INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE TENTH MEETING OF THE ATS/AIS/SAR SUB-GROUP (ATS/AIS/SAR/SG/10)

(Dakar 12 – 15 MAY 2009)

Prepared by the Secretary of the ATS/AIS/SAR/SG
May 2009

The ATS/AIS/SAR Sub-Group is a Sub-Group of the AFI Planning and Implementation Regional Group (APIRG). Its Reports are therefore submitted to APIRG for review and action.

PART I - HISTORY OF THE MEETING

PART II - REPORT ON AGENDA ITEMS

PART III - APPENDICES

PART I - HISTORY OF THE MEETING

1. Duration

1.1 The Tenth meeting of the ATS/AIS/SAR Sub-Group was convened by the International Civil Aviation Organization 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.

2. Officers and Secretariat

2.1 The meeting re-elected Mr. Papa A. FALL as its Chairman. Mr. FALL expressed his appreciation to the members and participants of the ATS/AIS/SAR Sub-Group meeting for giving him their confidence in conducting the meeting. The meeting elected Mr. Ochan A. Albinus as its vice-chairman.

2.2 Mr. Sadou MARAFA, Regional Officer, Air Traffic Management and Search and Rescue (RO ATM/SAR) of the ICAO WACAF Office, served as the Secretary of the meeting. He was assisted by Mr. George Baldeh, Regional Officer, AIS/MAP (RO/AIS/MAP) from ICAO WACAF Office and Mr. Drazen Gardilcic, Technical Officer, ATM (TO/ATM) ICAO HQ.

2.3 The meeting was opened by Mr. Evalou Gnang, ICAO WACAF Regional Officer Air Transport, representing the Regional Director. He estimated that convening the Fifteenth meeting of the APIRG RVSM Task Force (RVSM TF15), the Tenth Meeting of the APIRG Air Traffic Services, Aeronautical Information Service and Search and Rescue Sub-Group (ATS/AIS/SAR/SG/10), and the First meeting of the Tactical Action Group back to back during one week was a big challenge when you consider the importance of each, separately. He emphasized the fact that they represent the first forum at the regional level which will consider the necessary measures to be taken for the implementation of the recommendations adopted by the AFI RAN meeting, among which the introduction of the performances-based approach in all air navigation fields. He expressed his strong belief that the quality of the attendance will permit to take up the challenge and allow the meetings to achieve their goals in enhancing safety, efficiency and regularity of air navigation in the AFI region and wished the meeting fruitful deliberations.

3. Attendance

3.1 The meeting was attended by 69 participants and experts from 23 AFI Member States and 4 International Organizations, namely, ARMA, ASECNA, IATA, and ROBERTS FIR. The list of participants is given at **Appendix A** to this report.

4. Working Languages

4.1 Simultaneous interpretation services were provided in English and French, and the meeting documentation was provided in these two languages.

5. Agenda

5.1 The meeting adopted the following Agenda:

Agenda Item 1: Election of the Chairman and Vice – Chairman, and adoption of the Agenda.

Agenda item 2: Review of Special AFI RAN 08 Recommendations pertaining to ATS, AIS and SAR fields.

Agenda item 3: Review of outstanding Conclusions and Decisions of APIRG, as well as those of the ATS/AIS/SAR/SG/9 meetings and its future work program.

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Agenda item 4: Review of the Report of the Fifteenth meeting of the RVSM/ Task Force

Agenda Item 5: Review of the Report of the Fifth meeting of the AIS/MAP Task Force.

Agenda Item 6: Review of the Report of the second meeting of the PBN Task Force.

Agenda Item 7: Review of the implementation of Area Control Service

Agenda Item 8: Review of the ATS routes network including update of the AFI ANP Table ATS1 DOC 7474/27.

Agenda Item 9: Review of the implementation of ICAO requirements in the AIS/MAP field.

Agenda Item 10: Review of the implementation of ICAO requirements in the Search and Rescue (SAR) field.

Agenda Item 11: Consideration of specific air navigation planning and implementation problems and the review of deficiencies in the ATS/ AIS/SAR fields

Agenda Item 12: Any other business.

6. Draft Conclusions and Decisions

6.1. The Sub-Group records its action in the form of draft Conclusions and Decisions with the following significance:

6.2 Conclusions

Conclusions when approved by APIRG or on which further action will be initiated by ICAO in accordance with established procedures deal with matters which, in accordance with the APIRG terms of reference, merit directly the attention of States.

6.3 Decisions

Decisions when approved by APIRG deal with matters of concern only to the APIRG and its contributory bodies (i.e. Sub-Groups).

6.4 LIST OF CONCLUSIONS OF THE TENTH MEETING OF THE ATS/AIS/SAR SUB-GROUP (ATS/AIS/SAR/SG/10)

CONCLUSIONS AND DECISIONS	
Agenda item 2: Review of Special AFI RAN 08 Recommendations pertaining to ATS, AIS and SAR fields	
Conclusion 10/01	**Implementation of Performance Objectives** That, in view of the timeframes established in the relevant performance framework forms (PFFs) developed by the ICAO Special AFI RAN 08 meeting shown at **Appendices B1 to B8 to this report**, the Sub-group initiate follow-up activities on recommendations calling for APIRG action.
Conclusion 10/02	**Support for the Tactical Action Group (TAG)** That, in support of the establishment of a Tactical Action Group as endorsed by the SP AFI RAN 08 in its recommendation 6/7, States, as a matter of priority, make all efforts to assist and comply with requests from the TAG group.
Agenda item 3: Review of outstanding Conclusions and Decisions of APIRG, as well as those of the ATS/AIS/SAR/SG/9 and its future work program..	
Conclusion 10/03	**Introduction of strategic lateral procedures** That, • in order to increase air navigation safety, AFI States implement strategic lateral offset procedures in selected areas within the Region in accordance with ICAO provisions in Doc 4444 – PANS/ATM (**see Appendix D** to this report) as reflected in DOC 7030 • APIRG determines the areas where the strategic lateral offset procedures should be implemented.
Agenda item 4: Review of the Report of the Fifteenth meeting of the RVSM/ Task Force	
Decision 10/01	**Termination of APIRG RVSM Task Force activities** That the RVSM Task Force established under APIRG Decision 13/58, be disbanded taking into consideration its achievements, including the successful implementation of RVSM operations in the AFI Region on 25 September 2008.
Conclusion 10/04:	**RVSM Safety Monitoring/Assessment Data Collection** That the ICAO Regional Offices remind AFI States of their commitment to safety as reflected in their approved National Safety Plans (NSP) and the Special AFI RAN 2008 Recommendation 6/8.

CONCLUSIONS AND DECISIONS	
Decision 10/02:	**Post Operational Safety Case** That the AFI RMA a) Via the ICAO Regional offices: 1) Publishes a State Letter to officially initiate the POSC at the appropriate time; 2) Compiles for publication a State Letter to confirm the membership of the POSC Management Team; and b) On Completion of the POSC, present the result to the appropriate APIRG meeting and also circulate it to States via the NPMs for information.
Conclusion 10/05:	**ARMA Scrutiny Group** That: 1) The Sub-group a) Endorses the establishment of the Scrutiny Group as per the Special AFI RAN 2008 Recommendation 6/8 (e); b) Adopts the composition, meeting venues and draft Terms of Reference of the scrutiny group as shown at **Appendix E** to the report, and **2)** ARMA Scrutiny Group work closely with the Tactical Action Group (TAG).
Agenda Item 5:	**Review of Report of the Fifth meeting of the AIS/MAP Task Force**
Conclusion 10/06	**Updated list of AIS/MAP FASID Tables AIS-1 to AIS-8** That AFI States should provide by **30 November 2009,** an updated list of the status of implementation of the ICAO Requirements in the AIS/MAP field on Table AIS-1 to Table AIS-8 in Part VIII of the FASID Table which will subsequently form the amendment proposal to the AFI FASID.
Conclusion 10/07	**Implementation of WGS-84 and electronic terrain and obstacle data** That: a) APIRG adopts SP AFI RAN/8 Rec. 6/11 as contained in the Performance Framework Form in **Appendix B2** to this Report as its 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) APIRG adopts the draft AFI Region e-TOD Implementation strategy as proposed under **Appendix G** to this report. d) the adopted terms of reference of the AFI Region e-TOD Working Group under **Appendix H** to this report be proposed for adoption by APIRG.
Conclusion 10/08	**Submission of WGS-84 Implementation Survey Questionnaires** That States submit their responses to the Regional WGS-84 Implementation survey by **30 November 2009.**

CONCLUSIONS AND DECISIONS	
Decision 10/03	**Presentation of the Third AFI-CAD Meeting report** That the Secretariat presents to the next APIRG meeting, the Report of the Third and Fourth Meetings of the AFI Region Study Group on the Establishment of a Centralized AFI Region AIS Data base (AFI-CAD/Study Group/3/4).
Conclusion 10/09	**Adoption of the AIS to AIM Transition Roadmap** That APIRG: a) adopts the Roadmap as Guidance material to plan, manage and facilitate the global transition from AIS to AIM. b) by using the Roadmap, assists States in planning the scope and prioritizing projects and actions for the transition to AIM.
Conclusion 10/10	**e-TOD implementation awareness campaigns** Taking into consideration the adopted dates of applicability of e-TOD provisions introduced by Amendment 33 to Annex 15 and the resources required for the implementation of these new provisions, 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.
Conclusion 10/11	**Development and management of a national e-TOD program** 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 detail of collected terrain and obstacle data with particular emphasis on obstacle data and associated cost.
Conclusion 10/12	**Coordination and exchange of experience for the implementation of e-TOD requirements** That 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 10/13	**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 geodetic Institutes/Agencies, based on Service Level Agreements (SLA) reflecting such delegation.

CONCLUSIONS AND DECISIONS	
Conclusion 10/14	**ANP requirements related to e-TOD** That ICAO should develop an amendment to the basic Air Navigation Plans (ANP) for all ICAO Regions to include new e-TOD requirements and introduce a new table in the Facilities and Services Implementation Documents (FASIDs) in which detailed planning of e-TOD implementation by States together with an indication of the implementation timelines, are reflected.
Decision 10/04:	**Establishment of AFI region e-TOD working group** That with a view to, inter-alia, analysing the e-TOD requirements, developing a common understanding of these requirements and steering the planning and implementation process within the region, an AFI Region e-TOD Working Group be established as the way forward for the timely implementation of e-TOD through the proposed AFI Region e-TOD Implementation Strategy at **Appendix G** with the Terms of Reference at **Appendix H**.
Decision 10/05 :	**Revised TORs and Appellation of the AIS/MAP Task Force** That the Terms of Reference and name of the AIS/MAP Task Force be changed to reflect the Transition from AIS to AIM thereby amending the AIS/MAP Task Force to become the AIS-AIM Implementation Task Force**.**
Agenda Item 6: Review of Report of the second meeting of the PBN Task Force.	
Conclusion 10/15:	**Members of PBN Task Force** That the following States and International Organizations shall nominate experts to serve as members of the PBN Task Force: Algeria, Benin, Burundi, Botswana, Cameroon, Cape Verde, Chad, Democratic Republic of Congo (DRC), Egypt, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Mauritius, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tanzania, Tunisia, Uganda, IFALPA, IFATCA, IATA, ASECNA and Roberts FIR.
Conclusion 10/16:	**Conduct of Surveys on aircraft equipage** **That:** a) ICAO Regional Offices conduct regular surveys on aircraft equipage within the AFI Region, as part of PBN implementation related activities; and b) ICAO regional surveys on aircraft equipage should be carried out in close coordination with States, IATA and AFRAA.

CONCLUSIONS AND DECISIONS	
Conclusion 10/17:	**Civil/Military Coordination** That in order to ensure the safe and coordinated implementation of PBN in the AFI Region, States should ensure that the military aviation authorities are fully involved in the planning and implementing process.
Conclusion 10/18:	**Nomination of National PBN Program Managers (NPPMs)** **That**: States/service providers which have not done so, designate/nominate as soon as possible, but not later than **31 July 2009** a National PBN Program Manager PBN (NPPM), who will be responsible for ensuring that the proper mechanism be put in place for the effective implementation of PBN. Note: The terms of reference of PBN program managers are provided at **Appendix I** to this report
Conclusion 10/19:	**Implementation of PBN in the AFI Region** **That:** a) States in the AFI Region ensure that all requirements be met with a view to safely implementing PBN; and b) Implementation of PBN in the AFI Region be harmonized and coordinated with other adjacent Regions.
Conclusion 10/20:	**Training of all personnel involved with the implementation of PBN in the AFI Region** **That:** a) APIRG PBN Task Force identify training needs in order to assist States with RNAV/RNP implementation in the en-route, terminal, and approach flight phases, taking into account the performance-based navigation (PBN) concept. b) Seminars/Workshops be organized in the Region for training of relevant personnel directly involved in the implementation of PBN namely pilots, controllers, procedures designers, dispatchers, OPS/Air, operators etc; c) ICAO develop training modules on PBN by **31 December 2009** that may be used by States for training; and **d)** States having difficulties in implementing PBN implementation program, may either individually or in group explore the possibility of seeking outside expertise.
Conclusion 10/21:	**PBN Legislation** That the States that have not done so, include in their legislation and regulations the provisions relating to PBN.
Conclusion 10/22:	**Participation of representatives of States involved in PBN approval process** That representatives of States involved in the PBN approval process of aircraft operators, be invited to attend the future meetings of the PBN Task Force

CONCLUSIONS AND DECISIONS	
Conclusion 10/23:	**Funding of the PBN Implementation Program** 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 10/24:	**AFI Regional PBN Implementation Plan and National PBN Plan Template That:** a) The Regional PBN Implementation Plan at **Appendix J** is applicable in the AFI Region. b) States use the National PBN Plan Template at **Appendix K** in developing their National PBN Plans; and c) States complete their National PBN Plans as soon as possible, but not later than **31 December 2009.**
Conclusion 10/25:	**Amendment to the AFI CNS/ATM Plan (Doc.003)** That ICAO Regional Offices carry out necessary actions in coordination with States to amend the relevant parts of the AFI/CNS/ATM Plan (Doc.003) to incorporate PBN issues.
Decision 10/06	**Proposals of amendment to the AFI/CNS/ATM Plan (Doc.003)** That the PBN Task Force develop amendment proposals to assist APIRG in the incorporation of PBN elements in the AFI/CNS/ATM Plan (Doc.003)
Conclusion 10/26	**Renaming of the APIRG PBN Task Force** Taking into account the assigned objectives of both the PBN and GNSS Task Forces, the ATS/AIS/SAR proposes that APIRG endorses the merger of the two task forces into the AFI PBN/GNSS task force in order to prevent duplication of work, as per combined Terms of Reference at **Appendix L**
Decision 10/07	**AFI Regional PBN Performance Objectives and Action Plans** That, in accordance with Special AFI RAN 08 Recommendation 6/9, the APIRG PBN Task Force finalizes the development of the AFI PBN performance objectives and Action Plans based on the performance framework forms (PFFs), and report to APIRG.

CONCLUSIONS AND DECISIONS	
Conclusion 10/27	**Need for early implementation of PBN** That AFI States and other stakeholders anticipate PBN implementation activities, in accordance with APIRG *Conclusion 16/3 – Development of States PBN implementation Plans,* using available guidance material, including the navigation specifications shown in **Appendix M -** . In so doing, partnership with relevant Organizations should be considered as required
Conclusion 10/28	**Implementation of AFI Flight Procedures Office (FPO)** That ICAO expedites: a) the establishment of an AFI *Flight Procedures Office;* and b) its work on additional guidance material on PBN in a timeframe compatible with the milestones established under Assembly Resolution A36-23, and ensure that is made available in other ICAO working languages
Conclusion 10/29	**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.
Agenda Item 7: Review of the implementation of Area Control Service	
Conclusion 10/30	**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.
Conclusion 10/31	**Commitment for ICAO New Flight Plan** That, taking cognizance of ICAO Special AFI RAN 08 Recommendation 6/5**:** 1. Effective **15 November 2012**, all AFI States: a. Accept and disseminate 'NEW' FPLs only; and b. Implement the new FPL system in order to ensure a seamless and timely transition with no loss of service. If this cannot be agreed then it is preferable to set a minimum transition period; and 2. In the unlikely event that an ANSP does not implement, the concerned State shall notify the fact in part 1 of its AIP as a 'significant difference' to the PANS-ATM as described under Annex 15, 4.1.2-c, prior to November 15, 2012. 3. ICAO Regional Offices monitor the implementation of the ICAO New Flight Plan in the AFI Region

CONCLUSIONS AND DECISIONS	
Conclusion 10/32	**Implementation of fuel efficiency measures** That AFI States and Air Navigation Service Providers be reminded to implement APIRG Conclusion 15/28, requesting them to: a) Identify, with IATA and local airlines, actions related to ATM that would reduce fuel burn; b) Establish and promulgate a program to implement fuel efficiency measures; and c) Nominate a "fuel champion" who would liaise with IATA, airlines, ANS providers and other stakeholders to ensure that all possible fuel conservation strategies are evaluated and implemented.
Agenda Item 8: Review of the ATS routes network including update of the AFI ANP Table ATS1 DOC 7474/27.	
Conclusion 10/33	**ATS Routes** That States concerned implement the ATS routes at **Appendix N** as soon as possible, but not later than AIRAC date of **19 November 2009.**
Conclusion 10/34	**Procedure to implement air routes requirements** That**:** The requirements reflected by the network users, represented by IATA, should serve as a basis in order to facilitate the work on the development of a comprehensive ATS route network**.**
Conclusion 10/35	**Direct transitions to/from AORRA (Phase II) airspace** That the ICAO Regional Offices facilitate coordination, publication and implementation by Angola, Ghana, Sao Tome and Principe, ASECNA and Roberts FIR the direct transitions to/from AORRA airspace proposed in **Appendix O**, subject to further amendments as necessary.
Conclusion 10/36	**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.
Agenda Item 9: Review of the implementation of ICAO requirements in the AIS/MAP field (see Conclusion 10/08)	

CONCLUSIONS AND DECISIONS	
Agenda Item 10: Review of the implementation of ICAO requirements in the Search and Rescue (SAR) field	
Conclusion 10/37	**Search and Rescue (SAR) services** **That:** a) States implement the relevant recommendations relating to: i. SAR legislation ii. SAR cooperation agreements iii. the improvement of the SAR in general b) States agree to the establishment of sub-regional task forces to develop and implement SAR cooperative arrangements based on the performance objectives and work plan recommended by the SP AFI RAN 2008 Meeting; c) States which do not have SAR facilities should enter into agreements with States with adequate facilities (outside the sub-region) to assist in SAR operations; d) APIRG establishes a SAR Task Force to conduct SAR services implementation in the AFI region
Agenda Item 11: Consideration of specific air navigation planning and implementation problems and the review of deficiencies in the ATS/AIS/SAR fields	
Conclusion 10/38	**Elimination of ATS, AIS, SAR deficiencies** That: 1) States be requested to provide ICAO Regional Offices with updated information on the implementation status of Air Navigation Plan (ANP) requirements for the updating of the AFI List of Deficiencies in the ATS, SAR and AIS/MAP fields at **Appendices P1 to P3**. 2) Based on recommendation 6/25 of the SP AFI RAN 08, States establish action plans to eliminate deficiencies in the ATS, SAR and AIS/MAP fields.
Conclusion 10/39	**Need for a comprehensive list of deficiencies and coordination of initiatives** That: a) APIRG establishes a comprehensive list of deficiencies consistent with ICAO definition; and b) ICAO establishes mechanisms to ensure that AFI initiatives aimed at ensuring that air navigation safety and efficiency issues are properly coordinated to avoid duplication of efforts and develop effective synergy, thus enabling the timely resolution of identified deficiencies in the Region.
Decision 10/08	**Re-activation of CNS/ATM Implementation Coordination Groups (ICGs)** That: a) The Secretariat re-activates the implementation coordination groups (ICGs) established for each routing area, in accordance with APIRG Decision 16/29; and

CONCLUSIONS AND DECISIONS	
	b) Coordination be established between TAG and ICGs activities, through the ICAO Regional Offices and participation of ICG Coordinators in TAG meetings/teleconferences, as necessary.
Conclusion 10/40	**Improvement of air-ground communications** That, based on the outcome of the Regional Survey conducted by IATA, with the participation of airline pilots and air traffic units, States concerned improve air-ground communications in the following flight information regions : Harare FIR (South-West), Kano FIR, Khartoum FIR, Kinshasa FIR, Luanda FIR, Mogadishu FIR, Seychelles FIR, and Tripoli FIR.
Conclusion 10/41	**Ground – ground infrastructure performance** That a performance-based approach be adopted in implementing ICAO Special AFI RAN (2008) Conclusion 6/19 on Planning, Implementation and Operation of ground-ground communications infrastructure supported by VSAT networks to : a) Ensure that agreed operational requirements and end-to-end performance objectives are met, and b) Achieve system sustainability.

PART I I - REPORT ON AGENDA ITEMS

Report on Agenda Item 1: Election of the Chairman and Vice-Chairman and adoption of the agenda

1.1 The meeting re-elected Mr. Papa Atoumane FALL, Director of Air Navigation (ANACS), Senegal, as its Chairman, and Mr Ochan Alex Albinus, Air Traffic Management, CAA Uganda as its Vice-Chairman.

Report on Agenda Item 2: Review of Special AFI RAN 08 Recommendations pertaining to ATS, AIS and SAR fields

2.1 The Sub-Group was apprised of the Special AFI RAN 08 Recommendations pertaining to ATS, AIS and SAR fields.

2.2 The meeting particularly noted that the SP AFI RAN 08 meeting agreed to the introduction of a performance-based approach to the planning of air navigation services in the AFI region. In this regard, a series of performance framework forms (PFF) relating to air navigation fields was referred to APIRG as a mechanism to identify the performance objectives as well as to establish timeframes for the regional planning and implementation process. The following Conclusion was formulated by the Sub-group in this respect:

Conclusion 10/01: **Implementation of Performance Objectives**

That, in view of the timeframes established in the relevant performance framework forms (PFFs) developed by the ICAO Special AFI RAN 2008 shown at Appendices B1 to B8, the Sub-group initiate follow-up activities on recommendations calling for APIRG action.

2.3 The Sub-group noted and commended the establishment by the SP AFI RAN meeting, of a Tactical Action Group (TAG) through its recommendation 6/7. The TAG will replace the AFI RVSM Programme Management Team (PMT) and will henceforth be the group of experts addressing operational issues in the AFI region. The Sub-group agreed to the following Conclusion to support TAG activities:

Conclusion 10/02: Support for the Tactical Action Group (TAG)

That, in support of the establishment of a Tactical Action Group as endorsed by the SP AFI RAN 08 in its recommendation 6/7 States, as a matter of priority, make all efforts to assist and comply with requests from the TAG group

Report on Agenda item 3: Review of outstanding Conclusions and Decisions of APIRG, as well as those of the ATS/AIS/SAR/SG/9 and its future work program.

3.1 The Sub-group reviewed its outstanding Conclusions and Decisions, as well as those of APIRG 16 related to ATS, AIS and SAR, in the light of developments in order to

keep them current and limit their number to a minimum consistent with the progress achieved in their implementation. Those Conclusions considered to be valid were retained. The status of the implementation of ATS/AIS/SAR SG9 and APIRG 16 Conclusions, as reviewed by the Sub-group, is shown at **Appendix C** to this report.

3.2 The meeting was reminded of the issue of the application of strategic lateral offset (SLOP) procedures in the AFI Region, that was initiated by the ATS/AIS/SAR SG/8 Meeting and reviewed by APIRG 15. The Sub-group agreed to step forward with the application of SLOP procedures in the AFI region and formulated the following Conclusion:

Conclusion 10/03: Introduction of Strategic Lateral Procedures

That,

- **in order to increase air navigation safety, AFI States implement strategic lateral offset procedures in selected areas within the Region in accordance with ICAO provisions in Doc 4444 – PANS/ATM (Appendix D) as reflected in DOC 7030**
- **APIRG determines the areas where the strategic lateral offset procedures should be implemented**

Report on Agenda item 4: Review of the Report of the Fifteenth meeting of the RVSM/ Task Force

4.1 Under this Agenda Item, the Sub-Group reviewed the report of the fifteenth RVSM Task Force Meeting which was held in Dakar, Senegal, from 11 to 12 May 2009.

4.2 The meeting acknowledged that the RSVM Task Force had successfully completed its assigned work and that it should be disbanded. In this regard, the Sub-group formulated the following Decision:

Decision 10/01: Termination of APIRG RVSM Task Force activities

That the RVSM Task Force established under APIRG Decision 13/58, be disbanded taking into consideration its achievements, including the successful implementation of RVSM operations in the AFI Region on 25 September 2008.

4.3 However, the AFI Regional Monitoring Agency (ARMA) will carry on the monitoring of the RVSM post implementation operations with the support of a Scrutiny Group as recommended by the SP AFI RAN/08 meeting (Rec.6/8).

4.4 The ATS/SG reviewed the RVSM Task Force Conclusions and Decisions that were considered pertinent and endorsed them. The following Conclusions and Decision were retained by the Sub-group:

Conclusion 10/04: RVSM Safety Monitoring/Assessment Data Collection

That the ICAO Regional Offices remind AFI States of their commitment to safety as reflected in their approved national safety plans (NSP) and the Special AFI RAN 2008 Recommendation 6/8.

Decision 10/02: Post Operational Safety Case

That the AFI RMA Via

a) the ICAO Regional offices:

1) Publishes a State Letter to officially initiate the POSC at the appropriate time;
2) Compiles for publication a State Letter to confirm the membership of the POSC Management Team; and

b) On Completion of the POSC, present the result to the appropriate APIRG meeting and also circulate it to States via the NPMs for information.

Conclusion 10/05: ARMA Scrutiny Group

That:
1) The Sub-group
a) Endorses the establishment of the Scrutiny Group as per the Special AFI RAN 2008 Recommendation 6/8 (e);

b) Adopts the composition, meeting venues and draft Terms of Reference of the Scrutiny Group as shown at Appendix E to the report, and

2) The ARMA Scrutiny Group works closely with the Tactical Action Group (TAG).

Report on Agenda Item 5: Review of the Report of the Fifth Meeting of the AISMAP Task Force

5.1 Under this Agenda Item, the Sub-Group reviewed the report of the Fifth meeting of the AFI AIS/MAP Task Force which was held in Dakar, Senegal from 11-12 April 2009. The meeting noted the requirements for the provision of pre-flight and post-flight information services at aerodromes/heliports normally used for international air operations. It noted that with the current facilities offered, many pilots have started to make use of the commercial facilities available, which supply a product that demands an integrated and tailored briefing package. However, many users see only the information issued by the State Authority as being the official and correct data.

5.2 In the future it is envisaged that pre-flight briefing will be extended to the provision of pre-flight briefings directly to the flight deck of aircraft. This would enable the pilot to be provided with briefing information throughout the gate-to-gate operation of a flight. It would then be a natural progression to further extend this facility to include in-flight updates of aeronautical and meteorological information on the flight deck.

5.3 The meeting then agreed to endorse the following Task Force Conclusion:

Conclusion 10/06 Updated list of AIS/MAP FASID Tables AIS-1 to AIS-8

That AFI States should provide by 30 November 2009, an updated list of the status of implementation of the ICAO Requirements in the AIS/MAP field on Table AIS-1 to Table AIS-8 in Part VIII of the FASID Table which will subsequently form the amendment proposal to the AFI FASID.

5.4 The meeting noted that Annex 15 requires States to provide terrain and obstacle data at different precisions for different areas as necessary to accommodate current and planned new air navigation systems or functions. Four coverage areas have been defined for which specific levels of precision are required, with Area 1 requiring the least precision and Area 4 requiring the most as follows:

Area 1 *shall cover the entire territory of a State, including aerodromes.*

Area 2 *shall be the terminal control area as published in AIPs, limited to a 45KM radius from the aerodrome reference point. If the terminal control area is not established, Area 2 shall be the area within the 45KM radius from the aerodrome reference point.*

Area 3 *shall cover the area which is within 50 meters from the edges of defined aerodrome or heliport surface movement areas.*

Area 4 *shall be restricted only to those runways where precision approach Category 2 or 3 has been established. Area 4 terrain data shall be provided in order to enable operators to assess the effect of terrain on decision height determination by use of radio altimeters.*

5.5 The meeting noted that the implementation of e-TOD requirements is a challenging process that must be accomplished with a high level commitment, careful planning, sharing of resources and a structured tracking of regional progress. These tasks are based on experience gained at the AFI Regional Seminar on Electronic Terrain and Obstacle Data held in Casablanca, Morocco from 1 to 3 April 2008. **Appendix F** provides the structure for an AFI ANP FASID table which is proposed to be used to provide detail of regional eTOD requirements and as a tool to track implementation. It was noted that a structured approach to implementation is required to realize the important safety and efficiency benefits to be derived from the uniform implementation of WGS-84 and terrain and obstacle data (eTOD) provisions.

5.6 In view of the foregoing the meeting endorsed the following Conclusions and Decision of the Task Force:

Conclusion 10/07 Implementation of WGS-84 and electronic terrain and obstacle data e-TOD
That:

a) APIRG adopts AFI RAN Rec. 6/11 as contained in the Performance Framework Form in Appendix B2 to this Report as its 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) APIRG adopt the draft AFI Region e-TOD Implementation strategy as proposed under Appendix G.
d) the adopted terms of reference of the AFI Region e-TOD Working Group under Appendix H be proposed for adoption by APIRG.

Conclusion 10/10 **e-TOD implementation awareness campaigns**

Taking into consideration the adopted dates of applicability of e-TOD provisions introduced by Amendment 33 to Annex 15 and the resources required for the implementation of these new provisions, the 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.

Conclusion 10/11 **Development and management of a national e-TOD program**

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 program;

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

a) **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 10/12 **Coordination and exchange of experience for the implementation of e-TOD requirements**

That 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 10/13 **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 geodetic Institutes/Agencies, based on Service Level Agreement (SLA) reflecting such delegation.

Conclusion 10/14 **ANP requirements related to e-TOD**

That ICAO should develop an amendment to the basic Air Navigation Plans (ANP) for all ICAO Regions to include new E-TOD requirements and introduce a new table in the Facilities and Services Implementation Documents (FASIDs) in which detailed planning of E-TOD implementation by States together with an indication of the implementation timelines, are reflected.

Decision 10/04: **Establishment of AFI region e-TOD working group**

That with a view to, inter-alia, analysing the e-TOD requirements, developing a common understanding of these requirements and steering the planning and implementation process within the region, an AFI Region e-TOD Working Group be established as the way forward for the timely implementation of e-TOD through the proposed AFI Region e-TOD Implementation Strategy at Appendix G with the Terms of Reference at Appendix H.

5.7 The meeting noted the adoption of the framework and guidance material for the AFI-CAD by the APIRG 16 meeting (APIRG Conc.16/41 refers), the main objective of this technical meeting was to provide the required forum for the AFI-CAD study Group members to work and provide guidance to the ICAO designated specialist/financial analyst-experts tasked with the development of the AFI-CAD business/financial model and the URS. The Study Group in collaboration with the designated ICAO Expert are expected to submit the results of the project to the APIRG/17 Meeting for consideration and endorsement.

5.8 The meeting then endorsed the following Decision:

Decision 10/03 **Presentation of the Third AFI-CAD Meeting report**

That the Secretariat presents to the next APIRG Meeting the Reports of the third and fourth Meetings of the AFI Region Study Group on the Establishment of a Centralized AFI Region AIS Data base (AFI-CAD/Study Group/3/4).

5.9 The meeting noted that the AIS-AIM Transition Road map document is a plan, to manage and facilitate the global transition from AIS to AIM. The road map recognizes that not all States or regions can make the transition immediately to AIM, and that implementation will be evolutionary, based on regional needs. The transition would be supported by the Global Air Navigation Plan, regional plans and State implementation plans, which would also describe the progressive intermediate steps. The plans of all States and regions need to be aligned to ensure, to the greatest extent possible, that solutions are internationally harmonized and integrated and do not unnecessarily impose multiple equipment carriage requirements in the air components of the ATM system, or multiple systems on the ground.

5.10 The global strategy/roadmap for the transition from AIS to AIM has been developed to address in greater detail the direction given for aeronautical information in the *Global Air Navigation Plan* (Doc 9750). It is intended as a high-level document to provide a framework for States in their evolution towards AIM, and to clarify the purpose and scope of the transition. The roadmap identifies the major milestones towards a uniform global evolution to AIM and indicates specific steps and timelines for implementation. The roadmap for the transition from AIS to AIM was presented for the Commission's endorsement at http://www.icao.int/anb/AIM/.

5.11 The meeting then endorsed the following Task Force Conclusion:

Conclusion 10/09 **Adoption of the AIS to AIM Transition Roadmap**
That APIRG:

a) adopts the Roadmap as Guidance material to plan, manage and facilitate the global transition from AIS to AIM.

b) by using the Roadmap, assists States in planning the scope and prioritizing projects and actions for the transition to AIM.

5.12 The meeting noted the proposal to amend the provisions in Annex 15 related to the QMS stems from Decision 49/1 of the forty-ninth meeting of the European Air Navigation Planning Group (EANPG/49) held in Paris from 27 to 29 November 2007 and was further developed by the Secretariat with the assistance of the AIS-AIMSG.

5.13 Implementation difficulties and cost implications concerning the proposals related to the QMS and use of automation enabling digital data exchange may be substantial, especially for States with little or no automation capabilities. However, it was noted that the proposal allows for automation enabling digital data exchange to be introduced in a progressive manner. In the long term, automation and the associated QMS should lead to efficiencies.

5.14 The meeting then endorsed the following Decision of the Task Force:

Decision 10/05 : **Revised TORs and Appellation of the AIS/MAP Task Force**

That the Terms of Reference and name of the AIS/MAP Task Force be changed to reflect the Transition from AIS to AIM thereby amending the AIS/MAP Task Force to become the AIS-AIM Implementation TASK Force.

5.15 In view of the foregoing, the draft Conclusions and Decisions emanating from the Report of the AIS/MAP Task Force/5 Meeting which were reviewed and endorsed by the ATS/AIS/SAR SG-10 Meeting are listed herewith : **Conclusion 10/06**, **Conclusion 10/07, Decision 10/03, Conclusion 10/09, Conclusion 10/10, Conclusion 10/11, Conclusion 10/12**, **Conclusion 10/13, Conclusion 10/14, Decision 10/04 and Decision 10/05**.

Report on Agenda Item 6: Review of Report of the second meeting of the PBN Task Force.

6.1 Under this Agenda item**,** the Sub-group reviewed the report of the Second PBN Task Force (PBN/TF/2) meeting that was convened pursuant to APIRG/16 meeting Conclusion 16/2 by the ICAO ESAF Office, Nairobi, from 4 to 6 December 2008.

6.2 In the framework of the preparation of the implementation of the performance-based navigation concept in the AFI region it was noted that:

- the draft AFI Regional PBN Plan had been adopted and distributed to the States for application, and
- the draft State PBN Plan Template was adopted by the Task Force and disseminated to be used by States as a model for the development of their national PBN plans

6.3 The Sub-Group noted also that the Task Force assigned two Working Groups to develop the AFI PBN Performance Objectives and Action Plans, one for en – route phase of flight operations, and the other for terminal and approach phases.

6.4 Taking into consideration the PBN Task Force assigned objective and noting the critical role of GNSS in the implementation of PBN navigation specifications, the Sub-Group was of the view that the PBN Task Force should be renamed the AFI PBN/GNSS Task Force, as previously proposed by the two Task Forces.

6.5 The ATS/SG reviewed the PBN Task Force draft Conclusions and Decisions that were considered pertinent and endorsed them.

6.6 The Sub-Group recalled the guidelines laid out by Assembly Resolution A36-23 for the implementation of PBN in the AFI region. The meeting considered also the recommendations adopted by the SP AFI RAN 08 meeting relating to PBN.

6.7 As a result, the Sub-group formulated the following Conclusions and Decisions:

Conclusion 10/15: **Members of PBN Task Force**

That the following States and International Organizations shall nominate experts to serve as members of the PBN Task Force: Algeria, Benin, Burundi, Botswana, Cameroon, Cape Verde, Chad, Democratic Republic of Congo (DRC), Egypt, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Mauritius, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tanzania, Tunisia, Uganda, IFALPA, IFATCA, IATA, ASECNA and Roberts FIR.

Conclusion 10/16: **Conduct of Surveys on aircraft equipage**

That:

a. **ICAO Regional Offices conduct regular surveys on aircraft equipage within the AFI Region, as part of PBN implementation related activities; and**
b. **ICAO regional surveys on aircraft equipage should be carried out in close coordination with States, IATA and AFRAA.**

Conclusion 10/17: **Civil/Military Coordination**

That in order to ensure the safe and coordinated implementation of PBN in the AFI Region, States should ensure that the military aviation authorities are fully involved in the planning and implementing process.

Conclusion 10/18: **Nomination of National PBN Program Managers (NPPMs)**
That:
States/service providers which have not done so, designate/nominate as soon as possible, but not later than 31 July 2009 a National PBN Program Manager PBN (NPPM), who will be responsible for ensuring that the proper mechanism be put in place for the effective implementation of PBN.

Note: The terms of reference of PBN program managers are provided at Appendix I to this report

Conclusion 10/19: **Implementation of PBN in the AFI Region**
That:
a) States in the AFI Region ensure that all requirements be met with a view to safely implementing PBN; and

b) Implementation of PBN in the AFI Region be harmonized and coordinated with other adjacent Regions.

Conclusion 10/20: **Training of all personnel involved with the implementation of PBN in the AFI Region**

That:

a) **APIRG PBN Task Force identify training needs in order to assist States with RNAV/RNP implementation in the en-route, terminal, and approach flight phases, taking into account the performance-based navigation (PBN) concept.**
b) **Seminars/Workshops be organized in the Region for training of relevant personnel directly involved in the implementation of PBN namely pilots, controllers, procedures designers, dispatchers, OPS/Air, operators etc;**
c) **ICAO develop training modules on PBN by 31 December 2009 that may be used by States for training; and**
d) **States having difficulties in implementing PBN implementation programme, may either individually or in group explore the possibility of seeking outside expertise.**

Conclusion 10/21: **PBN Legislation**

That the States that have not done so, include in their legislation and regulations the provisions relating to PBN.

Conclusion 10/22: **Participation of representatives of States involved in PBN approval process**

That representatives of States involved in the PBN approval process of aircraft operators, be invited to attend the future meetings of the PBN Task Force.

Conclusion 10/23: **Funding of the PBN Implementation Program**

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 10/24: **AFI Regional PBN Implementation Plan and National PBN Plan Template**

That:

a) The Regional PBN Implementation Plan at Appendix J is applicable in the AFI Region.

b) States use the National PBN Plan Template at Appendix K in developing their National PBN Plans; and

c) States complete their National PBN Plans as soon as possible, but not later than 31 December 2009.

Conclusion 10/25: **Amendment to the AFI CNS/ATM Plan (Doc.003)**

That ICAO Regional Offices carry out necessary actions in coordination with States to amend the relevant parts of the AFI/CNS/ATM Plan (Doc.003) to incorporate PBN issues.

Decision 10/06 **Proposals of amendment to the AFI/CNS/ATM Plan (Doc.003)**

That the PBN Task Force develop amendment proposals to assist APIRG in the incorporation of PBN elements in the AFI/CNS/ATM Plan (Doc.003).

Conclusion 10/26 **Renaming of the APIRG PBN Task Force**

Taking into account the assigned objectives of both the PBN and GNSS Task Forces, the ATS/AIS/SAR proposes that APIRG endorses the merger of the two task forces into the AFI PBN/GNSS task force in order to prevent duplication of work, as per combined Terms of Reference at Appendix L.

Decision 10/07 AFI Regional PBN Performance Objectives and Action Plans

That, in accordance with Special AFI RAN 08 Recommendation 6/9, the APIRG PBN Task Force finalize the development of the AFI PBN performance objectives and Action Plans based on the performance framework forms (PFFs), and report to APIRG.

Conclusion 10/27 Need for early implementation of PBN

That AFI States and other stakeholders anticipate PBN implementation activities, in accordance with APIRG *Conclusion 16/3 – Development of States PBN implementation Plans,* using available guidance material, including the navigation specifications shown in Appendix M . In so doing, partnership with relevant Organizations should be considered as required

Conclusion 10/28 Implementation of AFI Flight Procedures Office (FPO)

That ICAO:

a) Expedite the establishment of an AFI *Flight Procedures Office;* and
b) Expedite its work on additional guidance material on PBN in a timeframe compatible with the milestones established under Assembly Resolution A36-23, and ensure that is made available in other ICAO working languages

Conclusion 10/29 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.

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Report on Agenda Item 7: Review of the Implementation of the Area Control Service

7.1 Under this Agenda item, the Sub-Group reviewed the status of the implementation of ATC Service in the AFI region.

7.2 The Sub-group recalled ICAO provisions to be considered when deciding whether or not ATC should be provided. Reference was also made to the AFI/7 RAN Rec. 5/21 which established the guidelines for the implementation of ATC in the AFI region.

7.3 In this regard the meeting acknowledged the complete implementation of ATC in the AFI region in accordance with AFI/7 RAN Rec. 5/21. However, it was noted that the ATS incident analysis carried out by the ATS Incident Analysis Group (AIAG) had shown areas where ATC quality was an issue in the Region, due to deficiencies affecting ATC proficiency, coordination procedures, communications, etc. In this regard the following Conclusion was formulated:

Conclusion 10/30: Dissemination of AIAG reports

That the ICAO Regional Offices ensure that the final reports of the AFI ATS Incidents Analysis Group (AIAG) are made available to all States and Air Navigation Service Providers for remedial action.

7.4 Sequel to recommendation 6/5 of the SP AFI RAN 08 meeting, the Sub-group considered the status of the implementation of the ICAO New Flight Plan. The meeting recognized the benefit expected from its implementation as well as the one of fuel efficiency measures. The Sub-group therefore agreed to the following Conclusions:

Conclusion 10/31: Commitment for ICAO New Flight Plan

That, taking cognizance of ICAO Special AFI RAN 08 Recommendation 6/5:

1. **Effective 15 November 2012, all AFI States:**
   a. **Accept and disseminate 'NEW' FPLs only; and**
   b. **Implement the new FPL system in order to ensure a seamless and timely transition with no loss of service. If this cannot be agreed then it is preferable to set a minimum transition period; and**
2. **In the unlikely event that an ANSP does not implement, the concerned State shall notify the fact in part 1 of its AIP as a 'significant difference' to the PANS-ATM as described under Annex 15, 4.1.2-c, prior to November 15, 2012.**
3. **ICAO Regional Offices monitor the implementation of the ICAO New Flight Plan in the AFI Region.**

Conclusion 10/32: Implementation of fuel efficiency measures

That AFI States and Air Navigation Service Providers be reminded to implement APIRG Conclusion 15/28, requesting them to:

a) **Identify, with IATA and local airlines, actions related to ATM that would reduce fuel burn;**

b) **Establish and promulgate a program to implement fuel efficiency measures; and**

c) **Nominate a "fuel champion" who would liaise with IATA, airlines, ANS providers and other stakeholders to ensure that all possible fuel conservation strategies are evaluated and implemented.**

Report on Agenda Item 8: Review of the ATS routes network including update of the AFI ANP Table ATS1 DOC 7474/27

8.1 The Sub-Group considered the status of implementation of the ATS routes network including RNAV routes with reference to APIRG Conclusion 16/46 on non-implemented routes. The meeting agreed that States be requested to implement the non-implemented routes not later than **19 November 2009**. Thus the following Conclusion:

Conclusion 10/33: ATS Routes

That States concerned implement the ATS routes at Appendix N as soon as possible, but not later than AIRAC date of 19 November 2009.

8.2 The Sub-Group was seized with requirements for new routes or route portions under WP 18 presented by IATA. The following Conclusion was formulated on the matter:

Conclusion 10/34: Procedure to implement air routes requirements

That the requirements reflected by the network users, represented by IATA, should serve as a basis in order to facilitate the work on the development of a comprehensive ATS route network.

8.3 The Sub-group was apprised of the successful implementation of the AORRA Phase II and the need for direct transitions to/from AORRA airspace concerned. In this regard, the meeting agreed to the following Conclusion:

Conclusion 10/35: Direct transitions to/from AORRA (Phase II) airspace:

That the ICAO Regional Offices facilitate coordination, publication and implementation by Angola, Ghana, Sao Tome and Principe, ASECNA and Roberts FIR the direct transitions to/from AORRA airspace proposed in Appendix O, subject to further amendments as necessary.

8.4 The Sub-group recalled the implementation of the two RNAV "Red Carpet Routes" UM214 and UM215 with an initial floor limited at FL330. The meeting agreed that the use of these two routes could be improved by lowering their floor down to FL 320. The following Conclusion was therefore adopted:

Conclusion 10/36: 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.

8.5 The Sub-Group took cognizance of the SP AFI/8 RAN meeting Rec.6/9 on performance-based navigation (PBN) objectives for the optimization of the air traffic services (ATS) route structure in the AFI Region.

Report on Agenda Item 9: Review of the implementation of ICAO requirements in the AIS/MAP field.

9.1 Under this Agenda item, the meeting reviewed and noted that current and future developments in satellite technology, will to a large extent, reduce the dependence of civil aviation on ground based navigation aids, as well as permit improvements in overall efficiency of the Air Navigation Systems. In this regard, the implementation of World Geodetic System of 1984 (WGS-84), an earth centred reference model to be used by Global Navigation Satellite Systems (GNSS) was encouraged within the AFI Region.

9.2 The implementation of GNSS is dependent on States providing geographical coordinates based on the same geodetic datum, i.e: WGS-84, in conformity with provisions contained in Annexes 4, 11, 14 and 15 to the Convention on International Civil Aviation. It is therefore essential that all ICAO Contracting States be fully compliant with WGS-84 provisions.

9.3 Additionally, the WGS-84 reference system requires regular updating. The AFI RAN/8 meeting recognized that implementation is now most urgent, as availability of geographical coordinates in the commonly agreed WGS-84 reference system is a prerequisite for States to obtain the benefits of PBN, and also an important step in preparing for the transition from Aeronautical Information Services (AIS) to Aeronautical Information Management (AIM) for which the provision of digital geographic data of appropriate quality will be essential.

9.4 In order to allow for a comprehensive analysis of the status of implementation of WGS-84 throughout the AFI Region, it is important that appropriate background information be provided to substantiate any discrepancy in the current implementation status. The meeting noted that the Secretariat has prepared a regional status report at **Appendix xx** to be updated for submission to the APIRG/17 Meeting.

9.5 In view of the foregoing, the following Conclusion was reviewed and endorsed:

Conclusion 10/08: Submission of WGS-84 Implementation Survey Questionnaires

That States submit their responses to the Regional WGS-84 Implementation survey by 30 November 2009.

Report on Agenda Item 10: Review of the implementation of ICAO requirements in the Search and Rescue (SAR) field

10.1 Under this Agenda item the Sub-Group reviewed the status of implementation of all ICAO provisions relating to Search and Rescue services. It was noted with concern that most of these provisions had remained unimplemented in spite of the action called for under relevant APIRG Conclusions.

10.2 The Sub-Group recalled the following important initiatives which also aimed at the improvement of SAR services in the AFI region:

- The ICAO/AFCAC Search and Rescue (SAR) Technical Co-operation Project (2002-2007)
- The Search and Rescue (SAR) Funding Conference (Saly-Portudal, Senegal, 25 – 28 October 2004)
- The SAR Conference in Saint Denis de La Réunion (3 – 7 September 2007)

10.3 It was pointed out that major deficiencies still existed in the establishment of appropriate SAR legislation and Agreements, and the carriage of Frequency 406Mhz for COSPAS SARSAT programme. The Sub-Group emphasized the need for States to continue addressing these deficiencies.

10.4 The Sub-Group took cognizance of the SP AFI/ 8 RAN meeting Rec.6/22 adopting SAR performance objectives, and calling for sub-regional SAR arrangements and the establishment of regional task forces to progress on the integration of SAR services.

10.5 In view of the above, the Sub-Group formulated the following Conclusion:

Conclusion 10/37: Search and Rescue (SAR) services

That:

a) States implement the relevant recommendations relating to:

i. SAR legislation
ii. SAR cooperation agreements
iii. the improvement of the SAR in general

b) States agree to the establishment of sub-regional task forces to develop and implement SAR cooperative arrangements based on the performance objectives and work plan recommended by the SP AFI RAN 2008 meeting.

c) States which do not have SAR facilities should enter into agreements with States with adequate facilities (outside the sub-region) to assist in SAR operations.

d) APIRG establishes a SAR Task Force to conduct SAR services implementation in the AFI region.

Report on Agenda Item 11: Consideration of specific air navigation planning and implementation problems and the review of deficiencies in the ATS/AIS/SAR fields

11.1 The Sub-Group recalled the list of deficiencies in the ATS, SAR and AIS/MAP fields as established by APIRG 16 and shown in **Appendices to WP11**. The meeting agreed that the list of deficiencies be circulated to States for their most recent updating.

11.2 The Sub-group noted the SP AFI/ 8 RAN meeting Rec.6/25 adopting performance objectives for the elimination of Air Navigation Deficiencies in the AFI Region, and calling States to develop their national action plans, aligned with the regional performance objective, to eliminate their relevant deficiencies. The Sub-group agreed to the following Conclusion:

Conclusion 10/38: Elimination of ATS, AIS, SAR deficiencies

That:

1. **States be requested to provide ICAO Regional Offices with updated information of the implementation status of Air Navigation Plan (ANP) requirements for the updating of the AFI List of Deficiencies in the ATS, SAR and AIS/MAP fields at Appendices P1 to P3.**

2. **Based on the recommendation 6/25 of the AFI RAN, States establish action plans to eliminate deficiencies in the ATS, SAR and AIS/MAP fields.**

11.3 After consideration of the list of deficiencies, the Sub-Group was of the view that there is still a need for the establishment of a comprehensive list of deficiencies consistent with ICAO definition. Likewise, the meeting deemed useful that ICAO establish mechanisms to ensure that AFI initiatives aimed at ensuring that air navigation safety and efficiency issues are properly coordinated to avoid duplication of efforts. In this regard, the meeting formulated the following Conclusion:

Conclusion 10/39: Need for a comprehensive list of deficiencies and coordination of initiatives

That:

a) **APIRG establish a comprehensive list of deficiencies consistent with ICAO definition; and**

b) **ICAO establish mechanisms to ensure that AFI initiatives aimed at ensuring that air navigation safety and efficiency issues are properly coordinated to avoid duplication of efforts and develop effective synergy, thus enabling the timely resolution of identified deficiencies in the Region.**

11.4 Furthermore, in order to enhance efficiency in addressing deficiencies, it is proposed to re-activate the Implementation Coordination Groups (ICGs) established for each routing area, in accordance with APIRG Decision 16/29; and recommended that coordination be established between TAG and ICGs activities. In consequence, the Sub-group agreed to the following Decision:

Decision 10/08: Re-activation of CNS/ATM Implementation Coordination Groups (ICGs)

That:

a) **The Secretariat re-activates the implementation coordination groups (ICGs) established for each routing area, in accordance with APIRG Decision 16/29; and**

b) **Coordination be established between TAG and ICGs activities, through the ICAO Regional Offices and participation of ICG Coordinators in TAG meetings/teleconferences, as necessary**.

11.5 The Sub-group noted with concern the persistence of severe deficiencies in the communications field in some areas, as reported by the regional survey conducted by IATA. The Sub-group adopted the following Conclusions to address the issue:

Conclusion 10/40: Improvement of air-ground communications

That, based on the outcome of the Regional Survey conducted by IATA, with the participation of airline pilots and air traffic units, States concerned improve air-ground communications in the following flight information regions : Harare FIR (South-West), Kano FIR, Khartoum FIR, Kinshasa FIR, Luanda FIR, Mogadishu FIR, Seychelles FIR, and Tripoli FIR.

Conclusion 10/41: Ground – ground infrastructure performance

That a performance-based approach be adopted in implementing ICAO Special AFI RAN (2008) Conclusion 6/19 on Planning, Implementation and Operation of ground-ground communications infrastructure supported by VSAT networks to:

a) Ensure that agreed operational requirements and end-to-end performance objectives are met, and

b) Achieve system sustainability

11.6 The Sub-group considered WP 26 presented by Mali aimed at the creation of a Flight Information region (FIR) covering the territory of the State and managed by a Control Center located in Bamako. The meeting recalled the orientations given by ICAO in this field since the AFI/7 RAN meeting whereby States are called to adopt a cooperative approach when establishing FIRs. The meeting was of the view that this issue should be presented at a higher level of decision making for appropriate consideration.

Report on Agenda Item 12: Any other business.

12.1 Under this item the Sub-group reviewed the set of performance framework forms (PFF) as established by the SP AFI RAN 08 (shown at **Appendix B1 to B8**) and relating to ATS , AIS and SAR fields and agreed to submit them to the next APIRG meeting (see conclusion 10/01).

12.2 The Sub-group reviewed its Terms of Reference and Work Programme as revised by APIRG 16 and endorsed them.

Appendix A
ATS/AIS/SAR-SG/10

INTERNATIONAL CIVIL AVIATION ORGANIZATION/
ORGANISATION DE L'AVIATION CIVILE INTERNATIONALE
Western and Central African Office/ Bureau Afrique Occidentale Et Centrale

Tenth ATS/AIS/SAR Sub-Group meeting/ Dixième réunion du Sous-groupe ATS/AIS/SAR
(Dakar, Senegal, 12 -14 May 2009)

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APPENDIX B1

ATM PERFORMANCE OBJECTIVES

OPERATIONAL SAFETY ASSESSMENT METHODOLOGY				
Benefits				
Environment **Efficiency** **Safety**	• reductions in fuel consumption • ability of aircraft to conduct flight more closely to preferred trajectories • facilitate utilization of advanced technologies (e.g. improved altimetry systems) thereby increasing efficiency • enhance safety by wider distribution of aircraft in a given airspace			
Strategy ***Short term (2010)*** ***Medium term (2011 - 2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***En-route airspace***	2009-….		
	• create a scrutiny group to monitor and analyze the safety of operations in the AFI region in a formal basis. The scrutiny group will utilize safety management principles outlined in Doc 9859 in order to analyze operational errors and deviations and propose mitigation measures to control them	2009		
	• that AFI States' use Safety Programmes and SMS methodologies in the control and mitigation of risks in the region	2009		
	• that a yearly CRA be conducted by the RMA for analysis by the scrutiny group. The CRA will be used as a relative reference from year to year. The initial acceptability of a collision risk to be determined by experts of the scrutiny group. Meeting the TLS of 2.5×10^{-9} fatal accidents per aircraft flying hour for **technical risk** be maintained as a requirement to continue with RVSM operations	ongoing		
	• the Scrutiny Group provide yearly report to APIRG about the status of operations safety in the region	ongoing		
linkage to GPIs	GPI/02: Support implementation of RVSM			

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APPENDIX B2

AIM PERFORMANCE OBJECTIVES

NATIONAL PERFORMANCE OBJECTIVE – IMPLEMENTATION OF WGS-84 AND eTOD				
Benefits				
Environment	• None			
Efficiency	• WGS-84 is a prerequisite for performance-based navigation, benefits described in performance objectives for PBN. • 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 • See benefits described in performance objectives for PBN			
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	
	• report requirements and monitor implementation status of eTOD using a new AIS Table of the AFI FASID (Ref. Appendix B).	2009-ongoing	APIRG States	
	• develop a high level policy for the management of a national eTOD programme.	2008-2009	States	
ATM AUO	***WGS-84***			
	• establish WGS-84 implementation goals in coordination with the national PBN implementation plan.	2008-2009	States	
	• report requirements and monitor implementation status of WGS-84 using the AIS-5 Table of the AFI FASID and take remedial action if required.	Ongoing	APIRG States	
Link to GPIs	GPI-5: Performance-based navigation; GPI-9: Situational awareness; GPI-11: RNP and RNAV SIDs and STARs; GPI-18: Aeronautical Information; GPI-20: WGS-84; GPI-21: Navigation systems			

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APPENDIX B3

ATM PERFORMANCE OBJECTIVES

BASIC CHECKLIST FOR IMPLEMENTATION OF THE NEW ICAO FPL FORM				
Benefits				
Environment **Efficiency** **Safety**	• reductions in fuel consumption • 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 • enhance safety by use of modern capabilities onboard aircraft			
Strategy ***Short term (2010; Medium term (2011 - 2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
SDM	***En-route airspace***	2009-2012		
	• ensure that the automation and software requirements of local systems are fully adaptable to the changes envisaged in the new FPL form	2009		
	• ensure that issues related to the ability of FDPS's to parse information correctly and to correctly identify the order in which messages are received, to ensure that misinterpretation of data does not occur	2009-2012		
	• 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 problems with regard to applicability of service provided by the facility itself or downstream units	2009		
	• ensure that there are no individual State peculiarities or deviations from the flight plan provisions	2009-2012		
	• 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		
	• 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	2009-2012		
	• 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 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.	2009-2012		
	• establish a central depository in order to track the implementation status and inform the ICAO regional offices on an ongoing basis	2009		
linkage to GPIs	GPI/18 Aeronautical Information			

APPENDIX B4

REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN EN-ROUTE AIRSPACE				
Benefits				
Environment **Efficiency**	• 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	***Terminal airspace***	2008		
	• develop regional implementation plan	1Q 2008 – 1Q 2009	PBN TF	In progress
	• develop regional action plan	1Q 2009	PBN TF	Not started
	• 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			
	• harmonize State and PBN implementation plans with regional plan			
	• develop performance measurement plan			
	• formulate safety plan			
	• establish collaborative decision making (CDM) process			
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material			
	• identify training needs and develop corresponding guidelines			
	• formulate system performance monitoring plan			
	• implementation of ATS routes enroute		Region/States	In progress
	• monitor implementation progress in accordance with AFI PBN implementation plan and State implementation plan			
linkage to GPIs	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management			

REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE				
Benefits				
Environment **Efficiency**	• 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	1Q 2008 – 1Q 2009	PBN TF	In progress
	• develop regional action plan	1Q 2009	PBN TF	Not started
	• develop State PBN implementation	1Q 2009 – 4Q 2009	State	
	• develop airspace concept based on AFI PBN roadmap, in order to design and implement a 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			
	• develop performance measurement plan			
	• formulate safety plan			
	• establish collaborative decision making (CDM) process			
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material			
	• identify training needs and develop corresponding guidelines			
	• formulate system performance monitoring plan			
	• develop a regional strategy and work programme for implementation of SIDs and STARs		State	
	• monitor implementation progress in accordance with AFI PBN implementation roadmap and State implementation plan			
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			

REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF VERTICALLY GUIDED RNP APPROACHES				
Benefits				
Environment **Efficiency**	• 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	***En-route airspace***	2008		
	• develop regional implementation plan	1Q 2008 – 1Q 2009	PBN TF	In progress
	• develop regional action plan	1Q 2009	PBN TF	Not started
	• develop State PBN implementation	1Q 2009 – 4Q 2009	State	
	• 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			
	• develop performance measurement plan			
	• formulate safety plan			
	• establish collaborative decision making (CDM) process			
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material			
	• identify training needs and develop corresponding guidelines			
	• identify training needs and develop corresponding guidelines			
	• implementation of APV procedures	present - 2016	State	
	• Formulate system performance monitoring plan			
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			

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APPENDIX B5

REGIONAL PERFORMANCE OBJECTIVES/NATIONAL

PERFORMANCE OBJECTIVES FOR 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**	**TIIVIEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
	•			
	• establish collaborative decision making process	IQ 2009		
	• develop needs assessment and gap analysis	1Q 2009		
	• develop Southern African regional action plan	1Q 2009		
	• conduct regional SAR Administrators training and	1Q 2009		
	• determine regional organisation, functions and responsibilities, accommodation and equipment needs	2Q 2009		
	• produce draft legislation, regulations, operational procedures, letters of agreement SAR plans and safety management policies for regional SAR provision	2Q 2009		
	• determine future training needs and develop training plans	2Q 2009		
	• 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	3Q 2009		

	• conduct training as required	3Q 2009		
	• conduct SAR exercises	3Q 2009		
	• monitor implementation	as appropriate		
linkage to GPIs	N/A			

Notes:

1. The above work plan requires to be duplicated for NW Africa, Eastern Africa, Western Africa (Lagos) and Western Africa (Liberia) in turn. The timing of work in these regions will be dependent on operational, demographic, financial and social factors which, presently, are indeterminate. The nature and duration of the planning and implementation activity for each sub-regional RCC is considered to be in the same order of the Southern African plan detailed above.

2. All work requires close cooperation with all States affected, ICAO, IMO, Cospas-Sarsat and other worldwide bodies as required.

APPENDIX B6

ATM PERFORMANCE OBJECTIVES

ELIMINATION OF IDENTIFIED ATM DEFICIENCIES (provision of ATC service and implementation of ATS routes including RNAV routes, joint use of airspace)				
Benefits				
Environment **Efficiency** **Safety**	• reductions in fuel consumption • ability of aircraft to conduct flight more closely to preferred trajectories • enhance safety by wider distribution of aircraft in a given airspace • enhanced safety management			
Strategy **Short term (2010)** ***Medium term (2011 - 20015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	• implementation and provision of ATC service along ATS routes UA618, UB525, UB607, UL612, UM220, UM365, UR400 (Khartoum FIR) and UR780 (Mogadishu FIR), in the Table ATS 1 – Basic ANP, Doc 7474 and the provision of ATC service at terminal area of Mogadishu International Airport	2008 – 2009		
	• elimination and/or removal of special use airspaces (prohibited restricted and danger areas)	2008 – 2009		
	• State develop an implementation action plan to eliminate/or reduce these deficiencies	2008 – 2009		
linkage to GPIs	GPI/1: Flexible use of airspace; GPI/7: Dynamic and flexible ATS route management; GPI/8: Collaborative airspace design and management; GPI/10: Terminal area design and management			

APPENDIX B7

SEARCH AND RESCUE (SAR) PERFORMANCE OBJECTIVES

ELIMINATION OF IDENTIFIED SAR DEFICIENCIES (SAR legislation, SAR agreements and SAR ELT)				
Benefits				
Efficiency **Safety**	• efficiency in the conduct of SAR service • effective and timely assistance by all participating emergency response agencies • safety of life			
Strategy **Short term (2010)** ***Medium term (2011 - 20015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
SAR service	• review deficiencies in the provision of effective SAR and rescue service	2008 – 2009		
	• review deficiencies concerning implementation of SAR legislation	2008 – 2009		
	• review deficiencies concerning implementation of SAR agreements with assisting SAR organizations	2008 – 2009		
	• review deficiencies concerning implementation of COSPAS SARSAT ELT 406 MHz	February 2009		
	• develop State action plan to eliminate and/or reduce these deficiencies	2009		
linkage to GPIs	GPI/16: Decision support and alerting service			

In addition to the above long standing deficiencies, supplementary data has become available to the normal deficiency identification process by virtue of the ICAO/AFCAC SAR Project in the AFI region that was conducted from 2002 through 2007. In all, thirty-four African States were evaluated by the project.

APPENDIX B8

AIS/MAP PERFORMANCE OBJECTIVES

<table>
<tr><td colspan="5">ELIMINATION OF AIS/MAP DEFICIENCIES
(implementation of WGS-84 coordinates, publication of aeronautical charts and timely publication and updating of AIS/MAP documents, i.e. NOTAMs, AIPs, AICs, etc.)</td></tr>
<tr><td colspan="5">Benefits</td></tr>
<tr><td>Efficiency</td><td colspan="4">• improved collaborative decision-making through sharing aeronautical data information</td></tr>
<tr><td>Safety</td><td colspan="4">• enhance safety by timely exchange air safety data, i.e. electronically and wider distribution of such data</td></tr>
<tr><td colspan="5">Strategy
Short term (2010)
Medium term (2011 - 20015)</td></tr>
<tr><td>ATM OC COMPONENTS</td><td>TASKS</td><td>TIMEFRAME START-END</td><td>RESPONSIBILITY</td><td>STATUS</td></tr>
<tr><td rowspan="4">AIS/MAP</td><td>• publication of relevant aeronautical charts</td><td>2008 – 2009</td><td></td><td></td></tr>
<tr><td>• publication of WGS-84 coordinates for en-route waypoints and use for GNSS coordinates for terminal approaches and departure procedures</td><td>2008 – 2009</td><td></td><td></td></tr>
<tr><td>• publication of AIPs, NOTAMs and AICs using standards formats</td><td></td><td></td><td></td></tr>
<tr><td>• States concerned to develop action plan to eliminate the deficiencies</td><td>2008 – 2009</td><td></td><td></td></tr>
<tr><td>linkage to GPIs</td><td colspan="4">GPI/18: Aeronautical information; GPI/20: WGS-84</td></tr>
</table>

— END —

APPENIDX C1
FOLLOW-UP OF APIRG/16 CONCLUSIONS AND DECISIONS RELATING TO ATS, AIS AND SAR

Conc/Dec No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Status	Remarks
Concl. 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.	wacaf eccairs held in 2007	wacaf eccairs workshop held 10-14 Dec.2007
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.	completed	
Concl.16/3 **A**	DEVELOPMENT OF STATES 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.	ongoing	**Concl. still valid**
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.	ongoing	**Concl. still valid**

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 Assembly Resolution A36-11 and the Standards of Annex 1, Annex 6, Annex 10 and Annex 11 in response to the ICAO State Letter AN 12/44.6-07/68 dated 26 October 2007; 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.	ongoing	**Concl. still valid**
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 relevant adjacent SAM PIRGs and their auxiliary bodies.	continuous	**Concl. still valid**
Concl. 16/33 **A**	FANS 1/A OPERATIONAL MANUAL FOR APPLICATION IN THE AFI REGION	That : a) The FANS 1/A Operational Manual for application in the AFI Region at **Appendix E** be applied in the AFI Region; and B) South Africa manages the Fans 1/A Operational Manual for the AFI Region.	continuous	South Africa manages the Fans 1/A 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**.	completed	
Dec. 16/35 **A**	RENAMING THE APIRG/RVSM/RNAV/RNP/TF	That the existing APIRG RVSM/RNAV/RNP Task Force shall be re- named the APIRG RVSM Task Force with the revised Terms of Reference at **Appendix F** to this report.	completed	
Concl. 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.	ongoing	**Concl. still valid** with respect to RVSM post implementation actions
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.	completed	
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 3 July 2008.	ongoing	**Concl. still valid :** severe deficiencies reported in some areas
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 25 September 2008.	completed	

Concl. 16/40 **A**	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.	*on-going*	This activity is being implemented by the HQ AIS-AIM Sub-Group under the Guidance of C/AINF at ICAO HQ.
Concl. 16/41 **A**	THE FRAMEWORK AND GUIDANCE MATERIAL FOR THE ESTABLISHMENT OF 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.	Completed	
Concl. 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.	ongoing	**Conclusion Still valid**
Concl. 16/43 **D**	SEMINARS/WORKSHOPS ON THE PROVISION OF ELECTRONIC TERRAIN AND OBSTACLE DATA	That ICAO organize seminars/workshops on the provision of Digital Electronic Terrain and Obstacle Data in accordance with the new provisions in Annex 15.	ongoing	**Conclusion Still valid**
Concl. 16/44 **A**	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.	ongoing	**Conclusion Still valid**
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 3 July 008 in the spirit of AFI/7 Rec. 5/21.	completed	AFI/7 Rec.5/21 implemented as for ATC; **Conclusion Still valid for ATS routes**

Concl. 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.	ongoing	**Conclusion Still valid**
Concl. 16/47 **A & 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.	ongoing	**Conclusion Still valid**
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.	ongoing	**Conclusion Still valid**
Dec. 16/69 **D**	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 to the AIS/MAP Task Force.	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

STATUS OF IMPLEMENTATION OF CONCLUSIONS AND DECISIONS OF THE NINTH MEETING OF THE ATS/AIS/SAR SUB-GROUP (ATS/AIS/SAR/SG/9)

Number	Title	
Conclusion 9/1	**Follow up on Previous APIRG Conclusions and Decisions.** That, noting that APIRG Conclusions 15/23,15/28, 15/29, 15/30, 15/31, 15/32, 15/53,15/54,15/55,15/56, 15/57, 15/58, 15/59, 15/60 , 15/61, 15/62, 15/64,15/66,15/67,15/68,15/69, 15/70, 15/71, 15/72, 15/73 and 15/74, Decisions 15/65, 15/76, 15/79, and 15/80, on ATS; Conclusions 15/48,15/49 and 15/50 on SAR and AIS/MAP Conclusions 15/33,15/34, 15/35, 15/36,15/37,15/38,15/39, 15/40,15/41, 15/42 an 15/44 were still valid, ICAO undertake follow up action with the States on the intent of these Conclusions and Decisions.	**All these conclusions are followed by APIRG**
Conclusion 9/2:	**FANS 1/A Operational Manual for application in the AFI Region** **That** a) the FANS 1/A Operational Manual at appendix B be applied in the AFI Region; and b) South Africa manages the FANS 1/A Operational Manual for the AFI Region	**endorsed by APIRG 16 (concl. 16/33); completed**
Conclusion 9/3	**Target date for AFI RVSM Implementation** **That:** a) The actual date/time of implementation of RVSM will be determined taking into account: i) The completion of the activities in the AFI RVSM Strategy/Action Plan; ii) The development of an acceptable PISC which includes an acceptable CRA and its subsequent approval by the ANC; iii) The approval by ICAO ANC of AFI RVSM Regional SUPP's (Doc.7030/4) relating to RVSM; and	**completed**

	b) The target date for implementation of RVSM in the AFI Region will be determined by the Task Force, after the second CRA, which is to be undertaken, and the completion of the other outstanding elements of the PISC.	
Conclusion 9/4:	**Completion and signing of National Safety Plans** That States of Central African Republic, Comoros, Equatorial Guinea, Gabon, Guinea Bissau, La Reunion (France), Mozambique, Sao Tome and Principe, South Africa, Swaziland, and Togo complete and sign their National Safety Plans (NSPs) and send them to ARPO as soon as possible but not later than **01 August, 2007**.	**completed**
Conclusion 9/5	**AFI RVSM Implementation – Funding** That IATA member airlines continue to finance within the available funds specific projects relating to the RVSM implementation effort in order to improve safety and economy of Air Traffic in AFI Region and keep the Task Force informed accordingly.	**endorsed by APIRG 16 (concl. 16/36); completed**
Conclusion 9/6:	**Amendment to the Regional Supplementary Procedures – Doc 7030/4** That the revised proposed amendments to the Regional Supplementary Procedures-Doc 7030/4 at **Appendix C** be processed by the secretariat in accordance with the established practice.	**completed**
Conclusion 9/7:	**AFI RVSM Strategy/Action Plan** That the updated AFI RVSM Strategy/Action Plan at **Appendix D** be circulated to States for action.	**endorsed by APIRG 16(concl. 16/37); completed**
Conclusion 9/8	**Non Receipt of Flight Plans** **That:** a) the Project Management Team develop the format and contents of a survey to identify the reasons and causes for missing flight plans and,. b) ICAO, using the methodology developed by the PMT and as early as possible but not later than **1 August 2007**, send the survey relating to missing flight plans and propose remedial action	**Action completed. But missing flight plans is still an issue in the region**

Conclusion 9/9	**Quality, Infrastructure and Status of AIS Personnel** That States take necessary action to ensure that: a) AIS is accorded a status commensurate with the current technological developments requiring high calibre and skilled personnel; b) Personnel recruited for AIS receive adequate professional training; c) Such personnel are accorded same status as that of personnel of other air navigation services; and d) Adequate facilities and funds needed for the efficient performance of AIS duties and priorities are provided as contained in the AIS manual.	**Still valid**
Conclusion 9/10	**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 introduction of the basic requirements for States to consider the licensing issue of their AIS personnel; and b) ICAO develop AIS training guidance material relating to the implementation of CNS/ATM system.	**endorsed by APIRG 16 (conc.16/40); Still valid**
Conclusion 9/11 :	**Adoption of the framework and guidance material for the establishment of AFI-CAD** That the framework and guidance material at **Appendix E b**e adopted for the AFI Region for the establishment of the centralized AFI Region AIS Database	**endorsed by APIRG 16 (concl. 16/41); completed**
Conclusion 9/12:	**Development of AFI CAD Business Model and Financial Model** That the Study Group develops a business model and financial model for the AFI CAD.	**endorsed by APIRG 16 (concl. 16/42); completed**
Conclusion 9/13	**Seminars/Workshops on the provision of Digital Electronic Terrain and Obstacle Data.** That ICAO organise Seminars/Workshops on the provision of Digital Electronic Terrain and Obstacle Data in accordance with the new provisions in Annex 15 not later than **31 December 2007**	**endorsed by APIRG 16(concl. 16/43); ; completed**
Conclusion 9/14 :	**Membership of Roberts FIR and Senegal to the AFI AIS/MAP Task Force**. That the Roberts FIR and Senegal be admitted as members of the AFI AIS/MAP Task Force.	**completed**

Conclusion 9/15	.**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 **20 November 2008** in the spirit of AFI/7 Rec.5/21.	**endorsed by APIRG 16 (concl. 16/45); AFI/7 Rec.5/21 implemented as for ATC; Conclusion Still valid for ATS routes**
Conclusion 9/16	**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 25 October 2007.	**endorsed by APIRG 16 (concl. 16/38);** **completed**
Conclusion 9 /17:	**Implementation of the non-implemented routes including RNAV routes and ATC Service** That States concerned implement the ATS routes at **Appendix F** and provide ATC service (a prerequisite for RVSM implementation), as soon as possible, but not later than AIRAC date of **25 October 2007**.	**endorsed by APIRG 16 (concl. 16/39) Conclusion Still valid for ATS routes**
Conclusion 9/18:	**Consequential Amendment to AFI ANP Doc.7474- Table ATS 1** That the meeting Table ATS 1-Doc 7474 be replaced with the Table ATS 1 at **Appendix G** to this report;	**completed**
Conclusion 9/19:	**Consideration of specific air navigation planning and implementation problems and the review of air navigation deficiencies in the Region** **That**: Considering the negative impact of non implementation of the air navigation plan requirements and the persistence of serious cases of deficiencies in several parts of the AFI region; a) States concerned should take as soon as possible concrete measures to eliminate all deficiencies at **Appendix H** to this report. b) the matter be regularly followed up by the ICAO regional offices; and **c)** results be brought to the attention of APIRG.	**Conclusion Still valid**

Conclusion 9/20:	**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 **Appendix I.**	**endorsed by APIRG 16 (concl. 16/34); completed**
Decision 9/1:	**Alternative approach for the achievement of the TLS** That the RVSM TF noted the proposed alternative approach for the achievement of the TLS and that certain elements of this proposal would be considered by the PMT in conjunction with the result of the PISC, incorporating the second CRA and subsequently report it to TF.	**completed**
Decision 9/2	**Target for the implementation of RVSM** That the Task Force, in light of APIRG Conclusion 15/32 give high priority to determine the target date for implementation of RVSM and report same to APIRG.	**endorsed by APIRG 16 (concl. 16/35); completed**

Appendix D

15.2.4 Procedures for strategic lateral offsets in oceanic and remote continental airspace (Doc 4444- PANS-ATM)

Note 1.— *Annex 2, 3.6.2.1.1, requires authorization for the application of strategic lateral offsets from the appropriate ATS authority responsible for the airspace concerned.*

Note 2.— *The following incorporates lateral offset procedures for both the mitigation of the increasing lateral overlap probability due to increased navigation accuracy, and wake turbulence encounters.*

Note 3.— *The use of highly accurate navigation systems (such as the global navigation satellite system (GNSS)) by an increasing proportion of the aircraft population has had the effect of reducing the magnitude of lateral deviations from the route centre line and, consequently, increasing the probability of a collision, should a loss of vertical separation between aircraft on the same route occur.*

15.2.4.1 The following shall be taken into account by the appropriate ATS authority when authorizing the use of strategic lateral offsets in a particular airspace:

a) strategic lateral offsets shall only be authorized in en-route oceanic or remote continental airspace. Where part of the airspace in question is provided with an ATS surveillance service, transiting aircraft should normally be allowed to initiate or continue offset tracking;

Table 15-1

Route centre line track	*Deviations* *> 19 km (10 NM)*	*Level change*
EAST 000° – 179° magnetic	LEFT RIGHT	DESCEND 90 m (300 ft) CLIMB 90 m (300 ft)
WEST 180° – 359° magnetic	LEFT RIGHT	CLIMB 90 m (300 ft) DESCEND 90 m (300 ft)

b) Strategic lateral offsets may be authorized for the following types of routes (including where routes or route systems intersect):

1) Uni-directional and bi-directional routes; and

2) Parallel route systems where the spacing between route centre lines is not less than 55.5km (30 NM).

c) in some instances it may be necessary to impose restrictions on the use of strategic lateral offsets, e.g. where their application may be inappropriate for reasons related to obstacle clearance;

d) strategic lateral offset procedures should be implemented on a regional basis after coordination between all States involved;

e) the routes or airspace where application of strategic lateral offsets is authorized, and the procedures to be followed by pilots, shall be promulgated in aeronautical information publications (AIPs); and

f) air traffic controllers shall be made aware of the airspace within which strategic lateral offsets are authorized.

15.2.4.1.1 The decision to apply a strategic lateral offset shall be the responsibility of the flight crew. The flight crew shall only apply strategic lateral offsets in airspace where such offsets have been authorized by the appropriate ATS authority and when the aircraft is equipped with automatic offset tracking capability.

15.2.4.1.2 The strategic lateral offset shall be established at a distance of 1.85 km (1 NM) or 3.7 km (2 NM) to the right of the centre line relative to the direction of flight.

Note 1.— Pilots may contact other aircraft on the inter-pilot air-to-air frequency 123.45 MHz to coordinate offsets.

Note 2.— The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, one of the three available options (centre line, 1.85 km (1 NM) or 3.7 km (2 NM) right offset) may be used.

Note 3.— Pilots are not required to inform ATC that a strategic lateral offset is being applied.

APPENDIX E

I -DRAFT TERMS OF REFERENCE

ARMA SCRUTINY GROUP

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.*

Scope: To continually evaluate and reduce the incidence of Large Height Deviations in the AFI Region

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.

Terms of Reference:

1. Assemble RVSM experts once annually to achieve the objective of the Scrutiny Group.

2. Analyze Large Height Deviations of 300FT or more occurring in AFI Region airspace.

3. Carry out the elementary mathematical analysis.

4 Identify any other problems associated with RVSM operations that are identified during the course of the analysis.

5 Recommend remedial actions and propose procedures to reduce the occurrence of Large Height Deviations via NPMs.

6. ARMA to report results to the ATM/AIS/SAR Subgroup in order to contribute to safety. Efficiency and harmonization of RVSM operations in the AFI Region.

7. ARMA to report to the APIRG the results of the annual Collision Risk Assessment, which automatically contains the work of the Scrutiny Group.

8. ARMA Scrutiny Group to closely work together with the Tactical Action Group (TAG).

Composition ARMA: ASECNA; IFALPA; IFATCA; ICAO

Working Methods Meet once annually before the Collision Risk Assessment. Any further correspondence between meetings will take place via email.

APPENDIX E

II-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 F

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

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 G

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 H

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:

1) analyse E-TOD requirements and develop a common understanding of these requirements (clarify the needs in terms of data format, temporality, cross-border harmonisation and develop associated guidelines as required);

2) recommend the way forward for timely implementation of E-TOD;

3) adopt and maintain an AFI Region E-TOD implementation strategy;

4) guide the development and support the roll-out of an awareness campaign for E-TOD implementation within AFI States;

5) carry out a theoretical study of candidates techniques for electronic Terrain and Obstacle Data acquisition including a cost benefit analysis;

6) develop an AFI Region business case for E-TOD implementation;

7) carry out a study case for a representative aerodrome from the AFI Region;

8) assist States in the development of mandate/policy pertaining to the implementation of E-TOD requirements;

9) develop an action plan for the implementation of E-TOD requirements in the AFI Region;

10) monitor the cost-effectiveness and timely implementation of E-TOD requirements in the AFI Region;

11) monitor and review latest developments pertaining to E-TOD; and

12) develop its work program within the scope of its Terms of Reference

B) COMPOSITION

The AFI Region E-TOD Working Group will be composed of Experts nominated by the AFI Region States and ANSP that participated in the AFI Region E-TOD Seminar with the State of Morocco being the Rapporteur. 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/MAP 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/MAP Task Force Secretariat based on the need to address AIS/MAP deficiencies in the AFI Region.

APPENDIX I

Terms of reference of National Performance-Based Navigation (PBN) Programme Managers

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, focussing 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.

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 defence; and
   h) Other relevant bodies.

3) Particpate in, coordinate and provide support to, APIRG PBN Implementation Task Force meetings and assigned tasks..

AFI REGION

Performance Based Navigation Roadmap

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1. INTRODUCTION

1.1 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

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 AFI Region PBN Roadmap.

5.2 The stakeholders who will benefit from the concepts in the AFI Region PBN Roadmap 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 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.

5.3 The AFI Region PBN Roadmap also supports other CAA and government-wide planning processes, working on several fronts to address the needs of the aviation community. This Roadmap 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 Roadmap 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.

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 Roadmap, 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.

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
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 Baro-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 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.

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. MID TERM IMPLEMENTATION TARGETS

a) RNP APCH (with Baro-VNAV) or APV 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

24. 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	

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 Roadmap will help answer some of these questions. The aviation community will address others through further concept development, analysis, modelling, 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

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.

Table of contents

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)

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Appendix L

PROPOSED TERMS OF REFERENCE FOR COMBINED APIRG 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 study, 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

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/Baro-VNAV).

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; and;

l) Report to APIRG through its ATM and CNS Sub-groups.

3. 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.

Appendix M

Short – Term and Mid – Term Navigation Specifications

Short – Term (2008-2012) Navigation Specifications		
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	

Mid – Term (2013-2016) Navigation Specifications		
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	

Appendix N

APIRG 16 REPORT

IMPLEMENTATION OF NON-IMPLEMENTED ROUTES INCLUDING RNAV ROUTES

Route Designator	Segment(s)	States	Observations/Remarks
UA618	Lumbumbashi Bukavu SAGBU Malatal	DRC Sudan	
UB525	Addis Ababa Luxor	Ethiopia Sudan	
UB527	Malakal Kenana	Sudan	Implemented at variance with AFI Plan via Kenana
UB607	Goma El Obeid New Valley El Dhaba	Sudan	
UG424	Dar-es-Salaam Lubumbashi	Tanzania	
UL612	Goma El Dhaba	DR. Congo Sudan Egypt	Egypt can accept implementation via ATMUL New Valley/KATAB/DBA
UM220	Lodwar Abu Simbel	Sudan	RNAV
UM365	Geneina Port Sudan	Sudan	RNAV
UM665	Addis Ababa Merowe	Sudan	
UR400	Abu Simbel Kassala	Sudan	

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Appendix O

Implementation of Direct Transitions to/from AORRA Airspace

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Abidjan FIS/Roberts/Dakar Oceanic FIRs

ABJ - Direct - N00 00/W009 00
ABJ - Direct - N00 00/W010 00
ABJ - Direct - N00 00/W011 00
ABJ - Direct - N00 00/W012 00
ABJ - Direct - N00 00/W013 00

Accra FIR/Abidjan FIS

ACC - Direct - N00 00/W004 00
ACC - Direct - N00 00/W005 00
ACC - Direct - N00 00/W006 00
ACC - Direct - N00 00/W007 00

Accra FIR

EBULI - Direct - N00 00/E005 00 (Need a Sao Tomo Exit WPT) EBULI - Direct - N00 00/E004 00 EBULI - Direct - N00 00/E003 00 EBULI - Direct - N00 00/E002 00 EBULI - Direct - N00 00/E001 00 EBULI - Direct - N00 00/E000 00

Brazzaville/Accra FIRs

DLA - Direct - GEBRO - Direct - EBULI
DLA - Direct - RITIL - Direct - N00 00/E005 00 (Need a Sao Tome Exit WPT)

Dakar Oceanic FIR

TUROT - SIBAX - N00 00/W017 03 59.5284
TUROT - Direct - N00 00/W018 04 44.5132 (Airway UL435) TUROT - Direct - N00 00/W019 00 TUROT - Direct - N00 00/W020 00 TUROT - Direct - N00 00/W020 59 43.5284 (Airway UA572)

Luanda FIR

MUNDA - Direct - S06 00/E010 24
MUNDA - Direct - S07 00/E011 00
MTI - Direct - S07 00/E011 00
MTI - Direct - NATAR - Direct - OPAPO
BUDEL - Direct - IMLEX - Direct - S09 00/E011 13 VNA - Direct - S09 00/E011 13 VNA - Direct - S11 00/E011 24

Roberts/Dakar Oceanic FIRs

ROB - Direct - N00 00/W013 00
ROB - Direct - N00 00/W014 00
ROB - Direct - N00 00/W015 00
ROB - Direct - N00 00/W016 00
ROB - Direct - N00 00/W018 00
ROB - Direct - N00 00/W019 00
ROB - Direct - N00 00/W020 00

ATM Deficiencies

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
									A
Algeria	AFI/7 Rec.5/21	FIR Algiers	Non-implementation of ATC in the upper airspace in the South area (prevision of implementation in 2006).					31/12/09	U
Angola	APIRG/13 Conclusion 13/43	Luanda FIR	Non-provision of 10 minutes longitudinal separation	1998			Angola	31/12/09	
Benin	This State has no deficiency in this field.								
Botswana	This State has no deficiency in this field.								
Burkina Faso	This State has no deficiency in this field.								
Burundi	This State has no deficiency in this field.								
Cameroon	This State has no deficiency in this field.								

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
Cape Verde	This State has no deficiency in this field.								
Central African Republic	This State has no deficiency in this field.								
Chad	This State has no deficiency in this field.								
Comoros	This State has no deficiency in this field.								
Congo	LIM AFI Rec.10/38	SSR Provision of effective surveillance.	Need for SSR surveillance in extended TMA as expressed in the AFI CNS/ATM Plan.	1998	Traffic density/complexity contributing to frequent ATS incidents	Implement SSR at Brazzaville	Congo	31/12/09	U
Côte d'Ivoire	This State has no deficiency in this field.								
Dem. Rep. of Congo	AFI/7 Rec.5/21	FIR Kinshasa	Non-provision of ATC service.	-	-	-	-	31/12/09	U
	APIRG/13 Conc.13/43	FIR Kinshasa	Non-implementation of 10 minute longitudinal separation.	-	-	-	-	31/12/09	U
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	RNAV UL612	Goma-EL Dhaba (Paleohora)	1995	Aircraft subjected to fly non-economical routes.	States concerned to coordinate common implementation dates.	Congo (DRC)-Egypt - Sudan	31/12/09	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
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	RNAV UL612	Goma-El Dhaba(Paleohora)	1995	Aircraft subjected to fly non-economical routes.	States concerned to coordinate common implementation dates.	Congo (DRC)-Egypt-Sudan	31/12/09	A
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	UB 527	Lubunbashi – Daras Salam	2001	Aircraft subjected to fly non-economical routes.	States concerned to coordinate a common implementation date.	D. R. Congo - Tanzania	31/12/09	
Djibouti	This State has no deficiency in this field.								
Egypt	This State has no deficiency in this field.								
Equatorial Guinea	This State has no deficiency in this field.								
Eritrea	This State has no deficiency in this field.								
Ethiopia	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Route UB525	Addis Ababa-ALEBA-Luxor	1996	Aircraft subjected to fly non-economical routes.	States concerned to coordinate common implementation dates.	Eritrea	1/9/2009	A
France (Réunion)	This State has no deficiency in this field.								
Gabon	This State has no deficiency in this field.								

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
Gambia	This State has no deficiency in this field.								
Ghana	This State has no deficiency in this field.								
Guinea	This State has no deficiency in this field.								
Guinea Bissau	This State has no deficiency in this field.								
Kenya	AFI/7 Rec.5/1 - Airspace management	P2, R10, D20	Prohibited area, restricted area, danger area.	1990	Non-availability of direct routing.	Withdraw these areas.	Kenya	31/12/09	A
Lesotho	This State has no deficiency in this field.								
Liberia	This State has no deficiency in this field.								
Libya	This State has no deficiency in this field.								
Madagascar	This State has no deficiency in this field.								

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
Malawi	This State has no deficiency in this field.								
Mali	This State has no deficiency in this field.								
Mauritania	This State has no deficiency in this field.								
Mauritius	This State has no deficiency in this field.								
Morocco	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Airspace Management	Problems associated with non flight level allocations on ATS routes.	1998	Non-standard flight level allocations contributed to ATS incidents	States concerned to meet and address issues under column 3.	Morocco-Portugal	31/12/09	U
Mozambique	This State has no deficiency in this field.								
Namibia	This State has no deficiency in this field								
Niger	This State has no deficiency in this field.								
Nigeria	This State has no deficiency in this field								

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
Rwanda	This State has no deficiency in this field.								
Sao Tome & Principe	This State has no deficiency in this field.								
Senegal	This State has no deficiency in this field.								
Seychelles	This State has no deficiency in this field.								
Sierra Leone	This State has no deficiency in this field.								
Somalia	AFI/7 Rec.5/21	Provision of ATC 150 NM concept.	Non-provision of ATC service 150 NM of Mogadishu.	1994	Delayed descent for arrival and steep climb for departure.	No action due to the present situation	Somalia	31/12/09	U
South Africa	This State has no deficiency in this field.								
Spain (Canary Is.)	This State has no deficiency in this field.								
Sudan	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Route UR400	A. Simbel-Kassala	1994	Aircraft subjected to fly non-economical routes.	Not acceptable now within Khartoum FIR.	Sudan	31/12/09	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
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	RNAV UM665	Addis Ababa-Merowe	1994	Aircraft subjected to fly non-economical routes.	Not acceptable in Khartoum FIR due to military reasons.	Sudan	17/02/09	A
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	RNAV UL612	Goma-El Dhaba	1994	Aircraft subjected to fly non-economical routes.	Overlaps UB607 need to review alignment at appropriate forum.	Sudan	17/02/09	A
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Route UB607	Goma-El Obeid-New Valley-El Dabha	1994	Aircraft subjected to fly non-economical routes.	States concerned to coordinate common implementation dates.	Sudan	17/02/09	A
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Route UB525	Addis Ababa-Luxor	1994	Aircraft subjected to fly non-economical routes.	Not acceptable now in Khartoum FIR.	Sudan	17/02/09	A
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Route UA618	Bukavu-Malakal	1994	Aircraft subjected to fly non-economical routes.	Not available now in Khartoum FIR.	Sudan	17/02/09	A
	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP Doc.7474.	Provision of ATS	Area control service not provided to most ATS routes in the upper airspace.	1998	Aircraft subjected to fly non-economical routes.	State to expedite implementation process.	Sudan	17/02/09	A
Swaziland	AFI/7 Rec.5/1	P4 - Airspace Management	Prohibited area	1990	Non-availability of direct routings.	Withdraw this area - P4.	Swaziland	31/12/09	A
Tanzania	AFI/7 Rec.5/8 and Table ATS 1 AFI ANP	UB527	Lubumbashi - Dar-es-Salaam	2001	Aircraft subjected to fly non-economical	Tanzania is coordinating with the States for a common implementation	D. R. Congo - Tanzania	31/12/09	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
	Doc.7474.				routes.	date.			
Togo	This State has no deficiency in this field.								
Tunisia	This State has no deficiency in this field.								
Uganda	This State has no deficiency in this field.								
Zambia	This State has no deficiency in this field.								
Zimbabwe	This State has no deficiency in this field.								

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SAR Deficiencies

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	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Algeria and adjacent States	31/12/09	A
Angola	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Angola and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Angola	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Angola	31/12/09	A
Benin	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Benin and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Benin	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Benin	31/12/09	A
Botswana	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Botswana and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Botswana	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Botswana	31/12/0	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
Burkina Faso	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Burkina Faso and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Burkina Faso	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Burkina Faso	31/12/09	A
Burundi	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency	Establish SAR legislation	Burundi	31/12/09	A
	Annex 12, 2.4, Annex 12, 3.2.4: AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Coordinate with States concerned.	Burundi and Adjacent States.		
Cameroon	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Cameroon and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Cameroon	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Cameroon	31/12/09	A
Cape Verde	This State has no deficiency in this field.								
Central African Republic	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	CAR and adjacent States	31/12/09	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
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	CAR	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	CAR	31/12/09	A
Chad	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Chad and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Chad	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Chad	31/12/09	A
Comoros	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Comoros and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Comoros	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Comoros	31/12/09	A
Congo	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Congo and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Congo	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Congo	31/12/09	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
Côte d'Ivoire	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Cote d'Ivoire and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Cote d'Ivoire	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Cote d'Ivoire	31/12/09	A
Dem. Rep. of Congo	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	DRC and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	DRC	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	DRC	31/12/09	A
Djibouti	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Djibouti and adjacent States	31/12/09	A
	Annex 12, 2.4, Annex 12, 3.2.4, AFI/7 Rec. 6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	I) Provide SPOC to ICAO: ii) Implement 406 MHz acft.	Djibouti	31/12/09	A
	Annex 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Djibouti	31/12/09	A
Egypt	This State has no deficiency in this field.								

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
Equatorial Guinea	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Equatorial Guinea and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Equatorial Guinea	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Equatorial Guinea	31/12/09	A
Eritrea	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	Establish SAR agreements	1995	Delay to conduct SAR OPS	Coordination with States concerned	Eritrea and adjacent States	31/12/09	A
	Annex 12, 3.1.6, 3.1.7	SAR Legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR	Establish SAR Agreements	Eritrea	31/12/09	A
Ethiopia	Annex 12, 3.1.5, AFI/7 Conc.6/3.	SAR Agreements	-	1995	Delay to conduct SAR/OPS	Coordinate with States concerned.	Ethiopia and adjacent States	31/12/09	A
France (Réunion)	This State has no deficiency in this field.								
Gabon	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Gabon and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Gabon	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Gabon	31/12/09	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
Gambia	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Gambia and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Gambia	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Gambia	31/12/09	A
Ghana	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Ghana and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Ghana	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Ghana	31/12/09	A
Guinea	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Guinea and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Guinea	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Guinea	31/12/09	A
Guinea Bissau	This State has no deficiency in this field.								
Kenya	Annex 12, 2.4, Annex 12, 3.2.4, AFI/7 Rec. 6/1 and 6/2	SARSAT ELT	406 MHz and 121.5 Mhz not implemented	1993	Delay to conduct SAR OPS	121.5 Mhz implemented. 406 MHz not Implemented.	Kenya	31/12/09	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
	Annex 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR Authority	1995	Lack of legal authority could delay SAR efficiency.	Development of draft legislation is on going	Kenya	31/12/09	A
	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1996	Delay to conduct SAR OPS	Signed with EAC States only. To coordinate with other neighbouring States concerned outside EAC.	Kenya and adjacent States	31/12/09	A
Lesotho	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Lesotho and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Lesotho	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Lesotho	31/12/09	A
Liberia	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Liberia and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Liberia	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Liberia	31/12/09	A
Libya	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Libya and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Libya	31/12/09	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
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Libya	31/12/09	A
Madagascar	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Madagascar adjacent States	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Madagascar	31/12/09	A
Malawi	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Malawi and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Malawi	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Malawi	31/12/09	A
Mali	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Mali and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Mali	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Mali	31/12/09	A
Mauritania	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Mauritania and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Mauritania	31/12/09	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
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Mauritania	31/12/09	A
Mauritius	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Mauritius and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Mauritius	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Mauritius	31/12/09	A
Morocco	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Morocco and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Morocco	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Morocco	31/12/09	A
Mozambique	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Mozambique and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Mozambique	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Mozambique	31/12/09	A
Namibia	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Namibia and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to	Namibia	31/12/09	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
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	ICAO Establish SAR legislation	Namibia	31/12/09	A
Niger	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Niger and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Niger	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Niger	31/12/09	A
Nigeria	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Nigeria and adjacent States	31/12/09	A
Rwanda	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Rwanda and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Rwanda	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Rwanda	31/12/09	A
Sao Tome & Principe	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Sao Tome &Principe and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Sao Tome &Pricipe	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Sao Tome &Principe	31/12/09	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
Senegal	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Senegal and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Senegal	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Senegal	31/12/09	A
Seychelles	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Seychelles and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Seychelles	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Seychelles	31/12/09	A
Sierra Leone	This State has no deficiency in this field.								
Somalia	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Somalia and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Somalia	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Somalia	31/12/09	A
South Africa	This State has no deficiency in this field.								
Spain (Canary Is.)	This State has no deficiency in this field.								

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
Sudan	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Sudan and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Sudan	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Sudan	31/12/09	A
Swaziland	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Swaziland and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Swaziland	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Swaziland	31/12/09	A
Tanzania	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Tanzania and adjacent States	31/12/09	A
Togo	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Togo and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Togo	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Togo	31/12/09	A
Tunisia	This State has no deficiency in this field.								

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
Uganda	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Uganda and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Uganda	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Uganda	31/12/09	A
Zambia	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Zambia adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Zambia	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Zambia	31/12/09	A
Zimbabwe	Annex 12, 3.1.5, AFI/7 Conc.6/3	SAR Agreements	-	1991	Delay to conduct SAR OPS	Coordinate with States concerned	Zimbabwe and adjacent States	31/12/09	A
	Annexe 12, 2.4, Annexe 12, 3.2.4, AFI/7 Rec.6/1 and 6/2	SARSAT ELT	406 MHz	1993	Delay to conduct SAR OPS	Implement 406 MHz in acft. – Provide SPOC to ICAO	Zimbabwe	31/12/09	A
	Annexe 12, 3.1.6, 3.1.7	SAR legislation	Provide legal framework for the SAR authority	1995	Lack of legal authority could delay SAR efficiency.	Establish SAR legislation	Zimbabwe	31/12/09	A

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AIS Deficiencies

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	This State has no deficiency in this field.								
Angola	This State has no deficiency in this field.								
Benin	This State has no deficiency in this field.								
Botswana	This State has no deficiency in this field.								
Burkina Faso	This State has no deficiency in this field.								
Burundi	This State has no deficiency in this field.								
Cameroon	This State has no deficiency in this field.								
Cape Verde	This State has no deficiency in this field.								
Central African Republic	This State has no deficiency in this field.								
Chad	This State has no deficiency in this field.								

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
Comoros	This State has no deficiency in this field.								
Congo	This State has no deficiency in this field.								
Côte d'Ivoire	This State has no deficiency in this field.								
Dem. Rep. of Congo	Annex 4, 13.2 and AFI/7, Rec.12/31	ICAO Mandatory Charts	Aerodrome Charts outdated	1990	Non-updated charts affects safety	Publish new charts. IAC and VAC charts published.	Congo (DRC)	31/12/07	U
Djibouti	This State has no deficiency in this field.								
Egypt	This State has no deficiency in this field.								
Equatorial Guinea	This State has no deficiency in this field.								
Eritrea	This State has no deficiency in this field.								
Ethiopia	This State has no deficiency in this field.								
France (Réunion)	This State has no deficiency in this field.								
Gabon	This State has no deficiency in this field.								

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*
Ghana	Annex 15, 3.3	Integrated AIS package		01/01/98	Non-availability of latest status of information.	Distribute regularly	Gambia	31/12/04	U
Gambia	This State has no deficiency in this field.								
Guinea	This State has no deficiency in this field.								
Guinea Bissau	This State has no deficiency in this field.								
Kenya	This State has no deficiency in this field.								
Lesotho	This State has no deficiency in this field.								
Liberia	Situation unknown								
Libya	This State has no deficiency in this field.								
Madagascar	This State has no deficiency in this field.								
Malawi	This State has no deficiency in this field.								
Mali	This State has no deficiency in this field.								
Mauritania	This State has no deficiency in this field.								
Mauritius	This State has no deficiency in this field.								
Morocco	This State has no deficiency in this field.								

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
Mozambique	This State has no deficiency in this field.								
Namibia	This State has no deficiency in this field.								
Niger	This State has no deficiency in this field.								
Nigeria	This State has no deficiency in this field.								
Rwanda	This State has no deficiency in this field.								
Sao Tome & Principe	This State has no deficiency in this field.								
Senegal	This State has no deficiency in this field.								
Seychelles	This State has no deficiency in this field.								
Sierra Leone	This State has no deficiency in this field.								
Somalia	Annex 4, 3.2, 11.2 and 13.2, AFI/7 Rec.12/31	ICAO Aerodrome Chart and the ICAO Aerodrome Obstacle Chart - Type A.	Non-availability of ICAO Aerodrome Chart, ICAO Aerodrome Obstacle Chart type A and ICAO Instrument Approach Chart for Hargeisa, Kismayu, Mogadishu.	1990	Lack of these charts affects safety.	Publish the three Charts as required	Somalia	31/12/07	U
	Annex 15, 3.6.4	Coordinates WGS84	Accuracy of coordinates to be established in accordance with Annexes 11 and 14.	01/01/98	Delay in introduction of GNSS	Implementation of WGS-84 coordinates	Somalia	31/12/07	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
South Africa	This State has no deficiency in this field.								
Spain (Canary Is.)	This State has no deficiency in this field.								
Sudan	This State has no deficiency in this field.								
Swaziland	This State has no deficiency in this field.								
Tanzania	This State has no deficiency in this field.								
Togo	This State has no deficiency in this field.								
Tunisia	This State has no deficiency in this field.								
Uganda	This State has no deficiency in this field.								
Zambia	This State has no deficiency in this field.								
Zimbabwe	This State has no deficiency in this field.								
