted in English and French and the meeting documentation was issued in both languages. Translation and simultaneous interpretation services were provided under the supervision of Mr. Adalbert Otou Nguini while Ms. Roseann Maina served as Administrative Officer for the meeting.

2.4 The meeting was opened by the Honourable Minister of Transport of Burkina Faso, M. Gilbert Noel Ouedraogo, who, on behalf of the Government of Burkina Faso, welcomed the participants to

the meeting and expressed his deep appreciation for the large turnout of delegates, and acknowledged the presence of the Minister of Transport of Niger, Honourable Ahmed Mohamed. He also thanked ICAO for choosing Burkina Faso to host APIRG/17, a major aviation event for the AFI Region and a significant milestone in the history of aviation in Burkina Faso.

2.5 Honourable Ouedraogo, recalled a number significant meetings and aviation events conducted in the recent past such as the Special AFI RAN meeting of November 2008, the outcomes of which have an important bearing on the deliberations of the PIRG/17 meeting in terms of follow up actions required. He also noted the relevance of the forthcoming 37th ICAO General Assembly to which the work of the APIRG is expected to significantly contribute.

2.6 He highlighted various aviation infrastructure development activities and projects that the host State has accomplished or is undertaking for the improvement of air navigation safety. Taking cognizance of the importance of the issues to be dealt with by the meeting, the Minister expressed the commitment of his State to spare no efforts in implementing the Conclusions and Decisions of the APIRG/17 meeting. He therefore urged all AFI States to cooperate and pool resources for the common goal of improving aviation safety in the Region.

2.7 In conclusion, he wished the delegates a pleasant stay in Ouagadougou and successful deliberations, and declared the APIRG/17 Meeting officially open.

2.8 In his welcome address, Mr. Moumouni Dieguimde, Director General of Civil Aviation and Meteorology of Burkina Faso, welcomed the participants to Burkina Faso, the land of the People of Integrity. He thanked ICAO for giving Burkina Faso the opportunity to host such an important meeting. He also recalled the hosting of similar events by the State which gives testimony to the commitment of the State to collaborate for the safe and orderly development of air transport in the AFI Region.

2.9 Mr. Geoffrey Moshabesha, Secretary of APIRG and ICAO Regional Director for the Eastern and Southern Africa Office, in turn, welcomed the delegates and thanked the Government and people of Burkina Faso, on behalf of the President of the Council of ICAO and Secretary General of ICAO as well as the entire Secretariat of ICAO for accepting to host the meeting and for the excellent arrangements and facilities provided.

2.10 Mr. Moshabesha recalled the background and reasons for the establishment of PIRGs by the ICAO Council. In his context, he made reference to the past Regional meetings including APIRG/16 meeting held in Rubavu, Rwanda in November 2007 and the Special AFI RAN meeting held in Durban, South Africa in November 2008. In highlighting the various matters of interest treated by these meetings, he pointed out the significant deficiencies in the AFI region and which States need to address both individually and collectively.

2.11 The Secretary of APIRG outlined the various recent developments and activities in the region in the various air navigation fields and highlighted the major areas of concern and those to be dealt with as per the APIRG/17 meeting Agenda.

2.12 Furthermore, he urged all States to respond to the need to take action to address the deficiencies as required and in so doing exploit various options including the use of established regional mechanisms.

2.13 In conclusion, he reaffirmed the commitment of ICAO to be at the disposal of all States to lend full support and facilitate in any way possible the successful enhancement of aviation safety and efficiency in the AFI Region.

2.14 In his address, the outgoing Chairperson of APIRG, Mr. Mohamed Cherif from Tunisia, welcomed the participants and thanked the Authorities of Burkina Faso for accepting to host the meeting and for the warm hospitality extended to the delegates. He recalled the successful organization of the Special AFI RAN meeting in November 2008, which brought up various issues for follow up by APIRG. He noted that although a lot of progress has been made, a lot more remains to be done for the safety of air navigation in the Region.

2.15 Mr. Cherif stressed the particular importance of the APIRG/17 meeting as reflected in the Agenda, and urged all participants to contribute to the extent possible for the success of the meeting.

3. ATTENDANCE

3.1 The meeting was attended by two hundred and thirteen (213) participants from thirty-nine (41) AFI States and twenty (20) from regional and international organizations: namely the African Civil Aviation Commission (AFCAC), the Agency for the Safety of Air Navigation in Africa and Madagascar (ASECNA), the AFI Regional Monitoring Agency (ARMA), the Commission of the Economic Community of West African States (ECOWAS), the International Air Transport Association (IATA), and the International Federation of Air Traffic Controllers (IFATCA). The European Commission (EC) and the Federal Aviation Administration (FAA) attended as observers.

3.2 The list of participants is provided in **Attachment 1**, attached hereto.

4. AGENDA

Agenda Item 1: Election of Chairperson and Vice-Chairpersons.

Agenda Item 2: Follow-up on the outcome of APIRG/16

- 2.1 Review of action taken by the Air Navigation Commission (ANC) and the Council on the APIRG/16 meeting report
- 2.2 Review of status of implementation of APIRG/16 Conclusions and Decisions
- 2.3 Review of status of implementation of APIRG outstanding Conclusions and Decisions

Agenda Item 3: AFI Regional Air Navigation Planning and Implementation Issues

- 3.1 Regional and National Performance Framework
- 3.2 Aerodrome Operations Planning (AOP)
- 3.3 Communications, Navigation and Surveillance (CNS)
- 3.4 Air Traffic Management (ATM)
- 3.5 Aeronautical Meteorology (MET)
- 3.6 Aeronautical Information Management (AIM)

Agenda Item 4: Regional Air Navigation Deficiencies

- 4.1 Review and Update of the List of Deficiencies in the Air Navigation Fields
- 4.2 National and Regional Efforts to Remove Identified Deficiencies

Agenda Item 5: Status of Implementation of the Special AFI Regional Air Navigation (SP AFI/08 RAN) Meeting Recommendations and its Follow-up

Agenda Item 6: Regional Technical Cooperation Activities

Agenda Item 7: Terms of Reference (TOR) and Future Work Programme of APIRG

Agenda Item 8: Any other business

5. CONCLUSIONS AND DECISIONS

5.1 APIRG records its actions in the form of conclusions and decisions with the following significance:

a) Conclusions deal with matters which, in accordance with the group's terms of reference, merit directly the attention of States or on which further action will be initiated by ICAO in accordance with established procedures; and

b) Decisions deal with matters of concern only to APIRG and its contributory bodies.

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PART II - REPORT ON AGENDA ITEMS

AGENDA ITEM 1: ELECTION OF CHAIRPERSON AND VICE-CHAIRPERSONS

1.1 The meeting elected the following members by acclamation:

Mr. John T. Kagoro (Uganda)	-	Chairperson
Mr. Moumouni Dieguimde (Burkina Faso)	-	First Vice-Chairperson
Mr. Pape Atoumane Fall (Senegal)	-	Second Vice-Chairperson

1.2 The meeting reviewed and adopted the Agenda as indicated in paragraph 4 of the History of the Meeting and agreed on the Work Programme.

AGENDA ITEM 2: FOLLOW-UP ON OUTCOME OF APIRG/16

2.1 Review of action taken by the Air Navigation Commission (ANC) and Council on APIRG/16 meeting report

2.1.1 The meeting reviewed the actions taken by the ANC (hereafter referred to as the Commission) and the Council on the Report of APIRG/16, which was held in Rubavu, Rwanda, from 19 to 23 November 2007.

2.1.2 The Group specifically noted the actions taken by the Commission on selected conclusions and decisions. In the case of the APIRG/16 Report, as there were no specific items that required action by the Council, the said report was not submitted to the Council.

2.1.3 Concluding its review, the meeting thanked the Commission for their valuable guidance on various activities of APIRG, which would be taken into account in the development of an ongoing action plan for the Region as at **Appendix 2.1A.**

2.2: Review of status of implementation of APIRG/16 Conclusions and Decisions.

2.2.1 The meeting was presented with the follow-up actions on APIRG/16 Conclusions and Decisions and noted the progress made in this respect as contained in Appendix 2.2A to this report.

2.2.2 With reference to actions taken by States and the Secretariat, the meeting expressed the need to be more State specific and agreed that it was important to indicate the results attained and the impact on the air navigation system of implementing these actions, and the same should be assessed and reflected in such reports. A revised template is to be developed for future reporting on the progress in the implementation of APIRG conclusions and decisions.

2.2.3 The meeting was informed about and noted the relevance of State specific progress status of implementation of conclusions and decisions to the Council and the Commission in determining required assistance to the states concerned. Furthermore, the Group considered it necessary to intensify and strengthen the work of its subordinate bodies for follow up on lack of progress or implementation of conclusions and decisions.

2.2.4 The various steps to be taken to assist States in implementing conclusions and decisions are to include regular meetings of Task Forces with focused terms of reference and more regular field visits by Regional Offices staff to States to the extent that available resources may permit. The meeting further urged States to provide the Regional Offices with up-to-date information on the implementation of these conclusions and decisions in order in to be able to develop business cases to support the States as appropriate.

2.2.5 The meeting took note and urged States to respond appropriately to follow-up actions by the Regional Offices for better results, and agreed to reinforce Task Forces and use them as effective tools for addressing the lack of progress in the implementation of certain APIRG Conclusions and Decisions. The meeting then adopted the following conclusion:

CONCLUSION 17/1: STRATEGIES FOR IMPROVED REPORTING AND EFFECTIVE IMPLEMENTATION OF APIRG CONCLUSIONS AND DECISIONS

That:

a) The template used to review and report the status of implementation of APIRG Conclusions and Decisions be amended to reflect the impact, results or effect on the air navigation system of the actions taken;

b) The activities of the task forces be enhanced through regular meetings/ communications with States to reinforce implementation of outstanding conclusions and decisions; and

c) States be more responsive to requests by the Regional Offices for reports on progress made in implementing these conclusions and decisions in order to develop business cases to support states as appropriate.

2.3: Review of status of implementation of other outstanding conclusions and decisions from previous meetings.

2.3.1 The current status on the follow-up actions taken by the States and ICAO on APIRG Conclusions and Decisions including those outstanding from APIRG/15 and other previous meetings was presented. The meeting took note of progress made on the outstanding Conclusions and Decisions since APIRG/16 as reflected in **Appendix 2.3A** to this report.

2.3.2 Progress on the implementation of long outstanding Conclusions and Decisions made in other previous APIRG meetings was reviewed**.** The meeting emphasized the need for the provision of information on impediments to implementation of these Conclusions and Decisions and requested that proposals for solutions be provided by the sub-groups at APIRG meetings when submitting their reports for the inter-sessional period.

DECISION17/2: PROPOSALS FOR SOLUTIONS TO LONG OUTSTANDING CONCLUSIONS AND DECISIONS OF APIRG

That, the sub-groups, when presenting their reports to the group, make proposals on strategies for addressing the long outstanding Conclusions and Decisions.

AGENDA ITEM 3: AFI REGIONAL AIR NAVIGATION PLANNING AND IMPLEMENTATION ISSUES

3.1 Regional and National Performance Framework

Outcomes of Initiatives regarding the next generation of aviation professionals

3.1.1 The meeting was provided with a progress report on the next generation of aviation professionals (NGAP) initiatives that were launched by ICAO to ensure that an adequate number of qualified and competent aviation professionals are available to operate, manage and maintain the future international air transport system. A NGAP Task Force created in May 2009 and the NGAP Symposium held at ICAO Headquarters (1 to 4 March 2010) supported the establishment of a work programme to address the enhancement of training for flight crew, air traffic management and aircraft maintenance personnel to meet the demands of new procedures and increasingly complex technologies, while the High-level Safety Conference (HLSC), held in Montréal in March 2010 recommended that States and international organizations should support the work of the NGAP Task Force.

3.1.2 The Group, when discussing the initiatives of the next generation of aviation professionals, agreed that there was a need in the AFI region to attract and retain personnel to work in the aviation field. The need to address challenges related to low remuneration packages and costs related to training was also highlighted. In this regard APIRG developed the following Conclusion:

CONCLUSION 17/3: NEXT GENERATION OF AVIATION PROFESSIONALS

That, States in the AFI Region take necessary actions to ensure that an adequate number of qualified and competent aviation professionals to operate, manage and maintain the future international air transport systems is developed and retained.

Performance-Based Global Air Navigation System-Developments in Implementation

3.1.3 The meeting was informed that in 2009, all planning and implementation regional groups (PIRGs), while adopting a regional performance framework, invited States to implement a national performance framework for air navigation systems on the basis of ICAO guidance material and aligned with the regional performance objectives, the regional air navigation plan and the Global ATM Operational Concept.

3.1.4 The meeting also noted that following the adoption of performance- based approach to air navigation planning and implementation by Regions/States, the next step entailed performance monitoring through an established measurement strategy.

3.1.5 While being informed of the global and regional efforts that were ongoing for the implementation of ICAO new flight plan format by November 2012; the meeting noted that the operational concept has greater data requirements than can be supported by the existing and new flight plan system. The meeting discussed the difficulties that some States in the AFI Region were experiencing in the implementation of the new flight plan format by the above mentioned date in 2012; and it was decided to further discuss the subject after the presentation of the report of the ATS/AIS/SAR/11 Subgroup meeting.

3.1.6 The Meeting recognized the importance to continue working on the implementation of a performance based approach and collection of data for the identified regional performance metrics in the AFI region, and made the following Conclusion:

CONCLUSION17/4: MECHANISM FOR DATA COLLECTION TO SUPPORT REGIONAL PERFORMANCE METRICS

That, States that have not done so, are requested to establish, when possible, a mechanism for data collection, processing and storage and provide the information to the corresponding Regional Office for the identified regional performance metrics.

ICAO Air Navigation Panels, Study Groups and Task Forces

3.1.7 The meeting noted information provided by the Secretariat on the voluntary work and programmes of the ICAO Air Navigation Panels, Study Groups which support the development of SARPs and guidance materials.

3.1. 8 The meeting noted the information of the Air Navigation Services and Infrastructure Plan of ASECNA as part of the regional and national performance framework planning for AFI region.

3.2 Aerodrome Operations (AOP) - Review of the report of the eighth meeting of the Aerodrome Operational Planning Sub-Group (AOP/SG/8).

3.2.1 The meeting was informed about and deliberated on the following outcomes of the Eighth Meeting of the Aerodromes Operational Planning Sub-Group, which was held in Nairobi, Kenya, from 02 to 04 June 2010. It was attended by 26 participants from 15 States and IATA:

Follow-up of the Special AFI RAN Meeting Conclusions

3.2.2 It was recognized that States in the AFI Region required technical and financial support and therefore continued to rely on ICAO and other stakeholders for expertise and assistance requiring ICAO to assume an increasing leadership role in order to ensure that the relatively high safety concerns in the AFI Region were addressed. On the other hand, the States were advised to strengthen cooperation across the region in order to make optimum use of available resources. The meeting noted the cooperative approaches that were being established within the BAG, WAEMU, EAC and SADC States.

3.2.3 With the foregoing in mind, ICAO established the AFI Comprehensive Implementation Plan (ACIP) to spearhead the support to States and the Regional Safety Oversight Organizations (RSOO). The meeting acknowledged the progress achieved by ACIP with respect to the conduct of training activities and the gap analysis exercises conducted in almost all AFI States during which the industry and other stakeholders have been actively involved thus creating an enhanced regulator/industry cooperation. The meeting remarked that there was need to monitor how these activities were translating into actual implementation of SARPS, actual improvement of safety and the reduction of accidents and incidents and formulated the following Conclusion.

CONCLUSION 17/5: MECHANISM FOR FOLLOW UP ON ACIP ACTIVITIES

That, ACIP should develop and implement a mechanism to follow up how much the training activities conducted have translated into actual implementation of the SARPS and eventually the reduction of accidents and incidents.

3.2.4 The meeting observed the non-implementation of the safety oversight Critical Element 4 - qualifications and training of technical staff, which was a prerequisite to the implementation of the other critical elements. Due to the fact that there were inadequate training opportunities for aerodrome inspectors, States depended on overseas training which was expensive and did not provide adequate practical hands-on

field experience that could only be obtained through on the job training. In this regard, the following Conclusion was formulated.

CONCLUSION 17/6: DEVELOPMENT OF TRAINING PROGRAMMES FOR AERODROME INSPECTORS

That:

a) ACIP should assist a few of the existing training institutions to develop and implement Aerodrome Inspectors training programmes,

b) In addition to the theoretical training to be offered at the training institutions, States should establish mechanisms for allowing their Aerodrome Inspectors to undergo on-the-job training through attachments.

3.2.5 With regard to Regional Aviation Safety Teams (RASTs), the meeting agreed that their establishment should be driven by the ICAO Regional Offices and that their terms of reference should be developed and disseminated to States in order to identify individuals who can give meaningful contributions to their activities.

CONCLUSION 17/7: ESTABLISHMENT OF REGIONAL AVIATION SAFETY TEAMS (RASTS) (SPECIAL AFI RAN REC. 5/4)

That:

a) ICAO Regional Offices should be the champions in the establishment of Regional Aviation Safety Teams (RAST); and

b) The Terms of Reference of the RAST should be established so that in soliciting participants from States, appropriate individuals are identified for participation.

Implementation of aerodrome services

3.2.6 The meeting discussed the status of implementation of facilities and services required at aerodromes and noted that despite the significant progress more effort was required. The ICAO audits conducted within the framework of the ICAO Universal Safety Oversight Audit Programme (USOAP) under the Comprehensive Systems Approach have by and large, confirmed the existence of these deficiencies.

Bird hazard reduction

3.2.7 With respect to bird hazards, the meeting noted that the cooperative arrangements in conducting ornithological studies among neighbouring States continued to be implemented in the five East African Community (EAC) Partner States through an EAC Wildlife Hazard Management Committee under the umbrella of the EAC Civil Aviation Safety and Security Oversight Agency (CASSOA). The meeting further reaffirmed the APIRG/14 Conclusion on this matter. On the issue of reporting of bird strikes to ICAO bird strike information system (IBIS), it was suggested that the Regional Safety Oversight Organizations and the various COSCAPs being established in various parts of Africa be used as additional means for the collection and dissemination of data to IBIS.

Rescue and Fire Fighting Services (RFFS)

3.2.8 The meeting acknowledged the improvements on the provision of firefighting equipment, rescue tools and protective clothing. The meeting however noted that a number of airports were not

allocating sufficient resources for personnel training and development and observed that there was need for States to develop appropriate regulations and guidance material regarding staff selection criteria defining the minimum education background, minimum qualifications and skills at each level and the need for periodic medical examination. The following conclusion was hence adopted by the meeting.

CONCLUSION 17/8: TRAINING OF RESCUE AND FIRE FIGHTING (RFFS) PERSONNEL

That, States which have not done so, should develop specific guidance on the rescue and fire fighting personnel minimum education background, qualifications and skills during their development including requirement for periodic medical examination.

Aerodrome emergency planning

3.2.9 The meeting noted that despite emphasis on this matter on previous discussions and the number of workshops that ICAO has conducted in the region deficiencies still existed. Furthermore, the meeting noted that with the applicability of Amendment No. 10 to Annex 14 Volume I, aerodromes are required to review their aerodrome emergency plans to include "public health emergencies" including increased risk of travelers or cargo spreading serious communicable diseases internationally through air transport and severe outbreaks of communicable diseases potentially affecting a large proportion of aerodrome staff. In addition, the meeting recalled that at those aerodromes located close to large bodies of water and/or swampy areas, or difficult terrain, the aerodrome emergency plan should include predetermined response for the specialist rescue services. In addition to reaffirming its **Conclusion 16/9,** the meeting formulated the following Conclusion.

CONCLUSION 17/9: AERODROME EMERGENCY PLANS

That:

a) States should develop guidance material to enable aerodrome operators review their aerodrome emergency plans to include "Public Health Emergencies"; and

b) ICAO Regional Offices should carry out surveys of all International Airports close to large bodies of water or swampy areas and organize workshops for them to emphasize the need to provide specific rescue facilities.

Aerodrome Pavement Strength and Friction Characteristics

3.2.10 Many AFI States are not implementing the requirement to carry out pavement strength measurements as a tool for proactively planning for preventive maintenance programmes. Further, it was also noted that very few aerodromes have implemented the requirement for measuring and reporting runway friction characteristics. The meeting acknowledged that the equipment required was expensive and the technology required was not readily available. Hence the meeting reaffirmed **Conclusion 16/10** for States to consider cooperative arrangements in the implementation of these requirements.

Requirement for Runway End Safety Area (RESA)

3.2.11 The meeting discussed the requirements in Annex 14 Volume I for the provision of the runway end safety area (RESA) and the specifications associated with it and the need to ensure that any equipment or installation in this area be frangible and mounted as low as possible. Where provision of a RESA would be prohibitive to implement, consideration may have to be given to reducing some of the declared distances. It was emphasized that runway excursion incidents and accidents have become prevalent and that airports should ensure this requirement is implemented.

Status of implementation of Annex 14 requirements for Aerodromes Certification and Safety Management Systems

3.2.12 The meeting noted the low level of implementation of requirement for State Safety Programme (SSP), Aerodrome Certification and Safety Management System (SMS) within the AFI States which is attributed to the lack of trained personnel. The enhancement of the aviation "safety culture" of African service providers has been one of the three focus areas of ACIP which has therefore conducted several Integrated Safety Management (ISM) training activities directed to both the regulators ***and*** service providers. In this regard the meeting was advised of the additional training opportunity where the ICAO WACAF office has scheduled to hold an aerodrome certification workshop. ACIP was also planning Aerodrome Inspectors' Courses in French and another in English. States were advised to take advantage of these training activities.

3.2.13 The meeting noted that when developing the regulatory framework and guidance material, it was necessary to ensure that there is sufficient consultations with airport operators, service providers and other stakeholders with a view to developing a realistic action plan for the implementation based on a carefully considered gap analysis. In this regard the initiatives being taken by the East African Community (EAC) through the Civil Aviation Safety and Security Oversight Agency (CASSOA) and other RSOOs is expected to enhance cooperation, understanding and implementation.

3.2.14 The meeting further observed that successful implementation of Annex 14 requirements for aerodrome certification is highly dependent on the commitment of both the regulator and the aerodrome operator. Some airports were not allocating sufficient resources for training and staff development and for the correction of safety concerns identified during inspections. The problem is compounded where there was no legal framework to impose operating restrictions at international airports which in most cases were wholly owned by government and act as major and usually the only gateway to the States. In this regard, the meeting formulated the following Conclusion.

CONCLUSION 17/10: AERODROME CERTIFICATION

That:

a) States which have not done so should while developing their legislative frameworks ensure that Aerodrome Inspectors are adequately empowered to impose operating restrictions and sanctions at aerodromes in cases where non-conformances have been identified; and

b) Where aerodrome certification has not been implemented, the Aerodrome Operators should commit to certification of their aerodromes by 2011.

3.2.15 The meeting observed that in order to implement SMS, aerodrome operators need to define safety policies, objectives and strategies. Further safety training and flow of safety information was inadequate and there was a general lack of commitment at the highest level of management. Management at some aerodromes continued to maintain an off-hand approach to SMS implementation, leaving the entire process to middle and low level managers. Operation of aerodromes without the requisite commitments to safety management may not deliver expected safety performance levels. The slow implementation of SMS by aerodrome operators has also been attributed to inadequate regulatory guidance. This called for the need to ensure that the State expeditiously established the SSP by providing the requisite regulations and guidance material and setting the required safety performance levels. In view of the above, the meeting developed the following Conclusion.

CONCLUSION 17/11: IMPLEMENTATION OF SSP AND SMS

That:

a) To effectively achieve the objectives of SMS at certified aerodromes, senior management of the aerodrome organizations should demonstrate commitment to SMS by actively participating in its implementation and by providing adequate resources for training of staff and contractors, and by facilitating the flow of safety information to all staff;

b) Senior management at aerodromes should pay more attention to safety monitoring and to the implementation of remedial actions necessary for the achievement of required safety performance levels and ensure that safety objectives and strategies are clearly defined; and

c) As a matter of urgency, civil aviation authorities should endeavor to establish objective strategic plans for the implementation of the SSP in order to expeditiously support implementation of Annex 14 requirements for aerodrome certification and SMS implementation.

Review of the AOP/SG Terms of Reference (TORs)

3.2.16 The meeting reviewed the terms of reference and future work programmes of the AOP/SG with a view to incorporate the ICAO emphasis on ensuring all activities support the ICAO Strategic Objectives. The TORs were amended to include:

a) Runway Safety,
b) Establishment and implementation of SSP and SMS,
c) Land use control and management around the airports, and
d) Mechanism for cooperation among States in the field of aerodrome operations.

3.2.17 The revised TORs of the AOP/SG are at Appendix 3.2A to this report.

3.3 COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

Review of the Report of the Third Meeting of APIRG Communications, Navigation and Surveillance Sub-group (CNS/SG/3)

3.3.1 The meeting reviewed the Report of the third meeting of the APIRG Communications, Navigation and Surveillance Sub-Group (CNS/SG/3), which was held in Nairobi, Kenya, from 26 to 30 April 2010 and attended by 42 delegates from 20 States and 5 International Organizations.

3.3.2 The meeting examined and adopted the amended Terms of Reference and work programme of CNS/SG; and considered the outcome of a survey on the attendance of the past CNS Sub-group meetings by its members. The available statistics showed a steady decline from 1998 which had 78 percent participation down to 58 percent in 2007 (CNS/SG/2). The Meeting adopted the following Decision:

DECISION 17/12: PARTICIPATION OF MEMBERS AT CNS/ SG MEETINGS

That, all States and Organizations which are members of the CNS sub-group should participate in sub-group meetings/teleconferences.

Aeronautical Fixed Service (AFS)

Review of the Status of AFTN Implementation and performance

3.3.3 The meeting reviewed the status of implementation and performance of the aeronautical fixed telecommunication network (AFTN) in the AFI Region, and noted that with the implementation of SADC/2 and NAFISAT networks and their interconnection to AFISNET, all AFI Air Navigation Plan (ANP) requirements for AFTN have been implemented. Additional circuits were implemented in Abidjan, Banjul, Bata, Brazzaville, Dakar, Ndjamena, Niamey, Nouakchott, Nouadhibou, and Sao Tome. The AFI Communication Chart (COMs Chart) was updated and will be included in the AFI FASID (Doc 7474).

3.3.4 However, a number of circuits need to be improved upon. The AFTN performance was reviewed as supported by AFISNET, CAFSAT, NAFISAT and SADC/2 networks and the meeting identified the deficiencies and the remedial actions for their elimination.

3.3.5 The meeting was informed that new bilateral AFTN circuits were implemented by some States and ANSPs to comply with the requirements of ATM new airspace organization and should be taken into consideration. However, in spite of the efforts undertaken by States/Organizations to replace the old VSAT nodes of AFISNET that were implemented over 20 years ago, some weaknesses remain, notably, Accra /Kano and Brazzaville /Kinshasa circuits. The meeting then formulated the following conclusion:

CONCLUSION 17/13: AFTN PERFORMANCE

That, D.R. Congo, Congo, Ghana and Nigeria should endeavour to improve the Accra/Kano and Brazzaville/Kinshasa circuits as soon as possible but not later than the end of December 2010.

AFTN Monthly statistical Data

3.3.6 The meeting noted that only 20 percent of States in the AFI Region responded to AFI/7 recommendations by sending the monthly AFTN availability statistics to the Regional Office. The meeting requested ICAO to develop a web based data collection centre where States can key in directly the AFTN statistical data for compilation and analysis. The meeting formulated the following Conclusions:-

CONCLUSION 17/14: AFTN MONTHLY STATISTICAL DATA

That, States which have not done so, follow up on and implement Recommendation 9/4 of AFI/7 (Performance of AFTN Circuits) and Decision 16/12 of APIRG/16 (Follow up of the performances of the aeronautical fixed service) by forwarding to the Regional Offices the AFTN Monthly Statistics (missing flight plans status, transit time statistics).

CONCLUSION 17/15: DEVELOPMENT OF AN AFTN DATABASE

That:

a) States provide AFTN centers with statistics software for the automation of AFTN data collection; and

b) ICAO develops a secured data base to facilitate web-based electronic compilation of AFTN statistical data collection and monitoring.

Implementation of AMHS in AFI Region

3.3.7 The meeting was informed of the recent development of AMHS implementation in other regions and noted that the implementation of AMHS in AFI should be conducted without any dysfunction

during the transition of AFTN to full AMHS operating time. In this regard the following conclusion was formulated:

CONCLUSION 17/16: IMPLEMENTATION OF AMHS

That, when implementing AMHS as part of Aeronautical Telecommunication Network (ATN) system, AFI States and Organizations adopt a cooperative approach based on a regional coordination to ensure the continuity of AFS during the transition period between AFTN and full AMHS operations.

3.3.8 In order to conduct a standardized and harmonized implementation process within the AFI Region, the meeting proposed the creation of an AHMS Implementation Task Force to coordinate the implementation of AMHS in the AFI Region, with the terms of reference shown at **Appendix 3.3A** to this report. . The following Conclusion was formulated:

CONCLUSION 17/17: CREATION OF AN AMHS IMPLEMENTATION TASK FORCE

That:

a) A task force be formed with Terms of Reference as at Appendix 3.3A to this report in order to coordinate and plan for the implementation of AMHS in AFI; and

b) ICAO continues to strongly support States in the implementation of AMHS by organizing more relevant workshops and seminars in AFI region.

Review of the Status of ATS/DS Implementation and performance

Implementation of ATS/DS Circuits

3.3.9 In reviewing the status of implementation and performance of Air Traffic Service Direct Speech (ATS/DS) circuits, the meeting noted a great improvement in the implementation. However, the following circuits, including new requirements were yet to be implemented:

- Luanda /Atlantico
- Kigali/ Goma
- Bujumbura /Goma
- Kigali/ Bukavu
- Algiers/ Tripoli
- Ouagadougou/Niamtougou
- Nouadhibou/ Dakhla
- Dakar /Rochambeau
- Bangui/ Gbadolite.
- Kinshasa/Khartoum
- Abidjan/Atlantico (new requirement)
- Moroni/Dar-es-Salam (new requirement)

3.3.10 The meeting noted that the following circuits could be implemented using the interconnection circuitry supported by SADC/2 and AFISNET: Kinshasa /Brazzaville, Bangui/Gbadolite (AFISNET) and (DRC network). Algiers/Tripoli (AFISNET and NAFISAT), Ouagadougou/Niamtougou AFISNET. The meeting formulated the following conclusion:-

CONCLUSION 17/18: IMPLEMENTATION OF ATS/DS CIRCUITS

That, concerned States and Organizations take appropriate action and implement the outstanding AFI ANP ATS/DS Circuits. In doing so, the guidelines developed by ICAO for the implementation of VSAT should be taken into consideration and ensure:

a) Harmonized networks avoiding the multiplication of sub-networks and technology; and

b) Cost effective networks by sharing existing networks interconnection capability.

3.3.11 Moreover the meeting noted that the following circuits have been implemented but not activated due to non technical reasons:

- Addis Ababa /Asmara
- Kinshasa/ Kigali
- Bujumbura/ Kinshasa

3.3.12 The meeting formulated the following conclusion:

CONCLUSION 17/19: ACTIVATION OF AFS CIRCUITS

That:

a) DRC, Ethiopia, Eritrea, Rwanda and Burundi endeavour to activate the following circuits which have been implemented through NAFISAT/SADC/2 Networks in order to improve flights coordination:

- Addis Ababa/Asmara,
- Kinshasa/Kigali; and
- Bujumbura/ Kinshasa.

b) ICAO facilitates the necessary arrangements as required.

3.3.13 The following ATS/DS circuits have been implemented but their performance is below expectation:

- Kinshasa /Brazzaville
- Kano /Accra
- Accra / Libreville
- Brazzaville / Accra
- Maiduguri /N`Djamena

3.3.14 The meeting was informed of the deliberations of the SAT/15 meeting pertaining to CNS. The SAT group particularly recommended that APIRG conducts a technical study for the development of a global ATS voice numbering plan for AFI Region and harmonize its implementation frame to ensure inter regional interconnection and interoperability of Voice Communication Switching Systems (VCSS). This task should be included in the work programme of CNS/SG. The following Decision was formulated:

DECISION 17/20: NEED FOR AN ATS-VOICE NUMBERING PLAN FOR AFI

That, in accordance with ICAO manual on ATS ground-ground voice switching and signaling (Doc 9804, Chapter 2 Section 2.3):

a) A technical study for the development of a global ATS voice numbering plan for the AFI Region be conducted to ensure inter regional interconnection and interoperability of Voice Communication Switching Systems (VCSS) and;
b) The work programme of the CNS/SG be amended accordingly.

Follow up AFISNET performance

3.3.15 The meeting was provided with the summary of the eighteenth meeting of the Satellite Network Management Committee (SNMC/18) held in Ouagadougou, Burkina Faso from 1 to 4 June 2010. The meeting noted that AFISNET members have set up a Joint Technical Evaluation and Re-engineering Team which carried out a joint technical evaluation exercise on June 2010 in line with Recommendation 6/18 of SP AFI/RAN meeting. The meeting formulated the following Conclusion:

CONCLUSION 17/21: AFISNET NETWORK

That, AFISNET States/Organizations pursue their effort in implementing the various conclusions of the previous relevant meetings (Conclusion 16/07 of SNMC/16; Recommendation 6/18 of SP AFI RAN; Conclusion 17/02 of SNMC/17; Conclusions of the Joint Technical Team) to modernize the network by evaluating and re-engineering AFISNET.

Follow up of Recommendation 6/19 of SP AFI RAN 2008 (VSAT managers' regular meetings)

3.3.16 The meeting was provided with the discussion on the implementation of Recommendation 6/19 of SP AFI RAN 2008 meeting that calls for regular meetings to be held by VSAT managers. It was noted that no such meeting had been held because of differences in organization structure of Institutions that manage the Networks.

3.3.17 The meeting noted that the SADC VSAT supervisory committee tasked ATNS (South Africa) to represent them at the meeting. However, NAFISAT Supervisory Committee tasked its members and ATNS to represent the network taking into consideration that some of the re-modification might have financial implications. A CAFSAT Network Management Committee (CNMC) was established by SAT/15 meeting based on SNMC model. The SNMC last meeting has defined the modalities for its representation at VSAT regular meetings. The following conclusion was formulated:

CONCLUSION 17/ 22: REGULAR MEETINGS BETWEEN VSAT NETWORK MANAGERS

That, in order to ensure interoperability between VSAT Networks AFI States should implement Recommendation 6/19 of SP AFI RAN 2008 calling for regular meetings to be held by VSAT Managers under the coordination of ICAO Regional Offices.

Back-up systems for AFS

3.3.18 The meeting discussed in detail the need to have back-up systems for the AFS operation. The meeting noted that Satellite telephones, Public Switched Telephone, fiber optics, Internet and Voice over Internet Protocol (VoIP), could also act as back-up systems. However, the backup systems should adhere to ATM operational requirements. The meeting formulated the following conclusion:

CONCLUSION 17/23: BACK UP-SYSTEMS FOR AFS

That, States provide suitable backup systems for AFS (ATS/DS and AFTN) based on available conventional and emerging technologies (satellite, fiber optics etc.), and install and/or enhance their backup systems using:

a) Satellite telephone voice and/or data facilities;
b) Public switched telephone network ;
c) Secured internet; and
d) Voice over Internet Protocol (VoIP).

Note 1: The references of the back-up systems (telephone numbers, addressing plan..) should be forwarded to ICAO for publication; and

Note 2: When implementing backup systems for AFS, States and organizations take into consideration AFS Performance Level Requirements for ATM operation.

3.3.19 The meeting was informed that bilateral circuits were implemented as back-up for Douala/Kano, Douala/Lagos, and Libreville/Lagos.

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

Very High Frequency (VHF) Communications

3.3.20 The meeting reviewed the status of implementation and the performance of aeronautical mobile services in the AFI Region. It was noted that States and Organization were making efforts to increase their airspace VHF coverage on ATS routes using remote VHF stations, in accordance with AFI/7 Recommendation 5/12. The meeting particularly acknowledged the efforts made by ASECNA member States (with the implementation of 17 VHF relay stations in *Antananarivo, Brazzaville, Dakar, N'Djamena and Niamey* FIRs), Democratic Republic of the Congo (DRC), Zimbabwe and Nigeria, for their respective ongoing VHF coverage enhancement projects.

3.3.21 IATA provided the meeting with a preliminary report on its18-monthly regional survey on aeronautical mobile service (AMS) – VHF and HF communications – which was conducted in June 2010, showing areas of improvement and also areas of safety concerns. The preliminary report was based on the feedback received from a very limited number of FIRs. States were called upon to contribute to finalizing the data analysis by timely providing IATA and the Regional Offices with their collected data. The final report will be distributed to States through ICAO Regional Offices.

High Frequency Communications (HF)

3.3.22 The meeting discussed the problems being encountered with the propagation of HF frequencies assigned to AFI flight information centres. It was noted that the ICAO SP AFI/RAN 2008 Recommendation 6/20 (*Improvement of air-ground high frequency (HF) communications in the AFI Region through use of ionospheric propagation forecasts)* was not implemented. States were therefore called upon to implement that recommendation.

Frequency Management

3.3.23 The meeting was informed of a web-based frequency management tool being developed by ICAO. A workshop on the final version of the software programme will be conducted by the end of year 2010 for the AFI Region. The meeting recalled that updated ICAO Communications Lists COM 1, COM 2 and COM 3 are needed to make sure that the correct database is reflected in the programme. All extended VHF sites should be included with site coordinates provided in WGS-84 format. The meeting formulated the following Conclusion:

CONCLUSION 17/24: SUBMISSION OF COM LISTS

That, States that have not done so, submit their updated COM lists to the ICAO Regional Offices. The submitted lists should have the aeronautical coordinates provided in WGS-84 format.

Controller-Pilot Data Link Communications (CPDLC)

3.3.24 The meeting noted the slow pace of implementation of the requirements for en – route controller-pilot data link communications (CPDLC) as contained in the Air Navigation Plan (ICAO Doc 7474). These requirements were introduced by APIRG/13 for AFI ACCs in 2001.

3.3.25 The meeting also noted that operational CPDLC procedures were implemented in 2009 within the EUR/SAM Corridor (Atlantico, Canaries and Dakar Oceanic FIRs) by Brazil and Spain. ASECNA member States (Chad, Congo, Cote d'Ivoire, Niger and Senegal) were also implementing CPDLC procedures in Abidjan, Brazzaville, Dakar, Ndjamena and Niamey managed airspace. Implementation projects developed by Cape Verde, Ghana and Seychelles for CPDLC procedures were also noted. The following conclusion was formulated:

Conclusion 17/25: Implementation of CPDLC

That, States implement CPDLC procedures for en-route operations in their managed oceanic and remote continental airspace.

Required Communication Performance (RCP)

3.3.26 The meeting reviewed the new concept of Required Communication Performance (RCP) as developed in the ICAO RCP Manual (Doc. 9869). RCP being a performance specification serves as one possible safety net in airspace planning in order to ensure that the various infrastructural, operational and technological components blend the aircraft systems and the ground systems to deliver a safe, reliable and repeatable service. It was agreed that the AFI Region should adopt RCP guidelines for planning towards the safe reduction in separation standards based on RNAV10 (RNP10) and RNP4 PBN navigation specifications. The following conclusion was formulated:

CONCLUSION 17/26: IMPLEMENTATION OF RCP CONCEPT

a) That States take the advantage of RCP concept stated in ICAO Doc 9869 to improve the provision of aeronautical mobile service (AMS) meeting service level agreements; and

b) ICAO support the implementation of the RCP concept through Regional Seminars and Workshops

Global Operational Data Link Document (GOLD)

3.3.27 The meeting was informed that an ICAO-sponsored Ad-hoc Working Group was developing the Global Operational Data Link Document (GOLD). The purpose of the GOLD is to facilitate global harmonization of existing data link operations and resolve regional and/or State differences impacting seamless operations. The meeting noted that, when finalized, the GOLD would effectively replace the Guidance Material for ATS Data Link Services in North Atlantic Airspace (NAT Data Link GM) and the FANS-1/A Operations Manual (FOM) for the Asia-Pacific, South American and African-Indian Ocean Regions.

Aeronautical Radio Navigation Service

Implementation and performance of Aeronautical Radio Navigation Service (ARNS)

3.3.28 The meeting reviewed the status of implementation and the performance of the Radio Navigation Service provided by CNS/SG/3. It was noted that there has not been any significant improvement in the service since the CNS/SG/2 meeting. The following Conclusion was formulated:

CONCLUSION 17/27: ELIMINATION OF AERONAUTICAL RADIONAVIGATION SERVICE (ARNS) DEFICIENCIES

That, States take urgent action to eliminate the current outstanding aeronautical radionavigation service (ARNS) deficiencies as identified in Appendix 4.1D to this report.

AFI GNSS Strategy

3.3.29 The meeting recalled that, mindful of the action taken by the Air Navigation Commission (ANC) on APIRG/15 Report on issues pertaining to GNSS implementation, and of IATA's position on SBAS, APIRG/16 had opted to delay consideration of the ISA until a further cost-benefit analysis in coordination with users demonstrates a conclusive need. As a follow-up to APIRG Decision 16/24, the 4th Meeting of AFI GNSS Implementation Task Force (GNSS/I/TF/4) (Nairobi, Kenya, 8-9 December 2008) developed an initial updated GNSS Strategy and called for a joint meeting of APIRG PBN and GNSS Implementation Task Forces in order to finalize the amended GNSS Strategy taking due account of performance based navigation (PBN) considerations as well as non-PBN requirements. The Joint Meeting of APIRG PBN and GNSS Task Forces, was held in Nairobi, Kenya from 8 to 10 September 2009.

3.3.30 The meeting was presented with an updated Cost-Benefit Analysis (CBA) prepared by the European Commission on the extension of EGNOS in the AFI Region.

3.3.31 AFCAC informed the meeting that the provision of SBAS over AFI was being considered in the frame work of Africa-European Union strategic partnership. The plan for the implementation will be discussed at a planned Africa – European Union Summit in November 2010.

3.3.32 The meeting discussed at length a number of issues related to the extension of EGNOS to the AFI Region, such as system certification, lack of consensus with users (IATA, AFRAA) on the cost-benefit analysis, cost-recovery, safety assurance, impact of Galileo on EGNOS development, Aircraft – Based Augmentation System (ABAS) performance, and transition timelines.

3.3.33 The attention of the meeting was also drawn to the need for the transition plan to consider aspects related to human resources, and to retain the principle of non-renewal of conventional navigation aids as opposed to their withdrawal from operation during the transition period until satellite-based navigation systems become sufficiently mature.

3.3.34 Concerning EGNOS certification, the meeting was informed that the Directorate General of Civil Aviation of France had certified EGNOS service for safety-of-life applications in July 2010, and that these services would be able to support aircraft operations by end of 2010.

3.3.35 Following the discussions, the meeting came to the realization that it was not in a position to endorse the proposed updated AFI GNSS Strategy which was drafted by the CNS Sub-group as shown in Appendix 3.3B to this report, together with the GNSS infrastructure in support of PBN requirements shown in Appendix 3.3C.

3.3.36 In view of the above, the meeting agreed on the need to organize a high-level meeting on AFI GNSS Strategy under the aegis of AFCAC, in close coordination with ICAO, ASECNA, IATA, AFRAA, and other relevant stakeholders. The following conclusion was formulated:

CONCLUSION 17/28: NEED FOR A HIGH LEVEL MEETING ON AFI GNSS STRATEGY

That, in order to assist AFI States in making an informed decision on the regional strategy for the introduction of GNSS applications, AFCAC organize as a matter of urgency a high level meeting in coordination with ICAO, ASECNA, IATA, AFRAA and other relevant stakeholders.

The outcome of the high level meeting will be presented to the air navigation commission and the ICAO Council.

3.3.37 After noting the lack of consensus between stakeholders on available cost-benefit analysis, the meeting also identified the need for a cost-benefit analysis to be conducted by independent experts, based on objective assumptions. The outcome of the study will be reviewed by the high-level meeting on AFI GNSS Strategy. Such a study should be based on credible and consistent traffic data. The following conclusion and decision were formulated:

CONCLUSION 17/29: NEED FOR AN INDEPENDENT COST-BENEFIT ANALYSIS

That, considering the lack of consensus between stakeholders on available cost-benefit analyses related to SBAS implementation in the AFI Region, a cost benefit analysis based on objective assumptions should be performed by independent experts, and submitted to the high level meeting to be organized by AFCAC on AFI GNSS strategy, for consideration.

DECISION 17/30: COORDINATION OF TRAFFIC DATA FOR AERONAUTICAL STUDIES

That, APIRG bodies should closely coordinate their work with the AFI Traffic Forecasting group (TFG) to ensure that accurate and reliable traffic data are made available for aeronautical studies conducted in the AFI Region, including CNS/ATM related Cost Benefit Analysis (CBA).

Merger between the AFI GNSS Implementation Task Force and PBN Task Force

3.3.38 The meeting endorsed a proposal made by the CNS and the ATS/AIS/SAR Sub-groups to merge the AFI GNSS Implementation Task force and the PBN task Force established under APIRG Decision 16/2. The terms of reference and work programme of the proposed joint task force are shown in **Appendix 3.4F** to this report.

Aeronautical Surveillance

Implementation and performance of Surveillance Systems

3.3.39 The meeting noted the slow pace of implementation of AFI Aeronautical Surveillance Plan requirements for en – route operations as contained in the Air Navigation Plan (ICAO Doc 7474). It recalled APIRG Decision 16/26 requesting that the status of implementation of the AFI Aeronautical Surveillance Plan for en-route operations be included in the review of CNS system performance.

3.3.40 The meeting also noted that operational ADS/C procedures were implemented in 2009 within the EUR/SAM Corridor (Atlantico, Canaries and Dakar Oceanic FIRs) by Brazil, Spain and Senegal (ASECNA). ASECNA was also implementing ADS/C procedures in Abidjan, Brazzaville, Dakar**,** Terrestrial, Ndjamena and Niamey managed airspace. Implementation projects developed by Cape Verde, Ghana and Seychelles for ADS/C procedures were also noted. The following conclusion was formulated:

That, States implement ADS-C Procedures for en-route operations in their managed oceanic and remote continental airspace.

Aeronautical Surveillance Strategy

3.3.41 The meeting reviewed an initial draft AFI Surveillance Strategy developed by the first meeting of the AFI Surveillance Implementation Task Force established under APIRG Decision 16/27, as endorsed by the third meeting of the CNS Sub-group.

3.3.42 Views were exchanged concerning the need for trials in respect of ADS-B and multilateration prior to operational implementation. Following the discussions, the meeting acknowledged that further work was required on the proposed AFI Surveillance Strategy, and agreed to include this work in the work programme of the AFI Aeronautical Surveillance Task Force as shown in **Appendix 3.3D** to this report. The meeting was also updated on the ICAO work in progress in the areas of aeronautical surveillance and anti-collision for consideration by the AFI Aeronautical Surveillance Task Force when addressing its assigned work programme. The following decision was formulated:

DECISION 17/32: DEVELOPMENT OF AFI SURVEILLANCE STRATEGY

That, in order to finalize the development of AFI Surveillance Strategy, the Terms of Reference, work programme and composition of the AFI Surveillance Task Force be amended as shown in Appendix 3.3D to this report.

3.3.43 In accordance with APIRG Conclusion 13/77, States which had not yet done so were urged to submit the relevant data concerning their managed aerodromes and Terminal Areas (TMAs) to facilitate the work of the CNS Sub-group on their categorization, including but not limited to the following:

Aerodromes (for each aerodrome):

- Total number of movements during the year 2000 for each of the following types of traffic:
- Commercial, military and general aviation
- IFR and VFR traffic numbers.

TMAs (for each TMA):

- Number of civil and military airports within the TMA
- Total number of movements during 2000 at each type of airport
- Vertical and lateral limits of the TMA
- IFR and VFR traffic numbers
- Restricted, prohibited and danger areas.

3.3.44 The meeting recommended close coordination between civilian and military stakeholders to provide the required data, and formulated the following conclusion:

That, no later than 31 December 2010, States which have not yet done so, compile and submit the relevant data concerning their managed aerodromes and Terminal Areas (TMAs) in order to facilitate the work of the CNS sub-group on their categorization. To this effect, States should ensure that close coordination is carried out between civilian and military stakeholders.

Review of the ICAO position and preparations for the ITU WRC-2012

Use of the Aviation Frequency Spectrum and the International Telecommunication Union (ITU) World Radiocommunication Conference (WRC)

3.3.45 The meeting noted the efforts of ICAO by having a strategy for establishing and promoting the aviation position at future ITU conferences with the aim to protect the aeronautical frequency spectrum. The meeting agreed that States in AFI region should support the ICAO position at the ITU WRC-12 Meeting. The meeting was provided with the *ICAO position for WRC-2012* which has been developed by Working Group F of the Aeronautical Communication Panel (ACP) and the Navigation Systems Panel (NSP). The meeting's attention was drawn to the successful outcome from the ITU WRC-07 as a result of direct participation of African Aviation Community.

3.3.46 States were urged to participate in national and regional WRC preparatory meetings and those of the African Telecommunications Union (ATU) in order for ICAO's position to be reflected in their submissions to the ITU. The following Conclusion was formulated:

CONCLUSION 17/34: ICAO POSITION FOR THE ITU WRC-2012

That, States and Air Navigation Service Providers (ANSPS):

a) Continue their efforts on implementation of the relevant elements of ICAO Assembly Resolution A32-13 and in particular, participate in the preparatory work of the ITU and the ATU for WRC; and

b) Continue to assign high priority to the tasks relating to the protection and availability of Radio frequency spectrum allocated to aeronautical services and in particular, actively participate in the relevant activities of the ITU-R and ATU.

Deletion of footnotes

3.3.47 Under Agenda Item1.1 of WRC-12, the following States were urged to delete footnote 5.330: Angola, Cameroon, Chad, Eritrea, Ethiopia, Mozambique, Somalia, Sudan, Tanzania and Togo, due to the effect it might have on PBN implementation. The following States were also urged to delete the footnotes 5.362B and 5.362C: Algeria, Benin, Gabon, Guinea, Guinea-Bissau, Nigeria, Senegal, Swaziland, Tanzania, Uganda, Chad, Congo, Egypt, Somalia, Sudan and Togo, in order to give protection to aeronautical radio navigation services from disabling interference, and allow the implementation of ADS-B and improvement of safety of aircraft operations. The following Conclusion was formulated:

CONCLUSION 17/35: DELETION OF FOOTNOTES 5.330, 5.362B AND 5.362C

That, States with footnotes at 5.330, 5.362B and 5.362C be urged to contact their spectrum regulators to delete theses footnotes.

AFI Frequency Management Group (AFI/FMG)

3.3.48 The meeting endorsed the terms of reference and work programme for AFI/FMG as provided at **Appendix 3.3E** to this report. States were urged to formally register their aviation frequencies with their telecommunication regulatory authorities. The following Conclusion was therefore adopted:

CONCLUSION 17/36: REGISTRATION OF OPERATIONAL FREQUENCIES

That, States which have not formally registered their operational frequencies take the necessary steps to register their operational frequencies with their Telecommunication Regulatory Authorities.

3.3.49 The meeting noted the assignment, by the CNS Sub- Group, of WRC-12 agenda items to South Africa, Kenya and Ghana to work on and develop Africa position to be discussed at the next AFI/FMG meeting and submitted to ICAO Aeronautical Communication Panel Working Group F (ACP/WG/F) and African Telecommunication Union (ATU) Conference Preparatory Meeting (CPM) respectively. The following Decision was formulated:

DECISION 17/37: FOLLOW –UP OF AFI/FMG ACTION PLAN

That:

a) The following States should follow up on ITU WRC-12 Agenda items and report to AFI/FMG:

- **South Africa: Agenda item 1.7;**
- **Ghana: Agenda item 1.3;**
- **Kenya: Agenda item 1.4; and**

b) The AFI/FMG rapporteur (ASECNA) coordinates and follows up the AFI/FMG action plan and report to the CNS Sub-group.

Non-Application of Charges for the Utilization of Aeronautical Frequency Spectrum

3.3.50 The meeting expressed concern on the fact that some States were considering the application of charges for the use of aeronautical frequencies in the provision of air navigation services, including aeronautical communications supported by VSAT Stations, in the interest of public safety. The following conclusion was formulated:

CONCLUSION 17/38: NON-APPLICATION OF CHARGES FOR THE UTILIZATION OF AERONAUTICAL FREQUENCY SPECTRUM

That, AFI States refrain from subjecting Air Navigation Service Providers to charges for the utilization of Aeronautical Frequency Spectrum, including aeronautical communications supported by VSAT Stations

Future work programme and composition of the CNS/SG

3.3.51 The meeting reviewed and updated the CNS/SG work programme and composition as shown in **Appendix 3.3F** to this report. The following decision was adopted.

DECISION 17/39: FUTURE WORK PROGRAMME AND COMPOSITION OF THE CNS SUB-GROUP

That, the work programme and composition of the CNS Sub-group be adopted as shown at Appendix 3.3F to this report.

CNS Performance Objectives

3.3.52 The meeting reviewed the CNS performance objectives and related framework form (PFF) developed by the ICAO Special AFI RAN Meeting of 2008 and developed the following conclusion. **Appendix 3.3G** to this report contains a revised CNS performance framework form.

CONCLUSION 17/40: CNS PERFORMANCE OBJECTIVES

That, the CNS performance objectives and performance framework form developed by ICAO SP AFI RAN (2008) be amended as shown at Appendix 3.3G to this report.

Global CNS technology roadmap

3.3.53 The meeting noted that ICAO would develop a CNS technology roadmap to serve as the global source of planning guidance for CNS investments by all stakeholders in the civil aviation community; and agreed that, when finalized, this roadmap should be taken into consideration for the regional and national planning and implementation of air navigation systems.

Any other business

3.3.54 The meeting was informed that the CNS Sub-group held a joint session with the ATS/AIS/SAR Sub-group (ATS/AIS/SAR/SG/11, Nairobi, Kenya, 26-30 April 2010). The joint session addressed the following issues:

- *Use of ICARD Software:* States were encouraged to log into ICARD website and validate their five-letter named codes (5LNC) and their coordinates.

- *Addressing missing flight plans:* States were requested to carry out investigation on missing flight plans, taking into consideration human factors, operational procedures and AFTN performance. The last regional survey on missing flight plans was inconclusive due to lack of feedback from States.

- *Transition to new ICAO flight plan format*: The AMHS implementation Task Force should work closely with AFI Flight Plan Transition Task Force, and include related activities in its work programme.

- *Implementation of Safety management systems (SMS):* States were encouraged to address aeronautical telecommunications when implementing SMS requirements for air traffic services.

3.4 Air Traffic Management (ATM)

Work of the ATS/AIS/SAR/11 Sub-Group and Related ATM and SAR issues

3.4.1 The meeting reviewed the report of the ATS/AIS/SAR Sub-Group, and noted that the Sub-Group had held two meetings since APIRG 16.

3.4.2 The ATS/AIS/SAR SG/10 meeting was convened at the conference centre of the "Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar" (ASECNA) in Dakar, Senegal, from 12 to 15 May 2009 and ATS/AIS/SAR SG/11 meeting was held at the United Nations compound at Gigiri, Nairobi, Kenya from 26-30 April 2010. In order to facilitate coordination between the Sub-Groups, the latter meeting was held on the same dates and venue with CNS/SG/3, and the two Sub-Groups had one joint session.

3.4.3 The meeting reviewed and endorsed Draft Conclusions and Decisions relating to ATM and SAR under agenda item 3.4.

3.4.4 The various subjects dealt with by the Sub-group were reviewed by the Group as follows:

Regional Performance Objectives

3.4.5 The meeting considered Performance Framework Forms (PFFs) establishing performance objectives for the AFI Region in the fields of ATM and SAR, which originated at the SP AFI/08 RAN Meeting in 2008 and updated by the ATS/AIS/SAR Sub-Group. It was noted that time available before target dates established by the SP AFI/08 RAN to achieve some of the tasks such as those related to Implementation of the new ICAO Flight Plan Provisions had elapsed considerably, however, that most target dates had to be maintained in order for the Region to remain on course for a harmonized implementation. Accordingly the meeting formulated the following Conclusion:

Conclusion 17/41: ATM Performance Framework

That, the AFI performance framework forms formulated by the Special AFI/08 RAN Meeting regarding performance objectives in the fields of ATM and SAR are updated as at Appendix 3.4A to this report

Appendix 3.4A (1) ***Implementation of the new ICAO Flight Plan Provisions***
Appendix 3.4A (2 ***Optimization of the ATS route Structure in en-route airspace***
Appendix 3.4A (3) ***Optimization of the ATS route Structure in terminal airspace***
Appendix 3.4A (4) ***Optimization of vertically guided RNP approaches***
Appendix 3.4A (5) ***Search and Rescue***

Issues of Coordination between Sub-groups

3.4.6 The meeting noted that during ATS/AIS/SAR SG/11 and CNS/SG/3 meetings held in Nairobi from 26 to 30 April 2010 the two Sub-groups discussed a number of issues which required coordination between them, including the following:

Missing flight plans

3.4.7 The joint session of the two Sub-Groups was briefed about the problem of missing flight plans. It was noted that, in a sample period of 27 days in the Johannesburg Air Traffic Control Centre (ACC), there were an average of six (6) missing flight plans per day which could be extrapolated to 2190 missing flight plans a year. The meeting acknowledged that this was a critical and perennial safety issue. It was recalled that several actions had been taken within APIRG and its subsidiary bodies over the years, however, effective solutions are yet to be established and implemented. Detailed information on the causes had also not been established. The meeting noted with concern that if the current rate of missing flight plans was not effectively addressed, the situation could be expected to result in more serious implications when the new ICAO model flight plan is implemented in November 2012. Accordingly, the Group formulated the following Conclusion:

CONCLUSION 17/42: RESOLUTION OF MISSING FLIGHT PLANS PROBLEM

That, in order to effectively address the problem of missing flight plans between AFI ACCS, AFI states:

(a) Take immediate measures to ensure that standard requirements for flight plan processing are adhered to;

(b) Ensure that all FIRs collect/record information on missing flight plans and exchange such information/data with other FIRs;

(c) Ensure that ACCs/FICs respond to queries from other ACCs/FICs regarding missing flight plans on a timely basis, providing details that might assist not just the affected firs but others in resolving the causes for missing flight plans; and

(d) Bring the trend information/data on missing flight plans to the attention of the TAG for further action.

Coordination of traffic between FIRs

3.4.8 The meeting was informed of an increase in operational anomalies because of institutional issues. The anomalies include transfer and coordination of traffic between air traffic control units in particular between Algiers and Tunis FIRs. The meeting emphasized on the fundamental necessity of having the letters of agreement/procedure between Algiers and Tunis, as well as any other ATS supporting facilities, up to date.

RVSM Operations and Monitoring

3.4.9 RVSM Implementation Safety Seminar (RISS) (SIP) – The Group noted that an RVSM Implementation Safety Seminar (Special Implementation Project (SIP)) was successfully held in Nairobi, Kenya 19-22 April 2010. The outcome of the Seminar, which was taken into consideration by the Sub-Group, is reflected at **Appendix 3.4 B** to this report.

ARMA Report

3.4.10 The meeting considered several aspects regarding the work undertaken by the AFI Regional Monitoring Agency (ARMA). ARMA presented an overview of activities since the tenth meeting of the Sub-Group in May 2009. In particular, the following issues which have direct safety implications were noted:

- The work of the ARMA was constrained by lack of data from States, and efforts to improve the flow of data are realizing limited improvement;
- The requirement of aircraft State RVSM approvals continues to be a challenge. Some States still allow aircraft in the RVSM strata without appropriate approvals; and
- In order to ensure that altimetry systems meet the required specifications, height monitoring needs to be undertaken by all operators; this is currently not the case.

3.4.11 The Group was apprised on the principles supporting the strategy to demonstrate the achievement of the Safety Policy in the process of the POSC:

- That RVSM in AFI is safe in principle after operational experience is measured against the safety requirements in the PISC;
- That the AFI RVSM application is safe by applying and realizing the safety requirements based on the availability of safety data over time period 25 September 2008 to 30 September 2009;
- That the issues that were identified in the PISC, and the assumptions made therein, have been satisfactorily addressed.

3.4.12 The overall conclusion was that due to the elevated overall risk element, RVSM operations were not meeting the required quantitative safety levels and remedial actions need to be implemented by concerned parties to address the concerns. The POSC culminated in twenty three safety recommendations which were to be presented to States through a State Letter, for consideration and implementation as applicable.

3.4.13 In summary, the outcome of the POSC was indicative of a number of issues that required to be addressed as a matter of urgency; these include:

- The need for States (ANSPs) to support the ARMA with regard to provision of data, and several other items identified in the terms of reference of the RVSM National Programme Manager;
- Reporting of incidents by all parties (States/ANSPs, airspace users, etc.);
- Strict aircraft State RVSM approval processes and oversight; and
- Consideration of the outcome of the RISS which was held in Nairobi, 19-22 April 2010.

Collision Risk Assessment (CRA)

3.4.14 The Group considered the outcome of the Fourth AFI CRA, which was the first full Assessment after the implementation of RVSM in the AFI Region and covered the time period from the 25

September 2008 until the end of September 2009. The CRA forms part of and contributes to the POSC. The meeting noted that the estimated Collision Risk was calculated to have been above the Overall TLS by a factor of six (6). The main contributing factor to the Overall Risk was identified to be aircraft operating at the incorrect flight levels.

3.4.15 The Group noted with concern that data required by the ARMA was received from only a limited number of FIRs, and that the assessment was made difficult to compile due to this fact. Moreover, the quality of the available information varied significantly. It was evident from the information provided to the Sub-Group that vertical incidents have increased since the implementation of RVSM, and that this could largely be attributed to aircraft operating at the wrong flight levels. This aspect appears to be coupled with lapses in the provision of ATM. A concerted effort from air traffic services providers will be necessary to rectify this situation. Once again, the continuing challenge of aircraft operating in the AFI RVSM airspace without appropriate State RVSM Operational Approval was noted.

3.4.16 The meeting noted that the pilot training guidance material that was developed by IFALPA prior to RVSM implementation in September 2008 had been updated and endorsed by the ATS/AIS/SAR Sub-Group.

Long Term Height Monitoring

3.4.17 The Group was informed that the ARMA is a Regional mechanism that enables the AFI States to meet the RVSM related provisions of Annexes 6 and 11 to the Chicago Convention and related guidance material, in particular the monitoring of height keeping performance of aircraft. It was also noted that the Amendment 34 to Annex 6 to the Chicago Convention, which will be applicable on 18 November 2010 has introduced additional provisions relating to aircraft vertical navigation performance.

RVSM National Programme Managers (NPM)

3.4.18 It was noted that in some States availability of RVSM National Programme Managers (NPM) or updated information regarding their contact details was no longer receiving the priority it deserves, thus exacerbating challenges faced by the ARMA as discussed above. State Letters urging action from States in this regard have had limited success. It was agreed that the Regional Offices should issue a new State Letter urging States to do the necessary on this matter.

AFI FIRs not providing data to ARMA

3.4.19 The meeting noted that some AFI FIRs were not providing necessary data to the ARMA. This trend could have resulted from the situation before the ARMA was established, when some FIRs provided data to other Regions' monitoring agencies. The meeting emphasized however, that in order for the AFI RVSM airspace safety to be maintained, it was imperative for all AFI FIRs to continue to provide the data to the ARMA, whether or not they continue to provide the data to other monitoring agencies.

Strategic Lateral Offset Procedures (SLOP)

3.4.20 The Group acknowledged that the provisions of PANS-ATM Doc 4444 Chapter 16 regarding SLOP had an important safety role in the AFI Region as identified by the ATS/AIS/SAR Sub-Group. Accordingly, the Group agreed on the application of SLOP in the AFI Region and formulated the following Conclusion:

CONCLUSION 17/43: IMPLEMENTATION OF STRATEGIC LATERAL OFFSETS (SLOP) IN THE AFI REGION

That, AFI States implement SLOP within their areas of responsibility, by AIRAC effective date 30th November 2010, in line with provisions in PANS-ATM Doc 4444 Chapter 16 and the following guidance:

a) SLOP will be applied in those oceanic FIRs where fixed routes are established;

b) SLOP will be applied in all areas of the continental AFI Region except in those areas where ATC separation is provided by surveillance, unless approved by the State; and

c) SLOP will be applied in oceanic random routing areas (AORRA and IORRA) with effect from the target date of AIRAC date of 2 June 2011

Note 1: Pilots may contact other aircraft on the inter-pilot frequency 123.45 MHz to coordinate offset.
2: Pilots are to note that frequency 126.90 MHz is mostly used in the AFI Region.

(The amendment above will have impact on the Regional Supps (Doc 7030) as was amended at the ATS AIS SAR SG/11meeting)

3.4.21 In view of the implementation of RVSM in the AFI Region in September 2008, the Group agreed on the dissolution of the RVSM Task Force. Furthermore, it was agreed to establish the ARMA Scrutiny Group in accordance with the SP AFI/08 RAN Recommendation 6/8, and formulated the following Decisions:

DECISION 17/44 DISSOLUTION OF APIRG RVSM TASK FORCE AND RE-ASSIGNMENT OF ACTIVITIES

That, taking into consideration the successful implementation of RVSM in the AFI Region on 25 September 2008, and the establishment of the Tactical Action Group (TAG) by the Special AFI RAN Meeting, 2008:

(a) The AFI RVSM Task Force established under APIRG Decision 13/58 is dissolved and;

(b) The ATS/AIS/SAR Sub-group review and adjust its terms of reference accordingly in order to address issues related to RVSM implementation.

DECISION 17/45 ARMA SCRUTINY GROUP

That, the ARMA Scrutiny Group is established with the Terms of Reference at Appendix 3.4C to this report.

Performance Based Navigation (PBN) and AFI ATS Route Network

3.4.22 The meeting noted the PBN implementation developments and issues addressed by the ATS/AIS/SAR Sub-Group, APIRG/16 meeting 19-23 November 2007, including outcome of the Joint meeting of PBN and GNSS/I Task Forces that was held in September 2009.

3.4.23 Regional PBN Implementation Plan: The Group noted that the AFI Regional PBN Implementation Plan had been successfully developed to guide the Region in meeting the goals outline in Assembly Resolution A36-23. However, the issues of the GNSS Strategy in order to support PBN implementation, in particular, sensors relating to approach with vertical guidance (APV) was deliberated on considerably.

3.4.24 The meeting noted that there were ongoing discussions under the partnership between the AU and EC on the role that might be played by EGNOS in the augmentation of GNSS signal to support APV in the AFI Region. States and AFCAC were desirous for explicit information regarding AFIs position on the matter of GNSS Space Based Augmentation. The Group agreed that CBA developed by the EC

should be analysed by independent expertise in order to assess the viability of such augmentation, prior to developing consensus on the way forward. Such analysis of the CBA and position of the APIRG would be available to discussions between the AU and EC (Paragraphs 3.3.38 and 39 refer)

3.4.25 The Group recognized that the role of the AFI GNSS strategy is to support PBN implementation. As such, the Group agreed that the outstanding issues relating to support of APV should not delay the adoption and implementation of the AFI Regional Implementation Plan. In this context, the Group endorsed the Plan referred further work on the matter of GNSS augmentation to the ATM/AIM/SAR Sub-Group.

3.4.26 Based on the above, the meeting formulated the following Conclusion:

CONCLUSION 17/ 46: AFI PBN IMPLEMENTATION REGIONAL PLAN

That:

(a) The AFI Regional PBN implementation plan is updated and endorsed as at Appendix g 3.4D to this report, to more accurately reflect PBN implementation goals in Assembly Resolution A36-23, guidance in the PBN Manual (9613), and Regional planning guidance provided by APIRG; and

(b) The Regional PBN Implementation Plan be included in the AFI Doc 003.

3.4.27 The meeting noted that the status of development of National PBN Implementation Plans, which were to be completed by 2009 pursuant to Assembly Resolution A36-23, is not known; the primary reason being lack of response from most States. It was also noted however, that the Secretariat will continue with its efforts to obtain the information.

3.4.28 In order to support States' efforts to develop their National PBN Implementation Plans and to progress with implementation, the Group endorsed a template for national plans and encouraged the use of tools provided by the PBN Task Force for the purpose, and adopted the following Conclusions:

CONCLUSION 17/47: NATIONAL PBN IMPLEMENTATION PLAN

That States:

(a) Use the Regional PBN implementation plan template at Appendix 3.4E to this report , for the development of a national PBN implementation plan and consider the action planning provided by the Joint PBN/GNSS/I Task Forces Meeting to support planning;

(b) Provide feedback to the ESAF and WACAF Regional Offices by 30 October 2010 regarding progress in the development of their national plans, indicating any challenges, if any, that are delaying the development of the plan, as well as measures taken or to be taken to overcome such challenges; and

(c) Complete their National PBN plans as soon as possible.

CONCLUSION 17/48: PBN IMPLEMENTATION TOOLS

That States:

(a) Use project management plans and implementation action plans provided by the PBN Task Force, as well as project management softwares (such as Microsoft project or freely available applications), to support PBN implementation activities; and

(b) Carry out a gap analysis using the project plan template attached to the report, or similar approach, in order to more accurately develop their PBN implementation plans.

PBN/GNSS Task Force

3.4.29 Taking into consideration the objectives assigned to PBN Task Force and noting the critical support of GNSS in the implementation of PBN navigation specifications, the meeting agreed with the view of the ATS/AIS/SAR and the CNS Sub-Groups regarding the merger of the two Task Forces, and accordingly agreed on the following Decision:

DECISION 17/49: DISSOLUTION OF THE GNSS IMPLEMENTATION AND PBN TASK FORCES AND ESTABLISHMENT OF THE PBN/GNSS TASK FORCE.

That, the GNSS implementation and PBN Task Forces are dissolved and the PBN/GNSS Task Force is established with the terms of reference in Appendix 3.4F to this report.

National PBN Implementation Plan

3.4.30 The Group was apprised on the efficiency and environmental protection benefits of implementing PBN and noted the desire by airspace users, for implementation of PBN in accordance with the goals outlined in Assembly Resolution A36-23, noting that most air transport aircraft already have capability for APV Baro-VNAV approach procedures.

ATS Routes Implementation and Development

3.4.31 It was noted that pursuant to the view of the SP AFI/08 RAN meeting the ATS/AIS/SAR Sub-Group established the PBN Route Network Development Working Group (PRND WG) to review the AFI ATS route network in the context of the implementation of PBN. The Group endorsed the establishment of the PRND Working Group and accordingly the following Decision:

DECISION 17/50: PBN ROUTE NETWORK DEVELOPMENT WORKING GROUP (PRND WG)

That, the AFI PBN Route Network Development Working Group (PRND WG) is established with the terms of reference, composition and working arrangements as at Appendix 3.4G to this report.

3.4.32 It was also noted that an updated list of priority ATS routes presented by users to the Sub-Group was subsequently addressed by the PRND WG/1 which was convened in Johannesburg, South Africa from 13 to 16 July 2010. The PRND WG/1 meeting was hosted by IATA and held along with an ATS route coordination Meeting. IATA also sponsored attendance of many delegates and members of the aviation industry supported the meeting with route planning tools. The Group noted with appreciation the exceptional achievement of the meeting, that 31 user-required routes were agreed for implementation by October 2010, and five (5) FIRs also signed updated Letters of Procedure to ensure the implementation of the routes in October 2010.

3.4.33 In order to facilitate improved usage of the "Red Carpet" RNAV routes UM214 and UM215, the Meeting agreed on the following Conclusion to lower the floor of the routes:

CONCLUSION 17/51: LOWERING OF RNAV / RNP ROUTES UM214 AND UM215

That, the ICAO Regional Offices carry out further consultations with the States concerned about the lowering of RNAV / RNP routes UM214 and UM215 from FL330 down to FL320, taking into account operational considerations.

AFI Flight Procedures Office/Programme (FPO/FPP)

3.4.34 The Group noted that there had been a delay in the dispatch of a State Letter inviting States to host and support establishment of the AFI FPP as envisaged by the Special AFI/08 RAN Meeting 2008 under Recommendation 6/10, and that the concern was raised at the Sub-Group meeting. Establishment of the AFI FPP was viewed as critical, considering Assembly Resolution 36-23 related to PBN implementation global goals and the limited resources of many States in the AFI Region. It was also noted that the Sub-Group was also informed that ASECNA was ready to host the AFI FPP.

3.4.35 The meeting was informed about the desire and readiness of ASECNA to host and fund the FPO. The issue of FPO was nevertheless deliberated upon at significant length. The concept of establishing two FPOs in order to address the amount of work and language requirements in the Region was also discussed. Detailed explanation was provided on the concept of the FPO, which is fundamentally different from service provider institutions established by a State or a group of States. The challenge of resource limitations in the PBN programme, which has an impact on the establishment of the FPO was also noted. Furthermore, in order to facilitate States' response on the matters of hosting and supporting the FPO, information on the AFI States' status of PBN implementation would be required. Finally, the Group recalled that the point of departure for the hosting and supporting of the FPO is SP AFI/08 RAN Recommendation 6/10. Accordingly, it was agreed that the Secretariat should expedite the State Letter referred to in the Recommendation.

3.4.36 It was noted, that not withstanding the above, the establishment of the FPP is to support the sustainable implementation of PBN by States. However, States are expected to proceed with implementation of PBN using available resources and expertise, without waiting for the establishment and operation of the FPP. To support ongoing implementation in the AFI Region, ICAO held a PBN Procedure Design Course, as a Special Implementation Project (SIP) in Dakar, Senegal 19-30 July 2010 and in collaboration with other parties, has arranged to hold a PBN Airspace Planning Workshop to be convened 6-9 September 2010 in Johannesburg, South Africa.

3.4.37 Based on the above, and in order to further support PBN implementation in the AFI Region, the Group agreed on the following Conclusions:

CONCLUSION 17/52: DISSEMINATION OF A LETTER INVITING PROPOSALS FOR ESTABLISHMENT OF THE AFI FLIGHT PROCEDURES PROGRAMME (FPP)

That, pursuant to special AFI/08 RAN meeting Recommendation 6/10, ICAO disseminate, as a matter of urgency, the letter inviting interested States and international organizations to submit proposals for establishment and hosting of the AFI FPP.

CONCLUSION 17/53: TRAINING IN SUPPORT OF PBN IMPLEMENTATION

That, in order to support the implementation of PBN in the AFI Region:

a) PBN Task Force identify priority training needs for implementation for PBN;

b) AFI Regional Offices organize seminars/workshops for training of relevant personnel directly involved in the implementation of PBN.

CONCLUSION 17/54: PBN ENABLING LEGISLATION

That, AFI States that have not already done so, include in their legislation and/or regulations provisions to enable the implementation of PBN.

CONCLUSION 17/55: PARTICIPATION OF REPRESENTATIVES OF STATES INVOLVED IN PBN APPROVAL PROCESS

That, in order to support the PBN planning and implementation processes, AFI States are urged to include in their delegations to meetings of the PBN Task Force, experts and officials involved in the PBN approval process of aircraft operators.

CONCLUSION 17/56: FUNDING OF THE PBN IMPLEMENTATION PROGRAMME

That, regulatory bodies, operators, service providers and other stakeholders be granted budgetary allocations for acquisitions and other activities necessary for ensuring that all the requirements be met in a timely manner in order to safely implement PBN in the AFI Region.

CONCLUSION 17/57: IATA GUIDELINES FOR OPERATIONAL APPROVALS

That, IATA facilitates stakeholders' access to its guidelines developed to assist operators in obtaining airworthiness and operational approvals for PBN, for guidance and reference as required.

Safety assessments and monitoring

3.4.38 The meeting noted that the Sub-Group debated on the need for clear orientation on how to perform a safety assessment for PBN implementation, as well as the need for Regional PBN system safety monitoring. In this regard, information was provided on guidance for safety assessment available in various ICAO documents to perform a qualitative or quantitative assessment. The concept of Regional system safety monitoring was considered not necessary or viable. In order to optimize benefits from available data however, information available at the ARMA regarding lateral deviations could be forwarded to States for their use in State safety monitoring processes, bearing in mind available ICAO guidance material.

National PBN Programme Managers (NPPM):

3.4.39 The Group was informed that, in many States the appointment of NPPM appears not to have taken effect, and where it has the NPPMs are not adequately supported for their function. Accordingly, the meeting formulated the following Conclusion:

CONCLUSION 17/58: NATIONAL PBN PROGRAMME MANAGERS (NPPM)

That, in order to facilitate the implementation of PBN and Regional coordination:

a) AFI States that have not already done so nominate/designate NPPMs as soon as possible and assign them the terms of reference as at Appendix 3.4H to this report .and provide ICAO with contact details of the NPPMs; and

b) States update the NPPMs contact information provided to ICAO whenever changes have been made.

Aircraft equipage data

3.4.40 The meeting recognized the importance of accurate data on aircraft equipage in order to facilitate effective planning and implementation of PBN globally, including the AFI Region. The meeting noted the concern of the Sub-Group regarding the limited availability accurate data on aircraft equipage for planning and implementation purposes. It was noted that IATA had obtained valuable statistical information on aircraft equipage and that the data could be used to estimate equipage in non-IATA airline fleets. However, the effort to obtain data relating to general aviation fleets through letters that had been circulated to States had met very limited success. It was further noted in some cases, efforts by ANSPs to obtain the data from operators was meeting resistance from operators.

3.4.41 In this regard, the Group requested that the matter of collection of aircraft equipage information be further clarified to the civil aviation authorities who should also be urged to support efforts to collect the data. In this regard the Group formulated the following Conclusions:

CONCLUSION 17/59: AIRSPACE PLANNING AND AIRCRAFT EQUIPMENT SURVEY

That, in order to facilitate airspace planning and decisions related to air navigation infrastructure:

a) ICAO in coordination with IATA and AFRAA conduct regular surveys on aircraft equipage within the AFI Region;

b) AFI States and air navigation service providers (ANSPs) are urged to support the ICAO/IATA global survey on aircraft equipment aimed at developing a database with accurate information on present and future avionics capabilities of airline fleets;

c) AFI States make efforts to bring awareness to the aircraft operators regarding the ICAO efforts on aircraft equipage data, and that joint efforts between civil aviation authorities and ANSPs be embarked upon to bring quicker results; and

d) AFI States ensure that initiatives for air navigation system enhancements are matched with fleets capabilities and readiness.

Note: In order to capture the necessary data, ANSPs are advised to take advantage of the flight plan data (Field 10) on aircraft equipment.

Amendment of Doc 7030

3.4.41 The meeting agreed to the proposal for amendment of Doc 7030 (Regional Supplementary Procedures) in order to update the document regarding current situation in the AFI Region, in particular the requirement relating to RNAV capability with AORRA and IORRA, along with amendments to text which may not be relevant to operations within the AFI Region or EUR/SAM corridor areas of responsibility. The Secretariat is to circulate and process the amendment proposal in accordance with the relevant ICAO procedures. It was noted that a formal amendment proposal will also be circulated by the Regional Offices with regard to application of strategic lateral offset procedures (SLOP).

3.4.42 In order to support States in providing air traffic services in the AORRA airspace, and enhance the use of the "GoldCarpet" RNAV routes, the Group formulated the following Conclusion:

CONCLUSION 17/60: DIRECT TRANSITIONS TO/FROM AORRA AIRSPACE

That, the ICAO Regional Offices facilitate coordination, publication and implementation by Angola, Ghana, Sao Tome and Principe, ASECNA and Roberts FIR, with regard to the AORRA airspace to/from transition points in Appendix 3.4I (as amended) to this report.

The Implementation Challenge

3.4.44 The meeting was updated of the developments related to the implementation of Performance Based Navigation (PBN) at global level including regional implementation plans for PBN (www.icao.int/pbn) which indicate that a growing number of States globally (126) have developed their national plans.

3.4.45 ICAO, the International Air Transport Association (IATA) and representatives of States, industry and international organizations established the Global PBN Task Force (GPBNTF) with the objective to build upon the global and regional structures already in place and to produce tools and enablers to facilitate and expedite the PBN implementation. The Group noted the need that States provide annual updates on implementation issues and progress made and complete the development of national implementation plans and ensure compliance with the dates indicated in the plans.

Transition to New ICAO Flight Plan Content

3.4.46 The Group recalled that on 28 May 2008, amendment No. 1 to the Fifteenth Edition of the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) was approved, calling for substantial changes to ICAO flight plan to take effect from 15 November 2012.

3.4.47 The new ICAO model flight plan form and related provisions are necessary to allow ATM systems to make optimum use of advanced aircraft capabilities as well as to meet the evolving requirements of automated ATM systems.

3.4.48 The Group noted that the impact of the modifications to flight data processing systems would vary from one air navigation service provider and State to another depending on their data requirements, the level of validation necessary and the types of systems in place, and would require significant effort and lead-time for States, air navigation service providers and aircraft operators.

3.4.49 It was noted that comprehensive coordination with all stakeholders, intra and inter-Regional coordination was essential and that each PIRG should develop coordinated transition plans with common strategies and mitigation measures. In this regard, the Group recognized the need for a Task Force dedicated to the matter of transition to the 2012 model flight plan and the support that should be provided to such Task Force.

3.4.50 It was noted the SP AFI RAN formulated Recommendation 6/5 – Implementation of the new ICAO model Flight Plan Form, and adopted initial Regional performance objectives for further development and update by APIRG. It was acknowledged in this regard, that the AFI Region had lost considerable preparation time since the 2012 flight plan provisions were communicated in May 2008.

3.4.51 The Group noted that in order to support the transition process by States, ICAO had employed a consultant specifically for the 2012 flight plan project. Information was provided about the Flight Plan Implementation Tracking System (FITS) and the ICAO website **http://www2.icao.int/en/FITS/Pages/home.aspx** at which updates could be made by States on their preparations and information obtained on the transition and guidelines.

3.4.52 It was noted that in order to facilitate effective and successful transition, information from States regarding their systems was necessary to be provided to ICAO and the relevant APIRG subsidiary bodies. Accordingly, States were urged to provide such information on a timely basis when requested.

3.4.53 Based on the above, the Group formulated the following Decision:

DECISION 17/61: ESTABLISHMENT OF THE AFI FLIGHT PLAN TRANSITION TASK FORCE (FPLT TF)

That, in order to enable a harmonized regional implementation of Amendment 1 to the Fifteenth edition of PANS-ATM (Doc 4444) in coordination with other ICAO Regions:

That, in order to enable a harmonized regional implementation of Amendment 1 to the Fifteenth edition of PANS-ATM (Doc 4444) in coordination with other ICAO Regions:

(a) The AFI Flight Plan Transition Task Force (FPLT TF) is established with the terms of reference (TOR) at Appendix 3.4J to this report.

(b) The Task Force should, if practical hold its first meeting as soon as possible but no later than September 2010;

(c) AFI States are urged to provide to the Task Force information requested with regard to its studies and assessments, with minimum delay; and

(d) APIRG noting that its next regular meeting could be in late 2011, directed the ATS/AIS/SAR SG to endorse the Regional strategy and plan including changes thereto, on its behalf.

3.4.54 The Group acknowledged that, in consideration of the preparatory and implementation issues related to the new flight plan format, as well as experience from other Regions, it is necessary to educate concerned stakeholders in order to enable their optimum contribution in the transition process. In this regard, the Group formulated the following Draft Conclusion:

CONCLUSION 17/62: CONVENING OF A WORKSHOP ON IMPLEMENTATION OF NEW ICAO FLIGHT PLAN MODEL PROVISIONS

That, in order to enable the optimum contribution of relevant stakeholder in the transition to and implementation of the new ICAO flight plan mode provisions, Regional Offices arrange workshops to sensitize and inform States, ANSPs and related entities.

SAFETY MANAGEMENT IN ATM

ATS Incident Analysis Group (AIAG) –

3.4.55 The Group was also briefed on the outcome of the ATS Incident Analysis Group (AIAG) meeting held in Johannesburg, South Africa, on 8-9 March 2010. It was recalled that the AIAG was

established to provide a forum for various aviation organisations and stakeholders, including States, International Organizations Regional and sub-Regional Organizations, to review reported incidents in the AFI region and formulate recommendations to prevent similar occurrences.

3.4.56 The meeting noted from the AIAG analysis, that there was an increase of occurrences in 2009 as compared to 2008, and that air traffic control proficiency/performance factors were either the main cause of incident or a contributing factor. In order to prevent similar occurrences, the AIAG made a number of recommendations which will be forwarded to States.

3.4.57 The Group formulated the following Conclusion.

CONCLUSION 17/63: DISSEMINATION OF AIAG REPORTS

That, the ICAO Regional Offices ensure that the final reports of the ATS Incidents Analysis Group (AIAG) are made available to all States and air navigation service providers for remedial action.

Incident reporting form

3.4.58 The meeting noted that while many civil aviation authorities have adopted the ICAO model reporting form in the PANS ATM Doc 4444 Appendix 4, and made it available to potential users particularly ATS personnel and air crew, through such mechanisms as the Aeronautical Information Publication (AIP), most reports are not being submitted through this form.

3.4.59 In order to improve on the use of the form, the Secretariat with the support of users would endeavour to develop a more user-friendly electronic format of the form.

Safety Management SARPs

3.4.60 The Group was apprised that, since the introduction of safety management provisions in 2005, there have been significant improvements to the provisions. The latest provisions are contained, inter alia, in amendment 47B to the Chicago Convention, which is applicable as of 18 November 2010.

3.4.61 It was noted that, the AIS, CNS, MET and/or SAR services, when provided under the authority of an ATS provider, are subject to the requirements of safety management in Annex 11 to the Convention. It was also noted that the framework for safety management systems (SMS) will be a Standard as of October 2010, and the framework for State Safety Programme will be available as guidance material.

3.4.62 The meeting recognized the importance of detailed information regarding the status of implementation of safety management provisions in the AFI Region, and that such information was currently not available.

3.4.63 Based on the above, the meeting formulated the following Conclusions:

CONCLUSION 17/64: IMPLEMENTATION OF SAFETY MANAGEMENT IN THE AFI REGION

That, AFI States are urged to take necessary measures including the development and promulgation of legislative/regularity provisions in order to:

(a) Implement the safety management provision of Annex 11,

(b) Prioritise giving effect to Assembly Resolutions A36-8, A36-9 and A36-10 regarding collection and protection of safety information, and improving accident prevention,

(c) Take full advantage of the training opportunities availed by ICAO under the ACIP and other programmes,

(d) Make use of guidance material provided by ICAO including, the Safety Management Manual (SMM) (Doc 9859) taking into consideration ICAO improvements on such guidance material from time to time.

CONCLUSION 17/65: STATUS OF IMPLEMENTATION OF SAFETY MANAGEMENT PROVISIONS IN THE AFI REGION

That, in order to establish the status of implementation of Annex 11 safety management provisions in the AFI Region, and in order to facilitate Regional planning and implementation strategies:

(a) The Regional Offices circulate a questionnaire aimed at collecting detailed information on the status of implementation in the AFI Region; and

(b) The Regional Offices circulate a questionnaire aimed at collecting detailed information on the status of implementation in the AFI Region; and

(c) States are urged to cooperate with the efforts of the Regional Offices and to respond to the questionnaires with minimum delay.

CONTINGENCY PLANS

3.4.64 The Group recalled ICAO provisions in Chapter 2 of Annex 11 to the Chicago Convention, and noted the requirement for approval of contingency plans by the President of the Council (on behalf of Council). The Group also recalled, inter alia, Recommendation 5/2 of AFI/7 RAN Meeting 1997, which urged States to develop contingency plans for their area of responsibility, as well as Assembly Resolution A36-13 Appendix M: Delimitation of air traffic services airspaces, whereby States providing air traffic services over the high seas are encouraged to enter, as far as is practicable, into agreements with appropriate States providing air traffic services in adjacent airspaces, so that, in the event the required air traffic services over the high seas cannot be provided, contingency plans, which may require temporary modifications of ATS airspace limits, will be available to be put into effect with the approval of the ICAO Council.

3.4.65 It was noted that based on information available with the Secretariat, many States had not developed or updated their contingency plans for airspaces in which they provided ATS.

3.4.66 It was also noted that in order to enhance the effectiveness of contingency planning, coordination and implementation, the ATS/AIS/SAR Sub-Group had endorsed a contingency plan template which is encouraged for use in all ICAO Regions. The objective of the template is, amongst others:

- To take advantage of the experiences in using it elsewhere and facilitate inter-FIR coordination,
- To reduce diversity in the development of the various States' plans, in particular the layout thereof, where such diversity is not necessitated by specific intricacies of the Region and/or of individual States, thereby enhancing their presentation and utility to users and stakeholder; and
- To enable the expeditious review, update and presentation of the contingency plan to the President of the Council for approval when the need for its activation becomes necessary.

3.4.67 Concern was raised regarding delays on responses from Regional Offices on communication from the States in the process of developing contingency plans. It was highlighted that the

delays discourage efforts by States to comply with ICAO provisions, as opposed to assistance being available from the Regional Offices as indicated in Annex 11.

3.4.68 Based on the above, the Group formulated the following Conclusion:

CONCLUSION 17/66: DEVELOPMENT AND PROMULGATION OF CONTINGENCY PLANS

That:

a) AFI States develop/update and promulgate contingency plans in accordance with Annex 11 and Annex 15 provisions.

b) AFI States use available ICAO guidance material for the development and promulgation of contingency plans including the template at Appendix 3.4K to this report.

c) ICAO Regional Offices carry out a survey on the status of development of contingency plans in the AFI region in order to take remedialactions as necessary; and

d) ICAO Regional Offices expedite responses to States on matters related to development of contingency plans, as well processes for approval of contingency plans submitted by States.

SEARCH AND RESCUE (SAR)

3.4.69 The Group recalled the provisions relating to States' obligations with regard to SAR, particularly Article 25 of the Convention on International Civil Aviation, and Annex 12 thereto, as well as Regional requirements in the AFI Basic Air Navigation Plan (ANP) (Doc 7474).

3.4.70 It was recalled also that some of the provisions in the ANP are the outcome of Regional Air Navigation (RAN) and APIRG meetings. In this regard, the following RAN Recommendations and APIRG Conclusions were recalled:

- AFI/7 meeting recommendations:

- Recommendation 6/1 – Carriage of 406 MHZ ELTs
- Recommendation 6/2 – Satellite-aided search and rescue
- Recommendation 6/3 – Cooperation between States
- Recommendation 6/4 – Coordination with maritime SAR authorities
- Recommendation 6/5 – Training of SAR personnel
- Recommendation 6/6 – Search and rescue seminars
- Recommendation 6/7 – Search and rescue exercises
- Recommendation 6/8 – Search and rescue facilities

- APIRG 15 Conclusions and Decisions:

- Conclusion 15/97 Search and Rescue (SAR)
- Decision 15/98 SAR Funding

- SP AFI/08 RAN Meeting

- Recommendation 6/22 – Establishment of sub-regional search and rescue (SAR) arrangements

3.4.71 The Group acknowledged that the abovementioned AFI/7 RAN Meeting provisions relating to SAR continue to have high relevance, and that more effort was necessary to give effect to the APIRG Conclusions and SP AFI/08 RAN Recommendation.

3.4.72 Furthermore the Group recalled that Assembly Resolution 36-13: Appendix N addresses various elements that are pertinent to and in support of implementation of other ICAO SAR provisions.

3.4.73 The Group recalled that the International Cospas-Sarsat System ceased satellite processing of 121.5/243 MHz beacons on 1 February 2009 and that by that time emergency beacons should have transitioned to 406 MHz. The need for States to ensure installation of 406 MHz beacons and registration with Cospas-Sarsat was emphasised.

3.4.74 Concern was raised that implementation of SAR was not receiving the attention it deserves and the participation of SAR experts in the activities of APIRG and its subsidiary bodies is significantly limited. There was a strong view that, in view of implementation challenges that have impeded implementation of SAR provisions for many years despite several above-mentioned Resolutions, Recommendations and Conclusions, a subsidiary body specifically on SAR matters was essential to support implementation and that it could actually attract the required expertise.

3.4.75 Based on the above, the meeting agreed with the proposal to establish a Task Force pursuant to SP AFI/08 RAN Recommendation 6/22, and accordingly formulated the following Decision and Conclusion:

DECISION 17/67: AFI SAR SERVICES INTEGRATION TASK FORCE (ASSI/TF)

That, in order to progress the initiatives taken at the Port Elizabeth Consultative Conference of October 2007 on integration of SAR services and similar other initiatives in the AFI Region, and to support the implementation of SAR provisions, the AFI SAR Services Integration Task Force (ASSI TF) is established with the terms of reference at Appendix 3.4L to this report.

CONCLUSION 17/68: SEARCH AND RESCUE SERVICES

That, with the objective to foster the implementation of SAR services and improvement of SAR systems in the Region, AFI states are:

(a) Urged to establish joint aviation/maritime rescue coordination centres (RCCs) in order to optimize usage of resources and coordination;

(b) Encouraged to establish sub-regional task forces to progress the development SAR cooperative arrangements and integration of SAR services;

(c) Urged to consider entering into agreements with States that have adequate facilities (within or outside the sub-region) to assist in SAR operations; and

(d) Encouraged to include officials from other State organs who are part of the States SAR organization, in their delegations to relevant ICAO meetings and workshops

CIVIL/MILITARY COORDINATION

3.4.76 The Group recalled that there are several documents containing provisions related to the subject of civil/military coordination. These include: the Chicago Convention (Article 3) Annexes 2, 11 and 15, PANS ATM (Doc 4444), Air Traffic Services Planning Manual (Doc 9426), Manual Concerning Safety

Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations (Doc 9554) and Manual concerning Interception of Civil Aircraft (Doc 9433).

3.4.77 The meeting also noted Assembly Resolution A36-13 Appendix O - Coordination of civil and military air traffic, as well as AFI/7 RAN Meeting Recommendation 5/3 – Civil/Military Coordination and APIRG 15 Conclusion 15/52: Civil/Military Coordination, all urging States to take a number of measures including establishment of appropriate civil/military bodies, informing military authorities about ICAO provisions, and arranging permanent liaison and close coordination between civil ATS units and relevant military units.

Outcome of the Fifteenth Informal Coordination Meeting on the Improvement of Air Traffic Services over the South Atlantic (SAT/15) and related follow up activities

3.4.78 The Meeting was apprised of the outcome of the fifteenth informal coordination meeting on the improvement of Air Traffic Services over the South Atlantic (SAT/15) which was held in Lisbon Portugal, from 19 to 21 May 2006, as well as the discussions of the Fifth Meeting of the SAT FANS 1/A Interoperability Team (SAT/FIT/5) held at the same venue, from 17th to 18th May 2010.

3.4.79 The Group noted the latest developments in the SAT area in the field of ATM, which include the following:

- The implementation of AORRA phase 3 and 4 scheduled by all ACCs concerned, to take place on the AIRAC date of 26 August 2010; AORRA entry/exit waypoints and transitions routes defined.
- Proposal for amendment to the Regional Supplementary Procedures (DOC 7030) under consideration within the SAT group, in particular with regards to operations within the Random Routing Areas.
- SATMA studies on the air traffic statistics for the EUR-SAM Corridor and collision risk assessment, and corrective actions to mitigate operational risks.
- The common contingency plan in force in the EURSAM Corridor and the ongoing development of a comprehensive contingency plan for the whole SAT area.

3.4.80 The meeting was also informed about the concern with regard to a great number of unknown aircraft flying through some parts of the SAT area as well as the remedial action proposed by the SAT group.

3.4.81 With regards to air navigation deficiencies reported by users in the SAT area, the meeting commended the decision of the SAT group to establish a comprehensive list thereof and develop an action plan to resolve them.

Civil/Military Cooperation – In Support of Optimum Airspace Use

Outcome of the Global Air Traffic Management on Civil/Military Cooperation

3.4.82 The Group noted outcome of the Global Air Traffic Management Forum on Civil/Military Cooperation held in Montreal from 19 to 21 October 2009 which emphasized that a flexible and efficient use of airspace for both civil and military operations would provide benefits in terms of more efficient aircraft operations and contribute to environmental protection. It was recommended by the Forum that military representatives should participate on a routine basis in ICAO meetings, seminars and other related

event as part of their State delegations, in order to promote and foster cooperation. The Group also noted the specific result elements and next steps of the Forum.

3.4.83 The Meeting agreed that States should be urged to work with air navigation services providers and their militaries, to take action to establish political will, develop institutional arrangements, set performance objectives, formulate practical and operational measures so as to enhance civil/military cooperation in optimizing safe and efficient use of airspace for all users.

Outcome of the AFI Search & Rescue and Civil/Military Coordination and Cooperation seminar (Niamey, Niger 02-03 June 2010)

3.4.86 The outcome of the ICAO Search & Rescue (SAR) and Civil/Military Coordination and Cooperation Seminar which was held in Niamey, Niger from 2 to 3 June 2010, was presented to the meeting by the Secretariat.

3.4.85 The objective of the Seminar was to provide and share information with participants, in order to support AFI Region States and airspace users in their efforts to implement ICAO provisions and enhance effectiveness in the fields of SAR and civil/military coordination and cooperation, in accordance with many APIRG conclusions and AFI RAN meeting recommendations.

3.4.87 The meeting noted the programme of the seminar which covered:

- ICAO relevant provisions in the SAR field;
- AFCAC/ICAO African SAR project 2002 – 2007: SAR services organizational and funding options;
- Cospas-Sarsat Developments and SAR regional issues;
- Civil Military coordination and cooperation and Flexible Use of Airspace (FUA);
- The European Region Experience in civil/military coordination and FUA;
- AFI regional civil/military issues; and
- The outcome of the Global ATM Forum on Civil/Military Cooperation (Montreal, 19 to 21 October 2009).

3.4.88 The meeting commended the call expressed by the seminar for AFI States to:

- Develop and implement national SAR legislation,
- Enter into SAR bilateral and sub-regional agreements,
- Establish Joint Aviation Maritime Rescue Coordination Centers where applicable,
- Implement national permanent committees in charge of civil/military Coordination / cooperation issues.

3.4.89 Having recognized that all the above actions were in line with APIRG conclusions, the meeting further recalled that a Performance Framework Form was available to help States implement SAR requirements.

AFI Tactical Action Group (TAG)

3.4.90 The secretariat presented a summary of activities of the Tactical Action Group (TAG), specifically informing the meeting about the status of teleconference activities of the group during 2009 and 2010. In this regard, the meeting was informed that the TAG had been tasked by the SP AFI/08 RAN meeting in September 2008 with the responsibility of monitoring airspace operations between FL 290 and FL 410 in the AFI Region. In this context, the Group was informed that the TAG teleconferences appear to be having a positive effect in reducing the number of reported incidents in African airspace but that there still remains quite a bit of room for improvement.

3.4.91 The Group noted that the TAG/2 meeting was held from 23 to 24 April 2010 in Nairobi, Kenya, and that it reviewed trends arising from analysis of Unsatisfactory Condition Reports (UCRs) that have come into the TAG database over the past year (since July 2009). It was noted that some States, despite high numbers of UCRs initially, have improved significantly in terms of responses to the TAG and resolving the UCRs. However, the rate of responses and resolution of UCRs by States, some experiencing high numbers of incidents, remained low. Furthermore, some States were slow in receiving TAG missions aimed at assisting and finding solutions for the UCRs. It was noted that the rate of incidents reporting by States and airlines in the Region was also low. A summary of TAG findings are contained in WP/18 discussed under Agenda Item 5.

3.4.92 All the good results notwithstanding, the paper went on to suggest that further work was needed. Specifically the paper suggested a number of conclusions specifically requesting that States:

a) improve their response in relation to queries from TAG;
b) provide a name to be the contact TAG person in the State;
c) respond and allow technical visits in the short term.

3.4.93 In reviewing the presentation of the Working Paper the meeting recognized the importance of the work the TAG was carrying and was encouraged to continue. As a result, the meeting endorsed the conclusions as proposed by the secretariat. Specifically:

CONCLUSION 17/69: TIMELY RESPONSE TO TAG QUERIES

That, States when responding to TAG queries, make every effort to do so in a timely manner, preferably within 14 days, in compliance with the recommendation of the Special AFI/ RAN Meeting of 2008.

CONCLUSION 17/70: COMMUNICATION OF TAG FOCAL POINTS

That, States that have not already done so, provide their respective ICAO Regional Offices with a TAG point of contact within their State.

CONCLUSION 17/71: APPROVAL OF TAG VISITS

That, AFI States:

a) Make every effort to approve TAG requests for technical visits to the State at the earliest available opportunity and that the visits be held during regular work days; and

b) Update the TAG contact list when requested and whenever there are changes of the contact points in the States.

3.5 AERONAUTICAL METEOROLOGY (MET)

3.5.1 The Group was presented with the Report of the Ninth meeting of the Meteorology Sub-Group (MET/SG/9), held at the ICAO Office in Dakar, Senegal, from 21 to 23 October 2009, and deliberated on it as follows.

Review of APIRG Conclusions and Decisions

3.5.2 The Group made an in-depth review of its Conclusions and Decisions on Meteorology developed at its Sixteenth meeting and those outstanding from its previous meetings under Agenda Item

2.2. The Group reviewed also Recommendations in the field of aeronautical meteorology developed at the Special AFI RAN Meeting held in Durban, South Africa, from 24 to 29 November 2008, to address aviation safety. It noted action taken and progress made so far on the implementation of these conclusions and decisions.

3.5.3 The meeting also noted the efforts made by States, in particular by ASECNA Member States, to implement the Conclusions and Decisions of the MET/SG adopted by APIRG.

The World Area Forecast System (WAFS) in the AFI Region

3.5.4 The Group reviewed the implementation of the World Area Forecast System (WAFS) in the AFI Region on the basis of the reports from the WAFS Operations Group (WAFSOPSG) and the Satellite Distribution System Operations Group (SADISOPSG). The meeting also took note of information provided by the World Area Forecast Centre (WAFC) in London on the recent and forthcoming developments in WAFS and SADIS.

3.5.5 The fifteenth meeting of the SADISOPSG, held in Paris, France from 26 to 28 May 2010, reviewed the Strategic Assessment Tables for the AFI Region which was prepared by the SADIS Provider State on behalf of the SADISOPSG Strategic Assessment Team for the purpose of planning resources for the next 5 years (2010 to 2014 inclusive).

3.5.6 The meeting agreed on the proposed tables and formulated the following Conclusion:

CONCLUSION 17/72: SADIS STRATEGIC ASSESSMENT TABLES

That, the AFI SADIS strategic assessment tables, as given in Appendix 3.5A to this report be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.

3.5.7 In addition, the meeting noted that the SADIS Provider State has completed acceptance tests of a VADOS VadEDGE 4100-series router for SADIS 2G and developed an alternative SADIS 2G Hardware. Whilst details of the NetSys SADIS Transcoder and the VADOS VadEDGE 4100 are contained within the SADIS User Guide, information on the SADIS 2G Hardware is available directly from the suppliers. The meeting adopted the following conclusion:

CONCLUSION 17/73: ALTERNATIVE SADIS 2G HARDWARE

That, States review available new options for the SADIS 2G systems in order to benefit from such options by contacting vendors directly.

3.5.8 The meeting was informed that at the request of SADISOPSG/13, the SADIS Provider State has conducted a third round of SADIS workstation software evaluations. The assessments were necessary in light of changes to the SADIS broadcast since the previous round of evaluations in 2005/2006, notably the adoption of Amendment 74 to Annex 3 and the cessation of the SADIS 1G broadcast. By May 2009, the SADIS Provider had conducted 8 SADIS workstation software evaluations, with 7 of the packages available fulfilling the software requirements of SADISOPSG/13. The results of these evaluations were presented to SADISOPSG/14 and are also available for viewing at URL: http://www.metoffice.gov.uk/sadis/software/index.html.

3.5.9 The Group agreed that it would be beneficial for States to be provided with such valuable information and concluded that:

CONCLUSION 17/74: SADIS WORKSTATIONS EVALUATIONS

That, States ensure that their current workstations fulfil the software requirements outlined on the WAFSOPSG website and take corrective action, as necessary, with their workstation providers.

3.5.10 The meeting was further informed that the SADIS Provider State has received endorsement from SADISOPSG/15 to progress with the development of a second phase of SADIS FTP enhancements which is aimed at delivering a *SADIS FTP Secure* service in 2010. Some of the technology utilised to deliver the initial phase of developments will be used to deliver the phase two enhancements – e.g. virtual server environment.

3.5.11 Concerning coordination between WAFCs and Tropical Cyclone Advisory Centres (TCACs), the WAFC Provider States have conducted a coordination trial with the TCACs, with a view to determining the feasibility, and benefits to the WAFS, of establishing and maintaining contact with the TCACs in order to harmonise the information on Tropical Cyclone (TC) in the WAFS SIGWX forecasts and the TCAC advisories. The WAFSOPSG/5 meeting considered the trial to be a success, with good participation and valuable feedback which had been beneficial for the WAFS. With minimum effort on the part of the WAFCs, it had led to greater awareness and harmonization between the TC information on the WAFS SIGWX charts and the advisory information issued by the TCACs.

Review of the Recommendations of First Meeting of AFI OPMET Management Task Force (AFI OPMET MTF/1)

3.5.12 The Group was presented with the Report of the First Meeting of the AFI OPMET Management Task Force (AFI OPMET MTF/1) held at the ICAO Office, Dakar, Senegal, from 19 to 20 October 2009. The meeting recalled that the AFI OPMET MTF was established by APIRG/16 meeting under Conclusion 16/54.

3.5.13 The meeting noted the election of Mr. Nirison RAKOTOARIMANANA from Madagascar CAA as Chairperson and Mr. Akoi T. VANYANBAH from Liberia CAA as Vice-Chairman of the Task Force.

3.5.14 The meeting made an in-depth review of the Recommendations of the AFI OPMET MTF/1 meeting provided in **Appendix 3.5.B** to this report, and in particular noted developments relating to the AMBEX scheme including OPMET information exchange procedures at **appendix 3.5C** to this report).

3.5.15 It was recalled that the AMBEX scheme was intended initially only for TAF exchanges; AIREPs and METAR were added to the scheme at a later stage. In March 2009, the 7th Edition of the AMBEX Handbook introduced new OPMET data types for SIGMETs (WS, WV, WC), Volcanic Ash Advisory (VAA) and Tropical Cyclone (TCA) in the AMBEX Scheme, to make the AMBEX scheme compatible with the existing communication environment and satisfy the evolving user requirements.

3.5.16 The Group adopted the following Conclusion:

CONCLUSION 17/75: OPMET EXCHANGE REQUIREMENTS AND INTER- REGIONAL OPMET GATEWAY (IROG) FUNCTIONS

That:

a) The OPMET data type, OPMET bulletins and types of OPMET exchange at Appendix 3.5C, be implemented by Dakar and Pretoria Regional OPMET data banks (RODBs), AMBEX bulletin compiling centres (BCCs) and National OPMET Centres (NOCs) as the OPMET

requirements in the AFI Region; and

b) The IROG functions and the requirements for the exchange of OPMET between the AFI Region and adjacent Regions in Appendices 3.5D and 3.5E to this. report be implemented by Dakar and Pretoria RODBs as the requirements for the interregional OPMET exchange in the AFI Region.

3.5.17 The meeting reviewed the OPMET data required from AOP aerodromes, based on proposals from States and ASECNA, to reflect the current status and future requirements. In this regard, the meeting agreed that the requirements for OPMET data from AOP aerodromes in the AFI region, be amended accordingly as given in Appendix **3.5F** to this report. The Group then adopted the following conclusion:

CONCLUSION 17/76: REVISION OF OPMET DATA REQUIREMENTS

That, information related to the requirements of OPMET data from AOP Aerodromes as given in Appendix 3.5F to this report be included in the AFI FASID MET Table 1A after the normal amendment of the FASID Table.

3.5.18 The meeting reviewed the management and monitoring of the OPMET information exchange at AFI BCCs and RODBs, described in **Appendices 3.5G and 3.5H** to this report and as developed in Chapter 12 of the AMBEX Handbook, for further implementation by the components of the AMBEX scheme as the requirements for the OPMET information exchange procedures at AFI BCCs and RODBs. The meeting also reviewed the Regional Interface Control Document (ICD) for AFI OPMET Database Access Procedures described in the AMBEX Handbook as given in **Appendix 3.5I** to this report**.**

3.5.19 In this regard, the group agreed that the requirements OPMET information exchange procedures at AFI BCCs, RODBs and ICD as given in **Appendices 3.5G, 3.5H and 3.5I** to this report be implemented by Dakar and Pretoria RODBs and by the BCCs. The Group then adopted the following conclusions:

CONCLUSION 17/77: OPMET EXCHANGE MONITORING AND MANAGEMENT PROCEDURES AT BCCS AND RODBS

That, the OPMET management and monitoring procedures given in appendices 3.5I and 3.5J to this report be implemented by the RODBS and the BCCS as the requirements for OPMET exchange monitoring and management procedures in the AFI region.

CONCLUSION 17/78: INTERFACE CONTROL DOCUMENT (ICD) FOR AFI OPMET DATABASE ACCESS PROCEDURES

That:

a) The procedures given in Appendix 3.5I to this report be implemented as the Regional Interface Control Document (ICD) access procedures for AFI OPMET database; and

b) The ICD be published by the ICAO Regional Office(s).

3.5.20 The meeting felt that to assess progress on assigned activities, the AFI OPMET Management Task Force (AFI OPMET MTF) will need to meet at least once a year for the review of new users OPMET requirements from SADISOPSG annual meeting, the review of results of annual SIGMET Tests, review of results of OPMET monitoring by the RODBs and assess the performance of the RODBs. The Group then formulated the following decisions:

DECISION 17/79: FUTURE WORK PROGRAMME AND COMPOSITION OF THE TASK FORCE

That, the updated work programme and the composition of the AFI OPMET Management Task Force (MTF) be as shown in Appendix 3.5L to this report.

DECISION 17/80: FREQUENCY OF MEETINGS OF THE AFI OPMET M/TF

That, the Task Force meets once a year to plan and assess progress on its work programme. The yearly meetings will be held alternatively between RODBs Dakar and Pretoria.

Provision of SIGMET, Tropical Cyclones and Volcanic Ash Advisories for the AFI Region

3.5.21 The meeting was informed that ICAO Regional Offices in Dakar and Nairobi conducted two SIGMET Tests based on Conclusions 16/56 of the APIRG/16 Meeting which adopted the procedures for conducting such tests.

3.5.22 The results of these first two SIGMET Tests conducted in November 2008 and June 2009 were presented to the meeting. The group was informed that the short term recommended actions were implemented by the MWOs concerned and those needing medium to long term implementation solutions were presented for review and appropriate action by the meeting. In this regard, the meeting reviewed the summary of the test results at **Appendix 3.5K** to this report and adopted the following Conclusions:

CONCLUSION 17/81: IMPROVING THE DISSEMINATION OF SIGMET

That:

a) Dakar ROBD provider State and ASECNA take the required measures to file automatically the SIGMET test results using the appropriate procedures in the SIGMET guide; and

b) Upon receipt of a VAA Message, the MWOs in the AFI Region act promptly to issue a corresponding SIGMET within ten (10) minutes.

CONCLUSION 17/82: MEASURES TO IMPROVE THE ISSUANCE AND DISSEMINATION OF SIGMET

That:

a) The ICAO Regional Offices of Dakar and Nairobi evaluate the provision of SIGMET information in all AFI MWOs through the RODB and State missions;

b) ICAO Regional Offices encourage States to establish arrangements between adjacent MWOs for the provision of SIGMET information in MWOs where telecommunications or organizational issues are still inadequate;

c) WMO in coordination with ICAO, be invited to provide additional training in the issuance of VA and TC SIGMETs to some MWOs not able to issue the required SIGMETs;

d) The ICAO Regional Offices of Dakar and Nairobi update the AFI SIGMET guide for additional details of VA and TC test procedures; and

e) The MWOs provider States endeavor to address the identified deficiencies in the issuance and dissemination of SIGMET.

Air Navigation Deficiencies in the MET field

3.5.23 The meeting reviewed and updated the list of deficiencies based on the uniform methodology approved by Council for identification, assessment, tracking and reporting of deficiencies in the air navigation system. The review also took into account the remedial action from States concerned and inclusion of additional deficiencies identified since the APIRG/16 Meeting. The updated list of deficiencies in the field of meteorology is detailed in **Appendix 4.1E** to this report.

3.5.24 The Group was informed of the monitoring of OPMET information in ASECNA Member States, indicating the availability of 56% of METAR in 2009 and 66% of TAF for the same period of time.

3.5.25 The results of the monitoring showed that for the same period of assessment, the availability of OPMET at RODB Dakar from the non-ASECNA States was even worse. A lot of the expected SIGMET information and special aircraft reports (AIREPs) were not available at the RODB.

3.5.26 The meeting was concerned about the result of the monitoring and invited the States concerned to improve the availability of OPMET data in the AFI region. To improve the availability of special AIREPs and non-regular OPMET information in the region, the group felt that the coordination between ATM, MET and pilots should be strengthened. In order to improve the availability of OPMET information, the group formulated the following conclusion:

CONCLUSION 17/83: IMPROVING AVAILABILITY OF NON-REGULAR OPMET INFORMATION

That, AFI States be invited to organize coordination meetings between ATM, MET and Pilots on regular basis, to improve the availability of non-regular OPMET information in the AFI Region.

3.5.27 The group was informed of the Cooperative Development Project of Aviation Meteorological Services initiated by the ICAO WACAF Office and funded by the International Financial Facility for Aviation Safety (IFFAS) being implemented in nine (9) WACAF States, in order to improve the overall quality and availability of OPMET information in the WACAF Region. Specifically, the immediate objective of this project is to enhance aviation safety by reducing safety related MET deficiencies through improvement in the capability of each Participating State to regulate and/or provide aeronautical meteorological services. The meeting encouraged ICAO to extend this kind of project (resources permitting) to other affected States in the AFI Region.

New Challenges Facing AFI Meteorological Services (Including the Future Impact of the FAA NEXTGEN and SESAR of EUROCONTROL Programmes)

3.5.29 The Group was presented with the challenges that the meteorological service providers will have to address in meeting the requirements of the Global Air Traffic Management Operational Concept including programmes such as FAA NextGen and Eurocontrol SESAR.

3.5.30 The provision of meteorological information will be an integrated function of the ATM system. The information will be tailored to meet ATM requirements in terms of content, format and timeliness. The main benefits of meteorological information, for the ATM system, will be related to the following:

a) The improved accuracy and timeliness of meteorological information will be used to optimize flight trajectory planning and prediction, thus improving the safety and efficiency of the ATM system;

b) The increased availability of shared meteorological information on-board the aircraft will allow the preferred trajectory to be refined in real time;

c) Better identification, prediction and presentation of adverse weather will allow the management of its effects more efficiently, thereby improving safety and flexibility, for example, by providing accurate and timely information on the need for diversion or re-routing;

d) Improved aerodrome reports and forecasts will facilitate the optimum use of available aerodrome capacity;

e) Increased availability of meteorological information (air-reports) from on-board meteorological sensors will contribute to improving forecast meteorological information and the display of real-time information; and

f) Meteorological information will contribute to minimizing the environmental impact of air traffic.

3.5.31 Performance management will be an important part of the quality assurance of meteorological information.

3.5.32 The Group agreed that there was an urgent need for the AFI Region to be actively engaged to address the impending challenges and collaborative effort was required with other regions particularly ASIA/PAC, EUR and MID Regions. The meeting agreed to establish a core team of experts to collect information as appropriate to advise the Group with a view to provide information to APIRG at its next meeting. The meeting then formulated the following decision:

DECISION 17/84: ESTABLISHMENT OF CORE TEAM OF EXPERTS FOR THE GLOBAL ATM GLOBAL OPERATIONAL CONCEPTS

That, a core team of experts be established consisting of members from ASECNA, Kenya, Morocco, South Africa and the United Kingdom to collect and study information on the impact of the global Air Traffic Management operational concept on the provision of Aeronautical Meteorological Services at a Regional level (AFI Region).

Note 1: The team of experts will consist of specialists in ATM, CNS and MET.

Cost Recovery

3.5.33 The meeting recalled that APIRG Conclusions 14/37, 14/38 and 16/58 called for the need to implement cost recovery for aeronautical meteorological services by States and the conduct of seminars by WMO and ICAO for this purpose. Therefore, since 1999, WMO in coordination with ICAO have conducted a series of seminars in cost recovery for aeronautical meteorological services in both English and French. The Group expressed its appreciation to the support provided by ICAO and WMO to participants at these seminars.

Quality Management System

3.5.34 The Group recalled that Amendment 75 to Annex 3 included provisions to upgrade the Recommended Practices in Quality Management Systems (QMS) to a Standard to be applicable in November 2012.

3.5.35 To build awareness of the States in the implementation of QMS, the meeting was further informed that WMO and ICAO had conducted two seminars on QMS for aeronautical meteorological services one in Casablanca, Morocco from 14 to 16 July 2009 and the other conducted from 10 to 11 December 2009 in Nairobi, Kenya. The meeting also noted that the Special AFI RAN Meeting (SP AFI RAN/08) in Durban, South Africa developed Recommendations 6/15 and 6/16 which *inter alia* requested APIRG to adopt the MET Performance Objective of fostering QMS in the AFI Region and that ICAO

identify potential sources of technical and financial support for States for its implementation in the field of meteorology.

3.5.36 ASECNA informed the meeting that they would request assistance from ICAO in order to progress work in QMS. (AFI/SP RAN/08 Recommendation 6/15 also refers).

Review of Regional Meteorological Procedures in AFI ANP/FASID

3.5.37 The meeting reviewed the regional procedures developed by WAFSOPSG/4 and WAFSOPSG/5 meetings pertaining to the WAFS and the associated changes which would require to be introduced in the AFI ANP/ FASID.

3.5.38 In this regard, the meeting noted that the changes to the meteorological regional procedures made at these WAFSOPSG Meetings were being processed by the ICAO AFI Regional Offices concerned and would be included in the AFI ANP/FASID in due course.

Terms of Reference, Work Programme and Composition of the MET/SG

3.5.39 The Group noted that the work programme has been subject to revision and consolidation to better reflect the work that is being undertaken by the MET/SG, and reviewed the Terms of Reference, the Work Programme and Composition of the MET/SG as given at **Appendix 3.5 N to this report** accordingly. Liberia indicated its desire to be a member of the Sub-Group and it would submit its application at the next meeting of APIRG. The meeting then endorsed the changes proposed and formulated the following decision:

DECISION 17/85: FUTURE WORK PROGRAMME OF THE MET/SG

That, the work programme of the MET/SG be updated as shown in Appendix 3.5L to this report.

3.6 Aeronautical Information Management (AIM)

3.6.1 The meeting reviewed WP/9 (A and B), WP/17, WP/19, WP/22, and was informed that the roadmap for the transition from AIS to AIM has been developed to address more specifically and in greater detail, the direction given in ICAO Doc. 9750 for the future development of aeronautical information. The changes foreseen are such that this development is being referred to as the transition from Aeronautical Information Service (AIS) to Aeronautical Information Management (AIM).

3.6.2 It was noted that the roadmap offers practical guidance and advice to regional planning groups and States for the development of implementation and funding strategies which will be required for the global plan initiatives related to aeronautical information. It identifies the major milestones recommended for a uniform evolution across all regions of the world, with specific steps that need to be achieved and timelines for implementation.

3.6.3 It was highlighted that the transition from the traditional product-centred provision of aeronautical information to a data-centred and systems-oriented information management approach has been identified as a fundamental component and key enabler of a future air traffic management (ATM) system meeting the vision of the ICAO global ATM operational concept. It is recognized that to satisfy new requirements arising from the *Global Air Traffic Management Operational Concept* (Doc 9854), aeronautical information services (AIS) must transit to the broader concept of aeronautical information management (AIM). As part of system wide information management (SWIM), AIM is required to support evolving requirements for collaborative decision making (CDM), performance-based navigation (PBN), ATM system interoperability, network centred information exchange, and to take advantage of improved aircraft capability.

3.6.4 The Group then reviewed and endorsed the following Conclusion and Decision concerning the AFI Region transition from AIS to AIM.

CONCLUSION 17/86: TRANSITION FROM AIS TO AIM

That, recognizing the limitations of the current AIS, which does not meet the new global ATM system requirements envisioned by the ATM operational concept, and taking into consideration the ICAO roadmap for the transition from AIS to AIM:

a) States that have not yet done so, are urged to develop national plans to implement the transition from AIS to AIM and send them to the ICAO ESAF and WACAF Regional Offices before 31 December 2010; and

b) AFI AIM implementation task force monitor the progress of transition from AIS to AIM in the AFI Region and support regional and national planning efforts.

DECISION 17/87: PLANNING FOR THE TRANSITION FROM AIS TO AIM

That, based on the ICAO global ATM operational concept and the ICAO roadmap for the transition from AIS to AIM, the AFI AIM Implementation Task Force (AFI AIM TF):

a) Develop performance goals for the transition from AIS to AIM in the AFI Region and identify achievable milestones; and

b) Carry out a review of the AIS parts of the AFI basic ANP and FASID in order to introduce/develop planning material related to the transition from AIS to AIM.

3.6.5 The meeting also reviewed and endorsed the AIM Performance Objectives at **Appendix 3.6 B** to this report concerning the transition from AIS to AIM by States in the AFI Region.

3.6.6 Whilst reviewing its implementation in the AFI Region and adoption of an AFI Region Policy for the management of associated National Programs, the meeting noted the advantages associated with e-TOD and acknowledged that they are all safety-related. It was further highlighted that the AFI e-TOD Working Group was established with the main objective to assist and guide States for harmonized, timely and cost-effective implementation. The meeting deliberated on the implementation templates adopted by the working Group and the draft development of the policy for the management of national e-TOD programs by States in the AFI Region.

3.6.7 The Group also noted that Amendment 36 to Annex 15 introduced important changes to Chapter 10 related to e-TOD and was apprised that the coverage areas (1 – 4) for sets of electronic terrain and obstacle data has been amended (Amendment 36 to Annex 15 refers).

3.6.8 It was highlighted that Amendment 36 of Annex 15 became effective on 12 July 2010 and introduced an extended applicability date and reduced requirements for electronic terrain and obstacle data. This is expected to significantly reduce implementation difficulties especially for Area 2. It was further noted that this Amendment introduced a number of important changes.

3.6.9 The meeting also noted that a structured approach to implementation is required in order to realize the important safety and efficiency benefits to be derived from the uniform implementation of e-TOD provisions.

3.6.10 On this basis, the meeting endorsed the following Conclusions.

CONCLUSION 17/88: e-TOD CHECKLIST

That, States be encouraged to use the e-TOD checklist at Appendix 3.6C to this report in order to assist them in the process of planning and implementation of the e-TOD provisions.

CONCLUSION 17/89: ADOPTION OF THE e-TOD IMPLEMENTATION PLAN TEMPLATE AS A REGIONAL MODEL

That states be encouraged to use the:

a) e-TOD implementation plan template at Appendix 3.6D to this report as regional model in order to assist them in the process of planning and implementation of the e-TOD provisions.

b) national e-TOD implementation plan at Appendix 3.6E to this report as a sample when developing their national e-TOD plans

CONCLUSION 17/90: IMPLEMENTATION OF WGS-84 AND ELECTRONIC TERRAIN AND OBSTACLE DATA

That:

a) States adopt the revised AIM performance objective "Implementation of WGS-84 and Electronic Terrain and Obstacle Data" as contained in the Performance Framework Form in the Appendix 3.6F to this report, as a strategy for implementation;

b) The proposed FASID table at Appendix F be adopted for inclusion as a requirement in the AFI FASID (Document 7474, Vol. II);

c) The AFI Region e-TOD implementation strategy under Appendix 3.6G to this report be adopted for implementation; and

d) The revised Terms of Reference of the AFI Region e-TOD working group are at Appendix 3.6H to this report be adopted.

CONCLUSION 17/91: e-TOD IMPLEMENTATION AWARENESS CAMPAIGNS

That, States' AIS should take the lead and carry out awareness campaigns at national level to promote a better understanding of the planning and implementation issues related to e-TOD and training programmes.

CONCLUSION 17/92: DEVELOPMENT AND MANAGEMENT OF A NATIONAL e-TOD PROGRAMME

That, States, in accordance with sound management principles and procedures, should:

a) Develop a framework and a detailed planning including priorities and timelines, for the implementation of a national e-TOD programme;

b) Adopt/follow a collaborative approach, involving all concerned parties, in the implementation of e-TOD provisions; and

c) Make an inventory of and evaluate the quality of existing terrain and obstacle data sources, and in the case of data collection, consider carefully the required level of details of collected

terrain and obstacle data with particular emphasis on obstacle data and associated cost.

CONCLUSION 17/93: COORDINATION BETWEEN STATES AND DATA PROVIDERS/INTEGRATORS FOR THE PROVISION OF e-TOD AND EXCHANGE OF EXPERIENCE FOR THE IMPLEMENTATION OF e-TOD REQUIREMENTS

That:

a) Collaboration between States and data providers/integrators should be considered in the process of e- TOD provision; and

b) Implementation of e-TOD provisions should be considered a global matter concerning all ICAO Regions, which thereby necessitates coordination and exchange of experience between States, ICAO and other national/international organizations and industry partners involved.

CONCLUSION 17/94: RESPONSIBILITY FOR THE PROVISION OF e-TOD

That, States, while maintaining the responsibility for data quality and availability, should consider the extent to which provision of electronic terrain and obstacle data could be delegated to national geodetic institutes/ agencies, based on Service Level Agreement (SLA) reflecting such delegation.

CONCLUSION 17/95: PROVISION OF FINANCIAL RESOURCES AND ASSISTANCE FOR THE IMPLEMENTATION OF e-TOD

That:

a) e-TOD implementation should be managed by each State as a national e-TOD programme supported by necessary resources, a high level framework and a detailed national plan including priorities and timelines for the implementation of the programme; and

b) States encountering difficulties in the implementation of e-TOD may seek assistance (individually or collectively) from ICAO and/or other States.

3.6.11 The Group noted the action taken on the outcomes of the Third Regional AIM Congress, Fourth AFI-CAD Informal consultative meeting and the First AFI e-TOD Working Group meeting. The meeting was also apprised on the latest developments in the AIS - AIM transition Roadmap pertaining to the adoption of amendment 36 to Annex 15 and amendment 56 to Annex 4. The meeting then adopted, in this regard, the following Conclusions.

CONCLUSION 17/96: PROJECT TO COMPLETE WGS-84 IMPLEMENTATION IN THE AFI REGION

That, ICAO takes necessary action to initiate a project for the completion of implementation of WGS-84 within AFI States having difficulties to complete WGS-84 implementation.

CONCLUSION 17/97: ADOPTION OF THE AIS TO AIM TRANSITION ROADMAP

That, States adopt the roadmap as guidance material to plan, manage and facilitate the global transition from AIS to AIM within the AFI Region including planning of the scope and prioritizing projects and actions for the transition to AIM.

AGENDA ITEM 4: REGIONAL AIR NAVIGATION DEFICIENCIES

4.1 Review and update of the list of deficiencies in the air navigation fields

4.1.1 The Group noted past efforts and concerns by the RAN meetings, ALLPIRT and with the framework of APIRG to resolve identified air navigation deficiencies in the AFI Region. The Group was of the view that AFI States should endeavour to deploy more effective efforts to resolve these deficiencies.

4.1.2 The Group also drew attention to the definition of "deficiency" as approved by the ICAO Council i.e. "a deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council or with related ICAO Standards and Recommended Practices, and which situation has a negative impact on the safety, regularity and/or efficiency of international civil aviation".

Deficiencies in the AOP field

4.1.3 In the AOP field, the meeting recalled that at APIRG/16, it had been agreed that there were some airports listed in the Air Navigation Plan (ANP), which were not being used for regular international flights. Such airports were not therefore given priority in allocation of resources and were therefore poorly equipped, thus contributing to the long list of deficiencies which remained unresolved for a long time. A conclusion for States to review the list of international aerodromes in the AFI ANP and FASID was therefore formulated by APIRG/16. The Group was informed that the ICAO ESAF and WACAF offices have twice circulated reminders to States to review the list of international aerodromes. On both occasions there has been minimal response. Consequently the meeting agreed that the list of aerodromes in the AFI Plan should continue to be amended following the standard ICAO procedures.

4.1.4 On the other hand, the meeting noted that the list of deficiencies have been compiled by the ICAO Regional Offices and updated with additional information collected during informal regional meetings, missions of regional officers to States including during safety oversight audits and also from various other sources, including user organizations, after validation in accordance with the decision of the Air Navigation Commission. The meeting was apprised of the persistent difficulties encountered by the Secretariat in obtaining from States current information on deficiencies and corrective actions taken, if any, and as such the list did not accurately reflect the actual status in the States. The meeting was therefore of the view that the methodology used to compile the list of deficiencies was not efficient and neither was the methodology adopted for the validation of the deficiencies reported by the users bearing in mind that States do not respond to enquiries sent to them. The following conclusion was therefore adopted.

CONCLUSION 17/98: REVIEW OF METHODOLOGY FOR THE DEVELOPMENT OF THE LIST OF DEFICIENCIES IN THE AOP FIELD.

That, ICAO should develop a more efficient methodology for the compiling, validating and tracking of deficiencies at international airports including other air navigation facilities and services that would ensure the list of deficiencies is reasonably up to date at all times.

Deficiencies in the CNS field

4.15 The Meeting reviewed the list of deficiencies affecting the operation of aeronautical Communications, Navigation and Surveillance services in the AFI Region as prepared by the Secretariat based on information received from States, relevant international organizations and reports of ICAO missions to States.

4.1.6 Tables at Appendices 4.1 A, 4.1B, 4.1C and 4.1D to this report contain a detailed list of AFTN, ATS/DS, AMS and ARNS deficiencies in AFI States as updated by the meeting. These deficiencies and the remedial actions are also addressed under agenda item 3.3 of this report.

Deficiencies in the AIS/MAP, ATM and SAR fields

4.1.7 It was noted that based on currently available information at the Secretariat as of March 2010, 44 States have no deficiencies in the field of ATM, 51 in the fields of AIS/MAP, while in the field of SAR most States (40-45) have three similar deficiencies identified between 1991 and 1995. The meeting agreed that the existing list of deficiencies is not useful, given the picture reflected by, inter alia, reports from the USOAP audit of AFI States, and unsatisfactory condition reports (UCRs) considered by the AFI Tactical Action Group (TAG).

4.1.8 The meeting acknowledged that a comprehensive review of the AFI deficiency database is necessary in order to more closely reflect the actual status of deficiencies, and in turn to trigger appropriate measures to resolve such deficiencies. Accordingly, the meeting formulated the following Conclusions:

CONCLUSION 17/99: ELIMINATION OF AIR NAVIGATION DEFICIENCIES IN THE ATM AIS/MAP AND SAR FIELDS

That, in order to facilitate the updating of the deficiency database by the Regional offices, and to foster the elimination of deficiencies in the AFI Region:

a) APIRG subsidiary bodies and secretariat establish a comprehensive list comprising all air navigation deficiencies consistent with the ICAO definition of deficiency as approved by Council, for necessary attention;

b) States and International Organizations (including IATA, IFALPA, IFATCA) are urged to actively contribute towards updating the deficiency database, by providing to the Regional Offices, information on the implementation status of SARPs and Air Navigation Plan (ANP) requirements and;

c) States provide copies of action plans developed in pursuant to SP AFI/08 RAN Recommendation 6/25 to the concerned APIRG subsidiary bodies and the Regional Offices.

CONCLUSION 17/100: DEVELOPMENT OF THE AFI WEB-BASED AIR NAVIGATION DEFICIENCY DATABASE

That, in order to enable States and International Organizations to contribute directly to the Deficiency database on a continuous basis, ICAO Regional Offices expedite the development of a web-based AFI Air Navigation Deficiencies Data Base (AANDD).

Deficiencies in the Aeronautical Meteorology (MET) field

4.1.9 The list of deficiencies in the MET field provided in **Appendix 4.1E** to the report on agenda item of this report, was reviewed and updated based on the uniform methodology approved by Council for identification, assessing, tracking and reporting of deficiencies of air navigation systems. The review also took into account remedial action from States concerned and inclusion of additional deficiencies identified since APIRG/16 Meeting.

4.2 National and Regional efforts to remove identified deficiencies

4.2.1 The Group was apprised on the Third Indian-Ocean ATS Coordination Meeting which was held in Antananarivo from 16 to 18 June 2010, and was attended by 6 States (Comoros, La Reunion, Madagascar, Mozambique, Seychelles and Tanzania) and 1 international organization (ASECNA). It reviewed the status of implementation of AFI Air Navigation Plan (ANP) requirements within, and identified and remedial action to be taken by participating FIRs in order to remove deficiencies. Participants particularly agreed to intensify cooperation and coordination to achieve interoperability of aeronautical surveillance systems, increase availability of communication infrastructure, and develop harmonized ATS contingency plans. La Reunion (France), Madagascar and South Africa were encouraged to finalize SAR agreements.

4.2.2 The Group was also informed to improve MET services in Brazzaville (ATIS, RVR, and VOLMET broadcast), Dakar (ATIS, RVR, visibility) and Moroni (automated weather station).

AGENDA ITEM 5: STATUS OF IMPLEMENTATION OF SPECIAL AFI REGIONAL AIR NAVIGATION (SP AFI/08 RAN) MEETING RECOMMENDATIONS AND IT'S FOLLOW-UP

Progress on the implementation of the Special Africa-Indian Ocean Regional Air Navigation Meeting Recommendations

5.1 The meeting was informed that the Special Africa-Indian Ocean Regional Air Navigation (SP AFI/08 RAN) Meeting, which was held in Durban, South Africa, from 24 to 29 November 2008, was the first ever dealing with issues not directly related to the regional air navigation plan. It focused primarily on safety issues and on monitoring the progress of the AFI Comprehensive Implementation Programme (ACIP). The meeting was also informed of the status of ongoing efforts by States, the Secretariat and the AFI Planning and Implementation Regional Group (APIRG) on the implementation of the SP AFI/08 RAN Meeting recommendations.

5.2 The Group noted that the Council requested that the Air Navigation Commission present a progress report on the implementation of the SP AFI/08 RAN Meeting recommendations for submission to the 37th Session of the Assembly. The meeting also noted that the follow-up to all efficiency recommendations will be handled by the APIRG on a continuous basis while flight safety issues will be addressed by the newly formed Regional Aviation Safety Group- Africa (RASG-AFI) and ACIP.

5.3 The meeting agreed that the table with the Action Plan for the Implementation of AFI/08 RAN Recommendations related to efficiency should be updated with the results of APIRG/17 and presented by the Secretariat to the 37th Session of the Assembly. Further updates of the recommendations by APIRG should be informed to the ANC and Council to allow them to actively monitor the implementation of these recommendations.

Training Strategies for Aviation Safety in Africa

5.4 The Meeting was presented with the progress on the implementation of SP AFI/08 Recommendation 5/8 which calls for the establishment of a working group of training experts to define a master plan for harmonization of training in the AFI Region. In this regard, the meeting was informed that the Training Experts Working Group (TEWG) was set up in May 2009 and is composed of training experts from AFI training institutions and regional organizations with the secretariat support of ACIP and the African Civil Aviation Commission (AFCAC).

5.5 The meeting was further apprised of the progress made by the TEWG which gathered and analyzed data from aviation organizations from all disciplines in the aviation sector. It was indicated that the data collected by TEWG provided insight into the state of aviation training on the continent and showed that the demand for training is higher than the capacities currently available in Africa.

5.6 The meeting was also informed that the TEWG submitted its report to the 2nd Pan-African Training Coordination Conference which was held in Cairo, Egypt, 22-24 June 2010 which approved a set of actions to be implemented by ICAO, AFCAC, States, aviation services providers and aviation training organizations in Africa for an effective harmonization of training requirements and rationalization of the capacities. The common strategic framework and action plan adopted by the Conference and the revised Terms of Reference of the TEWG are available in **Appendices 5A and 5B** respectively, to this report.

5.7 Given that the safety and efficiency of air transport depends primarily on the skills and qualification of the personnel that manage, operate and maintain the system, an effective and sustained improvement of the availability of quality training programmes, harmonized throughout Africa would have an immeasurable impact on aviation training, and subsequently, safety, on the continent.

5.8 Having noted the:

- necessity to continue to improve the availability of affordable and quality training programmes, harmonized and standardized throughout Africa;
- common strategic framework and action plan approved by the 2nd Pan-African Aviation Training Coordination Conference; and
- 2nd Pan-African Aviation Training Coordination Conference requested the continuation of the activities of the TEWG to speed up implementation of its recommendation and for the participation of States, aviation services providers and training organizations to the activities of the TEWG for additional expertise and inputs.

the meeting adopted the following Conclusion.

CONCLUSION 17/101: PARTICIPATION TO THE ACTIVITIES OF THE TRAINING EXPERTS WORKING GROUP (TEWG)

That:

a) States identify points of contact to coordinate efforts required in the collection and dissemination of data related to training needs and capacities and provide ICAO with the necessary information; and

b) States, training organizations and aviation services providers in the AFI Region, participate in the activities of the Training Experts Working Group (TEWG) and contribute towards the implementation of the Recommendation 5/8.

Implementation of Quality Management System in Aeronautical Meteorology and preparation and issuance of SIGMETs for aviation safety in the AFI Region

5.9 The meeting was informed that the ICAO Council has set November 2012 as the date of the introduction of Quality Management System (QMS) as a Standard in Annex 3. The AFI States were however still facing a challenge of financial and trained human resources to initiate action for the implementation of QMS to meet this deadline. Concrete steps are therefore required to assist the States. The first African Ministers responsible for meteorology at their meeting resolved that all necessary steps be taken to ensure that AFI meteorological services meet ICAO requirements on QMS by November 2012.

The meeting noted that support has been difficult to come by to assist in training of trainers to enable States to implement QMS for aeronautical meteorological services including training in SIGMETs for aviation safety (SP AFI RAN 2008 Rec. 6/15 and 6/17 refers). The meeting noted efforts being made by ASECNA in the training of its personnel.

5.10 In this regard, the meeting considering the issues as of high aviation safety concern, and proposed that the support for training of trainers in QMS(Quality Managers)and training of meteorological watch offices (MWOs) personnel on SIGMET preparation and issuance be included in the AFI Comprehensive Implementation Programme (ACIP) on a prioritized basis. The meeting then developed the following conclusion:

CONCLUSION 17/102: TRAINING OF METEOROLOGICAL OFFICES PERSONNEL FOR THE IMPLEMENTATION OF QUALITY MANAGEMENT SYSTEM (QMS) AND ISSUANCE OF SIGMETS UNDER ACIP.

That, the following programmes be accorded high priority in ACIP;

a) Selected aeronautical MET personnel be trained as trainers in Quality Management System (QMS); and

b) Meteorological Watch Offices (MWOs) personnel be provided with additional training in the preparation and issuance of SIGMETs.

Report on Tactical Action Group (TAG) Activities

5.11 A summary of safety incident reports identified and addressed by the TAG during 2009 and 2010 was presented as by the TAG Secretariat. The presentation was made in compliance with item e) of the Work Program of TAG as approved by the Special AFI RAN (08) which requires the TAG to report to APIRG on a yearly basis. The presentation highlighted the fact that there were a reduced number of States about which a large number of reports were received. In this context, the presentation urged those States with large numbers of incident reports to work closely with TAG in an attempt to reduce the number of reports.

5.12 Some States' representatives expressed their concern that they were not contacted to provide a point of contact in their State for TAG activities. The Meeting was informed that a State letter had indeed been sent in 2009 requesting that points of contact be provided, but that less than 60% of the States actually responded to the State letter. The Meeting further requested that these status reports be sent to States more frequently, perhaps every six months.

AGENDA ITEM 6: REGIONAL TECHNICAL COOPERATION ACTIVITIES

The Technical Cooperation Programme in Africa

6.1 The meeting was informed of the activities of the ICAO Technical Co-operation Bureau (TCB) in Africa, and the mechanisms used in the implementation of development projects in civil aviation. The challenges faced in implementation included funding difficulties and lack of commitment by some participating States in the regional projects. The meeting was advised that a new section designated Project Financing and Development (PFD) has been established in TCB. The PFD's mission is to aid States in mobilizing financial resources from external financing institutions.

6.2 The Group was also informed that the scope covered by projects in the region are mainly related to ICAO Strategic Objectives A, B, D, E, and F. Assistance projects are developed at the request of States as well as from deficiencies identified by meetings such as APIRG, ICAO audits and other ICAO

fact-finding and evaluation missions. Assistance is also provided to UN agencies involved in air transport operations. An appeal was made at the meeting for consideration by TCB for a region-wide assistance project in the area English language proficiency.

6.3 The cooperative approach used in the implementation of Cooperative Development of Operational Safety and Continuing Airworthiness Programme (COSCAP) Projects is increasingly being adopted in other areas with the support of TCB. A synopsis of projects being implemented in other areas of activity using the cooperative approach, including the CASP, the CODEVMET and the CAPSCA projects was presented. A detailed presentation of the CODEVMET project was provided and is shown in **Appendix 6A** to this report. .

6.4 In accordance with the recommendation of the SP AFI RAN, a programme of assistance in the implementation of PBN in the AFI States was presented and States were invited to indicate to the ICAO ESAF office, their intention to participate in the project. An outline of the PBN project was provided and is shown in **Appendix 6B** to this report.

6.5 AFI States were invited to note the possibilities of assistance under the ICAO Technical Cooperation Programme and to take advantage of its services while ensuring necessary financial and institutional support to the projects developed for providing assistance. Particular attention was drawn to the CAPSCA, the CODEVMET and the proposed PBN Implementation project. States were urged to join these projects by submitting formal requests to the ICAO Regional Offices.

6.6 The meeting agreed on the following conclusions:

CONCLUSION 17/103: TECHNICAL ASSISTANCE

That States should note the possibilities of assistance under the ICAO technical cooperation programme and take advantage of its services while ensuring necessary financial and institutional support to the projects developed for providing assistance.

CONCLUSION 17/104: SUPPORT FOR AND PARTICIPATION IN ASSISTANCE PROJECTS

That:

a) States interested in the CODEVMET Project should submit a formal application to the ICAO WACAF office, for enrollment to the project. Appendix 6A to this report refers;

b) States were urged to join the PBN project. Interested States should submit a formal application to the ICAO ESAF office, for enrollment to the project. Appendix 6B to this report refers; and

c) States are urged to join the CAPSCA Africa Project in accordance with Recommendation 6/27 (Pandemic Preparedness Planning in the Aviation Sector) of the Special AFI RAN Meeting of November 2008.

AGENDA ITEM 7: TERMS OF REFERENCE (TOR) AND FUTURE WORK PROGRAMME OF APIRG

Establishment of the Regional Aviation Safety Groups (RASGs)

7.1 The Meeting was informed that the Council approved on 25 May 2010, the establishment of Regional Aviation Safety Groups (RASGs) in all regions of the world with the aim of supporting regional performance framework for the management of safety and to monitor progress, coordinate actions among States and make recommendations to ICAO to facilitate the implementation of the Global Aviation Safety Plan (GASP) and the associated Global Aviation Safety Roadmap (GASR).

7.2 The meeting was also informed of the proposed regional structure, the terms of reference and membership, resources and specially the need for a close coordination between the PIRGs and the RASGs.

7.3 The meeting expressed its support for the creation of the RASGs to deal with safety related to flight operations and it had a lengthy discussion where several queries related to the establishment, scope, membership, coordination with the PIRGs, support from the ICAO, etc of these new bodies, were clarified by the Secretariat. An AFI RASG will be established for the Region.

The Terms of reference and composition of the AFI Planning and Implementation Regional Group (APIRG)

7.4 The meeting was informed that on 20 February 2006, the ICAO Council while reviewing the report of the sixteenth ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPRIG/16) agreed that it was time to reconsider the format and method of processing reports of the Air Navigation Commission on PIRG activity, as well as the Terms of Reference of the PIRGs.

7.5 The Group noted that the Commission agreed that PIRGs were primarily responsible for the development and maintenance of regional air navigation plans as well as the identification and resolution of air navigation deficiencies. The PIRGs were a planning and coordination mechanism and that, while implementation is the responsibility of States, PIRGs could play a significant role in supporting the implementation of Standards and Recommended Practices (SARPs).The Commission further examined the possibility of expanding the mandate of PIRGs to cover the broader Strategic Objectives of ICAO and concluded that their focus should remain on air navigation issues. It was noted that any expansion would require more technical and human resources for both ICAO and States; result in lengthier meetings; call for attendance of a greater number of participants per delegation; and also result in duplication of efforts, thereby decreasing productivity.

7.6 The meeting in agreement with the Commission felt that the involvement of PIRGs in flight safety issues was not feasible in the current regional air navigation planning structure. With respect to the environment, the APIRG concurred with the Commission's view that PIRGs addressed environmental issues within the context of ATM improvements. It was also noted that PIRGs take into account environmental benefits of CNS/ATM systems and estimate resultant reductions in emissions, while developing and reviewing the ATS route structures in the regions.

7.7 With regard to the membership of PIRGs, the meeting noted that the Commission agreed that all ICAO Contracting States, who were service providers in an air navigation region and part of that region's air navigation plan (ANP), should be included in the membership of that region's PIRG. This was also endorsed by the SP AFI RAN (2008) meeting under Recommendation 6/24. The Group then agreed to amend its Membership clause including that relating to its subsidiary bodies and directed the Secretariat to update the APIRG Handbook accordingly. The terms of reference and the tasks of the Group were reviewed

and updated taking into account the latest developments in the region including the to be established Regional Aviation Safety Group for the AFI Region (RASG-AFI). The Group then formulated the following Conclusion:

CONCLUSION 17/105: AMENDMENT OF APIRG TOR AND PROCEDURAL HANDBOOK

That:

a) The Terms of Reference and tasks of the group be amended as at Appendix 7A to this report; and

b) The amendments be reflected in the APIRG Procedural Handbook

7.1.5 While discussing the frequency of convening of APIRG meetings, the Group agreed that an interval of eighteen months was sufficient. However, the Group endorsed flexibility for by the Secretary of the Group, in consultation with the Chairman, to call up an APIRG meeting at any other time to address urgent issues within the terms of reference of the Group. In this regard, the Group agreed to convene a meeting of APIRG in November 2011 to prepare inputs for the 12th Air Navigation meeting in 2012. The meeting then formulated the following Decision:

DECISION 17/106: CONVENING OF APIRG/18 IN NOVEMBER 2011

That, APIRG/18 be convened in November 2011 to prepare material for input to the 12th Air Navigation Conference in 2012

Appellation of the ATS/AIS/SAR Sub-Group

7.1.6 The Group recalled the background issues relating to the establishment and appellation of the ATS/AIS/SAR Sub-Group, including the dissolution of the CNS/ATM Sub-Group that was replaced by the ATM Sub-Group, use of the ATS and ATM terminologies within ICAO, and noted functional experiences within APIRG and other PIRGs.

7.1.7 The Group recognized the importance of retaining SAR in the Sub-Group name, and agreed to increase focus on SAR issues.

7.1.8 In view of current developments, it was also agreed to change the term 'AIS' in the name to AIM. Consequently, the name was changed from ATS/AIS/SAR Sub-Group to ATM/AIM/SAR Sub-Group. The meeting also reviewed and updated the terms of reference of the Sub-Group and accordingly agreed to the following Decision:

DECISION 17/107: APPELLATION AND TERMS OF REFERENCE OF THE ATM/AIS/SAR SUB-GROUP

That, in order to facilitate consistency in the use of terminology and associated developments, the APIRG ATS/AIS/SAR Sub-Group is re-titled Air Traffic Management/ Aeronautical Information Management/ Search and Rescue/ Sub-Group (ATM/AIM/ SAR SG) with the Terms of Reference as at Appendix 7B to this report.

AGENDA ITEM 8: ANY OTHER BUSINESS

Communication between ICAO and States

8.1 There were many proposals on how to improve communication between the Regional Offices and States in order to reach parties that are pertinent to action in the implementation of ICAO provisions, attendance to ICAO forums, response to information seeking State Letters, etc.

8.2 The Secretariat explained the procedure and communication protocol concerning ICAO communication with States, which is nominally with the civil aviation authorities or higher as the State may advise. To change this procedure in order to include other parties such as air navigation service providers can only be done with the agreement of the above mentioned State authorities.

8.3 It was recalled nevertheless that in many cases States were requested to provide focal points in order to facilitate communication relating to specific projects/programmes, and that usually such focal points are provided.

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APPENDIX 2.1

REVIEW OF ACTION TAKEN BY THE ANC AND COUNCIL ON APIRG/16 REPORT

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
C 16/1 **A**	Training seminars on ECCAIRS	That the ICAO Regional Offices for the AFI Region arrange for the conduct of ECCAIRS seminars in English and French.	ICAORDs Dakar and Nairobi	Seminar	Noted	2009
D 16/2 **D**	Establishment of an APIRG Performance-Based Navigation Task Force (APIRG/PBN/TF)	That an APIRG PBN Task Force, with terms of reference as outlined in Appendix D to this report, be established to develop a PBN implementation plan for the AFI Region and address related regional PBN implementation issues.	APIRG Secretary	Establishment of Task Force	Noted	2009
C 16/6 **D**	Harmonization of PIRG work programmes	That the relevant ICAO Regional Offices ensure that common issues such as harmonization of air navigation plans, implementation of global plan initiatives and development of performance objectives, are included in the work programmes of AFI and relevant adjacent SAM PIRGs and their auxiliary bodies.	APIRG Secretary	Harmonized Work Programmes	Noted	2009
C 16/9 **D**	Aerodrome emergency plans	That: a) States consider the organization of local workshops with all departments and organizations concerned in order to facilitate coordination, finalization and approval of their aerodrome emergency plans; b) States, which have not done so, ensure that all international aerodromes in that State develop an approved aerodrome emergency plan; and c) both the ESAF and WACAF Regional Offices shall conduct a survey to ascertain which airports still have not implemented	ICAORDs Dakar and Nairobi	Survey	Noted	2009

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
		this requirement and convene a meeting with States concerned to discuss this issue further.				
C 16/11 **A**	Aerodrome certification process – aerodrome certification and safety management systems regulations	That: a) States be encouraged to exchange their experiences in implementing the aerodrome certification requirement; b) CAAs, which have not done so, consider putting in place a consultation framework with their airport operator with a view to developing a realistic action plan for the implementation of the aerodrome certification requirement based on a carefully considered gap analysis; c) States, which have not done so, ensure the development, approval and publication of aerodrome certification and SMS regulations as well as formal certification process defining steps to be followed for the certification of aerodromes; and d) ICAO further assist States in organizing training courses for aerodrome inspectors.	ICAORDs Dakar and Nairobi	State letter	Noted	2009
C 16/14 **D**	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. *Note: Indications are that ICAO SARPs related to ATN/IPS should be available by end of 2008.*	States	Implementation of ATN/IPS	Noted	2009

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
C 16/16 **D**	Implementation/ interconnection of SADC/2, NAFISAT and AFISNET VSAT networks	That States and international organizations concerned expedite the implementation and interconnection of SADC/2, NAFISAT and AFISNET VSAT networks as soon as possible, in order to increase AFS (AFTN and ATS/DS) connectivity and efficiency, thus improving flight coordination and management in the AFI Region.	States	Interconnection	Noted	2009
C 16/20 **D**	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 every 18 months.	IATA	VHF coverage survey	Noted	2009
C 16/21 **D**	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.	AFI States	Implementation	Noted and that work is in progress	2009

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
D 16/27 **D**	Establishment of an AFI Aeronautical Surveillance Implementation Task Force	That an AFI Aeronautical Surveillance Implementation Task Force (AS/I/TF) be established with the following terms of reference: a) Determine the operational performance requirements for aeronautical surveillance in the AFI Region, including en-route, terminal areas (TMAs) and aerodromes operations; b) Identify and quantify near term and long term benefits of relevant surveillance candidate systems; and c) Develop a consistent draft AFI surveillance implementation plan including recommended target dates of implementation, taking into account availability of SARPs and readiness of airspace users and air navigation service providers for a coordinated implementation of service as required. *Notes:* *1. The task force should be of multidisciplinary nature to cover all aspects related to its assigned work.*	APIRG Secretary	AFI Surveillance Implementation Plan	Noted	2009

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
		2. While undertaking the task, with a view to avoiding any duplication, the task force should take into account: *a) the work being undertaken by ICAO Panels; and* *b) the relevant RAN recommendations and APIRG Conclusions and Decisions pertaining to aeronautical surveillance;* *3. The task force should complete its work in coordination with APIRG ATS/AIS/SAR and CNS Sub-Groups, and present the results to the next meeting of APIRG.* *4. In assessing the readiness of airspace users, take into account business aviation usage.*				
C 16/31 **D**	Collective approach for the management of CNS/ATM system elements	That the air navigation service providers (ANSPs) 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.).	ICAORDs Dakar and Nairobi	Collective approach	Noted	2009
C 16/32 **D**	Establishment of an AFI Frequency Spectrum Management Group	That an AFI Frequency Spectrum Management Group (AFI/FSMG) be established under the coordination of the ICAO Secretariat in order to address issues of common interest related to aeronautical spectrum management and control.	APIRG Secretary	Frequency Spectrum Management Group	Noted	2008
C 16/36 **D**	AFI RVSM implementation – Funding	That IATA member airlines continue to finance within the available funds to support specific projects relating to the RVSM implementation effort in order to improve safety and economy of air traffic in the AFI region and keep the task force informed accordingly.	ICAORDs Dakar and Nairobi, IATA	Funding	Noted	2008

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
C 16/37 **D**	AFI RVSM strategy/action plan	That the updated AFI RVSM strategy/action plan at Appendix G be circulated to States for quality assurance.	ICAORDs Dakar and Nairobi	Updated plan	Noted	2008
C 16/38 **A**	Implementation of the required CNS infrastructure to support the implementation of RVSM in the AFI Region	That in view of the implementation of RVSM and provision of ATC service, States are urged to implement the required supportive CNS infrastructure namely; ATS DS circuits, AMS and appropriate NAVAIDS as soon as possible, but not later 3 July 2008.	ICAORDs Dakar and Nairobi	Improved CNS infrastructure	Noted	2008
C 16/39 **D**	Target date for AFI RVSM implementation	That the target date for implementation of RVSM in the AFI Region will be 25 September 2008. *Note: The RVSM Pre-implementation Safety Case (PISC) document will be forwarded to the Commission for consideration as soon as possible, but not later than 28 February 2008.*	ICAORDs Dakar and Nairobi	Pre-implementation safety case (see AN-WP/8328)	Noted, PISC to be reviewed	2008
C 16/40 **D**	Training guidelines for AIS personnel	That: a) ICAO expedite the publication of the revised Training Manual (Doc.7192), Part E-3 as recommended by the AIS/MAP Divisional Meeting in 1998 (Doc. 9733), so as to facilitate the introduction of the basic requirements for States to consider the licensing issue of their AIS personnel; and b) ICAO expedite the development of AIS training guidance material relating to the implementation of CNS/ATM system.	D/ANB	Training guidelines to be developed after maturity of AIM concept	Noted	2011
C 16/42 **D**	Development of AFI CAD business model and financial model	That ICAO provide appropriate experts to assist the AFI CAD Study Group to develop a business model and financial model for the AFI CAD.	D/ANB	Business model	Noted	2009

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
C 16/45 **D**	Implementation of ATC service	That States which have not yet done so, implement ATC service along all ATS routes contained in Table ATS 1 of the AFI Plan (Doc 7474) as soon as possible, but not later than 3 July 008 in the spirit of AFI/7 Rec. 5/21.	APIRG Secretary	ATC service	Noted the relationship with RVSM implementation	2008
C 16/46 **D**	Implementation of the non-implemented routes including RNAV routes	That States concerned implement the ATS routes at Appendix I as soon as possible, but not later than AIRAC date of 3 July 2008.	APIRG Secretary	ATC service	Noted the relationship with RVSM implementation	2008
C 16/47 **D**	Participation of SAR experts in the ATS/AIS/SAR Sub-group and inclusion of SAR activities in the *Comprehensive Regional Implementation Plan for Aviation Safety in Africa* (AFI Plan)	That: a) States, which have not done so, include SAR experts to participate in the work programme of the APIRG ATS/AIS/SAR Sub-Group; b) States, which have not yet done so, establish permanent SAR structures within national civil aviation authorities as a priority; and c) ICAO and AFCAC ensure that the Conclusions of the SAR Conference in La Réunion, be taken into account in the AFI Plan as far as possible.	APIRG Secretary, C/ACIP	Inclusion of SAR activities	Noted	2008
C 16/49 **D**	Training seminar on the use of icing, turbulence and convective clouds forecasts in GRIB2 code form	That the WAFC London Provider State be invited, in coordination with ICAO and WMO,, to provide training seminars on the use of icing, turbulence and convective clouds forecasts in GRIB2 code form, to AFI States. *Note: It is suggested that seminars be convened in 2010 and conducted in both English and French (Niger offered to host the French seminar).*	APIRG Secretary	Seminars	Noted	2008

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
D 16/54 **D**	AFI OPMET Management Task Force (AFI OPMET/MTF)	That an OPMET Management Task Force be established with the terms of reference and work programme, as presented in Appendix L to this report.	APIRG Secretary	AFI OPMET Management Plan/Strategy	Noted	2009
C 16/57 **D**	SIGMET workshops	That WMO, in coordination with ICAO and VAAC Toulouse Provider State, conduct two training workshops on SIGMET during 2008; one in English and another in French for the AFI Region. *Note: The workshops would address all types of SIGMET, including those related to VA and TC.*	APIRG Secretary	Seminars	Noted	2008
C 16/59 **D**	Support to states to implement quality management systems (QMS)	That WMO, in coordination with ICAO, continue to assist States in implementing QMS in the form of: a) seminars on QMS for the Chief Executives of Meteorological Authorities (CEOs) as a priority, and request the CEOs to report on status of implementation on QMS in their services on a regular basis; b) support for more detailed training for personnel who would act as a core group in the region (training of trainers); c) attachments of staff from the region to States that have already adopted QMS through VCP or otherwise; and d) financial resources for engaging consultancy services during the initial stages of implementation, as and when available.	APIRG Secretary	Seminars	Noted	2008

Concl/Dec No. --- Strategic Objective	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Action agreed by ANC	Reporting/ Completion date
C 16/65 **A**	*Comprehensive Regional Implementation Plan For Aviation Safety In Africa* (AFI Plan)	That: a) States support the implementation of the AFI Plan and closely coordinate their efforts with ICAO in order to ensure optimum benefits to aviation safety in Africa and to reduce duplication of efforts; b) The Programme Leader, as a start, follow up on specific offers to train aviation officers in the region and, as a priority, initiate the process to address known gaps; c) The Regional Offices accredited to States in Africa inform States on a regular basis regarding actions taken under the AFI Plan.	C/ACIP to identify training	Training of officials as a matter of urgency	Noted	2008
C 16/68 **D**	Membership of APIRG	That the applications from Burundi, Rwanda and Zimbabwe for membership to APIRG be approved.			Noted	2008

*** Note:** ICAO has established the following Strategic Objectives for the period 2005-2010:

A: Safety - *Enhance global civil aviation safety*;

B: Security - *Enhance global civil aviation security*

C: Environmental Protection - *Minimize the adverse effect of global civil aviation on the environment*

D: Efficiency - *Enhance the efficiency of aviation operations*

E: Continuity - *Maintain the continuity of aviation operations*

F: Rule of Law - Strengthen law governing international civil aviation.

APPENDIX 2.2

STATUS OF IMPLEMENTATION OF CONCLUSIONS AND DECISIONS OF APIRG/16 IN THE AIR NAVIGATION FIELDS

Follow-up to APIRG/16 Conclusions/Decisions-Action Plan

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/1	Training seminars on ECCAIRS	That, the ICAO Regional Offices for AFI Region arrange for the conduct of ECCAIRS seminars in English and French.	Hold ECCAIRS Seminar	ESAF Office	Organise ECCAIRs Seminar. Conducted one workshop for Information Technology Professionals and on for end users in June 1010 in Lusaka, Zambia.Another workshop for end users will be conducted in Nairobi, Kenya for World Food Programme (WFP) operators. WFP Middle East too has requested for an ECCAIRS technical and end user training to be conducted in Dubai in December 2010
Dec. 16/2 **A**	Establishment of an APIRG Performance Based Navigation Task Force (APIRG/PBN/TF):	That, an APIRG PBN Task Force, with terms of reference as outlined in Appendix D to this report, be established to develop a PBN implementation plan for the AFI Region and address related regional PBN implementation issues.	Nomination of Members of the Task Force	ESAF Office	APIRG PBN TF Established

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl.16/3 **A**	Development of State PBN Implementation Plans:	That, the Regional Offices encourage States to begin development of their State PBN implementation plans in harmony with the development of the AFI Regional PBN implementation plan being coordinated by the AFI PBN Task Force for submission to APIRG	Encourage States to develop State PBN implementation Plan 2008	ESAF Office	**State Letter issued**
Concl. 16/4 **A**	Designation of Contact Person for PBN Implementation:	That, by 28 February 2008, States designate a focal contact person responsible for performance based navigation implementation and provide details of the contact person to ICAO Regional Offices for the AFI Region.	Follow-up with States for POC	ESAF Office WACAF Office	State Letter issued. PBN POC being updated State Letter issued. PBN POC being updated
Concl. 16/5 **A**	Implementation of the ICAO provisions on Language Proficiency	That: a) As a matter of urgency, the States concerned implement the intent of the Assembly Resolution A36-11 and the Standards of Annex1, Annex 6, Annex 10, and Annex 11 in response to the ICAO State Letter AN/12/44.6-07/68 Dated 26 October 2007.	Notify States	ESAF Office ACAF Office	State Letter issued Some States yet to fully implement State Letter issued Some States yet to fully implement

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		b) States implement the language provisions with a high level of priority and ensure that flight crews, air traffic controllers and aeronautical station operators involved in international operations maintain language proficiency at least at ICAO Operational Level 4; and; c) States provide data concerning their level of implementation of the Language Proficiency Requirements to ICAO			Some States yet to provide data on level of implementation.
Concl. 16/6 **A**	Harmonization of PIRG work programmes	That the relevant ICAO Regional Offices ensure that common issues such as harmonization of air navigation plans, implementation of global plan initiatives and development of performance objectives, are included in the work programmes of AFI and SAM PIRGs and their auxiliary bodies.	Coordination between ICAO AFI and SAM Offices	WACAF Office	Implementation on a continuous basis
Conc. 16/7 **A**	Cooperative approach in conducting ornithological studies	That neighbouring States should where appropriate and possible, consider cooperative arrangements in the conduct of ornithological studies.	State letter to remind States of the conclusion seeking action taken	ESAF and WACAF Offices with copy to PARIS and CAIRO	Cooperative arrangements have been implemented within the East African Community (EAC) Partner States. Further promotion continuing within SADC States.

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/8 **A**	Rescue and fire fighting equipment for difficult terrain	That States which have aerodromes located close to large bodies of water or marshy land or mangrove areas develop and enforce the requirements for minimum rescue and fire fighting facilities and equipment considered necessary taking into account the critical aircraft and corresponding physical topography at the airport concerned.	State letter to States to which the Conclusion refers seeking implementation action plan	ESAF and WACAF Offices with copy to PARIS and CAIRO	Uniform implementation not yet achieved. More work required by ICAO with the support of Regional Safety Oversight. Organisations being established.
Concl. 16/9 **A & D**	Aerodrome emergency plans	That: a) States consider the organization of local workshops with all departments and organizations concerned in order to facilitate coordination, finalization and approval of their aerodrome emergency plans; b) States, which have not done so, ensure that all international aerodromes in that State develop an approved aerodrome emergency plan by 1st January 2008.	Follow up with States Follow up questionnaire and request for implementation action plan	ESAF and WACAF Offices with copy to PARIS and CAIRO	a) The subject has been discussed as part of the Aerodrome Certification Workshop b) Implementation progress has not been ascertained due to lack of response by States to survey questionnaires.

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		c) Both the ESAF and WACAF Regional Offices shall conduct a survey in February 2008 to ascertain which airports will still have not implemented this requirement and convene a meeting with States concerned to discuss this issue further.	Survey to be conducted. Meeting for States which have not implemented the requirement		c) States not adequately responding to questionnaire signifying probable lack of implementation
Concl.16/10 A & D	Cooperative approach for the evaluation of runway strength and measurement of runway friction characteristics	That neighbouring States consider cooperative arrangements for activities related to pavement strength evaluation and surface friction characteristics measurement, including the acquisition of associated equipment, as appropriate.	Follow up with AFI States	ESAF and WACAF with copies to PARIS and CAIRO	Responses to State letter State Letter issued
Concl. 16/11 A& D	Aerodrome certification process – Aerodrome certification and safety management systems regulations.	That: a) States be encouraged to exchange their experiences in implementing the aerodrome certification requirement. b) CAAs, which have not done so, consider putting in place a consultation framework with their airport operator with a view to developing a realistic action plan for the implementation of the aerodrome certification requirement based on a carefully considered gap analysis.	Follow up with AFI States Follow up with AFI States Survey to be initiated.	ESAF and WACAF with copies to PARIS and CAIRO ESAF and WACAF with copies to PARIS and CAIRO ESAF and WACAF with copies to PARIS and CAIRO	Responses to State letter State Letter issued Responses to State letter Responses to State letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		c) States, which have not done so, ensure the development, approval and publication by 1st January 2008, of aerodrome certification and SMS regulations as well as formal certification process defining steps to be followed for the certification of aerodromes. d) ICAO further assist States in organizing training courses for aerodrome inspectors.	Plan for training activity	ESAF and WACAF with copies to PARIS and CAIRO	Trained participants
Dec. 16/12 A	Survey on AFS performance	That the ICAO Regional Offices (Dakar and Nairobi) coordinate the conduct of regional surveys on AFS performance in order to ascertain that AFTN and ATS/DS continue to meet agreed performance requirements.	Carry out coordination between ESAF and WACAF	WACAF	Performance of AFI AFTN and ATS/DS networks
Concl. 16/13 A&B	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 a) The further use of X.25 protocol be discouraged in the AFI Region.	Develop new specifications for AFTN Notify States	WACAF WACAF	Amend AFI AFTN specification State Letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/14 A	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. *Note: Indications are that ICAO SARPs related to ATN/IPS should be available by end of 2008.*	Notify AFI States	WACAF	State Letter
Concl. 16/15 A & B	**A**eronautical use of public Internet for non-time critical applications	That, AFI States consider the use of the public Internet for non- time critical applications in accordance with relevant provisions in ICAO Annexes 3, 10 and 15, and Doc 9855.	Notify AFI States	WACAF	State Letter
Concl. 16/16 A	Implementation/Interconnection of SADC/2, NAFISAT and AFISNET VSAT Networks	That States and Organizations concerned expedite the implementation and inter-connection of SADC/2, NAFISAT and AFISNET VSAT networks by end of December 2007, in order to increase AFS (AFTN and ATS/DS) connectivity and efficiency, thus improving flight coordination and management in the AFI Region.	Sensitize concerned AFI States	WACAF	State Letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Dec.. 16/17 **A**	Surveys on missing flight plans	That the ICAO Regional Offices (Dakar and Nairobi) carry out the necessary coordination to ensure that due account is taken of AFTN technical and operational aspects in the conduct of surveys relating to missing flight plans in the AFI Region.	Develop a suitable form for such surveys to include AFS data	WACAF and ESAF Offices	Survey on-going
Concl. 16/18 **A & D**	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.	Notify ESAF States	WACAF	State Letter issued Implementation on a continuous basis
Dec. 16/19 **A & D**	Survey on AMS VHF coverage	That the ICAO Regional Offices (Dakar and Nairobi) coordinate the conduct of regional surveys 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.	Conduct a survey	WACAF	Organize a regional survey on AMS/VHF
Concl. 16/20 **A & D**	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 every 18 months.	Notify AFI States	WACAF	State Letter issued

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/21 A & F	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.	Notify AFI States	WACAF	State Letter issued Implementation on a continuous basis, in line with PBN implementation plan for AFI
Concl. 16/22 A & E	Recording of GNSS Parameters	That AFI States that approve GNSS-based operations 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 ;	Notify AFI States	WACAF	State Letter issued Implementation on a continuous basis

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		c) broadcast satellite navigation messages, for all satellites in view ; and d) relevant recording receiver status information.			
Concl. 16/23 A & D	Aeronautical information related to GNSS	That, when implementing GNSS-based operations, AFI States ensure that the relevant aeronautical information is provided to the users as appropriate.	Notify AFI States	WACAF	State Letter issued
Dec.16/24 A & F	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 and progressing its work accordingly.	Hold AFI/GNSS/1/TF Meeting	WACAF	AFI GNSS TF meeting organised and AFI/GNSS Implementation Strategy updated.
Dec. 16/25 A	NAVISAT Project	That: a) the progress report on NAVISAT Project submitted to APIRG/16 be referred to the AFI GNSS Implementation Task Force for consideration in addressing its work programme as required; and	Notify AFI GNSS/TF	WACAF	Letter to Egypt (through MID Office) issued

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		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.			
Dec. 16/26 A	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.	Notify States	WACAF	State Letter issued Prosper to confirm
Dec. 16/27 A	Establishment of an AFI Surveillance Implementation Task Force	That an AFI Surveillance Implementation Task Force (AS/I/TF) be established with the following terms of reference: a) Determine the operational performance requirements for aeronautical surveillance in the AFI Region, including en-route, terminal areas (TMAs) and aerodromes operations; b) Identify and quantify near term and long term benefits of relevant surveillance candidate systems; and;	Hold AS/I/TF meetings	ESAF and WACAF	Organize meetings of ASI/I/TF

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		c) Develop a consistent draft AFI surveillance implementation plan including recommended target dates of implementation, taking into account availability of SARPs and readiness of airspace users and air navigation service providers for a coordinated implementation of service as required. *Note:* *1. The Task Force should be of multidisciplinary nature to cover all aspects related to its assigned work.* *2. While undertaking the task, the Task Force should take into account the work being undertaken by relevant RAN recommendations and APIRG conclusions and decisions pertaining to aeronautical surveillance, and of ICAO Panels with a view to avoiding any duplication.*			

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		3. The Task Force should complete its work in coordination with APIRG ATS/AIS/SAR and CNS Sub-groups, and present the results to the next meeting of APIRG. *In assessing the readiness of airspace users, take into account business aviation usage.*			
Concl. 16/28 A	AFI CNS Systems Implementation Strategies	That the CNS implementation strategies described in the AFI CNS/ATM Implementation Plan (AFI/Doc 003) be updated taking due account of the revised ICAO Global Air Navigation Plan (9750) and AFI ATM operational objectives.	Hold ICG meetings for AFI areas of routing	ESAF	Organize ICG meetings in the Region and amend Doc. 003 as required
Dec. 16/29 A	Activities of AFI CNS/ATM Implementation Coordination Groups (ICGs)	That the CNS/ATM Implementation Coordination Groups (ICGs) established by APIRG for each area of routing should pursue their assigned work in accordance with AFI/Doc 003 provisions.	Hold ICG meetings for AFI areas of routing	ESAF and WACAF as appropriate	ICG meetings have been organised and will continue
Dec. 16/30	Harmonization of target dates of implementation of AFI operational systems	That: a) the CNS Sub-group Secretariat should harmonize target dates with ATS/AIS/SAR Secretariat regarding operational system implementation in the AFI programme; and	Harmonize target dates for AFI CNS/ATM system implementation	WACAF	Coordination between CNS and ATS/AIS/SAR Sub-group secretaries: On-going process

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		b) reference CNS and ATM implementation documents reflecting disparity in dates should be amended accordingly.			
Concl. 16/31 A	Collective Approach to CNS/ATM system elements	That the air navigation service providers (ANSPs) 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.).	Notify AFI ANSPs	WACAF	State Letter issued
Concl. 16/32 A	Establishment of an AFI Frequency Spectrum Management Group	That an AFI Frequency Spectrum Management Group (AFI/FSMG) be established under the coordination of the ICAO Secretariat in order to address issues of common interest related to aeronautical spectrum management and control.	Notify AFI States	WACAF	State Letter
Concl. 16/33 **A**	FANS 1/A operational manual for application in the AFI region	That : a) the FANS 1/A operational manual at ICAO Website: icao.int/APIRG/16 Report be applied in the AFI Region; and	Notify States	ESAF Office WACAF Office	State Letter issued State Letter issued

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		b) South Africa manages the FANS 1/A Operational Manual for the AFI region.			
Dec. 16/34 **A**	Appellation of the current ATM Sub-Group to be reverted to the ATS/AIS/SAR Sub-Group:	That the appellation of the current ATM Sub-Group be reverted to the ATS/AIS/SAR Sub-Group. Its revised Terms of Reference are at Appendix R.	Notify States	ESAF Office WACAF Office	State Letter Actioned by APIRG SG State Letter
Dec. 16/35 **A**	Renaming the APIRG/RVSM/RNAV/RNP/TF	That the existing APIRG/RVSM/RNAV/RNP Task Force shall be renamed the APIRG RVSM Task Force with revised Terms of Reference at Appendix F to this Report	Notify States	ESAF Office WACAF Office	State Letter Completed State Letter Completed
Concl. 16/36	AFI RVSM implementation – funding	The IATA member airlines continue to finance within the available funds to support specific projects relating to the RVSM implementation effort in order to improve safety and economy of air traffic in the AFI region and keep the task force informed accordingly.	Coordinate with IATA Regional Office for AFI	ESAF Office	State Letter issued Implementation on a continuous basis
Concl. 16/37 **A&D**	AFI RVSM strategy/action plan	That the updated AFI RVSM strategy/action plan at Appendix G be circulated to States for quality assurance.	Notify States	ESAF Office WACAF Office	State Letter issued State Letter issued

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/38 **A&D**	Implementation of the required CNS infrastructure to support the implementation of RVSM in the AFI Region	That in view of the implementation of RVSM and provision of ATC service, States are urged to implement the required supportive CNS infrastructure namely: ATS DS circuits AMS and appropriate NAVAIDS as soon as possible, but not later 03 July 2008.	Notify States	ESAF Office WACAF Office	State Letter State Letter
Concl. 16/39 **A&D**	Target date for AFI RVSM Implementation	That, the target date for implementation of RVSM in the AFI Region will be 25th September 2008. *Note: The RVSM Pre-implementation Safety Case (PISC) document will be forwarded to ANC for consideration as soon as possible but not later than128 February 2008.*	Notify States	ESAF Office WACAF Office	State Letter Completed State Letter Completed
Concl. 16/40 **A**	Training Guidelines for AIS personnel	a) That ICAO expedite the publication of the revised Training Manual (Doc.7192), Part E-3 as recommended by the AIS/MAP Divisional Meeting in 1998 (Doc. 9733), so as to facilitate the	Revise the Training Manual Doc. 7192 Part E-3	ICAO Headquarters	Appropriate Provisions

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		introduction of the basic requirements for States to consider the licensing issue of their AIS personnel; and b) ICAO expedites the development of AIS training guidance material relating to the implementation of CNS/ATM system.			
Concl. 16/41 **A**	Framework and guidance material for the establishment of centralized AFI Region Database(AFI-CAD)	That the framework and guidance material at Appendix H be adopted for the AFI Region for the establishment of the centralized AFI Region AIS Database.	Notify States	ESAF Office	State Letter
Concl. 16/42	Development of AFI CAD Business Model and Financial Model	That ICAO provides appropriate experts to assist the Study Group to develop a business model and financial model for the AFI CAD.	Request HQ for Expert	ICAO Headquarters	Provide Expert
Concl. 16/43 **D**	Seminars/Workshops on the provision of Digital Electronic Terrain and Obstacle Data.	That ICAO organise Seminars/Workshops on the provision of l Electronic Terrain and Obstacle Data in accordance with the new provisions in Annex 15.	Organise Seminar	WACAF Office	Conduct Seminar
Concl. 16/44 **A**	Adoption of the EUROCONTROL EAD URS for application in AFI Region	That the APIRG adopt the EUROCONTROL EAD URS as a basis for the AFI CAD URS taking into account the AFI requirements.	Notify States	ESAF Office	State Letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/45 **A&D**	Implementation of ATC Service	That States which have not yet done so, implement ATC service along all ATS routes contained in Table ATS 1 of the AFI Plan (Doc.7474) as soon as possible, but not later than 03 July 2008 in the spirit of AFI/7 Rec.5/21.	Notify States	ESAF Office WACAF OFFICE	State Letter issued Implementation on a continuous basis State Letter issued Implementation on a continuous basis
Concl. 16/46	Implementation of the non-implemented routes including RNAV routes	That States concerned implement the ATS routes at Appendix I as soon as possible, but not later than AIRAC date of 03 July 2008.	Notify States	ESAF Office	State letter issued Some routes yet to be implemented and continuous provision of an appropriate assistance required by State
Concl. 16/47 **A&D**	Participation in the ATS/AIS/SAR Sub-group and SAR inclusion in the comprehensive Regional Implementation Plan for Aviation Safety in Africa	That: a) States which have not done so, include SAR experts to participate in the work programme of the APIRG ATS/AIS/SAR sub-group; b) States, which have not yet done so, establish permanent SAR structures within national civil aviation authorities as a priority and c) ICAO and AFCAC ensure that the conclusions of the SAR Conference of Saint Denis, de la Réunion, be taken into account in	Notify States Regional Offices coordinate with HQ	ESAF Office WACAF Office Regional Offices	State Letter issued Some States yet to implement State Letter issued Some States yet to implement ~~Regional Offices coordinate with~~ HQ Coordination effected

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		the Comprehensive Regional Implementation Plan for Aviation Safety in Africa as far as possible.			
Concl. 16/48 **D**	Response by the States to ICAO Regional Offices State letters	That, States respond promptly to ICAO Regional Offices State letters soliciting information on the status of implementation of the relevant Decisions of the MET/SG and the MET related Conclusions and Decisions of APIRG and other implementation issues in the MET field.	Invite States to take appropriate action	Regional Offices	State Letter issued Monitoring of responses on-going
Concl. 16/49 **A&D**	Training seminar on the use of icing, turbulence and convective clouds forecasts in GRIB2 code form	That the WAFC London Provider State be invited, in coordination with ICAO and WMO, to provide training seminars on the use of icing, turbulence and convective clouds forecasts in GRIB2 code form to AFI States;	Invite WAFC London to conduct courses	MET HQ in Coordination with AFI Regional Offices	State Letter
Dec. 16/50 **D**	Indication of the type of VSAT in the FASID Tables MET 7	That, information related to the type of the VSAT station be included in the FASID Table MET 7 of the AFI plan as given in Appendix J to this report.	Update the table	Secretary MET/SG	Issue an amended version

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/51 **D**	SADIS FTP Accounts	That approved SADIS users in the AFI Region who have internet capabilities and do not have an active SADIS FTP account write to the SADIS Provider State to have an access account.	Invite the States to subscribe	ROs MET	State Letter
Concl. 16/52 **A&D**	Availability on SADIS, of ASHTAM and NOTAM related to volcanic ash (VA)	That, in order to improve the availability on SADIS, of ASHTAMs and NOTAMs related to VA, the ICAO Regional Offices in the AFI Region remind States of the requirement to transmit all ASHTAMs and NOTAMs related to VA to the AFTN address EGZZVANW.	Invite States to implement	ROs MET	State Letter
Concl. 16/53 **D**	SADIS Strategic Assessment Tables	That, the AFI SADIS Strategic Assessment Tables, as given in Appendix K to this report, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.	Invite the SADISOPSG to plan bandwith requirements accordingly.	MET Section HQ	Include in SADISOPSG/13
Concl. 16/54 **A&D**	AFI OPMET Management Task Force (AFI OPMET/M TF)	That, an AFI OPMET Management Task Force with the terms of reference at Appendix L be established**.**	Invite listed States to designate focal points	ROs MET	State Letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Dec. 16/55 **D**	Inclusion of Regional OPMET Data Banks and SIGMET requirements in the AMBEX Handbook	That, the operations of the AFI Regional OPMET Data Banks and SIGMET requirements be reflected in the AMBEX Handbook as per the text at Appendix M.	Amend the AMBEX Handbook	RO/MET Nairobi	Issue an amendment
Concl. 16/56 **A&D**	Adoption of procedures for conducting SIGMET tests for the AFI Region	That: 1) the ICAO Regional Offices in the AFI Region: a) assume the responsibility for the development of addressees related to the volcanic ash advisories (VAA) coming from the Volcanic Ash Advisory Centre (VAAC), Toulouse and intended for the AFI Region; b) make available to Inter-Regional OPMET Gateway (IROG), Toulouse ,WMO Headers that would facilitate the establishment of reception tests for volcanic ash advisories (VAA) within reasonable time limits;	Preparation of address list, WMO Headers and invite States to implement	RO/MET IROG Toulouse	State Letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		c) request those States maintaining meteorological watch offices (MWOs) in the AFI Region to implement WMO headings for volcanic ash SIGMET and transmitted by those MWOs and make them available to IROG Toulouse; and 2) the procedures at the Appendix N be adopted for use in SIGMETs tests in the AFI Region after action had been completed on items a) to c).			
Concl. 16/57 **A&D**	SIGMET Workshops	That WMO in coordination with ICAO and VAAC Toulouse Provider State conduct two training workshops on SIGMET during 2008; one in English and another in French for the AFI Region. *Note: The workshops would address all types of SIGMET, including those related to VA and TC*	Coordinate with VAAC Toulouse schedule and invited States to alternate	RO/MET	State Letters

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/58 **D**	Legal framework for Aeronautical Meteorological Services	That, States in implementing cost recovery for aeronautical meteorological services in accordance with APIRG Conclusions 14/37 and 14/38 put in place a national legal framework for aeronautical meteorological services which include cost recovery arrangements.	Invite States to take action as appropriate	ROs/MET	State Letter
Concl. 16/59 **D**	Support to States to implement quality management systems (QMS)	That WMO in coordination with ICAO continue to assist States in implementing QMS in the form of: a) Seminars on QMS for the Chief Executives of Meteorological Authorities (CEOs) as a priority and request them (CEOs) to report on status of implementation on QMS in their services on a regular basis; b) Support for more detailed training for personnel who would act as a core group in the region (training of trainers); c) Attachments of staff from the region to States that have already adopted QMS through VCP or otherwise; and	Coordinate with WMO to invite CEO-MET for QMS seminar	ROs/MET	State Letter and QMS seminar

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		d) Financial resources for engaging consultancy services during the initial stages of implementation as and when available.			
Concl. 16/60 **A&D**	Regional Meteorological Procedures	**T**hat the Regional Meteorological Procedures given at Appendix. O to the report replace the existing regional procedures of the AFI ANP/FASID (Doc 7474).	Amendment Proposal to be issued	ROs/MET	Amendment Proposal to DOC 744
Dec. 16/61	Introduction of 30-hours TAF in the AFI Region	That international aerodromes in the AFI Region currently issuing 24-hour TAF and have adequate capability, should issue 30-hour TAF from 5 November 2008 and those with limited capability, should advise the Regional Offices accordingly. A further assessment period of six months be extended to those still incapable.	Invite selected States to issue 30 hour TAFs	ROs/MET	State Letter
Concl. 16/62 **D**	Review and updating of FASID Table MET 1A	That: a) FASID Table MET 1A be replaced by single link (i.e. a URL address) to the global database to be developed by the Secretariat in line with SADISOPSG Conclusion 11/9; and	Completed the establishment of the data base	ROs/MET and HQ MET Section	Global database

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		b) Columns 6 and 7 in FASID Table MET 1A (the database to be re-named "Forecasts (TAF and TREND) to be issued for international aerodromes") be deleted.			
Concl. 16/63 **D**	Deletion of FASID Table MET 2B	That FASID Table MET 2B be deleted from the ICAO AFI FASID since the requirements for SIGMET are covered in the ANP Basic (BORPC and regional meteorological procedures).	Process Amendment Proposal	ROs/MET	Table detled
Dec. 16/64 **D**	Coordination between WMO Regional Association 1 (Africa) and APRIG on Aeronautical Meteorology	That, the Chairperson of the Meteorology Sub-Group liaise with the WMO Rapporteur for Aeronautical Meteorology Programme for Regional Association1 (Africa) on matters of common interest when required.	Establish contacts with WMO Rapporteur	Secretary of MET/SG, Nairobi	Letter establishing contacts and signed by the Chairperson
Concl. 16/65 **A,B,C,D,E**	Comprehensive Regional Implementation Plan for Aviation Safety in Africa	That: a) States support the implementation of the AFI Plan and closely coordinate their efforts with ICAO in order to ensure optimum benefits to aviation safety in Africa and to reduce duplication of efforts;	Provide the States with details on the project and request for active participation and support	Programme Leader in coordination with ICAOREPs, Cairo, Dakar, Nairobi	State Letter

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
		b) The Programme Leader, as a start, follow up on specific offers to train aviation officers in the region and initiate the process to address known gaps as a priority; c) The Regional Offices accredited to States in Africa inform States on a regular basis regarding actions taken under the AFI Plan;			
Concl. 16/66 A	Review of the list of International Airports in the AFI ANP	That States make a review of the list of airports included in the AFI ANP and FASID and propose appropriate amendments, including the removal from the Plan of airports not used or planned to be used for international operations, based on current and projected aviation activities.	State letter to States asking for review and report back.	ROs/AGA Dakar/Nairobi	Updated list of international aerodromes
Concl. 16/67 **A&D**	Elimination of Air Navigation Deficiencies	That States be reminded to adopt a step-by-step approach when implementing air navigation system elements, by giving priority to solving the deficiencies affecting all elements of the system	Notify States	WACAF	State Letter issued Implementation on a continuous basis

Conc/Dec No. …… Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Status/Action Taken
Concl. 16/68	Membership of APIRG	That, the applications from Burundi, Rwanda and Zimbabwe for membership to APIRG be approved.	Include the request in the ANC/Council papers	ESAF	~~ANC/Council working papers~~ Completed
Dec. 16/69	Membership to APIRG subsidiary bodies	That, the Group approve membership of Rwanda to the ATS/AIS/SAR and CNS Sub-Groups and Roberts FIR and Senegal be to the membership of the AIS/MAP Task Force.	Notify Rwanda	ESAF	~~State Letters~~ Completed

*Note: ICAO has established the following Strategic objectives for the period 2005-2010

A: *Safety: Enhance global civil aviation safety:*
B: Security: Enhance Global civil aviation security;
C: Environmental Protection: Minimize the adverse effect of global civil aviation on the environment;
D: Efficiency: Enhance the efficiency of aviation operation;
E: Continuity: Maintain the continuity of aviation operations; and
F: Rule of Law: Strengthen law governing international civil aviation

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APPENDIX 2.3

REVIEW OF STATUS OF IMPLEMENTATION OF OTHER OUTSTANDING CONCLUSIONS AND DECISIONS FROM PREVIOUS MEETINGS

CONCLUSIONS / DECISIONS	TITLE	ACTION
AOP		
CONCLUSION 15/1:	BIRD HAZARD CONTROL AND REDUCTION	CONCLUSION REFORMATTED AT APIRG/16
CONCLUSION 15/2:	RESCUE AND FIRE FIGHTING SERVICES (RFFS)	CONCLUSION REFORMATTED AT APIRG/16
CONCLUSION 15/3:	CONDUCT OF FULL-SCALE EMERGENCY EXERCISE	SLIGHT PROGRESS ACHIEVED AT APIRG/16 RECOMMENDED PARTICIPATION OF ICAO AND NEIGHBOURING STATES DURING CONDUCT OF FULL SCAL EXERCISES
CONCLUSION 15/4:	IMPLEMENTATION OF THE AERODROMES CERTIFICATION REQUIREMENT	CONCLUSION REFORMATTED AT APIRG/16 DUE TO CONTINUED LOW LEVEL OF IMPLEMENTATION
CONCLUSION 15/7 :	UPDATE OF THE AFI FASID AOP TABLE I	DUE TO LACK OF RESPONSE, AOP/SG/8 RECOMMENDS REVERT TO STANDARD ICAO PROCEDURES FOR AMENDMENT OF ANP AND FASID
CONCLUSION 15/8:	CONTINUITY OF PARTICIPATION AT AOP/SG MEETINGS	STATUS HAS NOT IMPROVED.
ATM		
CONCLUSION 15/36:	STATUS OF IMPLEMENTATION OF THE INTEGRATED AERONAUTICAL INFORMATION PACKAGE	THE TERM AIS WILL NOW BE REFERRED AS: AIM
CONCLUSION 15/42:	CONVERSION OF EN-ROUTE GEOGRAPHICAL COORDINATES TO WORLD GEODETIC SYSTEM-1984 (WGS-84) AND UPDATING OF AERONAUTICAL CHARTS	SOME STATES YET TO IMPLEMENT WGS-84
CONCLUSION 15/48:	SAR COOPERATION AGREEMENTS AMONGST STATES	SOME DIFFICULTIES ENCOUNTERED BY STATES IN MEETING SAR AGREEMENTS DUE TO LIMITED RESOURCES
CONCLUSION 15/49:	IMPLEMENTATION OF SAR LEGISLATION	SOME STATES YET TO IMPLEMENT
CONCLUSION 15/54	REPORTING OF DATA FOR MONITORING AND/OR CARRYING OUT SAFETY ASSESSMENT	AMOUNT OF DATA EING RECEIVED BY ARMA IS CONSIDERED INADEQUATE FOR REQUIRED INPUTS IN ORDER TO CARRY OUT SAFETY ASSESSMENTS
CONCLUSION 15/97	SEARCH AND RESCUE (SAR)	OUTSTANDING ISSUES BEING TAKEN UP BY SAR T/F

CONCLUSIONS / DECISIONS	TITLE	ACTION
CONCLUSION 15/99	ELIMINATION OF DEFICIENCIES AFFECTING THE CNS FIELD	IMPLEMENTATION IN PROGRESS

MET			
CONCLUSIONS / DECISIONS	**ACTION TAKEN BY STATES/ICAO**	**CONCLUSION OR DECISION TITLE AND ACTION REQUIRED**	**ACTION**
CONCLUSIONS 8/43:	STATE LETTERS ISSUED TO REQUEST STATES TO IMPLEMENT A) SURVEYS UNDERTAKEN BUT RESPONSES POOR.	**AMBEX PROCEDURES** THAT: A) STATES PARTICIPATING IN THE AMBEX SCHEME STRICTLY FOLLOW AMBEX PROCEDURES AS CONTAINED IN THE AMBEX HANDBOOK. C) THE ICAO REGIONAL OFFICES CONCERNED, WITH A VIEW TO ASSISTING STATES WHERE MAJOR DEFICIENCIES ARE IDENTIFIED, CONDUCT A SECOND SERIES OF SEMINARS ON AMBEX PROCEDURES. C) ICAO REGIONAL OFFICES MONITOR THE OPERATION AND EFFECTIVENESS OF THE AMBEX SCHEME THROUGH PERIODIC TAF AVAILABILITY SURVEYS.	AFI OPMET MANAGEMENT TASK FORCE ESTABLISHED TO ASSIST TO ENHANCE IMPLEMENTATION (DECISION MET/SG 8/8)
CONCLUSION 12/40:	STATE LETTER ISSUED	**TRAINING IN THE PREPARATION AND ISSUANCE OF VOLCANIC ASH ADVISORIES AND SIGMETs** THAT, STATES CONCERNED SHOULD CONDUCT REGULAR EXERCISES IN COOPERATION WITH THEIR VAAC AT THEIR METEOROLOGICAL WATCH OFFICES (MWOs) ON THE PREPARATION AND ISSUANCE OF VOLCANIC ASH ADVISORIES AND SIGMETs IN ORDER TO KEEP THEIR AERONAUTICAL METEOROLOGICAL FORECASTERS CURRENT WITH THE PROCEDURES.	SIGMETs ISSUANCE STILL A BIG CHALLENGE
CONCLUSION 13/68:	STATE LETTER ISSUED FOR FOLLOW-UP BY	**BETTER COMMUNICATIONS FOR VOLCANO OBSERVATORIES** THAT STATES CONCERNED MAKE EFFORTS TO ESTABLISH RELIABLE	NEED FOR MORE TRAINING

MET			
	STATES	COMMUNICATIONS LINKS BETWEEN THEIR VOLCANO OBSERVATORIES AND METEOROLOGICAL WATCH OFFICE (WMOs) AND AREA CONTROL CENTRES (ACCs)	
CONCLUSION 14/37:	STATE LETTER ISSUED	**COST RECOVERY OF AERONAUTICAL METEOROLOGICAL SERVICES** THAT, WHEN ESTABLISHING A COST RECOVERY SYSTEM FOR AERONAUTICAL METEOROLOGICAL SERVICES, STATES IN THE AFI REGION USE RELEVANT ICAO AND WMO DOCUMENTS AND COOPERATE WITH AIRPORTS, AIR NAVIGATION SERVICES AND OTHER AERONAUTICAL PARTNERS, INCLUDING USERS.	STILL A CHALLENGE
CONCLUSION 14/39:	STATE LETTER ISSUED	**AUTONOMOUS ENTITIES AND METEOROLOGICAL SERVICE FOR AIR NAVIGATION** THAT STATES IN THE AFI REGION WHEN CONSIDERING THE ESTABLISHMENT OF AUTONOMOUS ENTITIES TO MANAGE THEIR AIR NAVIGATION SERVICES, TAKE DUE ACCOUNT OF THE PROVISION OF METEOROLOGICAL SERVICE TO AIR NAVIGATION.	PROGRESS SLOW. FOLLOW-UP DURING MISSIONS BY ROS.

APPENDIX 3.2A

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE AERODROME OPERATIONAL PLANNING SUB-GROUP (AOP/SG)

1. Terms of reference

1.1 In the field of aerodrome operational planning

1.1.1 To keep under review the adequacy of the requirements contained in the ICAO Regional ANP, taking into account changes to aircraft operations, new operational requirements and/or technological developments, and to propose amendments as required.

1.2 With respect to oversight and surveillance responsibilities of the States:

1.2.1 To keep under review the status of implementation of the aerodrome oversight and surveillance responsibilities of the States in accordance with the relevant ICAO SARPS

In the field of aerodrome services:

To identify, assess and track a prioritized list of critical deficiencies in the provisions of aerodrome installations, equipment and services with particular emphasis to:

- aerodrome power supply;
- visual aids;
- rescue and fire fighting;
- aerodrome fencing;
- wildlife hazards;
- aerodrome emergency planning and testing; and
- Pavement surface condition
- Runway Safety
- Establishment and implementation of SSP and SMS
- Land use control and management around the airports
- Mechanism for cooperation among States in the filed of aerodrome operations.

APPENDIX 3.3A

TERMS OF REFERENCE OF THE AFI AMHS IMPLEMENTATION TASK FORCE

Terms of Reference:

1) Conduct a comprehensive review of ICAO Standards and Recommended Practices for the Aeronautical Message Handling System (AMHS) application as specified in Annex 10 Volume II[3], chapter 4.6 and Annex 10 Volume III, Part I[26], chapter 3.5.3) and ICAO Doc.9880 Part IIB[5];

2) Collect and analyze information on the status of AFI ANSP Aeronautical Message Handling System plan processing systems including ongoing upgrades to existing systems;

3) On the basis of the above, and in accordance with relevant additional ICAO provisions, develop a coordinated AFI transition strategy and plan with associated timelines to enable the streamlined coordinated implementation of AMHS.

Considerations:

In addressing these terms of reference, the Task Force should consider, inter alia, the following aspects:

a) The implemented systems in the AFI Region could differ from systems in other ICAO Regions and accordingly provide recommendable Regional action with global goals;
b) Inter and intra regional issues;
c) Personnel training for operational migration from AFTN to AMHS;
d) AFS network backbone capability;
e) Contingency arrangements for States that cannot comply by the due date;
   - Way to handle staged implementations by States,
   - Expectations across ANSPs with different implementation dates, and
f) Systems that transition early will need to be capable of handling both new and current instructions.
g) Inter-system exchanges need to take account of differing automation capabilities in order to avoid excessive message rejection;
h) Establishment of an Information Management system to track implementation timelines for various States/systems;
i) Impacts to users (compliance to new flight plan format); and
j) Appropriately timed withdrawal of existing systems specific requirements to ensure consistency with new instruction.
k) Existing ICAO guidance material

Membership (Provisional to be consolidated after the planned AMHS Training Workshop)

Core members:

- CNS operation specialist and systems engineering experts from AFI States and ANSPs with existing and planned AMHS plan processing systems
- ATNS, ASECNA, IFATSEA

APPENDIX 3.3B

Concept of the GNSS Strategy for the AFI Region

Amendment proposals to AFI CNS/ATM Implementation Plan (DOC. 003)

1. INTRODUCTION

1.1 The purpose of the AFI GNSS strategy is to define an evolution path for replacement of ground-based navigation aids, i.e. VOR/DME/ILS/NDB, ensuring that operational and other concerns such as positive cost-benefit are fully taken into account.

1.2 The AFI GNSS strategy assumes availability of a GNSS meeting of the specified parameters at every phase of deployment. It does not analyze GNSS systems configuration per se nor the advantages and disadvantages of various deployment strategies.

2. GENERAL CONSIDERATIONS

2.1 By necessity, satellite-based and ground-based navigation systems will co-exist for a period of time. Considering that the operation of a dual system is detrimental to a positive cost-benefit, users and providers will co-operate with the view of reducing the duration of the transition period as much as possible, having due regard for the following principles:

- The level of safety will not be downgraded during the transition;
- GNSS-based service must, before the end of the transition period, fully meet the required parameters of accuracy, availability, integrity and continuity for all phases of flight;
- During the transition, gradually evolving levels of functionality will be available;
- Operational advantage shall be taken in to consideration the available and capabilities at every step of deployment;
- Methods of application will take into account full consideration of safety considerations of any functional limitations;
- Users must be given sufficient advance notice to re-equip before ground-based systems are decommissioned.

3. EVOLVING FUNCTIONALITY

3.1 Phase I (Short term), up to 2012:

- This phase will allow the use of GNSS as a primary-means of navigation for en-route, and for NPA; and as a supplemental-means navigation system for TMA. Existing ground infrastructure remains intact.

3.2 Phase II (Medium term) -2013 - 2016:

- **This phase will allow for:**

a) En-route phase: sufficient capability to meet en-route navigation requirements everywhere in the AFI Region. GNSS will continue to be used as principal en-route navigation. The same principle will be characterized by a clearly planned transition for the use of GNSS as the sole means for en-route navigation. Navigational aids will accordingly not be replaced in consultation with the Users.

b) Terminal areas: sufficient capability to meet TMA navigation requirements everywhere in the AFI region. GNSS is approved as sole-means for TMAs, taking into account technical and legal developments, and institutional aspects.

c) Terminal area VOR/DME/NDB, and Locators not associated with ILS, will not be replaced during Phase II.

d) Approach and landing phase: sufficient capability for APV1 in the whole AFI Region. ILS will continue to be provided at aerodromes[1].

Note 1: Where the requirements for approach and landing can be met by APV 1, ILS CAT I should not be replaced.

During Phase II, the implementation of Long- term GNSS will be developed.

Phase III (Long term) 2017 onwards**:** It is assumed that more constellations of navigation satellites will be available to support GNSS as the sole-means of navigation from en-route to CAT I operations. CAT I by SBAS or GBAS will be available in those locations where analysis of historical MET data or traffic characteristics justifies the requirement. Other requirements will be met by ground-based augmentation system (GBAS). During Phase III, ILS CAT I will not be replaced in consultation with users. Where CAT II/III ILS requirements have been confirmed, these facilities will remain unless technical evolution then demonstrates that the requirement can be supported by GBAS or SBAS.

4. The strategy will be reviewed periodically. In particular, it will be reviewed and updated at the beginning of each planning phase to ensure continuous relevance in support of the global ATM operational concept, taking into account technological evolution and developments in the field of GNSS.

5. **Summary of AFI GNSS Strategy**

AFI GNSS Strategy – Synopsis

	Short term	Medium term	Long term
Time scale	2008 – 2012	2013 – 2016	2017 and beyond
Certification	Primary for en-route Supplemental for TMA Non-precision approach (NPA)	Primary means from en route to APV	Primary means from en route to CAT-I
Oceanic and Remote Continental En route	Basic GNSS	Basic GNSS	Multi-constellation GNSS
Continental En route	Basic GNSS	Basic GNSS	Multi-constellation GNSS
Terminal	Basic GNSS	Basic GNSS	Multi-constellation GNSS
Approach and Landing	Basic GNSS with Barometric Altimetry	Basic GNSS with ABAS, SBAS*	Multi-constellation GNSS with ABAS, SBAS, GBAS
			CAT I (GLS) CAT II/III/ (GLS) as required

**Note: As from 18 November 2010, it is expected that ICAO Annex 10, Volume I will enable Category I approach operations supported by satellite-based augmentation system (SBAS). The upper vertical alert limit (VAL) for CAT I operations has drastically been increased from 15.0 m to 35.0 m. However, a vertical alert limit greater than 10 m for a specific system design may only be used if a system-specific safety analysis has been completed.*

APPENDIX 3.3C

GNSS INFRASTRUCTURE IN SUPPORT OF PBN REQUIREMENTS

Time scale		**Short term**	**Medium term**	**Long term**
		2008 – 2012	**2013 – 2016**	**2017 and beyond**
Certification		Primary for en-route Supplemental for TMA Non-precision approach (NPA)	Primary means from en route to APV	Primary means from en route to CAT-I
Oceanic and Remote Continental/ En route	GNSS Configuration	Basic GNSS	Basic GNSS	Multi-constellation GNSS
	PBN Nav Spec	RNAV-10, RNP-4	RNAV-10, RNP-4	RNAV-10, RNP-4
Continental En route	GNSS Configuration	Basic GNSS	Basic GNSS	Multi-constellation GNSS
	PBN Nav Spec	RNAV-5, RNAV-1	RNAV-5, RNAV-2, RNAV-1	RNAV-5, RNAV-2, RNAV-1
Terminal	GNSS Configuration	Basic GNSS	Basic GNSS	Multi-constellation GNSS
	PBN Nav Spec	RNAV-1 in a surveillance environment Basic RNP-1 in non-surveillance environment	Expand RNAV-1, or RNP-1 application Mandate RNAV-1, or RNP-1 in high density TMAs	RNAV-1 in a surveillance environment Basic RNP-1 in non-surveillance environment
Approach	GNSS Configuration	Basic GNSS	Basic GNSS with ABAS, SBAS*	Multi-constellation GNSS with ABAS, SBAS*
	PBN Nav Spec	RNP APCH: NPA RNP APCH: APV with Baro-VNAV or RNP AR APCH: APV with Baro-VNAV	RNP APCH: NPA RNP APCH: Expand APV (with Baro-VNAV and/or augmented GNSS) Expand RNP AR APCH: APV with Baro-VNAV	RNP APCH: NPA RNP APCH: APV (with Baro-VNAV and/or augmented GNSS) RNP AR APCH: APV with Baro-VNAV

**Note: Although SBAS operations not yet included in the PBN concept contained in ICAO Doc 9613, they have been introduced in the spirit of Assembly Resolution A36-23.*

APPENDIX 3.3D

FUTURE WORK PROGRAMME
OF THE AFI SURVEILLANCE IMPLEMENTATION TASK FORCE

No.	Activity	Detailed requirements	Target dates
ENROUTE OPERATIONS WORKING GROUP			
1.	En-route surveillance requirement	Review the draft en-route strategy	CNS/SG/4 ATS/AIS/SAR/SG/12
2.		• Draft data distribution format • Draft data exchange agreement, including system details, data format, etc. • Draft Regulatory requirements (technical)	Feedback and input into February 2010 PBN Meeting
3.		Review and align with new ICAO Standards and guidance when development	On-going
4.		Finalize the surveillance data distribution format	CNS/SG/4
5.		Develop agreement template to be used for inter-State data exchange	First draft at CNS/SG/4
6.		Finalize a revised Draft AFI Surveillance Implementation Plan	CNS/SG/4
7.		Update Doc. 003 and CNS Table 4A&B in FASID	On-going
TERMINAL OPERATIONS WORKING GROUP			
1.	Terminal surveillance requirement	Review the draft terminals strategy	CNS SG4, ATS/AIS/SAR/SG/12
2.		• Draft data exchange agreement, incl. System details, data format, etc. • Draft Regulatory Requirements (Technical)	CNS/G/4 CNS/SG/4
3.		Review and align with new ICAO Standards and guidance when developed	On-going
4.		Update Doc. 003	On-going
5.		Finalize the surveillance data distribution format	CNS/SG/4
		Develop agreement template to be used for inter-State data exchange	First draft at CNS/SG/4
6.		Update Doc. 003 and CNS Tables 4A and 4B in FASID	On-going

APPENDIX 3.3E

DRAFT TERMS OF REFERENCE AND WORK PROGRAMME OF AFI FREQUENCY MANAGEMENT GROUP (AFI/FMG)

1. Terms of reference

The FMG works within the terms of reference of the APIRG, on the matters related to the aviation radio frequency spectrum which included the following task list in co-ordination with other relevant international organizations.

2. Task List

Task No.	Global Plan Initiative Ref.	Title/Brief description	Deliverables	Action by	Target date
1.	GPI 23	Aviation Spectrum requirements	Monitor and report to APIRG the status of available capacity in the various aviation bands.	FMG	On-going
2.	GPI 23	Frequency Planning	Ensure the effective operation of the coordination process for the necessary agreement to make new frequency assignments.	FMG	On-going
3.	GPI 23	Coordination with other agencies to protect aviation spectrum	Coordinate activities for the conduct of the 'block planning' process to provide for new frequency requirements which can only be satisfied by the relocation of existing assignments.	FMG	On-going
4.	GPI 23	Maintenance of Table COM 3	Maintain a parallel draft Table COM 3 until merging with the ICAO table is completed with refinement of COM3 Tables at the next stage.	Study Group ICAO	On-going
5.	GPI 23	Support for ICAO Position at ITU WRC	Ensure AFI States support ICAO at ITU meetings.	FMG	On-going

APPENDIX 3.3F

DRAFT TERMS OF REFERENCE, FUTURE 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/18
2.	GPI-22	Update the AFI AFTN routing directory	A	APIRG/18
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	Continuing
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/18
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/18
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	Continuing
8.	GPI-21	Follow up and monitor the implementation of Phase 1 of the AFI GNSS Strategy.	A	Continuing
		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
		Communications, Navigation and Surveillance – General matters		
10.	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
11.	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
12.	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
15.	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
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, Mali, Mauritius, Morocco, Niger, Nigeria, Senegal, South Africa, Spain, Sudan, Tanzania, Tunisia, Zambia, ACAC, ASECNA, IATA, and IFALPA.

APPENDIX 3.3G

CNS PERFORMANCE OBJECTIVES

CORRECTION OF DEFICIENCIES AND ENHANCEMENT OF AERONAUTICAL TELECOMMUNICATIONS				
Benefits				
Safety	• Implementation of AFI ANP			
	• Enhanced safety in flight operations			
	• Uniform implementation of CNS/ATM systems (AFI ANP, Doc 003) and relevant ICAO SARPs			
Efficiency	• Improved flight planning and coordination			
Environment	• Reduction in fuel consumption			
Strategy **Short term (2010)** ***Medium term (2011 - 2015)***				
ATM OPERATIONAL CONCEPT COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
	Communications			
	Aeronautical mobile service (AMS)			
	• provision of VHF in FIRs (Angola, Chad Congo, DR Congo, Sudan, Somalia)	2008–2012	States	Ongoing Implemented in DRC
	• provision of controller-pilot data link communications (CPDLC) procedures	2010-2015	States	On-going
	• establishment of a regional central reporting agency (CRA)	2010-2012	APIRG	Not started
	• development of regional guidance for required communication performance (RCP)	2010-2011	APIRG	On-going FANS 1/A Operations Manual (to be replaced with Global Operational Data Link Document (GOLD) under

CORRECTION OF DEFICIENCIES AND ENHANCEMENT OF AERONAUTICAL TELECOMMUNICATIONS				
				development
	• implementation of RCP	2010-2015	States	Not started
	Aeronautical fixed service (AFS)			
	• implementation of bit-oriented protocol (BOP) between AFTN main centres	2010-2012	States	In progress
	• implementation of Aeronautical Message Handling System (AMHS)	2010-2012	States	In progress
	• implementation of ATS Inter-facility Data Communications (AIDC)	2010-2012	States	In progress
	• activation of Addis Ababa/Asmara, Kinshasa/Kigali and Bujumbura/Kinshasa circuits	2009-2012	States	
	• improvement of Accra/Kano, Accra/Libreville and Accra/Brazzaville circuits	2009-2012	States	
	• implementation of Algiers/Tripoli, Atlantico/Luanda, Bujumbura/Goma and Bukavu/Kigali	2009-2012	States	
	Navigation			
	• implementation of navigational aids to increase safety at terminal areas	2008 – 2011	States	Ongoing
	• implementation of GNSS – carry out survey to determine the implementation status and identify the specific assistance needed if any	2009-2015	States	Ongoing
	Surveillance			
	• update of AFI surveillance plan for en-route operations	2008 – 2010	APIRG	In progress

CORRECTION OF DEFICIENCIES AND ENHANCEMENT OF AERONAUTICAL TELECOMMUNICATIONS				
	• implementation of AFI surveillance plan for en-route operations, including provision of automatic dependent surveillance (ADS-C) procedures	2008-2015	States	In progress
	• development of AFI surveillance plan for TMA and aerodromes	2009-2012	APIRG	In progress
	• development of State implementation action plan based on AFI surveillance plan	2009 – 2012	States	Not started
	Aeronautical spectrum			
	• implementation of automation support tools to enhance frequency management	July 2008 – 2009		Ongoing
	• AFI to join ICARD	August 2008 – March 2009		
	Performance measurement			
	• Development of performance measurement plan for CNS services	2010-2012	APIRG	Not started
Linkage to Global Plan Initiatives (GPIs)	*GPI/9: Situational awareness; GPI/10: Terminal area design and management; GPI/17: Implementation of data link applications; - GPI/21: Navigation systems; GPI/22: Communication network infrastructure; GPI/23 – Aeronautical spectrum*			

APPENDIX 3.4A (1)

ATM PERFORMANCE OBJECTIVES

NATIONAL PERFORMANCE OBJECTIVE - IMPLEMENTATION OF THE NEW ICAO FPL PROVISIONS BY 15 NOVEMBER 2012

Benefits

Environment	• reductions in fuel consumption
Efficiency	• ability of air navigation service providers t make maximum use of aircraft capabilities • ability of aircraft to conduct flights more closely to their preferred trajectories • facilitate utilization of advanced technologies thereby increasing efficiency • optimized demand and capacity balancing through the efficient exchange of information
Safety	• enhance safety by use of modern capabilities onboard aircraft

Strategy

Short term (2010-2012)

ATM OC COMPONENTS	TASKS	TIMEFRAME START-END	RESPONSIBILITY	STATUS
AUO SDM	• plan the transition arrangements to ensure that the changes from the current to the new ICAO FPL form occur in a timely and seamless manner and with no loss of service;	2009-June 2011	States	Ongoing
	• ensure that the capabilities of local systems are fully adaptable to the changes envisaged in the new FPL form;	2010	States	Ongoing
	• ensure the ability of FDPS's to parse information correctly to guarantee that misinterpretation of data does not occur;	2010	States	Ongoing
	• analyze each individual data item within the various fields of the new flight plan form, comparing the current values and the new values to verify any issue regarding the provision of service by the flight planning facility itself or downstream units;	2010	States	Ongoing
	• ensure that there are no individual State peculiarities or deviations from the flight plan provisions;	2011	States	Ongoing

	• ensure that the accepting ATS Reporting Office accepts and disseminates all aircraft capabilities and flight intent to all the downstream ACCs as prescribed by the PANS-ATM provisions.	2012	States	Ongoing
	• in order to reduce the change of double indications it is important that any State having published a specific requirement(s) which are now addressed by the amendment should withdraw those	2010-2012	States	Ongoing
	• requirements in sufficient time to ensure that aircraft operators and flight plan service providers, after 15 November 2012, use only the new flight plan indications;			
	• inform on the implementation status to the ICAO regional offices on an ongoing basis;	2010-2012	States	Ongoing
	• keep the Flight Plan Implementation Tracking System (FITS) up to date based on the information provided by the States.	2010-2012	ICAO Regional Office	Ongoing
linkage to GPIs	GPI/5 RNAV and RNP (Performance-based navigation) GPI-12 Functional integration of ground systems with airborne system GPI/18 Aeronautical Information			

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APPENDIX 3.4A(2)

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN EN-ROUTE AIRSPACE				
Benefits				
Environment **Efficiency** **Safety**	• reduction in gas emissions • ability of aircraft to conduct flight more closely to preferred trajectories • increase in airspace capacity • facilitate utilization of advanced technologies (e.g., FMS-based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency			
Strategy				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***En-route airspace***	2008		
	• develop regional implementation plan	2008-2009	AFI PBN TF	Completed
	• develop regional action plan	2009-2010	AFI PBN TF	Completed
	• develop airspace concept based on AFI PBN regional implementation plan, in order to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN, e.g. RNAV 10 and RNAV 5, and taking into account interregional harmonization	2009-2012	AFI PBN TF/States	In progress
	• harmonize national and regional PBN implementation plans	2010-2016	AFI PBN TF/States	On-going
	• develop performance measurement plan	2010-2012	States	In progress
	• formulate safety plan	2010-2012	States	To be developed
	• establish collaborative decision making (CDM) process	2010	States	In progress
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material	2010-2011	States	To be developed
	• identify training programmes and develop corresponding guidelines	2010-2011	AFI PBN TF/States	Not started
	• identify training needs and develop corresponding guidelines	2010-2011	States	In progress
	• formulate system performance monitoring plan	2010	AFI PBN TF/States	To be developed
	• implementation of ATS routes en-route	2010-2012	AFI PBN TF/States	In progress

	• monitor implementation progress in accordance with AFI PBN implementation plan and State implementation plan.	2010 and beyond	AFI PBN TF/States	On-going

APPENDIX 3.4A(3)

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE				
Benefits				
Environment **Efficiency** **Safety**	• reduction in gas emissions • ability of aircraft to conduct flight more closely to preferred trajectories • increase in airspace capacity • improved availability of procedures • facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency			
Strategy				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***Terminal airspace***	2008		
	• develop regional implementation plan	2009	AFI PBN TF	Completed
	• develop regional action plan	2009-2010	AFI PBN TF	Completed
	• develop State PBN implementation plan	2009-2010	States	In progress
	• develop airspace concept based on AFI PBN roadmap, in order to design and implement an optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), holding and associated instrument flight procedures, on the basis of PBN and, in particular RNAV 1 and Basic-RNP 1	2009-2012	PBN TF/States	In progress
	• develop performance measurement plan	2010-2012	States	In progress
	• formulate safety plan	2010-2012	States	To be developed
	• establish collaborative decision making (CDM) process	2010	States	In progress
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material	2010-2011	States	To be developed
	• identify training programmes and develop corresponding guidelines	2010-2011	AFI PBN TF	To be developed
	• identify training needs and develop corresponding guidelines	2010-2011	States	In progress
	• formulate system performance monitoring plan	2010-2012	AFI PBN TF/States	In progress
	• develop a regional strategy and work programme implementation of SIDs and STARs	2009-2012	AFI PBN TF/States	In progress
	• monitor implementation progress in accordance with AFI PBN implementation roadmap and State implementation plan	2010	AFI PBN TF/States	To be developed

APPENDIX 3.4A(3)

Linkage to GPIs	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: FMS-based arrival procedures.

APPENDIX 3.4A(4)

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

OPTIMIZATION OF VERTICALLY GUIDED RNP APPROACHES				
Benefits				
Environment **Efficiency** **Safety**	• reduction in gas emissions • increased accessibility to aerodromes, including continuity of access • increased runway capacity • reduced pilot workload • availability of reliable lateral and vertical navigation capability			
Strategy				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***Terminal airspace***	2008		
	• develop regional implementation plan	2008 – 2009	AFI PBN TF	Completed
	• develop regional action plan	2009-2010	AFI PBN TF	Completed
	• develop State PBN implementation plan	2009 – 2010	States	Implementation on a continuous basis
	• develop airspace concept based on AFI PBN implementation plan, in order to design and implement RNP APCH with Baro-VNAV in accordance with Assembly resolution A36-23, and RNP AR APCH where beneficial	2009 – 2012	AFI PBN TF/States	Implementation on a continuous basis
	• develop performance measurement plan	2010-2012	States	Implementation on a continuous basis
	• formulate safety plan	2010-2012	States	To be developed
	• establish collaborative decision making (CDM) process	2010	States	Implementation on a continuous basis
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material	2010-2011	States	To be developed
	• identify training programmes and develop corresponding guidelines	2010-2011	AFI PBN TF/States	To be developed
	• identify training needs and develop corresponding guidelines	2010-2011	States	Implementation on a continuous basis
	• implementation of APV procedures	2010 - 2016	AFI PBN TF/States	Implementation on a continuous basis
	• Formulate system performance monitoring plan	2010	AFI PBN TF/States	To be developed
linkage to GPIs	GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: FMS-based arrival procedures			

APPENDIX 3.4A(5)

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR SEARCH AND RESCUE (SAR)

ESTABLISHMENT OF SUB-REGIONAL SAR ARRANGEMENTS				
Benefits				
Efficiency and Safety	• cost-efficient use of accommodation and RCC equipment on a shared basis • service provision more uniform across a geographic area defined by risk • proficient services provided near and within States with limited resources. • harmonization of aviation / maritime procedures • inter-operability of life-saving equipment • development of a pool of experienced SAR mission coordinators skilled across both aviation and maritime domains thus reducing coordination and fragmentation			
Strategy				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
N/A	• conduct Southern African regional SAR workshop	2010	ICAO	2-3 June Workshop in Niger.
	• establish collaborative decision making process	2011 – 2012	ICAO/States	Not started
	• develop needs assessment and gap analysis	2011 – 2012	APIRG	Not started
	• develop Southern African regional action plan	2011 – 2012	APIRG	Not started
	• conduct regional SAR Administrators training and SAR Mission Coordinators training	2011 – 2012	ICAO	Not started
	• determine regional organisation, functions and responsibilities, accommodation and equipment needs.	2011 – 2012	APIRG	Not started
	• produce draft legislation, regulations, operational procedures, letters of agreement SAR plans and safety management policies for regional SAR provision using IAMSAR manual as guidance.	2010 – 2012	APIRG	Implementation on a continuous basis
	• determine future training needs and develop training plans	2010 – 2011	APIRG	Implementation on a continuous basis

	• develop ➢ alerting procedures ➢ resource databases ➢ interface procedures with aerodrome emergency procedures and generic disaster response providers ➢ RCC check lists ➢ staffing, proficiency and certification plans ➢ preventive SAR programmes ➢ quality programmes ➢ education and awareness programmes ➢ in-flight emergency response procedures	2011 – 2012	States	Not started
	• conduct training as required	2010 – Permanent	States	Implementation on a continuous basis
	• conduct SAR exercises required	2012 - Permanent	States	Not started
	• monitor implementation process	As appropriate	ICAO/States	Not started
linkage to GPIs	N/A			

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APPENDIX 3.4B

OUTCOME OF THE AFI RVSM IMPLEMENTATION SAFETY SEMINAR (RISS) 19-22 APRIL 2010

- National Programme Manager (NPM) as the National RVSM implementation focal points should sensitize their civil aviation authorities (CAA) with regard to adherence to the RVSM Approval processes.

- AFI CAA's are to ensure that the State Approval processes are clearly understood by the staff responsible for applying such processes and are adhered to by operators in order to reduce incidents of violations.

- AFI CAA's to ensure enough qualified CAA inspectors and adequate oversight of RVSM approvals and to ensure effective enforcement where necessary.

- AFI CAA's to ensure that the ARMA is supported in the AFI Height Monitoring Program.

- NPMs continue following up RVSM implementation issues as stipulated in the RVSM Implementation plan to ensure compliance

- To ensure optimal use of RVSM flight levels and efficiency in the upper airspace in general, LOP's should be re-addressed between Seychelles/Mumbai & Mogadishu/Mumbai in order to address current costly level restrictions being experienced.

- AFI ANSP's to ensure that ATS service providers are properly trained in RVSM and that proficiency checks are conducted periodically to ensure appropriate use levels in RVSM airspace.

- Following discussion and review of contingency procedures relating to RVSM operations within the AFI Region, the seminar wishes to request ICAO to review the contents of both Chapter 15 (*Procedures related to emergencies, communication failure and contingencies*) and Chapter 16 (*Miscellaneous procedures*), PANS ATM (DOC 4444) with a view of converting contingency procedures which relate specifically to Oceanic operation to general contingency procedures, for use both Continentally as well in Oceanic airspace as appropriate.

- CAA's to communicate to all stakeholders information about the existence and function of TAG.

- States to amend the LOA/LOP's to include the requirement to exchange information on individual aircraft/flight RVSM Status.

- CAA's to ensure specifically appointed personnel for the collection of data. This function could be assigned to existing staff but should be clearly, expressly assigned and supported.

- CAA's to ensure that NPM are supported to communicate with the ARMA and to provide necessary data.

- CAA's to apply immediate enforcement actions on Non-RVSM operators who operate in RVSM airspace where shear negligence and/or willful misconducts are confirmed. The same applies to RVSM Approved operators who commit such violence.

- AFI State that have not already done so to ensure that RVSM approvals certificates are included in the list of docs to be carried onboard.

- AFI CAA's should ensure that reporting procedures are in place in order to facilitate timely processing of RVSM related incidents or violations.

APPENDIX 3.4C

TERMS OF REFERENCE FOR ARMA SCRUTINY GROUP

1. ***SAFETY POLICY*:** *The Safety Policy for RVSM implementation has been established to meet the requirements of ICAO Standards and Recommended Practices and guidance material on managing collision risk consequent on the implementation of RVSM.*

2. **SCOPE:** To continually evaluate and reduce the incidence of Large Height Deviations in the AFI Region.

3. **OBJECTIVE:** To Analyze and Validate AFI RVSM Large Height Deviations and where applicable propose remedial actions and procedures which will be taken up through ARMA processes.

4. **TERMS OF REFERENCE:**

   a) Assemble RVSM experts once annually to achieve the objective of the Scrutiny Group;

   b) Analyze Large Height Deviations of 300FT or more occurring in AFI Region airspace;

   c) Carry out the elementary mathematical analysis;

   d) Identify any other problems associated with RVSM operations that are identified during the course of the analysis;

   e) Recommend remedial actions and propose procedures to reduce the occurrence of Large Height Deviations via NPMs;

   f) ARMA to report results to the ATM/AIM/SAR Subgroup in order to contribute to safety, efficiency and harmonization of RVSM operations in the AFI Region;

   g) ARMA to report to the APIRG the results of the annual Collision Risk Assessment, which automatically contains the work of the Scrutiny Group;

   h) ARMA Scrutiny Group to closely work together with the Tactical Action Group (TAG);

5. COMPOSITION: ARMA: ASECNA; IFALPA; IFATCA; ICAO.

6. WORKING METHODS: Meet once annually before the Collision Risk Assessment. Any further correspondence between meetings will take place via email.

ARMA SCRUTINY GROUP MEETING VENUES

Table 1: Venue: ARMA, Johannesburg, South Africa

ARMA x 2	Facilitator & Secretarial Duties	Located in South Africa No Travelling
IFATCA x 1	Validated Area Controller	South African Controller Tasked by IFATCA No Travelling
IFALPA x 1	Regional Pilot	South African Pilot Tasked by IFALPA No Travelling
ASECNA x 1	Validated Area Controller	Member will need to travel
ICAO x 1	ATM Officer	Member will be required to attend

Table 2: Venue: ASECNA Headquarters, Dakar, Senegal

ARMA x 1	Facilitator & Secretarial Duties	Member will need to travel
IFATCA x 1	Validated Area Controller	Controller Tasked by IFATCA Travel to be Considered
IFALPA x 1	Regional Pilot	Senegal Pilot Tasked by IFALPA No Travelling
ASECNA x 1	Validated Area Controller	No Travelling
ICAO x 1	ATM Officer	Member will be required to attend

APPENDIX 3.4D

AFI

Regional Performance Based Navigation

Implementation Plan

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1. Introduction

1.1 The AFI Region Performance Based Navigation (PBN) Implementation Plans details the framework within which the ICAO PBN concept will be implemented in the AFI Region for the foreseeable future. The Plan is guided by ICAO Doc. 9613 and relevant SARPs. The primary driver for this Plan is to maintain and increase safety, air traffic demand and capacity, and services and technology in consultation with relevant stakeholders. The AFI Region Plan also supports national and international interoperability and global harmonization.

2. BACKGROUND

2.1 The continuing growth of aviation places increasing demands on airspace capacity and emphasizes the need for the optimum utilization of the available airspace.

2.2 Growth in scheduled and GA aircraft is expected to increase point-to-point and direct routings. The increasing cost of fuel also presents a significant challenge to all segments of the aviation community. This anticipated growth and higher complexity of the air transportation system could result in increased flight delays, schedule disruptions, choke points, inefficient flight operations, and passenger inconvenience, particularly when unpredictable weather and other factors constrain airport capacity. Without improvements in system efficiency and workforce productivity, the aviation community and cost of operations will continue to increase. Upgrades to the air transportation system must leverage current and evolving capabilities in the near term, while building the foundation to address the future needs of the aviation community stakeholders. These circumstances can be partially alleviated by efficiencies in airspace and procedures through the implementation of PBN concepts.

2.3 In setting out requirements for navigation applications on specific routes or within a specific airspace, it is necessary to define requirements in a clear and concise manner. This is to ensure that both flight crew and ATC are aware of the on-board area navigation (RNAV) system capabilities and to ensure that the performance of the RNAV system is appropriate for the specific airspace requirements.

2.4 The early use of RNAV systems arose in a manner similar to conventional ground-based routes and procedures. A specific RNAV system was identified and its performance was evaluated through a combination of analysis and flight testing. For domestic operations the initial systems used VOR and DME for their position estimation. For oceanic operations, inertial navigation systems (INS) were employed.

2.5 These 'new' systems were developed, evaluated and certified. Airspace and obstacle clearance criteria were developed on the basis of available equipment performance. Requirements specifications were based upon available capabilities and, in some implementations, it was necessary to identify the individual models of equipment that could be operated within the airspace concerned.

2.6 Such prescriptive requirements result in delays to the introduction of new RNAV system capabilities and higher costs for maintaining appropriate certification. To avoid such prescriptive specifications of requirements, the PBN concept introduces an alternative method for defining equipage requirements by specification of the performance requirements. This is termed Performance Based Navigation (PBN).

3. PERFORMANCE BASED NAVIGATION

3.1 Performance based navigation (PBN) is a concept that encompasses both area navigation (RNAV) and required navigation performance (RNP) and revises the current RNP concept. Performance based navigation is increasingly seen as the most practical solution for regulating the expanding domain of navigation systems.

3.2 Under the traditional approach, each new technology is associated with a range of system-specific requirements for obstacle clearance, aircraft separation, operational aspects (e.g. arrival and approach procedures), aircrew operational training and training of air traffic controllers. However, this system-specific approach imposes an unnecessary effort and expense on States, airlines and air navigation services (ANS) providers.

3.3 Performance based navigation eliminates the need for redundant investment in developing criteria and in operational modifications and training. Rather than build an operation around a particular system, under performance based navigation the operation is defined according to the operational goals, and the available systems are then evaluated to determine whether they are supportive.

3.4 The advantage of this approach is that it provides clear, standardized operational approvals which enable harmonized and predictable flight paths which result in more efficient use of existing aircraft capabilities, as well as improved safety, greater airspace capacity, better fuel efficiency, and resolution of environmental issues.

3.5 The PBN concept specifies aircraft RNAV system performance requirements in terms of accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular Airspace Concept. The PBN concept represents a shift from sensor-based to performance-based navigation. Performance requirements are identified in navigation specifications, which also identify the choice of navigation sensors and equipment that may be used to meet the performance requirements. These navigation specifications are defined at a sufficient level of detail to facilitate global harmonization by providing specific implementation guidance for States and operators.

3.6 Under PBN, generic navigation requirements are defined based on the operational requirements. Operators are then able to evaluate options in respect of available technologies and navigation services that could allow these requirements to be met. The chosen solution would be the most cost effective for the operator, rather than a solution being imposed as part of the operational requirements. Technologies can evolve over time without requiring the operation itself to be revisited, as long as the requisite performance is provided by the RNAV system. As part of the future work of the ICAO it is anticipated that other means for meeting the requirements of the Navigation Specifications will be evaluated and may be included in the applicable Navigation Specifications, as appropriate.

3.7 ICAO's Performance Based Navigation (PBN) concept aims to ensure global standardisation of RNAV and RNP specifications and to limit the proliferation of navigation specifications in use world-wide. It is a new concept based on the use of Area Navigation (RNAV) systems. Significantly, it is a move from a limited statement of required performance accuracy to more extensive statements for required performance in terms of accuracy, integrity, continuity and availability, together with descriptions of how this performance is to be achieved in terms of aircraft and flight crew requirements.

4. PBN BENEFITS

4.1 PBN offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria. These include:

a) Reduces need to maintain sensor-specific routes and procedures, and their associated costs. For example, moving a single VOR ground facility can impact dozens of procedures, as that VOR can be used on routes, VOR approaches, as part of missed approaches, etc. Adding new sensor specific procedures will compound this cost, and the rapid growth in available navigation systems would soon make system-specific routes and procedures unaffordable.

b) Avoids need for development of sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive. The expansion of satellite navigation services is expected to contribute to the continued diversity of RNAV systems in different aircraft. The original Basic GNSS equipment is evolving due to the augmentations of SBAS, GBAS and GRAS, while the introduction of Galileo and modernization of GPS and GLONASS will further improve performance. The use of GNSS/inertial integration is expanding.

c) Allows more efficient use of airspace (route placement, fuel efficiency, noise abatement).

d) Clarifies the way in which RNAV systems are used.

e) Facilitates the operational approval process for operators by providing a limited set of navigation specifications intended for global use.

4.2 RNAV and RNP specifications facilitate more efficient design of airspace and procedures, which collectively result in improved safety, access, capacity, predictability, operational efficiency and environmental effects. Specifically, RNAV and RNP may:

a) Increase safety by using three-dimensional (3D) approach operations with course guidance to the runway, which reduce the risk of controlled flight into terrain.

b) Improve airport and airspace access in all weather conditions, and the ability to meet environmental and obstacle clearance constraints.

c) Enhance reliability and reduce delays by defining more precise terminal area procedures that feature parallel routes and environmentally optimized airspace corridors. Flight management systems (FMS) will then be poised to save operators time and money by managing climb, descent, and engine performance profiles more efficiently.

d) Improve efficiency and flexibility by increasing use of operator-preferred trajectories airspace-wide, at all altitudes. This will be particularly useful in maintaining schedule integrity when convective weather arises.

e) Reduce workload and improve productivity of air traffic controllers.

4.3 Performance-based navigation will enable the needed operational improvements by leveraging current and evolving aircraft capabilities in the near term that can be expanded to address the future needs of aviation stakeholders and service providers.

5. STAKEHOLDERS

5.1 Coordination is critical with the aviation community through collaborative forums. This will assist aviation stakeholders in understanding operational goals, determining requirements, and considering future investment strategies. This, in turn, enables the aviation stakeholders to focus on addressing future efficiency and capacity needs while maintaining or improving the safety of flight operations by leveraging advances in navigation capabilities on the flight deck. RNAV and RNP have reached a sufficient level of maturity and definition to be included in key plans and strategies, such as this Plan.

5.2 The stakeholders who will benefit from the concepts in the Plan include airspace operators, air traffic service providers, regulators and standards organizations. As driven by business needs, airlines and operators can use the AFI Region PBN Plan to plan future equipage and capability investments. Similarly, air traffic service providers can determine requirements for future automation systems, and more smoothly modernize ground infrastructure. Finally, regulators and standards organizations can anticipate and develop the key enabling criteria needed for implementation.

5.3 The AFI Region PBN Implementation Plan also supports other CAA and government-wide planning processes, working on several fronts to address the needs of the aviation community. This Plan is a work in progress and will be amended through collaborative AFI Region States, industry efforts and consultations that establish a joint aviation community/government/industry strategy for implementing performance-based navigation. Critical initiative strategies are required to accommodate the expected growth and complexity over the next two decades. These strategies have five key features:

a) Expediting the development of performance-based navigation criteria and standards.
b) Introducing airspace and procedure improvements in the near term.
c) Providing benefits to operators who have invested in existing and upcoming capabilities.
d) Establishing target dates for the introduction of navigation mandates for selected procedures and airspace, with an understanding that any mandate must be rationalized on the basis of benefits and costs.
e) Defining new concepts and applications of performance-based navigation for the mid term and Long term and building synergy and integration among other capabilities toward the realization of the AFI Region PBN goals.

6. STRATEGY

6.1 This Plan provides a high-level strategy for the evolution of navigation capabilities to be implemented in three timeframes: near term (2008-2012), mid term (2013-2016), and Long term (2017 and Beyond). The strategy rests upon two key navigation concepts; Area Navigation (RNAV) and Required Navigation Performance (RNP). It also encompasses instrument approaches, Standard Instrument Departure (SID) and Standard Terminal Arrival (STAR) operations, as well as en-route continental, oceanic and remote operations. The section on Long-term initiatives discusses integrated navigation, communication, surveillance and automation strategies.

6.2 To avoid proliferation of new navigation standards, States and other aviation stakeholders in the AFI region should communicate any new operational requirements with ICAO HQ, so that it can be taken into account by the PBN SG.

6.3 The Strategy for implementation of GNSS in the AFI Region for the purpose of supporting PBN implementation will be developed as Appendix to this Plan. It is to be noted that the AFI GNSS strategy, while supporting implementation of the AFI Regional PBN Implementation Plan, may include other aspects related to the Global Air Navigation Plan beyond the current PBN requirements. The GNSS strategy may however, not defeat the purpose and intent of the Plan and shall be guided by the provisions of APIRG.

7. NEAR TERM (2008-2012) MID TERM (2013-2016) AND LONG TERM (2016 AND BEYOND) KEY TASKS

7.1 The key tasks involved in the transition to performance-based navigation are:

a) Establish navigation service needs through the Long term that will guide infrastructure decisions and specify needs for navigation system infrastructure, and ensure funding for managing and transitioning these systems.
b) Define and adopt a national policy enabling additional benefits based on RNP and RNAV.
c) Identify operational and integration issues between navigation and surveillance, air-ground communications, and automation tools that maximize the benefits of RNP.
d) Support mixed operations throughout the term of this Plan, in particular considering navigation system variations during the near term until appropriate standards are developed and implemented.
e) To support Civil/Military coordination and develop the policies needed to accommodate the unique missions and capabilities of military aircraft operating in civil airspace.
f) Harmonize the evolution of capabilities for interoperability across airspace operations.

g) Increase emphasis on human factors, especially on training and procedures as operations increase reliance on appropriate use of flight deck systems.

h) Facilitate and advance environmental analysis efforts required to support the development of RNAV and RNP procedures.

i) Maintain consistent and harmonized global standards for RNAV and RNP operations.

8. NEAR-TERM (2008-2012)

8.1 Initiatives in the near-term focus on investments by operators in current and new aircraft acquisitions; in satellite-based navigation and conventional navigation infrastructure as well as AFI Region States investments. Key components include wide-scale RNAV implementation and the introduction of RNP for en route, terminal, and approach procedures.

8.2 The near-term strategy will also focus on expediting the implementation and proliferation of RNAV and RNP procedures. As demand for air travel continues at healthy levels, choke points will develop and delays at the major airports will continue to climb. RNAV and RNP procedures will help alleviate those problems. Continued introduction of RNAV and RNP procedures will not only provide benefits and savings to the operators but also encourage further equipage.

8.3 ANSPs as a matter of urgency must adapt new flight plan procedures to accommodate PBN operations. This particularly addresses fields 10 and 18.

8.4 Operators will need to plan to obtain operational approvals for the planned Navigation Specifications for this period. Operators shall also review Regional PBN Implementation Plans from other Regions to assess if there is a necessity for additional Operational approvals.

9. OCEANIC AND REMOTE OPERATIONS

9.1 To promote global harmonization, the AFI Region States continues to work closely with its international partners in implementing RNAV 10 and where operationally required RNP 4 by 2010. Safety assessment shall be undertaken to evaluate reduced oceanic and remote longitudinal/lateral separation minima between aircraft approved for RNAV 10 and RNP 4 operations. (NB. Deleted (-) in between route and number).

9.2 For Oceanic Remote Areas where high density traffic operations occur, a review of the airspace concept must be undertaken to convert to Continental En-Route Operation where sufficient, surveillance is available so as to allow RNAV 5 operations.

10. CONTINENTAL EN-ROUTE OPERATIONS

10.1 For airspace and corridors requiring structured routes for flow management, AFI Region States will review existing conventional and RNAV routes to transition to PBN RNAV 5 or where operationally required RNAV 2/1.

11. TERMINAL OPERATIONS

11.1 RNAV reduces conflict between traffic flows by consolidating flight tracks. RNAV 1/Basic RNP 1 SIDs and STARs improve safety, capacity, and flight efficiency and also lower communication errors.

11.2 AFI Region States will continue to plan, develop and implement RNAV 1 SIDs and STARs, at major airports and make associated changes in airspace design. In addition, AFI Region States will implement Basic RNP 1 SIDs and STARs. RNAV 1 will be implemented in airspace where there is sufficient surveillance coverage and Basic RNP-1 where there is no such coverage.

11.3 Where operationally feasible, States should develop operational concepts and requirements for continuous descent arrivals (CDAs) based on FMS Vertical Guidance and for applying time of arrival control based on RNAV and RNP procedures. This would reduce workload for pilots and controllers as well as increase fuel efficiency.

11.4 PBN SIDs and STARS would allow the following:

a) Reduction in controller-pilot communications;

b) Reduction of route lengths to meet environmental and fuel efficiency requirements;

c) Seamless transition from and to en-route entry/exit points;

d) Sequence departures to maximize benefits of RNAV and identify automation requirements for traffic flow management, sequencing tools, flight plan processing, and tower data entry activities.

12. APPROACH OPERATIONS

12.1 The application of RNP APCH is expected to be implemented in the maximum possible number of aerodromes. To facilitate a transitional period, conventional approach procedures and conventional navigation aids should be maintained for non PBN equipped aircraft during this term.

12.2 States should promote the use of APV Operations (Baro-VNAV or SBAS) to enhance safety of RNP Approaches and accessibility of runways.

12.3 The application of RNP AR Approach should be limited to selected runways where obvious operational benefits can be obtained due to the existence of significant obstacles.

12.4 RNP approaches include:

a) APV implemented at all instrument runways at major regional airports and all non-instrument runways serving aircraft weighing greater than 5,700kg.

13. SUMMARY TABLE NEAR-TERM (2008-2012)

Airspace	Nav. Specifications	Nav. Specifications where Operationally Required
En-Route Oceanic	RNAV 10	RNP 4
En-Route Remote Continental	RNAV 10	RNP 4
En-Route Continental	RNAV 5	RNAV 1/2
TMA Arrival/Departure	RNAV 1 in a surveillance environment	
	Basic RNP 1 in non-surveillance environment	
Approach	RNP APCH (with Baro-VNAV) OR RNP AR APCH if required	

14. NEAR TERM IMPLEMENTATION TARGETS

a) RNP APCH (with Bara-VNAV) in 30% of instrument runways by 2010 and 50% by 2012 and priority given to airports with operational benefits.

b) RNAV 1 SID/STAR for 30% of international airports by 2010 and 50% by 2012 and priority given to airports with RNP Approach.

c) Review existing conventional and RNAV routes to transition to PBN RNAV 5 or where operationally required RNAV 2/1 by 2012.

15 MID TERM (2013-2016) PRIORITIES

15.1 In the mid term, increasing demand for air travel will continue to challenge the efficiencies of the air traffic management system.

15.2 While the hub-and-spoke system will remain largely the same as today for major airline operations, the demand for more point-to-point service will create new markets and spur increases in low-cost carriers, air taxi operations, and on-demand services. Additionally, the emergence of VLJs is expected to create new markets in the general and business aviation sectors for personal, air taxi, and point-to-point passenger operations. Many airports will thus experience significant increases in unscheduled traffic. In addition, many destination airports that support scheduled air carrier traffic are forecast to grow and to experience congestion or delays if efforts to increase their capacity fall short. As a result, additional airspace flexibility will be necessary to accommodate not only the increasing growth, but also the increasing air traffic complexity.

15.3 The mid-term will leverage these increasing flight capabilities based on RNAV and RNP, with a commensurate increase in benefits such as fuel-efficient flight profiles, better access to airspace and airports, greater capacity, and reduced delay. These incentives, which should provide an advantage over non-RNP operations, will expedite propagation of equipage and the use of RNP procedures.

15.4 To achieve efficiency and capacity gains partially enabled by RNAV and RNP, the AFI Region States and aviation industry will pursue use of data communications (e.g., for controller-pilot communications) and enhanced surveillance functionality, e.g. ADS-Broadcast (ADS-B). Data communications will make it possible to issue complex clearances easily and with minimal errors. ADS-B will expand or augment surveillance coverage so that track spacing and longitudinal separation can be optimized where needed (e.g., in non-radar airspace). Initial capabilities for flights to receive and confirm 3D clearances and time of arrival control based on RNP will be demonstrated in the mid term. With data link implemented, flights will begin to transmit 4D trajectories (a set of points defined by latitude, longitude, altitude, and time.) Stakeholders must therefore develop concepts that leverage this capability.

16. OCEANIC EVOLUTION

16.1 In the mid term, AFI Region States will endeavor to work with international air traffic service providers to promote the application of RNP 10 and RNP 4 in additional sub-regions of the oceanic environment.

17. EN ROUTE EVOLUTION

17.1 The review of en-route airspace will be completed by 2016.

18. IMPLEMENTATION

18.1 By the end of the mid term other benefits of PBN will have been enabled, such as flexible procedures to manage the mix of faster and slower aircraft in congested airspace and use of less conservative PBN requirements.

19. Automation for RNAV and RNP Operations

19.1 By the end of the mid term enhanced en route automation will allow the assignment of RNAV and RNP routes based upon specific knowledge of an aircraft's RNP capabilities. En route automation will use collaborative routing tools to assign aircraft priority, since the automation system can rely upon the aircraft's ability to change a flight path and fly safely around problem areas. This functionality will enable the controller to recognize aircraft capability and to match the aircraft to dynamic routes or procedures, thereby helping appropriately equipped operators to maximize the predictability of their schedules.

19.2 Conflict prediction and resolution in most en route airspace must improve as airspace usage increases. Path repeatability achieved by RNAV and RNP operations will assist in achieving this goal. Mid-term automation tools will facilitate the introduction of RNP offsets and other forms of dynamic tracks for maximizing the capacity of airspace. By the end of the mid term, en route automation will have evolved to incorporate more accurate and frequent surveillance reports through ADS-B, and to execute problem prediction and conformance checks that enable offset manoeuvres and closer route spacing (e.g., for passing other aircraft and manoeuvring around weather).

20. TERMINAL EVOLUTION

20.1 During this period, either Basic RNP 1 or RNAV 1 will become a required capability for flights arriving and departing major airports based upon the needs of the airspace, such as the volume of traffic and complexity of operations. This will ensure the necessary throughput and access, as well as reduced controller workload, while maintaining safety standards.

20.2 With RNAV-1 operations as the predominant form of navigation in terminal areas by the end of the mid term, AFI Region States will have the option of removing conventional terminal procedures that are no longer expected to be used.

21. TERMINAL AUTOMATION

21.1 Terminal automation will be enhanced with tactical controller tools to manage complex merges in busy terminal areas. As data communications become available, the controller tools will apply knowledge of flights' estimates of time of arrival at upcoming waypoints, and altitude and speed constraints, to create efficient manoeuvres for optimal throughput.

21.2 Terminal automation will also sequence flights departing busy airports more efficiently than today. This capability will be enabled as a result of PBN and flow management tools. Flights arriving and departing busy terminal areas will follow automation-assigned PBN routes.

22. APPROACH EVOLUTION

22.1 In the mid term, implementation priorities for instrument approaches will still be based on RNP APCH and RNP AR APCH and full implementation is expected at the end of this term.

22.2 The introduction of the application of landing capability using GBAS (currently non PBN) is expected to guarantee a smooth transition towards high performance approach and landing capability.

23. Summary Table Mid-Term (2013-2016)

Airspace	**Nav. Specifications**	**Nav. Specifications where Operationally Required**
En-Route Oceanic	RNAV 10,	RNP 4
En-Route Remote Continental	RNAV 10,	RNP 4
En-Route Continental	RNAV 2, RNAV 5	RNAV 1
TMA Arrival/Departure	Expand RNAV 1, or RNP-1 application Mandate RNAV 1, or RNP-1 in high density TMAs	
Approach	Expand RNP APCH with (Baro-VNAV) and APV Expand RNP AR APCH where there are operational benefits	
(NB. Deleted (-) in between route and number).		

24. MID TERM IMPLEMENTATION TARGETS

a) RNP APCH (with Baro-VNAV) in 100% of instrument runways by 2016.
b) RNAV 1 or RNP 1 SID/STAR for 100% of international airports by 2016.
c) RNAV 1 or RNP 1 SID/STAR for 70% of busy domestic airports where there are operational benefits.
d) Implementation of additional RNAV/RNP Routes as required.

25. LONG TERM (2016 AND BEYOND): ACHIEVING A PERFORMANCE-BASED NAVIGATION SYSTEM

25.1 The Long-term environment will be characterized by continued growth in air travel and increased air traffic complexity.

25.2 No one solution or simple combination of solutions will address the inefficiencies, delays, and congestion anticipated to result from the growing demand for air transportation. Therefore, AFI Region States and key Stakeholders need an operational concept that exploits the full capability of the aircraft in this time frame.

26. LONG TERM KEY STRATEGIES (2017 AND BEYOND)

26.1 Airspace operations in the Long term will make maximum use of advanced flight deck automation that integrates CNS capabilities. RNP, RCP, and RSP standards will define these operations. Separation assurance will remain the principal task of air traffic management in this time frame. This task is expected to leverage a combination of aircraft and ground-based tools. Tools for conflict detection and resolution, and for flow management, will be enhanced significantly to handle increasing traffic levels and complexity in an efficient and strategic manner.

26.2 Strategic problem detection and resolution will result from better knowledge of aircraft position and intent, coupled with automated, ground-based problem resolution. In addition, pilot and air traffic controller workload will be lowered by substantially reducing voice communication of clearances, and furthermore using data communications for clearances to the flight deck. Workload will also decrease as the result of automated confirmation (via data communications) of flight intent from the flight deck to the ground automation.

26.3 With the necessary aircraft capabilities, procedures, and training in place, it will become possible in certain situations to delegate separation tasks to pilots and to flight deck systems that depict traffic and conflict resolutions.

Procedures for airborne separation assurance will reduce reliance on ground infrastructure and minimize controller workload. As an example, in IMC an aircraft could be instructed to follow a leading aircraft, keeping a certain distance. Once the pilot agreed, ATC would transfer responsibility for maintaining spacing (as is now done with visual approaches).

26.4 Performance-based operations will exploit aircraft capabilities for "electronic" visual acquisition of the external environment in low-visibility conditions, which may potentially increase runway capacity and decrease runway occupancy times.

26.5 Improved wake prediction and notification technologies may also assist in achieving increased runway capacity by reducing reliance on wake separation buffers.

26.6 System-wide information exchange will enable real-time data sharing of NAS constraints, airport and airspace capacity, and aircraft performance. Electronic data communications between the ATC automation and aircraft, achieved through data link, will become widespread—possibly even mandated in the busiest airspace and airports. The direct exchange of data between the ATC automation and the aircraft FMS will permit better strategic and tactical management of flight operations.

26.7 Aircraft will downlink to the ground-based system their position and intent data, as well as speed, weight, climb and descent rates, and wind or turbulence reports. The ATC automation will uplink clearances and other types of information, for example, weather, metering, choke points, and airspace use restrictions.

26.8 To ensure predictability and integrity of aircraft flight path, RNP will be mandated in busy en route and terminal airspace. RNAV operations will be required in all other airspace (except oceanic). Achieving standardized FMS functionalities and consistent levels of crew operation of the FMS is integral to the success of this Long-term strategy.

26.9 The most capable aircraft will meet requirements for low values of RNP (RNP 0.3 or lower en route). Flights by such aircraft are expected to benefit in terms of airport access, shortest routes during IMC or convective weather, and the ability to transit or avoid constrained airspace, resulting in greater efficiencies and fewer delays operating into and out of the busiest airports.

26.10 Enhanced ground-based automation and use of real-time flight intent will make time-based metering to terminal airspace a key feature of future flow management initiatives. This will improve the sequencing and spacing of flights and the efficiency of terminal operations.

26.11 Uniform use of RNP for arrivals and departures at busy airports will optimize management of traffic and merging streams. ATC will continue to maintain control over sequencing and separation; however, aircraft arriving and departing the busiest airports will require little controller intervention. Controllers will spend more time monitoring flows and will intervene only as needed, primarily when conflict prediction algorithms indicate a potential problem.

26.12 More detailed knowledge of meteorological conditions will enable better flight path conformance, including time of arrival control at key merge points. RNP will also improve management of terminal arrival and departure with seamless routing from the en route and transition segments to the runway threshold. Enhanced tools for surface movement will provide management capabilities that synchronize aircraft movement on the ground; for example, to coordinate taxiing aircraft across active runways and to improve the delivery of aircraft from the parking areas to the main taxiways.

27. SUMMARY OF LONG TERM KEY STRATEGIES (2017 AND BEYOND)

27.1 The key strategies for instituting performance-based operations employ an integrated set of solutions.

a) Airspace operations will take advantage of aircraft capabilities, i.e. aircraft equipped with data communications, integrated displays, and FMS.

b) Aircraft position and intent information directed to automated, ground-based ATM systems, strategic and tactical flight deck-based separation assurance in selected situations (problem detection and resolution).

c) Strategic and tactical flow management will improve through use of integrated airborne and ground information exchange.

d) Ground-based system knowledge of real-time aircraft intent with accurate aircraft position and trajectory information available through data link to ground automation.

e) Real-time sharing of National Air Space (NAS) flight demand and other information achieved via ground-based and air-ground communication between air traffic management and operations planning and dispatch.

f) Overall system responsiveness achieved through flexible routing and well-informed, distributed decision-making.

g) Systems ability to adapt rapidly to changing meteorological and airspace conditions.

h) System leverages through advanced navigation capabilities such as fixed radius transitions, RF legs, and RNP offsets.

i) Increased use of operator-preferred routing and dynamic airspace.

j) Increased collaboration between service providers and operators.

k) Operations at the busiest airports will be optimized through an integrated set of capabilities for managing pre-departure planning information, ground-based automation, and surface movement.

l) RNP-based arrival and departure structure for greater predictability.

m) Ground-based tactical merging capabilities in terminal airspace.

n) Integrated capabilities for surface movement optimization to synchronize aircraft movement on the ground. Improved meteorological and aircraft intent information shared via data link.

28. KEY RESEARCH AREAS

28.1 The aviation community must address several key research issues to apply these strategies effectively. These issues fall into several categories:

29. NAVIGATION

a) To what extent can lower RNP values be achieved and how can these be leveraged for increased flight efficiency and access benefits?

b) Under what circumstances RNAV should be mandated for arriving/departing satellite airports to enable conflict-free flows and optimal throughput in busy terminal areas?

30. FLIGHT DECK AUTOMATION

a) What FMS capabilities are required to enable the future concepts and applications?

b) How can performance-based communication and surveillance be leveraged in the flight deck to enable Long-term strategies such as real-time exchange of flight deck data?

31. AUTOMATION

a) To what extent can lateral or longitudinal separation assurance be fully automated, in particular on final approach during parallel operations?

b) To what extent can surface movement be automated, and what are the cost-benefit trade-offs associated with different levels of automation?

c) To what extent can conflict detection and resolution be automated for terminal ATC operations?

32. PROCEDURES

a) How can time of arrival control be applied effectively to maximize capacity of arrival or departure operations, in particular during challenging wind conditions?

b) In what situations is delegation of separation to the flight crews appropriate?

c) What level of onboard functionality is required for flight crews to accept separation responsibility within a manageable workload level?

33. AIRSPACE

a) What separation standards and procedures are needed to enable smoother transition between en route and terminal operations?

b) How can fuel-efficient procedures such as CDAs be accomplished in busy airspace?

34. POLICY

a) How is information security ensured as information exchange increases?

b) What are the policy and procedure implications for increased use of collaborative decision-making processes between the service provider and the operator?

34.1 The answers to these and other research questions are critical to achieving a performance-based airspace system. Lessons learned from the near-term and mid-term implementation of the Plan will help answer some of these questions. The aviation community will address others through further concept development, analysis, modeling, simulation, and field trials. As concepts mature and key solutions emerge, the community will develop more detailed implementation strategies and commitments.

35. PERIODIC REVIEW OF IMPLEMENTATION ACTIVITIES

35.1 Procedures to Modify the Regional Plan

35.2 Whenever a need is identified for a change to this document, the Request for Change (RFC) Form (to be developed) should be completed and submitted to the ICAO Regional Offices. The Regional Offices will collate RFCs for consideration by the PBN Task Force (ATM/SAR/AIS Sub-group of APIRG).

35.3 When an amendment has been agreed by a meeting of the PBN Task Force, a new version of the PBN Regional Plan will be prepared, with the changes marked by an "|" in the margin, and an endnote indicating the relevant RFC, to enable a reader to note the origin of the change. If the change is in a table cell, the outside edges of the table will be highlighted. Final approval for publication of an amendment to the PBN Regional Plan will be the responsibility of APIRG.

Glossary

ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ATC	Air Traffic Control
CDA	Continuous Descent Arrival
CNS	Communications, Navigation, Surveillance
EFVS	Enhanced Flight Visibility System
GA	General Aviation
GBAS	Ground-Based Augmentation System
GLS	GNSS Landing System
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical Guidance
NAS	National Airspace System
NAVAID	Navigation Aid
NM	Nautical Miles
PBN	Performance Based Navigation
RCP	Required Communications Performance
RF	Radius-to-Fix
RNAV	Area Navigation
RNP	Required Navigation Performance

Glossary

RNPSORSG	Required Navigation Performance and Special Operational Requirements Study Group
RSP	Required Surveillance Performance
SID	Standard Instrument Departure
STAR	Standard Terminal Arrival Route
VLJ	Very Light Jet
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System

AFI State PBN Plan Template

Performance Based Navigation (PBN) Implementation Plan

State X

Version 1

December 2008

ABOUT THE PLAN

Requirement for PBN

1.1 ICAO Assembly Resolution A36-23 calls for each State to develop a national PBN implementation plan by December 2009. This is a template developed by the ICAO PBN Programme as an example for use by the ICAO Contracting States as they each develop their own plans. This is only one example of what subjects a "National PBN Implementation Plan" that meets the intent of the resolution might include. States are encouraged to tailor their plans to meet their needs. This may mean that the "PBN Implementation Plan" is not stand-alone, but part of a broader plan for development of aviation in the State. This is a determination that only the State can make. It should be pointed out that if the State has not yet met its obligations with regard to conversion to the WGS-84 coordinate system, this should be included in the plan, as all RNAV and RNP operations are conducted solely with reference to WGS-84 coordinates.

Why is a PBN implementation plan or roadmap needed?

1.2 With RVSM implemented or soon to be implemented in most of the world, the main tool for optimising the airspace structure is the implementation of performance-based navigation (PBN), which will foster the necessary conditions for the utilization of RNAV and RNP capabilities by a significant portion of airspace users in the Regions and State s.

1.3 Current planning by the Regional Planning and Implementation Groups is based on the Air Navigation Plans and the Regional CNS/ATM Plans. Currently, these plans are mostly made up of tables that do not contain the necessary details for the implementation of each of the CNS and ATM elements. For this reason, the Regions will be developing Regional PBN implementation plans. The necessary concurrent and follow-on step is to develop national plans that implement the regional plans at the State level and address PBN implementation strategy at the national level.

1.4 In view of the need for detailed navigation planning, it was deemed advisable to call for preparation of a national PBN Implementation Plan by each State, to provide proper guidance and direction to the domestic air navigation service provider(s), airspace operators and users, regulating agency, as well as foreign operators who operate or plan to operate in the State. This guidance should address the planned evolution of navigation, as one of the key systems supporting air traffic management, and describe the RNAV and RNP navigation applications that should be implemented in at least the short and medium term, in the State.

What are the objectives of the PBN Implementation Plan or Roadmap?

1.5 The PBN implementation plan should meet the following strategic objectives:

a) provide a high-level strategy for the evolution of the navigation applications to be implemented in the State in the short term (2008-2012) and medium term (2013-2016). This strategy is based on the concepts of PBN, Area Navigation (RNAV) and Required Navigation Performance (RNP), which will be applied to aircraft operations involving instrument approaches, standard departure (SID) routes, standard arrival (STAR) routes, and ATS routes in oceanic and continental areas in accordance with the implementation goals in the Assembly resolution;

b) ensure that the implementation of the navigation portion of the CNS/ATM system is

based on clearly established operational requirements;

c) avoid unnecessarily imposing the mandate for multiple equipment on board or multiple systems on the ground;

d) avoid the need for multiple airworthiness and operational approvals for intra- and inter-regional operations;

e) prevent commercial interests from outdoing ATM operational requirements, generating unnecessary costs for the State as well as for airspace users.

What is the intent of the PBN Implementation Plan or Roadmap?

1.6 The PBN Implementation Plan should be developed by the State together with the stakeholders concerned and is intended to assist the main stakeholders of the aviation community plan a gradual transition to the RNAV and RNP concepts. The main stakeholders of the aviation community that benefit from this roadmap and should therefore be included in the development process are:

- Airspace operators and users
- Air navigation service providers
- Regulating agencies
- National and international organizations

1.7 The PBN Implementation Plan is intended to assist the main stakeholders of the aviation community plan the future transition and their investment strategies. For example, airlines and operators can use this roadmap to plan future equipage and additional navigation capability investments; air navigation service providers can plan a gradual transition for the evolving ground infrastructure. Regulating agencies will be able to anticipate and plan for the criteria that will be needed in the future as well as the future regulatory workload and associated training requirements for their work force.

What principles should be applied in development of the PBN Implementation Plan or Roadmap?

1.8 The implementation of PBN in the State should be based on the following principles:

a) Continued application of conventional air navigation procedures during the transition period, to guarantee availability by users that are not RNAV- and/or RNP-equipped;

b) Development of airspace concepts, applying airspace modelling tools as well as real-time and accelerated simulations, which identify the navigation applications that are compatible with the aforementioned concept;

c) Conduct of cost-benefit analyses to justify the implementation of the RNAV and/or RNP concepts in each particular airspace;

d) Conduct of pre- and post-implementation safety assessments to ensure the application and maintenance of the established target levels of safety.

e) Must not conflict with the regional PBN implementation plan.

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1. Introduction

The AFI Region Performance Based Navigation (PBN) Roadmap details the framework within which the ICAO PBN concept will be implemented in the AFI Region for the foreseeable future. The AFI Region Roadmap for PBN is guided by ICAO Doc. 9613 and relevant SARPs. The primary driver for this plan is to maintain and increase safety, air traffic demand and capacity, and services and technology in consultation with relevant stakeholders. The AFI Region Roadmap also supports national and international interoperability and global harmonization.

2. Background

The continuing growth of aviation places increasing demands on airspace capacity and emphasizes the need for the optimum utilization of the available airspace.

Growth in scheduled and General Aviation aircraft is expected to increase point-to-point and direct routings. The increasing cost of fuel also presents a significant challenge to all segments of the aviation community. This anticipated growth and higher complexity of the air transportation system could result in increased flight delays, schedule disruptions, choke points, inefficient flight operations, and passenger inconvenience, particularly when unpredictable weather and other factors constrain airport capacity. Without improvements in system efficiency and workforce productivity, the aviation community and cost of operations will continue to increase. Upgrades to the air transportation system must leverage current and evolving capabilities in the near term, while building the foundation to address the future needs of the aviation community stakeholders. These circumstances can be partially alleviated by efficiencies in airspace and procedures through the implementation of PBN concepts.

In setting out requirements for navigation applications on specific routes or within a specific airspace, it is necessary to define requirements in a clear and concise manner. This is to ensure that both flight crew and ATC are aware of the on-board area navigation (RNAV) system capabilities and to ensure that the performance of the RNAV system is appropriate for the specific airspace requirements.

The early use of RNAV systems arose in a manner similar to conventional ground-based routes and procedures. A specific RNAV system was identified and its performance was evaluated through a combination of analysis and flight testing. For domestic operations the initial systems used VOR and DME for their position estimation. For oceanic operations, inertial navigation systems (INS) were employed.

These ‘new’ systems were developed, evaluated and certified. Airspace and obstacle clearance criteria were developed on the basis of available equipment performance. Requirements specifications were based upon available capabilities and, in some implementations, it was necessary to identify the individual models of equipment that could be operated within the airspace concerned.

Such prescriptive requirements result in delays to the introduction of new RNAV system capabilities and higher costs for maintaining appropriate certification. To avoid such prescriptive specifications of requirements, the PBN concept introduces an alternative method for defining equipage requirements by specification of the performance requirements. This is termed Performance Based Navigation (PBN).

3. Performance Based Navigation (PBN)

Performance based navigation (PBN) is a concept that encompasses both area navigation (RNAV) and required navigation performance (RNP) and revises the current RNP concept. Performance based navigation is increasingly seen as the most practical solution for regulating the expanding domain of navigation systems.

Under the traditional approach, each new technology is associated with a range of system-specific requirements for obstacle clearance, aircraft separation, operational aspects (e.g. arrival and approach procedures), aircrew operational training and training of air traffic controllers. However, this system-specific approach imposes an unnecessary effort and expense on States, airlines and air navigation services (ANS) providers.

Performance based navigation eliminates the need for redundant investment in developing criteria and in operational modifications and training. Rather than build an operation around a particular system, under performance based navigation the operation is defined according to the operational goals, and the available systems are then evaluated to determine whether they are supportive.

The advantage of this approach is that it provides clear, standardized operational approvals which enables harmonized and predictable flight paths which result in more efficient use of existing aircraft capabilities, as well as improved safety, greater airspace capacity, better fuel efficiency, and resolution of environmental issues.

The PBN concept specifies aircraft RNAV system performance requirements in terms of accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular Airspace Concept. The PBN concept represents a shift from sensor-based to performance-based navigation. Performance requirements are identified in navigation specifications, which also identify the choice of navigation sensors and equipment that may be used to meet the performance requirements. These navigation specifications are defined at a sufficient level of detail to facilitate global harmonization by providing specific implementation guidance for States and operators.

Under PBN, generic navigation requirements are defined based on the operational requirements. Operators are then able to evaluate options in respect of available technologies and navigation services that could allow these requirements to be met. The chosen solution would be the most cost effective for the operator, rather than a solution being imposed as part of the operational requirements. Technologies can evolve over time without requiring the operation itself to be revisited, as long as the requisite performance is provided by the RNAV system. As part of the future work of the ICAO, it is anticipated that other means for meeting the requirements of the Navigation Specifications will be evaluated and may be included in the applicable Navigation Specifications, as appropriate.

ICAO’s Performance Based Navigation (PBN) concept aims to ensure global standardization of RNAV and RNP specifications and to limit the proliferation of navigation specifications in use worldwide. It is a new concept based on the use of Area Navigation (RNAV) systems. Significantly, it is a move from a limited State ment of required performance accuracy to more extensive State ments for required performance in terms of accuracy, integrity, continuity and availability, together with descriptions of how this performance is to be achieved in terms of aircraft and flight crew requirements.

3.1. RNAV Current status in [State X]

3.1.1 RNAV, ATS routes, SIDs, STARs and approaches

3.1.2 Fleet equipage

(To be developed by State)

3.2 Benefits of PBN and global harmonization

PBN offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria. These include:

- Reduces need to maintain sensor-specific routes and procedures, and their associated costs. For example, moving a single VOR ground facility can impact dozens of procedures, as that VOR can be used on routes, VOR approaches, as part of missed approaches, etc. Adding new sensor specific procedures will compound this cost, and the rapid growth in available navigation systems would soon make system-specific routes and procedures unaffordable.

- Avoids need for development of sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive.

- Allows more efficient use of airspace (route placement, fuel efficiency, noise abatement).

- Clarifies the way in which RNAV systems are used.

- Facilitates the operational approval process for operators by providing a limited set of navigation specifications intended for global use.

RNAV and RNP specifications facilitate more efficient design of airspace and procedures, which collectively result in improved safety, access, capacity, predictability, operational efficiency and environmental effects. Specifically, RNAV and RNP may:

- Increase safety by using three-dimensional (3D) approach operations with course guidance to the runway, which reduce the risk of controlled flight into terrain.

- Improve airport and airspace access in all weather conditions, and the ability to meet environmental and obstacle clearance constraints.

- Enhance reliability and reduce delays by defining more precise terminal area procedures that feature parallel routes and environmentally optimized airspace corridors. Flight management systems (FMS) will then be poised to save operators time and money by managing climb, descent, and engine performance profiles more efficiently.

- Improve efficiency and flexibility by increasing use of operator-preferred trajectories airspace-wide, at all altitudes. This will be particularly useful in maintaining schedule integrity when convective weather arises.

- Reduce workload and improve productivity of air traffic controllers.

Performance-based navigation will enable the needed operational improvements by leveraging current and evolving aircraft capabilities in the near term that can be expanded to address the future needs of aviation stakeholders and service providers.

3.3 Stakeholders

Coordination is critical with the aviation community through collaborative forums. This will assist aviation stakeholders in understanding operational goals, determining requirements, and considering future investment strategies. This, in turn, enables the aviation stakeholders to focus on addressing future efficiency and capacity needs while maintaining or improving the safety of flight operations by leveraging advances in navigation capabilities on the flight deck. RNAV and RNP have reached a sufficient level of maturity and definition to be included in key plans and strategies, such as this State PBN plan.

The stakeholders who will benefit from the concepts in this State PBN plan include airspace operators, air traffic service providers, regulators, and standards organizations. As driven by business needs, airlines and operators can use the State PBN roadmap to plan future equipage and capability investments. Similarly, air traffic service providers can determine requirements for future automation systems, and more smoothly modernize ground infrastructure. Finally, regulators and standards organizations can anticipate and develop the key enabling criteria needed for implementation.

This plan is a work in progress and will be amended through collaborative AFI Region States, industry efforts and consultations that establish a joint aviation community/government/industry strategy for implementing performance-based navigation. Critical initiative strategies are required to accommodate the expected growth and complexity over the next two decades. These strategies have five key features:

- Expediting the development of performance-based navigation criteria and standards.
- Introducing airspace and procedure improvements in the near term.
- Providing benefits to operators who have invested in existing and upcoming capabilities.
- Establishing target dates for the introduction of navigation mandates for selected procedures and airspace, with an understanding that any mandate must be rationalized on the basis of benefits and costs.
- Defining new concepts and applications of performance-based navigation for the mid term and Long term and building synergy and integration among other capabilities toward the realization of the AFI Region PBN goals.

4. Challenges

4.1 Increasing Demands

(To be developed by State)

4.1.1 En route

4.1.1.1 Oceanic and Remote Continental

(To be developed by State)

4.1.1.2 Continental

(To be developed by State)

4.1.2 Terminal Areas (Departures and Arrivals)

(To be developed by State)

4.1.3 Approach

(To be developed by State)

4.2 Efficient Operations

4.2.1 En route

4.2.1.1 Oceanic and remote continental

(To be developed by State)

4.2.1.2 Continental

(To be developed by State)

4.2.2 Terminal Areas

(To be developed by State)

4.2.3 Approach

(To be developed by State)

4.3 Environment

(To be developed by State)

5. Implementation strategy

This plan provides a high-level strategy for the evolution of navigation capabilities to be implemented in three timeframes: near term (2008-2012), mid term (2013-2016), and Long term (2017 and Beyond). The strategy rests upon two key navigation concepts: Area Navigation (RNAV) and Required Navigation Performance (RNP). It also encompasses instrument approaches, Standard Instrument Departure (SID) and Standard Terminal Arrival (STAR) operations, as well as en-route continental, oceanic and remote operations. The section on Long-term initiatives discusses integrated navigation, communication, surveillance and automation strategies.

To avoid proliferation of new navigation standards, [State X] and other aviation stakeholders in the AFI region should communicate any new operational requirements with ICAO HQ, so that it can be taken into account by the ICAO Study Group in charge of PBN.

Near Term (2008-2012) Mid Term (2013-2016) and Long Term (2017 and Beyond) Key Tasks

The key tasks involved in the transition to performance-based navigation are:

- Establish navigation service needs through the Long term that will guide infrastructure decisions and specify needs for navigation system infrastructure, and ensure funding for managing and transitioning these systems.
- Define and adopt a national policy enabling additional benefits based on RNP and RNAV.
- Identify operational and integration issues between navigation and surveillance, air-ground communications, and automation tools that maximize the benefits of RNP.
- Support mixed operations throughout the term of this Roadmap, in particular considering navigation system variations during the near term until appropriate standards are developed and implemented.
- To support Civil/Military coordination and develop the policies needed to accommodate the unique missions and capabilities of military aircraft operating in civil airspace.
- Harmonize the evolution of capabilities for interoperability across airspace operations.
- Increase emphasis on human factors, especially on training and procedures as operations increase reliance on appropriate use of flight deck systems.
- Facilitate and advance environmental analysis efforts required to support the development of RNAV and RNP procedures.
- Maintain consistent and harmonized global standards for RNAV and RNP operations.

5.2 Near term strategy (2008-2012)

In the near-term, initiatives focus on investments by operators in current and new aircraft acquisitions, in

satellite-based navigation and conventional navigation infrastructure as well as [States X] investments. Key components include wide-scale RNAV implementation and the introduction of RNP for en route, terminal, and approach procedures.

The near-term strategy will also focus on expediting the implementation and proliferation of RNAV and RNP procedures. As demand for air travel continues at healthy levels, choke points will develop and delays at the major airports will continue to climb. RNAV and RNP procedures will help alleviate those problems. Continued introduction of RNAV and RNP procedures will not only provide benefits and savings to the operators but also encourage further equipage.

ANSPs as a matter of urgency must adapt new flight plan procedures to accommodate PBN operations. This particularly addresses fields 10 and 18.

Operators will need to plan to obtain operational approvals for the planned Navigation Specifications for this period. Operators shall also review Regional PBN Implementation Plans from other Regions to assess if there is a necessity for additional Operational approvals.

5.2.1 En route

5.2.1.1 Oceanic and Remote Continental

To promote global harmonization, [State X] continues to work closely with its international partners in implementing RNAV–10 and where operationally required RNP-4 by 2010. Safety assessment shall be undertaken to evaluate reduced oceanic and remote longitudinal/lateral separation minima between aircraft approved for RNAV-10 and RNP-4 operations.

For Oceanic and Remote Areas where high density traffic operations occur, a review of the airspace concept must be undertaken to convert to Continental En-Route Operation where sufficient, surveillance is available so as to allow RNAV-5 operations.

5.2.1.2 Continental

For airspace and corridors requiring structured routes for flow management, [State X] will review existing conventional and RNAV routes to transition to PBN RNAV-5 or where operationally required RNAV-2/1.

5.2.2 Terminal Areas (Departures and Arrivals)

RNAV reduces conflict between traffic flows by consolidating flight tracks. RNAV-1/Basic RNP-1 SIDs and STARs improve safety, capacity, and flight efficiency and also lower communication errors.

[State X] will continue to plan, develop and implement RNAV-1 SIDs and STARs, at major airports and make associated changes in airspace design. In addition, [State X] will implement Basic RNP-1 SIDs and STARs. RNAV-1 will be implemented in airspace where there is sufficient surveillance coverage and Basic RNP-1 where there is no such coverage. Where operationally feasible, [State X] should develop operational concepts and requirements for continuous descent arrivals (CDAs) based on FMS Vertical Guidance and for applying time of arrival control based on RNAV and RNP procedures. This would reduce workload for pilots and controllers as well as increase fuel efficiency.

PBN SIDs and STARS would allow the following:

- Reduction in controller-pilot communications;
- Reduction of route lengths to meet environmental and fuel efficiency requirements;.
- Seamless transition from and to en-route entry/exit points;
- Sequence departures to maximize benefits of RNAV and identify automation requirements for traffic flow management, sequencing tools, flight plan processing, and tower data entry activities.

5.2.3 Approach

The application of RNP APCH is expected to be implemented in the maximum possible number of aerodromes. To facilitate a transitional period, conventional approach procedures and conventional navigation aids should be maintained for non PBN equipped aircraft during this term.

[State X] should promote the use of APV Operations (Baro-VNAV or SBAS) to enhance safety of RNP Approaches and accessibility of runways.

The application of RNP AR Approach should be limited to selected runways where obvious operational benefits can be obtained due to the existence of significant obstacles.

RNP approaches include:

- APV implemented at all instrument runways at major regional airports and all non-instrument runways serving aircraft weighing greater than 5,700kg.

5.2.5 Summary near term strategy

Airspace	**Nav. Specifications**	**Nav. Specifications where operationally required**
En-Route Oceanic	RNAV-10	RNP-4
En-Route Remote Continental	RNAV-10	RNP-4
En-Route Continental	RNAV-5	RNAV-1
TMA Arrival/Departure	RNAV-1 in a surveillance environment Basic RNP-1 in non-surveillance environment	
Approach	RNP APCH with Baro-VNAV or RNP AR APCH if required	

1.9 Implementation Targets

- RNP APCH (with Baro-VNAV) in 30% of instrument runways by 2010 and 50% by 2012 and priority given to airports with operational benefits
- RNAV-1 SID/STAR for 30% of international airports by 2010 and 50% by 2012 and priority given to airports with RNP Approach
- Review existing conventional and RNAV routes to transition to PBN RNAV-5 or where operationally required RNAV-2/1 by 2012.

5.3 Medium term strategy (2013-2016)

In the mid term, increasing demand for air travel will continue to challenge the efficiencies of the air traffic management system.

While the hub-and-spoke system will remain largely the same as today for major airline operations, the demand for more point-to-point service will create new markets and spur increases in low-cost carriers, air taxi operations, and on-demand services. Additionally, the emergence of VLJs is expected to create new markets in

the general and business aviation sectors for personal, air taxi, and point-to-point passenger operations. Many airports will thus experience significant increases in unscheduled traffic. In addition, many destination airports that support scheduled air carrier traffic are forecast to grow and to experience congestion or delays if efforts to increase their capacity fall short. As a result, additional airspace flexibility will be necessary to accommodate not only the increasing growth, but also the increasing air traffic complexity.

The mid term will leverage these increasing flight capabilities based on RNAV and RNP, with a commensurate increase in benefits such as fuel-efficient flight profiles, better access to airspace and airports, greater capacity, and reduced delay. These incentives, which should provide an advantage over non-RNP operations, will expedite propagation of equipage and the use of RNP procedures.

To achieve efficiency and capacity gains partially enabled by RNAV and RNP, [State X] and aviation industry will pursue use of data communications (e.g., for controller-pilot communications) and enhanced surveillance functionality, e.g. ADS-Broadcast (ADS-B). Data communications will make it possible to issue complex clearances easily and with minimal errors. ADS-B will expand or augment surveillance coverage so that track spacing and longitudinal separation can be optimized where needed (e.g., in non-radar airspace). Initial capabilities for flights to receive and confirm 3D clearances and time of arrival control based on RNP will be demonstrated in the mid term. With data link implemented, flights will begin to transmit 4D trajectories (a set of points defined by latitude, longitude, altitude, and time.) Stakeholders must therefore develop concepts that leverage this capability.

5.3.1 En route

5.3.1.1 Oceanic and Remote Continental

In the mid term, [State X] will endeavour to work with international air traffic service providers to promote the application of RNP 10 and RNP 4 in additional sub-regions of the oceanic environment.

5.3.1.2 Continental

The review of en-route airspace will be completed by 2016.

Implementation

By the end of the mid term other benefits of PBN will have been enabled, such as flexible procedures to manage the mix of faster and slower aircraft in congested airspace and use of less conservative PBN requirements.

Automation for RNAV and RNP Operations

By the end of the mid term enhanced en route automation will allow the assignment of RNAV and RNP routes based upon specific knowledge of an aircraft's RNP capabilities. En route automation will use collaborative routing tools to assign aircraft priority, since the automation system can rely upon the aircraft's ability to change a flight path and fly safely around problem areas. This functionality will enable the controller to recognize aircraft capability and to match the aircraft to dynamic routes or procedures, thereby helping appropriately equipped operators to maximize the predictability of their schedules.

Conflict prediction and resolution in most en route airspace must improve as airspace usage increases. Path repeatability achieved by RNAV and RNP operations will assist in achieving this goal. Mid-term automation tools will facilitate the introduction of RNP offsets and other forms of dynamic tracks for maximizing the capacity of airspace. By the end of the mid term, en route automation will have evolved to incorporate more accurate and frequent surveillance reports through ADS-B, and to execute problem prediction and conformance checks that enable offset manoeuvres and closer route spacing (e.g., for passing other aircraft and manoeuvring around weather).

5.3.2 Terminal Areas (Departures and Arrivals)

During this period, either Basic RNP-1 or RNAV-1 will become a required capability for flights arriving and departing major airports based upon the needs of the airspace, such as the volume of traffic and complexity of operations. This will ensure the necessary throughput and access, as well as reduced controller workload, while maintaining safety standards.

With RNAV-1 operations as the predominant form of navigation in terminal areas by the end of the mid term, AFI [State X] will have the option of removing conventional terminal procedures that are no longer expected to be used.

Terminal Automation

Terminal automation will be enhanced with tactical controller tools to manage complex merges in busy terminal areas. As data communications become available, the controller tools will apply knowledge of flights'

estimates of time of arrival at upcoming waypoints, and altitude and speed constraints, to create efficient maneuvres for optimal throughput.

Terminal automation will also sequence flights departing busy airports more efficiently than today. This capability will be enabled as a result of PBN and flow management tools. Flights arriving and departing busy terminal areas will follow automation-assigned PBN routes.

5.3.3 Approach

In the mid term, implementation priorities for instrument approaches will still be based on RNP APCH and RNP AR APCH and full implementation is expected at the end of this term.

The introduction of the application of landing capability, using GBAS (currently non PBN) is expected to guarantee a smooth transition towards high performance approach and landing capability.

5.3.4 Helicopter operations (To be developed by State)

5.3.5 Medium term strategy summary

Airspace	Nav. Specifications	Nav. Specifications where operationally required
En-Route Oceanic	RNAV-10,	RNP-4
En-Route Remote Continental	RNAV-10,	RNP-4
En-Route Continental	RNAV-2, RNAV-5	RNAV-1
TMA Arrival/Departure	Expand RNAV-1, or basic RNP-1 application Mandate RNAV-1, or basic RNP-1	
Approach	Expand RNP APCH with (Baro-VNAV) and APV Expand RNP AR APCH where there are operational benefits	

Implementation Targets

- RNP APCH (with Baro-VNAV) or APV in 100% of instrument runways by 2016
- RNAV-1 or RNP-1 SID/STAR for 100% of international airports by 2016
- RNAV-1 or RNP-1 SID/STAR for 70% of busy domestic airports where there are operational benefits

- Implementation of additional RNAV/RNP Routes as required

5.4 Long term strategy (2017 and beyond)

The Long-term environment will be characterized by continued growth in air travel and increased air traffic complexity.

No one solution or simple combination of solutions will address the inefficiencies, delays, and congestion anticipated to result from the growing demand for air transportation. Therefore, [State X] and key Stakeholders need an operational concept that exploits the full capability of the aircraft in this time frame.

5.4.1 Long Term Key Strategies (2017 and Beyond)

Airspace operations in the Long term will make maximum use of advanced flight deck automation that integrates CNS capabilities. RNP, RCP, and RSP standards will define these operations. Separation assurance will remain the principal task of air traffic management in this time frame. This task is expected to leverage a combination of aircraft and ground-based tools. Tools for conflict detection and resolution, and for flow management, will be enhanced significantly to handle increasing traffic levels and complexity in an efficient and strategic manner.

Strategic problem detection and resolution will result from better knowledge of aircraft position and intent, coupled with automated, ground-based problem resolution. In addition, pilot and air traffic controller workload will be lowered by substantially reducing voice communication of clearances, and furthermore using data communications for clearances to the flight deck. Workload will also decrease as the result of automated confirmation (via data communications) of flight intent from the flight deck to the ground automation.

With the necessary aircraft capabilities, procedures, and training in place, it will become possible in certain situations to delegate separation tasks to pilots and to flight deck systems that depict traffic and conflict resolutions. Procedures for airborne separation assurance will reduce reliance on ground infrastructure and minimize controller workload. As an example, in IMC an aircraft could be instructed to follow a leading aircraft, keeping a certain distance. Once the pilot agreed, ATC would transfer responsibility for maintaining spacing (as is now done with visual approaches).

Performance-based operations will exploit aircraft capabilities for “electronic” visual acquisition of the external environment in low-visibility conditions, which may potentially increase runway capacity and decrease runway occupancy times.

Improved wake prediction and notification technologies may also assist in achieving increased runway capacity by reducing reliance on wake separation buffers.

System-wide information exchange will enable real-time data sharing of NAS constraints, airport and airspace capacity, and aircraft performance. Electronic data communications between the ATC automation and aircraft, achieved through data link, will become widespread—possibly even mandated in the busiest airspace and airports. The direct exchange of data between the ATC automation and the aircraft FMS will permit better strategic and tactical management of flight operations.

Aircraft will downlink to the ground-based system their position and intent data, as well as speed, weight, climb and descent rates, and wind or turbulence reports. The ATC automation will uplink clearances and other types of information, for example, weather, metering, choke points, and airspace use restrictions.

To ensure predictability and integrity of aircraft flight path, RNP will be mandated in busy en route and terminal airspace. RNAV operations will be required in all other airspace (except oceanic). Achieving standardized FMS functionalities and consistent levels of crew operation of the FMS is integral to the success of this Long-term strategy.

The most capable aircraft will meet requirements for low values of RNP (RNP 0.3 or lower en route). Flights by such aircraft are expected to benefit in terms of airport access, shortest routes during IMC or convective

weather, and the ability to transit or avoid constrained airspace, resulting in greater efficiencies and fewer delays operating into and out of the busiest airports.

Enhanced ground-based automation and use of real-time flight intent will make time-based metering to terminal airspace a key feature of future flow management initiatives. This will improve the sequencing and spacing of flights and the efficiency of terminal operations.

Uniform use of RNP for arrivals and departures at busy airports will optimize management of traffic and merging streams. ATC will continue to maintain control over sequencing and separation; however, aircraft arriving and departing the busiest airports will require little controller intervention. Controllers will spend more time monitoring flows and will intervene only as needed, primarily when conflict prediction algorithms indicate a potential problem.

More detailed knowledge of meteorological conditions will enable better flight path conformance, including time of arrival control at key merge points. RNP will also improve management of terminal arrival and departure with seamless routing from the en route and transition segments to the runway threshold. Enhanced tools for surface movement will provide management capabilities that synchronize aircraft movement on the ground; for example, to coordinate taxiing aircraft across active runways and to improve the delivery of aircraft from the parking areas to the main taxiways.

5.4.2 Summary of Long Term Key Strategies (2017 and Beyond)

The key strategies for instituting performance-based operations employ an integrated set of solutions.

- Airspace operations will take advantage of aircraft capabilities, i.e. aircraft equipped with data communications, integrated displays, and FMS.
- Aircraft position and intent information directed to automated, ground-based ATM systems, strategic and tactical flight deck-based separation assurance in selected situations (problem detection and resolution).
- Strategic and tactical flow management will improve through use of integrated airborne and ground information exchange.

- Ground-based system knowledge of real-time aircraft intent with accurate aircraft position and trajectory information available through data link to ground automation.
- Real-time sharing of National Air Space (NAS) flight demand and other information achieved via ground-based and air-ground communication between air traffic management and operations planning and dispatch.
- Overall system responsiveness achieved through flexible routing and well-informed, distributed decision-making.
- Systems ability to adapt rapidly to changing meteorological and airspace conditions.
- System leverages through advanced navigation capabilities such as fixed radius transitions, RF legs, and RNP offsets.
- Increased use of operator-preferred routing and dynamic airspace.
- Increased collaboration between service providers and operators.

Operations at the busiest airports will be optimized through an integrated set of capabilities for managing pre-departure planning information, ground-based automation, and surface movement.

- RNP-based arrival and departure structure for greater predictability.
- Ground-based tactical merging capabilities in terminal airspace.
- Integrated capabilities for surface movement optimization to synchronize aircraft movement on the ground. Improved meteorological and aircraft intent information shared via data link.

5.4.3 Key Research Areas

The aviation community must address several key research issues to apply these strategies effectively. These issues fall into several categories:

Navigation

- To what extent can lower RNP values be achieved and how can these be leveraged for increased flight efficiency and access benefits?
- Under what circumstances RNAV should be mandated for arriving/departing satellite airports to enable conflict-free flows and optimal throughput in busy terminal areas?

Flight Deck Automation

- What FMS capabilities are required to enable the future concepts and applications?
- How can performance-based communication and surveillance be leveraged in the flight deck to enable Long-term strategies such as real-time exchange of flight deck data?

Automation

- To what extent can lateral or longitudinal separation assurance be fully automated, in particular on final approach during parallel operations?
- To what extent can surface movement be automated, and what are the cost-benefit trade-offs associated with different levels of automation?
- To what extent can conflict detection and resolution be automated for terminal ATC operations?

Procedures

- How can time of arrival control be applied effectively to maximize capacity of arrival or departure operations, in particular during challenging wind conditions?
- In what situations is delegation of separation to the flight crews appropriate?
- What level of onboard functionality is required for flight crews to accept separation responsibility within a manageable workload level?
-

Airspace

- To what extent can airspace be configured dynamically on the basis of predicted traffic demand and other factors?
- What separation standards and procedures are needed to enable smoother transition between en route and terminal operations?
- How can fuel-efficient procedures such as CDAs be accomplished in busy airspace?

Glossary

3D	Three-Dimensional
4D	Four-Dimensional
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ATC	Air Traffic Control
CDA	Continuous Descent Arrival
CNS	Communications, Navigation, Surveillance
EFVS	Enhanced Flight Visibility System
GA	General Aviation
GBAS	Ground-Based Augmentation System
GLS	GNSS (Global Navigation Satellite System) Landing System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System

ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical Guidance
NAS	National Airspace System
NAVAID	Navigation Aid
NM	Nautical Miles
PBN	Performance Based Navigation
RCP	Required Communications Performance
RF	Radius-to-Fix
RNAV	Area Navigation
RNP	Required Navigation Performance

RNPSORSG	Required Navigation Performance and Special Operational Requirements Study Group
RSP	Required Surveillance Performance
SAAAR	Special Aircraft and Aircrew Authorization Required
SID	Standard Instrument Departure
STAR	Standard Instrument Arrival
VLJ	Very Light Jet
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System

Appendix A – Oceanic and Remote Continental implementation schedule by area or city pair (to be developed by State)

Appendix B – En route continental implementation schedule by area or city pair (to be developed by State)

Appendix C – Terminal area and approach implementation schedule by aerodrome (to be developed by State)

APPENDIX 3.4F

TERMS OF REFERENCE AND WORK PROGRAMME FOR THE AFI PBN/GNSS TASK FORCE

1. TERMS OF REFERENCE

a) Carry out specific studies in support of the implementation of Performance Based Navigation (PBN) in the AFI Region, according to the ICAO Strategic Objectives and Global Plan Initiative (GPI) 5 and related GPIs (GPIs 7, 10, 11, 12, 20, 21).

b) Identify other issues/action items arising from the work of ICAO or for consideration by ICAO in order to facilitate regional and global harmonization of existing applications as well as future implementation of Performance Based Navigation operations.

c) Determine and recommend, on the basis of the studies, the PBN strategy and Implementation Plan for the AFI Region, based on the ICAO PBN Implementation goals as reflected in assembly resolution 36-23.

d) Assist States that may require support in the implementation of PBN.

2. WORK PROGRAMME

Activity/Task	Assigned person/organ	Target date
a) Study and assess the Regional RNAV and RNP requirements. b) Initially focus assistance to States that may require support on development of the State PBN implementation plans. c) Identify priority routes and terminal areas where RNAV and RNP should be implemented. d) Identify priority runways for Approach Procedures with Vertical Guidance (APV) to be implemented based on the ICAO RNP APCH navigation specification (APV). e) Develop an amendment proposal to the AFI Regional Supplementary Procedures concerning the implementation of PBN in the Region. f) Identify guidance material and training needs. g) Follow up on the developments in ICAO affecting the Global Plan and PBN in particular, in order to update the Regional plans accordingly. h) Coordinate with other ICAO Regions as necessary to address implementation interface issues. i) Undertake other functions relevant to implementation of PBN as assigned by APIRG. j) Develop and update (as necessary) the Regional PBN Implementation Strategy and Plan. k) Develop the PBN performance objectives and related action plans for en-route, terminal and approach phases of flight.		

Activity/Task	Assigned person/organ	Target date
l) Report to APIRG through its ATM and CNS Sub-groups.		

3. THE TASK FORCE SHALL BE GUIDED BY THE FOLLOWING PRINCIPLES

1. The Task Force shall in its work be guided by the following principles:

   a) Implementation of PBN shall follow the ICAO PBN goals and milestones.
   b) Avoid undue equipage of multiple on board equipment and/or ground-based systems;
   c) Avoid the need for multiple airworthiness and operational approvals for intra- and interregional operations;
   d) Continue application of conventional air navigation procedures during the transition period, to guarantee the operations by users that are not RNAV- and/or RNP-equipped;
   e) The first regional PBN Implementation Strategy and Plan should address the short term (2008-2012), medium term (2013-2016) and take into account long term global planning issues;
   f) Cognizance that the primary objective of ICAO is that of ensuring the safe and efficient performance of the global Air Navigation System, ensure that pre- and post-implementation safety assessments will be conducted to ensure the application and maintenance of the established target levels of safety;
   g) Take into account the introduction of new technologies, encourage implementation and development in GNSS;
   h) Coordinated implementation with other relevant Regional Plans;
   i) Apply ICAO guidance material and information as may be applicable to the Region to facilitate the implementation of PBN.

4. COMPOSITION OF THE TASK FORCE:

States: AFI States and States having territories in the AFI Region
(Meeting to decide on a concise list, preferably not exceeding 15).

Note: *States are requested to include in their delegations: PBN experts, GNSS (CNS) experts, as well as official experts involved in the PBN approval process of aircraft operators.*

Organizations: ASECNA, IATA, IFALPA, IFATCA and ESA. Additional representatives from International/Regional Organizations may be invited when required.

APPENDIX 3.4G

TERMS OF REFERENCE

PBN ROUTE NETWORK DEVELOPMENT WORKING GROUP (PRND WG*)*

A) TERMS OF REFERENCE

1. Review the AFI ATS route network in order to assess its capacity and constraints;

2. Based on the airspace user needs and in coordination with stakeholders (States, International Organizations, user representative organizations and other ICAO Regions), AFI Regional Performance Objectives, the Regional PBN Implementation Plan, as well as related ICAO provisions and guidance material, identify requirements and improvements for achieving and maintaining an efficient route network in the AFI Region;

3. Propose a strategy and prioritized plan for development of improvements to the route network, highlighting:

    - areas that require immediate attention
    - interface issues with adjacent ICAO Regions
    - the implementation of PBN

4. Develop a working depository for route proposals that will be used as a dynamic reference document for ongoing discussions on routes under development/modification. In this respect, the TF should explore the utility that can be realized from the route catalogue concept/ATS route database;

5. Engage the necessary parties regarding routes under consideration;

6. In coordination with the ARMA, carry out safety assessment of the proposed changes to the ATS route network;

7. After adoption by the ATM/AIM/SAR SG, or as delegated by the same, submit completed route proposals for amendment of the Basic ANP Table ATS-1, to the AFI Regional Offices for processing;

8. Assess the role that may contributed by a special project for a comprehensive review of the AFI ATS route network as envisaged by APIRG 15 and make recommendations, with detailed project description if the role a project is confirmed.

B) COMPOSITION

The PRND Working Group will comprise of:

a) experts nominated by AFI Provider States from both civil aviation entities and military authorities;

b) ARMA, IATA, IFALPA and IFATCA;

c) representatives from adjacent States and concerned international organizations (on ad-hoc basis).

C) WORKING ARRANGEMENTS

The Working Group shall:

a) report to the ATM/AIM/SAR SG Sub Group through the PBN TF (or its successor); and

b) meet as required and at least once a year;

c) use electronic communication between members as much as feasible.

APPENDIX 3.4H

TERMS OF REFERENCE

NATIONAL PERFORMANCE-BASED NAVIGATION PROGRAMME MANAGERS (NPPMS)

NATIONAL PBN PROGRAMME MANAGERS (NPPMS):

1) Are responsible for ensuring that proper mechanisms are put in place for the effective implementation of PBN, including:

   - Establishment of a National PBN Implementation Group.
   - Development of a National PBN Implementation Plan.

2) Act as Focal Points and Coordinators of the activities of States' PBN Implementation Groups, including but not limited to the following:

   a) Study of PBN operations technology and the Global and Regional guidance material;
   b) Review of the regional air navigation plan and take account of regional ATM objectives and regional ATM requirements in terms of communication, navigation and surveillance elements;
   c) Coordination with adjacent States;
   d) Consistent with ICAO's regional air navigation plan, identification of the principal objectives of the State for implementation of CNS/ATM systems;
   e) Review of the current and planned infrastructures in terms of airports, airspace, air routes, communications, navigation and surveillance elements;
   f) Assessment of the current traffic density and carry out air traffic forecasts with emphasis on aircraft movements and regional flows of traffic;
   g) Evaluation of the current ATM system, focusing on route structure, separation standards, equipage, maintenance, operations and procedures in order to identify any weaknesses;
   h) As a result of gap analyses, development of functional requirements that would result in improvements/benefits both in the short term and the long term, keeping in view users' requirements;
   i) Establishment of PBN operational objectives and supporting CNS elements that are most suitable for the scenario, taking into account the planning situation in adjacent States, the development status of ICAO guidance material (SARPs, PBN Manual, etc.) and the regional approach to air navigation planning;
   j) Establishment of implementation time lines for new systems and decommissioning time lines for current ground systems that are not required as a result of the transition to PBN operations;
   k) Carrying out of cost-benefit analyses to determine the most appropriate plan, using the iteration process;
   l) Harmonization with the regional plan;
   m) Formalization and maintenance of the planning document; and initiation of actions for the implementation of PBN.

3) Ensure that to the extent practical, the composition of the National PBN Implementation Group should include members from participating organizations, such as:

   a) The national administration;
   b) The regulating agency;

   c) ATM service provider;
   d) Airspace users;
   e) The airport authority;
   f) Research and development organizations;
   g) Military authorities, including air defense; and
   h) Other relevant bodies.

4) Participate in, coordinate and provide support to, APIRG PBN Implementation Task Force meetings and assigned tasks;

5) Facilitate the State's expeditious communication with ICAO with regard to PBN implementation;

6) Ensure that updates regarding progress in the implementation of PBN are provided to ICAO.

APPENDIX 3.4 I

AORRA GATES AND TRANSITIONS

Accra FIR

TYE VOR to:
EBUSO-GUGIG-EBTON-VABES-NANAK-RATIL-EDORO
EBUSO-GUGIG-EBTON-VABES-NANAK-RATIL-GANUM
EBUSO-GUGIG-EBTON-VABES-NANAK-RATIL-OPUGA
DIBSI-MEPAL-BUBRO-KINTO

Accra/Abidjan FIRs

ACC VOR to:

SIBEG-DIBTA- WP14(N02 59 06.11W002 59 37.46) - WP6(N015527.00W0040837.98) - WP31(S000000.00 W005 00 00.00)
SIBEG-DIBTA- WP14(N02 59 06.11W002 59 37.46) - WP6(N01 55 27.00 W004 08 37.98) - WP32(S000000.00 W006 00 00.00)
SIBEG-DIBTA- WP14(N02 59 06.11W002 59 37.46) - WP6(N01 55 27.00 W004 08 37.98) - WP33(S000000.00 W007 00 00.00)

Abidjan/Roberts FIRs

AD VOR to:

IPEKA - ARLEM
WP9 (N02 11 52.08 W007 22 27.18) - WP3 (N01 09 27.00 W008 31 55.98)
WP15 (N02 57 40.020 W007 23 18.36) - WP5 (N01 44 10.02 W009 07 58.02)
WP18 (N03 30 49.74 W007 23 55.5) - WP10 (N02 18 52.98-W009 43 55.98)
DEVLI - WP12 (N02 53 18.00 W010 19 58.98)
WP21 (N04 23 21.60 W007 24 54.36) - WP17 (N03 28 15.00 W010 56 03.00)

Roberts FIR

ROB VOR to:

WP17 (N03 28 15.00 W010 56 03.00)
WP20 (N04 02 54.00 W011 32 10.98)
TUROT
WP22 (N05 12 07.02 W012 44 34.98)
WP23 (N05 46 40.98 W013 20 52.98)
WP24 (N06 21 12.00 W013 57 16.02)

LGI VOR to:

WP24 (N06 21 12.00 W013 57 16.02)
TINIS
WP25 (N07 30 07.02 W015 10 16.02)
WP26 (N08 04 30.00 W015 46 54.00)
WP27 (N08 38 49.98 W016 23 39.00)

Roberts/Dakar FIRs

BIS VOR to:

WP27 (N08 38 49.98 W016 23 39.00)
WP28 (N09 13 06.00 W017 00 30.00)
WP29 (N09 47 18.00 W017 37 28.98)

WP7 (N10 21 27.00 W018 14 31.80)
WP8 (N10 55 31.02 W018 51 49.02)

Dakar FIR

DKR VOR to:
WP8 (N10 55 31.02 W018 51 49.02)
TAROT

Brazzaville FIR

DLA VOR to:
KINTO or KOPOX-KINTO
ILDOT or EBULI-INOSA-ILDOT

LV VOR to:
WP34 (S01 30 00.00 E006 35 00.00)
WP35 (S02 00 00.00 E006 48 07.56)

Luanda FIR

BUDEL - ONTAR
VNA – WP36 (S08 49 33.5 E011 13 53.2)
VNA – WP37 (S11 50 30.4 E011 27 59.5)

APPENDIX 3.4J

AFI Flight Plan Transition Task Force
Terms of Reference

Terms of reference:

1) Conduct a comprehensive review of Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, effective 15 November 2012) in order to identify, study and address implementation complexities arising from the adoption of amended PANS ATM Chapter 4, Chapter 11, Appendix 2 and Appendix 3 provisions relating to the ICAO Flight Plan and associated ATS Message formats; and

2) Collect and analyze information on the status of AFI ANSP flight plan processing systems including ongoing upgrades to such systems;

3) On the basis of the above, and in accordance with relevant additional ICAO provisions and the SP AFI RAN Re. 6/5, develop a coordinated AFI transition strategy and plan with associated timelines to enable the streamlined coordinated implementation of the amended Flight Plan and ATS Message provisions contained in Amendment 1 to the Fifteenth Edition of the PANS ATM.

Considerations:

In addressing these terms of reference, the Task Force should consider, *inter alia*, the following aspects:

a) Likelihood that changes within the systems in the AFI Region could differ from systems in other ICAO Regions and accordingly provide recommendable Regional action with global goals
b) Inter and intra regional issues;
c) Impact on inter-system co-ordination messaging (e.g. ATS AIDC)
d) Contingency arrangements for States that cannot comply by the due date;
- How to handle staged implementations by States and/or airspace users,
- Expectations across ANSPs with different implementation dates, and

e) Systems that transition early will need to be capable of handling both new and current instruction sets.
f) Inter-system exchanges need to take account of differing automation capabilities in order to avoid excessive message rejection;
g) Establishment of an Information Management system to track implementation timelines for various States/systems;
h) Management of Repetitive Flight Plans;
i) Implications for presentation formats, including paper & electronic flight progress strips;
j) Impacts to users (flight planning systems etc); and

k) Appropriately timed withdrawal of existing State or Regional specific requirements to ensure consistency with new instruction set
l) Existing ICAO guidance material

Membership

Core members:

- ATM specialist and systems engineering experts (CNS) from AFI States and ANSPs with existing and planned automated flight plan processing systems
- ASECNA, IATA, IFALPA, IFATCA,

Note:
Algeria, Kenya, Senegal, South Africa and Tanzania have offered their expertise as core members.

Other members

AFI States and ANSPs other than the above
Expertise from States, ANSPs outside the AFI Region that may be invited by the Task Force based on beneficial inputs they may contribute

Note:
Industry participation including systems providers, if required, is to be included under responsibility of State delegations

Reporting

The Task Force shall report progress to the ATS/AIS/SAR Sub-Group. However, owing to the limited time available for planning and in some cases acquisition of systems, valuable planning information emanating from the Task Force may, after coordination with Secretary of APIRG be provided to States without waiting for forthcoming meetings of the AFI ATS/AIS/SAR Sub-Group.

APPENDIX 3.4K

CONTINGENCY PLAN DEVELOPMENT TEMPLATE

ATM REGIONAL CONTINGENCY PLAN FOR CTA/UTA/FIR

OBJECTIVE: This contingency plan contains arrangements to ensure the continued safety of air navigation in the event of partially or total disruption of air traffic services (ATS) and is related to ICAO Annex 11- *Air Traffic Services* Chapter 2, paragraph 2.28. The contingency plan should be designed to provide alternative routes, using existing airways in most cases, which will allow aircraft operators to fly trough or avoid airspace within the (*XXX*) CTA/UTA/FIR.

AIR TRAFFIC MANAGEMENT

ATS Responsibilities

Tactical ATC considerations during periods of overloading may require re-assignment of routes or portions thereof.

Alternative routes should be designed to maximize the use of existing ATS route structures and communication, navigation and surveillance services.

In the event that ATS cannot be provided within the (*XXX*) CTA/UTA/FIR, the Civil Aviation Authority shall publish the corresponding NOTAM indicating the following:

a) Time and date of the beginning of the contingency measures;

b) Airspace available for landing and overflying traffic and airspace to be avoided;

c) Details of the facilities and services available or not available and any limits on ATS provision (e.g., ACC, APP, TWR and FIS), including an expected date of restoration of services if available;

d) Information on the provisions made for alternative services;

e) ATS contingency routes;

f) Procedures to be followed by neighbouring ATS units;

g) Procedures to be followed by pilots; and

h) Any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

In the event that the CAA is unable to issue the NOTAM, the (alternate) CTA/UTA/FIR will take action to issue the NOTAM of closure airspace upon notification by corresponding CAA or the ICAO ESAF Regional Office.

Separation

Separation criteria will be applied in accordance with the *Procedures for Air Navigation Services-Air Traffic Management* (PANS-ATM, Doc 4444) and the *Regional Supplementary Procedures* (Doc 7030).

Level Restrictions

Where possible, aircraft on long-haul international flights shall be given priority with respect to cruising levels.

Other measures

Other measures related to the closure of airspace and the implementation of the contingency scheme with the (*XXX*) CTA/UTA/FIR may be taken as follows:

a) Suspension of all VFR operations;

b) Delay or suspension of general aviation IFR operations; and

c) Delay or suspension of commercial IFR operations.

TRANSITION TO CONTINGENCY SCHEME

During times of uncertainty when airspace closures seem possible, aircraft operators should be prepared for a possible change in routing while en-route, familiarization of the alternative routes outlined in the contingency scheme as well as what may be promulgated by a State via NOTAM or AIP.

In the event of airspace closure that has not been promulgated, ATC should, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and to stand by for further instructions.

ATS providers should recognize that when closures of airspace or airports are promulgated, individual airlines might have different company requirements as to their alternative routings. ATC should be alert to respond to any request by aircraft and react commensurate with safety.

TRANSFER OF CONTROL AND COORDINATION

The transfer of control and communication should be at the common FIR boundary between ATS units unless there is mutual agreement between adjacent ATS units. ATS providers should

also review current coordination requirements in light of contingency operations or short notice of airspace closure.

PILOTS AND OPERATOR PROCEDURES

Pilots need to be aware that in light of current international circumstances, a contingency routing requiring aircraft to operate off of normal traffic flows, could result in an intercept by military aircraft. Aircraft operators must therefore be familiar with international intercept procedures contained in ICAO Annex 2 –*Rules of the Air*, paragraph 3.8 and Appendix 2, Sections 2 and 3.

Pilots need to continuously guard the VHF emergency frequency 121.5 MHz and should operate their transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where secondary surveillance radar (SSR) is used for ATS purposes. Transponders should be set on a discrete code assigned by ATC or select code 2000 if ATC has not assigned a code.

If an aircraft is intercepted by another aircraft, the pilot shall immediately:

a) Follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with international procedures;

b) Notify, if possible, the appropriate ATS unit;

c) Attempt to establish radio communication with the intercepting aircraft by making a general call on the emergency frequency 121.5 MHz and 243 MHz if equipped; and

d) Set transponder to code 7700, unless otherwise instructed by the appropriate ATS unit.

If any instructions received by radio from any source conflict with those given by the intercepting aircraft, the intercepted aircraft shall request immediate clarification while continuing to comply with the instructions given by the intercepting aircraft.

OVERFLIGHT APPROVAL

Aircraft operators should obtain overflight approval from States/Territories/International Organizations for flights operating through their jurisdiction of airspace, where required. In a contingency situation, flights may be rerouted at short notice and it may not be possible for operators to give the required advanced notice in a timely manner to obtain approval.

States/Territories/International Organizations responsible for the airspace in which contingency routes are established should consider making special arrangements to expedite flight approvals in these contingency situations.

CONTINGENCY UNIT

The ATM national contingency unit assigned the responsibility of monitoring developments that may dictate the enforcement of the contingency plan and coordination of contingency arrangements is:

Name of Agency:
Contact Person:
Telephone:
Fax:
Email:

During a contingency situation, the National Contingency Unit will liaise with the involved FIRs through the ICAO ESAF Regional Office.

The ICAO ESAF Office will:

a) closely monitor the situation and coordinate with all affected States/Territories/International Organizations and the IATA Regional Office, so as to ensure air navigation services are provided to international aircraft operations in the AFI Region;

b) take note of any incidents reported and take appropriate action;

c) provide assistance as required on any issue with the Civil Aviation Administrations involved in the contingency plan; and

d) keep the President of the Council of ICAO, the Secretary General, C/RAO, D/ANB and C/ATM continuously informed on developments, including activation of the contingency plan.

APPENDIX 3.4K

REROUTING SCHEME

In the event of closure the (*XXX*) CTA/UTA/FIR, aircraft operators should file their flight plans using the alternative contingency routes listed in the scheme below in order to ensure avoidance in that airspace (CTA/UTA/FIR).

Present ATS ROUTE	**CONTINGENCY ROUTINGS**	**FIRs INVOLVED**
In lieu of:	**(ATS unit)** provides ATC on the following routings: ***CR1:*** ***CR2:*** ***CR3:***	**XXX**: In coordination with **XXX**
In lieu of:	**(ATS unit)** provides ATC on the following routing: ***CR4:***	**XXX**: In coordination with **XXX**

All aircraft should establish and maintain contact on published VHF or HF frequencies with the (*XXX*) ATS unit (APP/ACC/FIC) responsible for the airspace being traversed.

APPENDIX 3.4K

List of points of contact of all concerned States/Territories/International Organizations, IATA and ICAO ESAF/WACAF Office.

State /Organization	*Point of contact*	Telephone	e-mail
IATA			
ICAO/ESAF	Mr. G P Moshabesha Regional Director	Tel.: +254 20 762 2395 Fax: +254 20 762 1092	geoffrey.moshabesha@icao.unon.org
	Mr. B Sekwati Deputy Regional Director	Tel: +254 20 762 2370 Fax: +254 20 762 1092	boitshoko.sekwati@icao.unon.org
	Mr. S M Machobane, RO ATM & SAR	Tel.: +254 20 762 2372 Fax: +254 20 762 1092	seboseso.machobane@icao.unon.org
ICAO/WACAF	Mr Amadou O. Guitteye, Regional Director	Tel.: +221 33 839 9368 Fax: +221 33 823 6926	aguitteye@dakar.icao.int
	Mr Mam S. Jallow Deputy Regional Director	Tel.: +221 33 839 9389 Fax: +221 33 823 6926	mjallow@dakar.icao.int
	Mr Sadou Marafa RO ATM/SAR	Tel.: +221 33 839 9390 Fax: +221 33 823 6926	smarafa@dakar.icao.int

Note:
For each contingency plan, information relating to communication with ICAO Regional Office will depend on the Regional Office that is accredited to the specific State.

APPENDIX 3.4L

AFI SAR SERVICES INTEGRATION TASK FORCE (ASSI TF)

TERMS OF REFERENCE AND COMPOSITION

1. TERMS OF REFERENCE

The ASSI Task Force is established to support the development of the concept of sub-regional search and rescue (SAR) arrangements and cooperation between neighbouring States; provide a forum for discussions and identifying solutions to impediments in the effective provision of SAR services in the Region; and developing regional guidance to meeting ICAO provisions in the field of SAR.

2. WORK PROGRAMME

As part of its work programme, the ASSI Task Force will:

a) Periodically review and update Regional performance objectives with regard to SAR;

b) Identify and coordinate task related to establishment and functions of sub-regional SAR organizations;

c) Develop Regional strategies and guidance to support establishment of joint aviation/maritime rescue coordination centres;

d) Review SAR deficiencies identified within the AFI region, taking into consideration existing capacity and other constraints being experienced by States and SAR organizations, and propose solutions;

e) Support the cooperation between ICAO and IMO in their continuing collaboration with African States to implement sub-regional, joint RCCs at strategic locations on the African continent.

3. REPORTING

The ASSI Task Force shall meet at least once a year and report to the ATM/AIM/SAR Sub-Group.

4. COMPOSITION:

The ASSI Task will comprise:

a) experts nominated by AFI States from both civil aviation entities, SAR organizations and ANSPs;

b) Interested International and Sub-Regional Organizations;
***Note**: The meeting accepted with appreciation the (starting) membership of Kenya, Seychelles and Uganda.*

c) Expertise on SAR from States outside the AFI Region and from other entities may be invited by the Task Force based on the contribution that may be provided by such expertise.

APPENDIX 3.5A

SUMMARY OF THE STRATEGIC ASSESSMENT TABLES: CURRENT AND PROJECTED DATA VOLUMES 2010-2014

Table 1. OPMET data volumes per day (in K bytes)

Region	*Current 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*	*Projected 2014*
AFI	671	778	817	842	
ASIA	970	1029	1065	1097	
EUR	4188	4440	4534	4645	
MID	254	313	333	343	
TOTAL	**6083**	**6560**	**6749**	**6927**	

Table 2. PNG data volumes per day (in K bytes)

Region	*Current 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*	*Projected 2014*
AFI	195	195	195	195	
ASIA	195	195	195	195	
EUR	195	195	195	195	
MID	0	0	0	0	
TOTAL	**585**	**585**	**585**	**585**	

Table 3. AIS data volumes per day (in K bytes)

Region	*Current 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*	*Projected 2014*
AFI	2	2	2	2	
ASIA	2	2	2	2	
EUR	2	2	2	2	
MID	1	1	1	1	
TOTAL	**7**	**7**	**7**	**7**	

SADIS STRATEGIC ASSESSMENT TABLES CURRENT AND PROJECTED DATA VOLUMES 2011-2014

Note.— 1 octet = 1 byte = 1 character. 1Kbytes = 1024 bytes

Table 1. AFI— OPMET data volumes

OPMET data	*Current 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*	*Projected 2014*
ALPHANUMERIC DATA					
Number of **FC bulletins** issued per day	117	130	140	150	-
Number of **FT bulletins** issued per day	320	340	350	370	-
Number of **SA bulletins** issued per day	1938	2100	2200	2250	-
Number of **SP bulletins** issued per day	27	45	55	60	-
Number of **SIGMET bulletins** issued per day	35	40	45	45	-
Number of other bulletins issued per day					
TOTALS					
Total number of OPMET bulletins per day	2437	2655	2790	2875	-
Average size of OPMET bulletin (bytes)	282	300	300	300	-
Total estimated OPMET data volume per day (in K bytes)	**671**	**778**	**817**	**842**	-

No provision is being made for the distribution of BUFR-coded OPMET data. Capacity for this data may need to be included in future depending on the issuance of this data in the region.

Table 2. AFI — PNG data volumes

Graphical information in the PNG chart form	*Current 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*	*Projected 2014*
TOTALS					
Total number of PNG charts per day	2	2	2	2	-
Average size of charts (bytes)	100000	100000	100000	100000	-
Total estimated volume of PNG charts per day (in K bytes)	**195**	**195**	**195**	**195**	-

Provision is made for the distribution of PNG-encoded VAG

Table 3. AFI — AIS data volumes

AIS data	*Current 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*	*Projected 2014*
ALPHANUMERIC AIS DATA (NOTAM related to volcanic ash, ASHTAM)					
Number of ASHTAM bulletins issued per day	2	2	2	2	-
Number of NOTAM bulletins issued per day	2	2	2	2	-
TOTALS					
Total number of AIS bulletins per day	4	4	4	4	-
Average size of AIS bulletin (byte)	600	600	600	600	-
Total estimated volume of AIS data per day (in K bytes)	**2**	**2**	**2**	**2**	**-**

Provision is made for the distribution of ASHTAM and NOTAM related to volcanic ash.

APPENDIX 3.5B

Recommendations of the AFI OPMET MTF/1

Title of Recommendation	Rec. Number	AFI OPMET MTF/1 Recommendation	Type of Recommendation		
			MTF	MET/SG	APIRG
AFI OPMET INFORMATION EXCHANGE REQUIREMENTS	1/1	That, the OPMET data type, OPMET bulletin and types of OPMET exchange in the **Attachment A** to the MTF/1 report, be implemented by Dakar and Pretoria Regional OPMET Data Banks (RODB), AMBEX Bulletin Compiling Centres (BCC) and National OPMET Centres (NOC) as the OPMET requirements in the AFI region.	Recommendation	Draft Conclusion	Conclusion
INTERREGIONAL OPMET EXCHANGE AND IROG FUNCTIONS	1/2	That, the IROG functions and the exchange of OPMET between the AFI region and adjacent regions in **Attachments B and C** to MTF/1 report, be implemented by Dakar and Pretoria RODBs as the requirements for the Interregional OPMET exchange and IROG functions in the AFI region.	Recommendation	Draft conclusion	Conclusion
REVISION OF THE REQUIREMENTS OF OPMET DATA FROM NON-AOP AERODROMES IN THE AFI REGION	1/3	That, information related to the requirements of OPMET data from non-AOP aerodromes as given in **Attachment D** to MTF/1 report, be submitted by ICAO regional Offices to the concerned States for approval, before amending the AFI FASID MET Table 2A and Annex 1 to the SUG.	Recommendation	Draft Conclusion	Conclusion
REVISION OF THE REQUIREMENTS OF OPMET DATA FROM AOP AERODROMES IN THE AFI REGION	1/4	That, information related to the requirements of OPMET data from AOP aerodromes, be included in the AFI FASID MET Table 1A, as given in **Attachment E** MTF/1 report.	Recommendation	Draft Conclusion	Conclusion
OPMET EXCHANGE MONITORING AND MANAGEMENT PROCEDURES AT BCC AND RODB	1/5	That, the OPMET management and monitoring procedures given in **Attachments F, G and H** to MTF/1 report, be implemented by the RODBs and the BCC as the requirements for OPMET exchange monitoring and management procedures in the AFI region.	Recommendation	Draft Conclusion	Conclusion

Title of Recommendation	Rec. Number	AFI OPMET MTF/1 Recommendation	Type of Recommendation		
INTERFACE CONTROL DOCUMENT FOR AFI OPMET DATABASE ACCESS PROCEDURES	1/6	That, 1. the Procedures given in **Attachment I** to MTF/1 report, be implemented as the Regional Interface Control Document (ICD) for AFI OPMET Database Access Procedures. 2. The ICD be published by the ICAO Regional Office through AIP Sup.	Recommendation	Draft Conclusion	Conclusion
PROVISION OF INFORMATION ON PRETORIA RODB	1/7	That, South Africa provides: 1. information to ensure that Pretoria RODB meets AMBEX requirements 2. the AFTN address and e-mail of the Pretoria RODB Manager 3. The internet access address of the Pretoria RODB	Recommendation	Decision	
FUTURE WORK PROGRAMME AND COMPOSITION OF THE TASK FORCE	1/8	That, the work programme and the composition of the MTF as shown in **Attachment J to** MTF/1 report**,** be updated**.**	Recommendation	Draft Decision	Decision
FREQUENCY OF THE MEETINGS OF THE MTF	1/9	That, the Task Force meets once a year to consider yearly activities (review new users OPMET requirements from SADIS, review results of SIGMET Tests, review results of OPMET monitoring by the RODBs, assess the performance of the RODBs, etc..). The yearly meeting will be held alternatively between RODB Dakar and Pretoria.	Recommendation	Draft Conclusion	Conclusion

APPENDIX 3.5C

OPMET INFORMATION AND OPMET EXCHANGES

1.1 OPMET Data Type

1.1.1 The following OPMET data types should be handled by the AMBEX scheme:

Data type	Abbreviated name	WMO data type designator
Aerodrome reports	METAR SPECI	SA SP
Aerodrome forecasts	TAF: 24 and 30 hour	FT
SIGMET information	SIGMET SIGMET for TC SIGMET for VA	WS WC WV
Volcanic ash and tropical cyclone advisories	Volcanic Ash Advisory Tropical Cyclone Advisory	FV FK
Air-reports	AIREP SPECIAL (ARS)	UA
Administrative	ADMIN	NO

1.2 OPMET bulletins

1.2.1 The exchange of OPMET data is carried out through bulletins containing one or more meteorological messages (METAR, SPECI, TAF or other OPMET information). An OPMET bulletin contains messages of the same type.

1.2.2 The format of OPMET bulletins is determined by:

- *ICAO Annex 10, Aeronautical telecommunications*, as regards the AFTN envelope of the bulletin;
- WMO-No.386, *WMO Manual on the Global telecommunication System*, as regards the WMO abbreviated heading of the bulletin;
- *ICAO Annex 3* and WMO-No.306, *Manual on Codes*, as regards the format and coding of the information included in the bulletin.

1.3 Types of OPMET exchange

1.3.1 Regional exchange – AMBEX scheme

1.3.1.1 The AMBEX scheme covers the exchange of OPMET information in the AFI region. It includes several types of exchanges as described below.

1.3.1.1.1 *Regular Exchange under AMBEX*. This is a scheduled exchange that encompasses collection of messages from the originating stations, compiling of bulletins and their dissemination according to predetermined distribution schemes. The collection and distribution is carried out at fixed times and the bulletin content is defined in the current Handbook.

1.3.1.1.2 *Non-regular exchange.* This includes:

a) *Exchange on request (request-reply service)*. The RODBs store OPMET data and make them available on request.

b) *Exchange of non-routine reports:* SPECI; TAF AMD; SIGMET; TCA and VAA; ADMIN messages.

1.3.2 Inter-regional OPMET exchange

1.3.2.1 Exchange of OPMET data between the AFI and the other ICAO Regions is carried out via designated centres, which serve as Inter-regional OPMET Gateways (IROG). An IROG is set up for sending/receiving specified OPMET data between AFI and every other ICAO region for which AFI OPMET data are required.

Note: The former name of these centres is ODREP.

1.3.2.2 Inter-regional OPMET exchange via IROGs is carried out through the ground segment of the AFS (currently, through the AFTN).

1.3.3 Exchange of OPMET information through the satellite segment of the AFS

1.3.3.1 The three satellite broadcasts provided by the United Kingdom (Satellite Distribution System for Aeronautical Information Relating to Air Navigation - SADIS) and the United States (International Satellite Communication System – ISCS/1 and ISCS/2), form another type of OPMET exchange, which is global in nature and is intended to cover the emerging requirement for global access to all available OPMET data.

1.3.3.2 All AFI data handled by the AMBEX scheme should be relayed to the SADIS for global broadcast.

1.3.4 Other OPMET exchanges

1.3.4.1 Where OPMET exchanges described in the above paragraphs are not sufficient, direct AFTN addressing should be utilized by the originating centres.

APPENDIX 3.5D

INTER-REGIONAL OPMET EXCHANGE – INTER-REGIONAL OPMET GATEWAYS (IROG) FUNCTIONS

1. Inter-regional OPMET Gateways (IROGs) are designated in the AFI Region for the the purpose of exchanging OPMET data between the AFI and the other ICAO Regions, as shown in the table below.

AMBEX IROG	**For Excchange of OPMET data between Regions**
Dakar	AFI and EUR, SAM, NAM, CAR; MID, ASIA/PAC as backup to Pretoria
Pretoria	AFI and MID, ASIA/PAC, EUR; SAM, NAM, CAR as backup to Dakar

2 IROGs and their functions are described at **Appendix E** of the AMBEX Handbook**.** IROGs arrange for relaying all AMBEX bulletins to a corresponding OPMET Gateway in the other ICAO regions concerned. In particular:

A) *Dakar IROG* relays all AFI bulletins to IROG Toulouse in the EUR Region, which serves the EUR, SAM, NAM and MID Regions, and should receive and store all required OPMET bulletins from these Regions;

B) *Pretoria IROG* relays all AFI bulletins to IROG London in the EUR Region and IROG Bangkok in the the ASI/PAC Regions, and should receive and store all required OPMET bulletins from MID, ASIA/PAC, EUR, SAM Regions;

3 The following principles are applied to IROGs:

A) IROGs should have reliable and efficient AFTN connection to the regions, for which they have exchange responsibilities, with adequate capacity to handle the OPMET data flow between the regions;

B) IROGs should be associated with AFTN relay centres capable of handling efficiently the volume of traffic anticipated;

C) IROGs should be capable of handling all OPMET data types, as described at para.3.1.1 to the HAMBEX Handbook.

4 In order to avoid duplication of the OPMET traffic and information, all inter-regional OPMET exchange should be directed through the IROGs. Inter-regional exchange via direct AFTN addressing from the originator or AMBEX centre to recipients in the other ICAO Regions should be avoided, except when bilateral or other agreements require such direct exchanges.

APPENDIX 3.5E

EXCHANGE OF OPMET DATA BETWEEN THE AFI, EUR, MID AND ASIA REGION

IROG RESPONSIBILITIES

1. DAKAR IROG

1.1. Outgoing responsibilities

1.1.1 The whole set of METAR, TAF, AIREP SPECIAL and SIGMET bulletins, as described in appendices A, B, C and D of this Handbook, received by RODB DAKAR shall be distributed to Rio de Janeiro and ROC Toulouse, which shall send them to the EUR ROCs deserving other adjacent regions and to the SADIS.

1.2. Incoming responsibilities

1.2.1 The bulletins containing the required international OPMET data as indicated in the FASID Table MET 1A (or 2A) shall be sent by Rio de Janeiro, Jedda and ROC Toulouse to IROG DAKAR, that shall send the bulletins following the States requirements.

1.2.2 Regular contacts with the adjacent IROG (s) shall insure the efficiency of the data exchange. A list of exchanged bulletins should be agreed and updated, as necessary.

2. PRETORIA IROG

2.1. Outgoing responsibilities

2.1.1 The whole set of METAR, TAF, AIREP SPECIAL and SIGMET bulletins, as described in appendices A, B, C and D of this Handbook received by RODB Pretoria shall be distributed to Rio de Janeiro, Jeddah, Bangkok and ROC Toulouse, that shall send to the EUR ROCs deserving other adjacent regions and to the SADIS

2.2. Incoming responsibilities

2.2.1 The bulletins containing the required international OPMET data as indicated in the FASID table MET 1A (or 2A) shall be sent by Rio de Janeiro, Jedda, Bangkok and ROC Toulouse to IROG PRETORIA, that shall send the bulletins following the States requirements.

2.2.2 Regular contacts with the adjacent IROG(s) should insure the efficiency of the data exchange. A list of exchanged bulletins should be agreed and updated, as necessary.

APPENDIX 3.5F

UPDATED FASID TABLE MET 1A

METEOROLOGICAL SERVICES REQUIRED AT AERODROMES

EXPLANATION OF THE TABLE

1 Name of the aerodrome or location where meteorological service is required

Note: The name is extracted from the *ICAO Location Indicators (Doc 7910)* updated quarterly.
If a state wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.

2 ICAO location indicator of the aerodrome

3 Designation of aerodrome:
RG - international general aviation, regular use
RS - international scheduled air transport, regular use
RNS - international non-scheduled air transport, regular use
AS - international scheduled air transport, alternate use
ANS - international non-scheduled air transport, alternate use

4 Name of the meteorological office responsible for the provision of trend and aerodrome forecasts in TAF code at the aerodrome indicated in column 1

Note: A secondary meteorological office may be included if the primary meteorological office is closed part of the 24-hour period or a specific day of the week. Offices responsible under exceptional (e.g. back-up) conditions should not be listed.

5 ICAO location indicator of the responsible meteorological office

6 Requirement for trend forecasts

Y - Required

7 Requirement for aerodrome forecasts in TAF code

C - Requirement for 9-hour validity aerodrome forecasts in TAF code (9H)
T - Requirement for 18/24-hour validity aerodrome forecasts in TAF code (18/24H)
X - Requirement for 30-hour validity aerodrome forecasts in TAF code (30H)

8 Availability of OPMET information (METAR/SPECI and TAF)

F - Full : OPMET data as listed issued for the aerodrome all through the 24-hour period
P - Partial : OPMET data as listed not issued for the aerodrome for the entire 24-hour period

MET 1A - AFI

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	TR	TAF	
1	2	3	4	5	6	7	8

Algeria							
ADRAR/TOUAT-CHEIKH SIDI MOHAMED BELKEBIR	DAUA	RS	ADRAR/TOUAT-CHEIKH SIDI MOHAMED BELKEBIR	DAUA			F
ALGER/HOUARI BOUMEDIENE	DAAG	RS	ALGER/HOUARI BOUMEDIENE	DAAG	Y	T	F
ANNABA/RABAH BITAT	DABB	RS	ANNABA/RABAH BITAT	DABB	Y	T	F
CONSTANTINE/MOHAMED BOUDIAF	DABC	RS	CONSTANTINE/MOHAMED BOUDIAF	DABC		T	F
GHARDAIA/NOUMERAT-MOUFDI ZAKARIA	DAUG	RS	GHARDAIA/NOUMERAT-MOUFDI ZAKARIA	DAUG		T	F
HASSI MESSAOUD/OUED IRARA-KRIM BELKACEM	DAUH	RS	HASSI MESSAOUD/OUED IRARA-KRIM BELKACEM	DAUH		T	F
IN SALAH	DAUI	RS	IN SALAH	DAUI		T	F
ORAN/ES SENIA	DAOO	RS	ORAN/ES SENIA	DAOO	Y	T	F
TAMANRASSET/AGUENAR-HADJ BEY AKHAMOK	DAAT	AS	TAMANRASSET/AGUENAR-HADJ BEY AKHAMOK	DAAT		T	F
TEBESSA/CHEIKH LARBI TEBESSI	DABS	RS	TEBESSA/CHEIKH LARBI TEBESSI	DABS		T	F
TLEMCEN/ZENATA-MESSALI EL HADJ	DAON	RS	TLEMCEN/ZENATA-MESSALI EL HADJ	DAON		T	F
ZARZAITINE/IN AMENAS	DAUZ	RS	ZARZAITINE/IN AMENAS	DAUZ		T	F
Angola							
HUAMBO	FNHU	RS	LUANDA/4 DE FEVEREIRO	FNLU			F
LUANDA/4 DE FEVEREIRO	FNLU	RS	LUANDA/4 DE FEVEREIRO	FNLU	Y	X	F
Benin							
CARDINAL BERNARDIN GANTIN DE CADJEHOUN INTERNATIONAL	DBBB	RS	CARDINAL BERNARDIN GANTIN DE CADJEHOUN INTERNATIONAL	DBBB	Y	X	F

Botswana							
FRANCISTOWN	FBFT	RS	GABORONE/SIR SERETSE KHAMA INT'L	FBSK			F
GABORONE/SIR SERETSE KHAMA INT'L	FBSK	RS	GABORONE/SIR SERETSE KHAMA INT'L	FBSK	Y	X	F
KASANE	FBKE	RS	GABORONE/SIR SERETSE KHAMA INT'L	FBSK			F
MAUN	FBMN	RS	GABORONE/SIR SERETSE KHAMA INT'L	FBSK			F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	TR	TAF	
1	2	3	4	5	6	7	8
SELIBE-PHIKWE	FBSP	RS	GABORONE/SIR SERETSE KHAMA INT'L	FBSK			F
Burkina Faso							
BOBO DIOULASSO	DFOO	RS	OUAGADOUGOU/AEROPORT	DFFD		T	F
OUAGADOUGOU/AEROPORT	DFFD	RS	OUAGADOUGOU/AEROPORT	DFFD	Y	X	F
Burundi							
BUJUMBURA	HBBA				Y	T	F
Cameroon							
DOUALA/AEROPORT	FKKD	RS	DOUALA/AEROPORT	FKKD	Y	X	F
GAROUA	FKKR	AS	GAROUA	FKKR	Y		F
MAROUA/SALAK	FKKL	RS	DOUALA/AEROPORT	FKKD			F
N'GAOUNDERE	FKKN	RS	DOUALA/AEROPORT	FKKD			F
YAOUNDE/NSIMALEN	FKYS	RS	YAOUNDE/NSIMALEN	FKYS	Y	T	F
Canary Islands (Spain)							
FUERTEVENTURA	GCFV	RS	GRAN CANARIA	GCLP		T	F
GRAN CANARIA	GCLP	RS	GRAN CANARIA	GCLP	Y	T	F
HIERRO	GCHI	RS	GRAN CANARIA	GCLP			F
LA PALMA	GCLA	RS	GRAN CANARIA	GCLP		T	F
LANZAROTE	GCRR	RS	GRAN CANARIA	GCLP		T	F
TENERIFE NORTE (AD CIVIL)	GCXO	RS	TENERIFE NORTE (AD CIVIL)	GCXO	Y	T	F
TENERIFE SUR/REINA SOFIA	GCTS	RS	TENERIFE SUR/REINA SOFIA	GCTS	Y	T	F

Cape Verde AMILCAR CABRAL/SAL ISLAND PRAIA	GVAC GVNP	RS RS	AMILCAR CABRAL/SAL ISLAND AMILCAR CABRAL/SAL ISLAND	GVAC GVAC	Y	X	F F
Central African Republic BANGUI/M'POKO BERBERATI	FEFF FEFT	RS RS	BANGUI/M'POKO BANGUI/M'POKO	FEFF FEFF	Y	X	F F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	TR	TAF	
1	2	3	4	5	6	7	8
Chad							
N'DJAMENA/AEROPORT	FTTJ	RS	N'DJAMENA/AEROPORT	FTTJ	Y	X	F
Comoros							
ANJOUAN/OUANI	FMCV						F
MORONI/PRINCE SAID IBRAHIM	FMCH	RS	MORONI/PRINCE SAID IBRAHIM	FMCH	Y	T	F
Congo							
BRAZZAVILLE/MAYA-MAYA	FCBB	RS	BRAZZAVILLE/MAYA-MAYA	FCBB	Y	X	F
POINTE NOIRE	FCPP	RS	POINTE NOIRE	FCPP	Y	T	F
Côte d'Ivoire							
ABIDJAN/FELIX HOUPHOUET BOIGNY	DIAP	RS	ABIDJAN/FELIX HOUPHOUET BOIGNY	DIAP	Y	X	F
BOUAKE	DIBK	RS	ABIDJAN/FELIX HOUPHOUET BOIGNY	DIAP			F

Democratic Republic of the Congo GOMA KINSHASA/N'DJILI KISANGANI-BANGOKA LUBUMBASHI MBUJI-MAYI	FZNA FZAA FZIC FZQA FZWA	RS RS AS AS AS	KINSHASA/N'DJILI KINSHASA/N'DJILI KINSHASA/N'DJILI KINSHASA/N'DJILI KINSHASA/N'DJILI	FZAA FZAA FZAA FZAA FZAA	 Y 	 X 	F F F F F
Djibouti DJIBOUTI/AMBOULI	HDAM	RS	DJIBOUTI/AMBOULI	HDAM	Y	T	F
Egypt ALEXANDRIA / INTL ALMAZA AFB / MILITARY	HEAX HEAZ	RS AS	CAIRO/INTL	HECA	Y	T	F F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
ASWAN / INTL	HESN	RS	CAIRO/INTL	HECA	Y	T	F
ASYUT / INTL	HEAT	RS					F
BORG EL ARAB / INTL	HEBA	RS				T	F
CAIRO/INTL	HECA		CAIRO/INTL	HECA	Y	T	F
EL ARISH / INTL	HEAR	AS	AL ALAMAIN/INTL	HEAL		T	F
HURGHADA / INTL	HEGN	RS	CAIRO/INTL	HECA	Y	T	F
LUXOR / INTL	HELX	RS	CAIRO/INTL	HECA	Y	T	F
MARSA ALAM / INTL	HEMA	RNS					F
PORT SAID/ INTL	HEPS	AS				T	F
SHARK EL OWEINAT / INTL	HEOW	AS					F
SHARM EL SHEIKH / INTL	HESH	RS	CAIRO/INTL	HECA		T	F
ST.CATHERINE / INTL	HESC	AS	CAIRO/INTL	HECA		T	F
	HETB	AS	CAIRO/INTL	HECA		T	F
Equatorial Guinea							
MALABO	FGSL	RS	MALABO	FGSL	Y	X	F
Eritrea							
ASMARA	HHAS	RS	ASMARA AIS/APP/COM/MET/TWR	HHAS	Y	T	F
AIS/APP/COM/MET/TWR	HHSB	RS	ASSAB	HHSB	Y		F
ASSAB							

Ethiopia							
ADDIS ABABA /BOLE COM/M	HAAB	RS	ADDIS ABABA/BOLE COM/MET/NOF	HAAB	Y	X	F
	HADR	RS	ADDIS ABABA/BOLE COM/MET/NOF	HAAB			F
Gabon							
FRANCEVILLE/MVENGUE	FOON	RS	LIBREVILLE/LEON M'BA	FOOL			F
	FOOL	RS	LIBREVILLE/LEON M'BA	FOOL	Y	X	F
LIBREVILLE/LEON M'BA PORT-GENTIL	FOOG	RS	LIBREVILLE/LEON M'BA	FOOL		T	F
Gambia							
BANJUL INTERNATIONAL	GBYD	RS	BANJUL INTERNATIONAL	GBYD		X	F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
Ghana							
ACCRA/KOTOKA INTERNATIONAL	DGAA	RS	ACCRA/KOTOKA INTERNATIONAL	DGAA	Y	X	F
KUMASI	DGSI	RS	ACCRA/KOTOKA INTERNATIONAL	DGAA		T	F
TAMALE	DGLE	RS					F
Guinea							
CONAKRY/GBESSIA	GUCY	RS	CONAKRY/GBESSIA	GUCY	Y	X	F
KANKAN/KANKAN	GUXN	RS	CONAKRY/GBESSIA	GUCY			F
LABE/TATA	GULB	RS	CONAKRY/GBESSIA	GUCY			F
N'ZEREKORE/KONIA	GUNZ	RS	CONAKRY/GBESSIA	GUCY			F
Guinea-Bissau							
BISSAU/OSWALDO VIEIRA INTL	GGOV	RS	BISSAU/OSWALDO VIEIRA INTL	GGOV	Y	T	F
Kenya							
ELDORET/INTL. AIRPORT	HKEL	RS	ELDORET/INTL. AIRPORT	HKEL	Y	T	F
MOMBASA	HKMO	RS	MOMBASA	HKMO	Y	T	F
NAIROBI/JOMO KENYATTA INTL	HKJK	RS	NAIROBI/JOMO KENYATTA INTL. TWR/APP/NOF/MET/CIVIL AIRLINES	HKJK	Y	X	F

Lesotho MASERU MOSHOESHOE I	FXMM	RS	MASERU MOSHOESHOE I	FXMM	Y	T	F
Liberia MONROVIA/ROBERTS INTL	GLRB	RS	MONROVIA/ROBERTS INTL	GLRB	Y	T	F
Libyan Arab Jamahiriya BENGHAZI (BENINA) SEBHA TRIPOLI (TRIPOLI INTL.)	HLLB HLLS HLLT	RS RS RS	BENGHAZI (BENINA) BENGHAZI (BENINA) TRIPOLI (TRIPOLI INTL.)	HLLB HLLB HLLT	Y Y	T T	F F F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
Madagascar							
ANTANANARIVO/IVATO	FMMI	RS	ANTANANARIVO/IVATO	FMMI	Y	X	F
ANTSIRANANA/ARRACHART	FMNA						F
DZAOUDZI	FMCZ	RS	MORONI/PRINCE SAID IBRAHIM	FMCH			F
MAHAJANGA/PH. TSIRANANA	FMNM	RS	MAHAJANGA/PH. TSIRANANA	FMNM	Y	T	F
NOSY-BE	FMNN	RS	MAHAJANGA/PH. TSIRANANA	FMNM			F
SAINTE-MARIE	FMMS	RS	TOAMASINA	FMMT			F
TOAMASINA	FMMT	RS	TOAMASINA	FMMT	Y	T	F
	FMSD	RS	ANTANANARIVO/IVATO	FMMI			F
Malawi							
BLANTYRE/CHILEKA	FWCL	RS	BLANTYRE/CHILEKA	FWCL	Y		F
LILONGWE/KAMUZU	FWKI	RS	LILONGWE/KAMUZU INTERNATIONAL	FWKI	Y	X	F
Mali							
BAMAKO/SENOU	GABS	RS	BAMAKO/SENOU	GABS	Y	X	F
GAO	GAGO	RS	BAMAKO/SENOU	GABS		T	F
KAYES	GAKD	RS	BAMAKO/SENOU	GABS			F
KIDAL	GAKL	RS	BAMAKO/SENOU	GABS			F
MOPTI/AMBODEDJO	GAMB	RS	BAMAKO/SENOU	GABS			F
NIORO	GANR	RS	BAMAKO/SENOU	GABS			F
TOMBOUCTOU	GATB	RS	BAMAKO/SENOU	GABS			F

Mauritania							
ATAR	GQPA	RS	NOUAKCHOTT/AEROPORT	GQNN			F
NEMA	GQNI	RS	NOUAKCHOTT/AEROPORT	GQNN			F
NOUADHIBOU	GQPP	RS	NOUADHIBOU	GQPP	Y	T	F
NOUAKCHOTT/AEROPORT	GQNN	RS	NOUAKCHOTT/AEROPORT	GQNN	Y	X	F
ZOUERATT/TAZADIT	GQPZ	RS	NOUAKCHOTT/AEROPORT	GQNN			F
Mauritius							
SIR SEEWOOSAGUR RAMGOOLAM INTERNATIONAL AIRPORT	FIMP	RS	SIR SEEWOOSAGUR RAMGOOLAM INTERNATIONAL AIRPORT	FIMP	Y	X	F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
Morocco							
AGADIR/AL MASSIRA	GMAD	RS	AGADIR/AL MASSIRA	GMAD	Y	X	F
AL HOCEIMA/CHERIF EL IDRISSI	GMTA	RS	CASABLANCA/MOHAMMED V	GMMN			F
CASABLANCA/MOHAMMED V	GMMN	RS	CASABLANCA/MOHAMMED V	GMMN	Y	X	F
ERRACHIDIA/MOULAY ALI CHERIF	GMFK	RS	CASABLANCA/MOHAMMED V	GMMN	Y	T	F
FES/SAISS	GMFF	RS	FES/SAISS	GMFF	Y	X	F
MARRAKECH/MENARA	GMMX	RS	MARRAKECH/MENARA	GMMX	Y	X	F
OUARZAZATE	GMMZ	RS	CASABLANCA/MOHAMMED V	GMMN	Y	T	F
OUJDA/ANGADS	GMFO	RS	OUJDA/ANGADS	GMFO	Y	X	F
RABAT/SALE	GMME	RS	RABAT/SALE	GMME	Y	X	F
TANGER/IBN BATOUTA	GMTT	RS	TANGER/IBN BATOUTA	GMTT	Y	X	F
	GMAT	RS	CASABLANCA/MOHAMMED V	GMMN			F
	GMTN	RS	TANGER/IBN BATOUTA	GMTT			F
Mozambique							
BEIRA	FQBR	RS	BEIRA	FQBR	Y	T	F
MAPUTO	FQMA	RS	MAPUTO	FQMA	Y	X	F
Namibia							
HOSEA KUTAKO INTL AIRPORT	FYWH	RS	HOSEA KUTAKO INTL AIRPORT	FYWH	Y	X	F
KEETMANSHOOP	FYKT	RS	HOSEA KUTAKO INTL AIRPORT	FYWH			F
WALVIS BAY	FYWB	RS	HOSEA KUTAKO INTL AIRPORT	FYWH			F

Niger							
AGADES SUD	DRZA	RS	NIAMEY	DRRN		T	F
NIAMEY	DRRN	RS	NIAMEY	DRRN	Y	X	F
ZINDER	DRZR	RS	NIAMEY	DRRN		T	F
Nigeria							
ABUJA/NNAMDI AZIKIWE	DNAA	RS	KANO/MALLAM AMINU KANO	DNKN	Y	X	F
CALABAR/MARGARET EKPO	DNCA	RS	LAGOS/MURTALA MUHAMMED	DNMM		T	F
ILORIN	DNIL	RS	LAGOS/MURTALA MUHAMMED	DNMM		T	F
KADUNA (NEW)	DNKA	RS	KATSINA	DNKT		T	F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
KANO/MALLAM AMINU KANO	DNKN	RS	KANO/MALLAM AMINU KANO	DNKN	Y	X	F
LAGOS/MURTALA MUHAMMED	DNMM	RS	LAGOS/MURTALA MUHAMMED	DNMM	Y	X	F
MAIDUGURI	DNMA	RS	KANO/MALLAM AMINU KANO	DNKN		T	F
PORT HARCOURT	DNPO	RS	LAGOS/MURTALA MUHAMMED	DNMM	Y	X	F
	DNSO	RS	KANO/MALLAM AMINU KANO	DNKN		T	F
Réunion (France)							
SAINT DENIS GILLOT	FMEE	RS	SAINT DENIS GILLOT	FMEE	Y	X	F
Rwanda							
KIGALI INTERNATIONAL AIRPORT	HRYR	RS	KIGALI INTERNATIONAL AIRPORT	HRYR	Y	T	F
Sao Tome and Principe							
SAO TOME/INTERNATIONAL SAO TOME	FPST	RS	SAO TOME/INTERNATIONAL,SAO TOME ISLAND	FPST	Y	X	F
Senegal							
CAP SKIRING	GOGS	RS	DAKAR/YOFF	GOOY		T	F
DAKAR/YOFF	GOOY	RS	DAKAR/YOFF	GOOY	Y	X	F
SAINT LOUIS	GOSS	RS	DAKAR/YOFF	GOOY		T	F
TAMBACOUNDA	GOTT	RS	DAKAR/YOFF	GOOY			F
ZIGUINCHOR	GOGG	RS	DAKAR/YOFF	GOOY			F

Seychelles SEYCHELLES INTERNATIONAL	FSIA	RS	SEYCHELLES INTERNATIONAL AIRPORT	FSIA	Y	T	F
Sierra Leone FREETOWN/LUNGI	GFLL	RS	FREETOWN/LUNGI	GFLL	Y	X	F
Somalia							

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
BERBERA	HCMI	AS	MOGADISHU	HCMM			F
BURAO	HCMV	RS	MOGADISHU	HCMM			F
EGAL INTERNATIONAL AIRPORT	HCMH	RS	MOGADISHU	HCMM			F
KISIMAYU	HCMK	AS	MOGADISHU	HCMM			F
MOGADISHU	HCMM	RS	MOGADISHU	HCMM	Y	T	F

South Africa							
BLOEMFONTEIN (BLOEMFONTEIN AIRPORT)	FABL	RS	BLOEMFONTEIN (BLOEMFONTEIN AIRPORT)	FABL	Y	T	F
CAPE TOWN (CAPE TOWN INTERNATIONAL AIRPORT)	FACT	RS	CAPE TOWN (CAPE TOWN INTERNATIONAL AIRPORT)	FACT	Y	X	F
DURBAN (DURBAN INTERNATIONAL AIRPORT)	FADN	RS	DURBAN (DURBAN INTERNATIONAL AIRPORT)	FADN	Y	X	F
LANSERIA	FALA	RS	O.R TAMBO INTERNATIONAL AIRPORT	FAJS			F
MAFIKENG AD	FAMM	AS	O.R TAMBO INTERNATIONAL AIRPORT	FAJS			F
NELSPRUIT	FANS	RS	GROOTFONTEIN	FAGF			F
O.R TAMBO INTERNATIONAL AIRPORT	FAJS	RS	O.R TAMBO INTERNATIONAL AIRPORT	FAJS	Y	X	F
PIETERSBURG (CIVIL)	FAPI	AS	O.R TAMBO INTERNATIONAL AIRPORT	FAJS			F
	FAPE	AS	O.R TAMBO INTERNATIONAL AIRPORT	FAJS			F
	FAUP	AS	O.R TAMBO INTERNATIONAL AIRPORT	FAJS			F
Spain							
MELILLA	GEML	RS	MELILLA	GEML		T	F
Sudan							
JUBA	HSSJ	RS	KHARTOUM	HSSS			F
KASSALA	HSKA	AS	KHARTOUM	HSSS			F
KHARTOUM	HSSS	RS	KHARTOUM	HSSS	Y	T	F
PORT SUDAN	HSPN	RS	WADI HALFA	HSSW			F
Swaziland							

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
MANZINI/MATSAPHA	FDMS	RS	MANZINI/MATSAPHA	FDMS	Y	T	F
Togo							
LOME/GNASSINGBE EYADEMA	DXXX	RS	LOME/GNASSINGBE EYADEMA	DXXX	Y	X	F
NIAMTOUGOU	DXNG	RS	LOME/GNASSINGBE EYADEMA	DXXX	Y	T	F
Tunisia							
DJERBA/ZARZIS	DTTJ	RS	TUNIS/CARTHAGE	DTTA	Y	T	F
MONASTIR/HABIB BOURGUIBA	DTMB	RS	TUNIS/CARTHAGE	DTTA	Y	T	F
SFAX/THYNA	DTTX	RS	TUNIS/CARTHAGE	DTTA	Y	T	F
TABARKA/7 NOVEMBRE	DTKA	RS	TUNIS/CARTHAGE	DTTA	Y	T	F
TOZEUR/NEFTA	DTTZ	RS	TABARKA/7 NOVEMBRE	DTKA	Y	T	F
TUNIS/CARTHAGE	DTTA	RS	TUNIS/CARTHAGE	DTTA	Y	T	F
Uganda							
ENTEBBE (INTL)	HUEN	RS	ENTEBBE (INTL)	HUEN	Y	X	F

United Republic of Tanzania							
DAR ES SALAAM APP,TWR,NOF,MET,COM,CIVIL AIRLINES	HTDA	RS	DAR ES SALAAM APP,TWR,NOF,MET,COM,CIVIL AIRLINES	HTDA	Y	X	F
KILIMANJARO APP, TWR, AIS, MET, CIVIL AIRLINES	HTKJ	RS	KILIMANJARO APP, TWR, AIS, MET, CIVIL AIRLINES	HTKJ	Y	T	F
ZANZIBAR - KISAUNI	HTZA	RS	ZANZIBAR - KISAUNI	HTZA	Y	T	F
Western Sahara							
EL AAIUN	GSAI	RS	EL AAIUN	GSAI			F
VILLACISNEROS	GSVO	RS	EL AAIUN	GSAI			F
Zambia							
LIVINGSTONE	FLLI	RS	LUSAKA/INTL	FLLS			F
LUSAKA/INTL	FLLS	RS	LUSAKA/INTL	FLLS	Y	X	F
MFUWE	FLMF	AS	LUSAKA/INTL	FLLS			F

Aerodrome where service is to be provided			Responsible MET Office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	8
NDOLA	FLND	AS	LUSAKA/INTL	FLLS			F

Zimbabwe HARARE INTERNATIONAL J.M. NKOMO VICTORIA FALLS	FVHA FVBU FVFA	RS RS RS	HARARE INTERNATIONAL J.M. NKOMO HARARE INTERNATIONAL	FVHA FVBU FVHA	Y	X	F F F

APPENDIX 3.5G

MANAGEMENT OF OPMET EXCHANGE UNDER THE AMBEX SCHEME

1 OPMET Bulletins Update Procedure

1.1 Information for changes of AMBEX bulletins should be disseminated to all AMBEX centres and national OPMET centres (NOC) concerned well in advance in order to allow the centres to introduce the necessary changes to their message handling systems. In this regard, a lead time period of two AIRAC cycles is considered appropriate.

1.2 The AMBEX centre planning the change, should send a notification by e-mail or fax to the ICAO Office, Dakar or Nairobi with copy to all AMBEX Focal Points. The notification should include detailed information of the changes and the proposed time schedule. The Regional Office should inform all other ICAO Regional Offices of the changes to be introduced and the effective date of implementation.

1.3 All requests by users for changes to AMBEX bulletins should be addressed to the ICAO Regional Office concerned. The Regional Office should carry out the necessary coordination with the Sates and AMBEX centres concerned. The duration of the coordination process should be minimized so that the period between the user request and the implementation of the change (if agreed) should normally be less than 3 months.

2 Quality Management of OPMET Exchange under the AMBEX Scheme

2.1 Objectives and Scope

2.1.1 **Objectives:** Develop a management system that provides general guidance on procedures applied to OPMET exchange, which includes quality control aspects and introduces a non-real-time monitoring for OPMET exchange.

2.1.2 **Scope:** Management of OPMET data exchange will be organized in the following sections:

Quality Control	***Data quality control applies to OPMET validation and correction during data processing and during preparation of messages***
OPMET monitoring	***Monitor and evaluate the performance indicators for the scheduled OPMET data***

2.2 Quality Control – General Requirements

2.2.1 Quality control (QC) consists of examination of OPMET data at NOCs, AMBEX Centres and RODBs to check the messages for formatting and coding errors, as well as, for time and space consistency.

2.2.2 OPMET data should be checked in real time or as close to it as possible, at the first point, i.e., the originator, which may be: meteorological station, aerodrome meteorological office or meteorological watch office. Errors may occur during coding or transcription of meteorological messages by the observer or forecaster. The originating office should apply quality control procedures during data processing and preparation of messages, in order to eliminate the main sources of errors.

2.2.3 The national OPMET centre (NOC) should apply QC procedures on the incoming messages from national sources and on the compiled national bulletins.

2.2.4 It is also advisable to apply QC checks at the AMBEX Centre, where the AMBEX bulletins are received or compiled. If automation is available it should be used, or partly assisted by computing facilities. The principle is that every message should be checked, preferably at the various points along the data chain.

2.2.5 The checks that have already been performed by originating offices and AMBEX Centres are usually repeated at the OPMET data banks. Erroneous messages found by the RODB should be either rejected or corrected by reference back to the source or by the data bank itself. Data corrected by the data banks should be flagged in the database for record purpose.

2.2.6 As a result of the quality control process described above, OPMET data of established quality will be used in the exchange and stored in the data banks. The RODBs should compile information with regard to errors that were found and compile records, such as the numbers and types of errors detected during quality control. Such non-conformities should be reported to ICAO Regional Office, Dakar or Nairobi for follow-up action.

2.3 Quality Control Procedures

2.3.1 General guidance on the quality control procedures for each type of OPMET is outlined in **Appendix I.**

3 OPMET Monitoring

3.1 Monitoring of Scheduled OPMET Data

3.1.1 The monitoring shall focus on the measurement of three performance indicators (PIs), viz., Compliance, Availability and Regularity indices of the scheduled, routine OPMET data (SA, FT) exchanged in the region. The PIs are described in detail in **Appendix I**

3.1.2 Monitoring Reference. The monitoring shall involve the recording and analysis of data provided by the AFTN circuit. The three PIs should be monitored against the respective AMBEX Tables.

3.1.3 Methodology: Data is monitored with reference to the procedures defined in **Appendix I** the EUR OPMET Data Monitoring Procedures as produced by APIRG MET/SG (Bulletin Management Group).

3.2 Monitoring of Non-Scheduled OPMET data

3.2.1 Monitoring of non-routine OPMET data shall be executed for FK, FV, WC, WS, and WV.

3.2.2 Monitoring of SIGMET, VAA and TCA should be performed during the scheduled regional SIGMET tests in accordance with the procedures published by the Regional Offices, Dakar and Nairobi.

3.2.3 The monitoring results shall be presented in bulletin-oriented format, one line per bulletin indicating the abbreviated header (TTAAii CCCC YGGgg), the FIR/UIR where applicable, receipt time and originator.

4 AMBEX Focal Points

4.1 In order to facilitate exchange of information between the AMBEX centres a system of AMBEX focal points have been developed. Contact details of the persons designated as AMBEX focal points by the relevant State's authorities is provided in **Attachment A** to this Appendix.

APPENDIX 3.5G

POINTS DE CONTACT AMBEX *(update ….)*

	State/*Etat*/ Organisation	Name/*Nom et Prénom*	Address/*Adresse*	E-mail	Fax	Telephone
1	Algeria					
2	Cameroon	ABONDO Cyrille	Chef de Service de la Météorologie Aéronautique	abondocyrille@yahoo.com	+237 22 30 33 62	+ 237 22 30 30 90
3	Congo	**OLEMBE Alexis Laurence**	B.P. 218 Brazzaville Aéroport CONGO	aolembe@yahoo.fr	+242 282 00 51	+242 972 16 77 / +242 411 48 95
4	Egypt					
5	Ethiopia					
6	Kenya					
7	France					
8	Madagascar	RAKOTONDRIANA Jérôme **RABENASOLO Mamitiana Alain**	Direction Générale de la Météo, BP 1254 Antananarivo B.P. 46 Ivato Aéroport MADAGASCAR	madagascarmto@asecna.org; jerome@asecna.mg mamyalain6@yahoo.fr	+261 202 258 115 +261 20 22 581 15	+ 261 33 12 108 05 +261 3410 034 54
9	Morocco					
10	Niger	**YERIMA Ladan**	B.P. 1096 Niamey Aéroport NIGER	E-mail : yeriladan@yahoo.fr	+227 20 73 55 12	+227 94 85 22 27
11	Nigeria	IKEKHUA O. Felix Mrs. M. O. Iso	NIMET	felix_ikekhua@yahoo.com maryottuiso@yahoo.com	+234 9 4130710 +234 9 4130711	+234 1 477 16 62 +234 9 4130709 + 234 9

						4130710
12	Senegal (Rapporteur)	DIEME Saïdou	ASECNA Sénégal B.P. 8132 Dakar Aéroport Yoff SENEGAL	saidoudieme@yahoo.fr saidoudieme@yahoo.fr	+221 33 820 06 00 +221 33 820 02 72/ +221 33 820 06 00	+221 33 869 22 03 : +221 77 652 53 87
13	South Africa					
14	United Kingdom (RU)					
15	ASECNA	NGOUAKA Dieudonné	ASECNA DG BP 3144 Dakar, Sénégal	ngouakadie@asecna.org	+221 33 8234654	+221 33 8695714
16	IATA	ZOO-MINTO'O Prosper	Adjoint au Directeur régional de l'IATA	ZooMintooP@iata.org	+2711 523 2702	+2711 523 27 00
17	WMO/OMM					
18	EUR BMG					
19	IROG Toulouse					
20	ASIA/PAC/MTSF					

APPENDIX 3.5H

OPMET Quality Control and Monitoring Procedures

1 Quality Control Procedures

1.1 OPMET Data Validation

1.1.1 The AMBEX Centres and RODBs should not modify the content of the meteorological data, e.g. visibility, QNH etc., but only items contained in the WMO bulletin headings, such as, location indicators or observation times.

1.1.2 WMO Abbreviated Heading (TTAAii CCCC YYGGgg BBB) Validation

TT	Message Type, shall comprise two alphabetical characters
AA	Location Indicator, shall comprise two alphabetical characters
ii	comprise two digits, from 01 to 99
CCCC	A 4-letter ICAO location indicator shall comprise 4 alphabetical characters
YYGGgg	The date time group of the bulletin, shall be configured to validate it with the current time
BBB	BBB is an optional group. The use of BBB group shall comply with the rules in the WMO abbreviated heading, in regard to delayed, corrected and amended bulletins.

Examples	After QC check
METAR with incorrect YYGGgg: SABM31 VYMD 100830 **UTC** VYMD 100830Z 18005KT 8000 FEW025 31/18 Q1000 =	 SABM31 VYMD **100830** VYMD 100830Z 18005KT 8000 FEW025 31/18 Q1000 =
TAF without AHL: 112324 WIDDYMYX TAF WIDD 112324Z 1200/1224 00000KT 4000 RA BKNT017 BECMG 1203/1205 20010KT 9000 SCT017=	 **FTID31 WIDD 112300** TAF WIDD 112324Z 1200/1224 00000KT 4000 RA BKNT017 BECMG 1203/1205 20010KT 9000 SCT017=
TAF with invalid BBB: FTBN31 OBBI 030525 **AMD** TAF AMD OBBI 030525Z 0306/0406 16010KT CAVOK BECMG 0308/0312 33017KT 5000 PROB30 TEMPO 0308/0314 0800 DU=	 FTBN31 OBBI 030525 **AAA** TAF AMD OBBI 030525Z 0306/0406 16010KT CAVOK BECMG 0308/0312 33017KT 5000 PROB30 TEMPO 0308/0314 0800 DU=

1.1.3 METAR/SPECI Validation

For each individual METAR or SPECI within a bulletin the following additional fields shall be validated:

Prefix checks	METAR METAR COR SPECI SPECI COR	SA SA SP SP
Observation Time YYGGggZ	The report shall have a valid date and time of observation, including the character 'Z'. In a SPECI bulletin, this group will be same as (or very close to) the YYGGgg, part of the abbreviated bulletin heading.	
End-of-message format "="	Each METAR or SPECI report shall be terminated by the "=" character.	

Examples	After QC check
METAR with Observation Time error: SAPK31 OPKC **030159** RRA OPKC **030200** 26004 8000 BKN020 27/23 Q1007 NOSIG=	 SAPK31 OPKC **030200** RRA OPKC **030200** 26004 8000 BKN020 27/23 Q1007 NOSIG=
METAR with mistyped observation time: SAID31 WADD **120100** METAR WADD **121000Z** 17004KT 9999 FEW018CB SCT120 BKN300 28/26 Q1005=	 SAXX31 WADD **120100** METAR WADD **120100Z** 17004KT 9999 FEW018CB SCT120 BKN300 28/26 Q1005=
SPECI with incorrect Message Type, TT: **SANZ31** NZKL 040000 **SPECI** NZWP 040000Z 17005KT 010V240 25KM FEW020 FEW020CB SCT035 BKN050 18/15 Q1018 NOSIG=	 **SPNZ31** NZKL 040000 AAA **SPECI** NZWP 040000Z 17005KT 010V240 25KM FEW020 FEW020CB SCT035 BKN050 18/15 Q1018 NOSIG=

1.1.4 TAF Validation

For each individual TAF within a bulletin, the following additional items shall be validated:

Prefix checks	TAF TAF COR TAF AMD	FT FT FT
Issue Time YYGGggZ	If the field is included, it shall have a valid date and time of origin of forecast including 'Z'.	
Validity $Y_1Y_1G_1G_1/Y_2Y_2G_2G_2$	Some TAFs are still produced with a 4-digit validity period. These shall be corrected by inserting a date consistent with the current date and the date time group of the bulletin header. If a TAF is received without a validity period it shall be discarded.	
End-of-Message format “=”	Each forecast shall be terminated by the "=" character:	

Examples	After QC check
TAF with issue time error (wrong date): FCID31 WIII 181630 TAF WIII **041630Z** 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=	 FCID31 WIII 181630 TAF WIII **181630Z** 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=
TAF with mistyped Validity Period: FTPH31 RPLL 132200 TAF RPLC 132200Z **1400/1428** 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 –SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=	 FTPH31 RPLL 132200 TAF RPLC 132200Z **1400/1424** 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 –SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=
TAF with Validity error (wrong date): FCMS33 WMKK 170748 TAF WMKK 170700Z **3009/3018** 30005KT 9999 FEW017CB SCT140 BKN270=	 FCMS33 WMKK 170748 TAF WMKK 170700Z **1709/1718** 30005KT 9999 FEW017CB SCT140 BKN270=
TAF with 4-digit Validity period: FTXX31 WIDD 170121 TAF WIDD **0618** 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000=	 FTXX31 WIDD 170121 TAF WIDD **1706/1718** 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000

1.1.5 SIGMET Validation

CCCC on the AHL	A valid 4-letter ICAO location indicator indicating the FIR for which the SIGMET was	
Prefix checks	SIGMET for TS, CB, TURB, ICE, MTW, DS and SS	WS
	SIGMET for VA	WV
	SIGMET for TC	WC
Validity Period DDHHMM/DDHHMM	Shall have a valid period of validity. Validity periods may be corrected if: • Missing VALID string • Incorrect SIGMET number format • Incorrectly formatted validity period	
Note: For SIGMET validation, please refer to the format described in the AFI (WACAF or ESAF) Regional SIGMET Guide		

Examples	After QC check
SIGMET without TTAAii: **SIGMET** OYSN 121525Z OYSC SIGMET 1 VALID 121530/122130 OYSNSANAA FIR EMBD TS OBS/FCST OVER WESTERN AND SOUTHWESTERN MOUNTAINS AND COASTAL AREAS CB TOPS FL36 NC=	 **WSXX31** OYSN 121525Z OYSC SIGMET 1 VALID 121530/122130 OYSNSANAA FIR EMBD TS OBS/FCST OVER WESTERN AND SOUTHWESTERN MOUNTAINS AND COASTAL AREAS CB TOPS FL36 NC=
SIGMET with incorrect number format WCPH30 RPLL 210445 SIGMET **NO 01** VALID 210000/210600 RPLL TC OBS N0830 E12900 ….=	 WCPH30 RPLL 210445 SIGMET **01** VALID 210000/210600 RPLL TC OBS N0830 E12900 …
SIGMET with incorrect formatted validity period: WSIN90 VIDP 181800 VIDP SIGMET 06 VALID **18/1600** **TO 18/2000 UTC** VIDPDELHI FIR ISOL TS … = WSSD20 OEJD 220503 OEJD SIGMET 01 VALID **220500** **TO 220900** OEJN- JEDDAH FIR ….=	 WSIN90 VIDP 181800 VIDP SIGMET 06 VALID **181600/182000** VIDPDELHI FIR ISOL TS … = WSSD20 OEJD 220503 OEJD SIGMET 01 VALID **220500/220900** OEJN-JEDDAH FIR

1.2 Quality Control Methods

OPMET Data	Elements Defining	Control Methods
METAR METAR COR SPECI (SA,SP)	• AHL • Code name • Observation date/time	Software verification Manual validate Periodic Quality Control & PI Monitoring
TAF TAF AMD TAF COR (FT)	• AHL • Code name • Originating station ICAO location indicator • Date/time of issue • Date, time of starting, time of end of the period the forecast refers to	Software verification Manual validate Periodic Quality Control & PI Monitoring
SIGMET (WS, WC, WV)	• AHL • SIGMET Sequence No • Date/time groups indicating the period of validity Additional Checks (recommended): • Name of the FIR or the CTA the message is issued for • Location indicator of the MWO originating the message	Software verification Manual validate Periodic SIGMET Quality Control Monitoring
Volcanic Ash Advisory FV	• Type of message • • Issue date and time Additional Checks (recommended): • • Location indicator or name of the VAAC centre originating the message	Software verification Manual validate Periodic VA Quality Control Monitoring
Tropical Cyclone Advisory FK	• Type of message • Issue date and time Additional Checks (recommended): • Location indicator or name of the TCAC centre originating the message	Software verification Manual validate Periodic TC Quality Control Monitoring

2 OPMET Monitoring

2.1 Monitoring of Scheduled OPMET data

2.1.1 Performance Indicators (PIs). The indices to be used by the RODBs are based on those developed by the European BMG for monitoring the SADIS distribution (ref. SADISOPSG/8, IP/5 – *SADIS OPMET Performance Indices*).

(i) Compliance Index

The AMBEX Compliance index can be calculated from:

The Compliance Index is to assess the level of compliance to the AMBEX scheme. The determination of the compliance index is performed as follows:

- Total number of reports received for AMBEX bulletin during the monitoring period, include reports in the retard bulletins.
- Weed out correction and amendment bulletins, as these are re-transmitted messages, can be disregarded.

(ii) Availability Index

The availability index measures the current coverage of the OPMET distribution against the AMBEX exchange requirements. The determination of the availability index is performed on a daily basis from the data captured during the monitoring period. If at least one non-NIL report is received from the aerodrome during the 24-hour period, that aerodrome is considered to have been available. The daily availability index of a particular bulletin can be calculated as:

(iii) Regularity Index

The regularity index measures the consistency in the number of reports provided by an aerodrome. The computation of Regularity Index assumes that the number of report follows a normal distribution and attempts to ascertain the distribution characteristics (mean and standard deviation) from a set of data. These characteristics are used to determine if subsequent number of reports from an aerodrome is "regular".

Denoting mean and standard deviation by μ and σ, a threshold report numbers (τ) can be established as:

$$\tau = \mu - \sigma$$

The threshold is a reporting characteristic of an aerodrome. If the subsequent daily number of reports meets or exceeds the threshold, it is considered "regular". The daily regularity index for a bulletin can be expressed as:

2.2 Monitoring of non-scheduled OPMET data

2.2.1 Monitoring of non-scheduled OPMET data should be executed for FK, FV, WC, WS, and WV types of bulletins.

2.2.2 The monitoring results should be presented in bulletin-oriented format, one line per bulletin indicating the abbreviated header (TTAAii CCCC YGGgg), the FIR/UIR where applicable, receipt time and originator.

2.2.3 Example non-routine OPMET monitoring result file formats:

TT	AAii	CCCC	YYGGgg	FIR/UIR Rx	Time	Origin
WS	PF21	NTAA	271004	NTTT	271004	NTAAYMYX
WS	IN90	VIDP	271000	VIDP	271007	VECCYMYX
WS	BW20	VGZR	271100	VGZR	271030	VGZRYMYX
WS	CI31	RCTP	271150	RCTP	271150	RCTPYMYX
WS	MS31	WMKK	272013	WBFC	272013	WMKKYMYX
WS	CI35	ZGGG	272225	ZGZU	272228	ZGGGYZYX
FV	AU01	ADRM	270323		270330	YMMCYMYX
FK	PQ30	RJTD	270500		270504	RJTDYMYX

Explanations to the table:

- TT: Type of bulletin FK, FV, WC, WS, WV
- AAii: Bulletin ID
- CCCC: Compiling Station
- YYGGgg: Standard time of report
- FIR/UIR: ICAO Location indicator of the FIR/UIR or blank (4 spaces) as applicable
- RxTime: Time of receipt
- Origin: Originator address.

2.2.4 Analysis of Monitoring Results:

2.2.4.1 Each RODB collects and analyses the relevant result in order to determine the effectiveness and suitability of the quality management system and to highlight any possible improvement to ICAO Regional Offices, Dakar and Pretoria.

2.3 Examples of Monitoring Results – PI Measurements

The following tables show values of Compliance, Availability and Regularity Index for ASIA/PAC OPMET bulletins compiled by Singapore RODB in March 05:

TABLE A	ROBEX Compliance Index		
	SA	FT	FC
AE31 VECC	0.81	--	
AS31 VABB	---	0.99	
AS31 VTBB	0.96	0.99	
SA32 VABB	--	0.98	
AS32 VTBB	--	0.85	
AU31 YBBN	1.00	0.99	0.97

Note: *Entry dashed out (--) means no reports of this type (SA or FT) are required*

TABLE B	Availability Index		
	SA	**FT**	**FC**
AE31 VECC	0.98	--	
AS31 VABB	---	1.00	
AS31 VTBB	0.99	1.00	
SA32 VABB	--	0.99	
AS32 VTBB	--	0.96	
AU31 YBBN	1.00	1.00	1.00
.	.	.	.
.	.	.	.

TABLE C	Regularity Index		
	SA	**FT**	**FC**
AE31 VECC	0.86	--	
AS31 VABB	---	0.96	
AS31 VTBB	0.93	0.96	
SA32 VABB	--	0.96	
AS32 VTBB	--	0.96	
AU31 YBBN	0.90	0.90	0.96
.	.	.	.

APPENDIX 3.5-I

INTERNATIONAL CIVIL AVIATION ORGANIZATION

APIRG
METEOROLOGY SUB-GROUP(MET/SG)

AFI OPMET MANGEMENT TASK FORCE

AFI OPMET DATA BANKS

INTERFACE CONTROL DOCUMENT
FOR

AFI OPMET Database Access Procedures

First Edition – March 2009

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Appendices

Appendix A — RODB Dakar – Specific procedures and catalogue of OPMET bulletins A-1
Appendix B — RODB Pretoria – Specific procedures and catalogue of OPMET bulletins B-1

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1 INTRODUCTION

1.1 This Interface Control Document (ICD) describes the standard interrogation procedures for access to the designated Regional OPMET Databanks (RODBs) in the AFI Region. By accessing these databanks, the user implicitly acknowledges the disclaimer in paragraph 6.

1.2 The ICD contains details of:

- locations and AFTN addresses of the RODBs;
- request and reply AFTN message formats; and
- standard available meteorological products.

1.3 The ICD is published and maintained up-to-date by the ICAO Regional Offices, Dakar and Nairobi. The RODBs should notify regularly the Regional Offices of any changes in the procedures or content of the respective data banks.

2 REGIONAL OPMET DATABANKS

2.1 Location

The designated RODBs in the AFI Region are located at Dakar, Senegal and Pretoria, South Africa.

2.2 AFTN Access Addresses

The AFTN addresses that should be used to access the RODBs are the following:

Dakar	GOOYYZYZ
Pretoria	FAPRYMYX

2.3 OPMET Data Types

2.3.1 The following meteorological data types, as defined by the WMO data designator indicator, are stored and available on request from the RODBs:

TT	**Message Type**
SA	METAR/SPECI(1)
FT	18/24/36 HR TAF
WS	SIGMET
WC	Tropical Cyclone SIGMET (3)
WV	Volcanic Ash SIGMET(3)
UA	Special AIREP (2)
FV	Volcanic Ash Advisory (VAA)
FK	Tropical Cyclone Advisory (TCA)

Note (1): A reply for a METAR request will consist of the latest METAR or SPECI reports available for the concerned station.
Note(2): Not yet available in the AFI OPMET Databases
Note(3): When a query for WS SIGMET is received, the reply will contain valid WS,WC and WV SIGMETs that are available for the FIR

2.3.2 Further data types may be added as new requirements emerge. Only data with valid WMO abbreviated headings as defined in the WMO publication No.386 should be processed.

3 REQUEST/REPLY MESSAGE FORMAT

3.1 Request messages

3.1.1 Request messages should follow the AFTN standard telecommunication procedures as defined in Annex 10, Volume II. The text part of the messages should be as defined in this document.

Note: *The standard AFTN message start and end characters and alignment characters (SOH, STX and ETX for ITA-5 format or ZCZC and NNNN for ITA-2 format) have been omitted for clarity in the following examples.*

3.1.2 Request messages should use the AFTN priority GG.

3.1.3 The general format of the request message is as follows:

GG xxxxxxxx
YYGGgg yyyyyyyy
RQM/TTCCCC,(report(s)).../TTAAii, (bulletin(s))...=
RQM/TTCCCC,(report(s)).../TTAAii, (bulletin(s))...=
….

The meaning of the groups and symbols in the request message is as follows:

3.1.3.1 In the AFTN heading:

GG	priority indicator
xxxxxxxx	AFTN address of the databank
YYGGgg	date-time group specifying the filing time of the request message
yyyyyyyy	AFTN address of the originator of the request

3.1.3.2 Each data request line is composed of the following elements:

RQM/	indicates the start of a data request line
TT	WMO data type identifier (as per paragraph 2.3)
CCCC	4-letter location indicator (as per ICAO Doc 7910)
or	
AAii	bulletin identifier (WMO Manual No. 386, table C1 for AA)
=	indicator of the end of a request line.

3.1.3.3 Delimiters can be used within a request line as follows:

, indicates more requests for reports or bulletins for the same data type or different data types for one location;

/ indicates a new data type request within the same data request line.

3.1.4 The length of the request line should not exceed 69 characters including 'RQM' and the '=' signal. Up to ten request lines can be included in one AFTN request message, unless otherwise specified by the RODB (see the Restrictions paragraph in the Appendices).

3.1.5 Examples of request types

3.1.5.1 ***Request for one data type at one location***

The format of the request line to obtain one meteorological data type for one location is as follows:

RQM/TTCCCC=

Examples:

1. RQM/SAFBSK=
2. RQM/FCFAJS=

3.1.5.2 ***Request for one data type at two or more locations***

The format of the request line to obtain one MET data type for two or more locations is as follows:

RQM/TTCCCC$_1$,CCCC$_2$,.....,CCCC$_n$=

Note: *Up to ten locations can be included in a request line.*

Examples:

1. RQM/SAYSSY,YBBN,YMML=
2. RQM/FTNZAA,NZCH=

3.1.5.3 ***Request for two or more data types at one location***

The format of the request line to obtain two or more MET data types for one location is as follows:

RQM/TT$_1$CCCC,TT$_2$,.....,TT$_n$=

Examples:

1. RQM/SAFQMP,FC=
2. RQM/FTFADN,SA,WC=

3.1.5.4 ***Request for different data types at different locations***

The format of the request line to obtain different MET data types for a number of locations is as follows:

RQM/TT$_1$CCCC,CCCC, …/TT$_2$CCCC,CCCC,…/...../TT$_n$CCCC,CCCC,…=

Examples:

1. RQM/SAFBSK/FCFQMP,FBMN/FTFBSK=

3.1.5.5 ***Request for a meteorological bulletin***

The format of the request line to obtain a Meteorological Bulletin is as follows:

RQM/TTAAii=

Examples:

1. RQM/FTAE31=
2. RQM/SATH33=

Note: *Only one bulletin can be requested in a RQM request line. Up to six bulletins can be included in a request message*

3.1.5.6 ***Other request options***

RODBs may apply other specific request formats and options, such as requesting a number of preceding messages of certain data type, which should be described in the "specific request formats" section in the Appendices for each RODB.

3.2 **Reply messages**

3.2.1 If the AFTN address of the originator of a request is authorised, the databank should automatically reply to the AFTN originator address given in the request message.

3.2.2 Valid requests for bulletins and/or messages should produce an answer, which should be returned in a standard WMO bulletin format embedded as text in a standard AFTN message. Each bulletin should be sent as a separate message.

3.2.3 Per valid requested bulletin or message(s) belonging to the same type and concerning valid stored messages, one or more reply bulletins should be generated. Non-valid requested groups should be replied by an appropriate *Information* or *Error* reply message.

3.2.4 In preparing the reply messages by the RODBs the following should apply☹
(See also notes at para.2.3.1).

3.2.4.1 A reply to a METAR request should consist of the latest METAR and/or SPECI reports available for the requested station.

3.2.4.2 When a request for SIGMET of any type (WS, WC or WV) is received, the reply should contain all valid WS, WV and WC SIGMETs that are available for the FIR concerned.

3.2.5 **Format of the reply message**

3.2.5.1 The WMO abbreviated heading of a reply message will be constructed as:
TTAAii CCCC YYGGgg
where,
TT = is the requested data type (e.g., SA)
AA = **XX** : fixed geographical designator for database reply or as specified by the RODB
ii = **99** : fixed bulletin number for database reply or as specified by the RODB
CCCC = location indicator of the reply database (e.g. FACT, HKJK, etc.)
YYGGgg = date-time group (DTG) depending on the original DTG of the bulletin header

Note: *For the issuing time of TAF and the observation time of METAR the user should refer to the DTG in the reports, which might be different from the DTG in the header.*

Example:

SAXX99 VTBB 031200

METAR CCCC 031200Z …
METAR CCCC 031200Z
…

3.2.6 **Format of the *Information* and *Error* reply messages**

3.2.6.1 Currently the RODBs are using different formats of the "*Information and Error messages*", which are sent to the originator of the request when the RODB is not in a position to send back valid OPMET data. The format of these messages is specified in the Appendices for each RODB.

4 DATABASE MISUSE AND ABUSE

4.1 The RODBs should on a continuous basis monitor all the requests received from AFTN-users. In order to determine possible abuse or misuse of the AFI Infrastructure (AFI RODBs and AMBEX scheme), a detailed investigation may be performed for all frequent users. A frequent user is a user performing 100 requests or more per day, on a regular basis.

4.2 These investigations might lead to the detection of:

4.2.1 **Misuse** of the DB: the DB is not used in the way it is intended to.

A typical example of misuse would be a user requesting on a regular basis (e.g. every hour) the same reports. In case of misuse of a RODB, the ICAO Regional Office should be notified and requested contact the database user , together with its Parent RODB or AMBEX centre (or equivalent for interregional users), in order to find an alternative way to receive the required data. If a suitable solution is found to receive the data using the regular OPMET exchange procedures, but this solution is not accepted by the databank user (i.e. the misuse continues), then the RODB could decide to limit *or block* the access to the AFI OPMET Database for this user.

4.2.2 **Abuse** of the DB: users are requesting data they are not entitled to receive or it is suspected that users use the data for commercial purposes.

In case of abuse of the RODB is suspected, the database user might be contacted by the ICAO Regional Office with a request for information on its databank use. After investigation, the RODB could decide to limit *or block* the access to the AFI OPMET Database for this user.

5 AFI OPMET DATABASE CATALOGUE

5.1 Basic principles

5.1.1 The AFI OPMET Database Catalogue consists of lists of OPMET products that are required to be available in the AFI Regional OPMET Databanks, based on the requirements stated in the AFI ANP and additional requirements by airlines, which have been agreed with the provider States.

5.1.2 AMBEX scheme and the RODBs should ensure availability of the required OPMET information from all AFI aerodromes included in the AOP Table of the AFI Basic ANP (respectively, in the FASID Table MET 1A). In addition, requirements for non-AOP aerodromes have been stated by airlines to support the evolving operations, especially the long-haul and ETOP flights. These requirements are included in the SADIS User Guide, Annex 1. The AFI OPMET Database Catalogue should include also those non-AOP aerodromes, for which the States concerned have agreed to provide the required OPMET information.

5.1.3 The AFI OPMET Database Catalogue is provided in three sections as follows:

a) *Message types METAR/SPECI, FT TAF and TAF: (section 1)*
*The list of required reports is based on the CCCC list contained in the ANP/FASID (*Facillities and Services Implementation Document), *adopted by ICAO. The names of the CCCC locations and States are those listed in AFI FASID Tables MET 1A and 2A.*

b) *SIGMET: (section 2)*
SIGMETs for all FIRs are required. The SIGMET list is based upon the list from ICAO AFI FASID Table MET 1B.

c) Bulletins: (section 3)
Bulletin requests are shortcuts for requests of lists of reports. The reply to a bulletin request consists of one or more messages containing the latest valid (not NIL) reports of the requested stations. The bulletin list is based on the AFI bulletin tables. The bulletins selected for this catalogue:
- belong to the AFI area (European "AA" in the header)
- have an "ii" < 50
- contain at least one station of the AFI OPMET DB station catalogue

Some further manual selection was done, in case of duplicate TTAAii in the headers.

6. AVAILABILITY OF DATABASE CATALOGUES ON INTERNET SERVERS AND CONTACT ADDRESSES

DB Agent	Catalogue on internet server	Contact address
DAKAR	DAKAR Catalogue: http://brdo.asecna.org AFI OPMET Database catalogue+ **To be filled**	Représentation de l'ASECNA au Sénégal BP 8132 Aéroport Léopold Sédar Senghor, Dakar/Yoff, Sénégal Fax : +221 33 820 06 00 AFTN : **GOOYYZYX**
PRETORIA	**To be filled**	South African Weather Service HQ Postal Address Private Bag X097 Pretoria 0001 South Africa Physical Address 442 Rigel Avenue South Erasmusrand Pretoria 0181 South Africa Telephone numbers Tel: +27 (0) 12 367 6000 Fax: +27 (0) 12 367 6300 (Reception) AFTN: FAPRYMYX

[+]: The AFI OPMET Database Catalogue is the combined catalogue for the two AFI OPMET DBs (Dakar and Pretoria), defining their minimum common contents. The file structure and its contents are identical on all two FTP servers.

7. DISCLAIMER

7.1 Usage of the AFI RODBs implies that the user has taken notice of the disclaimer below, and accepts the associated consequences.

7.1.1 The lists of bulletins and stations in the AFI OPMET Database Catalogue only consist of lists of required data. It does not mean that these data are presently received in the AFI OPMET Database, or have been yet received.

7.1.2 The fact that there is no data found for one location and one type of message in the AFI OPMET Database does not mean that a message has not been generated for such a location, but only means that no valid message concerning such a location and such a type of message has been received or stored by the AFI OPMET Database.

7.1.3 The user assumes the entire risk related to its use of data.

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APPENDIX 3.5J

MTF Future Work Programme for 2009 – 2013 (*5 years: Current and next triennium*)

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
1	Examine the existing and any new requirements for OPMET exchange in AFI and adjacent regions and assess the feasibility of satisfying these requirements, taking into account the availability of the data;	APIRG/16 Décision. 16/54	• The related Chapter of the AMBEX Handbook reviewed (October 2009) • Develop back up procedures for the AFI RODBs (2012)	OPMET exchange in AFI and adjacent regions, improved
2	Keep under review the AMBEX scheme and other OPMET exchange schemes and prepare proposal for updating the optimizing of the schemes;	APIRG/16 Décision. 16/54	• the AMBEX scheme reviewed by MTF/1 (October 2009) • Continuous review	Exchange of OPMET information through AMBEX, improved
3	Review and update the procedures for interregional OPMET exchange and ensure the availability of the required AFI OPMET data for the AFS satellite broadcast (SADIS);	APIRG/16 Décision. 16/54	• The related Chapter of the AMBEX Handbook developed (October 2009) • SADISOPSG/14 Concl. Reviewed (October 2009) • Continuous review of the procedures • SADISOPSG/15 Concl. Review (2010): yearly	Efficient inter-regional OPMET exchanges and availability of AFI OPMET on SADIS, improved
4	Keep under review and provide timely amendments of the regional guidance materials on the OPMET exchange; to ensure that guidance material covers procedures for the exchange of all required OPMET data types: SA, SP, FT, WS, WC, WV, FK, FV, UA;	APIRG/16 Décision. 16/54	• The related Chapter of the AMBEX Handbook developed (October 2009) • Continuous review	Regional guidance material for the issuance of OPMET established and improved
5	Conduct trials and develop procedures for monitoring and management of the OPMET exchange; to foster implementation of quality management of OPMET data by the AMBEX centres and the RODBs; and	APIRG/16 Décision. 16/54	• procedures for monitoring and management of the OPMET exchange developed (October 2009) • 2 SIGMET Test conducted (November/2009 and June 2010) • One SIGMET Test a year • One OPMET monitoring by the RODBs every three months: end of March, June, September and October	SIGMET exchange and management of other OPMET, enhanced

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
			• Assessment of the RODBs during yearly meeting	
6	Prepare regional plan for the transition to XML coded OPMET information in coordination with the relevant APRIG contributing bodies.	APIRG/16 Decision. 16/54	• Final decision on future OPMET XML coded format awaited (2010) • Regional Plan to be prepared before the new binary coded OPMET (2011°	A regional OPMET format transition plan established

2. Composition

The Task Force is composed of experts from:

a) Algeria, Cameroon, Congo, Ethiopia, Egypt, Kenya, France, **Liberia**, Madagascar, Morocco, Niger, Nigeria, Senegal (Rapporteur), South Africa, UK and ASECNA.

b) Representatives of IATA and WMO and a**ny other State willing to provide Experts** are invited to participate in the work of the Task Force.

APPENDIX 3.5K

Operational Shortcomings and Deficiencies Identified During the SIGMET Tests

	Operational Shortcomings and Deficiencies	VAAC, TCAC, RODBs or MWOs	
1	VA SIGMET tests format not in compliance with Annex 3 provisions	FBSK, DNKN	
2	The VA SIGMET issued does not reflect the MET contain VAA test message provided the VAAC	FTTJ, GMMC, DRRN, GOOY, DTTA	
3	No line change after the hyphen separating the preamble from the text	GMMC, FAJS	
4	The priority indicator GG instead of FF, was used to issue the Advisories (VAA or TCA) or the SIGMET messages	TCAC, DRRN, DNKN, DTTA, FAJS	
5	An Aerodrome MET Office issued a SIGMET while it is not a MWO.	DNMM	
6	A MWO issued a TC SIGMET while it is not allowed to do it	DTTA	
7	Used SIGMET type indicator WC instead of FK in the header	FAJS	
8	A real VAA message from VAAC Darwin reported as a VAA test message from Toulouse VAAC	Dakar RODB	
9	A none MET content TCA test message was issued instead of a MET content TCA	TCAC	
10	Some of the MWOs are not able to issue any SIGMET due to lack of telecommunication facilities or organizational issues (No SIGMET received during 21 days monitoring at the RODBs: Appendix 7)	**8 MWOs suspected:** FNLU, HBBA, HRYR, HCMM, HUEN, HTDA, FZAA, GLRB,	
11	No SIGMET received at the RODBs during both tests	24 MWOs	**ESAF - 19:** FNLU, HBBA, HECA, HAAB, HHAS, HKJK, HLLT, FWKI, FIMP, FQMA, FYWH, HRYR, FSIA, HCMM, HSSS, HUEN, HTDA, FLLS, FVHA.
			WACAF – 5: DAAG, GCLP, GVAC, FZAA, GLRB.

APPENDIX 3.5L

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE METEOROLOGY SUB-GROUP (MET/SG)

1. Terms of Reference

a. To keep under review, the adequacy of meteorological facilities and services to meet new technological developments in the air navigation field and make proposals as appropriate for implementation by States to APIRG.

b. To identify, State by State, those specific deficiencies and shortcomings that constitute major obstacle to the provision of efficient and reliable meteorological facilities and services to meet the requirements of air navigation in the AFI Region and recommend specific measures to eliminate them.

2. Future Work Programme

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
1	Establish and maintain detailed lists, State by State of the specific deficiencies of facilities for the provision of atmospheric measurements pertaining to surface wind, pressure, visibility/runway visual range, cloud base, temperature and dew point temperature considered critical for flight safety.	APIRG/13 Con. 13/96	• State by state MET deficiencies have been established and included in APIRG/15 Report • Surveys are in progress	Deficiencies on MET parameters measurements established and compiled
2	Monitor the exchange of OPMET information through the AMBEX scheme in the AFI Region and between the AFI and ASIA/PACIFIC and EUR Regions	APIRG/8 Con. 8/43 c)	•Continuing task •Next monitoring with two events in 2010	Exchange of OPMET information through AMBEX and SADIS, improved
3	Plan for the introduction of efficient inter-regional OPMET exchanges in coordination with the CNS Sub-group as required	AFI/7	Implementation of AMBEX Scheme	Efficient inter-regional OPMET exchanges
4	Monitor the degree of implementation of very small aperture terminals (VSATs) for the reception of WAFS products	AFI/7 Rec. 14/12	• A large number of AFI States have implemented SADIS2G VSATs with others using the SADIS FTP Service	Information on the implementation of SADIS VSAT and FTP established and compiled
5	Monitor the quality of WAFS high and medium level significant weather charts in the AFI Region, provide feed back to WAFC, London as appropriate	APIRG/12 Con. 12/34	• Continuing task • Survey is in progress	Improvement of the quality of WAFS high and low level significant weather charts in the AFI Region
6	Monitor the implementation of regional procedures for the issuance of volcanic ash and tropical cyclone advisories	AFI/7 Rec. 7/3 and 7/4	• Continuing task • Survey is in progress	Regional procedures for the issuance of volcanic ash and tropical cyclone advisories Implemented

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
7	Review on a continuing basis the contents of Tables MET 1A and 1B and Tables MET 2A to ensure their validity in light of operational requirements and develop proposals to update them if necessary.	AFI/7	• Continuing task • Survey is in progress	The validity of contents of Tables MET 1A, 1B and and Table MET 2A.are to ensured
8	Review the meteorological procedures in the introductory text to Part VI B Meteorology of the Basic AFI Regional Plan/FASID, as well as Meteorological related issues in other sections of the Plan and relevant regional supplementary Meteorology procedures (SUPPs) in the Doc 7030, in the light of procedures employed in other regions and develop amendment proposals as appropriate, coordinating where necessary with other APIRG Sub-Groups.	APIRG/12	•Amendments made since APIRG/16 in the plan	Maintain up to date procedures to improve safety and efficiency of air navigation.
9	Monitor developments in the CNS/ATM Systems with regard to meteorological requirements in the AFI Region and in coordination with AFI ATM Sub-Group.	APIRG/14 Con. 14/43	• The need to take in account how the developments in the FAA NextGen and Eurocrol SESAR programmes will impact the AFI Region	Consistent provision of meteorological information as an integrated function of the ATM system with improved accuracy and timeliness and increased availability. Performance management will be an important part of the quality assurance of meteorological information.
10	Develop guidelines for the use of GRIB and BUFR codes in the AFI Region.	APIRG/15 Con. 15/81		
11	Monitor the implementation in the AFI region of quality assurance/performance relating to the MET field	APIRG/14 Con. 14/40	• Two seminars in French and English for trainers of trainers in Quality Management System for aeronautical meteorological services in 2010	AFI region quality assurance/performance relating to the MET field, implemented

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
12	Monitor training and qualification of aeronautical MET personnel	APIRG/15 Dec. 15/94	• Undertake a survey during the triennium for purposes of establishing a database on the status of availability, level of training and competence of aeronautical meteorological services personnel,	Information on training and qualification of aeronautical MET personnel established and compiled

3. **Composition**

Algeria, Burkina Faso, Cameroon, Congo, Côte D'Ivoire, Egypt, Eritrea, Ethiopia, France, Gabon, The Gambia, Ghana, Guinea, Kenya, Madagascar, Malawi, Morocco, Niger, Nigeria, Senegal, South Africa, Spain, Tunisia, United Kingdom, United Republic of Tanzania, Zambia, ASECNA, IATA and WMO.

APPENDIX 3.6B

AIM PERFORMANCE OBJECTIVES (AIS-AIM Transition)

REGIONAL PERFORMANCE OBJECTIVES / NATIONAL PERFORMANCE OBJECTIVES **TRANSITION FROM AIS TO AIM**	
Benefits	
Environment **Efficiency** **Safety**	. reductions in fuel consumption; . improved planning and management of flights; . efficient use of airspace; . improved safety
KPI Region	Status of implementation of the AIRAC system in the AFI Status of implementation of QMS in the AFI Region Status of implementation of AIS Automation in the AFI Region
Proposed **Metrics**	Number of States complying with the AIRAC procedures Number of Posting of AIS information on the ICAO AFI Forum Number of States having developed and signed service Level Agreements between AIS and data Originators Number of States having organized QMS awareness campaigns and training programmes Number of States having implemented QMS Number of States having developed eAIP Number of States having developed a National Plan for the transition from AIS to AIM
Strategy ***Short term (2010)*** ***Medium term (2011 – 2015)***	

ATM OC COMPONENTS	TASKS	TIMEFRAME START-END	RESPONSIBILITY	STATUS
AUO, ATM SDM	• Improve the compliance with the AIRAC system	Ongoing	States & AFI AIMTF	Valid
	• Use of the internet, including the ICAO AFI Forum, for the advance posting of the aeronautical information considered of importance to users;	2009 – 2011	States & ICAO	Valid
	• Signature of service Level Agreements between AIS and data originators;	2009 – 2011	States	Valid
	• Foster the implementation of AFI QMS based on the AFI Region Methodology for the implementation of QMS ;	2009 – 2011	ICAO & AFI AIMTF & States	Valid
	• Monitor the implementation of QMS until complete implementation of the requirements by all AFI States;	2008 - 2013	ICAO & AFI AIMTF	Valid
	• Foster the development of eAIPs by AFI States;	2009 - 2013	States & AFI AIMTF	Valid
	• Monitor the implementation of AIS automation in the AFI Region in order to ensure	2008 -2013	ICAO & AFI AIMTF	Valid

	availability, sharing and management of electronic aeronautical information;			
	• Foster the development of National/regional AIS databases;	2010 – 2015	ICAO & AFI AIMTF & States	Valid
Linkage to GPIs	GPI-5: performance-based navigation; GPI-11: RNP and RNAV SIDs and STARs; GPI-18: Aeronautical Information			

Abbreviations used in the Global ATM Operational Concept:

AO	Aerodrome Operations
AOM	Airspace Organization and Management
ATM SDM	ATM Service Delivery Management
AUO	Air User Operations
CM	Conflict Management
DCB	Demand and Capacity Balancing
TS	Traffic Synchronization

APPENDIX 3.6C

eTOD Regulator Checklist to Support Implementation Planning

Awareness

- Determine the affected stakeholders in your State:
  - Ministry responsible for Transportation;
  - Civil Aviation Authority;
  - AISP;
  - ANSP;
  - Military;
  - National Geodetic, Cadastral or State Survey organisation;
  - Commercial survey companies or associations such as the Royal Institute of Chartered Surveyors (UK);
  - Military survey organisation;
  - Aerodrome operator or airport association(s);
  - National airlines;
  - General Aviation;
  - Helicopter operators or helicopter operator associations including
  - Air Ambulance and civil SAR;
  - Local authorities or those responsible for aerodrome safeguarding
  - construction approval in the vicinity of the aerodrome;
  - Ministry responsible for local government, land planning and environment;
  - Power transmission companies;
  - Regulatory authority for radio and television broadcasts;
  - GSM antenna operators;
  - Local port authorities if ports exist within close proximity to an airport.

- From the foregoing, identify the Focal Point(s) in your State;

- Consider holding an eTOD awareness day or regional awareness days;

- Consider the establishment of a State Working Group to identify costs and determine an implementation plan.

The Four Areas

- Establish the State's policy with regard to implementing the current SARPS;

- Determine a State policy for what data will be made available for each of the four Areas, for which aerodromes and when;

- Determine a State policy for how and by whom the eTOD will be made available.

Regulation

- Confirm the State policy for the safeguarding of aerodromes from obstacle penetration, consider how effective the policy is and determine if available data can be demonstrated to be in compliance with eTOD requirements. In the absence of a declared or established policy, consider establishing one;

- Consider the application of National regulation to allocate responsibility for the provision of eTOD;

- Consider and map the development and implementation of an obstacle permission process *(note: there are currently several commercial tools to support this process);*

- Consider the nature, scope, content, time and processes associated with the development of legislation for any obstacle permission process;

- Determine which data sources should be regulated, how standards may be placed upon them and with whom responsibility for data and the data processes should rest.

Data Sources

- Collate a list of possible sources of terrain and obstacle data;
- Establish a meeting to discuss the appropriateness and possible use of these data sources;
- Determine where liability for each data source resides.

Survey

- Determine the common survey formats to be used by surveyors and geodetic institutes;
- Determine the survey requirements for each of the four Areas, including resurvey intervals;
- Prepare example contracts for surveyors to ensure that the data provided meets the necessary numerical requirements;
- Determine the responsibilities that may be placed upon surveyors to ensure that they use the correct standards, and how this may be confirmed.

Cross-border Harmonisation

- Consider how cross-border harmonisation could be organised, if applicable;
- Consider the establishment of agreements with neighbouring States to exchange and harmonise common data.

Oversight Monitoring

- Determine a means of providing oversight management for monitoring progress;

- Determine a policy for the audit of involved organizations.

APPENDIX 3.6D

Insert Organization Name Here

Insert Organization Logo Here

eTOD Implementation Plan Template

AFI eTODWG/1

Edition:	**:**	**0.1**
Edition Date:	**:**	**Xxxx 200x**
Status	**:**	**Working Draft**

DOCUMENT APPROVAL

The following table identifies all management authorities that have successively approved the present issue of this document

AUTHORITY	NAME AND SIGNATURE DATE
Author/Editor	**[Insert Author details here]**
Quality Assurance	**[Insert reviewer details here]**

DOCUMENT CHANGE RECORD

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1. INTRODUCTION

1.1 Purpose and Scope

This document provides the plan for **[Name of State]** relating to the implementation of electronic Terrain and Obstacle Data (eTOD).

This covers the following activities:

- The Four Areas;
- Regulation;
- Data Sources;
- Survey;
- Cross-border Harmonisation;
- Oversight Mechanism;
- Charging and Cost Recovery;
- Data Validation and Verification;
- Data Provision and Maintenance.

[Supporting material may be found in ATTACTMENT- A. It is intended that at an appropriate stage of its development, this material is transferred to the eTOD Manual.

Text in blue is that which needs to be replaced by the developers of the implementation plan in the State. Text in green may be used as guidance in developing the implementation plan.

It should be noted that some sections of this template may not be applicable / appropriate for a State to include in its implementation plan. The sections are not intended to be mandatory and a State may select to include whichever sections it deems appropriate. Moreover, the issues addressed by the template are not exhaustive and States may add to the template, as required.]

2. THE FOUR AREAS

2.1 State Policy with Regard to Current SARPS

2.1.1 Purpose of this Section

This section documents the **[Name of State]** policy relating to the implementation of the SARPS in place on **[enter date here]**.

2.1.2 State Policy

[Provide the State policy here.]

2.1.3 Considerations

[Discussions should take place in a State with representatives of the aviation community to help define a national policy for the implementation of Chapter 10, ICAO Annex 15. The discussions should include, as a minimum, the Regulator, Military and ANSP. Mindful that any change proposals have not yet been submitted to ICAO for consideration, it is important that the State determines, as a minimum, what it intends to do with regards Areas 1 and 4 as these have an effective date of

20th November, 2008. In cases where there is data available, which meets the necessary numerical requirements, no action other than making it available needs to be taken. However, should this data not be available or data that is available does not meet the numerical requirements or the requirements of quality, including data validation, it is suggested that the State files a difference to ICAO.]

2.1.4 Text of ICAO Difference

[Provide the State ICAO difference text here, if applicable.]

2.2 State Policy for Scope of eTOD for Four Areas

2.2.1 Purpose of this Section

This section documents the **[Name of State]** policy for the scope of data provision for Areas 1, 2, 3 and 4, and for which aerodromes Areas 2 and 3 are applicable. The policy should include the quality requirements, such as accuracy, resolution, etc.

2.2.2 State Policy for Area 1

[Provide the State Policy for Area 1 here.]

2.2.3 State Policy for Area 2

[Provide the State Policy for Area 2 here.]

2.2.4 State Policy for Area 3

[Provide the State Policy for Area 3 here.]

2.2.5 State Policy for Area 4

[Provide the State Policy for Area 4 here.]

2.3 State Policy of How, When and by Whom eTOD will be Made Available

2.3.1 Purpose of this Section

This section documents the **[Name of State]** policy of how, when and by whom eTOD will be made available.

2.3.2 State Policy

[Provide the State Policy for the availability of eTOD.]

3. REGULATION

3.1 Applicable Regulation

3.1.1 Purpose of this Section

This section documents ICAO, AFI Region and other international and national regulations applicable to eTOD.

3.1.2 International Regulation

[List international regulation for eTOD here.]

3.1.3 National Regulation

[List any national regulation for eTOD here.]

3.1.4 Considerations

[In addition to ICAO regulation, the Aeronautical Data Quality Implementing Rule should be included.

It may be determined during State discussions that some form of national Regulation may be needed to expedite the implementation of eTOD and ensure that all actors accept their responsibilities. Any national Regulation related to eTOD should be listed in 3.1.3.

Consideration should also be given to guidance material, such as ISO 9001, ISO 19100, OGC standards, (draft) Doc 9881, etc.]

3.2 State Policy on Aerodrome Safeguarding

3.2.1 Purpose of this Section

This section documents the **[Name of State]** policy for the safeguarding of aerodromes.

3.2.2 State Policy

[Provide the State policy for aerodrome safeguarding here.]

3.3 Obstacle Permission Process

3.3.1 Purpose of this Section

This section documents the obstacle permission process of **[Name of State]** and any legislation that applies.

3.3.2 Process

[Provide the State obstacle permission process here and list any legislation that applies.]

3.3.3 Considerations

[It is recommended that a State considers the development of an obstacle permission process. This may take best practice from South Africa and other

States which have a declared policy. In addition, States may wish to consider the development of legislation to enforce this process on those responsible for the erection and maintenance of obstacles.]

3.4 Regulation of Data Sources

3.4.1 Purpose of this Section

This section documents the **[Name of State]** approach to regulating data sources, to ensure that the appropriate standards and processes are applied.

3.4.2 Regulation

[Provide the State's policy for regulating data sources**.]**

4. DATA SOURCES

4.1 Purpose of this Section

This section lists the organisations that have been consulted to assess if the data they originate and maintain meets the appropriate requirements of eTOD. To be fully able to assess the data source, States should determine if the type of data source provider, i.e., State-owned, commercial organisation, etc, in order to be able to fully assess the impact of using its data. Where data is available and is suitable for use, this section provides information about the liability, cost/cost recovery and licence issues associated with it. Where arrangements are made for data source providers to make data available for aviation use, to the State, formal arrangements should be established between the data source providers and the receiving body. This section should list the formal arrangements in place which are related to the provision of eTOD.

The use of a Service Level Agreement is one example of a formal arrangement being established.

4.2 Data Sources Consulted

4.2.1 Data Source Provider

[For each data source provider identified, provide information about its status, i.e., State-owned, commercial organisation and list any particular areas of issue that arise from this.]

4.2.2 Liability

[For each data source identified, provide information about where the liability for the data lies.]

4.2.3 Cost Model

[For each data source identified, provide information related to the costs for the data.]

4.2.4 Licensing

[For each data source identified, provide information related to the licensing of the data.]

4.2.5 Formal Arrangements

[List the formal arrangements in place for the provision of eTOD.]

4.3 Considerations

[The owners of the following data sources or the following organisations, as an example, should be consulted:

- Geodetic institutes;
- Power / energy supply companies;
- Wind farm operators;
- Mapping agencies;
- Authority(ies) responsible for the authorisation of radio/TV and other broadcast antenna;
- Cell phone operators;

- Port authorities.

States should establish their own list of data sources which they will consult in the process of trying to identify eTOD providers. Following this, it is recommended that a meeting is held with each possible data source to discuss the appropriateness and possible use of their data and where liability lies.

States should assess the cost model and licensing of the data from a data source, taking into account whether the organisation is State-owned or a commercial organisation. Clearly, commercial organisations that already provide data for a charge to its users will not be willing to loose this revenue stream, this making the cost model and licensing for these products, more complex.

Formal arrangements should be made between data source providers and the receiving party. This will clearly state the quality requirements for the data, means of provision, etc. It is recommended that where a data source provider will provide data regularly, over a period of time, a Service Level Agreement is used to capture this agreement. Where data provision is likely to be a one-off or a very infrequent occurrence, it is recommended that a contract is established between the two parties.]

5. SURVEY

5.1 Survey Formats

5.1.1 Purpose of this Section

This section documents the common survey formats to be used by surveyors and geodetic institutes.

5.1.2 Formats

[List the common survey formats to be used here.]

5.2 Survey Requirements

5.2.1 Purpose of this Section

This section documents the survey requirements for each of the four Areas.

5.2.2 Survey Requirements for Area 1

[Provide the survey requirements for Area 1 here.]

5.2.3 Survey Requirements for Area 2

[Provide the survey requirements for Area 2 here.]

5.2.4 Survey Requirements for Area 3

[Provide the survey requirements for Area 3 here.]

5.2.5 Survey Requirements for Area 4

[Provide the survey requirements for Area 4 here.]

5.3 Survey Contracts

5.3.1 Purpose of this Section

States may, if they wish, include in their implementation plans details of requirements that should be included in survey contracts. If this is the case, this section will include the requirements that should be included in survey contracts for each of the four Areas, to ensure that the data provided through the contract meets the necessary numerical and quality requirements.

5.3.2 Survey Contracts

[Provide the text to be used in survey contracts here.]

5.4 Surveyor Vetting

5.4.1 Purpose of this Section

This section documents how surveyors are vetted to ensure that they adhere to the correct standards and discharge their legal responsibilities in accordance with the contract.

5.4.2 Vetting Process

[Provide the State vetting process for surveyors here.]

5.4.3 Considerations

It should be noted that this section may not be relevant to every State. Responsibility for the vetting of surveyors may rest elsewhere and, therefore, this section only applies to those States that have responsibility for this.

6. CROSS-BORDER HARMONISATION

6.1 State Agreements / Arrangements

6.1.1 Purpose of this Section

This section documents the arrangements in place with other States for the exchange, provision and receipt of common eTOD.

6.1.2 Arrangements

[List the arrangements in place with neighbouring States for the exchange, provision and receipt of common eTOD.]

6.1.3 Considerations

[It is recommended that some form of harmonisation activity is undertaken with neighbouring States, perhaps through the medium of a Service Level Agreement

(SLA). Further, it is recommended that, where appropriate, States could make arrangements for data within its boundary to be provided to the other State, where it is needed for the other State's aerodrome. Alternatively, arrangements could be made to share the survey costs or to use one survey company, all with the intention of lowering the cost of data acquisition.

To assist with the exchange of data between States and other users, it is recommended that a common TOD exchange format is adopted.]

7. OVERSIGHT MECHANISM

7.1 Progress Monitoring

7.1.1 Purpose of this Section

This section details the mechanism by which the State intends to monitor the implementation of eTOD.

7.1.2 Monitoring Policy

[Detail how the State will monitor the implementation of eTOD, including how any obligations to meet ICAO Requirements .]

[List the State policy for monitoring eTOD implementation.]

7.2 Audit

7.2.1 Purpose of this Section

This section details the **[Name of State]** plan for the audit of the organisations involved in the implementation and subsequent management and maintenance of eTOD.

7.2.2 State Plan

[Provide the State's plan for the audit of organisations**.]**

8. COST RECOVERY AND CHARGING

8.1 Cost Recovery

8.1.1 Purpose of this Section

This section identifies how **[Name of State]** will finance eTOD. It states from whom the finance will be obtained and the cost recovery mechanisms associated with the initial and ongoing costs for eTOD, for each of the four Areas.

8.1.2 Initial Costs

8.1.2.1 Cost Recovery for Area 1

[Provide the means of cost recovery for Area 1 here.]

8.1.2.2 Cost Recovery for Area 2

[Provide the means of cost recovery for Area 2 here.]

8.1.2.3 Cost Recovery for Area 3

[Provide the means of cost recovery for Area 3 here.]

8.1.2.4 Cost Recovery for Area 4

[Provide the means of cost recovery for Area 4 here.]

8.1.3 Ongoing Costs

8.1.3.1 Cost Recovery for Area 1

[Provide the means of cost recovery for Area 1 here.]

8.1.3.2 Cost Recovery for Area 2

[Provide the means of cost recovery for Area 2 here.]

8.1.3.3 Cost Recovery for Area 3

[Provide the means of cost recovery for Area 3 here.]

8.1.3.4 Cost Recovery for Area 4

[Provide the means of cost recovery for Area 4 here.]

8.1.4 Considerations

[Consideration should be given to the need to recover costs not only in the initial implementation but as an ongoing activity including the:

- Increased costs for AISPs in managing the data;
- Increased costs for regulators in monitoring and auditing those associated with eTOD implementation and provision;
- Indirect costs such as the adaptation of procedures due to new / updated obstacle data.]

8.2 Charging Mechanisms

8.2.1 Purpose of this Section

This section identifies the charging mechanisms in place in **[Name of State]** to recover the costs associated with the initial and ongoing provision of eTOD.

8.2.2 Mechanisms

[Provide the charging mechanisms for eTOD here.]

9. DATA VALIDATION AND VERIFICATION

9.1 Assessment of Existing Data

9.1.1 Purpose of this Section

This section identifies how existing data should be assessed to determine if it meets the eTOD requirements.

9.1.2 State Policy

[Provide the State Policy for assessment of existing data here.]

9.1.3 Considerations

[Consideration should be given to whether means already exist in the State to validate data, including its associated metadata, to determine its appropriateness.

Consideration should be given to the following:

- Does the data meet the ICAO numerical requirements?
- Does the data have the associated metadata?
- Does the data have full traceability?

Methods for the assessment of different data types should be determined / identified.]

9.2 Data Validation and Verification

9.2.1 Purpose of this Section

This section details the approach of **[Name of State]** to the validation and verification of existing and new data.

9.2.2 Approach to Data Validation and Verification of Existing Data

[Provide the State's approach to data validation and verification of existing **data.]**

9.2.3 Approach to Data Validation and Verification of New Data

[Provide the State's approach to data validation and verificati**on of new data.]**

9.2.4 Considerations

[Consideration should be given to whether means already exist in the State to validate data, including its associated metadata.

The approach should ensure that the data has full traceability

10. DATA PROVISION AND MAINTENANCE

10.1 Data Exchange Formats

10.1.1 Purpose of this Section

This section details the data exchange formats to be used for eTOD.

10.1.2 Data Formats

[List the exchange formats to be used for eTOD.]

10.2 Means / Media

10.2.1 Purpose of this Section

This section details the means / media by which each data set shall be made available.

10.2.2 Means of Provision: XXXX

[Insert explanation of how the means will be used to make the data sets available.]

10.2.3 Considerations

[It is intended that a subsection is provided for each means of provision, for example, Means of Provision: DVD, Means of Provision: Internet, etc.]

10.3 Data Maintenance

10.3.1 Purpose of this Section

This section details the State policy for the update / maintenance of data, including periodicity.

10.3.2 State Policy

[Provide the State's policy for data mai**ntenance.]**

ATTACHMENT- A GUIDANCE FOR INCLUSION IN eTOD MANUAL

A.1 Identification of all Stakeholders

It is important that the stakeholders in the State are identified so that there is full awareness of eTOD and that there is an efficient flow of information between the parties involved. It is anticipated that the stakeholders will meet, as appropriate, to plan and implement the eTOD policies for the State.

A.2 eTOD Awareness Day

It is recommended that a national awareness day or a series of regional seminars are held to raise the awareness of stakeholders to the requirements of eTOD. This would allow all parties, especially those that do not usually attend the TOD WG or Aeronautical Information (AI) Team, to be briefed on the requirements of ICAO and the AFI Region progress towards the implementation of eTOD. The attendance by personnel of the following organisations should be considered, though the list is by no means exhaustive:

- Ministry of Transport;
- Civil Aviation Authority;
- AISP;
- ANSP;
- Military;
- Aerodrome operators;
- Survey organisations – civil and military;
- Geodetic institutes;

- Airline representatives;

- General Aviation.

In the interests of economy, States may wish to co-host such workshops and to share their experiences and best practices associated with eTOD for the common good.

A.3 State Working Group

This section would include information related to the establishment of a State

Working Group for TOD.

This has been demonstrated as a successful initiative in States and has, therefore, been taken as an example of best practice.

A.3.1 Considerations

It is recommended that such a working group be formed by, amongst others:

- State Regulator responsible for TOD provision;

- State AIS for publication;

- Military AIS (when applicable to data provision);

- State survey organisation;

- Military survey organisation, if applicable;

- Representative(s) of national aerodromes;

- Representation (probably at a national level) of local authorities or those with the responsibility for safeguarding and/or approving construction in the vicinity of an aerodrome

- Authorities or organisations responsible for the authorisation or maintenance of obstacles, such as:
  - ◊ Broadcast transmission antennas;
  - ◊ GSM masts;
  - ◊ Electricity transmission pylons;
  - ◊ Wind turbine farms.

- In States, where aerodromes may be adjacent to ports, representatives of the

  Port Authority.

A.4 Focal Points

This section will include guidance about which organisations should be considered to establish contact points in a State. This would include:

- Ministry of Transport
- The Civil Aviation Authority;
- The Military;
- The ANSP;
- The civil AIS / AIM;
- Aerodrome authorities;
- National geodetic institutions.

A.5 Cross-border Harmonisation

Consideration should be given to means by which States may share common data. It is recommended that meetings are held with neighbouring States to discuss possible ways forward. Consideration should also be given to the use of common exchange formats.

APPENDIX 3.6E

NATIONAL E-TOD IMPLEMENTATION PLAN

South African
Electronic Terrain and Obstacle Data (eTOD)
Implementation Plan

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EXECUTIVE SUMMARY

Amendment 33 to ICAO Annex 15 (effective 12/07/2004) introduced requirements for States to ensure that electronic sets of Terrain and Obstacle Data (TOD) are available. The data shall be provided for four distinct areas, with each having specific data collection requirements.

Implementation of these requirements has caused significant concerns, mainly as a result of the high costs associated with data collection and processing, and the lack of a clear business case to support this expenditure.

This document provides the plan for South Africa relating to the implementation of electronic Terrain and Obstacle Data (eTOD). The purpose of providing terrain and obstacle data in an electronic format is stated in ICAO Annex 15, 10.1, where a set of applications / operations is listed.

The requirements for providing electronic terrain and obstacle data can be grouped as follows:

- Data collection requirements (geographical area): Areas 1,2,3 and 4;
- Data quality requirements (data accuracy, integrity and resolution);
- Database requirements (terrain database and obstacle database);
- Availability requirements (when / how data to be made available by States).

As regards Area 1 Electronic Terrain Data, South Africa will fully comply with Chapter 10, ICAO Annex 15, and therefore does not intend to file any difference with regards the technical content requirements. However not all of Electronic Obstacle Data complies with the data integrity requirements, therefore South Africa will not fully comply with Chapter 10, ICAO Annex 15, and has filed differences (alternative method of compliance differences have been filed on 10.2.5, 10.4.2 and 10.5.6). The issue is that we are dealing with legacy data whose integrity cannot be guaranteed at present. Circular Error of Probabilities (CEPs) will be provided with all data whose positional integrity does not fully comply with Chapter 10, ICAO Annex 15. The SACAA has taken responsibility for the provision of Area 1 data. For Area 2, IFR Aerodrome with ATS Service Provider, eTOD will be provided by the ATS Service Provider in conjunction with the SACAA, and for IFR Aerodrome without an ATS Service Provider, eTOD will be the responsibility of the Aerodrome License Holder in conjunction with the SACAA. Area 3 and Area 4 will be the responsibility of the Aerodrome License Holder.

Two databases shall be provided: a terrain database and an obstacle database. Neither of the databases shall contain data belonging to the other. All the eTOD data will reside with the SACAA in a Geodatabase that will be maintained by the Procedure Design & Cartography Department, and the data will be maintained by the respective data providers for each area.

Terrain and obstacle data shall comply with ISO 19100 series requirements in terms of data modelling. The eTOD implementation shall be in compliance with ICAO provisions contained in Annex 15, as amended, and Document 9881, and will be managed by the SACAA as a national programme supported by necessary resources, a high level framework and detailed planning, including priorities and timelines for the implementation of the programme.

Data validation and verification will be done to ensure that the data meets the ICAO numerical requirements, has the associated metadata and has full data source traceability. Updating of the database shall be done on a regular basis to account for errors, new or amendments to existing data sets. In that way, applications that use data continue to be trustworthy.

The SASACAA will adopt/follow a collaborative approach involving all concerned parties in the implementation of eTOD and establish a multi-disciplinary team defining clearly the responsibilities and roles of the different Administrations within and outside the SACAA in the implementation process i.e. AIS Department, Aerodrome Operators, Military, National Mapping Agency, *et cetera*.

For eTOD implementation, commercial geospatial data vendors will be used in order to acquire Area 1 terrain data, and with regard to obstacle data the SACAA's obstacle dataset will be used, together with additional data from ATNS, ACSA, ESKOM, Local Municipalities Telecommunication companies, Petroleum & Gas companies, as well as the SA National Defence Force.

Currently there are arrangements to include as part of the South African eTOD implementation the terrain data for Lesotho and Swaziland, but there no arrangements for cross-border harmonization with Namibia, Botswana, Zimbabwe and Mozambique at present. It is recommended that some form of harmonisation activity is undertaken with neighbouring States, perhaps through the medium of a Memorandum of Understanding (MOU).

A South African eTOD Implementation Workgroup has been established, consisting of stakeholders in the South African aviation community, to manage and oversee the eTOD implementation in South Africa.

1. INTRODUCTION

This document provides the plan for South Africa relating to the implementation of electronic Terrain and Obstacle Data (eTOD). This covers the following activities:

- The Four Areas;
- Regulation;
- Data Sources;
- Cross-border Harmonisation;
- Oversight Monitoring;
- Charges and Cost Recovery;
- Data Validation and Verification;
- Data Provision and Maintenance.

1.1 Geographic Information

Geographic phenomena could broadly be divided into two categories: discrete and continuous. Discrete phenomena are objects with well-defined boundaries or spatial extent (buildings, bridges, etc.), and continuous phenomena vary over space and have no specific extent (elevations, temperatures, etc.) These two categories are not mutually exclusive as many elements of the landscape could be categorized as discrete or continuous.

Geographic information is treated and presented as vector data or raster data. Vector data deals with discrete phenomena – features, which spatial characteristics are presented by a set of one or more geometric primitives (point, curve, surface). Raster data deals with geographic phenomena that vary continuously over the space and contain a set of values each associated with one of the elements in a regular arrangement of points or cells in space.

2. ICAO eTOD REQUIREMENTS

2.1 ICAO eTOD SARPS

The purpose of providing terrain and obstacle data in an electronic format is stated in ICAO Annex 15, 10.1, where a set of applications / operations is listed.

All these applications / operations should ideally be supported by relevant provisions at the ICAO level in a compliant and harmonised manner that would be easily referenced and understood.

2.2 Text of ICAO Difference

With regard to Electronic Terrain Data, South Africa will fully comply with the technical content requirements for Chapter 10, ICAO Annex 15, and therefore does not intend to file any difference. However not all of Electronic Obstacle Data complies with the data integrity requirements, therefore South Africa will not fully comply with Chapter 10, ICAO Annex 15, and has filed differences (alternative

method of compliance differences have been filed on 10.2.5, 10.4.2 and 10.5.6). The issue is that we are dealing with legacy obstacle data whose integrity cannot be guaranteed. Circular Error of Probabilities (CEPs) will be provided with all data whose positional integrity does not fully comply with Chapter 10, ICAO Annex 15. The SACAA text will state that not all Electronic Obstacle Data complies with the integrity requirements of Chapter 10, ICAO Annex 15.

2.3 State Policy for Scope of eTOD for Four Areas

The requirements for providing electronic terrain and obstacle data can be grouped as follows:

- Data collection requirements (geographical area): Areas 1,2,3 and 4;
- Data quality requirements (data accuracy, integrity and resolution);
- Database requirements (terrain database and obstacle database);
- Availability requirements (when / how data to be made available by States).

Area	Definition
Area 1	Entire State territory including aerodromes / heliports
Area 2	For IFR aerodromes / heliports, designated TMAs or 45 km radius, whichever is smaller (45 km where no TMA is established)
Area 3	RWY edges up to 90 metres from RWY centre line and 50 metres from the edges of the rest of the movement areas
Area 4	60 m on either side of the extended runway centre line while the length shall be 900 m from the runway threshold measured along the extended runway centre line (only for precision approach Cat II / III RWYs)

2.3.1 Area 1

Terrain Data

The SACAA has taken responsibility for the provision of Area 1 data and will consist of a complete 20 m seamless DEM of South Africa (including Swaziland and Lesotho as well as a 35 km buffer into neighbouring countries).

- Datum: WGS84
- Spheroid: WGS84
- Projection: Lamberts Conformal Conic
- Format: DTED1/ESRI Binary

Quality Attributes	Area 1 – the State
Horizontal Accuracy	50.0 m
Data Integrity	Routine (10^{-3})
Vertical Accuracy	30.0 m
Vertical Resolution	1.0 m
Confidence Level	90 %
Post Spacing	3 arc second (approx. 90 m)

Obstacle Data

This is the responsibility of the South African Civil Aviation Authority and will consist of every known obstacle within Area 1 whose height above the ground is equal to or greater than 60 m.

Quality Attributes	Area 1 – the State
Horizontal Accuracy	50.0 m
Data Integrity	Routine (10^{-3})
Vertical Accuracy	30.0 m
Vertical Resolution	1.0 m
Confidence Level	90 %
Maintenance Period	As required

The integrity of legacy obstacle data cannot be guaranteed, Circular Error of Probability will therefore be specified for every non-compliant obstacle, and differences have been filed in this respect.

2.3.2 Area 2

Area 2 is the responsibility of the ATS Service Provider, and for IFR Aerodrome without an ATS Service Provider, eTOD will be provided by the ATS Service Provider in conjunction with the SACAA.

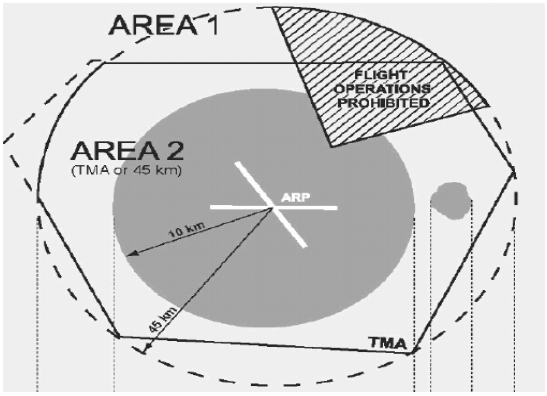
Area 2 is the most complex area in terms of the operations supported. It addresses to the following functions:

- Take-off and landing
- Arrival, approach and departure procedures
- Contingency procedures
- Instrument flight procedure design
- Aeronautical chart production (SID/STAR/IAC, PATC, AOC, etc.)
- Aerodrome / heliport obstacle restriction and removal

Terrain Data

Terrain data for Area 2 has a geographical footprint as follows:

- Within 10 km from the ARP;
- Between 10 km from the ARP extending to the TMA boundaries or to 45 km, whichever is smaller, for terrain that penetrates the horizontal plane of 120 metres above the lowest RWY elevation.

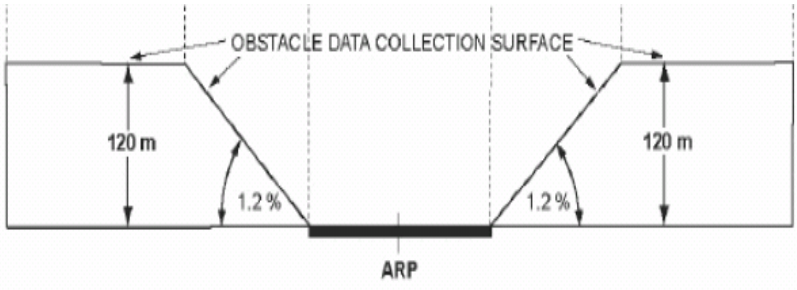


Quality Attributes	Area 2 – Terminal Airspace
Horizontal Accuracy	5.0 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	3.0 m
Vertical Resolution	0.1 m
Confidence Level	90 %
Post Spacing	1 arc second (approx. 30 m)

Obstacle Data

Obstacle data for Area 2 has a geographical footprint as follows:

- The conical surface whose origin is at the edges of the 180 m wide rectangular area and at the nearest runway elevation measured along the runway centre line, extending at 1.2 % slope until it reaches 120 m above the lowest runway elevation of all operational runways at the aerodrome;
- Between 10 km from the ARP extending to the TMA boundaries or to 45 km, whichever is smaller, the horizontal plane of 120 metres above the lowest RWY elevation.



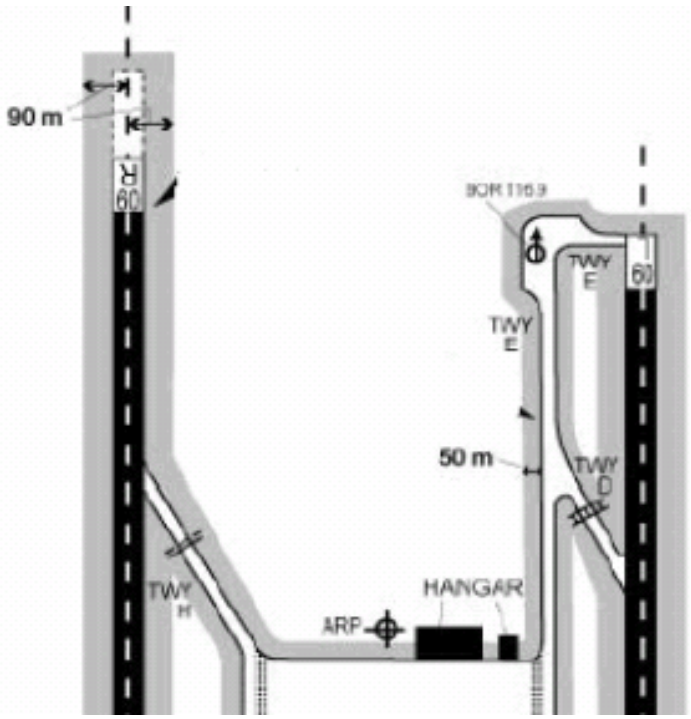
Area 2 Profile View

Quality Attributes	Area 2 – Terminal Centred Area
Horizontal Accuracy	5.0 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	3.0 m
Vertical Resolution	0.1 m
Confidence Level	90 %
Maintenance Period	As required

The integrity of legacy data cannot be guaranteed, Circular Error of Probability will therefore be specified if applicable, and differences have been filed in this respect.

2.3.4 Area 3

Area 3 is adjacent to the movement area and extends from the edges of the RWYs up to 90 metres from the RWY centreline and for the rest of the movement area, 50 metres from its edges.



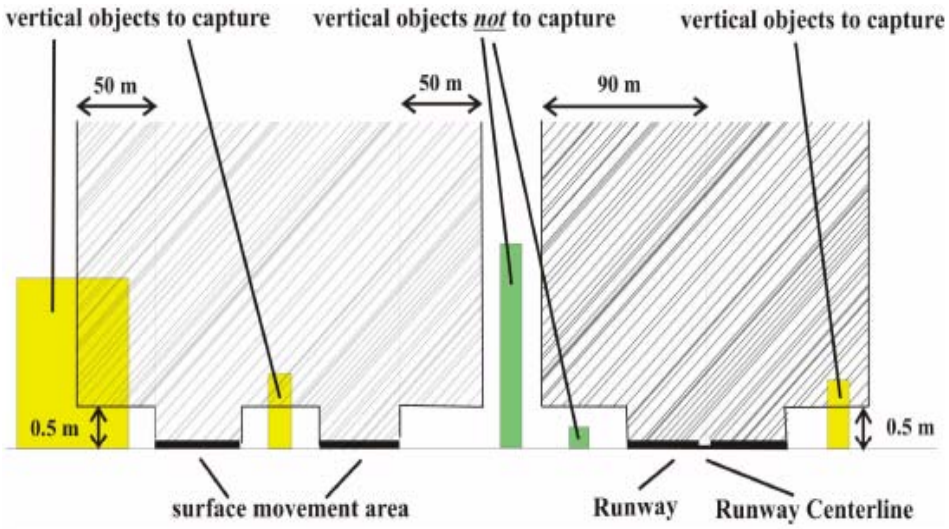
Concerning the obstacle collection, all obstacles that rise higher than 0.5 metres above the horizontal plane passing through the nearest point of the movement area shall be taken into consideration.

Terrain Data

Quality Attributes	Area 3 – Aerodrome Mapping
Horizontal Accuracy	0.5 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	0.5 m
Vertical Resolution	0.01 m
Confidence Level	90 %
Post Spacing	0.6 arc second (approx. 20 m)

Obstacle Data

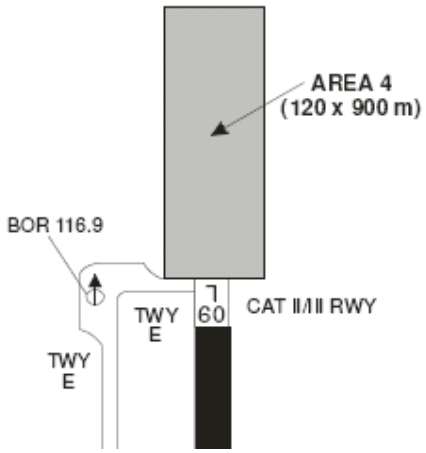
Quality Attributes	Area 3 – Terminal Centred Area
Horizontal Accuracy	0.5 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	0.5 m
Vertical Resolution	0.01 m
Confidence Level	90 %
Maintenance Period	As required



2.3.5 Area 4

Defined as the radar altimeter area for CAT II/III precision approach procedures, and is restricted to those runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable the assessment, by use of radio altimeters, the effect of terrain on decision height determination.

The width of the area shall be 60m on either side of the extended runway centre line while the length shall be 900m from the runway threshold measured along the extended runway centre line.



The policy of the South African Civil Aviation Authority is that the eTOD responsibility for Area 4 fall to the Aerodrome License Holder – which for South Africa is presently limited to 2 ACSA owned aerodromes:

- Cape Town International;
- OR Tambo International.

Terrain Data

Quality Attributes	Area 4 – CAT II/III Operation Area
Horizontal Accuracy	2.5 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	1.0 m
Vertical Resolution	0.1 m
Confidence Level	90 %
Post Spacing	0.3 arc second (approx. 9 m)

Obstacle Data

There are currently no ICAO obstacle data requirements for Area 4, but SACAA intends to make available a dataset that contain all the features which may impact on height determination and which are not contained within the terrain dataset.

Obstacle data includes data generated and issued to ACSA by ATNS as well as additional obstacles identified within the ACSA Geodatabase.

2.4 How, When and by Whom eTOD will be Made Available

All the eTOD Obstacle data will reside with the SACAA in a Geodatabase, the database will be maintained by the Procedure Design & Cartography Department. Area 1 Obstacle data will be maintained and disseminated to all interested parties by the SACAA.

With regard to Area 1 Terrain data, the SACAA intends to conclude an Accredited Supplier arrangement with a Commercial Vendor, who would then be the official supplier of the data. Any Person/Organisation/Sub-contractor/State Organ that requires the terrain data would be directed to the Accredited Supplier.

Area 2 terrain and obstacle data for IFR Aerodrome ***with*** an ATS Service Provider shall remain the responsibility of ATS Service Provider – hence they will also be the custodians of this data for both maintenance and for data dissemination. For an IFR Aerodrome ***without*** an ATS Service Provider, eTOD will be the responsibility of the Aerodrome License Holder.

Area 3 and Area 4 will be the responsibility of the Aerodrome License Holder and they will be the custodians of this data for both maintenance and for data dissemination.

2.5 Considerations

Two databases for each area shall be provided: a terrain database and an obstacle database. Neither of the databases shall contain data belonging to the other one. Ref. ICAO Annex 15, 10.3.2: Terrain is, "*naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles*". Ref. ICAO Annex 15, 10.4.1: Obstacles are *"all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight shall not be included in terrain databases.*

3. REGULATION

3.1 Applicable Regulation

ICAO Annex 15, 10.5.2 requires States to provide specifications for the terrain and obstacle data made available: *"… statement of available electronic terrain and obstacle data sets shall be provided in the form of terrain data product specifications as well as obstacle data product specifications …"*. Terrain and obstacle data shall comply with ISO 19100 series requirements in terms of data modelling.

3.1.1 International Regulation

The eTOD implementation shall be in compliance with ICAO provisions contained in Annex 15, as amended, and Document 9881, and will be managed by the SACAA as a national programme supported by necessary resources, a high level framework and a detailed planning, including priorities and timelines for the implementation of the programme.

3.1.2 National Regulation

No National Regulation currently exists. It is foreseen that National Regulations will be required. Required regulations will be drafted by the SACAA and will undergo the normal CARCOM process before promulgation. Voluntary compliance with the national implementation is expected of all stakeholders pending the promulgation of the required regulations.

3.1.3 Considerations

The SACAA has adopted/followed a collaborative approach involving all concerned parties in the implementation of eTOD provisions and has established a multi-disciplinary implementation team defining clearly the responsibilities and roles of the different stakeholders within and outside the SACAA in the implementation process i.e. AIS Department, Aerodrome Operators, Military, National Mapping Agency, *et cetera*.

3.2 Regulation of Data Sources

This section documents the South Africa approach to regulating data sources, to ensure that the appropriate standards and processes are applied.

3.2.1 Regulation

Terrain and obstacle data shall comply with ISO 19100 series requirements in terms of data modelling. Appendix 8 of ICAO Annex 15 contains the provisions for the definition of Areas 1, 2, 3 and 4 as well as for the quality requirements and data attributes (metadata) for collecting terrain and obstacle numeric data.

4. DATA SOURCES

This section lists the organisations that have been consulted to assess if the data they originate and maintain meets the appropriate requirements of eTOD. Where data is available and is suitable for use, this section provides information about the liability, cost/cost recovery and license issues associated with it.

4.1 Data Sources Consulted

For eTOD implementation, 3 commercial vendors were consulted in order to acquire Area 1 terrain data – ComputaMaps, GISCOE and TeleAtlas. Furthermore, the SACAA also looked at using Shuttle Radar Topography Mission (SRTM) data - available for free from NASA Jet Propulsion Laboratory (JPL) or from the US Geological Survey (USGS).

4.1.1 Liability

ComputaMaps

"ComputaMaps disclaims all other warranties, express or implied, including the implied warranties of merchantability and fitness for a particular purpose. ComputaMaps shall not be liable for any damage or loss of any kind arising out of or resulting from your possession or use of the Product (including data loss or corruption), regardless of whether such liability is based in tort, contract or otherwise.
If the aforegoing limitation is held to be unenforceable, Computa Maps maximum liability to you shall not exceed the amount of the licence fees paid by you for the Product. The remedies available to you against ComputaMaps under this agreement are exclusive. In the event that any particular state does not allow the limitation or exclusion or implied warranties or liabilities for incidental or consequential damages contained herein, the above limitations and exclusions shall not apply to you."

TeleAtlas Africa

Will not be liable to the SACAA *"for any damages, which includes incidental and/or consequential damages (including but not limited to loss of profit), which may arise out of any occurrence related to the work done with the DATA or the Product or from the use of the DATA or the Product by the Purchaser or ant third party. In this regard TeleAtlas Africa guarantees the accuracy of our processes and the subsequent results to be guaranteed according to the source data used."*

NASA - SRTM

NASA states that *"..Although these data have been processed successfully on a computer system at the U.S. Geological Survey, EROS Data Center, no warranty expressed or implied is made by either regarding the utility of the data on any system, nor shall the act of distribution constitute any such warranty. The USGS will warrant the delivery of this product in computer-readable format and will offer appropriate adjustment of credit when the product is determined unreadable by*
correctly adjusted computer peripherals, or when the physical medium is delivered in damaged condition…"

4.1.2 Cost Model

ComputaMaps

South Africa, including Lesotho, Swaziland and a 35km buffer: ca 1,381,000 km^2 – R540,000.00.

TeleAtlas Africa

South Africa, including Lesotho, Swaziland and a 35km buffer: ca 1,381,000 km^2 – R190,000.00.

GISCOE

South Africa, including Lesotho, Swaziland and a 35km buffer: ca 1,381,000 km^2 – R473,533.20.

NASA – SRTM

South Africa, including Lesotho, Swaziland and a 35km buffer: ca 1,381,000 km^2 – Free, but coverage is incomplete.

4.1.3 Licensing

ComputaMaps

"ComputaMaps grants the licensee a non-exclusive, personal, non-transferable and non-assignable right to use the Product on a maximum of fifteen (15) workstations within a single client organisation.

The ownership of the copyright and all other intellectual property rights in the digital data contained in the Product vests in ComputaMaps and its suppliers and is supplied under license from the said copyright owner(s). Furthermore, the copyright and intellectual property rights in the data selection, processing, enhancements, packaging, structure and format of the Product vest in ComputaMaps."

TeleAtlas Africa

"All spatial data products licensed by TeleAtlas Africa, remains the sole property of TeleAtlas Africa. Data is licensed on a user license basis and the following conditions apply:

- *Spatial Data products licensed by TeleAtlas Africa are licensed without distribution rights and my not be licensed (value added or not) or distributed in any form to other organizations but the Purchaser without express permission from TeleAtlas Africa.*
- *Copyrights exists on all spatial data products licensed by TeleAtlas Africa. Data may not be copied in any form (analog or digital) without express permissions by TeleAtlas Africa.*
- *TeleAtlas Africa must be acknowledged in publications referring to the data and in any electronic media using the data."*

NASA – SRTM

The objective of the SRTM mission is to obtain elevation radar data on a near-global scale and generate the most complete high-resolution digital topographic database of the Earth. The information collected by SRTM will be used to provide a tool to enhance the activities of scientists, the military, commercial, and civilian users and there are no licensing issues to consider.

4.2 Considerations

With regard to obstacle data the following organisations have/will be contacted and engaged with:

- ATNS
- ACSA
- ESKOM
- Telecommunication companies
- Petroleum & Gas companies
- SA National Defence Force
- Department of Public Works
- Statistics SA
- NIMAC
- Local Councils

5. CROSS-BORDER HARMONISATION

Currently there are arrangements to include as part of the South African eTOD implementation the terrain data for Lesotho and Swaziland, but there no arrangements for cross-border harmonization with Namibia, Botswana, Zimbabwe and Mozambique.

It is recommended that some form of harmonisation activity is undertaken with neighbouring States, perhaps through the medium of a Memorandum of Understanding (MoU). Further, it is recommended that, where appropriate, States could make arrangements for data within its boundary to be provided to the other State, where it is needed for the other State's aerodrome. To assist with the exchange of data between States and other users, it is recommended that a common eTOD exchange format is adopted.

The SACAA, in its function as the manager of the South African eTOD implementation program, will endeavour to attempt to establish contact with neighbouring states in order to implement MoUs to enable data harmonisation.

6. OVERSIGHT MONITORING

6.1 Progress Monitoring

A South African eTOD Workgroup has been established, consisting of stakeholders in the South African aviation community, to manage and oversee the eTOD implementation in South Africa.

The following stakeholders are involved:

- SACAA (PD&C, AIS, Aerodrome Section);
- ATNS;
- ACSA;
- SA Air Force;
- Chief Director Surveys and Mapping;
- Private IFR Aerodrome License holders;
- IATA.

6.2 Audit

Make an inventory of and evaluate the quality of existing (legacy) terrain and obstacle datasets.

7. CHARGING AND COST RECOVERY

This section documents how South Africa will finance, from whom the finance will be obtained and the cost recovery mechanisms associated with the initial and ongoing costs for eTOD, for each of the four Areas.

7.1 Initial Costs

7.1.1 Cost Recovery for Area 1

	Who	How	Cost
Terrain	SACAA	50k interpolation	Data user
Obstacles	SACAA	Obstacle database	Data user

7.1.2 Cost Recovery for Area 2

	Who	How	Cost
Terrain	ATNS	10k interpolation	User charges
Obstacles	ATNS	Obstacle database	User charges

7.1.3 Cost Recovery for Area 3

	Who	How	Cost
Terrain	ACSA	stereoscopic aerial photography	User chargers
Obstacles	ACSA	ATNS Surveys	User charges

7.1.4 Cost Recovery for Area 4

	Who	How	Cost
Terrain	ACSA	stereoscopic aerial photography	User charges
Obstacles	ACSA	ATNS Surveys	User charges

7.2 Ongoing Costs

	Terrain	Obstacles
Area 1	Data user	Owner
Area 2	Data user	ATS Service Provider
Area 3	Data user	AD charges
Area 4	Data user	AD charges

8. DATA VALIDATION AND VERIFICATION

The requirements for aeronautical data quality are provided in several ICAO SARPS, grouped in two main categories:

- Data collection (calculated or surveyed) – accuracy and integrity level;
- Data publication – (charting and publication) resolution and integrity level.

The ICAO SARPS responsible for data collection requirements are:

- ICAO Annex 11 Air Traffic Services, Appendix 5 geographical coordinates and the elevations for obstacles in Area 1 and Area 2 (outside the aerodrome / heliport boundary); instrument approach procedure altitudes; obstacle clearance altitudes / heights; minimum (flight) altitudes
- ICAO Annex 14, Volume I, Appendix 5 – geographical coordinates and the elevations for obstacles in Area 2 (within the aerodrome / heliport boundary) and Area 3;
- ICAO Doc 8168, Vol. II – PANS-OPS (for calculated data):
  - obstacle clearance altitudes / heights;
  - minimum (flight) altitudes.
- ICAO Doc 9674 WGS-84 Manual (for surveyed and calculated data):
  - obstacles en-route;
  - obstacles in the approach and take-off area;
  - obstacles in the circling area;
  - instrument approach procedure altitudes;
  - obstacle clearance altitudes / heights;
  - minimum (flight) altitudes.

The ICAO SARPS responsible for data publication requirements are:

- ICAO Annex 4, Aeronautical Charts, Appendix 6 (charting resolution and integrity level):
  - geographical coordinates and the elevations for obstacles in Areas 1, 2 and 3;
  - instrument approach procedure altitudes;
  - obstacle clearance altitudes / heights (OCA / H);
  - minimum (flight) altitudes.

- ICAO Annex 15, Appendix 7:
  - geographical coordinates and the elevations for obstacles in Areas 1, 2 and 3;
  - minimum (flight) altitudes.

- ICAO Doc 8168, Vol. II – PANS-OPS (for calculated data):
  - obstacle clearance altitudes / heights;
  - procedure altitudes;

- ICAO Doc 9674 WGS-84 Manual (for surveyed and calculated data):
    - obstacles en-route;
    - obstacles in the approach and take-off area;
    - obstacles in the circling area;
    - instrument approach procedure altitudes;
    - obstacle clearance altitudes / heights;
    - minimum (flight) altitudes.

8.1 Data Quality – Confidence Levels

Accuracy requirements for aeronautical data are based upon a 95% confidence level, as required by ICAO Annex 11, 2.19.1 and ICAO Annex 14, Vol. I and II, 2.1.1. Three types of positional data are considered: surveyed points, calculated points (mathematical calculations from known surveyed points / fixes) and declared points.

ICAO Doc 9674, WGS-84 Manual provides an interpretation of the 95% confidence level to be taken into consideration.

- The statistical principles governing the determination of a two dimensional position consider a circular normal distribution around the real location of the measured data. Because there is no 100% certainty that what is measured reflects the reality, the statistical calculation aims at determining the probability of the measurement to fall inside of a circle of a certain radius, centred on the reported position.
- In order to better understand the confidence level, another two terms have to be introduced: confidence interval and confidence limit.
- Confidence interval: an estimated range of values which is likely to include an unknown population parameter, the estimated range being calculated from a given set of sample data.
- Confidence limits: represent the lower and upper boundaries / values of a confidence interval.
- Confidence level: the statistical probability that a random variable (in our case the position) lies within the confidence interval of an estimate.

8.2 Assessment of Existing Data

Change in mindset required for ICAO AMDT 33:

- Change from “approval-oriented” (Annex 14) to a “flight-safety and data-oriented mindset”(Annex 15);
- Electronic obstacle data should no longer be a by-product of an approval process.
- Electronic obstacle data should be a tool to ensure flight safety.

Electronic Data Provision

- Standards for electronic data exchange

Quality and integrity

- Verify 3D-elevations against accurate terrain model;
- Verify accuracy of existing obstacles;
- Ensure integrity in the data chain.

8.3 Requirements

Data must comply with requirements of Annex 15, Chapter 10 (as supplemented by ICAO Doc 9881), which include the following:

- Data must meet the ICAO numerical requirements as specified;
- Dataset must have the required associated metadata;
- Data must have full traceability.

9. DATA PROVISION AND MAINTENANCE

9.1 Data Exchange Formats

Establish a consistent basis for the interchange of data among originators, integrators, system designers and users. Furthermore, the exchange format must be compliant with ISO 19100 series of standards, provide unique DPS for terrain, obstacle, and aerodrome mapping data sets.

The Aeronautical Information Exchange Model (AIXM) is a data exchange format originating from Eurocontrol and FAA that is now readable using ArcGIS, PLTS aeronautical extension. AICM and AIXM are emerging international standards for describing and exchanging aeronautical data. AIXM is being increasingly used in government aviation agencies and COTS vendors are beginning to adopt AIXM for representing aeronautical data.

The SACAA will ultimately deliver eTOD data to users in an AIXM database format which will allow interoperability with AIS packages.

9.2 Means / Media

Data will be distributed to users via CD, DVD or external Hard Drives, depending on file size.

9.3 Data Maintenance

The erecting and dismantling of temporary obstacles happens on short notice and within days:

- Besides the initial preparation of the data a constant monitoring of the information is necessary to provide updated obstacle data
- Periodic systematic surveys are not sufficient to meet this requirement
- A collaborative approach for improving the data collection and data delivery process for obstacles involving owners, local authorities, airports, AISP and regulator should guarantee the timely availability of quality data

Updating of database to account for errors, new or amendments to existing data sets. In that way, applications that use data continue to be trustworthy. The updates should be as required, or in accordance with the AIRAC system. The process should include data integrator issuing updated database together with list of changes made from the previous edition.

9.4 Recommendations

- Collaborative approach involving all affected parties with possible ICAO support;
- Update cycle, institutional issues such as cost recovery, sharing of liability need to be addressed and defined;
- Closer collaboration of States with data integrators (electronic data exchange, application requirements in the transition phase;
- Sharing information on eTOD in States already advancing on the Implementation.

ANNEXURE A – IMPLEMENTATION STATUS

	Feature	ICAO Implementation Data	Status	Target Implementation Date	Action Plan Reference Number
Area 1	Terrain	20 November 2008	Not implemented	28 February 2009	AP/001/8/9/10
	Obstacle	20 November 2008	Not implemented	28 February 2009	AP/002
Area 2	Terrain	18 November 2010	Not implemented	18 November 2010	AP/003
	Obstacle	18 November 2010	Not implemented	18 November 2010	AP/004
Area 3	Terrain	18 November 2010	Not implemented	18 November 2010	AP/005
	Obstacle	18 November 2010	Not implemented	18 November 2010	AP/006
Area 4	Terrain	20 November 2008	Implemented	20 November 2008	AP/007
	Obstacle	Not required	Not required	Not required	

ANNEXURE B – ACTION PLAN

Ref Number	Area	Feature	Description	Action By	Target Date	Implementation Date	Comments
AP/001	1	Terrain	Terrain dataset for South Africa, including Lesotho and Swaziland, available from commercial vendors. Not yet verified and validated to ensure compliance with ICAO requirements.	SACAA	28/02/2009	28/02/2009	Awaited SACAA budget approval for procurement of terrain data for in-house use.
AP/002	1	Obstacle	Meeting held with owners of structures on the 14th of October 2008 at SACAA offices. ICAO obstacle data requirements were discussed and their co-operation was requested.	SACAA	14/10/2008	14/10/2008	See AP/008
AP/003	2	Terrain	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 20th January 2009.
AP/004	2	Obstacle	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 20th January 2009.
AP/005	3	Terrain	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 20th January 2009.
AP/006	3	Obstacle	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 20th January 2009.

AP/007	4	Terrain	Terrain dataset available from and maintained by ACSA.	ACSA	20/11/2008	20/11/2008	
AP/008	1	Obstacle	SACAA to provide the ICAO Obstacle data requirements to the owners of the structures.	SACAA	20/10/2008	17/10/2008	See AP/009
AP/009	1	Obstacle	Structure owners to provide available obstacle data for verification by the SACAA.	SACAA	13/03/2009		See AP/010
AP/010	1	Obstacle	Guarantee that all CEPs for obstacle data are eliminated.	SACAA	18/11/2010		

ANNEXURE C - ACRONYMS

A

ACSA	Airport Company South Africa
AGL	Above Ground Level
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
AISP	Aeronautical Information Service Provider
AIXM	Aeronautical Information Exchange Model
AMDB	Aerodrome Mapping Database
AOC	Aedrome Obstacle Chart
ARP	Aerodrome Reference Point
ASCII	American Standard Code for Information Interchange
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service

B

C

CARCOM	Civil Aviation Regulations Committee
CEP	Circular Error of Probability

D

DEM	Digital Elevation Model
DPS	Data Product Specification
DSM	Digital Surface Model
DTED1	Digital Terrain Elevation Data Level 1
DTM	Digital Terrain Model

E

ED	EUROCAE Document
EROS	Earth Resources Observation and Science
eTOD	electronic Terrain and Obstacle Database
EUROCONTROL	European organization for safety of air navigation

F

FAA	Federal Aviation Administration

G

GIS	Geographic Information System
GPS	Global Positioning System

H

I

ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
ISO	International organisation for standardization

J

K

L

M

MSL	Mean Sea Level

N

NASA	National Aeronautics and Space Administration
NIMAC	National Imagery and Mapping Advisory Council
NM	Nautical mile

O

P

PATC	Precision Approach Terrain Chart
PD&C	Procedure Design & Cartography

Q

R

RWY	Runway

S

SACAA	Civil Aviation Authority
SA eTOD WG	South African eTOD Work Group
SARPs	Standards and Recommended Practices
SID	Standard Departure Chart – Instrument
SRTM	Shuttle Radar Topography Mission
STAR	Standard Terminal Arrival Route

T

TMA	Terminal Area

U

V

W

WGS-84	World Geodetic System – 1984

X

XML	Extensible Mark-up Language

Y

Z

ANNEXURE D - DEFINITIONS

Accuracy. A degree of conformance between the estimated or measured value and the true value.

Aerodrome. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome elevation. The elevation of the highest point of the landing area.

Aerodrome mapping database (AMDB). One or more files containing information in a digital form that represent selected aerodrome features. This data includes geo-spatial data and metadata over a defined area. The files have a defined structure to permit an AMDB management system and other applications to make revisions that include additions, deletions, or modifications.

Aerodrome reference point (ARP). The designated geographical location of an aerodrome.

Aerodrome surface movement area. That part of an aerodrome that is to be used for the take-off, landing, and taxiing of aircraft. This includes runways, taxiways, and apron areas.

Aeronautical data. A representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing.

Aeronautical database. Any data that is stored electronically in a system that supports airborne or ground based aeronautical applications. An aeronautical database may be updated at regular intervals.

Aeronautical Information Publication (AIP). A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Aeronautical information regulation and control (AIRAC). A system aimed at advance notification based on common effective dates, of circumstances that necessitate significant changes in operating practices.

Aeronautical information service (AIS). A service established within the defined area of coverage responsible for the provision of aeronautical information/data necessary for the safety, regularity and efficiency of air navigation.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

Bare earth. Surface of the Earth including bodies of water and permanent ice and snow, and excluding vegetation and man-made objects.

Canopy. Bare earth supplemented by vegetation height.

Completeness. The primary quality parameter describing the degree of conformance of a subset of data compared to its nominal ground with respect to the presence of objects, associations instances, and property instances.

Confidence. Meta-quality element describing the correctness of quality information.

Confidence level. The probability that the true value of a parameter is within a certain interval around the estimate of its value. The interval is usually referred to as the accuracy of the estimate.

Coordinate reference system. **C**oordinate system that is related to the real world by a datum.

Coordinate system. Set of mathematical rules for specifying how coordinates are to be assigned to points

Coverage. A feature that acts as a function to return one or more feature attribute values for any direct position within its spatiotemporal domain.

Cultural features**.** Manmade morphological formations that include transportation systems (roads and trails; railroads and pipelines; runways; transmission lines), and other manmade structures, (buildings, houses, schools, churches, hospitals).

Culture. All man-made features constructed on the surface of the Earth, such as cities, railways and canals.

Database. One or more files of data so structured that appropriate applications may draw from the files and update them.

Data element. A term used to describe any component of an AMDB. For example: a feature, an attribute, an object, an entity, or a value.

Data integrator**.** The part of an organisation, which takes data from one or more sources to produce a terrain or obstacle database that satisfies a particular specification.

Data originator**.** The part of an organisation which performs measurements by a particular means and which then groups those measurements to represent an area of terrain or a set of obstacles.

Data product. Data set or data set series that conforms to a data product specification.

Data product specification. Detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party.

Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity.

Data set. Identifiable collection of data.

Data set series. Collection data sets sharing the same product specification.

Data type. Specification of the legal value domain and legal operations allowed on values in this domain.

Datum. Any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities.

Digital Elevation Model (DEM)*.* The representation of terrain surface by continuous elevation values at all intersections of a defined grid, referenced to common datum.

Note.— Digital Terrain Model (DTM) is sometimes referred to as DEM.

Digital surface model*.* Digital model of the topographic surface, including vegetation and man-made structures.

Elevation. The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

Ellipsoid height (Geodetic height). The height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

End-user. An ultimate source and/or consumer of information.

Error. Defective or degraded data elements or lost or misplaced data elements or data elements not meeting stated quality requirements.

Feature. Abstraction of real-world phenomena.

Format. The process of translating, arranging, packing, and compressing a selected set of data for distribution to a specific target system.

Geodetic datum. A minimum set of parametres required to define location and orientation of the local reference system with respect to the global reference system/frame.

Geographic coordinates. The values of latitude, longitude, and height that define the position of a point on the surface of the Earth with respect to a reference datum.

Geographic data. Data with implicit or explicit reference to a location relative to the Earth.

Geoid**.** The equipotential surface in the gravity field of the Earth, which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents.

Height. The vertical distance of a level, a point, or an object considered as a point, measured from a specified datum.

Integrity (aeronautical data). A degree of assurance that an aeronautical data and its value has not been lost or altered since the data origination or authorized amendment.

Mean sea level (MSL). The average location of the interface between the ocean and the atmosphere, over a period of time sufficiently long so that all random and periodic variations of short duration average to zero.

Metadata. Data about data.

Model. Abstraction of some aspects of reality.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight.

***Originate*.** The process of creating a data item or amending the value of an existing data item.

Originator (data). The first organization in the aeronautical data chain that accepts responsibility for the data.

Polygon. A surface or area described by a closed line.

Position (geographical). Set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid that define the position of a point on the surface of the Earth.

Post spacing. Angular or linear distance between two adjacent elevation points.

Precision. The smallest difference that can be reliably distinguished by a measurement process.

Quality. Degree to which a set of inherent characteristics fulfils requirements.

Quality assurance. Part of quality management focused on providing confidence that quality requirements will be fulfilled.

Resolution. A number of units or digits to which a measured or calculated value is expressed and used.

Runway. A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

Spatial resolution. The capacity of the system (lens, sensor, emulsion, electronic components, etc.) to define the smallest possible object in the image. Historically, this has been measured as the number of lines pair per millimetre that can be resolved in a photograph of a bar chart. This is the so-called analogue resolution. For the modern photogrammetric cameras equipped with forward motion compensation (FMC) devices and photogrammetric panchromatic black and white

emulsions, the resolution could (depending on contrast) be 40 to 80 lp/mm (line pairs per millimetre).

***Specification*.** Document which establishes the requirements the product or service should be compliant with.

State. An internationally recognized geographic entity that provides aeronautical information service.

Terrain. The surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, excluding obstacles.

Threshold. The beginning of that portion of the runway useable for landing.

Traceability. Ability to trace the history, application or location of that which is under consideration.

Validation. Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled.

Verification. Confirmation, through the provision of objective evidence that, specified requirements have been fulfilled.

ANNEXURE E - REFERENCES

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APPENDIX 3.6F1-1

PERFORMANCE FRAMEWORK FORMS FOR WGS-84 AND E-TOD IMPLEMENTATION

AIM PERFORMANCE OBJECTIVES

NATIONAL PERFORMANCE OBJECTIVE IMPLEMENTATION OF WGS-84 AND ELECTRONIC TERRAIN AND OBSTACLE DATA	
Benefits	
Environment	none
Efficiency	required by Performance Based Navigation
	support approach and departure procedure design and implementation
	improve aircraft operating limitations analysis
	support aeronautical chart production and on-board databases
Safety	improve situational awareness
	support determination of emergency contingency procedures
	support technologies such as ground proximity and minimum safe altitude warning systems
KPI	Status of implementation of WGS-84 in the AFI Region
	Status of implementation of eTOD in the AFI Region (for areas 1 & 4)
Proposed	Number of States having implemented WGS-84
Metrics:	Number of States having implemented a number of PBN components (based on WGS-84)
	Number of States having organized eTOD awareness campaigns and training programs
	Number of States having implemented eTOD for Areas 1 & 4

Strategy Short term (2010) Medium term (2011 - 2015)				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME** **START-END**	**RESPONSIBILITY**	**STATUS**
ATM CM	Electronic terrain and obstacle data (eTOD) Share experience and resources in the implementation of eTOD through the establishment of an eTOD working group.	2008-2011	APIRG States	Valid
	Report requirements and monitor implementation status of eTOD using a new AIS Table of the AFI FASID (Ref. Appendix B). Develop e-TOD implementation plan as per the implementation template endorsed by the AFI e-TOD WG/1 Meeting.	2009-ongoing	APIRG States	valid
	Develop a high level policy for the management of a national eTOD Programme.	2008- 2011	States	valid
	Provide terrain and obstacle data for Area 1;	2008-2010	States	valid
	Provide terrain and obstacle data for Area 4;	2008-2010	States	valid
	Provide terrain and obstacle data for Area 2;	2015	States	valid
	Provide terrain and obstacle data for Area 3;	2015	States	valid

ATM AUO	WGS-84 Report requirements and monitor implementation status of WGS-84 using the AIS-5 Table of the AFI FASID.	Ongoing	APIRG States	Valid
Link to GPIs	GPI-9: Situational awareness;GPI-11: RNP and RNAV SIDs and STARs; GPI-18: Aeronautical Information;GPI-20: WGS-84;GPI-21: Navigation Systems			

APPENDIX 3.6 F1-2

PROPOSED FASID TABLE AIS-X — eTOD REQUIREMENTS

EXPLANATION OF THE TABLE

Column

1 Name of the State, territory or aerodrome for which electronic terrain and obstacle data (eTOD) are required with the designation of the aerodrome use:

RS — international scheduled air transport, regular use

RNS — international non-scheduled air transport, regular use

RG — international general aviation, regular use

AS — international scheduled air transport, alternate use

2 Runway designation numbers

3 Type of each of the runways to be provided. The types of runways, as defined in Annex 14, Volume 1, Chapter I, are:

NINST — non-instrument runway;

NPA — non-precision approach runway

PA1 — precision approach runway, Category I;

PA2 — precision approach runway, Category II;

PA3 — precision approach runway, Category III.

4 Requirement for the provision of terrain data for Area 1, shown by an ‘‘X’’ against the State or territory to be covered.

5 Requirement for the provision of terrain data for Area 2 (TMA), shown by an ‘‘X’’ against the aerodrome to be covered.

6 Requirement for the provision of terrain data for Area 2 (45 Km radius from the ARP), shown by an ‘‘X’’ against the aerodrome to be covered.

7 Requirement for the provision of Terrain data for Area 3, shown by an ‘‘X’’ against the aerodrome to be covered.

8 Requirement for the provision of Terrain data for Area 4, shown by an ‘‘X’’ against the runway threshold to be covered.

9 Requirement for the provision of Obstacle data for Area 1, shown by an ‘‘X’’ against the State or territory to be covered.

10 Requirement for the provision of Obstacle data for Area 2 (TMA), shown by an ‘‘X’’ against the aerodrome to be covered.

11 Requirement for the provision of Obstacle data for Area 2 (45 Km radius from the ARP), shown by an ‘‘X’’ against the aerodrome to be covered.

12 Requirement for the provision of Obstacle data for Area 3, shown by an ‘‘X’’ against the aerodrome to be covered.

13 Remarks (timetable for implementation)

Note. — For columns 4 to 12 use the following symbols:

X — Required but not implemented

XI — Required and implemented

APPENDIX 3.6 F1-3

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45 Km		
1	2	3	4	5	6	7	8	9	10	11	12	13
STATE X			X					X				
(ABCD) City Y/AD Z				X		X			X		X	
RS	11 29	NPA PA1										

APPENDIX 3.6G

DRAFT AFI REGION E-TOD IMPLEMENTATION STRATEGY

Considering

The new provisions introduced by Amendment 33 to Annex 15 related to E-TOD; and

the guidance material contained in Doc 9881 (Guidelines for electronic Terrain, Obstacle and Aerodrome Mapping Information); and

Recognizing that:

Significant safety benefits to international civil aviation will be provided by in-flight and ground-based applications that rely on quality electronic Terrain and Obstacle Data; and

The implementation of E-TOD requirements is a challenging, costly, and cumbersome task of cross-domain nature;

The Seminar proposed an AFI Region implementation strategy based on the following adopted criteria as detailed below:

E-TOD implementation should be in compliance with ICAO provisions contained in Annex 15 and Doc 9881;

E-TOD implementation should be based on national plans/roadmaps;

E-TOD implementation should be managed by each State as a national E-TOD programme supported by necessary resources, a high level framework and a detailed national plan including priorities and timelines for the implementation of the programme;

States should adopt/follow a collaborative approach involving all concerned parties in the implementation of E-TOD provisions and establish a multi-disciplinary team defining clearly the responsibilities and roles of the different Administrations within and outside the Civil Aviation Administration in the implementation process (AIS, Aerodromes, Military, National Geographic and Topographic Administrations/Agencies, etc);

E-TOD requirements should be analyzed and a common understanding for the Implementation of these requirements developed;

States should make an inventory of and evaluate the quality of existing terrain and obstacle data sources and in the case of data collection, consider carefully the required level of details of collected terrain and obstacle data with particular emphasis on obstacle data and associated cost;

States should carry out theoretical studies of candidate techniques for data acquisition (photogrammetry, LIDAR, IFSAR, etc) based on a Cost-Benefit Analysis and supported by case study for a representative aerodrome;

In the development of their E-TOD programme, States should take into consideration the requirements for update/maintenance of data, especially the obstacle data;

States, while maintaining the responsibility for data quality and availability, should consider the extent to which the provision of electronic terrain and obstacle data could be delegated to national geodetic Institutes/Agencies, based on Service Level Agreement reflecting such delegation. Collaboration between States and data providers/integrators should also be considered;

ICAO and States should undertake awareness and training programmes to promote and expedite E-TOD implementation;

Implementation of E-TOD provisions should be considered a global matter, which necessitates coordination and exchange of experience between States, ICAO and other national/international organizations and industry partners involved;

To the extent possible, States should work co-operatively especially with regard to the cross-border issue, for the sake of harmonization and more efficient implementation of E-TOD; and

States encountering difficulties in the implementation of E-TOD may seek assistance (individually or collectively) from ICAO, through a TCB project, and/or from other States.

APPENDIX 3.6H

REVISED TOR FOR AFI REGION E-TOD WORKING GROUP

AFI REGION ELECTRONIC TERRAIN AND OBSTACLE DATA WORKING GROUP (E-TOD WG)

A) TERMS OF REFERENCE

With a view to harmonize, coordinate and support E-TOD implementation activities on a regional basis, the AFI Region E-TOD Working Group shall be established as follows:

Mission

To identify, develop , validate and establish support mechanisms and serve as a forum by which the AFI States m ay implement the provision of electronic Terrain and obstacle Data (eTOD) , in accordance with ICAO Annex 1 5 , in a consistent and harmonised manner.

Reporting Line

The e -TOD Working Group (e -TOD WG) will report to the APIRG.

Participants profile

The e -TOD WG will be open to participants from any relevant domain, including , but not limited to , AIS/AIM personnel , surveyors , regulators , industry and international organisations in AFI and non-AFI States .

Tasks

Overall , the TOD WG shall support the :

- establishment of a common understanding of the intentions of Annex 1 5 with regard to eTOD ;
- promotion of awareness of the responsibility and accountability of States for the implementation of eTOD;
- specification of the responsibilities for the bodies involved (regulator, surveyor, service provider etc.) ;
- specification of a concept and the development of the associated AFI Region guidance material for the implementation of eTOD. The guidance material should assist in the definition of:

Qualities of data collection techniques;

Methods for the validation and verification of eTOD;

The data model(s) to be used;

Mechanisms for the storage and exchange of eTOD;

Data protection and other quality processes;

Quality management / assurance (verification and validation) criteria;

Cross-border harmonisation;

Methodologies for cost recovery, if appropriate;

Guidance relating to the assessment of eTOD for periodic resurvey (timeliness).

- working with other fora to develop harmonised approaches to copyright, liability, intellectual property, and methodologies for cost recovery, if appropriate; etc.;
- Review of the requirements for Area 2
- introduction b y States , of regulation to support the act of data provision; _ facilitation and coordination of eTOD implementation within AFI Region;
- monitoring of the progress towards implementation of eTOD within the AFI Region;
- the promotion of the means for global harmonisation;
- submission of material created under the project to ICAO and its promotion on a world-wide basis;
- AIM domain in gaining the necessary support and resources from the Agency management.

B) COMPOSITION

The A F I R e g i o n E-TOD Working Group will be composed of Experts nominated by the AFI Region States, ANSP and participants from any relevant domain, including, but not limited to AIS/AIM personnel, surveyors, regulators, industry and international organisations in AFI and non-AFI States .

Other representatives from industry and user organizations having a vested interest in the aeronautical services and E-TOD in particular, could participate in the work of this Working Group.

C) WORKING ARRANGEMENTS

The AFI Region E-TOD Working Group shall report to the AIS-AIM Implementation Task Force established under the AFI Planning Implementation Regional Group (APIRG).The work of the AFI E-TOD Working Group shall be carried out mainly through exchange of correspondence (email, facsimile, Tel., etc) between its Members.

The Working Group shall meet as required and at least once in every year prior to an APRIG Meeting. The convening of the Working Group meetings should be initiated by the established AIS - AIM Implementation Task Force Secretariat based on the need to address AIS - AIM deficiencies in the AFI Region .

APPENDIX 3.6-I

AFI-CAD Doc 007

Business and Financial Plan -

ICAO Centralised AFI Region AIS Data Base

Version: 0.5

Draft – Subject to Endorsement by APRIG/17

Name of Project	ICAO AFI Region Centralised AIS Database (AFI CAD)	
Project Leader	<Project Leader>	
Responsible	<Responsible Person> Requirements Engineer (Acquirer)	
Created on	<Creation Date>	
Last changed	29.09.2010 11:41	
Processing status	X	in Process
		submitted
		completed
Document File	J:\1_Document_Management\3_External_Issues\4_Committees-Organisations\ICAO\00-Regional-Offices\AFI-Region\APIRG-17\ICAO-AFI-CAD-Business-&-Financial-Plan-Doc-007-v0.5.doc	
V-Modell Version	Version 1.2.1 English	

Further Product Information

Participating	[not involved] [not involved] [not involved]	User Executive Project Leader
Creation		

Change Listing

Change			Changed Chapters	Description of the Change	Author	State
No	Date	Version				
1	05.09.08	0.1	All	Initial Product creation	Rudolph	Draft
2	01.10.08	0.2	All	Input from WACAF	Rudolph	Draft
3	01.11.08	0.3	All	Input from AFI CAD SG/3	Rudolph	Draft
4	01.06.09	0.4	All	Adjustments befor Informal Consultative AFI CAD SG/4	Rudolph	Draft
5	25.07.10	0.5	All	Version for APIRG/17	Rudolph	Draft
6						

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CHAPTER 1 - INTRODUCTION

1.1 Executive Summary

1.1.1 This Business Plan is intended to describe and summarise the Strategic Objectives, Financial Implications, Organisational Framework, Management Structure, Procurement and Implementation Concept and Schedule, general Planning, and, in its Appendix, the User Requirements for the African Centralised AIS Data Base (AFI-CAD). It shall form the basis for the next steps to be undertaken towards implementation after endorsement by APIRG/17.

1.1.2 The Business Plan is an action based on APIRG Conclusions 16/44 and 16/42[1] and a subsequent Special Implementation Project (SIP)[2].

1.1.3 The Business Plan is written based on the data and information made available until today by the various actors and is therefore under review cycle on a regular process based on the schedule suggested in the Business Plan itself (cf. 4.4).

1.1.4 The Plan tries to follow the structure of the ICAO Business Plan as far as possible.

1.2 Background

1.2.1 The Reports of the four meetings[3] of the AFI Region Study Group on the Establishment of a Centralised AFI Region AIS Data Base have been taken into account. The Special AFI Regional Navigation (RAN) Meeting 20084 has noted the AFI-CAD study work under way.

1.2.2 The Business Plan considers the Framework and Recommendations of the AFI-CAD Study Group as latest provided in the Appendix H to APIRG/16 Report[1] and in Appendix 11 of the ATS/AIS/SAR SG/11 Report[5]. It is provided in Annex B) to this Business Plan as reference material.

1.3 Structure of the Business Plan

Chapter 2 - Vision and Mission Statement and Strategic Objectives

This chapter describes the vision and mission of the AFI-CAD which is then further detailed in strategic objectives.

Chapter 3 – AFI-CAD Strategic Profile

This chapter describes the operational focus, the services and products, stakeholders and strategic factors for successful implementation.

Chapter 4 – Organisation, Management, Milestones

This chapter describes the legal framework, management issues, ownership issues milestones and organisational options.

[1] APIRG/16 Meeting 19-23 November 2007
[2] ICAO WACAF Office T 2/8.1 – 0778 09 September 2008
[3] (1) 8-10 November 2006, (2) 3-5 October 2007, (3) 7-9 October 2008, (4) 26 June 2009
[4] SP AFI/08 24-29 November 2008
[5] 26-30 April 2010

Chapter 5 - Financial Plan

This chapter describes the business model, value propositions, cost and other financial issues.

Chapter 6 - Benefits and Disadvantages

This chapter describes benefits and disadvantages.

Chapter 7 - Action Plan

This chapter contains the action plan.

Chapter 8 – Summary and Conclusions

This chapter gives a short summary and conclusions.

Chapter 9 – Appendix

This chapter contains supporting information like abbreviations, literature and others

Annexes

The annexes contain the requirements (URD), the guidance material (recommendations), the V-Model overview and the questionnaire for current AIS costs.

CHAPTER 2 - VISION AND MISSION STATEMENT AND STRATEGIC OBJECTIVES

2.1 VISION AND MISSION (ICAO)[6]

2.1.1 The International Civil Aviation Organization, a United Nations Specialized Agency, is the global forum for civil aviation.

2.1.2 ICAO works to achieve its vision of safe, secure and sustainable development of civil aviation through cooperation amongst its Member States.

2.1.3 The AFI-CAD assists the achievement of better civil aviation safety and enhanced efficiency of aviation operations in the ICAO AFI Region for flights within, to/from or crossing the region.

2.2 Strategic Objectives[7]

2.2.1 The following Strategic Objectives exist:

A: Enhance global civil aviation safety,

B: Enhance global civil aviation security,

C: Minimize the adverse effect of global civil aviation on the environment,

D: Enhance the efficiency of aviation operations,

E: Maintain the continuity of aviation operations,

F: Strengthen law governing international civil aviation.

2.2.2 The AFI-CAD undertaking is related to ICAO Strategic objectives “Safety (A2)” and “Efficiency (D1):

A2) Ensure the timely implementation of ICAO provisions by continuously monitoring the progress toward compliance by States.

D1) Develop, coordinate and implement air navigation plans that reduce operational unit costs, facilitate increased traffic (including persons and goods), and optimise the use of existing and emerging technologies.

Safety	Security	Environment Protection	Efficiency	Continuity	Rule of Law
Supporting Implementation Strategies					

Table 1: Relationship between Objectives and Supporting Implementation Strategies

Therefore the AFI-CAD undertaking is one of the major Supporting Implementation Strategies in the AFI Region to reach the ICAO Strategic Objectives A) and D1) in the Region.

[6] approved by the Council (C-DEC 174/13) on 11 March 2005
[7] approved by the Council (C-DEC 173/13) on 17 December 2004

CHAPTER 3 - AFI CAD STRATEGIC PROFILE

3.1 Basis for Strategic Profile

3.1.1 The two Strategic Objectives described in CHAPTER 1 of the Business Plan and the AFI-CAD Guidance Material form the basis of the Strategic Profile that will enable the AFI part of the ICAO (WACAF and ESAF Office) to position itself vis-à-vis its primary audience.

3.1.2 The predominant driving forces are the Criteria and Services of the Guidance Material Recommendations the AFI-CAD (cf. Annex B) and the financial limiting factor that the Cost Recovery must ensured as a minimum requirement of the continues Operation, shown in Recommendation 10, b) i. (cf. Annex B).

3.2 Strategic Positioning

3.2.1 The strategic positioning of AFI-CAD detailed below consist of four major thrusts: the operational focus of AFI-CAD, the scope of the programmes, services and products, the scope of customers, users, and partners, and the strategic skills need for success.

3.2.2 They need to take into account efficiency, performance criteria and need to be linked to budgets.

3.3 Operational Focus

3.3.1 The advantages for users and the value propositions of the AFI-CAD are the most important factors which must be driven by an Operational Focus. The AFI-CAD initiative is a very advanced approach to fulfil the airspace user needs in aeronautical data, aeronautical obstacles, and terrain data requirements. It will built, in a large extend, the basis for and assist the implementation and usage of the Global Satellite Navigation System (GNSS) technology on the African continent. Therefore the ICAO ATM Operational Concept (doc 9854-AN/458) 1st Edition 2005 and ICAO Global Air Navigation Plan (Doc 9750-AN/963) 3rd Edition 2007 should be taken into account.

3.3.2 Because of its far reaching influence the AFI Operational Concept (OCD) and the User Requirements Document (URS) to takes into account that the 1st Edition 2005 of the ICAO ATM Operational Concept views Aeronautical Information with its temporality, intelligent information management, with unlimited access, limited bandwidth and optimised transfer of information, with fully electronic and network environment with printouts used only as needed for reference, temporary memorisation and visualisation support to human operators (paragraph 2.9.12 to 2.9.16).

3.3.3 The ICAO ATM Operational Concept views seven ATM concept areas components in paragraph 2.1.6, Figure 2-1:

1. Airspace organisation and management (AOM),
2. Demand/capacity balancing (DCB),
3. Aerodrome operation (AO),
4. Traffic synchronisation (TS),
5. Conflict management (CM),
6. Airspace user operations (AUO),
7. ATM service delivery management (ATM SDM),

The AFI-CAD will contribute to all of those new components which show that the aeronautical information in form of aeronautical data, aeronautical obstacle data, terrain data and others (e.g. NOTAM) is a key enabler for the new ATM concept. It should be carefully analysed during the finalisation of the OCD and URS that the new requirements stemming from this concept are reflected in the OCD and URS.

3.3.4 The ICAO Global Plan Initiatives (GPI) of the 3rd Edition of the Global Air Navigation Plan will also be taken into account, namely GPI-18 “Aeronautical Information” and GPI-20 “WGS-84” to ensure that the scope of both GPIs “to make available in real-time quality assured electronic information (aeronautical, terrain and obstacle)” and “to implement WGS-84 by all Sates”.

The two GPIs address also the quality of aeronautical information as made available by data originators and to be maintained during its process through national AIS in the AFI Region and AFI CAD to end users. Therefore the whole electronic uninterrupted aeronautical data chain will be addressed in the Operational Concept for the AFI-CAD.
It will be noted that GPI-18 “Aeronautical Information” is the only GPI[8] which provides input to all seven ATM concept components. This underlines the importance of Aeronautical Information and the set-up of the AFI-CAD.

3.3.5 In addition to that the finalisation of the OCD and URS will take into account the ICAO Roadmap from AIS to AIM[9] and the outcome of the work of the ICAO AIS to AIM Study Group which will continue its work until 2016. The ICAO AIS/MAP Divisional Meeting, planned for 2014, will be taken into account in the milestone planning and the organisational frame (CHAPTER 4).

3.4 Scope of Services and Products

Based on ICAO Annex 4 and 15, the related Manuals, and the AFI-CAD Recommendations 2 and 8 (cf. Annex B)) the AFI-CAD shall have the following operational scope:

3.4.1 AFI CAD services (Recommendation 2)

a) the International NOTAM Operation (INO) providing facilities for world-wide NOTAM, SNOWTAM, ASHTAM and AFTN or equivalent message handling and for pre-flight Information Bulletins (PIB) generation.
b) the Static Data Operation (SDO) providing facilities for AFI Static Aeronautical Data/information handling and reporting. Moreover, a minimum set of data is also maintained to allow the correct functioning of the INO system.

3.4.2 Scope of Services Provided (Recommendation 8)

a) Regarding the data operations service domains, the services provided shall ensure:
    a. Co-ordination of the resolution of data conflicts detected by the system data checking processes ;
    b. for non-participating States (world wide) :
        i. - NOTAM processing (verification, validation, etc…)
        ii. - entry of the statistic data required by the system NOTAM function.

b) b) As currently defined, the service does not include the provision of AIS services on behalf of participating States, i.e. the service shall not comprise the following activities :
    a. creation of NOTAMs
    b. origination and publication of AIP, AIP supplements, AIP amendments, AIC and charts.

[8] See Table 1-1 of ICAO Global Air Navigation Plan (Doc 9750-AN/963) 3rd Edition 2007
[9] 1st Edition 2009

c) c) As part of the provision of the service, the service provider will deliver to the centralized AFI Region AIS Data Base client the following services :
   a. 24 hour operational and technical help desk
   b. Client training
   c. Management and monitoring of the delivery of aeronautical information and AIP elements.

3.4.3 This scope of services and products will be covered in the URS. The finalisation of the URS will include the following requirements:

1. from the Guidance Material for the AFI CAD, as per Annex B) to this document,
2. from the Eurocontrol URS Documents (General, Commons Services, Static Data, NOTAM, AIP, Charting),
3. from the AFI States based on a filled Questionnaires[10],
4. from AFRAA[11], AACO[12], and IATA[13] as user representatives,
5. additionally to be considered from the Roadmap from AIS to AIM.

3.5 Scope of Customers / Users / Partners

3.5.1 The main existing stakeholders and entities which will have or might have an influence on the planning are the following:

Name	Role
African Airlines Association (AFRAA)	User representation
Arab Air Carrier Organisation (AACO)	User representation
International Air Transport Association (IATA)	User representation
Organization of African Unity (OAU)	Political will and acceptance
African Development Bank (AFDB)	Financing, Procurement (?)
African Civil Aviation Commission (AFCAC)	Promoting, organising, depositing of the AFI CAD agreement between AFI States
ICAO AIS/MAP Divisional Meeting planned for 2014	Planning for next decade
ICAO Study Group AIS to AIM	Studying new requirements and restructuring of the Annex 4 and 5. Preparing the AIS/MAP Divisional Meeting and eventually the PANS-AIM
ICAO AFI Planning and Implementation Regional Group (APIRG)	Coordination and amendment AFI Regional Plan, Regional Coordination
APIRG ATS/AIS/SAR Sub-Group	Identify shortcomings and problems and review, the adequacy of requirements
APIRG AIS/MAP Task Force	Specialist Input for AFI CAD
AFI Region Study Group on AFI CAD	Concept development for AFI CAD
Agency for the Safety of Aerial Navigation in Africa and Madagascar (ASECNA)	Major AIS Service Provider
AFI CAD Company (owned by the AFI States)	Procurements (?), System operation, Service operation

[10] Ref.: T2/8.1 – 303, 15 April 2009 and T2/8.1 – 308, 21 April 2009
[11] African Airlines Association
[12] Arab Air Carrier Organisation
[13] International Air Transport Association

3.5.2 The activities and already planned meetings of those stakeholders should be explored before finalising the Schedule, COD, and URS in order to ensure the common acceptance and decision process for the AFI CAD.

3.5.3 It will be very important to promote and present the AFI-CAD and its advantage to those stakeholders and to gather their expertise and assistance.

3.6 Strategic Factors for Successful Implementation of the Business Plan

3.6.1 Important strategic success factors for the AFI-CAD are:

1. Ownership and commitment from all Stakeholders,
2. Compliancy with ICAO Air Navigation Services Economics,
3. Establishment of a Legal Framework,
4. Establishment of an Initial Program Team.

3.6.2 These factors will be further explored in CHAPTER 4 and CHAPTER 5.

CHAPTER 4 – ORGANISATION, MANAGEMENT, MILESTONES

4.1 Organisation, Legal Framework

4.1.1 To pave the way for a Legal Framework the initial establishment of an organisational kernel of the AFI-CAD is very important to be able start continues work on the program and to establish initial funding. Users and all African countries can benefit from the AFI CAD establishment therefore it could be an initiative assisted by the African Organisation of Unity (OAU) and managed under the auspices of the African Civil Aviation Commission (AFCAC). From 53 African countries, 39 have signed the AFCAC Constitution, 44 have ratificated, and 44 have deposited it. This is a big majority. AFCAC has in its constitution already the functions of "fostering arrangements between States", "contribute to ICAO Regional Plan implementation", and close consultation and cooperation with OAU and ICAO.

4.1.2 According to article 13 of the AFCAC Constitution, AFCAC shall prepare and approve a budget for the direct cost; indirect costs are handled under the practice of Chapter XV of the Chicago Convention. This would give the possibility to fund the set-up of the AFI CAD Office with defined and planed costs by AFCAC. During this set-up time a legal entity is inaugurated where all African States have the eligibility to joint. This legal entity will be funded by the members and, as to be identified in the financial model, eventually by alternative funding (see 1.27 to 1.34 of ICAO Global Air Navigation Plan). The alternative funding could be organised through the African Development Bank Group, where all African countries are members.

Figure 1 shows an initial legal framework which needs further development, but it is intended to give an initial overview and to open discussion.

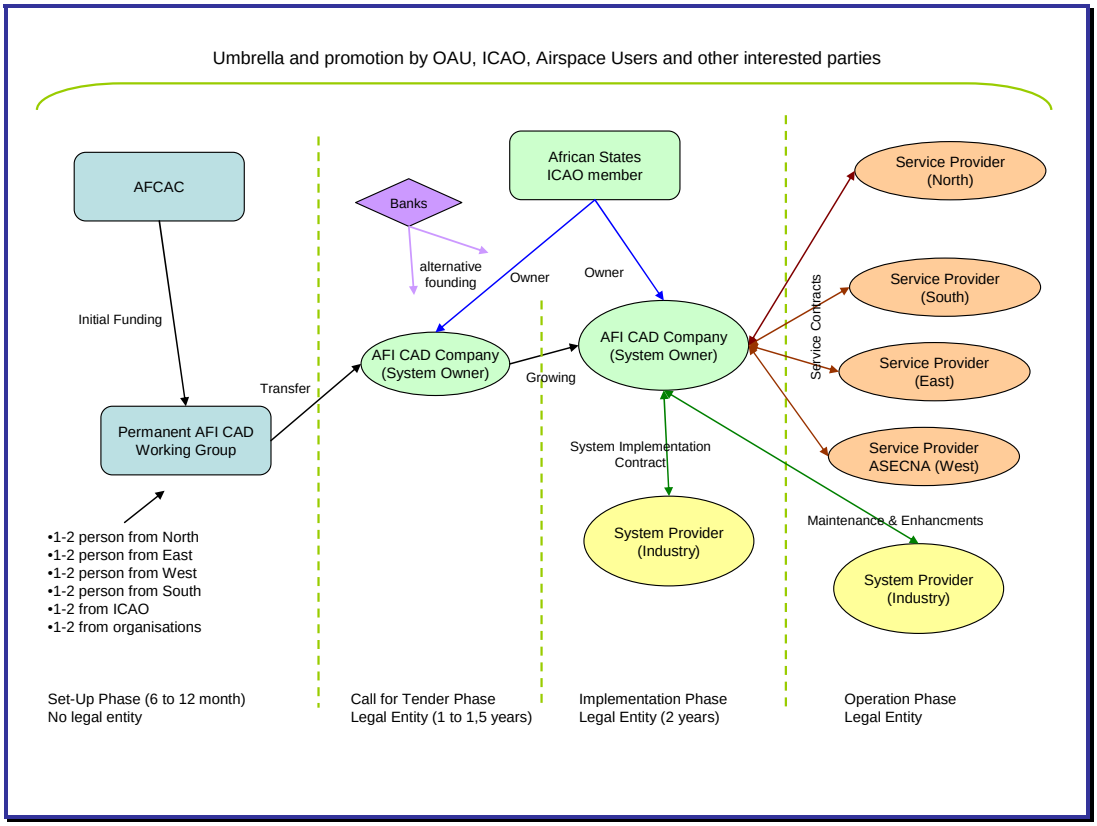

Figure 1: Legal Framework Set-Up

4.2 Management

4.2.1 The initially set-up Permanent AFI CAD Working Group (Program Team) will grow over the time (cf. Figure 1). It is important to set-up a team which understands the process from initial schedule and applicable documentation planning, making working plans including initial principle thinking about procurement and call for tender preparation. The team members need to be aware with the latest ICAO developments and need operational know and experience in the Aeronautical Information areas. The team needs founding and the right composition of representatives. The representatives shall represent:

1. the four indented areas of responsibility (North, West, East and South),
2. the three intended language groups (Arabic, English, French),
3. ICAO HQ, and ICAO AFI,
4. Organisations in a position to contribute.

4.2.2 Initially the team can be set-up by ICAO AFI but as soon as the procurement agency is inaugurated the team shall be responsible to that entity.

4.2.3 The responsibility of the Permanent AFI CAD Working Group (Program Team) shall cover the following ten principle phases:

1. Preparation Phase,
2. Set-Up Phase,
3. Call for Tender Preparation Phase,
4. Call for Tender Phase,
5. Contract Negotiation Phase,
6. System Implementation Phase,
    a. Each Area/Centre (North, east, South, west) can follow a separate Implementation Plan,
    b. Those Phases can move in parallel,
7. Service Implementation Phase,
    a. Each Area/Centre (North, east, South, west) can follow a separate Implementation Plan in conjunction with the system implementation,
    b. Those Phases can move in parallel,
8. Service Migration Phase,
9. Operation Phase (System and Service),
10. Maintenance and Enhancement Phase.

4.2.4 The methodology to organise this process shall be according to the V-Model ® XT [14]. This model is used by the German Government for all its civil and military procurements of software products and systems. The V-Model is designed as guidance for planning and executing development projects, taking into account the entire system life cycle. It defines the results to be achieved in a project (or program) and describes the actual approaches for developing these results. In addition the V-Model specifies the responsibilities of each participant. Thus, the V-Model describes in detail, "who" has to do "what" and "when" within a project.

4.2.5 These standardized, methodical guidelines permit a systematic execution even of complex and extensive projects. Thus, projects get more planable, traceable and lead to high-quality results with greater reliability, which is advantageous for acquirer and supplier.

4.2.6 The cooperation between acquirer and supplier is an essential factor of success. Thus, it is regulated by the V-Model. The responsibilities of both sides are specified. Thus, the V-Model standards are an important basis for contracts between acquirer and supplier. In addition, the V-Model improves the comparability of Offers.

4.2.7 Thus, the V-Model can be used as basis for contracting, as process guidance and as basis of communication.

4.2.8 The big advantage of the V-Model is that it includes a process of tailoring the model for specific needs like the AFI CAD procurement. The V-Model is fully documented in PDF and HTML in English and German language, is available free of charge and includes electronic Java based tools for tailoring, customisation, document generation. The V-Model uses free Open Source Editors (Open Office) but the documents are also compatible to commercial editors like Microsoft Word.

4.2.9 The V-Model also contains the procurement cycle in total which is a big advantage for the AFI CAD as the modelled procurement rules can be considered in setting up the AFI CAD program even when the procurement entity is not yet know.

4.2.10 Important for the AFI CAD is the fact that the organisation who will finally issue the call for tender is not yet existing. This means that the process needs to cover, from the professional point of view, nevertheless all phases including Set-up Phase, Tender Preparation Phase until Maintenance Phase and not only identifying user requirements. This is necessary in order to have a holistic approach to the methodology of the whole program process. If a mapping of the chosen methodology and process to a other methodology and process is needed at the end because of legal and/or liability requirements, then the mapping shall be done in total and not only for a limited part. However, when the whole process is chosen at the beginning of the work then it is very likely that the work can be re-used in total.

4.2.11 The phases will need to be executed basically in sequence where the work result of one phase is the prerequisite for beginning the next phase. To support the phases the team will need to compile the following documents because of its size and complexity from the beginning.

[14] According to paragraph 4.4 of AFI-CAD Study Group Meeting No. 2 Report

4.2.12 The minimum set of Documents could be viewed as follows in Table 2:

No	Doc Group	Doc Title	Audience	Priority
1.1	Planning and Control	Program Manual	Internal	-
1.2		Program Plan	Internal	High
2.1	Requirements and Analyses	Program Proposal	Internal	High
2.2		Legal Framework of the operation of the AFI CAD	Internal	High
2.3		Operational Concept	External	High
2.4		Requirements Specification Overall Project	External	High
2.5		Requirements Evaluation	External	-
2.6		Service Provision Requirements	External	High
3.1	Acquisition and Contracting	RFP Concept	Internal	High
3.2		Criteria Catalogue for Assessment of Offers	Internal	-
3.3		Request for Proposal	External	-
3.4		Offer Assessment	Internal	-
3.5		Contract	External	-
3.6		Contract Addendum	External	-
3.7		Statement of Acceptance	External	-
4.1	Configuration and Change Management	Problem Report - Change Request	External	-
4.2		Change Status List	Internal	-
4.3		Problem Change Evaluation	Internal	-
4.4		Change Decision	External	-

Table 2: AFI-CAD Program Documents

4.2.13 The documents marked in the Audience Column as “Internal” are important for setting up the internal process of the procurement team, the documents marked “External” need to be sent to the potential bidders during the tender process or to be used during program execution process. The documents marked in the Priority Column as “High” shall be developed in parallel to the Requirements Specification.

4.2.14 The documents with no priority shall be developed when the process for the set-up of the AFI CAD is more settled.

4.3 Ownership

4.3.1 It is very important that all stakeholders and representatives of the intended AFI areas are taking ownership in the idea of the AFI CAD at the earliest possibility. This means that those areas shall be formed as first provisional step very soon. Otherwise a real ownership and representation is not easy to achieve. If a program team starts working without representing the intended areas of responsibility and being not from the language groups’ then special care needs to be taken by regular interviews and presentations to allow the areas to follow along the preparation of the concept and documents and to ensure input.

4.4 Timeline and Major Milestones

4.4.1 The Timeline and Schedule for setting up and implementing the AFI CAD need careful planning because of its complex legal, organisation, technical, and political nature.

4.4.2 The Timeline and Schedule needs to be divided into phases which contain well defined and clear working packages each with clear:

1. pre-requisites (required input),
2. term of references (statement of work),

3. requested output (result).

This is needed to be able to decide at the end of each phase what the next steps which can be initiated are.

4.4.3 The Timeline and Schedule will be influenced by existing planning and timelines of the major stakeholders. This needs to be reflected during planning. The contents of the phases can be described as follows in Table 3:

No	Phase	Contents	Result/Deliverable
1	**Preparation Phase**	• Program Plan • Schedule • Gather interest by State • Document Concept	• AFI CAD Study Group presents work result to APIRG/16 • APIRG/16 inaugurates Permanent AFI CAD Working Group (CADWG)
2	**Set-Up Phase**	• AFCAC plans AFI CAD meeting • Discussions with AFDB about financing • States deciding about financing • CADWG finalises documentation concept • Legal establishment of AFI CAD Company (Service Provider Company - SPC)	• State Groupings (North, East, South, West) are fixed • Legal frame are finalised • Service Provider company (SPC) are founded • CADWG gets part of the Service Provider company • Financing agreed with AFDB
3	**Call for Tender Preparation Phase**	• SPC prepares Call for Tender based on the CADWG documentation • SPC develops pre-qualification criteria • Call for pre-qualification • Assessment companies/consortia which have interest to be pre-qualified	• Call for Tender finalised • Publication of Call for Pre-Qualification • Decision on list of pre-qualified companies/consortia • International Call for Tender published (either by SPC or AFDB)
4	**Call for Tender Phase**	• Call for Tender • Public clarification meeting with interested bidders • Tender Closing • Development of the list of shortlisted bidders • Individual clarification with shortlisted bidders • Call for provisional final offer from shortlisted bidders • Decision about preferred final bidder • Call for definitive final offer from preferred bidder	• Decision about preferred bidder (company/consortia)
5	**Contract Negotiation Phase**	• Negotiation of system and service contract	• Signed System Contract • Signed Service Contract
6	**System Implementation Phase**	• Area/Centre 1 implementation • Area/Centre 2 implementation • Area/Center 3 implementation • Area/Center 4 implementation • System Training and Training Centres implementation	• Each Area/Centre (North, East, South, West) separate implementation schedule acceptance
7	**Service Implementation Phase**	• Service implementation Area/Centre 1 • Service implementation Area/Centre 2 • Service implementation Area/Centre 3 • Service implementation Area/Centre 4 • Service Training	• Each Area/Centre (North, East, South, West) separate service acceptance
8	**Service Migration**	• Service migration Area/Centre 1 • Service migration Area/Centre 2 • Service migration Area/Centre 3 • Service migration Area/Centre 4	• Operational usage (cut over) separate for each Area/Centre
9	**Operation Phase (System and Service)**	Operation of the System and delivering the service	AIS Services
10	**Maintenance and Enhancement Phase**	• Identification of changes	Acceptance of System and

No	Phase	Contents	Result/Deliverable
		• Decision about changes • Implementation of changes	Service changes

Table 3: AFI CAD Program Phases

4.4.4 The contents description of the Phases needs continuous reassessment.

4.4.5 The timeline covers about the next four years 2010 to 2014 until the first Centre/Area could move into operational use. Figure 2 gives an overview.

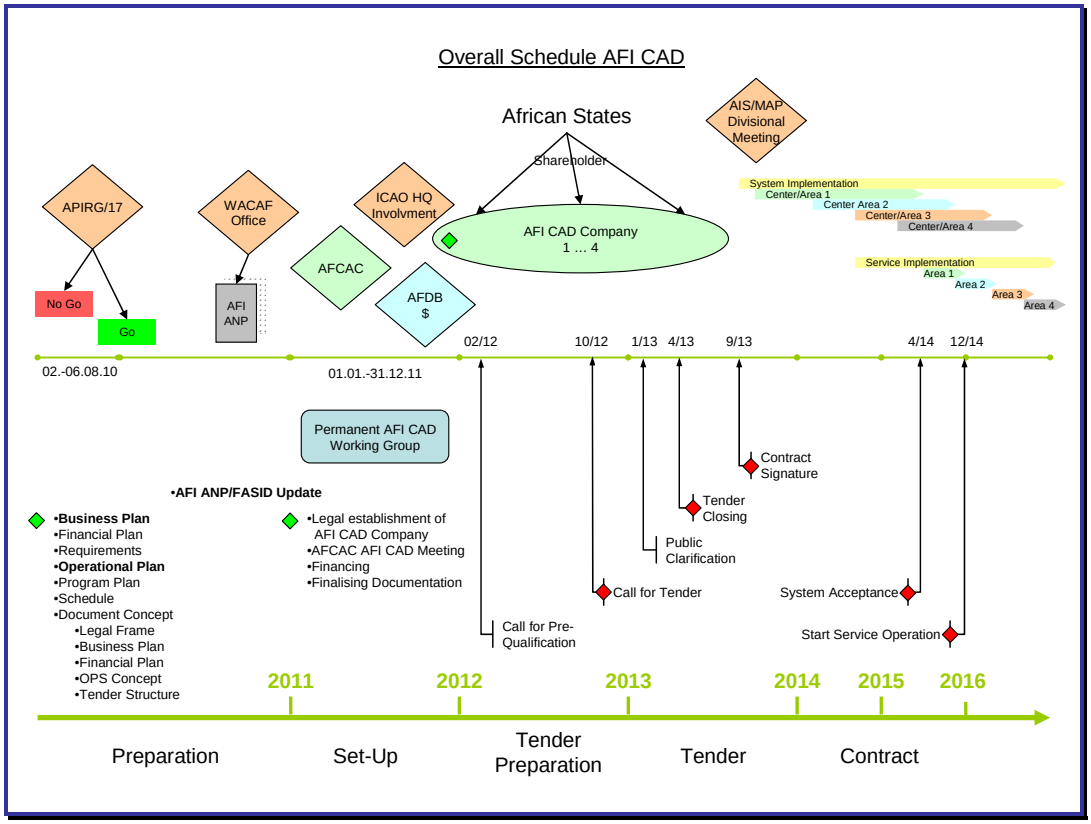

Figure 2: Timeline/Major Milestones

4.4.6 To meet the Timeline depends mostly on the agreement about the AFI CAD Company (Service Provider Company) and the financing.

4.5 Organisational Options

4.5.1 Existing International Cooperation's and International Operating Agencies need to be taken into consideration as nucleuses for the AFI-CAD as those have experience in international working relationships for air navigation service provisions.

4.5.2 The Agency for Air Navigation Safety in Africa and Madagascar (ASECNA) is an recognised International Operating Agency of Air Navigation Services[15],) and the Roberts FIR Organisation is an recognized International Cooperation in the frame of an sub-regional activity[16].

4.5.3 In the coming discussions and the Set-Up Phase the position of ASECNA and Roberts FIR Organisation shall be exploited and it could be assessed how the experience of ASECNA and the Roberts FIR Organisation can be leveraged for the AFI CAD.

4.5.4 Both are possible candidate to operate one of the Operation Centres and/or Training Centres because they have experience in working based on agreements for the mutual benefit.

4.5.5 From this perspective it is necessary to discuss the area of responsibility of the East, North, South, and West centre in the not so far future. A possible initial idea is shown in Figure 3[17].

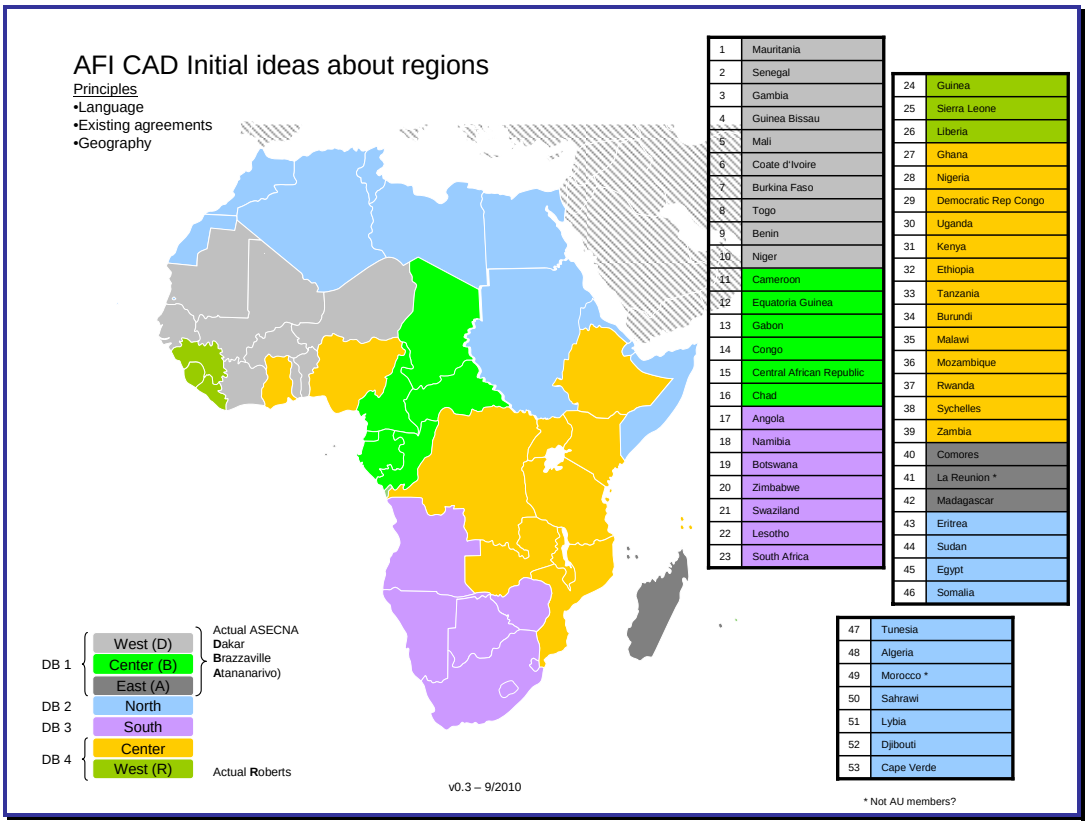

Figure 3: AFI-CAD Initial Regions

[15] See ICAO Global ANP (Doc 9750-AN/963), 3rd Edition – 2007, page App D-7 and D-8
[16] See ICAO Global ANP (Doc 9750-AN/963), 3rd Edition – 2007, page App D-5.
[17] Reference AFI-CAD Study Group Meeting No. 3

4.6 AFI-CAD Focal Points

The future coordination of AFI-CAD through the whole AFI Region requires continues coordination and ownership in each state who is interested to participate. Therefore eac stae shall appoint a Focal Point as contact for the ICAO WACAF Office and later for the Project Team.

CHAPTER 5 - FINANCIAL PLAN

5.1 Business Model

5.1.1 The classical business model requires defining of the Value Proposition, the Added Value and the Earnings of the AFI CAD. In the non profit environment of cost recovery of the ICAO model, in which the AFI CAD shall be operated, the cost planning is very important.

5.1.2 The Cost assessment can be done generally in the following structure:

1. Identification of direct set-up cost (set-up phase, funding by AFCAC),
   a. Setting up the legal structure according to Figure 1,
   b. Office, management, specialists from regions, administration,
   c. Writing the concept, preparing the documents (cf. 4.2.12),
2. Identification of the Call for Tender Cost (company operating cost, e.g. Ltd.),
   a. Company cost structure planning: personnel cost, infrastructure cost, travel, etc.,
   b. Personnel cost (staffing) related to the Call for Tender planning,
   c. Co-financing by banks possible (e.g. loan),
   d. Planning of the budget for the:
      i. Systems Contract, including training centres,
      ii. Service Contract, including training (Operating cost at 10 years),
      iii. Maintenance and Enhancement (10 years).
3. Identification of Implementation Phase cost (company operating cost),
   a. Company cost structure planning: personnel cost, infrastructure cost, travel, etc.,
   b. Personnel cost (staffing) related to the Call for Tender planning,
   c. Co-financing by banks possible (e.g. loan),
   d. Re-planning/update Operation Phase:
      i. Systems Contract, including training centres,
      ii. Service Contract, including training (Operating cost at 10 years),
      iii. Maintenance and Enhancement (10 years).
4. Update of Operation Phase cost.

5.1.3 The Business Cost Model is the basis before doing the next steps. It forms the basis for the set-up. It will need to be shown that the capital needed to cover the cost will bring earnings. There for the Value Proposition, the Added Value and Earnings will be carefully developed. Also non financial advantages which can not be valued in cost advantage for users shall be identified and described.

5.2 Value Proposition

5.2.1 The Value Proposition for the AFI CAD is probably the most important part for the users of the AFI CAD. Examples for the Value Propositions are:

1. electronic aeronautical data, obstacle data, terrain data from one source,
2. single access point,
3. consistent data,
4. online availability,

5. higher availability of services,
6. better quality,
7. etc.

5.2.2 The Added Values of the AFI CAD for the African States are for instance:

1. Sharing of cost,
2. Sharing of know,
3. Harmonisation of planning and work,
4. Better trained personnel,
5. etc.

5.3 Earnings

5.3.1 The Earnings of the AFI CAD for the African States are for instance:

1. Cost saving through common operation,
2. Cost saving through common training,
3. Cost saving through common procurement,
4. May be later selling of additional service as far as ICAO's Policies on Charges for Air Navigation Services allows this.

5.4 Joint Financing

5.4.1 Aeronautical Information Services (AIS) fall by definition under "Air navigation services" in sense of Charges[18]. Therefore the ICAO Manual on Air Navigation Services Economics (Doc 9161) is applicable for identifying the cost for AFI CAD. The organisational and international cooperative aspects of Appendix D to the Global Air Navigation Plan (Doc 9759) shall be taken into account as the AFI-CAD:

1. will be an multinational facility and service implementation,
2. will need an international operating agency,
3. will need an joint charges collecting agency,
4. will need joint financing arrangements.

[18] See ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082/7), Appendix 3.

5.4.2 The AFI CAD activity is therefore full in line with Assembly Resolution A35-14, Appendix X, where Sates are expected to give consideration to cooperative efforts for introducing more efficient systems and services.

5.5 Current Cost

5.5.1 It was planned to identify the current cost of the AIS operations in all AFI countries by means of a questionnaire[19], which was sent by the WACAF Office to all 53 countries and territories. The reply from countries was not sufficient to determine the current costs.

5.5.2 In order to identify the current cost an awareness campaign shall be initialised and the current costs shall be then collected by means of telephone interviews using the same questionnaire as for State Letter. The questionnaire is reproduced in Annex D).

5.6 ICAO Approach

5.6.1 For the further work on the Financial Plan the Appendix E “Cost-Benefit and Economic Impacts” and Appendix F “Financial Aspects” of the ICAO Global ANP (Doc 9750-AN/963, 3rd Edition 2007) shall be used as guidance material by the Program Team.

5.6.2 The text below from 5.7 to 5.16 is therefore heavily taken from this document and tries to relate the ICAO approach to the AFI-CAD where it seems to be relevant.

5.7 Cost- Benefit Methodology

5.7.1 The cost-benefit analysis is used to estimate the economic viability of the planned AFI CAD investment project, i.e. the extent to which the total benefit from the investment exceeds the total cost. The AFI CAD is complex and consists of a package of investments. Measures of the viability of the new investment package (the project case) are based on a comparison with the existing systems (the base case). The existing systems are defined to include their normal and expected maintenance and possible development over the planning horizon. The new facilities replace the existing facilities, and as the latter are phased out, the reduction in their costs can be regarded as benefits from installing the new systems. The most important benefits of the AFI CAD are the cost reductions from more efficient flight operations, reduced flight times, and enhancing safety and security which are expected to emerge as AFI CAD is implemented.

5.7.2 A rigorous approach to developing a measure of the expected economic performance of an investment project is the net present value (NPV) or life-cycle approach, which focuses on the annual flows of costs and benefits (cash flows) related to the project. The costs and benefits in cash flow terms are not distributed evenly over time. Typically, there are large capital expenditures in the early years of a new project followed by many years of benefits, and also of operating and maintenance costs. There could be significant costs during the period of transition from the existing to the new systems, and these must be included in the analysis. The benefits will normally be in the form of cost savings. The net benefit in each year is equal to the sum of all the benefit items minus the sum of all the cost items expected in that year. The NPV (i.e. current year capitalized value) of the stream of net benefits (net cash flows) can be determined by a process of discounting the future cash flows. This process takes into account the effect of the rate of interest on the present value of each future cash flow.

[19] State Letter WACAF Office T2/8.1 - 0309

5.7.3 Estimation of the future flows of the costs and benefits, and hence the NPV associated with the implementation of the AFI CAD requires many assumptions about the prices and quantities of communications, equipment, services, and about the amount of potential savings in aircraft operating costs. Therefore, there is an element of uncertainty and risk in the NPV results. The financial risks can be appreciated by studying the effects on the NPV estimate resulting from changes in the assumptions. A particularly important assumption is that the transition to the AFI CAD by the AFI CAD provider and its owners (the AFI States) and aircraft operators occurs in a coordinated fashion so that net benefits are maximized.

5.7.4 Comprehensive guidance material to assist States in carrying out cost-benefit studies of the implementation of CNS/ATM systems was made available by ICAO in relation of Economics of Satellite-based Air Navigation Services in Circular 257. This circular focuses on the NPV methodology, which is widely recognized and used by financial institutions such as those potentially involved in funding AFI CAD.

5.8 Business Case Evaluation

5.8.1 The development of a business case for the implementation of the AFI CAD systems by a service provider or an operator (owned by the AFI States) involves taking the financial cost-benefit analysis a step further. In particular, changes in revenues resulting from changes in the price of the product/services sold must be taken into account. It is generally expected that the AFI CAD systems will facilitate reduced operating costs and a lower price for the service provided. From the point of view of a specific organization, assessment of the net financial impact, in present value terms, must include not only the implementation cost and operating cost savings, which are included in the cost-benefit analysis, but also consequent changes in revenues.

5.8.2 For a service provider, a business case evaluation must include the impact on revenues of changes in charges associated with the implementation of the AFI CAD systems. Assuming that the AFI CAD service provider is an autonomous organization (owned by the AFI States) operating on a commercial basis and is currently covering its costs with the present technology systems, the basic issue is for the service provider to be satisfied that the changes in revenues expected from the planned changes to AIS charges will match the net change in costs, measured by the cost-benefit analysis. However, if the relationship between costs and revenues is not being monitored (e.g. if costs are met from the government budget and revenues are treated independently as general government revenues), then the AFI CAD services are not being provided on a commercial basis. Even in these circumstances it is recommended that a business case evaluation be conducted to assess the financial impact of the new systems on the service provider.

5.8.3 For an airline and other airspace users, a business case evaluation would include, among other factors, assumptions about the impact on its costs of expected changes in route charges and operating costs and the impact on revenues of changes in airline fares and rates or operating cost of other airspace users (like business aviation, military, etc.), where these changes are associated with the implementation of the AFI CAD systems. These impacts are in addition to the direct investment costs and operating cost savings attributable to the new AFI CAD systems and identified in the cost-benefit analysis described above.

5.8.4 The AFI-CAD Program Team will use the ICAO CNS/ATM Business Case Analysis Tool (DFACS)[20] to assist the current cost collection.

[20] ICAO Catalogue 2007, CD-109.

5.8.5 The ICAO Africa-Indian Ocean Regional Traffic Forecasts, 2004–2020. (Doc 9879) will be considered as input to the Financial Model to underline the necessity to build the AFI CAD. This report contains long-term air traffic forecasts for the major route groups to, from and within the Africa/Indian Ocean area, in terms of both passengers and aircraft movements. It also contains movement forecasts at city-pair level for the top 25 city-pairs and an analysis of the year 2005 FIR traffic data for the airspace controlled by ASECNA including various peak period parameters. This Traffic Forecast will be used as an indicator for the rollout plans and stepwise coverage of the AFI CAD.

5.9 Other Economic Effects

5.9.1 States may be interested in the broader economic and social impact of the AFI-CAD systems as well as the financial viability of the new systems. For example, implementation of the new systems should produce passenger time savings, improve safety, produce environmental benefits and may also lead to some industry restructuring and changes in skills required.

5.9.2 CNS improvements, which produce benefits for ATM such as more direct flight paths and less delay from airspace congestion, will reduce the passenger travel time for a given journey. If passengers value these time savings, they represent an additional benefit.

5.9.3 An understanding of the contribution of air transport to general economic activity can increase the political commitment to the process of transition to the AFI-CAD systems. National accounting and industry data and employment surveys may be used to determine the share of air transport in total economic activity and its importance as an employer. The input/output tables of a State's national accounts can illustrate the interrelationships among the various elements of the air transport industry and other industries and economic sectors. Other industries purchase air transport services or supply products and services to the air transport industry. From a national or regional economic planning perspective, it is especially important to appreciate the role of air transport in generating employment and incomes and in supporting other non-aviation economic activities. This will put into perspective the value of supporting and investing in state-of-the art national and regional air transport facilities.

5.9.4 Summary of Economic Effects of CNS/ATM

1. Financial benefits and lower fares and rates,
2. Improved safety,
3. Passenger time savings,
4. Environmental benefits,
5. Transfer of high-tech skills,
6. Productivity improvements and industry restructuring,
7. Higher traffic and stimulation of related industries.

5.10 ICAO Policy on Cost Recovery

5.10.1 Whatever approach is taken by a State or group of States collectively to provide the AFI-CAD systems services within the airspace for which responsibility has been assumed, the resultant cost recovery through charges must be in conformity with basic ICAO policies on charges for airports and air navigation services. This policy is contained in Article 15 of the Chicago Convention and is supplemented by ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082/7). The implementation of the AFI CAD systems should not require any basic changes to that policy.

5.10.2 The Statement of ICAO Policy on CNS/ATM Systems Implementation and Operation, approved by the ICAO Council in March 1994, addresses cost-recovery as follows: "In order to achieve a reasonable cost allocation between all users, any recovery of costs incurred in the provision of CNS/ATM services shall be in accordance with Article 15 of the Convention and shall be based on the principles set forth in ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082), including the principle that it shall neither inhibit nor discourage the use of the satellite-based safety services. Cooperation among States in their cost-recovery efforts is strongly recommended."

5.10.3 In ICAO's policies set out in Doc 9082, the following four general principles should particularly be noted with regard to CNS/ATM systems:

in paragraph 36, " . . . as a general principle, where air navigation services are provided for international use, the providers may require the users to pay their share of the related costs; at the same time, international civil aviation should not be asked to meet costs that are not properly allocable to it . . .";

paragraph 38 i), "The cost to be shared is the full cost of providing the air navigation services, including appropriate amounts for cost of capital and depreciation of assets, as well as the costs of maintenance, operation, management and administration";

in paragraph 38 ii), "The costs to be taken into account should be those assessed in relation to the facilities and services, including satellite services, provided for and implemented under the ICAO Regional Air Navigation Plan(s) . . ."; and

in paragraph 47, ". . . the providers of air navigation services for international use may require all users to pay their share of the cost of providing them regardless of whether or not the utilization takes place over the territory of the provider State."

5.10.4 Particular attention also needs to be given to the following principle in paragraph 41 iii) of Doc 9082: "Charges should be determined on the basis of sound accounting principles and may reflect, as required, other economic principles, provided that these are in conformity with Article 15 of the Convention on International Civil Aviation and other principles in this document. The application of economic principles to setting charges which are consistent with ICAO's policy should emphasize the need to recover costs in an efficient and equitable manner from the users of air navigation services. Within an economic context, charges should be set to recover costs, provide a reasonable return on investment where appropriate and provide additional capacity when justified."

5.10.5 In ICAO's policies on charges, pre-funding of projects is considered as a possible source of financing and the following policy guidance is included in paragraph 42 of Doc 9082: "notwithstanding the principles of cost-relatedness for charges and of the protection of users from being charged for facilities that do not exist or are not provided (currently or in the future) that, after having allowed for possible contributions from non-aeronautical revenues, pre-funding of projects may be accepted in specific circumstances where this is the most appropriate means of financing long-term, large-scale investment, provided that strict safeguards are in place, including the following:

(i) Effective and transparent economic regulation of user charges and the related provision of services, including performance auditing and "bench-marking" (comparison of productivity criteria against other similar enterprises).

Comprehensive and transparent accounting, with assurances that all aviation user charges are, and will remain, earmarked for civil aviation services or projects.

Advance, transparent and substantive consultation by providers and, to the greatest extent possible, agreement with users regarding significant projects."

5.11

5.12 Cost Determination

5.12.1 Charges for the AFI CAD systems services should not be imposed unless these services are actually being provided according to the regional ANPs concerned. Consequently, it is important that regional plans be promptly amended to incorporate the AFI-CAD once the States involved have agreed that the element(s) should form part of the plan or plans concerned.

5.12.2 The regional ANPs should provide a schedule for the phase-out of facilities made redundant by the provision of the AFI-CAD systems services. This is also of major importance because significant financial benefits from AFI-CAD systems implementation will not be realized if the facilities and services made redundant continue to be listed in the regional plans and charged for.

5.12.3 As AFI CAD systems components are implemented, the costs are added to the costs of the AFI CAD multinational system and service cost base for charges.

5.12.4 From an organizational viewpoint, it is important, with regard to cost recovery of the AFI CAD system and services costs, the States concerned should assign, to one entity, the responsibility for ensuring that the costs attributable to the provision of AFI CAD systems and services by the different entities in the States are included in the cost basis for any cost-recovery programme or mechanism. This assignment can be made to the AFI CAD services provider.

5.12.5 Costs, in the form of payments made by a State to the service provider offering AFI CAD systems services, will need to be allocated amongst the different participating States, which are potential, all AFI States. That, in turn, will require an agreement between the parties concerned as to how such an allocation should proceed. Assuming a uniform level of service, such allocation could be based on either distance flown or the number of flights in the airspace for which each State has accepted responsibility, or others. Both are viable options. Distance flown would offer more precision while using number of flights as the basis would be simpler to administer. Other schemas could relate number of airports to be provided or similar.

5.13 Cost Recovery during Development and Implementation

5.13.1 One particular issue that needs to be addressed in the implementation of the AFI CAD systems is the treatment of costs and cost recovery during the three initial stages: (1) Set-Up Phase, (2) Call for Tender Phase, (3) Implementation Phase.

5.13.2 The implementation of the AFI CAD systems will, in many cases, lead to the retirement of existing AIS facilities before the end of their economic life. In such circumstances, the balance of the undepreciated portion of the facilities concerned could be included in the cost basis for charges. The same procedure could apply to such costs that may be incurred because of premature retirement or training of personnel made redundant by the implementation of the new systems. Such costs, however, should be limited to termination settlements, costs attributable to early retirement and costs of retraining and/or relocation. These costs could be capitalized and thereafter written off gradually, with the portion written off each year being included in the cost basis for charges. These factors would need to be taken into account in any related cost-benefit analysis or business case study.

5.14 Consultation with Users

5.14.1 Particular attention should be drawn to Doc 9082, paragraphs 49 to 51, and the emphasis placed on (direct) consultation with users regarding increased or new air navigation services charges, where AIS charges are part of it; and also on users being consulted as early as possible when major air navigation services are being planned. This would call for such consultations to be carried out when plans are being developed for the implementation of the AFI CAD systems.

5.14.2 The involvement of IATA can be leveraged for this.

5.15 Financing Plan

5.15.1 The purpose of the financing plan is to provide basic information as follows:

(i) estimates of the element costs (labour, materials, equipment, etc.) of each distinct part of the overall project;

(ii) the funds required to make disbursements at various stages in the project's progress;

(iii) the currencies in which payments are to be made; and

(iv) the sources from which the funds are to be forthcoming, whether from:

a. sources generated by the entity providing the AFI CAD services from its operations, which would primarily include user charges, and possibly retained earnings, but could in some circumstances also include contractual payments; or

b. other sources, including information on the applicable conditions, i.e. interest rate, repayment period, etc.

5.15.2 Also to be emphasized is the importance of the availability of data showing the financial situation of the air navigation services provider over recent years, as well as anticipated developments over the period of debt repayment. Of particular relevance is the recording of revenues and expenses by major item. Estimates regarding future financial developments would emanate from budgets and longer-term financial plans. In the absence of such financial data, it would be much more difficult to decide whether or not the loan or financing sought should be granted and, if so, what terms should be offered.

5.16 Sources of Financing

5.16.1 A survey of potential sources of funds and which of them to approach should be done as early as possible in the planning process. Potential sources of funds will vary considerably from project to project and State to State. The sources to be approached should be studied and decided upon individually for each project and could be grouped as follows: direct contributions from government(s); loans or debt financing; internally generated resources; equity financing; and leasing.

Direct Contributions from Governments

5.16.2 The extent to which direct contributions will be required from the government depends on a number of factors. Chief among these is the organizational form under which the AFI CAD systems services will be provided, i.e. will the government be directly involved, either alone, or in a joint effort with other governments, or will it primarily involve a commercial corporation? Yet another factor is whether the traffic volume within the airspace concerned is sufficient to support the AFI CAD systems component in financial terms, including servicing debt.

5.16.3 For most States, the foreign sources of financing are principally government operated. Such foreign financing may be available from foreign governments in the form of loans negotiated directly with the government of the recipient country or may otherwise be facilitated by particular agencies of government which have been established for the primary purpose of promoting the nation's export trade. Of particular importance among the possible sources of foreign financing available to developing States are the international banks and funds that have been established to assist in the financing and execution of projects promoting national economic development.

5.16.4 Project costs payable in foreign funds constitute a demand on the State's reserves of foreign exchange and as such their financing will usually have to be arranged through or with the approval of the appropriate government authorities. Nevertheless, foreign sources should always be explored as a matter of course, since financing may be available from them on more favourable terms than those obtainable from domestic institutions (e.g. lower interest rate, repayment over a longer period). However, there are also some risks involved in foreign exchange, such as currency fluctuations.

Debt Financing

5.16.5 The feasibility of debt financing will depend on whether the traffic to be served by the AFI CAD systems to be financed is of sufficient volume and strength to service the debt, including interest and repayment of capital. Where an international agency or corporate entity would be providing basic AIS systems services, its costs of financing could be reduced if the States for which the basic services are being provided were to guarantee the servicing and repayment of the loans concerned. This in turn should reduce the costs to be recovered from these user States.

Internally Generated Resources

5.16.6 Depreciation and retained profits from the operation of air navigation services may become a supplementary source of financing for the AFI CAD systems facilities. However, with regard to profits, an important qualification that needs to be recalled is the principle outlined in Doc 9082, paragraph 38:

"Air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets (before tax and cost of capital) to contribute towards necessary capital improvements."

Reference should also be made to the text on pre-funding of projects in 5.10.5 of this document.

Equity Financing

5.16.7 Equity financing may be a viable alternative in some instances. For example, if the AFI CAD systems services were acquired under contract from a commercial service provider, that operator could finance the investment required partially or completely through increased equity.

Leasing

5.16.8 Leasing rather than outright ownership could become an important alternative in the AFI CAD systems and service provision. The possibility could also be explored of applying leasing to local units at AFI CAD Centres, possibly through the establishment of leasing companies, which would operate in a manner similar to those purchasing and leasing out, for example, computer systems, communications systems and/or others under long-term leases.

5.17 Summary

The aspects of the financial plan have been included in this extend in the Business Plan as the Current Cost collection and subsequent financial planning needs still to be done after the Questionnaires in Annex D) are returned respectively the interviews have been finalised.

CHAPTER 6 – BENEFITS AND DISADVANTAGES

6.1 Benefits

6.1.1 Benefits have been presented in 5.9 under Other Economic Effects.

6.2 Disadvantages / Risks

6.2.1 Disadvantages as such have not been identified until now.

6.2.2 Potential risks associated with the AFI-CAD undertaking are:

a) Investment risks,

b) Legal complexity,

c) Organisational complexity,

d) Technical complexity,

e) Non availability of sufficient human resources.

CHAPTER 7 - ACTION PLAN

The following actions shall be taken by the responsible parties.

No.	Action	Responsible	Deadline	Remarks
1	Return of the questionnaires in Annex D	States	31.10.10	
2	Participation in the cost interviews	States	31.10.10	
3	Appointment of the Focal Points	States	30.11.10	
4	Finalisation of the Business Plan with APIRG/17 input	Consultant	30.09.10	
5	Finalisation of Financial Part after input from the cost questionnaire	Consultant	20.12.10	
6				
7				

Table 4: Action Plan

CHAPTER 8 - SUMMARY AND CONCLUSION

The AFI-CAD Business Plan summarises the Requirements and all planning and management activities for AFI-CAD. It shall form a living document to be used by the Program Team and updated on a regular basis until the Program Team has established the Project Manual mentioned in paragraph 4.2.12 .

CHAPTER 9 – APPENDIXES

9.1 List of Abbreviations

Abbreviation	Explanation
Empty in this version	

9.2 List of Literature

To be added.

9.3 List of Figures

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Figure 2: Timeline/Major Milestones 17
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ANNEX A) REQUIREMENTS SPECIFICATION OVERALL PROJECT

The Requirements Specification is provided as a separate Annex to this document under "AFI-CAD Doc 008".

ANNEX B) AFI-CAD GUIDANCE MATERIAL

The Guidance Material for the establishment of AFI-CAD emanated from the Recommendations of the AFI-CAD/Study Group/1 meeting, subsequently endorsed by ICAO under Conclusion 16/41 of the APIRG/16 Meeting, and further developed by AFI-CAD/Study Group/3 and 4. Consequently, the Guidance Materials are listed herewith in the form of Recommendations as lastly published by Appendix A to the ATS/AIS/SAR SG/11[21] .

Recommandation 1:	**Basic Criteria** The AFI AIS/MAP TF/4 meeting then concluded that : a) whether the service provision is subcontracted or not: i. the service shall at all times be AFI States owned service. The service provider shall ensure the service is at all times perceived and recognized as being an AFI States provided service. ii. the service provision shall be an activity of cost-recovery nature and shall not generate profit on its own behalf (bearing in mind that the AFI CAD facilitates the safety, regularity and efficiency of international air navigation); iii. the service provision shall be subjected to a " trial phase" of operation at the end of which the service may be reviewed if there has been insufficient take-up by clients and/or if the service levels have not been met; iv. all clients' service level agreements shall be between the client and the Agency entrusted by the AFI States. v. the Agency shall not be allowed to sell, trade or commercialize the data and/or services of the AFI CAD on its own behalf and/or profit.
Recommendation 2:	**AFI CAD services** That AFI CAD should provide the following major services: a) the International NOTAM Operation (INO) providing facilities for world-wide NOTAM, SNOWTAM, ASHTAM and AFTN or equivalent message handling and for pre-flight Information Bulletins (PIB) generation. b) the Static Data Operation (SDO) providing facilities for AFI Static Aeronautical Data/information handling and reporting. moreover, a minimum set of data is also maintained to allow the correct functioning of the INO system.
Recommendation 3:	**AFI CAD Clients** That the recommended AFI CAD clients are the following: a) the Data Providers which are AIS Organizations providing aeronautical information to the Centralized AFI Database; b) the Data Users which are Air Transport Community and beyond.
Recommendation 4:	**Proposed AFI CAD System Design** That the proposed AFI CAD System should be designed to provide the following: a) a single repository for aeronautical information and IAIP elements of participating States;

[21] 26-30 April 2010

	b) data questioning enhancement through multilevel consistent data checking processes, including cross border data verification; c) a secure channel/vehicle for timely and efficient electronic distribution of aeronautical information and IAIP elements; d) harmonization and interoperability will be ensured by common and standardized: - System interface and data exchange model (AIXM), - Static data model (AICM).
Recommendation 5:	**AFI CAD System Data Operations Services** That the proposed System Data Operations Services will then provide the Centralized AFI Database clients with the following system services: a) support to edit and provide (to the system) aeronautical information; b) electronic access to and delivery of aeronautical information; c) browsing and downloading of participating State's aeronautical information; and d) generation of reports.
Recommendation 6:	**Access to AFI CAD** That the Data Operations System Services will be accessed by clients via direct electronic interface in one or more of the following three ways: i. The Client Interface terminal (CIT). A terminal located at the client site, connected to the AFI CAD, and allowing download, modification (only by data providers) and reporting of aeronautical information as determined by the clients Service Level Agreement (SLA); ii. The Client Interface (CI). A technical toolkit allowing clients' own systems to access and interact with the AFI CAD to upload, download, modify (only Data Providers can modify) and report aeronautical information as determined by the clients' SLA; iii. INTERNET: Access to the Centralized AFI AIS Data Base will also be allowed via the Internet.
Recommendation 7:	**Development of AFI CAD user requirements specifications** That States and/or Organizations in a position to do so, provide the required technical expertise to assist the Study Group to develop user requirements specifications (URS) for AFI CAD.
Recommendation 8:	**Scope of Services Provided** That : a) Regarding the data operations service domains, the services provided shall ensure: i. Co-ordination of the resolution of data conflicts detected by the system data checking processes ; ii. for non-participating States (world wide) : - NOTAM processing (verification, validation, etc…) - entry of the statistic data required by the system NOTAM function. b) As currently defined, the service does <u>not</u> include the provision of AIS services on behalf of participating States, i.e. the service <u>shall not comprise</u> the following

	activities : i. creation of NOTAMs ii. origination and publication of AIP, AIP supplements, AIP amendments, AIC and charts. c) As part of the provision of the service, the service provider will deliver to the centralized AFI Region AIS Data Base client the following services : i. 24 hour operational and technical help desk ii. Client training iii. Management and monitoring of the delivery of aeronautical information and AIP elements.
Recommendation 9:	**Institutional Arrangements** That AFI States shall: a) Identify or set up an agency to develop, establish and operate the centralized AFI CAD; b) Determine the most effective and appropriate ways of funding, implementing and delivering the service. c) Commit to the timely provision of the required information to the AFI CAD; *Note: This shall not preclude them from providing the same data to other agents and/or entities.* d) Continue to be responsible for providing an AIS singularly or jointly with one or more other States or by delegating the authority for the provision of the service to a non-governmental agency in accordance with Annex 15 of the Chicago Convention; e) Maintain the intellectual property rights for the data provided to the AFI CAD; f) Provide advice and other appropriate support to any administration outside the AFI Region to consider the introduction of an aeronautical information database system compatible with the AFI CAD; g) Promote the use of the AFI CAD by taking active steps to provide appropriate information to the public on the services available from the AFI CAD and encourage the use of the service; h) Define a legal and financial framework to be applied to States participating in the AFI CAD, and non members of the AFI Region States, covering contribution to the funding of the data operations service provision; i) Define a charging policy that: - complies with the principle of free exchange of aeronautical information amongst States AIS, in accordance with Annex 15 of the Chicago Convention; - Continues to allow recovery by States of the costs incurred for the provision of AIS services; - Avoids double charging of the Data Users.

Recommendation 10:	**Suggestions for Financial Model** **a) <u>Business Plan</u>** i. <u>Setup Capital</u>: The business plan to be adopted must define the total set-up costs and where this capital will be obtained (eg Loans, Donations/Aid, State Contributions). Each states responsibility in this regard must be defined and be enforceable in any AFI CAD membership agreement ii. <u>Financial Sustainability</u>: The business plan to be adopted must also define how financial sustainability will be ensured (eg by State Contributions, fees to be charged for access by users, en-route charges, etc). This must also show how continuous improvement and safety monitoring systems will be maintained and funded. iii. <u>Service Provider</u>: The resources that the Service Provider will bring to the project must be defined and enforced in the Service Providers contract. It should not be the sole responsibility of the member states or the Agency to fund this project as it should be based on the User/ Beneficiary Pays principle. b) **<u>Financial Plans</u>**: The financial model for AFI CAD as discussed above also needs to address the following operational considerations i. <u>Continuous Operational Cost Recovery</u>: Continuous Operational Cost Recovery must be ensured as a minimum requirement. If this does not occur AFI CAD will not be a viable concern. ii. <u>Cost Benefit Analysis</u>: A Cost Benefit Analysis reflecting the advantages and disadvantages of all business models discussed above needs to be performed before a particular model can be recommended and accepted by AFI CAD member states. iii. <u>Future Cost Benefits</u>: To AFI CAD (eg via provision of services additional to what is presently being provided) will need to assessed to ensure organizational structuring to take advantage of these future benefits.
Recommendation 11:	**Evaluation criteria for the identification of the AFI-CAD Operating Centers:** 1. Geographical Location 2. Communication Infrastructure 3. Sustainability of Economy 4. Political Stability 5. Information Technology – currently available and sustainable 6. Provision of training – Training ability / infrastructure 7. Power supply : – availability – reliability – sustainability 8. Human Resource availability – i. AIM ii. Management iii. Project Management iv. Information Technology v. Training 9. Financial availability / sustainability 10. Previous experience – Track record 11. Common consensus 12. Infrastructure – Buildings 13. Evaluation to be conducted by an International Organization with a proven track record of successfully completing similar evaluations (e.g. ICAO/ United Nations/ EUROCONTROL, etc.)

Recommendation 12:	Introduction of QMS by AFI-CAD States That each contracting AFI – CAD Member State shall take all necessary measures to introduce a properly organized QMS containing procedures, processes and resources necessary to implement the quality management at each function stage. The execution of such quality management shall be in accordance with Annex 15, Chapter 3 paragraph 3.2.1.
Recommendation 13:	Measurement tool for evaluation of AIS Services That Appendix K to APIRG/15 report as per Attachment A to DP/7 be adopted by AFI States as a measurement tool for evaluation of services in order to provide room for improvement and the prevention of non-conformity.
Recommendation 14:	**Framework for development of the QMS** That AFI – CAD member States adopt the template for a project proposal in Appendix XX to Attachment A of DP/7(AFI-CAD/2) as a framework for development of the QMS in terms of defining scope, assessing the potential benefits, continuing the program, determining the roles and responsibilities of those involved in the development and implementation of the QMS, and specifying deliverables, target dates and the resources needed.
Recommendation 15:	**Timelines for the development and implementation of the AFI – CAD** That ICAO would synchronize the most suitable timelines for the development and implementation of the AFI – CAD based on the evolution of events.
Recommendation 16:	**Development of the required training modules** That AFI – CAD through the cooperation with GroupEAD develops the required training modules for AFI-CAD member States.
Recommendation 17:	**Development of the required format of a service level agreement** That AFI – CAD through the cooperation with GroupEAD develops the required format of a service level agreement for the AFI – CAD member States.
Recommendation 18:	**Compilation of the URS Document :** That it is therefore necessary to compile the user and other requirements in one document based on the input from: - the Framework and Guidance Material of the AFI-CAD, as per Appendix H of the APIRG/16 Report, - the EUROCONTROL URS Documents (General, Common Services, Static Data, NOTAM, AIP, Charting), - the AFI States based on a filled Questionnaires (cf. DP/04) to include further AFI Requirements.

Recommendation 19:	**Institutional Framework:** a. Establishment of a supervisory management board composed of Technical Representatives appointed by the Civil Aviation Directors. They should also be empowered to make decisions. b. Appoint a Technical team competitively, to participate in the project processes from its initiation stage to completion, so that all members gain an understanding of the project tasks and objectives c. Appoint Service Provider competitively to develop, implement and manage the AFI-CAD. The Service Provider may also take responsibility for Hardware and Software maintenance
Recommendation 20:	**Procurement Process:** • That the Business plan includes the development of procurement procedures acceptable to participating member states. • That the Business Plan includes the development of a logical acquisition system, which would include an efficient and transparent procurement process for implementation of the AFI-CAD • That participating states should ensure that the procurement is done in a transparent manner acceptable to the participating states.
Recommendation 21:	**Location of AFI-CAD** That the Technical Board should determine the centre and sub-centers location subject to the agreed set criteria listed in Recommendation11 . There is need to take into account the geographical locations and requisite infrastructure currently available.
Recommendation 22:	**Realization of the AFI-CAD** That in order to realize the maximum benefits of the AFI Region centralized AIS Database all AFI Region States need to fully participate in its development, implementation and operations.

ANNEX C) V-MODEL PROCESS FOR ACQUIRER AND SUPPLIER

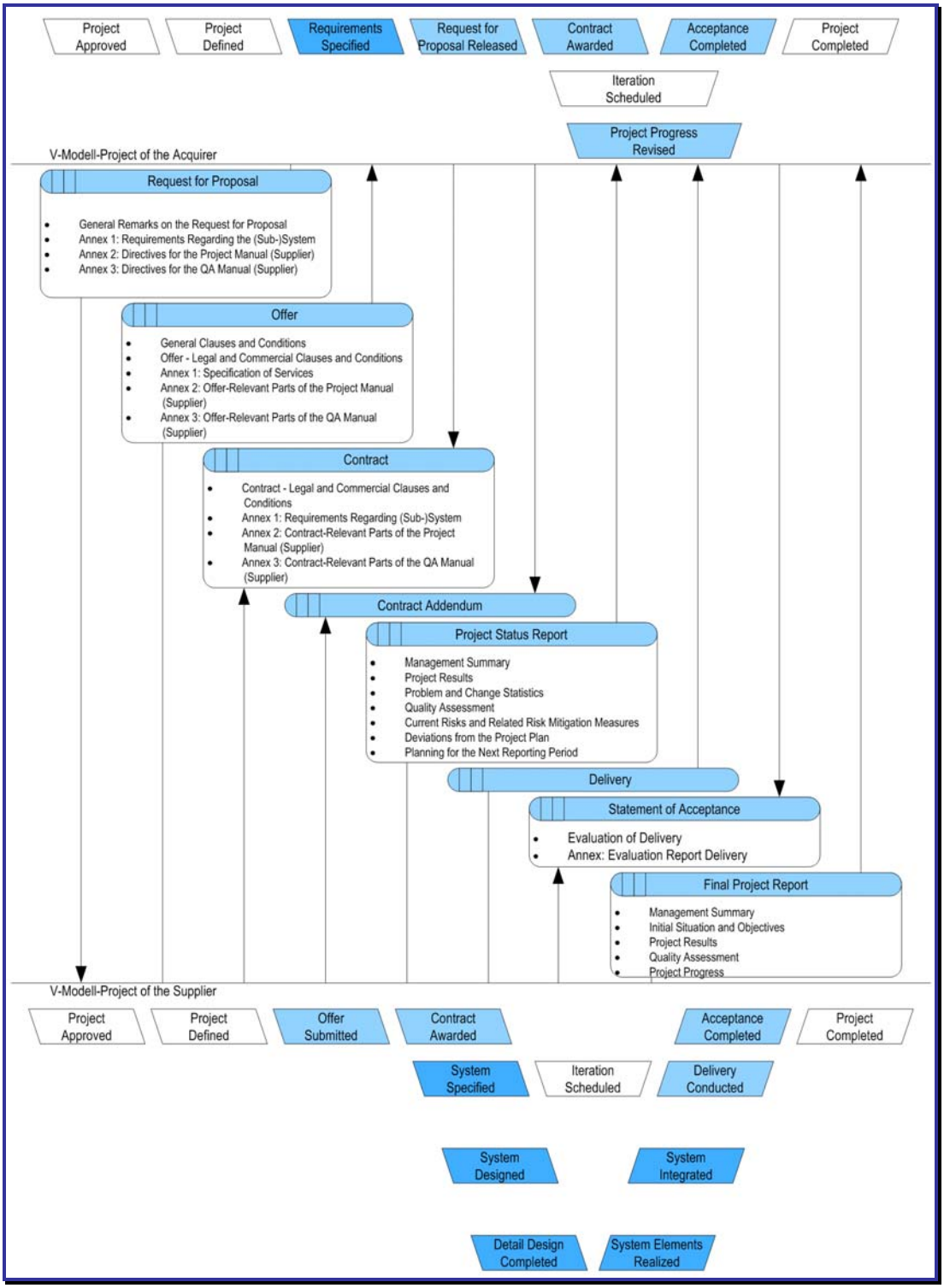

Figure 4: V-Model

ANNEX D) QUESTIONAIR ABOUT CURRENT AIS COST

ATTACHMENT to State letter AN T2/8.1-309/2009

QUESTIONNAIRE ABOUT EXISTING COST AND INFRASTRUCTURE FOR THE AFI CENTRALISED AERONAUTICAL DATABASE BUSINESS AND FINANCIAL PLAN

Name of State/Organisation: …….

Experts have attended the AFI CAD Study Group meeting(s) ❒ *if applicable please tick - ✓ -*
If necessary, please add additional pages.

1. Existing Cost:

Purchase Cost	…… USD
Installation Cost	…… USD
Maintenance and Inspection Cost	…… USD
Annual Communication Cost	…… USD
Refurbishment Cost	…… USD
Decommissioning Cost	…… USD
Life Cycle	…… Years

2. General Additional Cost:

2.1	Communication	…… USD
2.2	Training	…… USD
2.3	Restructuring	…… USD
2.4	Staffing	…… USD
2.5	Others	…… USD

3. Infrastructure:

Number of Personnel	……
Number of Servers	……
Number of Working Positions	……
AIS Centres Served	……
Aerodrome AROs Served	……

4. Comments and additional information

……
……
……
……

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APPENDIX 4.1A

LIST OF DEFICIENCIES IN THE AIR NAVIGATION FIELDS

AFTN

StateName	*Requirements*	*Facilities or Services*	*Description of Deficiency*	*Date first reported*	*Comments on Deficiency*	*Description of Corrective action*	*Executing Body*	*Target date for implementation*	*Priority*
Algeria									
	AFTN Plan, AFI Rec. 9/7	**Algiers AFTN Centre**	**Main circuit Algiers/Niamey**	**1998**	**implemented**	**VSAT implemented in Algiers**	**Algeria, ASECNA**		**U**
Angola									
	AFTN Plan, AFI Rec. 9/7	**Luanda AFTN centre**	**Circuit Luanda/Brazzaville**	**1998**	**implemented**	**Interconnection between AFISNET and SADC/2 VSAT**	**Angola, ASECNA**		**U**
Burundi									
	AFTN Plan, AFI Rec. 9/7	**Bujumbura AFTN Centre**	**Circuit Bujumbura/Johannesburg**	**2002**	**implemented**	**SADFC/2 VSAT installed in Bujumbura**	**Burundi, South Africa**		**U**
Comoros									
	AFTN Plan, AFI Rec. 9/7	**Dzaoudzi AFTN centre**	**Circuit Dzaoudzi/Antananarivo**	**1996**	**implemented**	**AFISNET VSAT Installed in Dzaoudzi**	**Comoros, ASECNA**		**A**
Congo									
	AFTN Plan, AFI Rec. 9/7	**Brazzaville AFTN centre**	**Circuit Brazzaville/Luanda**	**1998**	**implemented**	**Interconnection between AFISNET and SADC/2 VSAT**	**ASECNA, Angola**		**A**
	AFTN Plan, AFI Rec. 9/7	**Brazzaville AFTN centre**	**Main circuit Brazzaville/Johannesburg**	**1998**	**implemented**	**interconnection between the AFISNET and SADC/2 VSATs**	**ASECNA, South Africa**		**U**
	AFTN Plan, AFI Rec. 9/7	Brazzaville AFTN centre	Main circuit Brazzaville/Nairobi	1998	implemented	Interconnection between AFIQSNET and NAFISAT	ASECNA, Kenya		U
	AFTN Plan, AFI Rec. 9/7	**Brazzaville AFTN centre**	**Circuit Brazzaville/Sao Tome**	**1998**	**Implemented**	**AFISNET VSAT installed in Sao Tome by ASECNA**	**ASECNA, Sao Tome & Principe**		**U**

APIRG/17 REPORT

StateName	*Requirements*	*Facilities or Services*	*Description of Deficiency*	*Date first reported*	*Comments on Deficiency*	*Description of Corrective action*	*Executing Body*	*Target date for implementation*	*Priority*
Djibouti									
	AFTN Plan, AFI Rec. 9/7	**Djibouti AFTN centre**	**Circuit Djibouti/Addis Ababa**	**2002**	**Unserviceable**	**To repair and upgrade. Modem available in Djibouti as well as new automatic switching centre**	**Djibouti, Ethiopia**		**U**
Equatorial Guinea									
	AFTN Plan, AFI Rec. 9/7	**Malabo AFTN centre**	**Circuit Malabo/Bata**	**2001**	**Implemented**	**VSAT in stalled in Bata**	**ASECNA**	**2003**	**U**
Eritrea									
	AFTN Plan, AFI Rec. 9/7	**Asmara AFTN centre**	**Circuit Asmara/Addis Ababa**	**1998**	**The circuit has been disconnected**	**To be restored**	**Eritrea, Ethiopia**		**U**
Ethiopia									
	AFTN Plan, AFI Rec. 9/7	**Addis Ababa AFTN centre**	**Circuit Addis Ababa/Djibouti**	**2002**	**Unserviceable**	**To repair and upgrade. Modem available in Djibouti as well as new automatic switching centre**	**Ethiopia, Djibouti**		**U**
	AFTN Plan, AFI Rec. 9/7	**Addis Ababa AFTN centre**	**Circuit Addis Ababa/Asmara**	**1998**	**This circuit has been disconnected**	**To be restored**	**Ethiopia, Eritrea**		**U**
	AFTN Plan, AFI Rec. 9/7	**Addis Ababa AFTN centre**	**Circuit Addis Ababa/Khartoum**	**1996**	**implemented**	**NAFISAT VSATs project completed**	**Ethiopia, Sudan**		**A**
Guinea Bissau									
	AFTN Plan, AFI Rec. 9/7	**Bissau AFTN centre**	**Circuit Bissau/Dakar**	**1998**	**implemented**	**VSAT installed in Bissau**	**ASECNA, Guinea Bissau**		**U**
Kenya									
	AFTN Plan, AFI Rec. 9/7	**Nairobi AFTN centre**	**Main circuit Nairobi/Brazzaville**	**1998**	**Implemented .**	**Interconnection between AFIQSNET and NAFISAT**	**Kenya, ASECNA**		**U**
Madagascar									
	AFTN Plan, AFI Rec. 9/7	**Antananarivo AFTN centre**	**Circuit Antananarivo/Dzaoudzi**	**1996**	**implemented**	**AFISNET VSAT Installed in Dzaoudzi**	**ASECNA, Comoros**		**A**
	AFTN Plan, AFI Rec. 9/7	**Antananarivo AFTN centre**	**Circuit Antananarivo/Johannesburg**	**2002**	**implemented**	**Interconnection VSAT ASECNA & SADC**	**ASECNA, South Africa**		**U**

APIRG/17 REPORT

StateName	*Requirements*	*Facilities or Services*	*Description of Deficiency*	*Date first reported*	*Comments on Deficiency*	*Description of Corrective action*	*Executing Body*	*Target date for implementation*	*Priority*
Niger									
	AFTN Plan, AFI Rec. 9/7	**Niamey AFTN centre**	**Main circuit Niamey/Algiers**	**1998**	**implemented**	**VSAT implemented in Algiers**	**ASECNA, Algeria**	**2002**	**U**
Rwanda									
	AFTN Plan, AFI Rec. 9/7	**Kigali AFTN centre**	**Circuit Kigali/Johannesburg**	**2002**	**implemented**	**SADC/VSAT installed in Kigali**	**Rwanda, South Africa**		**U**
Sao Tome & Principe									
	AFTN Plan, AFI Rec. 9/7	**Sao Tome AFTN centre**	**Circuit Sao Tome/Brazzaville**	**1998**	**Implemented**	**AFISNET VSAT installed in Sao Tome by ASECNA**	**Sao Tome & Principe, ASECNA**		**U**
Senegal									
	AFTN Plan, AFI Rec. 9/7	**Dakar AFTN centre**	**Circuit Dakar/Bissau**	**1998**	**implemented**	**VSAT installed in Bissau**	**ASECNA, Guinea Bissau**		**U**
South Africa									
	AFTN Plan, AFI Rec. 9/7	**Johannesburg AFTN centre**	**Main circuit Johannesburg/Brazzaville**	**1998**	**implemented**	**interconnection between the AFISNET and SADC/2 VSATs**	**South Africa, ASECNA**		**U**
	AFTN Plan, AFI Rec. 9/7	**Johannesburg AFTN centre**	**Inter-regional circuit Johannesburg/SAM (Buenos Aires)**	**1996**	**Not implemented**	**Implement LTT circuit**	**South Africa, Argentina**		**U**
	AFTN Plan, AFI Rec. 9/7	**Johannesburg AFTN centre**	**Inter-regional circuit Johannesburg/ASIA/PAC (Australia)**	**2002**	**Not implemented**	**Implement LTT circuit**	**South Africa, Australia**		**U**
	AFTN Plan, AFI Rec. 9/7	**Johannesburg AFTN centre**	**Circuit Johannesburg/Antananarivo**	**2002**	**implemented**	**Interconnection VSAT ASECNA & SADC**	**South Africa, ASECNA**		**U**
	AFTN Plan, AFI Rec. 9/7	**Johannesburg AFTN centre**	**Circuit Johannesburg/Bujumbura**	**2002**	**implemented**	**SADFC/2 VSAT installed in Bujumbura**	**South Africa, Burundi**		**U**
	AFTN Plan, AFI Rec. 9/7	**Johannesburg AFTN centre**	**Circuit Johannesburg/Kigali**	**2002**	**implemented**	**SADC/VSAT installed in Kigali**	**South Africa, Rwanda**		**U**
Sudan									
	AFTN Plan, AFI Rec. 9/7	**Khartoum AFTN centre**	**Circuit Khartoum/Addis Ababa**	**1996**	**implemented**	**NAFISAT VSATs project completed**	**Ethiopia, Sudan**		**A**

APPENDIX 4.1B

LIST OF DEFICIENCIES IN THE AIR NAVIGATION FIELDS

ATS DIRECT SPEECH

State Name	*Requirements*	*Facilities or Services*	*Description of Deficiency*	*Date first reported*	*Comments on Deficiency*	*Description of Corrective action*	*Executing Body*	*Target date for implementation*	*Priority*
Algeria	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Algiers ACC-FIC	Circuit Algiers/Tripoli	1998		Implement LTF circuit	Algeria, Libya		U
Burundi	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Bujumbura APP	Circuit/ Bujumbura/Kinshasa	1998	Not operational	VSAT implemented at Bujumbura and Kinshasa	Burundi, DR Congo		A
Dem. Rep. of Congo	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Bukavu TWR	Circuit Bukavu/Kigali	1996	Not implemented		DR Congo, Rwanda		A
	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Kinshasa	Circuit Brazzaville/Kinshasa		unserviceable	Interconnection between AFISNET and SADC/2	DRC ASECNA	End of year 2010	A
	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Gbadolite TWR	Circuit Gbadolite/Bangui	2002	Not implemented	Could be implemented by interconnection between Bangu AFISNET and G'Badolite RVA domestic VSATs.	DR Congo, ASECNA	End of year 2010	A
	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Goma APP	Circuit Goma/Bujumbura	1998	Not implemented		DR Congo, Burundi		A
	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Goma APP	Circuit Goma/Kigali	1998	Not implemented		DR Congo, Rwanda		A
Eritrea	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Asmara ACC	Circuit Asmara/ Addis Ababa	1998	The circuit has been disconnected	To be restored. NAFISAT	Eritrea, Ethiopia		U

State Name	*Requirements*	*Facilities or Services*	*Description of Deficiency*	*Date first reported*	*Comments on Deficiency*	*Description of Corrective action*	*Executing Body*	*Target date for implementation*	*Priority*
Ethiopia	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Addis Ababa ACC/FIC	Circuit Addis Ababa/ Asmara	1998	The circuit has been disconnected	To be restored. NAFISAT	Ethiopia, Eritrea		U
Ghana	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Accra ACC	Circuit Accra/Kano	2009	Unserviceable	To be restored AFISNET	Ghana Nigeria		A
Congo	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Brazzaville ACC	Circuit Accra/Brazzaville		Unserviceable	To be restored AFISNET	GHANA ASECNA	End of year 2010	A
Rwanda	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Kigali ACC	Kigali/Kinshasa		Unserviceable	To be restored SADC//2	Rwanda, DR Congo		A
Somalia	ATS Direct Speech Circuits Plan, AFI/7 Rec. 9/9	Hargeisa APP	Circuit Hargeisa/Djibouti	1998	Not implemented	Implement LTF circuit	Somalia, Djibouti		A

APPENDIX 4.1C

LIST OF DEFICIENCIES IN THE AIR NAVIGATION FIELDS
AMS

State Name	Requirements	Facilities or Services	Description of Deficiency	Date first reported	Comments on Deficiency	Description of Corrective action	Executing Body	Target date for implementation	Priority
Angola	AMS AFI/7 Rec. 9/12	Luanda FIC	Inadequate VHF coverage of busy ATS routes	1998	Implement remote VHF stations	5 VHF stations to be installed	ENANA		U
	AMS AFI/7 Rec. 9/12	Luanda FIC	HF poor quality and unavailable in oceanic area	2004	Improve facilities	Install adequate equipment	ENANA		U
Congo	AMS AFI/7 Rec. 9/12	Brazzaville FIC	Inadequate VHF Coverage	2009	Improve facilities	Extension VHF coverage in progress	ASECNA	**2011**	U
Chad	AMS AFI/7 Rec 9/12	N`Djamena FIR	Inadequate VHF Coverage	2009	Improve facilities	Extension VHF coverage in progress	ASECNA	2011	U
Dem. Rep. of Congo	AMS AFI/7 Rec. 9/12	Kinshasa FIR	Inadequate VHF coverage of busy ATS routes	1998	Improve facilities	Extension VHF coverage in progress	DR Congo	**2011**	U
	AMS AFI/7 Rec. 9/12	Kinshasa FIR	HF poor quality Selcal not available	1998	FIC Kinshasa OP> April 2005	New installed equipment to be restored	DR Congo	**2011**	U
Libya	AMS AFI/7 Rec. 9/12	Kinshasa FIR	Inadequate VHF coverage of busy ATS routes	2004	Implement remote VHF stations		Libya		U
Malawi	AMS AFI/7 Rec. 9/12	FIR Lilongwe	VHF coverage incomplete	2001	Install additional VHF relay stations at Muzuzu and Zomba	Extension VHF coverage in progress. Equipment in place	Malawi		U
Nigeria	AMS AFI/7 Rec 9/12	Kano FIR	Inadequate VHF Coverage	2009	Improve facilities	Extension VHF coverage in progress	NAMA	**2011**	U
Somalia	AMS AFI/7 Rec. 9/12	Mogadishu ACC	Lack of VHF coverage of busy ATS ROUTES	1998	Implement remote VHF stations	Install VHF relays	Somalia		U

APPENDIX 4.1D

LIST OF DEFICIENCIES IN THE AIR NAVIGATION FIELDS

ARNS

State Name	Requirements	Facilities or Services	Description of Deficiency	Date first reported	Comments on Deficiency	Description of Corrective action	Executing Body	Target date for implementation	Priority
Angola	Navaids AFI/7, Rec. 10/4	Huambo	VOR/DME	1998	Not implemented	Implement facility	ENANA		A
	Navaids AFI/7, Rec. 10/4	Kuito	VOR/DME	1998	Not implemented	Implement facility	ENANA		A
	Navaids AFI/7, Rec. 10/4	Luena	VOR/DME	1998	Not implemented	Implement facility	ENANA		U
	Navaids AFI/7, Rec. 10/4	Saurimo	VOR/DME	1998	Not implemented	Implement facility	ENANA		U
Cameroon	Navaids AFI/7, Rec. 10/4	Maroua	VOR	1998	Not implemented	Implement facility	Cameroon		A
Guinea	Navaids, AFI/7 Rec. 10/4	Kankan	VOR	1998	Not implemented	Implement facility	Guinea		A
	Navaids AFI/7 Rec. 10/4	Labe	VOR	1998	Not implemented	Implement facility	Guinea		A
	Navaids AFI/7 Rec. 10/4	Nzerekore	VOR	1998	Not implemented	Implement facility	Guinea		A
Kenya	Navaids AFI/7 Rec. 10/4	Mandera	VOR/DME	1998	Not implemented	Implement facility	Kenya		U
Lesotho	Navaids AFI/7 Rec. 10/4	Maseru	VOR/DME	2002	Not implemented	To implement	Lesotho		U
Liberia	Navaids AFI/7 Rec. 10/4	Robertsfield	ILS 04	1998	Not implemented	Implement facility	Liberia		U
Libya	Navaids AFI/7 Rec. 10/4	Sarir	VOR/DME	1998	Not implemented	Implement facility	Libya		U
Madagascar	Navaids AFI/7 Rec. 10/4	Antsiranana	VOR	1998	Not implemented	Implement facility	Madagascar		U
	Navaids AFI/7 Rec. 10/4	Maintirano	VOR	2002	Not implemented	Implement facility	Madagascar		U
	Navaids AFI/7 Rec. 10/4	Morondava	VOR	1998	Not implemented	Implement facility	Madagascar		U
	Navaids AFI/7 Rec. 10/4	Sainte Marie	VOR	1998	Not implemented	Implement facility	Madagascar		A
	Navaids AFI/7 Rec. 10/4	Toliara	VOR	1998	Not implemented	Implement facility	Madagascar		U
Sao Tome & Principe	Navaids AFI/7 Rec. 10/4	Sao Tome	ILS 11	1998	Not implemented	Implement facility	Sao Tome & Principe		A

State Name	Requirements	Facilities or Services	Description of Deficiency	Date first reported	Comments on Deficiency	Description of Corrective action	Executing Body	Target date for implementation	Priority
Sierra Leone	Navaids AFI/7 Rec. 10/4	Freetown/ Lungi	ILS 30	1999	Unserviceable	To repair	Sierra Leone		U
	Navaids AFI/7 Rec. 10/4	Freetown/ Lungi	VOR/DME	1999	Unserviceable	To repair	Sierra Leone		U
Somalia	Navaids AFI/7 Rec. 10/4	Hargeisa	VOR/DME	1998	Not implemented	Implement facility	Somalia		U
	Navaids AFI/7 Rec. 10/4	Mogadishu	VOR/DME	1998	Not implemented	Implement facility	Somalia		U
Sudan	Navaids AFI/7 Rec. 10/4	Geneina	VOR	1998	Not implemented	Implement facility	Sudan		U
	Navaids AFI/7 Rec. 10/4	Juba	ILS 13	1998	Not implemented	Implement facility	Sudan		A
	Navaids AFI/7 Rec. 10/4	Karina	VOR/DME	1998	Not implemented	Implement facility	Sudan		U
Tanzania	Navaids AFI/7 Rec. 10/4	Dodoma	VOR/DME	1998	Not implemented	Implement facility	Tanzania	31/12/2005	U
	Navaids AFI/7 Rec. 10/4	Mbeya	VOR/DME	1998	Not implemented	Implement facility	Tanzania	June 2006	U
	Navaids AFI/7 Rec. 10/4	Mwanza	DME	1998	Not implemented	Implement facility	Tanzania	June 2005	U
Zambia	Navaids AFI/7 Rec. 10/4	Mongu	VOR	1998	Not implemented	Under installation	Zambia	30/12/2005	U
	Navaids AFI/7 Rec. 10/4	Solwezi	VOR	1998	Not implemented	Sourcing for funds	Zambia	Dec.w 2006	U

Deficiencies in the Meteorology Field

(REF. Air Navigation Plan - Africa-Indian Ocean region (Doc 7474)
Part IV - Meteorology (MET)

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
ANGOLA	Requirement to provide aerodrome forecasts (AFI FASID Table MET 1A)	Angola/Luanda 4 de Fevereiro Associated MET Office	TAF of Luanda not regularly available	2003	Advice given by correspondence	Improve reliability of telecomm	INAMET and ENANA	As soon as possible	A
BURUNDI	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Busumbura aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Burundi/ Busumbura International Airport	MET station located very far from the runway and among buildings	2006	Data observed not representative of weather conditions along the runway. Unreliable exchange of data to users	Install an automatic weather observing system with sensors appropriately located. Install a MET message distribution system.	Meteorological Services Department	2007	U
CAPE VERDE	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Cape Verde/Sal International Airport.	Visibility data, RVR, cloud base height, air temperature, dew point and pressure are not provided by an automatic weather observing system at Sal International airport equipped with an ILS	09/2009	Advice given during CODEVMET Mission	Install an automated weather observing system with sensors appropriately located.	INMG/ ASA	2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CAPE VERDE	Requirements for Surface wind, RVR and air pressure displays relating to each sensor to be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units to be related to the same sensors in accordance with ICAO Annex 3. para. 4.1.5 and App. 3 para. **4**.1.2.1, 4.3.3.1 and 4.7.1	Cape Verde/Sal International Airport	The meteorological parameters displayed in the control tower and those displayed in the aerodrome meteorological centre and used for issuance of observation messages METAR, MET REPORT, SPECI and SPECIAL are from two different sources of observations: the Meteorological observation station and an automatic observing system under demonstration.	09/2009	Advice given during CODEVMET Mission	Use the same sensors for the measurement of meteorological parameters to be displayed in ATS units and the aeronautical meteorological station	INMG/ ASA	2011	U
	Requirements to use local routine and special reports MET REPORT and SPECIAL in the meteorological information used pour l'ATIS in accordance with Annex 11, chap. 4, para. 4.3.6.1, g) and Annex 3, Chap. 4 para. 4.3.2 and 4.4.2	Cape Verde/Sal International Airport	Meteorological information used to issue ATIS are not the local routine and special reports MET REPORT and SPECIAL	09/2009	Advice given during CODEVMET Mission	Use local routine and special meteorological reports to issue ATIS information (ATIS voice and D-ATIS)	ASA INMG	2011	A

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CHAD	Requirement to provide meteorological information to aerodrome control tower, approach control unit and flight information centre in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Chad, N'Djamena International Airport	Aerodrome Warning (AD WRNG) and wind shear (WS WRNG) reports are not displayed in the control tower and at the ATS units. TAF, SIGMET and AIREP whose display is provided by the air traffic management system EUROCAT/X, are not available at the ACC (Rea Control centre)	02/2010	Advice given during Sate Mission	Display warning reports WRNG AD and WS WRNG in the existing system for display of weather information of the control tower of N'djamena. Display TAFs, SIGMET and special AIREP in the EUROCAT/X system and forward to the MWO all special AIREPs transmitted by aircraft en route in N'djamena FIR.	ASECNA	2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for implementation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CHAD	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway at N'Djamena International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Chad, N'Djamena International Airport	Even though N'Djamena International Airport is intended for Category II (ILS) instrument approach and landing operations, RVR assessments are not provided at the mid-point of the runway.	02/2010	Advice given during Sate Mission	Install RVR sensor at the mid-point of the runway..	ASECNA	2010	A
	Requirement to collect, process and relay special air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2-b), 5.5, 5.8 and 5.9	Chad, N'Djamena International Airport	special aircraft observations and reports are not collected, processed and redistributed	02/2010	Advice given during Sate Mission	- Update and implement the provisions of the ATS/MET service agreement - Encourage ATS/MET/pilots coordination meetings	ADAC et ASECNA	2011	B
COMOROS	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Comoros/ Prince Said Ibrahim International Airport of Moroni	Moroni International Airport equipped with a category II approach and landing operations instrument, is not using a proper automated equipment for measuring, assessing, monitoring and remote indicating of MET parameters	09/ 2009	Advice given during Sate Mission	Install an automated aerodrome weather observing system with sensors and display located at required places for the provision of operational MET information	ASECNA	December 2010	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Prince Said Ibrahim International Airport of Moroni, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Comoros/ Prince Said Ibrahim International Airport of Moroni	Runway visual range (RVR) assessments are not representative of the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations	09/ 2009	Advice given during the mission	1°) Introduce manual assessment of RVR in accordance with ICAO Doc. 9328. Install RVR sensor at the touchdown zone and the mid-point of the runway	ASECNA	December 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
COMOROS	Requirement to provide aerodrome forecasts (TAF) in accordance with AFI FASID MET Table 1A	Comoros/ Prince Said Ibrahim International Airport of Moroni	Only three TAF are issued every day, the TAF expected at 16:00 is not issued	09/ 2009	Advice given during the mission	Issue four TAF every day	ASECNA	December 2010	U
CONGO	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Brazzaville International Airport, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Congo, Brazzaville International Airport	Runway visual range (RVR) is not assessed at the mid-point of the runway of Brazzaville International Airport, intended for Category II instrument approach and landing operations	08/2008	Advice given during the mission	Install RVR sensor at the mid-point of the runway.	ASECNA	2009	U
	Requirement to provide VOLMET broadcast at Brazzaville International Airport (VOLMET), in accordance with ICAO Doc 7474 Volume II, Part V, Table ATS 2A..	Congo, Brazzaville International Airport	The VOLMET broadcast service is not operational	08/2008	Deficiency identify during ICAO WACAF mission	Re-establish the VOLMET broadcast service in the Brazzaville FIR	ASECNA	2009	U
	Requirement to collect, process and relay special air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2, 5.3.2, 5.4.1, 5.5, 5.7, 5.8 and 5.9	Congo, Brazzaville International Airport	Aircraft observation and reports are not collected, processed and relayed	08/2008	Advice given during the mission	Necessary arrangements between the MET authority and the appropriate ATS authority be made.	ANAC, ASECNA, Airlines	2009	U
	Requirement to provide Automatic Terminal Information Service (ATIS) in accordance with ICAO Doc 7474 Volume II, FASID AFI, Part III - Tableau AOP 1.	Congo, Brazzaville International Airport	The ATIS service is not implemented at Brazzaville International Airport	08/2008	Deficiency identify during ICAO WACAF mission	Install and implement an operational ATIS system	ASECNA	2009	B

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for implementation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
DJIBOUTI	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Djibouti/ Djibouti International Airport	Djibouti International Airport equipped with a category II approach and landing operations instrument, is not using an automated equipment for measuring, assessing, monitoring and remote indicating of MET parameters	09/ 2009	Advice given during the mission	Install an automated aerodrome weather observing system with sensors and display located at required places for the provision of operational MET information	AID-DPW	December 2010	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Djibouti International Airport of Moroni, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Djibouti/ Djibouti International Airport	Runway visual range (RVR) assessments are not representative of the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations	09/ 2009	Advice given during the mission	1°) Introduce manual assessment of RVR in accordance with ICAO Doc. 9328. Install RVR sensor at the touchdown zone and the mid-point of the runway	AID-DPW	December 2010	U
	Requirement to issue local routine and special reports in accordance with Annex 3, chap. 4, para. 4.3.1, 4.3.2 a) et 4.4.2 a)	Djibouti/ Djibouti International Airport	Local routine and special reports (MET REPORT) and SPECIAL) are not issued	09/ 2009	Advice given during the mission	Issue local routine and special reports (MET REPORT) and SPECIAL)	AID-DPW	June 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
DJIBOUTI	Requirement to issue aerodrome and wind shear warnings and wind shear alert in accordance with Annex 3, chap. 7, para. 7.3 et 7.4 et App. 6 Table A6-2 et A6-3	Djibouti/ Djibouti International Airport	Aerodrome and wind shear warnings (AD WRNG, WS WRNG) and wind shear alert are not issued at Djibouti International Airport	07/ 2009	Advice given during the mission	1. sensitize forecasters and observers in the issuance and dissemination of messages and WS WRNG AD WRNG 2. issue and disseminate WS WRNG and AD WRNG information and wind shear alert; 3. develop and enforce a letter of service agreement between the MET and ATS (TWR, CCR, Office of the runway, ..) in order inter alia to promote the regular routing of aircraft reports on wind shear at landing or take off, to assess RVR, etc. .. 4. consider the possibility of installing, after a survey with users, at Djibouti Airport, a wind shear detecting system	1. AID-DPW 2. AID-DPW 3. DACM et AID-DPW 4. DACM et AID-DPW	1. June 2010 2. June 2010 3. June 2010 End 2010	U U U A
	Requirement to provide flight documentation in accordance with AFI FASID Table MET 7 (Doc 7474 Volume II, FASID AFI)	Djibouti/ Djibouti International Airport	Flight documentation is provided from a public non-secured website ADDS	07/2009	Advice given during the mission	In the short term, a SADIS FTP service shall be accessed from the WAFC London to extract required data for the provision of flight documentation. Access procedures are described on the following Website http://www.icao.int/anb/sadisopsg/sadis%20ftp%20service%20v4.0.pdf In the medium term, install a SADIS VSAT station with the required SADIS workstation software:	AID-DPW	- SADIS FTP : avant fin juin 2010 -Station VSAT SADIS 2G : fin 2010	A

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
THE GAMBIA	Requirement to provide runway visual range (RVR) for runway intended for non-precision or Category I approach and landing Operations (Annex 3, Chapter 4, para. 4.6.3. 4 a), 4.6.3.5 and Appendix 3, para.4.3.6.4).	The Gambia/ Banjul/ Yundum International Airport.	Runway visual range (RVR) is not assessed and reported during periods of reduced visibility.	30/07/2007	Reported by the State concerned from a survey questionnaire, advice given during State mission, further advice given CODEVMET 9/2009.	**In the short term:** Training of MET personal for manual assessment and reporting of RVR, or **In the medium term:** Installation of a RVR measurement, assessment and reporting equipment recommended.	Civil Aviation Authority and MET, The Gambia.	2009 2012	U
	Requirement to report visibility along the runway in local routine and special reports: Annex 3, Appendix 3 para; 4.2.4.2.	The Gambia, Banjul/ Yundum International Airport.	MET station located very far from the runway and behind a tree.	07/2007	Data observed not representative of weather conditions along the runway. Advice given during State Mission and CODEVMET Project 9/2009.	Install an automatic weather observing system with sensors appropriately located.	GCAA (Gambia Civil Aviation Authority).	2012	U
	Requirement to relay air reports: Annex 3 Chapter 5, para.5.8.	The Gambia, Banjul/ Yundum International Airport.	Aircraft observations and reports are not collected, processed and disseminated.	07/2007	Advice given during State Mission.	Necessary arrangements between the MET authority and the appropriate ATS authority be made.	GCAA (Gambia Civil Aviation Authority).	2010	B
	Requirement to measure and report wind direction and speed Annex 3 Chapter 4 para.4.6.11.	The Gambia, Banjul/ Yundum International Airport.	Wind direction and speed are estimated due to breaking of wire around the runway.	16/09/2009	Reported to CODEVMET Mission, advice given for immediat solution.	<u>Short Term:</u> Purchase wire and connect at the selected point to restore measurement and reading at MET and controlo Tower. <u>Medium Term:</u> Installation of automatic weather observing system.	GCAA and MET the Gambia.	11//2009 2012	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
THE GAMBIA	Requirement to issue aerodrome warnings (AW) and wind shear warning Annex 3 Chapter 7 para.7.3, 7.4 App.6 Table A6.2 and A6.3.	The Gambia, Banjul/ Yundum International Airport.	No provision for issuance of AW.	16/09/ 2009	Deficiency assessed during CODEVMET mission, advice given.	Short term, write procedures for issuance of AD and implement immediately.	GCAA and MET The Gambia.	When required starting from 11/2009	U
	Requirement to issue trend forecasts as contained in AFI FASID Table MET 1 A.	The Gambia, Banjul/ Yundum International Airport.	No provision to issue trend forecast.	16/09/2 009	Deficiency assessed during CODEVMENT Project, advice given.	Writing required procedures to follow for issuance of Trend forecasts.	GCAA and MET The Gambia	12/2009	A
	Requirement to provide MET Reports to ATS Units Annex 3 Chapter 10 para. 10.1.1.	The Gambia, Banjul/ Yundum International Airport.	Provision of MET reports to ATS Units deficient, messages carried by hand and no wind display at Control Tower.	16/09/2 009	Deficiency assessed during CODEVMET Project, advice given.	Repair the internal communication system and the wind measurement system. Medium Term Acquisition of new internal communication system.	GCAA and MET the Gambia GCAA and MET	12/2009 2011	U
GHANA	Requirement to disseminate SIGMET information in accordance with the provisions in the AFI FASID Table 2B.	Ghana, Accra Kotoka International Airport (KIA	SIGMET information issued by Accra MWO is not disseminated properly and the AMBEX procedures are not well known by the telecommunication staff for the dissemination of OPMET information	March 2010	Advice given during State Mission and a new version of the AMBEX Scheme was provided	Disseminate SIGMET information in accordance with AMBEX scheme and AFI FASID Table 2B.	GMet	12/2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GHANA	Requirement to provide meteorological parameters affecting landing and take-off operations as surface wind, visibility, runway visual range (RVR), height of cloud base, air and dew-point temperatures and atmospheric pressure from an integrated automatic system for acquisition, processing, dissemination and display in real time: ICAO Annex 3, Chap. 4, para. 4.1.5	Ghana, Accra Kotoka International Airport (KIA)	Surface wind, visibility, runway visual range (RVR), height of cloud base, air and dew-point temperatures and atmospheric pressure are not provided from an integrated automatic system for acquisition, processing, dissemination and display in real time at Accra International Airport	March 2010	Procurement for the purchase of an integrated automatic system underway (Letter N° PPA/CEO/ 436/10 of 22 February 2010 from the Public Procurement Authority)	Install an automatic integrated observing system on AKIA runway (ILS Cat 2) with sensors appropriately sited in accordance with the provision in ICAO Annex 3, Chap 4, para 4.1.5 and 4.6.3.1 and Appendix 3 para; 4.2.4.2	GMet (Ghana Meteorological Agency)	12/2010	U
	Requirement to provide runway visual range (RVR): Annex 3, Chapter 4, para. 4. 6 .3	Ghana, Accra Kotoka International Airport (KIA	Runway visual range (RVR) is not assessed and reported	March 2010	Advice given during State Mission	Install a RVR assessment and reporting system	GMet	12/2010	U
	Requirement to issue compliant local routine report (MET REPORT) and local special report (SPECIAL) in accordance with provisions in ICAO Annex 3, Table 3-1	Ghana, Accra Kotoka International Airport (KIA	MET REPORT and SPECIAL are not compliant with Annex 3, Table 3-1	March 2010	Advice given during the mission	Issue compliant local routine and special reports and display them at the MET Office and at all ATS units	GMet	12/2010	U
GUINEA	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Republic of Guinea, Conakry International Airport.	Conakry International Airport equipped with a category II approach and landing operations instrument, is not using an automated equipment for measuring, assessing, monitoring and remote indicating of MET parameters	09/2009	Advice given during CODEVMET mission	Install an automatic integrated observing system on Conakry International Airport runway (ILS Cat 2) with sensors appropriately sited in accordance with the provision in ICAO Annex 3, Chap 4, para 4.1.5 and 4.6.3.1 and Appendix 3 para; 4.2.4.2	DNAC and DNM	December 2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GUINEA	Requirement to issue compliant local routine report (MET REPORT) and local special report (SPECIAL) in accordance with provisions in ICAO Annex 3, Table 3-1	Republic of Guinea, Conakry International Airport.	MET REPORT and SPECIAL are not compliant with Annex 3, Table 3-1	09/2009	Advice given during CODEVMET mission	Issue compliant local routine and special reports and display them at the MET Office and at all ATS units	DNM	Before December 2010	U
	Requirement to provide meteorological information to aerodrome control tower, approach control unit and flight information centre in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Republic of Guinea, Conakry International Airport.	Aerodrome Warning (AD WRNG) and wind shear (WS WRNG) reports are not displayed in the control tower and at the ATS units	09/2009	Advice given during CODEVMET mission	Display warning reports WRNG AD and WS WRNG in the existing system for display of weather information of the control tower of N'djamena.	DNM	Before December 2010	A
	Requirement to provide flight documentation in accordance with AFI FASID Table MET 7 (Doc 7474 Volume II, FASID AFI)	Republic of Guinea, Conakry International Airport..	Flight documentation is provided from a public non-secured website ADDS	09/2009	Advice given during CODEVMET mission	In the short term, a SADIS FTP service shall be accessed from the WAFC London to extract required data for the provision of flight documentation. Access procedures are described on the following Website http://www.icao.int/anb/sadisopsg/sadis%20ftp%20service%20v4.0.pdf In the medium term, install a SADIS VSAT station with the required SADIS workstation software:	DNAC, DNM, ANA, FIR Roberts, SOGEAC	- SADIS FTP before December 2010 - VSAT SADIS before Decembre 2011	A
	Requirement to issue OPMET information from the following AOP aerodromes Kankan, Labé, N'Nzérékoré in accordance with ICAO Doc 7474 Volume II, FASID AFI, Part III - Tableau AOP 1.	Republic of Guinea, Conakry International Airport..	OPMET information from AOP aerodromes Kankan, Labé, N'Nzérékoré is not issued 24h a day	09/2009	Advice given during CODEVMET mission	issue METAR and SPECI from AOP aerodromes Kankan, Labé and N'Nzérékoré	DNAC, DNM and ANA	Before December 2015	B

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GUINEA BISSAU	Requirement to measure and report wind in accordance with provisions contained in Annex, Chapter 4 para 4.6.1.1..2	Guinée Bissau, Osvaldo Vieira International Airport	The wind sensors are installed on the top of the control tower and wind information is not representative of the condition along the runway.	10/2009	Advice given during CODEVMET mission	Install wind sensors at the touch down zone	ASECNA MET Administration	2011	U
	Requirement to issue aerodrome warnings (AD WRNG) and Wind Shear warnings (WS WRNG) as contained in provisions of Annex 3 Chapter 7 para 7.3.1 and 7.4.1 and App. 6 Table A6.2, A6.3	Guinée Bissau, Osvaldo Vieira International Airport	AD WRNG and WS WRNG are not issued at Osvaldo Vieira International Airport	10/2009	Advice given during CODEVMET mission	**Short term**: Writing of procedures for issuance of AW and WS Warnings and implement immediately. **Medium term:** Acquisition of MET Radar and wind shear detection equipment	AAC, ASECNA, Administration MET	12/2009 2013	U
	Implementation of MET facilities and services AFI/7 Rec. 14/10	Guinée Bissau, Osvaldo Vieira International Airport	Lack of personnel to ensure METY services to aviation properly	10/2009	Advice given during CODEVMET mission	Provide sufficient number of MET personnel	ASECNA et MET	2011	A
	Requirement to issue aerodrome forecasts (TAF) at Osvaldo Vieira International Airport:Annex 3 Chap. 9, para 9.13a)	Guinée Bissau, Osvaldo Vieira International Airport	TAF of Bissau issued by Dakar aerodrome meteorological Office in accordance with a bilateral agreement resulting in a lack of qualified MET personnel	1995 et 10/2009	Advice given during CODEVMET mission	Provide sufficient number of MET personnel	ASECNA , ACC, ENAG and MET	2012	A
LESOTHO	Implementation of MET facilities and services AFI/7 Rec. 14/10	Lesotho/Maseru/Moshoeshoe	Anemometer on RWY 04 has been unserviceable for many months	2003	Advice given through mission	Install a new sensor with displays at appropriate ATC and MET positions	Lesotho	As soon as possible but not later than 2007	A

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
LIBERIA	Requirement to re-establish the Meteorological Watch Office (MWO) of Robertsfield in accordance with Annex 3, Chap. 3, para. 3.4.1 and ICAO Doc 7474, Volume II, AFI FASID Table MET 1B.	Liberia/ Robertsfield International Airport.	The meteorological watch office (MWO) has not been re-established and the Liberian Administration has not arranged for another contracting State to provide SIGMET.	10/2009	Advice given during the mission and a draft Agreement provided for the issuance of SIGMET by an adjacent MWO	Reach an agreement with the nearest MWO for the provision of meteorological watch services including SIGMET for an interim period of time. Re-establish the MWO in the medium term	LCAA and MET Authority	-Short term: End November 2009 - Medium term: 2012	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Robertsfield International Airport intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Liberia/ Robertsfield International Airport.	Runway visual range (RVR) is not assessed and reported during periods of reduced visibility.	10/2009	Advice given during the mission.	**In the short term:** Training of MET personal for manual assessment and reporting of RVR, and **In the medium term:** Installation of a RVR measurement, assessment and reporting equipment recommended.	LCAA, Meteorological Authority and RIA	-Short term: November 2009 - Medium term: 2012	U
	Requirement to provide appropriate sensors of the automated equipment for measuring, assessing, monitoring and remote indicating visibility, runway visual range (RVR) and height of cloud base at the required in accordance with Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1 and App. 3 para; 4.2.4.2	Liberia/ Robertsfield International Airport.	Except the wind sensor, the other required sensors of the automatic weather observing system, are not installed to support approach, landing and take-off operations.	10/2009	Advice given during the mission.	Install the required sensors of the automatic weather observing system at appropriate location	LCAA, Meteorological Authority and RIA	End of April 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for implementation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
LIBERIA	Requirement to provide briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel in accordance with Annex 3, Chap. 3, para. 3.3.2 d) and Chap. 9, para. 9.3	Liberia/ Robertsfield International Airport.	Briefing, consultation and flight documentation are not provided to flight crew members and/or other flight operations personnel.	10/2009	A draft statement on the re-establishment of the AMO and the MWO established.	Provide briefing, consultation and flight documentation to flight crew members and other flight operations personnel, and equip the AMO and the future MWO with a high speed Internet access and required MET systems listed in Annex 3 Chap. 9 para. 9.1.3 h) and i). The AMO/MWO should be installed in a suitable room having a direct access to the AIS Office itself having direct access to the apron	LCAA, MET Authority, RIA and RFIR	End of April 2011	A
	Requirement to collect, processed and disseminated aircraft observations and reports (AIREP) in accordance with Annex 3, para. 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8 and 5.9	Liberia/ Robertsfield International Airport.	Aircraft observations and reports (AIREP) are not collected, processed and disseminated at Roberts MWO.	10/2009	Advice given during the Mission.	Develop and implement a service agreement for air traffic services, aeronautic information services and aeronautical MET services at Robertsfield International Airport in accordance with ICAO DOC 9377; Initiate regular meetings between the MET authorities, ATS units and appropriate local airlines.	LCAA, RFIR, RIA	Februar y 2010	A
	Requirement to provide reliable data source for the preparation of aviation weather forecasts in accordance with Annex 3, Chap. 9, para. 9.1.3 c), e), g), h) and i).	Liberia/ Robertsfield International Airport.	Reliable data sources are not available for the preparation of aviation weather forecasts such as SIGMET, aerodrome warnings, Trend forecast, TAFs, flight documentation, etc..	10/2009	Advice given during the Mission.	Supply the meteorological information to operators and flight crew members in accordance with the provisions contained in ICAO Annex 3, Chap. 9, para. 9.1.3 c), e), g), h) and i).	LCAA, MET Authority and RIA	2010	B
	Requirement to use forecasts issued by the WAFCs in the preparation of flight documentation, whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, .. in accordance with Annex 3, App. 2, para. 2.1.1	Liberia/ Robertsfield International Airport.	The Roberts AMO does not receive any WAFS products for the provision of flight documentation.	10/2009	Advice given during the Mission.	Short Term: Use SADIS FTP service. Access procedures are described on the following Website: http://www.icao.int/anb/sadisopsg/SADIS%20FTP%20Service%20V4.0.pdf Medium Term: Provide AMO/MWO with SADIS 2G VSAT equipment and compliant SADIS workstation software in accordance with SADISOPSG/9 conclusion 9/15 and SADISOPSG/10 conclusion 10/4..	MET Authority and RIA	11//2009 2012	B

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
NIGER	Requirement to provide meteorological information to aerodrome control tower, approach control unit and flight information centre in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Niger, Niamey International Airport	Aerodrome Warning (AD WRNG) and wind shear (WS WRNG) reports are not displayed in the control tower and at the ATS units. TAF, SIGMET and AIREP whose display is provided by the air traffic management system EUROCAT/X, are not available at the ACC (Rea Control centre)	03/2010	Advice given during Sate Mission	Display warning reports WRNG AD and WS WRNG in the existing system for display of weather information of the control tower of Niamey. Display TAFs, SIGMET and special AIREP in the EUROCAT/X system and forward to the MWO all special AIREPs transmitted by aircraft en route in Niamey FIR.	ASECNA	December 2009 December 2010	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway at Niamey International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Niger, Niamey International Airport	Even though NiameyInternational Airport is intended for Category II (ILS) instrument approach and landing operations, RVR assessments are not provided at the mid-point of the runway..	03/2010	Advice given during Sate Mission	Install RVR sensor at the mid-point of Niamey runway.	ASECNA	Before December 2010	A
	Requirement to collect, process and relay special air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2-b), 5.5, 5.8 and 5.9.	Niger, Niamey International Airport	special aircraft observations and reports are not collected, processed and redistributed	03/2010	Advice given during Sate Mission	- Update and implement the provisions of the ATS/MET service agreement - Encourage ATS/MET/pilots coordination meetings	DAC and ASECNA	Before December 2010	B
NIGERIA	Requirement to provide measurement of MET elements representative of conditions prevailing on the Runmay – Annex 3, Appendix 3 – Part 4 observing and reporting of MET element	Nigeria / Kano MA	Observing and reporting of MET elements deficient, Site of measurement about 2 kms from touchdown zone	25/09/09	Advice given by CODEVMET Phase 1 mission	Relocation of site of measurement of MET elements at a distance of 120 m or less from touchdown zone install an automatic observing system already available (NIMET Source)	NIMET NCAA and NAMA	2010 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
NIGERIA	Requirement to measure and report RVR for runway intended for category II instrument approach and landing operations – Annex 3 Chapter 4 – Para. 4.6.3.4, 4.6.3.5 – appendix 3 – Para 4.3.6.4.	Nigeria / Kano MA	RVR not measured and reported for runway intended for category II instrument approach and landing operations	25/09/09	Advice given by CODEVMET – Phase I mission	**Short term:** Manuel measurement and reporting as immediate solution **Medium term :** install automatic observing system which is available	NIMET and NAMA	2010	U
	Requirement to assess and report wind shear in accordance with Annex 3 chapter 7 para. 7.4.1 and relevant provisions contained in low level wind shear Manuel 9817	Nigeria / Kano M.A.	Kano Airport affected by WS, no system of detection except for information received from pilots	25/09/09	Advice given by CODEVMET Phase I mission	NIMET, NAMA and NCAA to study possibility of installing WS detection system	NIMET NAMA and NCAA	2011	U
	Requirement to use WAFS products for flight documentation as in provisions contained in Annex 3 Chapter 9 para 9.4.3 and 9.1.6	Nigeria/ Kano AM	Use of other non WAFS products for coverage of flights departing Kano	25/09/2009	Advice given during CODEVMET Phase I mission	NIMET and NAMA to provide a SADIS station to Kano MET centre	NIMET and NAMA	2012	A
DEMOCRATIC REPUBLIC OF CONGO	Requirement to arrange that selected volcano observatory of Goma, observes: a) significant pre-eruption volcanic activity, or a cessation thereof; b) a volcanic eruption, or a cessation thereof; and/or c) volcanic ash in the atmosphere and send this information as quickly as practicable to its associated ACC, MWO and VAAC: ICAO Annex 3, para. 3.6	Democratic Republic of Congo (DRC), Volcano Observatory of Goma.	Volcanic activity information are not provided to air navigation units because of the lack of communication means between the observatory and MWO, ACC and FIC	09/2009	Advice given during Sate Mission	Improve communication means between Goma and Djili	Goma Observatory / METELSAT/ RVA	Before December 2011	U
	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Djili aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap	Democratic Republic of Congo (DRC), N'Djili International Airport.	Except the wind sensor, the other required sensors of the automatic weather observing system, are not installed to support approach, landing and take-off operations.	09/2009	Advice given during Sate Mission	Install an automatic weather observing system with sensors appropriately located. Install a MET message distribution system..	METELSAT/ RVA	Before december 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	4, para. 4.1.5 and 4.6.3.1								

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for implementation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
DEMOCRATIC REPUBLIC OF CONGO	Requirement to issue aerodrome and wind shear warnings and wind shear alert in accordance with Annex 3, chap. 7, para. 7.3 et 7.4 et App. 6 Table A6-2 et A6-33	DRC, N'Djili International Airport.	Aerodrome and wind shear warnings (AD WRNG, WS WRNG) and wind shear alert are not issued at N'Djili International Airport	09/2009	Advice given during Sate Mission	1. issue and disseminate WS WRNG and AD WRNG information and wind shear alert; 2. develop and enforce a letter of service agreement between the MET and ATS (TWR, CCR, Office of the runway, ..) in order inter alia to promote the regular routing of aircraft reports on wind shear at landing or take off, to assess RVR, etc. .. 3. consider the possibility of installing, after a survey with users, at Djibouti Airport, a wind shear detecting system	METELSAT/ RVA	Before March 2010	U
	Requirements to use local routine and special reports MET REPORT and SPECIAL in the meteorological information used pour l'ATIS in accordance with Annex 11, chap. 4, para. 4.3.6.1, g) and Annex 3, Chap. 4 para. 4.3.2 and 4.4.2	DRC, N'Djili International Airport	Meteorological information used to issue ATIS are not the local routine and special reports MET REPORT and SPECIAL	09/2009	Advice given during Sate Mission	Use local routine and special meteorological reports to issue ATIS information (ATIS voice and D-ATIS)	METTELSAT RVA	July 2010	A
SAO TOME	Requirement to issue aerodrome and wind shear warnings and wind shear alert in accordance with Annex 3, chap. 7, para. 7.3 et 7.4 et App. 6 Table A6-2 et A6-33	Sao Tome, and Principe, Sao Tome International Airport (STIA).	Aerodrome and wind shear warnings (AD WRNG, WS WRNG) and wind shear alert are not issued at Sao Tome International Airport	09/ 2009	Advice given during CODEVMET Mission	1. issue and disseminate WS WRNG and AD WRNG information and wind shear alert; 2. develop and enforce a letter of service agreement between the MET and ATS (TWR, CCR, Office of the runway, ..) in order inter alia to promote the regular routing of aircraft reports on wind shear at landing or take off, to assess RVR, etc. .. 3. consider the possibility of installing, after a survey with users, at Djibouti Airport, a wind shear detecting system	INM, ENASA	Before June 2010	U
	Requirement to issue local routine and special reports in accordance with Annex 3, chap. 4, para. 4.3.1, 4.3.2 a) et 4.4.2 a)	Sao Tome, and Principe, (STIA)..	Local routine and special reports (MET REPORT) and SPECIAL) are not issued	09/ 2009	Advice given during CODEVMET Mission	Issue local routine and special reports (MET REPORT) and SPECIAL)	INM/ ENASA	Before december 2010	A
	Requirements to issue METAR, SPECI) and TAF on 24h Sao Tome International Airport: FASID AFI,	Sao Tome, and Principe,	METAR and SPECI are not issued on 24h basis	09/2009	Advice given during CODEVMET	Issue METAR and SPECI on 24h basis	INM et	Before June	A

APIRG/17 REPORT
APPENDIX 4.1E

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for implementation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	Tableau MET 1A	(STIA).			Mission		ENASA	2010	

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi-fication**	**Observations sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priorité**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
SAO TOME	Requirement to provide flight documentation in accordance with AFI FASID Table MET 7 (Doc 7474 Volume II, FASID AFI)	Sao Tome, and Principe, Sao Tome International Airport..	Flight documentation is provided from a public non-secured website ADDS	09/2009	Advice given during CODEVMET Mission	In the short term, a SADIS FTP service shall be accessed from the WAFC London to extract required data for the provision of flight documentation. Access procedures are described on the following Website http://www.icao.int/anb/sadisopsg/sadis%20ftp%20service%20v4.0.pdf In the medium term, install a SADIS VSAT station with the required SADIS workstation software:	INM/ ENASA	Before December 2010	B
SÉNÉGAL	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Dakar International Airport, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Senegal/ Leopold Sedar Senghor International Airport or Dakar	Runway visual range (RVR) assessments are not representative of the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations	02/ 2009	Deficiency identify during ICAO WACAF visit	Install RVR sensor at the mid-point of the runway	AID-DPW	December 2010	U
	Requirement to collect, process and relay air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2, 5.3.2, 5.4.1, 5.5, 5.7, 5.8 and 5.9	Senegal/ Leopold Sedar Senghor International Airport or Dakar	Aircraft observation and reports are not collected, processed and relayed	02/2009	Deficiency identify during ICAO WACAF visit	Necessary arrangements between the MET authority and the appropriate ATS authority be made.	ANACS and ASECNA	December 2009	B
	Requirement to report visibility along the runway in local routine and special reports in accordance with Annex 3, Appendix 3 para; 4.2.4.2	Senegal/ Leopold Sedar Senghor International Airport or Dakar	Many obstacles (2 control towers, airlines hangars, etc ...) around the visibility estimation platform of the aeronautical meteorological station (SMA), does not allow to estimate the visibility along the runway .	02/2009	Deficiency identify during ICAO WACAF visit	Install visibility sensors along the runway Or Relocate the SMA at a location enabling the observer to estimate the visibility along the entire length of the runway.	ASECNA	June 2010	A

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi - fication**	**Observa tions sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priorité**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
SÉNÉGAL	Requirement to provide Automatic Terminal Information Service (ATIS) in accordance with ICAO Doc 7474 Volume II, FASID AFI, Part III - Tableau AOP 1.	Senegal/ Leopold Sedar Senghor International Airport or Dakar	The ATIS service is not implemented at Brazzaville International Airport	02/2009	Deficiency identify during ICAO WACAF visit	Install and implement an operational ATIS system	ASECNA	June 2010	A
SIERRA LEONE	Requirement to measure and report wind in accordance with provisions contained in Annex, Chapter 4 para 4.6.1.1.	Sierra Leone/ Freetown Lungi Airport	Wind measurement system old and deficient	1994	Advice given during mission CODEVMET Phase I 10/2009	Installation of new wind measurement equipment	SLAA and MET Department	2010	U
	Requirement to measure and report RVR for runway intended for Category II instrument approach and landing operations	Sierra Leone/ Freetown Lungi Airport	In case of reduced visibility RVR not measured and reported	29/09/ 2009	Advice given during mission CODEVMET Phase I	**Short term :** manual measurement **Long term :** Installation of RVR measurement, assessment and reporting equipment	MET Department and SLAA	10/2009 2013	U
	Requirement to issue aerodrome warnings (AW) and Wind Shear warnings (WS) as contained in provisions of Annex 3 Chapter 7 para 7.3.1 and 7.4.1 and App. 6 Table A6.2, A6.3	Sierra Leone/ Freetown Lungi Airport	AW and WS are not issued at Lungi Airport	29/09/ 2009	Advice given during mission CODEVMET Phase I	**Short term**: Writing of procedures for issuance of AW and WS Warnings and implement immediately. **Medium term:** Acquisition of MET Radar and wind shear detection equipment	MET Department and SLAA	11/2009 2013	U
	Requirement to observe and report MET elements in accordance with Anne 3, para 4.6	Sierra Leone/ Freetown Lungi Airport	Not in compliance with recommended practices on observing and reporting of MET elements	29/09/ 2009	Advice given during mission CODEVMET Phase I	Relocate measurement site and acquire automated observing system	MET Department SLAA and SLCA	2012	A
	Requirement to provide MET information to ATS units Annex 3 Chapter 10 para 10.1.5 Appendix 9 para 1.1.a)	Sierra Leone/ Freetown Lungi Airport	MET messages MET report, METAR, SPECIAL are hand carried to control TWR Lack of commu- nication system	29/09/ 2009	Deficiency reported during mission CODEVMET Phase I	Repair the communication system and install reliable display system to ATS	SLAA Roberts FIR and MET Department	2010 2012	A
	Requirement to implement MET facilities and services AFI/7 Rec. 10/14	Sierra Leone/ Freetown Lungi Airport	Insufficient number of forecasters and observers at Lungi MET centre	29/09/ 2009	Deficiency assessed during mission CODEVMET Phase I	Provide MET centre with required number of qualified personnel	MET Department SLAA Roberts FIR	2012	A

SIERRA LEONE	Requirement to use qualify WAFS products for flight documentation in accordance with provision contained in Annex 3 Chapter 9 para 9.1.3, 9.1.6 and 9.1.6 and FASID Table MET7	Sierra Leone/ Freetown Lungi Airport	No SADIS station at Lungi Airport	29/09/ 2009	Deficiency assessed during mission CODEVMET Phase I	**Short Term:** Use FTP to acquire WAFS data Acquisition of SADIS station	MET Department SLAA Roberts FIR SLAA MET Roberts FIR	10/2009 2012	A
SOMALIA	Situation unknown	FIR Mogadishu							
SWAZILAND	Requirement to provide MET reports to ATS Units (Annex 3, Chapter 10, para 10.1.1)	Swaziland/Manzini Matsapha Airport Associated MET Office	Provision of MET reports to ATS units deficient. No wind displays in control tower	2004	Advice was given on mission	Install a display system for MET data and information at ATS units	DCA and MET Department	As soon as possible	U
ZAMBIA	1)Implementation of MET facilities and services (Annex 3, para 4.1.6)	Zambia/Lusaka International Airport	Inadequate level of equipment maintenance	2002 and missions of 2004 and 2007	Equipment remain unserviceable for a long time due to lack of spare parts	Provide financial resources including use of air navigation charges which currently is not fully available to the MET Department.	Zambia MET Department and NACL	As soon as possible	U
	2)Requirement to provide MET reports to ATS Units (Annex 3, Chapter 10, para 10.1.1)	Zambia/Lusaka Meteorological Office	Provision of MET reports to ATS Units deficient	2002 and missions of 2004 and 2007	Advice given during mission by correspondence	Install display system of MET data to ATS units	MET Department	As soon as possible	U
	3)Requirement to provide meteorological data and forecasts in form of flight documentation (Annex 3, Chapter 3, para 3.3.2).	Zambia/Lusaka Meteorological Office	Provision of MET reports to ATS Units deficient	2002 and missions of 2004 and 2007	Advice given during mission and by correspondence	Install appropriate telecomms equipment to receive OPMET information and appoint adequate trained personnel	MET Department	As soon as possible	U
	4) Requirements for SIGMET information (Annex 3 para 3.4.2 b, c, d and add para. 7.1.1	Zambia/Lusaka Meteorological watch office (MWO)	SIGMET not issued	2007	Advice given on mission	Immediately provide training and issue SIGMET	MET Department	As soon as possible	U

APPENDIX 5A

Common strategic framework and action plan for African States, aviation training organizations, and aviation services providers on the implementation of Recommendation 5/8 of Special AFI RAN meeting

A. Background

Pursuant to recommendation 5/8 of SP/08 AFI-RAN meeting, a Training Experts Working Group (TEWG) was established in May 2009 with a mandate to review training needs and available capacity in Africa.

The TEWG submitted its report to the Second Pan-African Aviation Training Coordination Conference which was held in Cairo, Egypt, 22 – 24 June 2010.

Using the information collected through an Africa-wide survey, on the state of aviation training needs and capacities in Africa, conducted in cooperation with SITA and analyzed by the TEWG, the Conference reviewed the training needs, evaluated the available training capabilities and identified the barriers with the aim to increase the availability of affordable quality training programmes in Africa.

B. Common Strategic Framework for a coordinated approach for aviation training in Africa

The Conference formulated the following actions for States and training organizations as the way forward for a coordinated approach of aviation training in Africa:

a) ICAO should continue to collect data, maintain a database on aviation training needs and capacities in Africa, and provide bi-annual report on the state of aviation training in Africa;

b) States should appoint a Point Of Contact to coordinate efforts required in the collection and dissemination of data related to training needs and capacities.

c) Aviation training organizations in Africa should implement SMS, coordinate and integrate course development through the establishment of Centers of Excellence.

d) Aviation training organizations should form an Association of training organizations.

e) States should form “Training Advisory Board (TAB)”.

f) States and aviation training organizations should cooperate and agree on harmonized common competencies requirements for key aviation specialists skills/jobs/functions and common criteria for mutual recognition.

g) States should cooperate and agree on harmonized common requirements for the approval of training organizations throughout the continent.

h) Aviation service providers should make use of the training institutions in Africa.

i) The TEWG should continue its activities towards the implementation of the recommendations from the Conference.

An action plan for the implementation of the above recommendations by July 2011 is presented in Section C, below.

C. Action plan for a coordinated approach to aviation training in Africa

C.1 - Cooperation between aviation training organizations
Objective
• Foster cooperation and sharing of resources among training organizations;
• Create an Association of Aviation Training Organizations that would advocate on matters related to aviation training in Africa;
Actors
• TEWG
• Training organizations
• Regional and International Organizations: ICAO, AFCAC, and AFRAA
Mechanism – Continuation of the activities of the TEWG under revised Terms of Reference
In the area of cooperation between training organizations, the TEWG is requested to:
• Develop the framework for standardization of training programme and instructor qualifications; • Develop a framework for standardization of criteria for approval of aviation training organizations • Establish criteria for endorsement of Centers of Excellence • Conduct the preparatory activities leading to the formal creation of the Association of Training Organizations; • Identify actions and assistance required from States, ICAO, AFCAC, AFRAA, and other partners to enable the newly created association to operate efficiently and effectively.
Activities
(1) By 30 November 2010, TEWG to adopt its revised work programme, and identify stakeholders and partners; [Adapt and assign Secretariat, invite meeting]
(2) By first quarter 2011, hold the conference for the formal creation of the Association of African Training Organizations;
(3) By second quarter 2011, formalize the relationship between the newly created Association of African aviation training organizations, States, aviation services providers, regional and international organizations on matters related to aviation training in Africa.

C.2 - Cooperation between States in Africa on training
Objective
• Foster cooperation and sharing of resources among States on training related matters, including accreditation and oversight;
• Create Training Advisory Board (TAB), a focal point of States on matters related to aviation training in Africa, including accreditation and oversight;
• Establish a framework for implementation monitoring of the activities related to harmonization and standardization of aviation training in Africa;
• Establish a framework for the development of a common African Aviation training accreditation system recognized around the world.
Actors
• TEWG
• Training Organizations
• States
• Regional and International Organizations: ICAO, AFCAC, and AFRAA
Mechanism   ***– Continuation of the activities of the TEWG under the revised Terms of Reference***
In the area of cooperation between States, the TEWG is requested to:
• Conduct the preparatory activities leading to the formal creation of the "*Training Advisory Board (TAB)";*
• Identify further actions required by States and assistance needed from ICAO, AFCAC, AFRAA and other partners to operationalize the TAB and enable it to operate efficiently and effectively.
Activities
(1) By first quarter 2011, hold the conference for the formal creation of the African *"Training Advisory Board (TAB)"*
(2) By second quarter 2011 formalize the relationship between the newly created Board, training organizations, States, aviation services providers, regional and international organizations on matters related to aviation training in Africa.

C.3 - Rationalizing Training Capacities in Africa
Objective
• Improve usage of aviation training institutions in the continent by multiple States;
• Improve availability of quality aviation training in Africa.
The principal way of achieving within a reasonable time the above objectives is to create Centers of Excellence throughout Africa
Actors
• States
• Training Organizations:
• Regional and International Organizations: ICAO, AFCAC, and AFRAA
Mechanism – Continuation of the activities of the TEWG under revised Terms of Reference
Activities
(1) By last quarter 2010, draft procedures and criteria for designation of Centers of Excellence, and an initial list of Centers of Excellence;
(2) By first quarter 2011, obtain agreement from Training Organizations on the procedures and criteria for designation of Centers of Excellence (at the first meeting of the association of Training Organizations);
(3) By second quarter 2011, propose to the *Training Advisory Board (TAB)"* an initial list of Centers of Excellence for accreditation.

C.4 – Harmonization and standardization of training
Objective
• Harmonize competencies requirements for key aviation specialists skills/jobs/functions;
• Harmonize requirements for the approval of training organizations;
• Establish common criteria for mutual recognition of credits, certificates, diplomas, or degrees delivered by aviation training organizations in Africa.
Actors
• TEWG
• States
• Training Organizations:
• Regional and International Organizations: ICAO,AFCAC, and AFRAA
Mechanism – Continuation of the activities of the TEWG under revised Terms of Reference
Activities
(1) By last quarter 2010, draft an initial list of the key aviation specialists skills/jobs/functions for which competencies requirements are to be harmonized;
(2) By second quarter 2011, obtain agreement from aviation training organizations and States on the key aviation specialists skills/jobs/functions for which competencies requirements are to be harmonized;
(3) By second quarter 2011, submit to the *Training Advisory Board (TAB)"* and the Association of African Training Organization a proposal on harmonized requirements for the approval of training organizations including quality assurance standards.
(4) By second quarter 2011, submit to the *Training Advisory Board (TAB)"* and the Association of African training organization a proposal on common criteria for mutual recognition of credits, certificates, diplomas, or degrees delivered by training organizations in Africa
(5) By second quarter 2011, submit to the *Training Advisory Board (TAB)"* a proposal on harmonized competencies requirements for the aviation specialists skills/jobs/functions.

APPENDIX 5B

Training Experts Working Group (TEWG)
REVISED TERMS OF REFERENCE (2ND PAN AFRICAN AVIATION TRAINING COORDINATION CONFERENCE)

A. **Tasks**

1. Develop a framework for harmonization of aviation training in Africa, including :

    1.1. Standardization of training programme
    1.2. Standardization of instructor qualifications;
    1.3. Harmonization of competencies requirements for key aviation specialists skills/jobs/functions;
    1.4. Standardization of criteria for approval of aviation training organizations;
    1.5. Criteria for endorsement of Centers of Excellence;
    1.6. Common criteria for mutual recognition of credits, certificates, diplomas, or degrees delivered by aviation training organizations in Africa;
    1.7. Conduct the preparatory activities leading to the formal creation of the Association of Training Organizations;
    1.8. Conduct the preparatory activities leading to the formal creation of the *"Training Advisory Board (TAB)"*.

2. Establish database for aviation training needs and capacities in Africa, including:

    2.1. A web-based a database on aviation training needs and capacities in Africa;
    2.2. Development of bi-annual report on the state of aviation training needs and the training capacity available throughout the continent.

3. Determine and distribute actions for States and Training Institutions, including:
    3.1. Actions and assistance required from States, ICAO, AFCAC, AFRAA, and other partners to enable the association of training organizations to operate efficiently and effectively;
    3.2. Actions required by States and assistance needed from ICAO, AFCAC, AFRAA and other partners to operationalize the TAB and enable it to operate efficiently and effectively;

B. **Membership: training experts from:**

Airports Council International (ACI) - Africa
Airports Company South Africa (ACSA) Training Centre
African Airlines Association (AFRAA)
Air Traffic National Services South Africa (ATNS)
Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar (ASECNA)
Eastern Africa School of Aviation (EASA)
Ecole Régionale de la Navigation Aérienne et du Management (ERNAM)
Egyptian Aviation Academy (EAA)

Additional membership required from States, Training Institutions and Aviation Services Providers

C. Secretariat:

ICAO – ACIP & AFCAC

D. Reporting:

TEWG to submit a progress report to the 3rd Pan-African Aviation Training Coordination Conference, 3rd Quarter 2011

APPENDIX 6A

THE CODEVMET-WACAF PROJECT

1. CONTEXT

1.1 The APIRG Meeting will recall that the 35th Session of the ICAO Assembly resolved (Assembly Resolution A35-6 refers) that the ICAO Universal Safety Oversight Audit Programme (USOAP) be expanded to cover the safety-related provisions in all safety-related Annexes (all with the exception of Annex 9 — *Facilitation* and Annex 17 — *Security*) and also to implement a comprehensive systems approach for the conduct of safety oversight audits. The subject of Aeronautical Meteorology is to be covered in the comprehensive audit programme.

1.2 The List of Air Navigation Deficiencies in the AFI Region forming part of the records of the 15th and 16th Meeting of the AFI Planning and Implementation Regional Group (APIRG) contains a number of safety critical aviation meteorology (AeroMET) deficiencies that have existed for a long time. Deficiencies have also been identified during the missions to States undertaken by the Regional Officers of the ICAO Regional Office, Western and Central Africa (RO-WACAF).

1.3 Given the need to improve and enhance aeronautical meteorological services provided by the concerned States, it was proposed to provide ICAO technical cooperation in this area through a cost-effective resource-sharing sub-regional cooperative programme called CODEVMET WACAF. It is noted that several similar ICAO executed programmes covering mainly the subjects of airworthiness and flight operations, in the form of COSCAPs, have been established and are in operation in different regions of the world.

2. OBJECTIVES

2.1 The Cooperative Development of Aeronautical Meteorology Services in WACAF Region (CODEVMET-WACAF) has the following objectives:

- Ensuring that safety related meteorological requirements of Annex 3 and 11 to the Convention on International Civil Aviation, guidance material provided in MET related ICAO manuals including PANS-ATM (Doc 4444), and the requirements specified in Doc. 7474 (AFI basic ANP and FASID) Chapter on Meteorology, are met;

- Ensuring sustainable development of the meteorological services to civil aviation in the States, for the provision of timely, reliable and accurate meteorological information to aviation users in an efficient manner;

- Ensuring contingency measures for the provision of meteorological services necessary for the continuity of aviation operations in cases of natural disasters and other disruptions;

- Ensuring that national legislation of the participating States related to the provision of meteorological services to aviation is harmonized and is aligned with ICAO requirements;

- Promoting greater cooperation between meteorological authorities/ service providers and the concerned State regulatory administrations, ATS providers, airlines and other stakeholders in the State;

- Ensuring that adequate number of suitably qualified and trained meteorological and technical personnel are available in the participating States and that they are provided with the means to sustain and enhance their professional qualifications through recurrent and specialized training courses, workshops etc.;

- Promoting greater harmonization of regulations, policies and procedures concerning the implementation of the requisite MET facilities and services among the Programme participating States and also with neighbouring member States of the Agency for the Safety of Air Navigation in Africa and Madagascar (ASECNA) and ;

- Assisting participating States in developing Quality Management Systems (QMS) in support of Safety Management Systems (SMS) for the provision of AeroMET services, in line with ICAO policies and requirements.

3 IMPLEMENTATION OF THE CODEVMET PROJECT

3.1 CODEVMET Phase 1

3.1.1 In 2009, at the request of nine States of the West and Central Africa region States (Cape Verde, Democratic Republic of Congo, Gambia, Guinea, Guinea-Bissau, Liberia, Nigeria, Sao Tome and Principe and Sierra Leone) ICAO conducted a study for the establishment of a resource sharing programme for Cooperative Development of AeroMet services for the West and Central region of Africa (CODEVMET-WACAF Phase 1) for the removal of AeroMet deficiencies. The study was funded by the International Financial Facility for Aviation Safety (IFFAS).

3.1.2 The CODEVMET Phase 1 Study identified specific air navigation deficiencies in the aeronautical meteorology (AeroMet) field in each State and concluded that the level of implementation of facilities and services of the majority of the participating States was low and very far from satisfactory. Except for Murtala Muhammed International Airport of Lagos which is virtually not in need of assistance, all the other international airports evaluated will need important technical assistance to comply with ICAO SARPs contained in Annexes 3 and 11 to the Convention of International Civil Aviation. The AeroMet observational system of the majority of the participating States was found to be obsolete and this is coupled with difficulties to access quality World Area Forecast System (WAFS) products for efficient provision of aeronautical meteorological services to domestic and international air navigation. Insufficient number of qualified personnel in the forecasting units and maintenance of AeroMet equipment has further aggravated the situation. There is a need for an urgent programme of assistance for training of personnel.

3.1.3 The Study developed action plans for removal of the deficiencies. Sets of recommendations forming guidelines for the medium to long-term (5-10 years) planning and implementation of AeroMet services and facilities were provided**.**

3.1.4 The Study supported the proposal to establish a semi-permanent or permanent resource-sharing and cost-effective cooperative Programme –to be called "Cooperative Development of Aeronautical Meteorology–West and Central Africa (CODEVMET-WACAF Pilot Project (or Phase II))" for the implementation of the above mentioned action plans and sets of recommendations. It is recognized that the weaknesses in most of the participating States are extensive and will require large funding input to eliminate. Approximately 1,200 personnel need to be recruited and trained and more than US$ 16 million will be required to meet the shortcomings in AeroMet systems and equipment.

3.2 CODEVMET Phase II or CODEVMET Pilot Project

3.2.1 This is a pilot project for a continuing Programme for Cooperative Development of Aeronautical Meteorology (AeroMet) Services in WACAF Region or for a successor Organization. A decision on the future format will be taken by the Programme Member States towards the conclusion of this pilot project. The objectives of the Programme and hence of this pilot project are:

- To establish a system aimed at enabling AeroMet Service Providers in Member States achieve compliance with international aviation safety standards as these relate to the provision of timely, reliable and accurate meteorological information to aviation users in an efficient manner, and
- To enhance the capability of the States' regulatory authority in carrying out safety oversight of AeroMet services

3.2.2 The project will be implemented under an institutional framework developed on the basis of ICAO's experience in having executed similar regional cooperative programmes globally.

3.2.3 It is envisaged that at the end of this pilot project, regional capability will have been developed to enable continuation of the Programme or the operation of a successor organization, with the region's own expertise.

3.2.4 The continuing Programme or its successor 'Organization' will result in the States having established harmonized Aeromet related Regulations and Quality Management System in support of AeroMet services safety management system. The Programme will have trained sufficient number of inspectors/trainers capable of performing the full range of AeroMet QMS implementation and AeroMet oversight activities to international standards, thus enabling the beneficiary States to meet their international obligations in the field of aeronautical meteorology.

3.2.5 The continuing Programme or its Successor 'Organization may serve as a regional AeroMet oversight and training resource whose services could be made available at the discretion of Programme Steering Committee to States outside the community on a fee-for-service basis.

APPENDIX 6B

THE AFI PBN PROJECT PROPOSAL

THE PERFORMANCE BASED NAVIGATION (PBN) IMPLEMENTATION PROJECT

1. CONTEXT

1.1 The meeting will recall that the 36th Session of the Assembly adopted Resolution A36-23: *Performance-based navigation global goals*, inter alia, urging all States to implement RNAV and RNP air traffic services (ATS) routes and approach procedures in accordance with the ICAO PBN concept laid down in the *Performance Based Navigation Manual* (Doc 9613).

1.2 Resolution A36-23 calls for achievement by States, of specific goals in this regard and for ICAO to develop a coordinated action plan to assist States in the implementation of PBN and to ensure development and/or maintenance of globally harmonized SARPs, Procedures for Air Navigation Services (PANS) and guidance material including a global harmonized safety assessment methodology to keep pace with operational demands.

1.3 The Special AFI/8 RAN Meeting in November 2008 formulated Recommendation 6/13: *Publication of GNSS-based RNP approach procedures* calling on States that had taken part in the IATA area navigation (RNAV) global navigation satellite systems (GNSS) procedures to develop and implement a programme to publish GNSS-based required navigation performance (RNP) approaches, and to remove any restrictions that may be impeding operations. Moreover, Recommendation 6/14: called on ICAO to provide assistance to States in overcoming legal and regulatory difficulties associated with implementation of global navigation satellite systems (GNSS) based approach procedures.

1.4 The Special AFI/8 RAN Meeting in November 2008 also formulated Recommendation 6/28 - **Implementation of a Global ATM System ICAO Technical Cooperation Project**

> *That the AFI Region consider the establishment of a Technical Cooperation Project, funded by AFI States and donors, to support planning and implementation of performance objectives, aligned with the Global ATM Operational Concept and the Global Air Navigation Plan.*

1.5 Further to the above, the meeting may wish to note that the ATS/AIS/SAR SG/11 meeting was of the view that the implementation of PBN within the AFI Region continues to be a major challenge. In this regard, the APIRG 17 meeting may wish to agree that in order to achieve the requirements in the Regional PBN Implementation, which is developed within the framework of APIRG pursuant to Assembly Resolution A36-23, many States will require assistance. The meeting will recall that the implementation of WGS-84 is a prerequisite for the implementation of PBN. In this regard it is to be noted that many states are yet to implement WGS-84, or not done so to the extent covering all parts of the relevant airspace.

1.6 Missions carried out to States in 2010 identified that in the States visited, there was a significant requirement for development of expertise in the areas covered by the Global Air Navigation Plan other than ATS. Aspects relating PBN were particularly affected due to lack of training and expertise.

1.7 The AFI PBN Implementation Project is proposed to give effect or support to recommendations of APIRG and relevant Task Forces (PBN Task Force and GNSS Implementation Task Force) by providing necessary assistance to States to support the implementation of PBN in the AFI Region.

2. OBJECTIVES

2.1 The PBN Implementation Project would have the following objectives:

- Development of model regulations to enable the GNSS aspects of air navigation and the implementation of PBN
- Direct interaction with States needing assistance to ensure that the model regulations are appropriately integrated into the specific States' legislation
- Assistance to States in developing specific actions in order to meet the requirements of the Regional PBN Implementation Plan, and to support efforts relating to the States national performance objectives.

3 IMPLEMENTATION

3.1 Regulatory issues

3.1.1 Legal expertise would be required to review the implementation aspects relating to GNSS and PBN and study the concerns of States, and in this regard to develop regulatory elements that would be included in national regulations to enable implementation and to address the States' specific impediments to implementation.

3.2 GNSS and PBN Technical Aspects

3.2.1 Appropriate technical expertise would be required to assist States needing assistance, with regard to:

- identifying specific challenges and impediments to implementation of the GNSS-based instrument approach procedures that have already been developed, and proposing solutions;
- assisting in the development of actions to support national performance objectives relating to ATM in particular those that are PBN related;
- identifying further actions where applicable and making recommendations to the project Steering Committee on their implementation.

3.3 Implementation Strategy

3.3.1 It is proposed that the project be implemented as a cooperative type project in the manner of the other regional cooperative programmes being implemented by ICAO TCB. Pooling of resources offers a practical and cost-effective method of addressing common goals. Cooperative framework enhances harmonized implementation and fosters participation of interested third party stakeholders and donor agencies. The project will be directed by a Steering Committee comprising representatives of the States participating in the project. Monitoring of the performance of the project will be carried out by the Steering Committee as well as the relevant APIRG Task Force(s) through the Regional Officers/secretaries of the Task Force(s).

3.3.2 Following the compilation of data (from a gap and impediments analysis) on individual beneficiary States, it is proposed to prioritize actions according to the degree of their importance in the hierarchy of the regional/national PBN implementation plan.

3.3.3 TCB will thereafter develop a detailed project with estimated costs, drawing on the experience States within and outside the region which have implemented PBN, using existing tools and guidance material and aimed at providing expertise and training to States to assist in the implementation of PBN including the GNSS applications. The detailed project will be circulated to the interested States for their review and approval.

3.3.4 TCB will subsequently assist in the sourcing and mobilization of the requisite funds.

APPENDIX 7A

TERMS OF REFERENCE OF THE APIRG

1. TERMS OF REFERENCE OF THE APIRG

1.1 The terms of reference of the Group are to:

Strategic Objective	The terms of reference of the Group are to:
C*	a) ensure continuous and coherent development of the AFI Air Navigation Plan and other relevant regional documentation in a manner that is harmonized with adjacent regions, consistent with ICAO SARPs and reflecting global requirements;
C*	a) facilitate the implementation of air navigation systems and services as identified in the AFI Air Navigation Plan with due observance to the primacy of air safety and the environment; and;
A*	b) identification and addressing of specific deficiencies in the air navigation field.

*** Strategic Objectives of ICAO for 2011-2013**

- *Strategic Objective A: Safety - Enhance global civil aviation safety.*
- *Strategic Objective B: Security - Enhance global civil aviation security*
- *Strategic Objective C: Environmental protection and sustainable development of Air Transport - Foster harmonized economically viable development of international civil aviation that does not unduly harm the environment.*

2. **In order to meet the terms of reference, the Group shall perform the following tasks:**

a. review, and propose when necessary, the target dates for implementation of facilities, services and procedures to ensure the coordinated development of the Air Navigation System in the AFI Region;

b. assist the ICAO Regional Offices providing services in the AFI Region in their task of fostering implementation of the AFI Regional Air Navigation Plan;

c. in line with the Global Aviation Safety Plan (GASP), ensure the conduct of any necessary systems performance monitoring, identify specific deficiencies in the air navigation field, especially in the context of safety, efficiency and continuity and propose corrective action;

d. facilitate the development and implementation of an action plan by States to resolve identified deficiencies, where necessary;

e. develop amendment proposals to update the AFI Regional Air Navigation Plan necessary to satisfy any changes in the requirements, thus removing the need for regular regional air navigation meetings;

f. monitor implementation of air navigation facilities and services and where necessary, ensure interregional harmonization, taking due account organization, aspects, economic issues (including financial aspects) of cost/benefit analysis, business case studies and , environmental matters;

g. examine human resource planning and training issues and propose where necessary human resource development capabilities in the region compatible with the AFI Regional Air Navigation Plan;

h. review the Statement of Basic Operational Requirements and Planning Criteria (BORPC) and recommend to the Air Navigation Commission such changes to them as may be required in the light of developments in the air navigation field ;

i. invite financial institutions, as required, on a consultative basis as appropriate to provide advise in the planning process ;

j. maintain close cooperation with relevant organizations and State grouping to optimize the use of available expertise and resources; and

k) conduct the above activities in the most efficient manner possible with a minimum of formality and documentation and call meetings of the APIRG when deemed appropriate; and

l) coordinate with RASG AFI on safety issues.

APPENDIX 7B

REVISED TERMS OF REFERENCE (TOR) OF THE AIR TRAFFIC MANAGEMENT/ AERONAUTICAL INFORMATION MANAGEMENT/ SEARCH AND RESCUE SUB-GROUP (ATM/ AIM/SAR/ SG)

1. **TERMS OF REFERENCE**

a) Support the implementation of a performance based transition to the ATM system envisaged in the Global ATM Operational Concept, the Global Air Navigation Plan and in accordance with the regional performance objectives,

b) Ensure that the planning and implementation of ATM systems in the AFI Region, is coherent and facilitates the objective of achieving seamlessness in the air navigation system, interoperability and harmonization within the Region and with other Regions.

c) Keep under review the adequacy of requirements in the fields of Air Traffic Management, Search and Rescue, PANS-OPS, Aeronautical Information Services, as well as Aeronautical Charts, taking into account, *inter alia*, changes in user requirements, the evolution in operational requirements and technological developments.

d) Identify, State by State, those specific deficiencies and problems that constitute major obstacles to the provision of efficient air traffic management, aeronautical information services and search and rescue services and recommend specific measures to eliminate them.

2. **WORK PROGRAMME**

No.	Task Description	Priority	Target Date
1.	Analyse the operational implications of the introduction of CNS/ATM systems in the fields of ATM, SAR and AIS/MAP and propose any required actions with a view to ensuring their smooth integration in the operational environment.	A	ongoing
2.	Consider problems and make specific recommendations relating to ATM interface issues with other regions.	B	ongoing
3.	Monitor achievements and progress in the implementation of RVSM, provide recommendations improvement and support the functions of the ARMA.	A	ongoing
4.	Review the Regional requirements air traffic control service and surveillance, monitor and support implementation	B	Oct 10

5.	Taking into consideration the Regional performance objectives relating to PBN implementation, Review the existing ATS route network (including RNAV routes) on a systematic basis with a view to achieving an optimum flow of air traffic while keeping flight distances of individual flights to a minimum. (AFI/7 Rec.5/8) (SP AFI RAN)	A	Complete user requirement by Oct 10 PRND TF agreement Apr 11
6.	Monitor and support the development and update of ATM contingency arrangements	B	ongoing
7.	Monitor trends on unsatisfactory condition (including incidents) reports through the TAG, IATA AIAG and similar mechanisms recommend action as appropriate	A	ongoing
8.	Develop standard auditing and proficiency maintenance procedures to be used by States to assess the capability/competence of any ATS unit as well as monitor the implementation of uniform proficiency assessment for ATS personnel. (AFI/7 Conc 5/27) (Comment – *Perhaps this needs to be developed and finished ASAP. A Working Group could draft & circulate)*	C	Oct 10
9.	Review the requirements and monitor the implementation of Search and Rescue Services	B	First Revision Oct 10
10.	Support the development of sub-regional SAR bodies	B	ongoing
11.	Promote and support States' efforts in the development of SAR agreements.	A	Review progress every Apr/May
12.	Taking into considering the Regional performance objectives that have been formulated by the SP AFI RAN 2008: – Develop further the Regional performance objectives using the Performance Framework Forms – Update the Regional performance objectives, particularly with regard to identification of and assignment of detailed tasks, and identifying deliverables with deadlines – Monitor implementation	A	Initial development by Oct 10
13.	Review the requirements and monitor the implementation of AIS and MAP services	B	ongoing
14.	Analyse, review and monitor shortcomings and deficiencies in the fields of ATM/SAR, PANS-OPS and AIS/MAP, propose measures to eliminate the shortcomings	A	ongoing

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;

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, Burkina Faso, Cameroon, Congo, Democratic Republic of Congo (DRC), Côte d'Ivoire, Egypt, Ethiopia, France, Gabon, Ghana, Guinea, Kenya, Madagascar, Malawi, Mauritania, Morocco, Niger, Nigeria, Rwanda, Senegal, Spain, South Africa, Sudan, Uganda, Tanzania, Togo, Tunisia, Zambia, Zimbabwe, ASECNA, IATA, IFALPA and IFATCA.

SEVENTEENTH MEETING OF THE AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG/17)
(Ouagadougou, Burkina Faso, 2-6 August, 2010)

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