INTERNATIONAL CIVIL AVIATION ORGANIZATION

THE AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG)

REPORT OF THE ELEVENTH MEETING OF THE AIR TRAFFIC SERVICES/AERONAUTICAL INFORMATION SERVICES/SEARCH AND RESCUE SUB-GROUP

ATS/AIS/SAR SG/11

(Nairobi, Kenya, 26 – 30 April 2010)

Approved by the Meeting
and published by authority of the Secretary General

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PART I – HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The eleventh meeting of Air Traffic Services/Aeronautical Information Services/Search and Rescue Sub-Group (ATS/AIS/SAR SG/11) was held at the United Nations compound at Gigiri, Nairobi, Kenya from 26-30 April 2010.

2. OPENING

2.1 The Meeting was opened in a joint session of the ATS/AIS/SAR Sub-Group and CNS Sub-Group by Mr. Geoffrey P Moshabesha, ICAO Regional Director Eastern and Southern African (ESAF) Office. In his opening remarks, Mr. Moshabesha welcomed all delegates to Nairobi and to the eleventh meeting. He expressed appreciation on the level of attendance and thanked States and Organizations that had made it possible for the officials to attend the meeting.

2.2 Mr. Moshabesha highlighted some of the programmes in the ATM and CNS fields which the meetings of the two Sub-Groups would be addressing, and noted that the sessions of the Sub-Groups had been planned to take place adjacently during the same week in order to facilitate necessary coordination. He drew attention of the Sub-Groups to the matter of elimination of deficiencies in the AFI Region which is one of the main challenges, and in this regard urged the Sub-Groups to recommend effective measures to eliminate the deficiencies, some of which had been identified many years ago.

2.3 Finally, Mr. Moshabesha reminded the participants that their primary role in the Sub-Groups was the interest of the AFI Region, and as such urged them to work as experts of the Sub-Groups in order to achieve Regional goals.

3. ATTENDANCE

3.1 The meeting was attended by a total of 80 participants from twenty six (26) States and six (6) organisations. The list of participants is at **Attachment A** to the Report.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by Mr. Silas Silas, Manager ANS-Operations (BCAA), Botswana. Mr. Seboseso Machobane, Regional Officer ATM/SAR ESAF Office was the Secretary of the meeting, supported by Messrs. Saulo Da Silva Technical Officer ATM ICAO HQ, Sadou Marafa Regional Officer ATM/SAR WACAF Office and Georges Baldeh Regional Officer AIS from WACAF Office.

5. LANGUAGE

5.1 Discussions were conducted in the English and French languages and documentation was also issued in the two languages.

6. AGENDA

6.1 The following Agenda was adopted:

Strategic Objective	Agenda Item No.	Subject
D	1	Adoption of Provisional Agenda and Election of the Chairperson and Vice Chairperson
A, C & D	2	Follow-up on SP AFI/8 RAN Recommendations, Conclusions and Decisions within the Framework of APIRG Relevant to the ATS/AIS/SAR Sub-Group
A & D	3	APIRG Performance Objectives
A & D	4	CNS/ATM Coordination Issues
A	5	RVSM Operations and Monitoring
A & D	6	Performance Based Navigation (PBN) and AFI ATS Route Network
A	7	ATS Safety Management Systems
A & E	8	Contingency Arrangements
A & D	9	Search and Rescue (SAR) and Civil/Military Coordination
A & D	10	Transition to New ICAO Flight Plan Content
A & D	11	AIS/MAP Issues
A, D & E	12	Review of Air Navigation Deficiencies in the ATM/AIS/MAP and SAR Fields
D	13	Sub-Group Appellation and Future Work Programme
	14	Any Other Business

7. CONCLUSIONS AND DECISIONS –

DEFINITION

7.1 All APIRG Sub-Groups and Task Forces record their actions in the form of Conclusions and Decisions with the following significance:

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

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

LIST

7.2 The list of ATS/AIS/SAR SG/11 Conclusions and Decisions, which include the reformulated ATS/AIS/SAR SG/10 Conclusions and Decisions, are at **Attachment B** to this Report.

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

1.1 The meeting reviewed the proposed agenda for the eleventh meeting of the Air Traffic Services/Aeronautical Information Services/Search and Rescue Sub-Group (ATS/AIS/SAR SG/11), copy of which had been forwarded to States and international organizations as an attachment to the invitation State Letter. The agenda was adopted as indicated in paragraph 6 of the History of the Meeting.

1.2 In accordance with established procedure within APIRG, the representative from Senegal proposed and it was accepted by the meeting, that in order to benefit from the expansive expertise in the Region, the chairmanship of the ATS/AIS/SAR Sub-Group should rotate among the sub-regions and use expertise from all parts of the AFI Region. In this regard, the Representative from Senegal nominated Mr. Silas Silas, Manager ANS-Operations, Botswana Civil Aviation Authority (BCAA) as Chairman. The nomination was seconded by the representative from Kenya. Accordingly Mr. Silas Silas was elected Chairman of the ATS/AIS/SAR Sub-Group.

1.3 In accepting the election, Mr. Silas Silas thanked the participants for their confidence in him, and assured them that, with their able support he will do his best to serve the proceedings of the Sub-Group.

1.4 The meeting also agreed to elect a Vice-Chairman and in this regard, the representative from Morocco nominated Mr. Abdelwahab Djatouf, ATS Director, Entreprise Nationale de Navigation Aérienne (ENNA) of Algeria, as Vice-Chairperson. The nomination was seconded by the representative from Uganda. As such Mr. Djatouf was elected Vice-Chairman of the Sub-Group.

Report on Agenda Item 2: Follow-up on SP AFI/8 RAN Recommendations, Conclusions and Decisions within the Framework of APIRG relevant to the ATS/AIS/SAR SG

2.1 The meeting reviewed progress on the Recommendations of the Special AFI/8 RAN Meeting, and Conclusions and Decisions formulated within the framework of APIRG relevant to its terms of reference, for follow up and update as necessary, including consolidation where appropriate, and the enhancement of the mechanism for follow up of actions required to implement the Recommendations, Conclusions and Decisions.

2.2 It was explained that the proposal to consolidate Conclusions/Decisions envisages increasing the efficiency within APIRG and avoiding duplication and oversight. The meeting acknowledged that the follow-up action form that has columns for identifying specific follow up actions, responsible parties and target dates, which is already being used at the level of APIRG meetings to facilitate a systematic management of work related the Conclusions and Decisions, should be used by the ATS/SAR/AIS Sub-Group, as is appropriate for all APIRG subsidiary bodies.

2.3 The meeting agreed that it was also necessary to reflect the status of implementation of the Conclusions/Decisions. As such the secretariat should modify the follow-up form accordingly. It was noted that the objective of these enhancements was generally to facilitate follow-up and management of work.

2.4 The meeting considered the need where appropriate, to merge Conclusions or Decisions with others that are considered similar or closely related; identify as redundant those that are adequately addressed by other Conclusions, Decisions, procedures, or activities; and similarly, identified those that could be included in the terms of reference and work programmes of relevant APIRG subsidiary bodies or be included in the APIRG handbook to serve general purposes.

2.5 The meeting formed a small working group (SWG) to identify follow-up action, responsible parties and target dates in order to facilitate implementation of the SP AFI/8 RAN Recommendations and APIRG Conclusions/Decisions. However, due to limited time, it was agreed that the Secretariat should continue after the meeting to indicate such details.

2.6 The meeting agreed that, as this was the second meeting of Sub-Group since APIRG 16, Draft Conclusions/Decisions of the 10th meeting of the Sub-Group will be readopted by the 11th meeting and submitted as such to APIRG 17.

2.7 The SP AFI/8 RAN Recommendations, Conclusions and Decisions from within the framework of APIRG as reviewed and updated by the meeting are at **Appendices 2A, 2B & 2C** to the report on agenda item 2.

2.8 During the discussions, concern was raised regarding delays in establishing the AFI Flight Procedures Office (FPO) as envisaged by the Special AFI/8 RAN Meeting 2008 under Recommendation 6/10. Further discussion on this matter is reflected under agenda item 6.

ATS/AIS/SAR SG/11
Report on Agenda Item 3

Report on Agenda Item 3: APIRG Performance Objectives

3.1 The meeting was informed that ICAO has adopted a performance-based approach for the planning of air navigation services. In this regard the SP AFI/8 RAN formulated and referred to APIRG a series of performance framework forms establishing performance objectives for the AFI region with relevant timeframes for achievement, to be updated and effectively applied in the Region.

3.2 It was recalled that at its 10th meeting in Dakar in May 2009, the ATS/AIS/SAR Sub-Group assigned to working groups, the work of updating and completing the Performance Framework Forms (PFFs) initiated by the SP AFI/8 RAN, which were related to PBN implementation and optimization of the ATS route structures. The Sub-Group noted with concern that due to very limited participation of members of the Working Groups, the Joint Meeting of the PBN and GNSS Task Forces, Nairobi 8 to 10 September 2009 had reconstituted the Working Groups and re-assigned the unfinished work. However, that endeavour still did not bear fruit due lack of low or no participation (including on correspondence) by the Working Group members.

3.3 In this regard, the ATS/AIS/SAR SG/11 meeting, recognizing the importance of the PFFs in the management of the implementation projects including coordination and regional harmonization, formed small working groups (SWG) and assigned them the work to convene side meetings, update and complete before the final session of the ATS/AIS/SAR SG/11, the PFFs that were assigned by the ATS/AIS/SAR SG/10 in 2009. Furthermore, to do the same with respect to PFFs that are relevant to the Sub-Group, other than those that had been assigned by the ATS/AIS/SAR SG/10 for updating. Accordingly, the ATS/AIS/SAR SG/11 updated the PFFs from the SP AFI/8 RAN Meeting, and formulated the following Draft Conclusion:

DRAFT DECISION 11/26: ATM PERFORMANCE FRAMEWORK

That, the AFI Performance Framework Forms formulated by the Special AFI/8 RAN Meeting regarding performance objectives in the fields of ATM, AIS/MAP and SAR are updated as at **Appendixes 3A to 3F** to the report on agenda item 3.

Appendix 3A	Implementation of the new ICAO Flight Plan Provisions
Appendix 3B	Optimization of the ATS route Structure in en-route airspace
Appendix 3C	Optimization of the ATS route Structure in terminal airspace
Appendix 3D	Optimization of vertically guided RNP approaches
Appendix 3E	Search and Rescue
Appendix 3F	Implementation of WGS-84 and Electronic Terrain & Obstacle Data

3.4 The meeting discussed the issue of safety monitoring: technical aspects, responsibilities including the institutional aspects related thereto.

Note:
For the purpose of report development this discussion is reflected under agenda item 6.

ATS/AIS/SAR SG/11
Report on Agenda Item 4

Report on Agenda Item 4: CNS Coordination issues referred/requiring ATS/AIS/SAR SG action

4.1 The Sub-Group discussed a number of issues requiring coordination between ATS/AIS/SAR SG and the CNS SG, and subsequently discussed them in a joint session on the fourth day of the combined Sub-Groups sessions.

4.2 The meeting analyzed proposals to amend ATM and CNS requirements contained in the AFI CNS/ATM Implementation Plan (Doc 003) – Systems Evolution Tables for en-route, terminal and aerodrome operations and agreed that Doc 003 should be updated accordingly. The proposals for amendment are in the **Appendix 4A** to this report. The proposals were however, referred to the PBN and GNSS Task Forces for detailed review and to develop final material for updating of Doc 003.

4.3 The joint session of the two groups was briefed about the problem of missing flight plans which was highlighted by South Africa in the ATS/AIS/SAR SG/11 meeting. Presentation was made on a sample period of 27 days selected from information supplied by the Johannesburg ACC, with regard to flight plans not being present in the system until created by the operational ATC. In the said period, it amounted to some 161 flights, averaging six (6) missing flight plans per day, or on average, 2190 flight plans not being received in the system annually.

4.4 It was highlighted that automated systems require the input of data in order to produce the required information. This data is also required to be accurate and timely, in order for it to be of use in the execution by ATC operational personnel on duty. Specifically, the system should be in a position to inform ATC of pending traffic, well before the traffic arrives within that particular ATC's area of responsibility. Should the required information not be at hand, the system cannot report on that which it has not been informed on, leaving the ATC exposed to having to create a parcel of information from what the ATC has been able to glean as a result of, possibly an ATS/DS coordination event.

4.5 It was noted that cases experienced in one FIR, such as the cases from Johannesburg ACC, often mean that the aircraft has traversed one or more other FIRs without its presence being detected in advance, if at all. The meeting acknowledged that situations created by the missing flight plans, which as pointed out by the small sample from Johannesburg ACC, are unacceptably high and constitutes an unacceptable level of risk which could contribute to mid air accidents.

4.6 In this regard, the meeting recalled that the missing flight plan matter had become a perennial safety and efficiency issue for which solutions should be identified and put into effect as soon as practical. It was also recalled that some initiatives had been taken by the ATS/AIS/SAR and CNS Sub-Groups. The RVSM TF/12 Dakar, 23-24 April 2007 discussed the situation relating to non-receipt of flight plans at the respective ACCs and reiterated that there was a need to investigate the root cause of the problems. Subsequently, the ATS/AIS/SAR SG/9 meeting which was also convened in Dakar, 25-27 April 2007 sought to first determine the causes for missing flight plans, and had formulated Draft Conclusion 9/8 as follows:

ATS/AIS/SAR SG/9 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

4.7 The CNS SG/2 in Dakar, 22 – 25 May 2007, cognizant of the situation raised by the ATS/AIS/SAR SG/9 had agreed that Aeronautical Fixed Telecommunication Network (AFTN) aspects should be included in the survey and investigated to determine the possible impact of AFTN performance on the issue of missing flight plans. Accordingly, the CNS SG/2 meeting formulated Draft Conclusion 02/04: Survey on missing flight plans, calling for the survey, which was to be initiated by the ESAF and WACAF Regional Offices and to be completed in by 1 August 2007.

4.8 The joint session of the ATS/AIS/SAR SG/11 and the CNS SG/3 noted that the causes for missing flight plans had still not been fully determined. However, the session was informed that the problem could be due to a number of technical reasons, including modulation/parsing, and AFTN performance and that collection of data would facilitate further analysis of the problems and to find solutions. The meeting was informed that there were many cases in which queries on missing flight plans, to FIRs from which flights had traversed or originated were not responded to. This situation made it difficult to resolve both short and long term challenges on the unreceived flight plans.

4.9 The meeting was concerned that if the current rate of missing flight plans was not effectively addressed, the situation could be expected to result in more serious implications when the new ICAO model flight plan is implemented in November 2012.

4.10 In view of the above, the meeting formulated the following Draft Conclusion:

Draft Conclusion 11/27: Resolution of Missing Flight Plans Problem

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

take immediate measures to ensure that standard requirements for flight plan processing are adhered to;
a) ensure that all FIRs collect/record information on missing flight plans and exchange such information/data with other FIRs;
b) ensure that ACCs/FICs respond to queries from other ACCs/FICs regarding missing flight plans on a timely basis providing details that might assist not just the affected FIRs but others in resolving the causes for missing flight plans; and
c) bring the trend information/data on missing flight plans to the attention of the TAG for consideration.

(This Draft Conclusion supersedes ATS/AIS/SAR SG/9 Conclusion 9/8)

4.11 The meeting was informed on an increase of operational anomalies because of institutional issues, transfer and coordination of traffic between air traffic control organizations in particularly between Algeria and Tunisia.

4.12 The meeting emphasized on the fundamental necessity of having the Letters of Agreement between Tunisia and Algeria, as well as any other ATS facilities up to date.

4.13 The meeting was informed about the ongoing work on the establishment of the Required Communication Performance (RCP) concept. A proposal was made for the AFI Region to embrace the concept, noting the various challenges facing the AFI Region, including the lack of direct communication and surveillance in remote and oceanic airspace which led to the take-up of data link applications to support separation assurance and conformance monitoring.

4.14 RCP being a performance specification, serves as one possible safety net in order to ensure that the various infrastructural and technological components blend with the Aircraft and the Ground systems to deliver an effective service. IATA informed the meeting that they fully endorse the RCP methodology as the key to seamless and efficient movement of flight in all flight phases. That the Performance (and not the availability alone) of ground and airborne capability can combine to form an end-to-end ATM system is the key to flight safety and efficiency. The meeting agreed to follow up on the concept as it was being developed.

4.15 The meeting also noted that the Global Operational Data Link Document (GOLD) is under development by the Ad-Hoc GOLD Working Group, and that this effort was a modification of the FANS-1/A Operations Manual (FOM).

REPORT ON AGENDA ITEM 5: RVSM OPERATIONS AND MONITORING SERVICES

5.1 The meeting noted that the RVSM Implementation Safety Seminar (RISS) was successfully convened at Hotel SixEighty in Nairobi, Kenya 19-22 April 2010. The meeting was apprised on the proceeding of the Seminar and noted the issues raised by the Seminar which were to be taken into consideration for action by various parties including the ATS/AIS/SAR Sub Group. Further details regarding outcome of the Seminar are at **Appendix 5A** to the report on agenda item 5.

5.2 The meeting considered a number of relevant subjects relating to RVSM operations and monitoring as below.

5.3 **ARMA Report –**The ARMA presented an overview of the work undertaken since ATS/AIS/SAR SG/10 in 2009. Generally the ARMA is meeting expectations with the required outputs. In most cases the outputs are dependent on data supplied to the agency. It became evident that the ARMA is hampered in its work by States that are not submitting the required data returns. Specifically the 34% return by States of Air Traffic Flow Safety Assessment data was mentioned as not being adequate and should receive urgent attention in order to achieve an improved flow of data submissions. The requirement that Civil Aviation Authorities approve all Operators/Aircraft for RVSM operations was also highlighted as needing urgent attention. It was emphasized that the submission of RVSM State approved aircraft to the ARMA by CAA's must be improved in order to realize the full benefits of RVSM operations and to improve safety. In order to ensure that altimetry systems meet the required specifications, height monitoring needs to be undertaken by all operators which is not currently the case.

5.4 **Post Operational Safety Case (POSC) –** The meeting recalled that the strategy to demonstrate the achievement of the Safety Policy has been supported by three principle safety arguments, and that these were followed in the process of the POSC:

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

5.5 The process and outcome of the POSC were provided to the meeting in summary, presenting the three arguments that were used to demonstrate RVSM safety. Material amplifying operations over the time period 25 September 2008 to 30 September 2009 was utilised. Included in the information were the four hazards that were identified as contributing to the high vertical incident rate. The meeting noted that the POSC culminated in twenty three safety recommendations which were presented to States for consideration and implementation as applicable. In this respect, a State Letter will be compiled and disseminated. The meeting noted that in summary, the overall conclusion was that due to the elevated overall risk element, the RVSM operations are not meeting the required quantitative safety levels and remedial actions needs to be implemented by concerned parties to address these concerns.

5.6 The meeting noted with concern that the outcome of the POSC was indicative of a number of issues that required to be addressed as matter of urgency. These included the following:

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

5.7 **Pilot Guidance Material –** Pilot training guidance material was compiled by IFALPA prior to RVSM implementation and approved for distribution at AFI RVSM Task Force 13. It was emphasized that this material served AFI well and was thus forwarded back to IFALPA for review and amendment where required for another period. IFALPA proceeded to make some amendments to the contingency procedures in line with ICAO provisions which was presented at the meeting and approved for distribution.

5.8 **Collision Risk Assessment (CRA) –** The Fourth AFI Collision Risk Assessment was presented as part of and contributing to the POSC. It was noted that this is the first full Assessment after the implementation of RVSM in the AFI Region and covers the time period from the 25 September 2008 until the end of September 2009. It was noted that the Estimated Technical Risk was calculated to be below the Technical TLS. The meeting noted that the estimated Collision Risk was however calculated to have been above the Overall TLS by a factor of six (6). The main contributory factor to the Overall Risk was identified to be aircraft operating at the incorrect flight levels.

5.9 The meeting noted with concern that the assessment was made difficult to compile due to the absence of data from various FIRs. Data was only received from a limited number of FIRs. For 16 FIRs, the quality of the data was such that the passing frequency and aircraft population could be determined. However, this constitutes only 34% of the total data that should have been available from the 30 participating FIRs. Moreover, the quality of the available information varied strongly.

5.10 It was evident from the information provided to the meeting that vertical incidents have increased since the implementation of RVSM, and that this could largely be attributed to aircraft operating at the wrong flight levels. This aspect appears to be coupled to lapses in the provision of ATM. The meeting acknowledged that a concerted effort from air traffic services providers will be necessary to rectify this situation. It was also noted that one of the continuing challenges is aircraft operating in AFI RVSM airspace without appropriate State RVSM Operational Approvals .

5.11 The recommendations for action to address shortcomings relating to the CRA are contained in the POSC document.

5.12 **Long Term Height Monitoring** – The meeting recalled that ARMA is a Regional entity performing functions on behalf the AFI Region in accordance with the ICAO AFIRMA Manual, ICAO Doc 9574 and other relevant ICAO provisions in order to meet the requirements of Section 3.3 in particular paragraphs 3.3.5.1 through 3.3.5.2 of Annex 11 to the Chicago Convention. Accordingly, the following primary functions are expected to be carried out by the ARMA:

- Establish and maintain a data base of RVSM approvals
- Monitor aircraft height-keeping performance and the occurrence of large height deviations and report results appropriately
- Conduct Safety Assessments and report results appropriately

- Monitor operator compliance with State approval requirements
- Initiate necessary remedial actions if RVSM requirements are not met

5.13 The meeting was apprised on the Long Term Monitoring Requirements fully explaining the implications and the implementation thereof. It was recalled that the AFI Region introduced a height monitoring program during the pre implementation phase and has continued Long Term Monitoring thereafter. This was in line with the European model on which AFI RVSM was based.

5.14 The meeting was also apprised on new provisions (Standards) introduced under Amendment 34 to Annex 6 to the Convention on International Civil Aviation. The meeting noted that the Standards would become applicable on 18 November 2010. The amendments, which relate to Section 7.2 of Annex 6, concern long-term monitoring requirements to ensure the safety of operations in reduced vertical separation minimum (RVSM) airspace. Amongst others, the new provisions require that:

- *An aeroplane shall demonstrate a vertical navigation performance in accordance with Appendix 4 to Annex 6 Part 1; and*
- *The State of the Operator that has issued an RVSM approval to an operator shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer. If an operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.*

5.15 The Long Term Monitoring Requirements Standard is supplemented by the Minimum Monitoring Requirements Table which was accepted by the meeting in order to ensure that regional safety targets are met.

5.16 **RVSM National Programme Managers:** The meeting noted that in some States availability of RVSM National Programme Managers (NPM) or updated information regarding their contact details was no longer receiving the priority it deserves, thus making delivery on the tasks allocated to ARMA exceedingly difficult. The meeting recalled that in this regard, a State letter requesting updated information on NPMs was circulated to States in July and November 2009, reminding States that had not provided the updated information to do so. However, in both cases the response was very low.

5.17 The meeting recalled that, as evidenced by the provisions of Annex 11 to the Chicago Convention, RVSM National Programme Managers (NPM's) continue to play a pivotal role in the RVSM system monitoring and are indispensable even as the AFI Region has implemented RVSM and goes beyond the post operational period. In this context, the ARMA will periodically compile and distribute a reminder to all States, where there is doubt as to the name and details of the NPM, requesting updates. In order to support this initiative, the meeting agreed that the Regional Offices should issue a new State Letter urging States to do the necessary on this matter.

5.18 The meeting discussed the issue of FIRs in the AFI Region that were not providing necessary RVSM related data to the ARMA. It was noted that non-availability of such data distorted the Regional RVSM safety analysis and could defeat the purpose of Regional monitoring. The meeting was informed that when the AFI Region commenced collection of the data, some FIR/s were already providing the data to other Regions' RVSM monitoring bodies. The meeting however, acknowledged and reiterated the need for the ARMA to receive such data irrespective of the related interface issues with other Regions that may have prevailed. It was agreed that ICAO would initiate coordination as necessary to facilitate the forwarding of information to the ARMA in order to harmonise the AFI FIR's contribution.

5.19 The Sub-Group recalled that at tenth meeting in Dakar 12-15 May 2009, the ATS/AIS/SAR Sub-Group had discussed the feasibility of implementation of strategic lateral offset procedures (SLOP) in the AFI Region, and accordingly agreed on Conclusion 10/03: Introduction of strategic lateral offset procedures, inter alia, calling APIRG to determine areas where SLOP should be implemented.

5.20 It was noted that Section 16.5 of PANS-ATM Doc 4444 contains clear and adequate provisions on the application of SLOP, which can be followed without difficulty. Furthermore, that only aircraft that are appropriately equipped would apply SLOP. Presentations were made from the user perspective for further clarification on application and safety benefits.

5.21 The meeting acknowledged that the application of SLOP has direct and immediate safety benefits, particularly in the environment of RVSM and noting that there were still several areas in the AFI Region in which there was no ATM surveillance. The meeting agreed to enable the implementation of SLOP as soon as possible, and accordingly formed a small working group (SWG) to identify the areas in which SLOP would be implemented as well associated requirements. The Sub-Group endorsed the outcome of the SWG, and accordingly formulated the following Draft Conclusion.

DRAFT CONCLUSION 11/28: IMPLEMENTATION OF STRATEGIC LATERAL OFFSETS IN THE AFI REGION

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

a) SLOP will be applied in those Oceanic FIRs where fixed routes are established excluding defined random routing areas.

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

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

(This Draft Conclusion supersedes ATS/AIS/SAR SG Conclusion 10/03)

ATS/AIS/SAR SG/11
Report on Agenda Item 6

REPORT ON AGENDA ITEM 6: PERFORMANCE BASED NAVIGATION (PBN) AND AFI ATS ROUTE NETWORK

6.1 The meeting noted the issues from the Joint PBN & GNSS/I TFs that was held in September 2009 and that due to low participation, the second Joint PBN & GNSS/I TFs meeting, which was to be convened in March 2010 had to be postponed. As such there was unfinished business that was intended to be presented to the ATS/AIS/SAR SG/11. This includes the revised Regional PBN Implementation Plan which was to be merged with the GNSS Implementation Strategy.

6.2 **Regional PBN Implementation Plan:** The meeting deliberated on aspects of the Plan including the application of the terminology "approach with vertical guidance (APV) procedures" emanating from the Joint Meeting of the PBN and GNSS/I Task Forces in September 2009, as well as supporting infrastructure including onboard technology . It was explained that the term was used in the context of its definition in the PBN Manual (Doc 9613), that is to indicate an instrument procedure which utilizes lateral and vertical guidance but which does not meet the requirements established for precision approach and landing operations. It was noted that in developing the Regional Roadmap for implementation of PBN, the PBN TF/2 meeting Nairobi 4-6 December 2008 had, in some parts of the Roadmap indicated that APV should be achieved through Baro-VNAV and SBAS, while in some parts of the Roadmap, only Baro-VNAV was identified to support APV.

6.3 As it appeared that there were still divergent unresolved views on the matter, the meeting recognized that such technical details could only be appropriately addressed by the PBN TF. In the meantime, the Plan remains unchanged, subject to editorial changes that were agreed by the Joint PBN & GNSS/I TFs in September 2009. Furthermore, the AFI GNSS Implementation Strategy should support the Plan as is.

6.4 The Joint meeting of the PBN/TF3 and GNSS/I Task Forces in September 2009 in adopting the Roadmap as the AFI Regional PBN Implementation Plan, also discussed the issue of Baro-VNAV and SBAS and agreed that except where specifically specified by APIRG, in conformity with the approach to reduce specifications and sensors in favour of performance specifications, the AFI Regional PBN Implementation Plan should not specify Baro-VNAV and/or SBAS. Subsequent to the September 2009 meeting, queries by the airspace users and space-based GNSS augmentation providers led to the matter being brought to the attention of ATS/AIS/SAR SG/11.

6.5 Further queries on the matter were presented for resolution by the ATS/AIS/SAR SG/11 meeting. Although the Sub-Group was desirous to fully address the APV issue, it was recognized that such technical details could only appropriately be addressed by the PBN TF, and not at the Sub-Group. Accordingly, it was felt that further discussions on the need to modify such elements of the plan should be referred back to the PBN Task Force.

6.6 The meeting however, acknowledged the importance of not delaying formal adoption of the AFI Regional PBN Implementation Plan by APIRG. In this regard, it was agreed that, except for editorial changes and modifications by the Joint PBN and GNSS TFs meeting in September 2009, which transformed the Roadmap to a Plan in accordance with Resolution A36-23, the AFI Regional PBN Implementation Plan should, with regard to the issue of APV retain the sensors specified by the PBN TF/2, and submitted as such to APIRG 17.

6.7 Based on the above, the ATS/AIS/SAR SG/11 meeting formulated the following Draft Conclusion:

DRAFT CONCLUSION 11/29: AFI PBN IMPLEMENTATION REGIONAL PLAN

That,

a) The AFI Regional PBN Implementation Plan is updated and endorsed as at **Appendix 6A** to the report on agenda item 6, to more accurately reflect PBN implementation goals in Assembly Resolution A36-23, guidance in the PBN Manual (9613), and Regional planning guidance provided by APIRG; and

b) the Regional PBN Implementation plan be included in the AFI Doc 003.

(This Draft Conclusion supersedes ATS/AIS/SAR SG10 Conclusion 10/24 and Joint PBN & GNSS TFs/1 Draft Concl. 1/5)

6.8 In order to support States efforts to develop National PBN Implementation Plans in accordance with APIRG 16 Conclusion 16/3: ***Development of States PBN Implementation Plans***, and to progress with implementation, the meeting endorsed the following Draft Conclusions originated by the Joint Meeting of the PBN and GNSS/I Task Forces, Nairobi 8-10 September 2009, providing a template for national plans and tools that may be used:

DRAFT CONCLUSION 11/30: NATIONAL PBN IMPLEMENTATION PLANS

That States,

a) use the Regional PBN implementation plan template at **Appendix 6B** to the report on agenda item 6, for the development of a national PBN implementation plan and consider the action planning provided by the Joint PBN/GNSS/I Task Forces meeting to support planning;

b) provide feedback to the ESAF and WACAF Regional Offices by 30 October 2009 regarding progress in the development of their national plans, indicating any challenges, if any, that are delaying the development of the plan, as well as measures taken or to be taken to overcome such challenges; and

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

DRAFT CONCLUSION 11/31: PBN IMPLEMENTATION TOOLS

That States,

a) are encouraged to use project management plans and implementation action plans such as provided at **Appendix 6C** to the report on agenda item 6 as well as project management softwares (such as Microsoft Project or freely available applications) , to support PBN implementation activities; and

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

6.9 Regarding the matter of GNSS implementation strategy in the AFI Region, the meeting highlighted that the Secretariat should undertake necessary coordination to ensure that the Regional GNSS Implementation Strategy supports the implementation of the AFI PBN Regional Implementation and that the strategy ultimately forms part of the Plan.

6.10 **Regional Performance Objectives:** The meeting noted that the ATS/AIS/SAR SG/10 and subsequently the Joint Meeting of the PBN & GNSS/I Task Forces had made efforts to update the PFFs, albeit with limited success. **For the purpose of report development, more detailed discussion on this matter is reflected under agenda item 3.**

6.11 **ATS routes implementation and development** – The meeting noted that users (IATA) had prepared an updated user priority list of ATS routes to be implemented. It was noted that a number of ATS routes had been in the Air Navigation Plan for some time and that the implementation of such routes was imperative to efficiency of the airspace and contribution to environmental protection.

6.12 The meeting endorsed the establishment of the PBN Route Network Development Working Group (PRND WG) as proposed by the Joint PBN & GNSS/I TFs in September 2009, and subsequently agreed to refer the development of ATS routes to the Working Group, and accordingly endorse the following Draft Decision.

DRAFT DECISION 11/32: PBN ROUTE NETWORK DEVELOPMENT WORKING GROUP (PRND WG)

That the AFI PBN Route Network Development Working Group (PRND WG) is established with the terms of reference, composition and working arrangements as at **Appendix 6D** to the report on agenda item 6. A list of Priority Air Routes proposed by IATA for implementation has been appended in **Appendix 6E** to agenda item 6.

6.13 The meeting recognized that work assigned to the PRND WG had accumulated since the Working Group was established in September 2009. Furthermore, that coordination in the comprehensive definition of the user requirements and the work of the PRND WG would significantly support implementation.

6.14 Based on the above, the meeting accepted with appreciation IATA's offer to host an ATS route development coordination and development meeting at the earliest possible date, in order to facilitate expeditious Regional ATS route development and implementation, in particular ATS routes identified in priority lists.

6.15 **AFI Flight Procedures Office (FPO):** The meeting raised the issue of FPO and expressed the wish to proceed with the establishment of the AFI FPO as a matter of urgency.

Note:
Developments in the FPO concept have precipitated the use of the more inclusive terminology of Flight Procedures Programme (FPP) which is used hereafter.

6.16 The meeting was of the view that establishment of the AFI FPP critical, considering Assembly Resolution 36-23 related to PBN implementation global goals and the limited resources of many States in the AFI Region. The meeting was subsequently informed that ASECNA was ready to host the AFI FPP.

6.17 The meeting also took note of the information provided in this regard, that as the concept of an FPP was new, it had been considered essential not to start with several Regional FPPs at the same time, but to use the experience of establishing one to inform others, in order to reduce risks of the FPPs not meeting objectives. In the same vein, ICAO had assigned the Implementation and Resource Development Coordinator for the ICAO PBN Programme at ICAO HQ to provide close guidance to the establishment of the first FPP in the APAC Region, including on-site elements thereof, to ensure that principles that form the tenets of the FPP are adequately met.

6.18 It was however expected that, based on valuable experience gained in the establishment of the FPP in the APAC Region, the letter to invite interested States for proposals to host the FPP would be disseminated by the end of June 2010.

6.19 Based on the above, the meeting formulated the following Draft Conclusion:

DRAFT CONCLUSION 11/33: DISSEMINATION OF A LETTER INVITING PROPOSALS FOR ESTABLISHMENT OF THE AFI FLIGHT PROCEDURES PROGRAMME (FPP)

That, pursuant to Special AFI/8 RAN Meeting Recommendation 6/10, ICAO disseminate, as a matter of urgency, the letter inviting interested States and international organizations to submit proposals for establishment and hosting of the AFI FPP.

6.20 It was also noted, that notwithstanding the above, the establishment of the FPP was to support the sustainable implementation of PBN by States. However, States are expected to proceed with implementation of PBN using available resources and expertise, without waiting for the establishment and operation of the FPP. The meeting also recognized that ICAO had scheduled a PBN Procedure Design Course that is to be held in Dakar, Senegal 19-30 July 2010 and in collaboration with other parties, had also arranged a PBN Airspace Planning Workshop to be convened 6-9 September 2010 in Johannesburg, South Africa.

6.21 Electronic copies of State Letters of invitations to the PBN Procedure Design Course and the PBN Airspace Planning Workshop were provided to the Sub-Group meeting participants along with working material for the meeting, and the participants were requested to assist in bringing the letters to the attention of relevant authorities in their States.

6.22 **Safety assessments and monitoring:** The meeting debated on the need for clear orientation on how to perform a safety assessment for PBN implementation. The Secretariat explained that guidance is provided in different ICAO documentation to perform a qualitative or quantitative assessment. Among the documents are *Doc 9689- Manual on Airspace Planning Methodology for the Determination of Separation Minima, Doc 9859-SMS Manual and Circ 319- A Unified Framework for Collision Risk Modelling in Support of the Manual on Airspace Planning Methodology the Determination of Separation Minima (Doc 9689).* It was also highlighted that to achieve sound results, the safety assessments, depending on the method chosen would require a multidisciplinary group involving mathematicians and statisticians besides ATM experts.

6.23 The meeting noted that the Joint PBN and GNSS/I Task Forces meeting, Nairobi 8-10 September 2009 had deliberated at length on the matter of Regional PBN system safety monitoring. However, the Task Forces had not succeeded to reach consensus on the need for such monitoring or the appropriate body for the monitoring, should the need be identified. Consequently the Joint PBN and GNSS/I Task Forces meeting had referred the matter to APIRG (through the ATS/AIS/SAR Task Force) for decision and guidance.

6.24 The ATS/AIS/SAR SG/11 also deliberated at length on the matter of Regional PBN system safety monitoring Sub-Group and recognized that any safety monitoring, including PBN system safety monitoring, remains the responsibility of each State. Furthermore, it was acknowledged that the need for Regional system safety monitoring could not be clearly identified and justified and could overlap with the system safety management already being put in place by the States with no benefits. As such, the concept of Regional system safety monitoring was not agreed.

6.25 In order to optimize benefits from available data, the meeting agreed that information available at ARMA regarding lateral deviations could be forwarded to States for their use in State safety monitoring processes. Furthermore, it was highlighted that ICAO guidance material such as the one listed in paragraph 6.20 above could be used.

6.26 **National PBN Programme Managers (NPPM)**: The meeting noted that, based on communication exchanged between the Regional Offices and States regarding PBN implementation, it has been observed that in many States the appointment and functioning of NPPM has not taken effect, or done so in a limited form.

6.27 6.25 The meeting also recalled that APIRG 16 adopted Conclusion 16/4: ***Designation of Contact Person for PBN Implementation***, while ATS/AIS/SAR SG/10 adopted Conclusion 10/18: ***Nomination of National PBN Programme Managers***. The effect of these two Conclusions together has not been adequately understood; as to whether the two were interchangeable, one served the purpose of the other, etc.

6.28 Based on the above, the meeting consolidated the two Conclusions and formulated the following Draft Conclusion to supersede ATS/AIS/SAR SG10 Conclusion 10/18 and is to supersede APIRG Conclusion 16/4.

DRAFT CONCLUSION 11/34: NATIONAL PBN PROGRAMME MANAGERS (NPPM)

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

a) AFI States that have not already done so nominate/designate NPPMs as soon as possible with the terms of reference as at **Appendix 6F** to the report on agenda item 6 and provide ICAO with contact details of the NPPMs; and

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

6.29 **Aircraft equipage data:** The meeting noted the concerns of the Joint PBN & GNSS/I TFs regarding the need for accurate data on aircraft equipage for planning implementation purposes. It was noted that IATA had obtained valuable statistical information on aircraft equipage and that the data could be used to estimate equipage in non-IATA airline fleets. However, the effort to obtain data relating to general aviation fleets through State letters that had been circulated to States had met very limited success. It was further noted that some ANSPs were making efforts to obtain the data from operators. However, this was meeting resistance. In this regard, the meeting requested that the matter of collection of aircraft equipage information be further clarified to the civil aviation authorities who should also be urged to support efforts to collect the data.

6.30 Based on the above, the meeting endorsed the following Draft Conclusion:

DRAFT CONCLUSION 11/35: AIRSPACE PLANNING AND AIRCRAFT EQUIPMENT SURVEY

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

a) AFI States and Air Navigation Service Providers (ANSPs) are urged to support the ICAO/IATA Global Survey on aircraft equipment aimed at developing a database with accurate information on present and future avionics capabilities of airline fleets;

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

c) ensure that initiatives for air navigation system enhancements are matched with fleet capabilities and readiness.

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

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

6.32 The meeting discussed a proposal for amendment of Doc 7030 (Regional Supplementary Procedures) in order to update the document regarding current situation in the AFI Region, in particular the requirement relating to RNAV capability with AORRA and IORRA, along with amendments to text which may not be relevant to operations within the AFI Region or EUR/SAM corridor areas of responsibility

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ATS/AIS/SAR/SG/11
Report on Agenda Item 7

REPORT ON AGENDA ITEM 7 – ATS SAFETY MANAGEMENT SYSTEMS

7.1 **Tactical Action Group (TAG):** The meeting was briefed on the outcome of the second meeting of the APIRG Tactical Action Group (TAG/2) that was held on 23-24 April 2010 in Nairobi, Kenya. The meeting was informed that there were notable trends arising from analysis of Unsatisfactory Condition Reports (UCRs) that have come into the TAG database over the past year (since July 2009). Amongst others, the TAG/2 meeting noted that one State that initially had a considerably high number of UCRs had resolved most of them. However, three States remained with high numbers of UCRs that include AIRPROXs. Responses to the TAG from these States were also very low.

7.2 In general the TAG had achieved a considerable amount of work over the past year and progress had been made in resolving a significant number of UCRs. The progress included missions by TAG representatives to States that were experiencing high numbers of UCRs with no effective response. However, the TAG had noted with concern that some of the States to which TAG missions were deemed necessary, had postponed receiving the TAG mission several times. It was also noted that the level of reporting of ATS incidents by States or their air navigation service providers (ANSPs) was significantly slow. It was observed that of the 53 AFI States, no more than three to five States were reporting incidents. Many airlines were also not reporting incidents.

7.3 The ATS/AIS/SAR SG/11 noted that the TAG had reviewed its Terms of Reference, Work Programme and Standard Operating Procedures. In this regard, the TAG agreed on the need to expand the scope of its work by addressing trends on safety problems identified by the ATS Incident Analysis Group (AIAG) and other sources.

7.4 Concerning sustainability of operations, the TAG acknowledged that dedicated sustainable resources were necessary. In this regard, it was agreed that the Secretariat would draft a proposal to be presented at appropriate forums within the ICAO structures (APIRG, etc.) to highlight the issue of resources for sustainable operation of the TAG.

7.5 **ATS Incident Analysis Group:** The meeting was also briefed on the outcome of the ATS Incident Analysis Group (AIAG) meeting held in Johannesburg, South Africa 8-9 March 2010. It was recalled that the AIAG was established to provide a forum for various aviation organisations and stakeholders, including States, International Organizations Regional and sub-Regional Organizations, to review reported incidents in the AFI region and formulate recommendations to prevent similar occurrences in the future.

7.6 The meeting noted that 142 incidents including 66 AIRPROXs were reported in 2009, and that concerned air navigation service providers (ANSPs) had provided feedback on 122 of the incidents. There were four (4) incidents on which feedback was not provided as the incidents were not reported to the relevant ANSP. Although the average rate of feedback was 88%, the response rate varied significantly from one State to another.

7.7 The meeting was informed that, among the lessons learned was that in a number of incidents (50 instances), which had doubled as compared to 2008, lack of ATC anticipation/ATC situational awareness/ATC proficiency, was either the main cause of incident or a contributing factor.

7.8 In order to prevent similar occurrences, the AIAG made a number of recommendations which are reflected at **Appendix 7A** to the report on agenda item 7.

7.9 **Incident reporting form:** On discussing issues related incident reporting, the meeting recalled that many civil aviation authorities have adopted the ICAO model reporting form in the PANS ATM Doc 4444 Appendix 4, and have made it available to potential users particularly ATS personnel and air crew, through such mechanisms as the Aeronautical Information Publication (AIP). However, the meeting noted that from experience, most reports are not submitted through this form.

7.10 It was acknowledged that, while the form in Doc 4444 Appendix 4 provides for adequate collection of information related to an incident, many users and potential incident reporters including air crew and air traffic services personnel found it difficult to use. The meeting was of the view that ATS personnel and air crew could benefit from a modified version of the form, arranged to make it more user-friendly as well as availing an electronic format of the form. The meeting noted the effort under way in the Regional Offices to develop an easier to use format of the form, and IATA (South African Airways) offered to participate in the development of the form.

7.11 **Safety Management SARPs and related guidance:** The ATS/AIS/SAR SG/11 and the CNS/SG3 discussed safety management provisions (SARPs and guidance material) in a joint session on the fourth day of the meeting. It was noted that ICAO provisions for Safety Management Programmes in ATS first became applicable in November 2005 in accordance with Amendment 43 to Annex 11. In March 2006, the ICAO Council adopted harmonized safety management provisions in Annexes 6, 11 and 14 requiring States to establish a safety programme and, as a part of such a programme, require aerodrome operators, air traffic services providers and air operators to implement a Safety Management System (SMS) acceptable to the Authority. The harmonized provisions, which in ATS were contained in Amendment 44 to Annex 11, became applicable as of 23 November 2006 for national authorities, aerodromes operators and air traffic services providers and as of 1 January 2009 for air operators. The requirements also obligate States, with the responsibility to establish an acceptable level of safety for the activities/provision of services.

7.12 It was noted that in an ongoing endeavour to improve safety management, on 2 March 2009, the 186th Session of the ICAO Council adopted Amendment 47 to Annex 11, which arose from, inter alia, a continuing effort toward harmonization of safety management provisions. Provisions of Amendment 47 that relate to safety management, identified in the Annex as Amendment 47B, are applicable as of 18 November 2010. Accordingly, States that will not have complied with these provisions on the date that they become applicable are obliged under Article 38 of the Chicago Convention to file a notification of difference.

7.13 The meeting recalled that the APIRG 15 meeting in Nairobi, Kenya, 26 – 30 September 2005 formulated Conclusion 15/32: *ATS Safety Management*, urging States that had not done so to implement a systematic and appropriate ATS Safety Management Programme to ensure that safety is maintained in the provision of ATS.

7.14 The meeting noted a number of Resolutions of the 36th Session of ICAO Assembly related to safety management, among them:

- Resolution A36-7: *ICAO Global Planning for Safety and Efficiency* -- Appendix A: *Global Aviation Safety Plan* and Appendix W: *The Provision of Air Traffic Services.* Resolution A36-7 also addresses the concept of "just culture."
- Resolution A36-8: *Non-disclosure of certain accident and incident records*
- Resolution A36-9: *Protecting information from safety data collection and processing systems in order to improve aviation safety*
- Resolution A36-10: *Improving accident prevention in civil aviation*

7.15 The meeting noted the provisions of Annex 11, in particular Section 2.27 regarding safety management: the requirement for State Safety Programme (SSP) and service provider safety management system (SMS).

7.16 More particularly, the meeting was made aware of the note under paragraph 2.27.4 of Annex 11, which is reflected hereunder, relating to requirement under the SSP to establish and SMS (2.27.3); and requirements relating to lines of safety accountability, including a direct accountability for safety on the part of senior management (2.27.4):

> *…The provision of AIS, CNS, MET and/or SAR services, when under the authority of an ATS provider, are subject to the requirements of 2.27.3 and 2.27.4. When the provision of AIS, CNS, MET and/or SAR services are wholly or partially provided by an entity other than an ATS provider, the requirements under 2.27.3 and 2.27.4 relate to the services that come under the authority of the ATS provider, or those aspects of the services with direct operational implications.*

7.17 The meeting noted available ICAO guidance material for safety management such as Attachment D to Annex 11, as well as training available. Furthermore, with regard to training, the meeting was informed of the mechanism announced by the ICAO Secretary General under State Letter Ref.: AN 1146-06152 dated 30 June 2006 in which training could be delivered upon specific request from individual States or group of States, and under specific conditions which include the provision of instructors by ICAO and provision by the requesting State (group of States) of travel and living expenses for the instructors.

7.18 The meeting was made aware that with regard to AFI States, much of the envisaged training that would be achieved under the cost sharing mechanism have been made available to the AFI States under the AFI Comprehensive Implementation Programme (ACIP), which enabled the training to be achieved with involvement of much lesser cost to States.

7.19 The meeting noted that the training, which was initially delivered in as SSP and SMS and later Integrated Safety Management (ISM) courses were made available to every AFI State through a series of courses targeted at small groups of States at a time. The courses were held at every sub-region of the AFI Region. Participants were encouraged to visit the ACIP website and find out which States were still to receive the courses, and accordingly advise their States and organizations.

7.20 The meeting acknowledged that detailed information regarding the status of implementation of safety management provisions in the AFI Region was necessary to facilitate work of the Sub-Groups in fostering implementation. However, the meeting noted that the Status of implementation was not clearly known, particularly in light of the new provisions applicable in November 2010.

7.21 Based on the above, the meeting formulated the following Draft Conclusions:

DRAFT CONCLUSION 11/36: IMPLEMENTATION OF SAFETY MANAGEMENT IN THE AFI REGION

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

(a) implement the Safety Management provision of Annex 11;

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

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

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

(This Draft Conclusion is to supersede APIRG Conclusion 15/32)

DRAFT CONCLUSION 11/37: STATUS OF IMPLEMENTATION OF SAFETY MANAGEMENT PROVISIONS IN THE AFI REGION

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

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

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

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ATS/AIS/SAR SG/11
Report on Agenda Item 8

REPORT ON AGENDA ITEM 8: CONTINGENCY PLANS

8.1 The meeting recalled that Chapter 2 of Annex 11 to the Chicago Convention provides that air traffic services (ATS) authorities shall develop and promulgate contingency plans for implementation in the event of disruption or potential disruption of ATS and supporting services in the airspace for which they are responsible for such services. Guidance material for the development of contingency planning is presented as Attachment C to Annex 11.

Secretariat Note:
"Public health emergencies" has been included in changes to Attachment C (guidance material) introduced in Amendment 47 to Annex 11.

8.2 The meeting noted that contingency plans constitute a temporary deviation from the facilities and services provided by States in accordance with Article 28 of the Convention on International Civil Aviation (Doc 7300) and as reflected in the Regional ANP. Consequently, as Regional ANPs are approved by the Council, contingency plans also require Council approval.

8.3 The Subgroup was reminded of Recommendation 5/2 of AFI/7 RAN Meeting 1997, which urged States to develop contingency plans for their area of responsibility, in co-ordination with adjacent States, ICAO and interested international organizations, in order to facilitate early implementation of contingency measures, should services be disrupted.

8.4 Reference was also made to Assembly Resolution A36-13 Appendix M: *Delimitation of air traffic services airspaces*, whereby States providing air traffic services over the high seas are encouraged to enter, as far as is practicable, into agreements with appropriate States providing air traffic services in adjacent airspaces, so that, in the event the required air traffic services over the high seas cannot be provided, contingency plans, which may require temporary modifications of ATS airspace limits, will be available to be put into effect with the approval of the ICAO Council until the original services are restored.

8.5 The meeting acknowledged that, it can take several years before a need arises for the implementation (activation) of a specific contingency plan. Furthermore, that over time there are changes in routes, events, ATS and related capabilities, etc., which necessitate review and updating of the plans prior to final approval as the need for their implementation is required.

8.6 The Sub-Group noted that the Secretariat had received updated contingencies plans from some States. However, most States in the AFI Region have either not developed, not updated or not informed the Regional Offices about their contingency plans pursuant to ICAO provisions.

8.7 In view of the above, the meeting recognized the need to support States to address deficiencies related to contingency planning. It was also acknowledged that in order to enhance the effectiveness of contingency planning, coordination and implementation, experience has pointed to the benefit of using a common template.

8.8 Accordingly, the meeting reviewed and endorsed the contingency plan development template at **Appendix 8A** to the report on agenda item 8. The objective of the template is, amongst others:

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

8.9 In order to assist AFI States developing their contingency plans and enhance the effectiveness of contingency planning, coordination and implementation, the Sub-group endorsed the use of a common template for the development of contingency plans.

8.10 The meeting raised concern regarding significant delays in Regional Offices responses on communication from States in the process of developing contingency plans as indicated in Section 2.30 of Annex 11 to the Convention. It was highlighted that the delays discourage efforts for States to comply with ICAO provisions, as opposed to assistance being available from the Regional Offices as indicated in Annex 11.

8.11 Based on the above and in order to further assist AFI States in developing their contingency plans, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 11/38: DEVELOPMENT AND PROMULGATION OF CONTINGENCY PLANS

That,

a) AFI States are urged to develop/update and promulgate contingency plans in accordance with Annex 11 and Annex 15 provisions;

b) AFI States use available ICAO guidance material for the development and promulgation of contingency plans including the template at **Appendix 8A** to the report on Agenda Item 8**;** and

c) ICAO Regional Offices carry out a survey on the status of development of contingency plans in the AFI Region in order to inform the ATS/AIS/SAR Sub-Group for necessary action.

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

8.12 In order to further assist AFI States in the development of contingency arrangements, the meeting made available a contingency plan model at **Appendix 8B** containing exemplary material based on the template as at Appendix 8A the report on agenda item 8. It was emphasized that material is not to be adopted as such by States as is. However, it is to be used as a model, to improve understanding of the minimum requirements and other elements of plan that States should, through coordination and collaborative decision making (CDM), ensure that it is covered to the extent necessary for the particular State.

8.13 Accordingly, the actual material to be adopted by a particular State will be the outcome of an elaborate process involving several parties as indicated in Section 2.30 of Annex 11 and guidance in Attachment C of the Annex.

REPORT ON AGENDA ITEM 9: SEARCH AND RESCUE (SAR) AND CIVIL/MILITARY COORDINATION

9.1 The meeting recalled the provisions relating to States' obligations with regard to SAR which are rooted in the Convention on International Civil Aviation, specifically in Article 25 thereof and Annex 12 to the Convention. It was further recalled that in support of the provisions of Annex 12, the basic principles, operational requirements and planning criteria regarding search and rescue services, are also indicated in the Basic Air Navigation Plan (ANP) (Doc 7474).

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

- AFI 7 meeting recommendations:

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

- APIRG 15 Conclusion and Decision:

  – Conclusion 15/97 Search and Recue (SAR)
  – Decision 15/98 SAR Funding

- SP AFI/8 RAN Meeting
  – Recommendation 6/22 – Establishment of sub-regional search and rescue (SAR) arrangements

9.3 The Sub-group acknowledged that the abovementioned AFI/7 provisions relating to SAR continue to have high relevance, and that more effort was necessary to give effect to the APIRG Conclusions and SP AFI/8 RAN Recommendation..

9.4 In addition to that and in order to support and facilitate States in discharging their responsibilities under Article 25 of the Convention, the Assembly has adopted Resolution 36-13: *Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation,* which is reviewed and updated as necessary at every Assembly Session. Appendix N of the Resolution is about *Provision of Search and Rescue Services*, and the resolving clauses of Appendix N address various elements that are pertinent to implementation: delimitation of areas, cooperation with maritime search and rescue services, agreements with other States, delegation of responsibilities, and remedies to inadequacies in the provision of efficient SAR services.

9.5 The meeting recalled that the International Cospas-Sarsat System ceased satellite processing of 121.5/243 MHz beacons on 1 February 2009. As such, for continued sole users of the 121.5/243 MHz beacons (who have not installed 406 Mhz beacons), this brings the alert services

conditions to the pre-1985 era, when there was no satellite coverage service for the beacons.

9.6 Based on the above, the meeting agreed that more effort should be expended by the Sub-Group in its future meetings, to foster implementation of the SARPs. Furthermore, the meeting agreed to establish a task force pursuant to SP AFI/8 RAN Recommendation 6/22, and accordingly formulated the following Draft Decision.

DRAFT DECISION 11/39 AFI SAR SERVICES INTEGRATION TASK FORCE (ASSI TF)

That, in order to progress the initiatives taken at the Port Elizabeth Consultative Conference of October 2007 on integration of SAR services and similar other initiatives in the AFI Region, the AFI SAR Services Integration Task Force (ASSI TF) is established with the terms of reference at **Appendix 9A** to the report on agenda item 9.

9.7 The meeting also re-formulated ATS/AIS/SAR SG/10 Conclusion 10/37: *Search and Rescue Services as follows:*

DRAFT CONCLUSION 11/40 SEARCH AND RESCUE (SAR) SERVICES

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

a) urged to establish joint aviation/maritime rescue coordination centres (RCCs) in order to optimize usage of resources and coordination;
b) encouraged to establish sub-regional task forces to progress the development SAR cooperative arrangements and integration of SAR services; and
c) urged to consider entering into agreements with States that have adequate facilities (within or outside the sub-region) to assist in SAR operations.

Civil/Military Coordination

9.8 The meeting recalled that provisions relating to the subject of coordination of civil air traffic with military activities is covered in a number of ICAO documents, in particular: the Convention (Article 3) Annexes 2, 11 and 15, PANS ATM (Doc 4444), Air Traffic Services Planning Manual (Doc 9426), Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations (Doc 9554) and Manual concerning Interception of Civil Aircraft (Doc 9433).

9.9 The meeting was presented with a review of civil/military issues and provided with an update on relevant ICAO provisions, in particular Assembly Resolution A36-13 Appendix O -- *Coordination of civil and military air traffic*, as well as on Global Air Traffic Management Forum on Civil/Military Cooperation convened at ICAO HQ in Montreal, Canada from 19 to 21 October 2009.

9.10 The Sub-Group recalled AFI/7 RAN Meeting Recommendation 5/3 – *Civil/Military Coordination* and APIRG 15 Conclusion 15/52: *Civil/Military Coordination*, all urging States to take a number of measures including establishment of appropriate civil/military bodies, informing military authorities about ICAO provisions, and arranging permanent liaison and close coordination between civil ATS units and relevant military units

9.11 The meeting also acknowledged the increasing significance of coordination between civil ATS providers and relevant military authorities in order to address safety and efficiency concerns, in particular, with the increasing demand on the airspace due to growth in various civil aviation activities, the economic pressure facing the air transport industry, as well as increasing environmental concerns. These aspects have been duly considered in the ICAO Strategic Objectives as follows:

Strategic Objective A: Safety – Enhance global civil aviation safety
Strategic Objective C: Environmental Protection – Minimize the adverse effect of global civil aviation on the environment
Strategic Objective D: Efficiency – Enhance the efficiency of aviation operations

9.12 The meeting was apprised on the Global Air Traffic Management Forum on Civil/Military Cooperation, Montreal, October 2009. It was noted that the forum considered a Draft Outline of the ICAO Guidance on Civil/Military Cooperation, which had been prepared by an ICAO informal drafting group. One of the objectives in the drafting is that States will be requested to provide ICAO with information on their best practices for civil/military cooperation as well as for the management of airspace use.

9.13 It meeting noted in particular that, the word “cooperation” instead of the usual “coordination” has been used in the title of the said draft guidance material. This is consistent with the realization of the role of cooperation to facilitate a wider spectrum of civil/military issues including coordination. Further requirement of this concept is notable in the Global Air Navigation Plan (GANP), in particular Global Plan Initiatives (GPI) 1 and 8 thereof.

9.14 Based on the above, the meeting agreed to more comprehensively address the issues of civil military/coordination and cooperation in the next meeting of the Sub-Group.

REPORT ON AGENDA ITEM 10: TRANSITION TO NEW ICAO FLIGHT PLAN CONTENT

10.1 The meeting recalled that on 28 May 2008, amendment No. 1 to the Fifteenth Edition of the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) was approved, calling for substantial changes to ICAO flight plan to take effect from 15 November 2012. The interim edition of the amendment is available as an attachment to State letter AN 13/2.1-08/50 dated 25 June 2008 on the ICAO-NET (www.icao.int/icaonet).

10.2 It was noted with concern that the AFI Region preparations, which (other than the SP AFI/8 RAN guidance) are yet to start effectively, were almost 18 months in delay, given the lead time of about 54 months provided by ICAO in May 2008.

10.3 It was noted that the new ICAO model flight plan form and related provisions are necessary to allow ATM systems to make optimum use of advanced aircraft capabilities as well as to meet the evolving requirements of automated ATM systems. The new flight plan addresses air navigation functionalities and technologies such as RVSM, PBN, RCP, ADS-B and GNSS, while maintaining a high degree of commonality with the existing flight plan format. It should be noted that the amendment to the flight plan is an interim step towards a completely revamped system of interaction between aircraft and the ATM system, wherein the aircraft will be an integral part of the ATM system as envisaged in the Global ATM Operational Concept.

10.4 The meeting was informed on the preparations for implementation of the new provisions related to flight plan established by Amendment 1 to the 15th edition of PANS-ATM (Doc 4444). It was also recalled in this regard that the Special AFI/8 Regional Air Navigation Meeting (SP AFI/8 RAN) Durban, South Africa, 24 to 29 November 2008 noted that the impact of the modifications to flight data processing systems would vary from one air navigation service provider and State to another depending on their data requirements, the level of validation necessary and the types of systems in place.

10.5 The SP AFI/8 RAN acknowledged in particular, that the implementation of Amendment 1 to Doc 4444 would require significant effort and lead time for States, air navigation service providers and aircraft operators, and that because the change-over should be coordinated with all stakeholders, the planning and implementation regional groups (PIRGs) should develop coordinated transition plans with common strategies and mitigation measures. The RAN Meeting therefore agreed to a basic checklist in the form of a Performance Framework Form (PFF), to be followed by States and used by APIRG to monitor transition efforts. Accordingly, the SP AFI RAN formulated Recommendation 6/5 – Implementation of the new ICAO model Flight Plan Form.

10.6 As part of the preparations and considering that the transition between the present to the new flight plan provisions may present challenges at a regional and local level, the meeting was informed on the ICAO efforts to help the achievement of a harmonized implementation of the new provisions.

10.7 Besides the transition guidelines already published by ICAO in State Letter AN 13/2.1-09/9 dated 06/02/2009, the meeting was informed and introduced to the Flight Plan Implementation Tracking System (FITS), a web based tool that can be accessed at **http://www2.icao.int/en/FITS/Pages/home.aspx** to monitor the implementation of the new FPL in all ICAO Regions and help States and any other organization involved in flight data processing system to clarify issues related to the interpretation and implementation of the new provisions.

10.8 The meeting agreed that for coordination purposes one of the information requested is the State point of contact for FPL issues. In this regard and in order to advance the assessment of impact of the changes in the new flight plan content the meeting was informed that the ESAF Regional Office circulated to the ESAF (area of accreditation) States, State Letter Ref: ES AN 4/3 – 0825 dated 21 December 2009, requesting States to provide:

a) Point of Contact for flight plan content transition, and contact details thereof;
b) Indication of whether or not processing of flight plan information was automated; and
c) Whether or not capability exist to process the new 2012 content.

10.9 Despite the apparent simple and straight-forwardness of the information requested, the meeting was informed that response to the requested information has been very low; only about 20% States responded.

10.10 In this regard and to start the coordination process for implementation, the meeting agreed that a provisional point of contact could be the participants of the meeting and if in the future a State decides to change the point of contact this could be done any time directly with the ICAO ESAF or WACAF Regional Offices. These provisional points of contact will be used by the secretariat to get the other information requested to complete the FITS as necessary.

10.11 The meeting also agreed that, to deal with regional matters and coordinate and support the implementation of the new provisions a Flight Plan Transition Task Force (FPLT TF) should be established. According the meeting formulated the following Draft Decision:

DRAFT DECISION 11/41: ESTABLISHMENT OF THE AFI FLIGHT PLAN TRANSITION TASK FORCE (FPLT TF)

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

a) the AFI Flight Plan Transition Task Force (FPLT TF) is established with the terms of reference (TOR) at **Appendix 10A** to the report on agenda item 10;

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

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

d) noting that after APIRG 17 the next regular meeting of APIRG will be in 2012, the ATS/AIS/SAR SG may endorse the Regional Strategy and Plan to the Task Force TOR, including changes thereto, on behalf of APIRG.

10.12 The meeting, taking as a basis the ATM performance objectives and the Performance Framework Form (PFF) developed by the SP AFI/8 RAN also agreed to a basic checklist in the form of a revised PFF, to be followed by States and APIRG to monitor the transition efforts. The revised PFF is at Appendix 3A to the report on Agenda item 3.

10.13 The meeting was informed that users prefer the transition to the new provisions should be done by all States at the same date, 15 November 2012, and that aiming for the standardization of the contents of flight plan; the current provisions should be raised to a status of Standards in Annex 2 to the Convention on International Civil Aviation. The secretariat clarified that the date, as any other regional issue should be discussed by the task force to be put in place and all ICAO efforts are to achieve a global implementation of the new provisions as it is; that would have the same effect in terms of standardization.

10.14 The meeting was of the view that in consideration of the preparatory and implementation issues related to the new flight plan format, it is necessary to educate concerned stakeholders in order to enable their optimum contribution in the transition process. In this regard, the meeting formulated the following Draft Conclusion:

DRAFT CONCLUSION 11/42: CONVENING OF A WORKSHOP ON IMPLEMENTATION OF NEW ICAO FLIGHT PLAN MODEL PROVISIONS

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

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REPORT ON AGENDA ITEM 11: AIS/MAP ISSUES

11.1 The meeting reviewed the Summary Report of the Third Regional AIM Congress, Fourth AFI-CAD Informal Consultative meeting , First AFI e-TOD Working Group Meeting, and the Fifth Meeting of the AFI AIS/MAP Task Force, pursuant to the implementation of APIRG/16 Conclusions 16/41, 16/42, 16/43, 16/44 respectively, taking into account SP AFI RAN/8 Meeting Recommendations 6/11 and 6/25 which call for the implementation of WGS-84, e-TOD and the elimination of AIS-MAP deficiencies).

11.2 The meeting also noted that the main objective of the Third Regional AIM Congress organized by the Global AIM Consortium in South Africa was to inform and involve the ICAO AFI Region in the evolution of the Concept of AIM and to act as catalyst for change.

11.3 The Congress noted that the Special AFI RAN/8 Meeting recalled that APIRG and AFI States had been working towards WGS-84 implementation for many years and that a large part of the work had been completed by most States. However, considerable work still remains. Additionally, the WGS-84 reference system requires regular updating. The SP 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.

11.4 In order to keep pace on the subject, the Secretariat prepared a regional status report at Appendix- A to Agenda Item 11 for consideration and review by the APIRG/17 Meeting. On this basis, the meeting adopted the following Draft Conclusions to guide the work of APIRG.

DRAFT CONCLUSION 11/43- SIP PROJECT FOR COMPLETE WGS-84 IMPLEMENTATION IN THE AFI REGION.

That, APIRG take necessary action to initiate an SIP for the total and complete implementation of WGS-84 within AFI States having difficulties to complete WGS-84 implementation.

11.5 The meeting also noted that the adoption of Amendment 36 to Annex 15, on 22 February 2010, introduced some changes related to AIS automation. In this regard, it was highlighted that the provision of automated pre-flight information service was upgraded to a Standard. It was noted that this represents a signal that the transition to AIM has begun and that the introduction of automation enabling digital data exchange needs to be started in States.

11.6 The meeting further noted that amendment 36 to Annex 15 to the Chicago Convention included a Recommendation for the provision of an eAIP, which is based on a format that allows for digital data exchange. It was considered that clear provisions and guidance are necessary to prevent proliferation of eAIP formats and that a standard layout would simplify access by users. Accordingly, the adopted amendment specified that when the eAIP is provided, the information contained in the eAIP shall follow the content and structure of the paper AIP as specified in Annex 15, Appendix 1. It was noted that, in this Appendix 1, the contact information in the AIP for designated authorities and responsible services has been updated to include e-mail and website addresses and discontinue the inclusion of telex numbers.

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11.7 The meeting also reviewed the Fourth consultative meeting of the AFI Regional Study Group on the Establishment of a Centralized AFI Region AIS Data Base (AFI – CAD) held in Johannesburg, South Africa, 26 June 2009. The main objective of this Informal consultative meeting was for States and Stakeholders to provide inputs to assist the ICAO Designated Consultant in the consolidation of the draft AFI-CAD Business Plan. However, the meeting revised the AFI-CAD Guidance material in order to include new additional Recommendations endorsed by the Study Group *(Recommendations 11 to 22)* **of Appendix 11A** to agenda item 11.

11.8 The meeting reviewed the Report of the First Meeting of the AFI Region Electronic Terrain and Obstacle Data Working Group (AFI e-TOD WG/1) held in Johannesburg South Africa on 27 June 2009. The meeting noted the advantages associated with e-TOD confirming that all of them are safety-related and highlighted that the AFI e-TOD Working Group was established with the main objective to assist and guide States for a harmonized, timely and cost-effective implementation of e-TOD. The meeting elaborated on the Implementation of e-TOD templates adopted by the working Group and the draft development of a policy for the management of national e-TOD programmes by States in the AFI Region.

11.9 The meeting also noted that Amendment 36 to Annex 15 to the Chicago Convention introduced important changes to Chapter 10 related to eTOD. The meeting noted that the coverage areas for sets of electronic terrain and obstacle data has been amended to be specified as follows :

- Area 1: the entire territory of a State;

- Area 2: within the vicinity of an aerodrome, sub-divided as follows;

- Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exist,
- Area 2b: an area extending from the ends of Area 2a in the direction of departure , with a length of 10km and a splay of 15% to each side,
- Area 2c : an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and
- Area 2d: an area outside the Areas 2a, 2b, and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, which ever is nearest;

- Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90m from the runway centre line and 50m from the edge of all other parts of the aerodrome movement area.

- Area 4: The area extending 900 m prior to the runway threshold and 60 m from each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II and III.

11.10 The meeting highlighted that the implementation of eTOD provisions is a challenge for all concerned. It was also recognized that since some of those who should be involved in the implementation process were not aware of the responsibilities that they might have and that only a small cross section of those affected were fully aware of the implications and the new responsibilities arising. Furthermore, as a result of the nature of the task and the new technologies and standards that are involved, it was underlined that many stakeholders require training to enable them to perform the tasks for which they are responsible.

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11.11 Based on the above, the meeting agreed that States should organize awareness campaigns and training events (workshops) involving all concerned personnel from within and outside the Civil Aviation Authority in order to provide an overview of the technical, legal, institutional and financial issues related to eTOD as well as of the actions that need to be taken in implementing eTOD and to bring a high- level understanding of the associated topics

11.12 The meeting also 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 terrain and obstacle data (eTOD) provisions.

11.13 On this basis, the meeting adopted the following Draft Conclusions to guide the work of APIRG.

DRAFT CONCLUSION 11/44: E-TOD CHECKLIST

That, States be encouraged to use the e-TOD checklist at **Appendix11B** to Agenda Item 11 in order to assist them in the process of planning and implementation of the e-TOD provisions.

DRAFT CONCLUSION 11/45: ADOPTION OF THE E-TOD IMPLEMENTATION PLAN TEMPLATE AND NATIONAL ETOD IMPLEMENTATION SAMPLE PLAN

That, States be encouraged to use:

a) the e-TOD Implementation Plan Template at **Appendix11C** as a regional model in order to assist them in the process of planning and implementation of the e-TOD provisions.

b) the National e-TOD Implementation Plan **at Appendix 11D** as a Sample when developing their national e-TOD plans.

DRAFT CONCLUSION 11/46: COORDINATION BETWEEN STATES AND DATA PROVIDERS/ INTEGRATORS FOR THE PROVISION OF E-TOD

That, collaboration between States and data providers/integrators should be considered in the process of e-TOD provision.

DRAFT CONCLUSION 11/47: RESOURCES AND MANAGEMENT OF NATIONAL E-TOD PROGRAMMES

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

b) States encountering difficulties in the implementation of E-TOD consider seeking assistance (individually or collectively) including from available programmes ICAO TCB and from other States.

REPORT ON AGENDA ITEM 12: REVIEW OF AIR NAVIGATION DEFICIENCIES IN THE ATM, AIS/ MAP AND SAR FIELDS

12.1 The meeting recalled that the identification, assessment and reporting of air navigation deficiencies is one of the regular tasks of the ICAO planning and implementation regional groups (PIRGs). Accordingly, in accordance with established practice, the sixteenth meeting of APIRG (Rubavu, Rwanda, 19 – 23 November 2007) reviewed the list of air navigation deficiencies in the AFI Region at Appendix 12A to the report on agenda item 12.

12.2 The meeting noted The SP AFI/ 8 RAN Meeting Rec.6/25 adopted performance objectives for the elimination of Air Navigation Deficiencies in the AFI Region, and called States to develop their national action plans, aligned with the regional performance objective, to eliminate their relevant deficiencies.

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

12.4 It was noted that concern has been expressed by the ALLPIRG/5 meeting in March 2006, the Air Navigation Commission and the Council on the persistent deficiencies, in particular those impairing safety. The meeting was informed also that the SP AFI/8 RAN Meeting in November 2008 expressed the same concerns raised by the Commission and the Council on the serious impact of unresolved deficiencies on safety, and agreed that States concerned should with extreme urgency, take concrete measures to eliminate all deficiencies impairing safety in the region. Accordingly, the SP AFI/8 RAN formulated Recommendation 6/25 – *Elimination of air navigation deficiencies in the AFI Region*.

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

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

DRAFT CONCLUSION 11/48: ELIMINATION OF AIR NAVIGATION DEFICIENCIES IN THE ATM, AIS/MAP AND SAR FIELDS

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

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

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

c) AFI States provide copies of action plans developed pursuant to SP AFI/8 RAN Recommendation 6/25 to the concerned APIRG Subsidiary bodies and the Regional Offices.

d) APIRG adopt a matrix similar to the model in safety management guidance (Appendix F) to facilitate a consistent assessment and prioritization of deficiencies (i.e. Urgent, Top Priority and Intermediate requirement).

(This Draft Conclusion supersedes ATS/AIS/SAR SG10 Conclusions 10/38 and 10/39)

DRAFT CONCLUSION 11/49: DEVELOPMENT OF THE AFI WEB-BASED AIR NAVIGATION DEFICIENCY DATABASE

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

REPORT ON AGENDA ITEM 13: APPELLATION OF THE SUB-GROUP AND FUTURE WORK PROGRAMME

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

13.2 The meeting was of the view that the use of words "Air Traffic Services" in the name of the Sub-Group did not adequately reflect the functions of the Sub-Group. Furthermore, the meeting agreed that the title of the name does influence views of authorities regarding selection of expertise for participation.

13.3 In discussing options for change of the name of the Sub-Group, the Sub-Group gave consideration to the meaning of air traffic management (ATM) used in the context of PANS ATM Doc 4444, the wider meaning in the ATM Operational Concept, other views and probable impact on the name. It was also acknowledged that replacement ATS, AIS and SAR by ATM in favour of the wider meaning of the latter, could very well lead to a situation whereby some authorities misunderstand the name to mean that AIS and SAR expertise is not required at the Sub-Group meetings and its business.

13.4 Concern was raised that despite various efforts including APIRG and RAN Meetings Conclusions and Recommendations aimed at encouraging the participation of SAR experts in the meetings of ATS/AIS/SAR Sub-Group, the SAR field was consistently, significantly underrepresented in the Sub-Group meetings. Furthermore, despite more than thirty working papers that were submitted at the ATS/AIS/SAR SG/11, typically only one working paper covers SAR issues. It was noted that part of the challenge could be the limitation or lack of SAR expertise in the Region.

13.5 In this context, the meeting recognized the importance of retaining SAR in the Sub-Group name, and agreed to increase focus on SAR issues. Moreover, the meeting agreed that ICAO ROs should increase the use of targeted communication to States urging them to include SAR expertise to the Sub-Group meetings and to actively contribute to the work of the Sub-Group with such materials as working papers.

13.6 The change of the term AIS to AIM was also considered, and after lengthy discussions the agreed to replace AIS with aeronautical information management (AIM) . As such, the meeting agreed on the change of the name from ATS/AIS/SAR Sub-Group to ATM/AIM/SAR Sub-Group. The meeting also reviewed and updated the terms of reference of the Sub-Group and accordingly formulated the following Draft Conclusion:

DRAFT DECISION 11/50: APPELLATION AND TERMS OF REFERENCE OF THE ATM/SAR/AIS SUB-GROUP

That, in order to facilitate consistency in the use of terminology and associated developments, the APIRG ATS/AIS/SAR Sub-Group is re-titled Air Traffic Management/ Aeronautical Information Management/ Search and Rescue/ Sub-Group (ATM/AIM/SAR SG) with the terms of reference as at **Appendix 13A** to the report on agenda item 13.

13.7 Further to the above, the meeting deliberated at length on the matter of joining the ATS/AIS/SAR SG and the CNS/SG in order to improve coordination between the two Sub-Groups as well as improve efficiency. Consideration was also given to available information on the experiences of other Regions that have had CNS/ATM Sub-Groups. The meeting agreed readily on the need to ensure proper coordination between the Sub-Groups. However, whether efficiency could actually be achieved by the merger could not be agreed. Furthermore, consideration was given to possible side effects of a merger, such as tandem consideration of the business of the two Sub-Groups that could result in excessively long meetings or inadequate consideration of issues, particularly considering that many areas in the ATS/AIS/SAR SG are yet to be adequately covered. Another consideration was that, based on resources currently available to the Sub-Groups of APIRG, languages services would not be available to any committees or break away sessions in which detailed technical material of the combined Sub-Group would be addressed.

13.8 The issue of the merger of the Sub-Groups was further deliberated jointly by participants of the ATS/AIS/SAR Sub-Group and the CNS/Sub-Group in a joint session held in the fourth day of the meeting, and similar pros and cons of the merger as were earlier discussed by the ATS/AIS/SAR Sub-Group were given more detailed consideration.

13.9 Based on the above, the matter of merging the ATS/AIS/SAR SG and the CNS/SG was not agreed. However, the meeting urged the Secretariat to ensure that future meetings of the two Sub-Groups continue to meet in the same week and that joint sessions should be arranged as necessary to ensure coordination on specific issues.

13.10 In accordance with the ICAO Business plan and the requirements for performance monitoring, the meeting developed a follow-up action plan as at **Appendix 13B** to the Report on Agenda Item 13.

REPORT ON AGENDA ITEM 14: ANY OTHER BUSINESS

14.1 In accordance with the APIRG Procedural Handbook, the Sub-Group was expected to decide on the dates and venue of the next meeting.

14.2 Two proposals were made for the venue of the ATS/AIS/SAR SG/12, by Niger and Senegal. The meeting expressed appreciation on the offers by the two States. The meeting also noted with appreciation that Senegal, as the host of the ICAO WACAF Regional Office since its establishment, had just completed new facilities to host the Regional Office and was eager to put the facilities in full use. It was agreed to acknowledge the commendable effort of the new facilities by Senegal by convening the next meeting of the Sub-Group at the new WACAF Regional Office facilities in Dakar tentatively in the April-May-June time frame in 2011.

14.3 However the meeting recognized that the dates and the venue of the meeting would have to be coordinated with other activities of the Regional Offices, and accordingly agreed that the ESAF and WACAF Offices would do the necessary in this regard.

14.4 The meeting agreed also to the draft provisional agenda for the next meeting of the Sub-Group as shown at **Appendix 14A** to the report on Agenda item 14, in order to facilitate advance preparation by States and organizations.

FOLLOW-UP ON PBN RECOMMENDATIONS OF SP AFI RAN 2008

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 3/3:	**Performance-based approach and measurement**	That APIRG and regional safety groups develop indicators that are specific, measurable, achievable, realistic and time bound and attach them to the performance framework forms (PFFs) in the appropriate box, using the following metrics and/or others determined to be appropriate indicators for the African continent	Include tasks in the APIRG & Subsidiary bodies programme	APIRG & Subsidiary bodies	Performance indicators for AFI Region	APIRG 17	
Recommendation 4/3:	**State Safety Programme**	That ICAO urge the AFI States, with cooperation from COSCAPs and RSOOs as applicable, to implement a State Safety Programme that incorporates effective occurrence investigations, the gathering of such safety data in a database compatible with ADREP and to share and analyze the data.	State Letter to urge implementation	ESAF & WACAF Offices	State Safety Programmes Regional Safety Programmes		Implementation on a continuous basis under ACIP programme

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 4/6:	**Investigation of air traffic services incidents and provision of comprehensive feedback to parties involved**	That, in coordination with their air navigation service providers, States: a) diligently conduct investigations on all reported air traffic services incidents having taken place in airspace under their responsibility; and; b) provide timely, documented feedback to all involved parties through participation in the established AIAG mechanism via the relevant ICAO regional office.	TAG activities	TAG, ATS SG States States	Resolution of UCRs Feedback to AIAG & ICAO Regional Offic		Implementation on a continuous basis Implementation on a continuous basis
Recommendation 4/7:	**Reporting of air traffic services incidents**	That air operators be reminded, by IATA and their State Authority, of their obligation to ensure that air traffic services incident reports are filed on a timely basis, following the ICAO model as contained in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444), Appendix 4, and provide sufficient relevant information to facilitate the ensuing investigation.	Implement Recommendation Make reporting form more available and usable	States, Operators States, ATS/AIS/SAR SG	Increased ATS incidents reporting using Doc 4444 incident reporting form		Implementation on a continuous basis

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 6/1:	**Regional performance framework**	a) APIRG adopt the performance-based framework for air navigation systems planning as detailed in the report of this meeting, identifying regional performance objectives and utilizing the performance framework forms (PFFs);	Update the PFF	APIRG & Subsidiary bodies	Complete and updated PFFs	APIRG 17	
		b) APIRG develop additional PFFs to meet new performance objectives as necessary; and	Develop other (additional) PFFs		Update of additional PFFs	APIRG 17	
		c) the performance objectives and the associated PFFs adopted by the meeting and any other PFFs developed by APIRG, be integrated into the CNS/ATM implementation plan for the AFI Region (Doc 003) which should then be updated to serve as an integrated planning document for the AFI Region.	Integrate PFFs into Doc 003	ESAF & WACAF Offices	Integration of PFFs in Doc 003	ATM/AIS/ SAR SG/12	
Recommendation 6/2:	**National performance framework**	That States adopt a national performance-based framework for air navigation systems planning as detailed in the report of this meeting, identifying national performance objectives, aligned with the regional performance objectives, utilizing the performance framework forms.	State Letter	ESAF & WACAF Offices	Up to date State PFFs	2009-2015	

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 6/5:	**Implementation of the new ICAO Model flight Plan Form**	a) APIRG adopt the ATM Performance Objective: Transition to the New ICAO Model Flight Plan Form as contained in the performance framework form (PFF) in Appendix A to the Report on Agenda Item 6; and b) **S**tates coordinate, through APIRG, their transition to the new ICAO flight plan and follow the checklist in the PFF in Appendix A to the Report on Agenda Item 6 in order to ensure harmonization and orderliness in their transition to the new flight plan by 15 November 2012.	Update flight plan implementation PFF Participate in FITS Establish Transition Task Force	ATS/AIS/SAR SG States ESAF & WACAF Offices APIRG ATS/AIS/ SAR SG	Adoption of updated PFFs Streamlined coordination transition to new flight plan content by Nov 2012 Guidance & coordination of implementation	APIRG 17 2009 – Nov 2012 Task Force established April 2010	Coordination in progress till 2012
Recommendation 6/6:	**Operational safety assessment methodology**	That APIRG adopt the ATM Performance Objective: Operational Safety Assessment Methodology as contained in the performance framework form in Appendix B to the Report on Agenda Item 6.	Implement Recommendation	APIRG ATS/AIS/SAR SG	Complete and updated PFFs	APIRG 17	

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 6/7:	**Establishment of a Tactical Action Group (TAG)**	a) A Tactical Action Group be created in the AFI Region with the Terms of Reference and Work Programme outlined in Appendix C to the Report on Agenda Item 6; and;	State Letter Convene TAG and its activities	ICAO HQ ESAF & WACAF Offices	Information on TAG objectives Resolution of UCRs		Completed Implementation on a continuous basis
		b) States as a matter of priority make all efforts to assist and comply with requests from the TAG group.	State Letter	ICAO HQ ESAF & WACAF Offices	Cooperation with TAG		Implementation on a continuous basis
Recommendation 6/8:	**Reduced vertical separation minimum (RVSM) monitoring and follow-up activities**	That AFI States support: a) the long-term submission of State RVSM operationally approved aircraft to the AFI Regional Monitoring Agency (ARMA); b) provision of long-term support to the AFI height monitoring programme; c) long-term collection of safety assessment data; d) the availability of personnel to fulfil the role of RVSM National Programme Managers;	Inform and urge State action Implement Recommendation	ESAF & WACAF Offices States	Awareness & support of ARMA activities Submission of all data to ARMA Support of RVSM implementation and ARMA activities Appointment & function of		Implementation on a continuous basis

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		e) the establishment of the ARMA scrutiny group in 2009; and f) measures to reduce the large number of horizontal incidents in the AFI Region.			RVSM Programme Managers Reduced horizontal incidents	Scrutiny Group established Implementation on a continuous basis	
Recommendation 6/9:	**Performance-based navigation (PBN) performance objectives**	That APIRG adopt the Performance Objectives as contained in the performance framework forms in Appendix D to the Report on Agenda Item 6: a) optimization of the air traffic services (ATS) route structure in en-route airspace; b) optimization of the ATS route structure in terminal airspace; and c) implementation of vertically guided required navigation performance (RNP) approaches. That States develop their national action plans to meet the requirements of the regional performance framework forms, as a matter of priority to meet the PBN implementation goals established by Assembly Resolution A36-23.	➢ Implement recommendation. ▪ Identify action parties and specific target dates. ▪ Update PFFs. Follow-up Provide guidance for States. Identify action parties and specific target dates. Update PFFs. Follow-up	APIRG (PBN/TF) States	Updated Regional and National PFFs	PBN TF/4	ATS/AIS/SAR SG11 has updated the initial PFFs
Recommendation 6/10:	**Support for establishment of an Africa ICAO**	That: a) States and international organizations	Provide support to FPO.	States and International	Support for FPO	Based on APAC	

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
	flight procedure office	support the implementation of an AFI flight procedures office; and b) ICAO disseminate a letter, with supporting documentation, inviting interested States and international organizations to submit proposals for establishment and hosting of the FPO.	State letters to invite States to make proposal	Organisations ICAO HQ.	Invitation to establish FPO.	FPO experience to be reviewed by APIRG/17.	
Recommendation 6/11:	**Implementation of WGS-84 and eTOD**	That APIRG adopt the AIM Performance Objective: Implementation of world geodetic system-1984 (WGS-84) and electronic terrain and obstacle data (eTOD) as contained in the performance framework form in Appendix E to the Report on Agenda Item 6.	Implement Recommendation	APIRG	Full implementation of WGS-84 & eTOD		Implementation on a continuous basis
Recommendation 6/12:	**Full implementation of Atlantic Ocean random RNAV routing area (AORRA)**	That ICAO: a) take immediate action to inform all concerned States that implementation of AORRA Phase II will be delayed until further notice; and b) as a matter of urgency, facilitate and coordinate implementation of all phases of AORRA and assist in determining a suitable date for AORRA Phase II implementation.	State Letter Implement Recommendation	WACAF Office Concerned FIRs, SAT	Information to States Revised implementation date of AORRA Phase II		Completed

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 6/13:	**Publication of GNSS-based RNP approach procedures**	That: a) States having taken part in the IATA area navigation (RNAV) global navigation satellite systems (GNSS) procedures development and implementation programme and which had not yet done so, publish GNSS-based required navigation performance (RNP) approaches, and at the same time, remove any operational restrictions that may be in place; and; b) States that had not taken part in the IATA RNAV GNSS procedures development and implementation programme, seek assistance from appropriate organizations with the objective of designing and implementing GNSS-based RNP approach procedures.	- Publish GNSS-based instrument Flight Procedures (IFPs). - Remove restrictions. Coordinate / Seek assistance	States. States	GNSS-based IAPs published and operational. Regional implementation of GNSS Based RNP procedures	APIRG/17 APIRG/17	
Recommendation 6/22:	**Establishment of sub-regional search and rescue (SAR) arrangements**	That APIRG: a) adopt the SAR Performance Objective: Establishment of Sub-regional SAR Arrangements as contained in the performance framework form in Appendix H to the Report on Agenda Item 6; b) adopt as policy the general concept of sub-regional SAR provision from joint aviation/maritime RCCs as a key strategy in the improvement of the Africa-wide SAR system;	Update RAN PFFs Establish SAR TF to coordinate and progress outcome of PE Consultative Conference Adoption of	APIRG ATS/AIS/SAR SG States and Sub-regional bodies)	SAR PFF Regional SAR TF Joint SAR Policy	APIRG 17 APIRG 17	

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		c) support the establishment of a task force to progress the initiative taken at the Port Elizabeth Consultative Conference of October 2007 on the integration of SAR services in the southern African Region; and d) cooperate with ICAO and IMO in their continuing collaboration with African States to implement sub-regional, joint RCCs at strategic locations on the African continent.	Policy Provision of support		Establishment and operation of a SAR TF Implementation of Sub-regional JRCCs	2009 -2012 2010-2012	

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 6/25:	**Elimination of air navigation deficiencies in the AFI Region**	That: a) APIRG adopt the Performance Objective: Elimination of Air Navigation Deficiencies in the AFI Region as contained in the performance framework form in Appendix J to the Report on Agenda Item 6; b) States develop their national action plans, aligned with the regional performance objective, to eliminate their relevant deficiencies in the fields of aerodromes and ground aids (AGA), air traffic management (ATM), aeronautical information services (AIS), communications (CNS), meteorological (MET) and search and rescue (SAR), priority being given to the deficiencies as contained in the performance framework form in Appendix J to the Report on Agenda Item 6; and c) States take steps to seek assistance where required for the implementation of their action plans through ICAO mechanisms such as Technical Co-operation Bureau (TCB), International Financial Facility for Aviation Safety (IFFAS), special implementation projects (SIPs) and from industry stakeholders and donor agencies.	State Letter Review list of deficiencies Find solutions for elimination of deficiencies Seek assistance through TCB/SIPs	ESAF & WACAF Offices ATS/AIS/SAR SG ATS/AIS/SAR SG States States	Reminder on elimination of deficiencies Updated list of deficiencies Elimination of deficiencies Implementation of Action Pan	 ATM/AIS/SAR/SG12 	Implementation on a continuous basis Implementation on a continuous basis Implementation on a continuous basis

Conc/Dec No. Strategic Objectives*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Recommendation 6/26:	**A collaborative approach to air traffic management (ATM) systems planning that considers the environment**	That APIRG adopt an approach to the planning and implementation of ATM systems and ATM improvements that supports collaboration and considers best outcomes and the environment.	Establish compliant work programmes	APIRG & Subsidiary bodies	A collaborative approach to air traffic management (ATM) systems planning that considers the environment		Implementation on a continuous basis

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*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

FOLLOW-UP ACTION ON PBN RELATED APIRG/16 CONCLUSIONS/DECISIONS

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
DECISION 16/2: A	**ESTABLISHMENT OF AN APIRG PERFORMANCE-BASED NAVIGATION TASK FORCE (APIRG/PBN/TF):**	That an APIRG PBN Task Force, with terms of reference as outlined in Appendix D to this report, be established to develop a PBN implementation plan for the AFI Region and address related regional PBN implementation issues.	Nomination of Members of the Task Force	ESAF Office	State Letter to nominate Members. .		Completed
CONCLUSION 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.	Encourage States to develop State PBN implementation Plan 2008 through State Letter.	ESAF Office	State Letter. PBN National Plans	 Dec 2010	Completed Some States yet to develop their plans
CONCLUSION 16/4: A	**DESIGNATION OF CONTACT PERSON FOR PBN IMPLEMENTATION:**	That, by 28 February 2008, States designate a focal contact person responsible for Performance-Based Navigation implementation and provide details of the contact person to ICAO Regional Offices for the AFI Region.	Follow-up with States for POC through State Letter.	ESAF & WACAF Offices	State Letter	Feb 2008	Completed

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
CONCLUSION 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.	Issue State Letter	ESAF & WACAF Offices	State Letter	Nov 2009 APIRG 17	Completed
CONCLUSION 16/21: A & F	**IMPLEMENTATION OF GNSS EN-ROUTE AND NON-PRECISION APPROACH OPERATIONS:**	That AFI States continue their efforts to implement GNSS applications for en-route and non-precision approach operations as part of Phase 1 of AFI GNSS Strategy.	Issue State Letter	ESAF & WACAF Offices	State Letter	Nov. 2009	Completed

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
		In so doing, particular attention should be accorded to meeting all GNSS implementation requirements, including establishment of GNSS legislation, regulatory framework, and approval and monitoring procedures.					
CONCLUSION 16/23: A	**AERONAUTICAL INFORMATION RELATED TO GNSS**	That when implementing GNSS-based operations, AFI States ensure that the relevant aeronautical information is provided to the users as appropriate.	Issue State Letter	WACAF Office	State Letter	Nov 2009	Completed

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
DECISION 16/27: A	**ESTABLISHMENT OF AN AFI AERONAUTICAL SURVEILLANCE IMPLEMENTATION TASK FORCE**	That an AFI Aeronautical Surveillance Implementation Task Force (AS/I/TF) be established with the following terms of reference: a) Determine the operational performance requirements for aeronautical surveillance in the AFI Region, including en-route, terminal areas (TMAs) and aerodromes operations; b) Identify and quantify near term and long term benefits of relevant surveillance candidate systems; and c) Develop a consistent draft AFI surveillance implementation plan including recommended target dates of implementation, taking into account availability of SARPs and readiness of airspace users and air navigation service providers for a coordinated implementation of service as required.	Hold AS/I/TF meetings	ESAF and WACAF Offices	Organize meetings of ASI/I/TF		Completed TF/1 held in Johannesburg during Sept 2009

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
		Notes: *1. The Task Force should be of multidisciplinary nature to cover all aspects related to its assigned work.* *2. While undertaking the task, with a view to avoiding any duplication, the Task Force should take into account:* *a) the work being undertaken by ICAO Panels; and* *b) the relevant RAN recommendations and APIRG Conclusions and Decisions pertaining to aeronautical surveillance;* *3. The Task Force should complete its work in coordination with APIRG ATS/AIS/SAR and CNS Sub-Groups, and present the results to the next meeting of APIRG.* *4. In assessing the readiness of airspace users, take into account business aviation usage.*					

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
DECISION 16/29: A	**ACTIVITIES OF AFI CNS/ATM IMPLEMENTATION COORDINATION GROUPS (ICGs**	That the CNS/ATM Implementation Coordination Groups (ICGs) established by APIRG for each area of routing should pursue their assigned work in accordance with Doc 003 provisions.	Hold ICG meetings for AFI areas of routing	ESAF and WACAF Offices	Organize ICG meetings in the Region	2010 -2015	Implementation on a continuous basis
DECISION 16/30: D	**HARMONIZATION OF TARGET DATES OF IMPLEMENTATION OF AFI OPERATIONAL SYSTEMS**	That: a) the CNS Sub-Group should harmonize target dates with ATM/AIS/SAR/SG regarding operational system implementation in the AFI programme; and b) reference CNS and ATM implementation documents reflecting disparity in dates should be amended accordingly.		WACAF Office	Harmonised Target dates	2010-2015	Implementation on a continuous basis
CONCLUSION 16/31: A	**COLLECTIVE APPROACH FOR THE MANAGEMENT OF CNS/ATM SYSTEM ELEMENTS**	That the air navigation service providers (ANSPs) adopt a collective approach and speak in a single voice on issues of common interest related to the implementation of CNS elements of the CNS/ATM systems (such as service level agreements with ATN service providers, system availability, etc.).	Issue State Letter	WACAF Office	State Letter		Completed

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
CONCLUSION 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. ***Secretariat Note****:* *The FANS1/A Operational Manual, while still relevant to the AFI Region, in its present form, is being reviewed in order to incorporate operations in the North Atlantic. The proposed document under development will be identified by a new title, 'GOLD" and will be published under the auspices of ICAO.*	Issue State Letter	ESAF & WACAF Offices	State Letter		Completed *See Note in Column 3*
DECISION 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**.		ESAF & WACAF Offices	Revised TOR for ATS/AIS/SAR SG		Completed
DECISION 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.		ESAF & WACAF Offices	Re-naming of APIRG RVSM TF		Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
CONCLUSION 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.	Coordinate with IATA Regional Office for AFI	ESAF Office	State Letter Funding available		Completed Implementation on a continuous basis
CONCLUSION 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.	Issue State Letter	ESAF & WACAF Offices	Updated AFI RVSM strategy/action plan		Completed
CONCLUSION 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.	Notify States through State Letter	ESAF & WACAF Offices States	State Letter Coordinated RVSM implementation		Completed
CONCLUSION 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	Revise the Training Manual Doc. 7192 Part E-3	ICAO Headquarters	Draft Training Manual		Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
		ICAO expedites the development of AIS training guidance material relating to the implementation of CNS/ATM system.					
CONCLUSION 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.		WACAF Office			Follow up at APIRG 17
CONCLUSION 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.	Request HQ for Expert	ICAO HQ WACAF Office AIS/MAP	Provide Expert		Completed
CONCLUSION 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.	Organize Seminar / workshops	WACAF Office	Conduct Seminar /workshops		Completed e-TOD Seminar held in Casablanca April 2008.
CONCLUSION 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.		APIRG	Adoption of EAD URS		Completed

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
CONCLUSION 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.		States	ATC Service	Jul 2008	Follow up at APIRG17
CONCLUSION 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.		ESAF & WACAF Offices States	Updated ATS Routes	Jul 2008	Follow up at APIRG 17
CONCLUSION 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.	Regional Offices coordinate with HQ/AFCAC	ESAF & WACAF Offices States ICAO HQ/ROs	SAR structures Integration of SAR Conclusions	APIRG 17 APIRG 17	

Conclusions/Decisions No. Strategic Objectives*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable / Intended Outcome	Target Dates	Status of Implementation
CONCLUSION 16/66: A	**REVIEW OF THE LIST OF INTERNATIONAL AIRPORTS IN THE AFI ANP**	That States make a review of the list of airports included in the AFI ANP and FASID and propose appropriate amendments, including the removal from the Plan of airports not used or planned to be used for international operations, based on current and projected aviation activities.	Issue State Letter asking for review and report back.	ESAF & WACAF Offices States	State Letter Updated list of international aerodromes		Completed Follow up at APIRG 17
CONCLUSION 16/67: A & D	**ELIMINATION OF AIR NAVIGATION DEFICIENCIES**	That States be reminded to adopt a step-by-step approach when implementing air navigation system elements, by giving priority to solving the deficiencies affecting all elements of the system.	Notify States through State Letter	ESAF & WACAF Offices States	State Letter Adopt step by step approach implementation	Nov 2009 2009-2015	Completed Implementation on a continuous basis
DECISION 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.	Notify Rwanda	WACAF Office	State Letter		Completed

*Note 1: 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

*Note 2: *Short term = 2009-2011, Medium term = 2009-2015*

FOLLOW UP ACTION ON ATS/AIS/SAR SG/10 CONCLUSIONS/DECISIONS

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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.~~	~~Secretariat~~				Conclusion considered redundant
~~**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.~~	~~Secretariat~~				Conclusion considered redundant.
~~**Conclusion 10/03**~~	~~**Introduction of strategic lateral offset 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~~	~~Secretariat~~				Conclusion considered redundant.

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		• ~~(**see Appendix D** to this report) as reflected in DOC 7030~~ • ~~APIRG determines the areas where the strategic lateral offset procedures should be implemented.~~					

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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.~~	~~Secretariat~~				Decision re-formulated below as Draft Decision 11/01
Draft Decision 11/01	**Dissolution of APIRG RVSM Task Force activities**	That, taking into consideration the successful implementation of RVSM in the AFI Region on 25 September 2008, and the establishment of the Tactical Action Group by the Special AFI RAN Meeting, 2008 (a) the AFI RVSM Task Force established under APIRG Decision 13/58 is dissolved; and (b) the ATS/AIS/SAR Sub-Group review and adjust its terms of reference accordingly in order to address issues related to RVSM implementation.	Secretariat	ATS/AIS/ SAR SG/11	Dissolution of APIRG RVSM TF		Follow up at APIRG17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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.~~	~~Secretariat~~				Conclusion considered redundant.
~~**Draft 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~~ ~~**a)** On Completion of the POSC, present the result to the appropriate APIRG meeting and also circulate it to States via the NPMs for information~~.	~~Secretariat~~				Decision considered redundant

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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).~~	~~Secretariat~~				Conclusion re-formulated below as Draft Dec 11/02
Draft Decision 11/02	**ARMA Scrutiny Group**	That the ARMA Scrutiny Group is established with the terms of reference at Appendix 2A to the report on agenda item 2.	Establish Scrutiny Group	ATS/AIS/ SAR SG	ARMA Scrutiny Group		Follow up at APIRG17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**Conclusion 10/06**~~ **Draft Conclusion 11/03**	**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.	Issue State Letter	ESAF & WACAF Offices	State Letter Updated Table AIS1 to AIS 8	Nov 2009	Completed Some States yet to update
~~**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.~~					Conclusion re-formulated below as Draft Con 11/04

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		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~~.					
Draft Conclusion 11/04	**Implementation of WGS-84 and electronic terrain and obstacle data**	a) The proposed FASID Table at **Appendix F** be adopted for inclusion as a requirement in the AFI FASID Document 7474 Vol II. b) APIRG adopts the draft AFI Region e-TOD Implementation strategy as proposed under **Appendix G** to this report.	Invite States' attention	ESAF & WACAF Offices States ESAF & WACAF Offices	Adoption of FASID Table Adoption of draft e-TOD strategy	APIRG APIRG17	
~~**Conclusion 10/08**~~ **Draft Conclusion 11/05**	**Submission of WGS-84 Implementation Survey Questionnaires**	That States submit their responses to the Regional WGS-84 Implementation survey by **30 November 2009.**	Issue State Letter	ESAF & WACAF Offices States	State Letter WGS-84 surveys	30 Nov 2009	Completed Many States yet to submit.

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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).~~	~~Secretariat~~				Decision considered redundant
~~**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 re-formulated below as Draft Con 11/06
Draft Conclusion 11/06	**Adoption of the AIS to AIM Transition Roadmap**	That in order to assist States in planning the scope and prioritising projects and actions for transition to AIM, the AFI Roadmap for transition from AIS is adopted as at Appendix 2X to the report on agenda item 2	Follow up adoption	AIS-AIM SG	Adoption of Roadmap	APIRG17	

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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.~~					
Draft Conclusion 11/07	**e-TOD implementation awareness campaigns**	That, taking into consideration the Annex 15 applicability dates of e-TOD provisions, resources required for the implementation of these new provisions, States' AIS providers 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.	Issue State Letter	ESAF & WACAF Offices States	State Letter e-TOD awareness	Dec 2010	Completed Follow up at APIRG17
~~**Conclusion 10/11**~~ **Draft Conclusion 11/08**	**Development and management of a national e-TOD program**	That ~~States~~, in accordance with sound management principles and procedures, States ~~should~~:		ESAF & WACAF Offices	National e-TOD program	2010-2011	

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		a) develop a framework and ~~a~~ detailed planning including priorities and timelines, for the implementation of ~~a~~ national e-TOD programmes; 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.		States	e-TOD inventory	2011	
~~**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 re-formulated below as Draft Con 11/09

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Draft Conclusion 11/09	**Coordination and exchange of experience for the implementation of e-TOD requirements**	That in order to support the implementation of e-TOD in the AFI Region, AFI States are encouraged to exchange experiences within the Region and with other States in other ICAO Regions.		ICAO Regional Offices States	Shared experiences on e-TOD		Follow up at APIRG17
~~**Conclusion 10/13**~~ **Draft Conclusion 11/10**	**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.		States	Quality assurance & availability of e-TOD data		Completed (
~~**Conclusion 10/14**~~ **Draft Conclusion 11/11**	**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.	Issue amendment Doc	ICAO HQ ESAF & WACAF Offices	Revised ANP	Dec 2010	Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**Decision 10/04:**~~ **Draft Decision 11/12**	**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**.		ICAO HQ ESAF & WACAF Offices	AFI e-TOD WG	APIRG17	
~~**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.	~~Secretariat~~				Decision re-formulated below as Draft Dec 11/13

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Draft Decision 11/13	**Dissolution of the AIS/MAP Task Force and establishment of the AIS-AIM Implementation Task Force**	That, in order to ensure the necessary focus in the support and coordination of the transition from AIS to AIM, the AIS/MAP Task Force is dissolved and the AIS-AIM Implementation Task Force is established with the terms of reference as at Appendix X to the report on agenda item yy (Appendix bb to this working paper)		ICAO HQ ESAF & WACAF Offices	Revised AIS/MAP TF TOR	APIRG17	
~~**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.~~	~~No action in light of ATS/AIS/SAR/ SG/10 Concl.10/13~~ ~~Secretariat~~				Conclusion Considered redundant

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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 re-formulated below as Draft Con 11/14
Draft Conclusion 11/14	**Aircraft PBN Equipage Surveys**	That, in order to support the implementation of PBN in the AFI Region: a) ICAO ESAF and WACAF Regional Offices in coordination with IATA and AFRAA conduct regular surveys on aircraft equipage within the AFI Region.	Follow-up for updated data	ESAF & WACAF Offices	Updated data		Implementation on a continuous basis

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		b) AFI States are urged to support the global and Regional efforts aimed at developing a database with accurate information on aircraft navigation capabilities.	Implement Conclusion	States			
~~**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.~~	~~Secretariat~~				Conclusion Considered redundant
~~**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.~~				Nov. 09	Conclusion re-formulated below as Draft Con 11/15

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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 Considered redundant
~~**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 account the performance based navigation (PBN) concept.~~					Conclusion re-formulated below as Draft Con 11/16

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		~~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.~~					

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Draft Conclusion 11/15	**Training in support of PBN implementation**	That, in order to support the implementation of PBN in the AFI Region: a) PBN Task Force identify priority training needs for implementation for PBN, involving; b) AFI Regional Offices organize Seminars/Workshops for training of relevant personnel directly involved in the implementation of PBN.	Implement Conclusion	PBN TF	Identify training needs PBN W/Shops & seminars		Follow up at APIR17 Implementation on a continuous basis
~~**Conclusion 10/21:**~~	~~**PBN Legislation**~~	~~That the States that have not done so, include in their legislation and regulations the provisions relating to PBN.~~				~~Dec.2009~~	Conclusion re-formulated below as Draft Con 11/17
Draft Conclusion 11/16	**PBN enabling Legislation**	That, AFI States that have not already done so, include in their legislation and/or regulations provisions to enable the implementation of PBN.	Issue State Letter	ESAF & WACAF Offices States	States' awareness PBN implementation enabling regulatory provisions	May 2010	Completed Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**Conclusion 10/22:**~~ **Draft Conclusion 11/17**	**Participation of representatives of States involved in PBN approval process**	That, in order to support the PBN planning and implementation processes, AFI States are urged to include in their delegations to meetings of the PBN Task Force, experts and officials involved in the PBN approval process of aircraft operators.	Issue State Letter	ESAF & WACAF Offices States	Shared PBN Expertise	2010-2016	Implementation on a continuous basis
~~**Conclusion 10/23:**~~ **Draft Conclusion 11/18**	**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.	Issue State Letter Funding	ESAF & WACAF Offices States	States awareness. Funding of PBN programmes .	Dec. 2009 2010-2016	Completed Funding of PBN programme on a continuous basis
~~**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.~~		~~**PBN TF States.**~~			Conclusion considered redundant

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		~~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.~~		~~**States.**~~ ~~**States.**~~		~~**Dec. 09**~~ ~~**Dec. 09**~~	
~~**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.~~					Conclusion considered redundant
~~**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).~~	~~Secretariat~~				Decision considered redundant

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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.~~	~~Secretariat~~				Conclusion reformulated below
Draft Decision 11/19	**Dissolution of the GNSS Implementation and PBN Task Forces and establishment of the PBN/GNSS Task Force**	That the GNSS Implementation and PBN Task Forces are dissolved and the PBN/GNSS Task Force is established with the terms of reference in **Appendix 6G** to the report on agenda item 6. (*This Draft Decision is to supersede ATS/AIS/SAR/SG/10 Conclusions 10/15 and 10/26*)	Establish TF	APIRG	**PBN/GNSS TF**	APIRG17	
~~**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.~~	~~Secretariat~~				Conclusion considered redundant

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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~~	~~Secretariat~~				Conclusion considered redundant
~~**Conclusion 10/29**~~ **Draft Conclusion 11/20**	**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.	Implement conclusion.	IATA	Stakeholders access to PBN approved guidelines.		Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**Conclusion 10/30**~~ **Draft Conclusion 11/21**	**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.		ESAF & WACAF Offices IATA			Completed
~~**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~~	~~Secretariat~~				Conclusion superseded by Draft Decision 11/23 below

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		~~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~~ ~~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.~~					Conclusion considered redundant. Suffice for ROs to issue a State Letter as reminder

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**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.**~~	~~Secretariat~~				Conclusion re-formulated below as Draft Con 11/24
~~**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.~~	~~Secretariat~~				Conclusion considered redundant
~~**Conclusion 10/35**~~ **Draft Conclusion 11/22**	**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.		ESAF & WACAF Offices		PRND TF	Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
~~**Conclusion 10/36**~~ **Draft Conclusion 11/23**	**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.		ESAF & WACAF Offices States		PRND TF	Follow up at APIRG 17
~~**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;~~	~~Secretariat~~				Conclusion re-formulated below as Draft Con 11/27

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		~~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;~~ ~~APIRG establishes a SAR Task Force to conduct SAR services implementation in the AFI region~~					
~~**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.~~	Secretariat				Conclusion re-formulated below as Draft Con 11/28

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
Draft Conclusion 11/24	**Elimination of Air Navigation deficiencies in the ATM, AIS/MAP, and SAR fields**	That: a) AFI States are urged 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 X1 X2 and X3 b) APIRG Subsidiary bodies and Secretariat establish a comprehensive list of air navigation deficiencies consistent with the ICAO definition of deficiency.	Issue State Letter	ESAF & WACAF Offices States	State Letter Updated List of deficiencies	APIRG 17	Completed Implementation on a continuous basis
~~**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~~					Conclusion considered redundant, covered in Draft Con 11/28 above

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		~~b) ICAO establish mechanisms to ensure that AFI initiatives aimed at ensuring that air navigation safety and efficiency issues are~~ ~~c) 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~~	~~Secretariat~~				Decision to be reformulated because the ICGs were never deactivated Meetings should just be convened

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		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~~ Draft Conclusion 11/25	**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.		ESAF & WACAF Offices States	Reliable comms facilities	2011	Follow up at APIRG 17
~~Conclusion 10/41~~ Draft Conclusion 11/26	**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		CNS SG States			Follow up at APIRG 17

Conclusions/Decisions No. Strategic Objectives	Title of Conclusion /Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable/ Intended Outcome	Target Dates	Status of Implementation
		to : a) Ensure that agreed operational requirements and end-to-end performance objectives are met, and ~~b)~~ Achieve system sustainability.					

APPENDIX 3A

ATM PERFORMANCE OBJECTIVES

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

Benefits

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

Strategy

Short term (2010-2012)

ATM OC COMPONENTS	TASKS	TIMEFRAME START-END	RESPONSIBILITY	STATUS
AUO SDM	• plan the transition arrangements to ensure that the changes from the current to the new ICAO FPL form occur in a timely and seamless manner and with no loss of service	2009-June 2011	States	Ongoing
	• ensure that the capabilities of local systems are fully adaptable to the changes envisaged in the new FPL form	2010	States	Ongoing
	• ensure the ability of FDPS's to parse information correctly to guarantee that misinterpretation of data does not occur	2010	States	Ongoing
	• analyze each individual data item within the various fields of the new flight plan form, comparing the current values and the new values to verify any issue regarding the provision of service by the flight planning facility itself or downstream units	2010	States	Ongoing
	• ensure that there are no individual State peculiarities or deviations from the flight plan provisions	2011	States	Ongoing
	• ensure that the accepting ATS Reporting Office accepts and disseminates all aircraft capabilities and flight intent to all the downstream ACCs as prescribed by the PANS-ATM provisions	2012	States	Ongoing

	• in order to reduce the change of double indications it is important that any State having published a specific requirement(s) which are now addressed by the amendment should withdraw those 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	2010-2012	States	Ongoing
	• inform on the implementation status to the ICAO regional offices on an ongoing basis	2010-2012	States	Ongoing
	• keep the Flight Plan Implementation Tracking System (FITS) up to date based on the information provided by the States	2010-2012	ICAO Regional Office	Ongoing
linkage to GPIs	GPI/5 RNAV and RNP (Performance-based navigation) GPI-12 Functional integration of ground systems with airborne system GPI/18 Aeronautical Information			

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APPENDIX 3B

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

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

	• implementation of ATS routes en-route	2010-2012	AFI PBN TF/States	In progress
	• monitor implementation progress in accordance with AFI PBN implementation plan and State implementation plan	2010 and beyond	AFI PBN TF/States	On-going

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Appendix 3C to the Report on Agenda Item 6

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE				
Benefits				
Environment **Efficiency** **Safety**	• reduction in gas emissions • ability of aircraft to conduct flight more closely to preferred trajectories • increase in airspace capacity • improved availability of procedures • facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency			
Strategy				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***Terminal airspace***	2008		
	• develop regional implementation plan	2009	AFI PBN TF	Completed
	• develop regional action plan	2009-2010	AFI PBN TF	Completed
	• develop State PBN implementation plan	2009-2010	States	In progress
	• develop airspace concept based on AFI PBN roadmap, in order to design and implement an optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), holding and associated instrument flight procedures, on the basis of PBN and, in particular RNAV 1 and Basic-RNP 1	2009-2012	PBN TF/States	In progress
	• develop performance measurement plan	2010-2012	States	In progress
	• formulate safety plan	2010-2012	States	To be developed
	• establish collaborative decision making (CDM) process	2010	States	In progress
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material	2010-2011	States	To be developed
	• identify training programmes and develop corresponding guidelines	2010-2011	AFI PBN TF	To be developed
	• identify training needs and develop corresponding guidelines	2010-2011	States	In progress
	• formulate system performance monitoring plan	2010-2012	AFI PBN TF/States	In progress
	• develop a regional strategy and work programme implementation of SIDs and STARs	2009-2012	AFI PBN TF/States	In progress
	• monitor implementation progress in accordance with AFI PBN implementation roadmap and State implementation plan	2010	AFI PBN TF/States	To be developed
Linkage to GPIs	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: FMS-based arrival procedures.			

APPENDIX 3D

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

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

APPENDIX 3E

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

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

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

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APPENDIX 3F

AIM PERFORMANCE OBJECTIVES

NATIONAL PERFORMANCE OBJECTIVE IMPLEMENTATION OF WGS-84 AND ELECTRONIC TERRAIN AND OBSTACLE DATA				
Benefits				
Environment	none			
Efficiency	required by Performance Based Navigation support approach and departure procedure design and implementation improve aircraft operating limitations analysis support aeronautical chart production and on-board databases			
Safety	improve situational awareness support determination of emergency contingency procedures support technologies such as ground proximity and minimum safe altitude warning systems			
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). Develop e-TOD implementation plan as per the implementation template endorsed by the AFI e-TOD WG/1 Meeting.	2009-ongoing	APIRG States	
	Develop a high level policy for the management of a national eTOD Programme.	2008- 2011	States	
ATM AUO	WGS-84 Report requirements and monitor implementation status of WGS-84 using the AIS-5 Table of the AFI FASID.	Ongoing	APIRG States	

Link to GPIs	GPI-9: Situational awareness GPI-11: RNP and RNAV SIDs and STARs GPI-18: Aeronautical Information GPI-20: WGS-84 GPI-21: Navigation Systems

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REVIEW OF DOC 003						
Area of Routing	**FIRs**	**En-Route – Systems Evolution 1999-2010**				
		Airspace and Traffic Management	**Communications**		**Navigation**	**Surveillance**
			Mobile Service	**Fixed Service**		
1	**2**	**3**	**4**	**5**	**6**	**7**
Europe - South Atlantic (Oceanic routes) **AR-1**	Atlantico[1] Canarias Casablanca Dakar Oceanic Lisboa[1] Sal	Fixed RNAV routes (1995); Progressive evolution towards a random RNAV environment from West to East (Nov. 2005); Reduction of longitudinal separation to 10 minutes using Mach Number Technique (1998); In selected airspaces: Longitudinal separation 30 NM (2001). Lateral separation 25 NM (2001) both with radar surveillance; Distance based separation 80 NM (1998 - 2002) 50NM (2002 - onwards); Reduction of lateral separation to 50 NM (1999-2004). Further reduction of lateral separation to 30NM (2004 - onwards); RVSM (2002)	DCPC (data) by participating aircraft (Bpa) (2004); Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (2004-onwards)	RNP 5: Casablanca and Canarias FIRs (1998); RNP 10: Other FIRs (2001); RNP 5: (2005 - onwards) Other FIRs GNSS as primary-means	Automatic Dependent Surveillance (ADS) on RNP airspace Bpa (from 2004)
Atlantic Ocean (AFI-NAT/SAM interface) **AR-2**	Accra Dakar Oceanic Johannesburg Oceanic Luanda	Random routing (2005); Reduction of longitudinal separation to 10 minutes (2000) RVSM (Jan. 2005)	DCPC (data) by participating aircraft (Bpa) (1998); HF (voice)	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between main AFTN Centres (1998-onwards); AFTN and ATS/DS (1999)	RNP 10 (2000) GNSS as primary-means	ADS (2000)

REVIEW OF DOC 003						
Area of Routing	**FIRs**	**En-Route – Systems Evolution 1999-2010**				
		Airspace and Traffic Management	**Communications**		**Navigation**	**Surveillance**
			Mobile Service	**Fixed Service**		
1	**2**	**3**	**4**	**5**	**6**	**7**
Europe - Eastern Africa (including oceanic areas) **AR-3**	Addis Ababa Antananarivo Asmara Cairo Dar es Salaam Entebbe Khartoum Mauritius Mogadishu Nairobi Seychelles Tripoli	Fixed RNAV routes coexisting with conventional routes (1999); Longitudinal separation 10 minutes (2000); Lateral separation: progressive introduction of 30 NM in line with RNP 5 in the upper airspace (2001); Vertical Separation: introduction of RVSM initially between FL 350 and FL 390 (2003-onwards) and extension to FL 290 - FL 410 by 2005; Full ATC service on all ATS routes above FL 245 and 150NM from international airports (1999); RNAV: Gradual implementation of Random RNAV initially above FL 350 from 2001.	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) DCPC (data) Bpa (2000).	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (1999-onwards); AFTN and ATS/DS (1999); Introduction of ATS inter-facility data communications (AIDC) starting in 2005 to be completed by 2008	RNP 10: (2000); RNP 5: from 2001 onwards GNSS as primary-means	Procedural; ADS 2001 onwards with full ground capability in 2005; SSR in selected airspaces (1999); Automation: progressive introduction of computer assisted conflict detection and resolution from 2000

REVIEW OF DOC 003						
Area of Routing	**FIRs**	**En-Route – Systems Evolution 1999-2010**				
		Airspace and Traffic Management	**Communications**		**Navigation**	**Surveillance**
			Mobile Service	**Fixed Service**		
1	**2**	**3**	**4**	**5**	**6**	**7**
Europe - Southern Africa including Continental Southern Africa routes **AR-4**	Algiers Beira Brazzaville Cape Town Gaborone Harare Johannesburg Kano Kinshasa Lilongwe Luanda Lusaka N'Djamena Niamey Tunis Tripoli Windhoek	Fixed RNAV routes coexisting with conventional routes from 1995; Longitudinal separation 10 minutes from (2000) Lateral separation minima; Gradual introduction of 30 NM in line with RNP 5 in the upper airspace (2001); RVSM: Introduction initially between FL 350 and 390 (2003-onwards), evolving towards FL 290/410 by 2005; Full ATC service on all ATS routes above FL 245 and 150NM from international airports (1999). Random RNAV initially above FL350 from 2001	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) DCPC (data) Bpa (From 2001)	Implementation of all ATS/DS circuits. AFTN and ATS/DS links upgraded; Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (1999 - onwards); Gradual introduction of AIDC from 2005 to be completed by (2008)	RNP 5: from 2001 onwards GNSS as primary-means	Procedural (on account of traffic diversity); ADS (2001 onwards with full ground capability in 2005; SSR at Brazzaville, Kinshasa, Luanda and N'Djamena from (2000);
Continental Western Africa routes including coastal areas **AR-5**	Accra Dakar Kano Niamey Ndjamena Roberts	Fixed RNAV routes coexisting with conventional routes from 1999; Longitudinal separation 10 minutes (2000); Full ATC service on all ATS routes above FL 245 and 150NM from international airports (1999). Lateral separation 30 NM in an RNP 5 environment (2001 - onwards); RVSM initially between (FL 350-FL 390) (2003 -onwards); Random routing initially above FL350 (2001 - onwards)	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) Progressive introduction of DCPC (data) from 2000 onwards	AFTN and ATS/DS links upgraded (1999); Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main Centres (1999-onwards); Gradual introduction of AIDC from 2005 to be completed by (2008)	RNP 5 environment (2001) GNSS as primary-means	SSR along itinerary Abidjan/Accra/Lagos (2000); ADS/CPDLC from 2001 with full ground capability by 2005

REVIEW OF DOC 003						
Area of Routing	**FIRs**	**En-Route – Systems Evolution 1999-2010**				
		Airspace and Traffic Management	**Communications**		**Navigation**	**Surveillance**
			Mobile Service	**Fixed Service**		
1	**2**	**3**	**4**	**5**	**6**	**7**
Continental Southern Africa **AR-6**	Antananarivo Bombay[1] Johannesburg Oceanic Male[1] Mauritius Melbourne[1] Seychelles	Reduction of longitudinal separation to 10 minutes (2000); Random routing in selected portions of the airspace (1999); RNP itineraries (2000); Full ATC service on all ATS routes above FL 245 and 150NM from international airports; Reduction of lateral separation to 50 NM coinciding with RNP 10 from 2000 onwards; RVSM along selected itineraries initially between FL 350-FL390 (2001-onwards) evolving towards FL 290-FL 410 from 2005 onwards.	DCPC (data) from 1999); Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)	AFTN and ATS/DS links upgraded (1999); AIDC (2005) with full capability in 2008	RNP 10: (2000) GNSS as primary-means	ADS Bpa (2000)

<table>
<tr><th colspan="6">REVIEW OF DOC 003</th></tr>
<tr><th rowspan="3">Type of TMA or Aerodrome (See Note 1)</th><th rowspan="3">Characterisation</th><th colspan="4">TMAs and Aerodromes - Systems Evolution 1995-2005</th></tr>
<tr><th colspan="2">Communications</th><th rowspan="2">Navigation</th><th rowspan="2">Surveillance</th></tr>
<tr><th>Voice</th><th>Data</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr>
<tr><td>TMA Type 1</td><td>Multiple airports within TMA; Complex traffic patterns;
High density traffic.</td><td rowspan="3">VHF voice coverage up to 150 NM from all international airports at operationally significant altitudes</td><td>VHF data-link by participating aircraft</td><td rowspan="3">VOR/DME; fixed RNAV routes;
GNSS overlay</td><td>Voice position reports plus:
- SSR; Mode S (See Note 2)
- Automatic Dependent Surveillance (ADS) by participating aircraft.</td></tr>
<tr><td>TMA Type 2</td><td>Multiple airports within TMA with complex traffic patterns, or TMAs with medium density traffic.</td><td>VHF data-link by participating aircraft (the ground element of the system where justified only)</td><td>Voice position reports plus:
- SSR Mode A/C (where justified)
- ADS (where justified)</td></tr>
<tr><td>TMA Type 3</td><td>TMAs with low density traffic.</td><td>N/A</td><td>Voice position reports.</td></tr>
<tr><td>Aerodrome Type 1</td><td>High density traffic.</td><td rowspan="2">Independent ground and Tower high reliability VHF voice frequencies</td><td>VHF data-link by participating aircraft;
Gate data-link by participating aircraft.</td><td rowspan="3">ILS;
GNSS based approach procedures :
1. overlay to ILS procedures;
2. non-instrument runways;
3. non-precision runways.</td><td>Voice position reports.
Visual surveillance plus:
- Surface Movement Radar (where justified)
- ADS by participating aircraft.</td></tr>
<tr><td>Aerodrome Type 2</td><td>Medium density traffic.</td><td>VHF data-link by participating aircraft; (the ground element of the system where justified only)</td><td>Voice position reports;
Visual surveillance plus:
- ADS by participating aircraft (where justified).</td></tr>
<tr><td>Aerodrome Type 3</td><td>Low density traffic.</td><td>Single ground/Tower high reliability VHF voice frequency</td><td>N/A</td><td>Voice position reports.
Visual surveillance.</td></tr>
</table>

***Note 1**: Those Airports and TMAs falling within each type will be designated by the AFI Planning and Implementation Regional Group (APIRG) based on suitable proposals by provider and user States and organizations concerned.*

***Note 2**: Primary radars may continue to be used in those TMAs where there is a mix of transponder equipped and non-transponder equipped aircraft and the number of non-transponder equipped aircraft is sufficiently large to justify the requirement.*

ATS/AIS/SAR SG 11
Report on Agenda Item 5

OUTCOME OF THE AFI RVSM IMPLEMENTATION SAFETY SEMINAR (RISS) 19-23 APRIL 2010

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ATS/AIS/SAR SG/11
Appendix 6A to the Report on agenda item 6

AFI

Regional Performance Based Navigation

Implementation Plan

ATS/AIS/SAR SG/11
Appendix 6A to the Report on agenda item 6

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ATS/AIS/SAR SG/11
Appendix 6A to the Report on agenda item 6

1. Introduction

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

2. BACKGROUND

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

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

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

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

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

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

3. PERFORMANCE BASED NAVIGATION

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

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

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

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

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

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

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

4. PBN BENEFITS

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

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

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

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

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

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

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

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

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

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

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

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

4.3 Performance-based navigation will enable the needed operational improvements by leveraging current and evolving aircraft capabilities in the near term that can be expanded to address the future needs of aviation stakeholders and service providers.

5. STAKEHOLDERS

5.1 Coordination is critical with the aviation community through collaborative forums. This will assist aviation stakeholders in understanding operational goals, determining requirements, and considering future investment strategies. This, in turn, enables the aviation stakeholders to focus on addressing future efficiency and capacity needs while maintaining or improving the safety of flight operations by leveraging advances in navigation capabilities on the flight deck. RNAV and RNP have reached a sufficient level of maturity and definition to be included in key plans and strategies, such as this Plan.

5.2 The stakeholders who will benefit from the concepts in the Plan include airspace operators, air traffic service providers, regulators and standards organizations. As driven by business needs, airlines and operators can use the AFI Region PBN Plan to plan future equipage and capability investments. Similarly, air traffic service providers can determine requirements for future automation systems, and more smoothly modernize ground infrastructure. Finally, regulators and standards organizations can anticipate and develop the key enabling criteria needed for implementation.

5.3 The AFI Region PBN Implementation Plan also supports other CAA and government-wide planning processes, working on several fronts to address the needs of the aviation community. This Plan is a work in progress and will be amended through collaborative AFI Region States, industry efforts and consultations that establish a joint aviation community/government/industry strategy for implementing performance-based navigation. Critical initiative strategies are required to accommodate the expected growth and complexity over the next two decades. These strategies have five key features:

a) Expediting the development of performance-based navigation criteria and standards.
b) Introducing airspace and procedure improvements in the near term.
c) Providing benefits to operators who have invested in existing and upcoming capabilities.
d) Establishing target dates for the introduction of navigation mandates for selected procedures and airspace, with an understanding that any mandate must be rationalized on the basis of benefits and costs.
e) Defining new concepts and applications of performance-based navigation for the mid term and Long term and building synergy and integration among other capabilities toward the realization of the AFI Region PBN goals.

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6. STRATEGY

6.1 This Plan provides a high-level strategy for the evolution of navigation capabilities to be implemented in three timeframes: near term (2008-2012), mid term (2013-2016), and Long term (2017 and Beyond). The strategy rests upon two key navigation concepts; Area Navigation (RNAV) and Required Navigation Performance (RNP). It also encompasses instrument approaches, Standard Instrument Departure (SID) and Standard Terminal Arrival (STAR) operations, as well as en-route continental, oceanic and remote operations. The section on Long-term initiatives discusses integrated navigation, communication, surveillance and automation strategies.

6.2 To avoid proliferation of new navigation standards, States and other aviation stakeholders in the AFI region should communicate any new operational requirements with ICAO HQ, so that it can be taken into account by the PBN SG.

6.3 The Strategy for implementation of GNSS in the AFI Region for the purpose of supporting PBN implementation will be developed as Appendix to this Plan. It is to be noted that the AFI GNSS strategy, while supporting implementation of the AFI Regional PBN Implementation Plan, may include other aspects related to the Global Air Navigation Plan beyond the current PBN requirements. The GNSS strategy may however, not defeat the purpose and intent of the Plan and shall be guided by the provisions of APIRG.

7. NEAR TERM (2008-2012) MID TERM (2013-2016) AND LONG TERM (2016 AND BEYOND) KEY TASKS

7.1 The key tasks involved in the transition to performance-based navigation are:

a) Establish navigation service needs through the Long term that will guide infrastructure decisions and specify needs for navigation system infrastructure, and ensure funding for managing and transitioning these systems.
b) Define and adopt a national policy enabling additional benefits based on RNP and RNAV.
c) Identify operational and integration issues between navigation and surveillance, air-ground communications, and automation tools that maximize the benefits of RNP.
d) Support mixed operations throughout the term of this Plan, in particular considering navigation system variations during the near term until appropriate standards are developed and implemented.
e) To support Civil/Military coordination and develop the policies needed to accommodate the unique missions and capabilities of military aircraft operating in civil airspace.
f) Harmonize the evolution of capabilities for interoperability across airspace operations.

g) Increase emphasis on human factors, especially on training and procedures as operations increase reliance on appropriate use of flight deck systems.

h) Facilitate and advance environmental analysis efforts required to support the development of RNAV and RNP procedures.

i) Maintain consistent and harmonized global standards for RNAV and RNP operations.

8. Near-term (2008-2012)

8.1 Initiatives in the near-term focus on investments by operators in current and new aircraft acquisitions; in satellite-based navigation and conventional navigation infrastructure as well as AFI Region States investments. Key components include wide-scale RNAV implementation and the introduction of RNP for en route, terminal, and approach procedures.

8.2 The near-term strategy will also focus on expediting the implementation and proliferation of RNAV and RNP procedures. As demand for air travel continues at healthy levels, choke points will develop and delays at the major airports will continue to climb. RNAV and RNP procedures will help alleviate those problems. Continued introduction of RNAV and RNP procedures will not only provide benefits and savings to the operators but also encourage further equipage.

8.3 ANSPs as a matter of urgency must adapt new flight plan procedures to accommodate PBN operations. This particularly addresses fields 10 and 18.

8.4 Operators will need to plan to obtain operational approvals for the planned Navigation Specifications for this period. Operators shall also review Regional PBN Implementation Plans from other Regions to assess if there is a necessity for additional Operational approvals.

9. OCEANIC AND REMOTE OPERATIONS

9.1 To promote global harmonization, the AFI Region States continues to work closely with its international partners in implementing RNAV 10 and where operationally required RNP 4 by 2010. Safety assessment shall be undertaken to evaluate reduced oceanic and remote longitudinal/lateral separation minima between aircraft approved for RNAV 10 and RNP 4 operations. (NB. Deleted (-) in between route and number).

9.2 For Oceanic Remote Areas where high density traffic operations occur, a review of the airspace concept must be undertaken to convert to Continental En-Route Operation where sufficient, surveillance is available so as to allow

RNAV 5 operations.

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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.

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12. APPROACH OPERATIONS

12.1 The application of RNP APCH is expected to be implemented in the maximum possible number of aerodromes. To facilitate a transitional period, conventional approach procedures and conventional navigation aids should be maintained for non PBN equipped aircraft during this term.

12.2 States should promote the use of APV Operations (Baro-VNAV or SBAS) to enhance safety of RNP Approaches and accessibility of runways.

12.3 The application of RNP AR Approach should be limited to selected runways where obvious operational benefits can be obtained due to the existence of significant obstacles.

12.4 RNP approaches include:

a) APV implemented at all instrument runways at major regional airports and all non-instrument runways serving aircraft weighing greater than 5,700kg.

13. SUMMARY TABLE NEAR-TERM (2008-2012)

Airspace	**Nav. Specifications**	**Nav. Specifications where Operationally Required**
En-Route Oceanic	RNAV 10	RNP 4
En-Route Remote Continental	RNAV 10	RNP 4
En-Route Continental	RNAV 5	RNAV 1/2
TMA Arrival/Departure	RNAV 1 in a surveillance environment	
	Basic RNP 1 in non-surveillance environment	
Approach	RNP APCH (with Baro-VNAV) OR RNP AR APCH if required	

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14. NEAR TERM IMPLEMENTATION TARGETS

a) RNP APCH (with Bara-VNAV) in 30% of instrument runways by 2010 and 50% by 2012 and priority given to airports with operational benefits.

b) RNAV 1 SID/STAR for 30% of international airports by 2010 and 50% by 2012 and priority given to airports with RNP Approach.

c) Review existing conventional and RNAV routes to transition to PBN RNAV 5 or where operationally required RNAV 2/1 by 2012.

15 MID TERM (2013-2016) PRIORITIES

15.1 In the mid term, increasing demand for air travel will continue to challenge the efficiencies of the air traffic management system.

15.2 While the hub-and-spoke system will remain largely the same as today for major airline operations, the demand for more point-to-point service will create new markets and spur increases in low-cost carriers, air taxi operations, and on-demand services. Additionally, the emergence of VLJs is expected to create new markets in the general and business aviation sectors for personal, air taxi, and point-to-point passenger operations. Many airports will thus experience significant increases in unscheduled traffic. In addition, many destination airports that support scheduled air carrier traffic are forecast to grow and to experience congestion or delays if efforts to increase their capacity fall short. As a result, additional airspace flexibility will be necessary to accommodate not only the increasing growth, but also the increasing air traffic complexity.

15.3 The mid-term will leverage these increasing flight capabilities based on RNAV and RNP, with a commensurate increase in benefits such as fuel-efficient flight profiles, better access to airspace and airports, greater capacity, and reduced delay. These incentives, which should provide an advantage over non-RNP operations, will expedite propagation of equipage and the use of RNP procedures.

15.4 To achieve efficiency and capacity gains partially enabled by RNAV and RNP, the AFI Region States and aviation industry will pursue use of data communications (e.g., for controller-pilot communications) and enhanced surveillance functionality, e.g. ADS-Broadcast (ADS-B). Data communications will make it possible to issue complex clearances easily and with minimal errors. ADS-B will expand or augment surveillance coverage so that track spacing and longitudinal separation can be optimized where needed (e.g., in non-radar airspace).

Initial capabilities for flights to receive and confirm 3D clearances and time of arrival control based on RNP will be demonstrated in the mid term. With data link implemented, flights will begin to transmit 4D trajectories (a set of points defined by latitude, longitude, altitude, and time.) Stakeholders must therefore develop concepts that leverage this capability.

16. OCEANIC EVOLUTION

16.1 In the mid term, AFI Region States will endeavor to work with international air traffic service providers to promote the application of RNP 10 and RNP 4 in additional sub-regions of the oceanic environment.

17. EN ROUTE EVOLUTION

17.1 The review of en-route airspace will be completed by 2016.

18. IMPLEMENTATION

18.1 By the end of the mid term other benefits of PBN will have been enabled, such as flexible procedures to manage the mix of faster and slower aircraft in congested airspace and use of less conservative PBN requirements.

19. Automation for RNAV and RNP Operations

19.1 By the end of the mid term enhanced en route automation will allow the assignment of RNAV and RNP routes based upon specific knowledge of an aircraft's RNP capabilities. En route automation will use collaborative routing tools to assign aircraft priority, since the automation system can rely upon the aircraft's ability to change a flight path and fly safely around problem areas. This functionality will enable the controller to recognize aircraft capability and to match the aircraft to dynamic routes or procedures, thereby helping appropriately equipped operators to maximize the predictability of their schedules.

19.2 Conflict prediction and resolution in most en route airspace must improve as airspace usage increases. Path repeatability achieved by RNAV and RNP operations will assist in achieving this goal. Mid-term automation tools will facilitate the introduction of RNP offsets and other forms of dynamic tracks for maximizing the capacity of airspace. By the end of the mid term, en route automation will have evolved to incorporate more accurate and frequent surveillance reports through ADS-B, and to execute problem prediction and conformance checks that enable offset manoeuvres and closer route spacing (e.g., for passing other aircraft and manoeuvring around weather).

20. TERMINAL EVOLUTION

20.1 During this period, either Basic RNP 1 or RNAV 1 will become a required capability for flights arriving and departing major airports based upon the needs of the airspace, such as the volume of traffic and complexity of operations. This will ensure the necessary throughput and access, as well as reduced controller workload, while maintaining safety standards.

20.2 With RNAV-1 operations as the predominant form of navigation in terminal areas by the end of the mid term, AFI Region States will have the option of removing conventional terminal procedures that are no longer expected to be used.

21. TERMINAL AUTOMATION

21.1 Terminal automation will be enhanced with tactical controller tools to manage complex merges in busy terminal areas. As data communications become available, the controller tools will apply knowledge of flights' estimates of time of arrival at upcoming waypoints, and altitude and speed constraints, to create efficient manoeuvres for optimal throughput.

21.2 Terminal automation will also sequence flights departing busy airports more efficiently than today. This capability will be enabled as a result of PBN and flow management tools. Flights arriving and departing busy terminal areas will follow automation-assigned PBN routes.

22. APPROACH EVOLUTION

22.1 In the mid term, implementation priorities for instrument approaches will still be based on RNP APCH and RNP AR APCH and full implementation is expected at the end of this term.

22.2 The introduction of the application of landing capability using GBAS (currently non PBN) is expected to guarantee a smooth transition towards high performance approach and landing capability.

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23. Summary Table Mid-Term (2013-2016)

Airspace	**Nav. Specifications**	**Nav. Specifications where Operationally Required**
En-Route Oceanic	RNAV 10,	RNP 4
En-Route Remote Continental	RNAV 10,	RNP 4
En-Route Continental	RNAV 2, RNAV 5	RNAV 1
TMA Arrival/Departure	Expand RNAV 1, or RNP-1 application Mandate RNAV 1, or RNP-1 in high density TMAs	
Approach	Expand RNP APCH with (Baro-VNAV) and APV Expand RNP AR APCH where there are operational benefits	
(NB. Deleted (-) in between route and number).		

24. MID TERM IMPLEMENTATION TARGETS

a) RNP APCH (with Baro-VNAV) in 100% of instrument runways by 2016.
b) RNAV 1 or RNP 1 SID/STAR for 100% of international airports by 2016.
c) RNAV 1 or RNP 1 SID/STAR for 70% of busy domestic airports where there are operational benefits.
d) Implementation of additional RNAV/RNP Routes as required.

25. LONG TERM (2016 AND BEYOND): ACHIEVING A PERFORMANCE-BASED NAVIGATION SYSTEM

25.1 The Long-term environment will be characterized by continued growth in air travel and increased air traffic complexity.

25.2 No one solution or simple combination of solutions will address the inefficiencies, delays, and congestion anticipated to result from the growing demand for air transportation. Therefore, AFI Region States and key Stakeholders need an operational concept that exploits the full capability of the aircraft in this time frame.

26. LONG TERM KEY STRATEGIES (2017 AND BEYOND)

26.1 Airspace operations in the Long term will make maximum use of advanced flight deck automation that integrates CNS capabilities. RNP, RCP, and RSP standards will define these operations. Separation assurance will remain the principal task of air traffic management in this time frame. This task is expected to leverage a combination of aircraft and ground-based tools. Tools for conflict detection and resolution, and for flow management, will be enhanced significantly to handle increasing traffic levels and complexity in an efficient and strategic manner.

26.2 Strategic problem detection and resolution will result from better knowledge of aircraft position and intent, coupled with automated, ground-based problem resolution. In addition, pilot and air traffic controller workload will be lowered by substantially reducing voice communication of clearances, and furthermore using data communications for clearances to the flight deck. Workload will also decrease as the result of automated confirmation (via data communications) of flight intent from the flight deck to the ground automation.

26.3 With the necessary aircraft capabilities, procedures, and training in place, it will become possible in certain situations to delegate separation tasks to pilots and to flight deck systems that depict traffic and conflict resolutions. Procedures for airborne separation assurance will reduce reliance on ground infrastructure and minimize controller workload. As an example, in IMC an aircraft could be instructed to follow a leading aircraft, keeping a certain distance. Once the pilot agreed, ATC would transfer responsibility for maintaining spacing (as is now done with visual approaches).

26.4 Performance-based operations will exploit aircraft capabilities for “electronic” visual acquisition of the external environment in low-visibility conditions, which may potentially increase runway capacity and decrease runway occupancy times.

26.5 Improved wake prediction and notification technologies may also assist in achieving increased runway capacity by reducing reliance on wake separation buffers.

26.6 System-wide information exchange will enable real-time data sharing of NAS constraints, airport and airspace capacity, and aircraft performance. Electronic data communications between the ATC automation and aircraft, achieved through data link, will become widespread—possibly even mandated in the busiest airspace and airports. The direct exchange of data between the ATC automation and the aircraft FMS will permit better strategic and tactical management of flight operations.

26.7 Aircraft will downlink to the ground-based system their position and intent data, as well as speed, weight, climb and descent rates, and wind or turbulence reports. The ATC automation will uplink clearances and other types of information, for example, weather, metering, choke points, and airspace use restrictions.

26.8 To ensure predictability and integrity of aircraft flight path, RNP will be mandated in busy en route and terminal airspace. RNAV operations will be required in all other airspace (except oceanic). Achieving standardized FMS functionalities and consistent levels of crew operation of the FMS is integral to the success of this Long-term strategy.

26.9 The most capable aircraft will meet requirements for low values of RNP (RNP 0.3 or lower en route). Flights by such aircraft are expected to benefit in terms of airport access, shortest routes during IMC or convective weather, and the ability to transit or avoid constrained airspace, resulting in greater efficiencies and fewer delays operating into and out of the busiest airports.

26.10 Enhanced ground-based automation and use of real-time flight intent will make time-based metering to terminal airspace a key feature of future flow management initiatives. This will improve the sequencing and spacing of flights and the efficiency of terminal operations.

26.11 Uniform use of RNP for arrivals and departures at busy airports will optimize management of traffic and merging streams. ATC will continue to maintain control over sequencing and separation; however, aircraft arriving and departing the busiest airports will require little controller intervention.

Controllers will spend more time monitoring flows and will intervene only as needed, primarily when conflict prediction algorithms indicate a potential problem.

26.12 More detailed knowledge of meteorological conditions will enable better flight path conformance, including time of arrival control at key merge points. RNP will also improve management of terminal arrival and departure with seamless routing from the en route and transition segments to the runway threshold. Enhanced tools for surface movement will provide management capabilities that synchronize aircraft movement on the ground; for example, to coordinate taxiing aircraft across active runways and to improve the delivery of aircraft from the parking areas to the main taxiways.

27. SUMMARY OF LONG TERM KEY STRATEGIES (2017 AND BEYOND)

27.1 The key strategies for instituting performance-based operations employ an integrated set of solutions.

a) Airspace operations will take advantage of aircraft capabilities, i.e. aircraft equipped with data communications, integrated displays, and FMS.

b) Aircraft position and intent information directed to automated, ground-based ATM systems, strategic and tactical flight deck-based separation assurance in selected situations (problem detection and resolution).

c) Strategic and tactical flow management will improve through use of integrated airborne and ground information exchange.

d) Ground-based system knowledge of real-time aircraft intent with accurate aircraft position and trajectory information available through data link to ground automation.

e) Real-time sharing of National Air Space (NAS) flight demand and other information achieved via ground-based and air-ground communication between air traffic management and operations planning and dispatch.

f) Overall system responsiveness achieved through flexible routing and well-informed, distributed decision-making.

g) Systems ability to adapt rapidly to changing meteorological and airspace conditions.

h) System leverages through advanced navigation capabilities such as fixed radius transitions, RF legs, and RNP offsets.

i) Increased use of operator-preferred routing and dynamic airspace.

j) Increased collaboration between service providers and operators.

k) Operations at the busiest airports will be optimized through an integrated set of capabilities for managing pre-departure planning information, ground-based automation, and surface movement.

l) RNP-based arrival and departure structure for greater predictability.

m) Ground-based tactical merging capabilities in terminal airspace.

n) Integrated capabilities for surface movement optimization to synchronize aircraft movement on the ground. Improved meteorological and aircraft intent information shared via data link.

28. KEY RESEARCH AREAS

28.1 The aviation community must address several key research issues to apply these strategies effectively. These issues fall into several categories:

29. NAVIGATION

a) To what extent can lower RNP values be achieved and how can these be leveraged for increased flight efficiency and access benefits?

b) Under what circumstances RNAV should be mandated for arriving/departing satellite airports to enable conflict-free flows and optimal throughput in busy terminal areas?

30. FLIGHT DECK AUTOMATION

a) What FMS capabilities are required to enable the future concepts and applications?

b) How can performance-based communication and surveillance be leveraged in the flight deck to enable Long-term strategies such as real-time exchange of flight deck data?

31. AUTOMATION

a) To what extent can lateral or longitudinal separation assurance be fully automated, in particular on final approach during parallel operations?

b) To what extent can surface movement be automated, and what are the cost-benefit trade-offs associated with different levels of automation?

c) To what extent can conflict detection and resolution be automated for terminal ATC operations?

32. PROCEDURES

a) How can time of arrival control be applied effectively to maximize capacity of arrival or departure operations, in particular during challenging wind conditions?

b) In what situations is delegation of separation to the flight crews appropriate?

c) What level of onboard functionality is required for flight crews to accept separation responsibility within a manageable workload level?

33. AIRSPACE

a) What separation standards and procedures are needed to enable smoother transition between en route and terminal operations?

b) How can fuel-efficient procedures such as CDAs be accomplished in busy airspace?

34. POLICY

a) How is information security ensured as information exchange increases?

b) What are the policy and procedure implications for increased use of collaborative decision-making processes between the service provider and the operator?

34.1 The answers to these and other research questions are critical to achieving a performance-based airspace system. Lessons learned from the near-term and mid-term implementation of the Plan will help answer some of these questions.

The aviation community will address others through further concept development, analysis, modeling, simulation, and field trials. As concepts mature and key solutions emerge, the community will develop more detailed implementation strategies and commitments.

35. PERIODIC REVIEW OF IMPLEMENTATION ACTIVITIES

35.1 Procedures to Modify the Regional Plan

35.2 Whenever a need is identified for a change to this document, the Request for Change (RFC) Form (to be developed) should be completed and submitted to the ICAO Regional Offices. The Regional Offices will collate RFCs for consideration by the PBN Task Force (ATM/SAR/AIS Sub-group of APIRG).

35.3 When an amendment has been agreed by a meeting of the PBN Task Force, a new version of the PBN Regional Plan will be prepared, with the changes marked by an "|" in the margin, and an endnote indicating the relevant RFC, to enable a reader to note the origin of the change. If the change is in a table cell, the outside edges of the table will be highlighted. Final approval for publication of an amendment to the PBN Regional Plan will be the responsibility of APIRG.

Glossary

ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ATC	Air Traffic Control
CDA	Continuous Descent Arrival
CNS	Communications, Navigation, Surveillance
EFVS	Enhanced Flight Visibility System
GA	General Aviation
GBAS	Ground-Based Augmentation System
GLS	GNSS Landing System
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical Guidance
NAS	National Airspace System
NAVAID	Navigation Aid
NM	Nautical Miles
PBN	Performance Based Navigation
RCP	Required Communications Performance
RF	Radius-to-Fix
RNAV	Area Navigation

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Glossary

RNP	Required Navigation Performance
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

(TEMPLATE)

December 2008

AFI State PBN Plan Template

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.

AFI State PBN Plan Template

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.

AFI State PBN Plan Template

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.

AFI State PBN Plan Template

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APPENDIX 6B

AFI State PBN Plan Template

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).

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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)

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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	

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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?

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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 6B

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Appendix A – Oceanic and Remote Continental implementation schedule by area or city pair (to be developed by State)

APPENDIX 6B

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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)

_____ (State)

NATIONAL PERFORMANCE OBJECTIVES AND ACTION PLAN
OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE

PERIOD: Near Term (2008-2012)
APPLICATION: Terminal Phase

Benefits

Environment:

Efficiency :

Strategy

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Preliminary						
	• Review AFI PBN Implementation Plan Key Targets (Terminal)	***AFI PBN Implementation Plan*** Near Term: 2008-2012 [Ch. 10-14]				
	• Review State PBN Implementation Plan Key Targets (Terminal)	***State PBN Implementation Plan*** Near Term: 2008-2012 [Ch. 5.1.2-5.1.3]				

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Terminal Applications Implementation						
Process 1 **Determine Requirements**	**Step 1**- Formulate airspace concept	PBN Manual, Vol. 1B Ch. B 2.3.1 ➢ ATM needs (civil/military)				
	Step 2- Assessment of existing fleet capability and available navaid infrastructure	PBN Manual, Vol. 1B Ch. B 2.3.2 ➢ IATA Survey ➢ State Survey				
	Step 3- Assessment of existing ATS surveillance system and communications infrastructure and ATM system	PBN Manual, Vol. 1B Ch. B 2.3.3				
	Step 4- Identify necessary navigation performance and functional requirements	PBN Manual, Vol. 1B Ch. B 2.3.4				
			➢ **Navigation functional requirements** ➢ **Fleet capability** ➢ **CNS/ATM capabilities**			

Process 2 **Identifying ICAO navigation specification for implementation**	**Step 1**- Review ICAO navigation specifications	PBN Manual, Vol. 1B Ch. B 3.3.1 ➢ Navigation functional requirements ➢ Fleet capability ➢ CNS/ATM capabilities				
	Step 2- Identify appropriate ICAO navigation specification to apply in the specific CNS/ATM environment ➢ RNAV 5 ➢ RNAV 2 ➢ RNAV 1 ➢ New specification?	PBN Manual, Vol. 1B Ch. B 3.3.2				
	Step 3- Identify trade-offs with airspace concept and navigation functional requirements (if necessary)	PBN Manual, Vol. 1B Ch. B 3.3.3				
			➢ **Navigation specifications**			

Process 3 **Planning and implementation**	**Step 1**- Formulate safety plan	PBN Manual, Vol. 1B Ch. B 4.3.1 ➢ Navigation specifications				
	Step 2- Validate airspace concept for safety	PBN Manual, Vol. 1B Ch. B 4.3.2				
	Step 3- Procedure design	PBN Manual, Vol. 1B Ch. B 4.3.3				
	Step 4- Procedure ground validation	PBN Manual, Vol. 1B Ch. B 4.3.4				
	Step 5- Implementation decision	PBN Manual, Vol. 1B Ch. B 4.3.5				
	Step 6- Flight inspection and flight validation	PBN Manual, Vol. 1B Ch. B 4.3.6				
	Step 7- ATC system integration considerations	PBN Manual, Vol. 1B Ch. B 4.3.7				
	Step 8- Awareness and training material	PBN Manual, Vol. 1B Ch. B 4.3.8				
	Step 9- Establishing operational implementation date	PBN Manual, Vol. 1B Ch. B 4.3.9				
	Step 10- Post-implementation review	PBN Manual, Vol. 1B Ch. B 4.3.10		**DEC 2012**		
			➢ **Training programmes** ➢ **RNAV STARs and SIDs**			

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NATIONAL PERFORMANCE OBJECTIVES AND ACTION PLAN
OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE

PERIOD: Mid Term (2013-2016)
APPLICATION: Terminal Phase

Benefits

Environment:

Efficiency :

Strategy

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Preliminary						
	• Review AFI PBN Implementation Plan Key Targets (Terminal- Approach)	***AFI PBN Implementation Plan*** Mid Term: 2013-2016 [Ch. 20-24]				
	• Review State PBN Implementation Plan Key Targets (Terminal Approach)	***State PBN Implementation Plan*** Mid Term: 2013-2016 [Ch. 5.2.2-5.2.3]				

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Terminal Applications Implementation						
Process 1 **Determine Requirements**	**Step 1**- Formulate airspace concept	PBN Manual, Vol. 1B Ch. B 2.3.1 ➢ ATM needs (civil/military)				
	Step 2- Assessment of existing fleet capability and available navaid infrastructure	PBN Manual, Vol. 1B Ch. B 2.3.2 ➢ IATA Survey ➢ State Survey				
	Step 3- Assessment of existing ATS surveillance system and communications infrastructure and ATM system	PBN Manual, Vol. 1B Ch. B 2.3.3				
	Step 4- Identify necessary navigation performance and functional requirements	PBN Manual, Vol. 1B Ch. B 2.3.4				
			➢ **Navigation functional requirements** ➢ **Fleet capability** ➢ **CNS/ATM capabilities**			

Process 2 **Identifying ICAO navigation specification for implementation**	**Step 1-** Review ICAO navigation specifications	PBN Manual, Vol. 1B Ch. B 3.3.1 ➢ Navigation functional requirements ➢ Fleet capability ➢ CNS/ATM capabilities				
	Step 2- Identify appropriate ICAO navigation specification to apply in the specific CNS/ATM environment ➢ RNP APCH ➢ RNP AR APCH ➢ New specification?	PBN Manual, Vol. 1B Ch. B 3.3.2				
	Step 3- Identify trade-offs with airspace concept and navigation functional requirements (if necessary)	PBN Manual, Vol. 1B Ch. B 3.3.3				
			➢ **Navigation specifications**			

Process 3 **Planning and implementation**	**Step 1**- Formulate safety plan	PBN Manual, Vol. 1B Ch. B 4.3.1 ➢ Navigation specifications				
	Step 2- Validate airspace concept for safety	PBN Manual, Vol. 1B Ch. B 4.3.2				
	Step 3- Procedure design	PBN Manual, Vol. 1B Ch. B 4.3.3				
	Step 4- Procedure ground validation	PBN Manual, Vol. 1B Ch. B 4.3.4				
	Step 5- Implementation decision	PBN Manual, Vol. 1B Ch. B 4.3.5				
	Step 6- Flight inspection and flight validation	PBN Manual, Vol. 1B Ch. B 4.3.6				
	Step 7- ATC system integration considerations	PBN Manual, Vol. 1B Ch. B 4.3.7				
	Step 8- Awareness and training material	PBN Manual, Vol. 1B Ch. B 4.3.8				
	Step 9- Establishing operational implementation date	PBN Manual, Vol. 1B Ch. B 4.3.9				
	Step 10- Post-implementation review	PBN Manual, Vol. 1B Ch. B 4.3.10		**DEC 2012**		
			➢ **Training programmes** ➢ **RNAV STARs and SIDs**			

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NATIONAL PERFORMANCE OBJECTIVES AND ACTION PLAN
OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE

PERIOD: Long Term (2016 +)
APPLICATION: Terminal Phase

Benefits

Environment:

Efficiency :

Strategy

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Preliminary						
	• Review AFI PBN Implementation Plan Key Targets (Terminal)	***AFI PBN Implementation Plan*** Long Term: 2016 + [Ch. 25-26]				
	• Review State PBN Implementation Plan Key Targets (Terminal)	***State PBN Implementation Plan*** Long Term: 2016 + [Ch. 5.3]				

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Terminal Applications Implementation						
Process 1 **Determine Requirements**	**Step 1-** Formulate airspace concept	PBN Manual, Vol. 1B Ch. B 2.3.1 ➢ ATM needs (civil/military)				
	Step 2- Assessment of existing fleet capability and available navaid infrastructure	PBN Manual, Vol. 1B Ch. B 2.3.2 ➢ IATA Survey ➢ State Survey				
	Step 3- Assessment of existing ATS surveillance system and communications infrastructure and ATM system	PBN Manual, Vol. 1B Ch. B 2.3.3				
	Step 4- Identify necessary navigation performance and functional requirements	PBN Manual, Vol. 1B Ch. B 2.3.4				
			➢ **Navigation functional requirements** ➢ **Fleet capability** ➢ **CNS/ATM capabilities**			

Process 2 **Identifying ICAO navigation specification for implementation**	**Step 1-** Review ICAO navigation specifications	PBN Manual, Vol. 1B Ch. B 3.3.1 ➢ Navigation functional requirements ➢ Fleet capability ➢ CNS/ATM capabilities				
	Step 2- Identify appropriate ICAO navigation specification to apply in the specific CNS/ATM environment ➢ RNAV 5 ➢ RNAV 2 ➢ RNAV 1 ➢ New specification?	PBN Manual, Vol. 1B Ch. B 3.3.2				
	Step 3- Identify trade-offs with airspace concept and navigation functional requirements (if necessary)	PBN Manual, Vol. 1B Ch. B 3.3.3				
			➢ **Navigation specifications**			

Process 3 **Planning and implementation**	**Step 1**- Formulate safety plan	PBN Manual, Vol. 1B Ch. B 4.3.1 ➢ Navigation specifications				
	Step 2- Validate airspace concept for safety	PBN Manual, Vol. 1B Ch. B 4.3.2				
	Step 3- Procedure design	PBN Manual, Vol. 1B Ch. B 4.3.3				
	Step 4- Procedure ground validation	PBN Manual, Vol. 1B Ch. B 4.3.4				
	Step 5- Implementation decision	PBN Manual, Vol. 1B Ch. B 4.3.5				
	Step 6- Flight inspection and flight validation	PBN Manual, Vol. 1B Ch. B 4.3.6				
	Step 7- ATC system integration considerations	PBN Manual, Vol. 1B Ch. B 4.3.7				
	Step 8- Awareness and training material	PBN Manual, Vol. 1B Ch. B 4.3.8				
	Step 9- Establishing operational implementation date	PBN Manual, Vol. 1B Ch. B 4.3.9				
	Step 10- Post-implementation review	PBN Manual, Vol. 1B Ch. B 4.3.10	➢ **Training programmes** ➢ **RNAV STARs and SIDs**	**DEC 2012**		

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NATIONAL PERFORMANCE OBJECTIVES AND ACTION PLAN
OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE

PERIOD: Near Term (2008-2012)
APPLICATION: Approach Phase

Benefits

Environment:

Efficiency :

Strategy

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Preliminary						
	• Review AFI PBN Implementation Plan Key Targets (Terminal- Approach)	***AFI PBN Implementation Plan*** Near Term: 2008-2012 [Ch. 10-14]				
	• Review State PBN Implementation Plan Key Targets (Terminal-Approach)	***State PBN Implementation Plan*** Near Term: 2008-2012 [Ch. 5.1.2-5.1.3]				

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Terminal Applications Implementation						
Process 1 **Determine Requirements**	**Step 1-** Formulate airspace concept	PBN Manual, Vol. 1B Ch. B 2.3.1 ➢ ATM needs (civil/military)				
	Step 2- Assessment of existing fleet capability and available navaid infrastructure	PBN Manual, Vol. 1B Ch. B 2.3.2 ➢ IATA Survey ➢ State Survey				
	Step 3- Assessment of existing ATS surveillance system and communications infrastructure and ATM system	PBN Manual, Vol. 1B Ch. B 2.3.3				
	Step 4- Identify necessary navigation performance and functional requirements	PBN Manual, Vol. 1B Ch. B 2.3.4				
			➢ **Navigation functional requirements** ➢ **Fleet capability** ➢ **CNS/ATM capabilities**			

Process 2 **Identifying ICAO navigation specification for implementation**	**Step 1**- Review ICAO navigation specifications	PBN Manual, Vol. 1B Ch. B 3.3.1 ➢ Navigation functional requirements ➢ Fleet capability ➢ CNS/ATM capabilities				
	Step 2- Identify appropriate ICAO navigation specification to apply in the specific CNS/ATM environment ➢ RNP APCH ➢ RNP AR APCH ➢ New specification?	PBN Manual, Vol. 1B Ch. B 3.3.2				
	Step 3- Identify trade-offs with airspace concept and navigation functional requirements (if necessary)	PBN Manual, Vol. 1B Ch. B 3.3.3				
			➢ **Navigation specifications**			

Process 3 **Planning and implementation**	**Step 1**- Formulate safety plan	PBN Manual, Vol. 1B Ch. B 4.3.1 ➢ Navigation specifications				
	Step 2- Validate airspace concept for safety	PBN Manual, Vol. 1B Ch. B 4.3.2				
	Step 3- Procedure design	PBN Manual, Vol. 1B Ch. B 4.3.3				
	Step 4- Procedure ground validation	PBN Manual, Vol. 1B Ch. B 4.3.4				
	Step 5- Implementation decision	PBN Manual, Vol. 1B Ch. B 4.3.5				
	Step 6- Flight inspection and flight validation	PBN Manual, Vol. 1B Ch. B 4.3.6				
	Step 7- ATC system integration considerations	PBN Manual, Vol. 1B Ch. B 4.3.7				
	Step 8- Awareness and training material	PBN Manual, Vol. 1B Ch. B 4.3.8				
	Step 9- Establishing operational implementation date	PBN Manual, Vol. 1B Ch. B 4.3.9				
	Step 10- Post-implementation review	PBN Manual, Vol. 1B Ch. B 4.3.10		**DEC 2012**		
			➢ **Training programmes** ➢ **RNP approaches with Baro VNAV**			

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NATIONAL PERFORMANCE OBJECTIVES AND ACTION PLAN
OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE

PERIOD: Mid Term (2013-2016)
APPLICATION: Approach Phase

Benefits

Environment:

Efficiency :

Strategy

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Preliminary						
	• Review AFI PBN Implementation Plan Key Targets (Terminal- Approach)	***AFI PBN Implementation Plan*** Mid Term: 2013-2016 [Ch. 20-24]				
	• Review State PBN Implementation Plan Key Targets (Terminal Approach)	***State PBN Implementation Plan*** Mid Term: 2013-2016 [Ch. 5.2.2-5.2.3]				

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Terminal Applications Implementation						
Process 1 **Determine Requirements**	**Step 1**- Formulate airspace concept	PBN Manual, Vol. 1B Ch. B 2.3.1 ➢ ATM needs (civil/military)				
	Step 2- Assessment of existing fleet capability and available navaid infrastructure	PBN Manual, Vol. 1B Ch. B 2.3.2 ➢ IATA Survey ➢ State Survey				
	Step 3- Assessment of existing ATS surveillance system and communications infrastructure and ATM system	PBN Manual, Vol. 1B Ch. B 2.3.3				
	Step 4- Identify necessary navigation performance and functional requirements	PBN Manual, Vol. 1B Ch. B 2.3.4				
			➢ **Navigation functional requirements** ➢ **Fleet capability** ➢ **CNS/ATM capabilities**			

Process 2 **Identifying ICAO navigation specification for implementation**	**Step 1**- Review ICAO navigation specifications	PBN Manual, Vol. 1B Ch. B 3.3.1 ➢ Navigation functional requirements ➢ Fleet capability ➢ CNS/ATM capabilities				
	Step 2- Identify appropriate ICAO navigation specification to apply in the specific CNS/ATM environment ➢ RNP APCH ➢ RNP AR APCH ➢ New specification?	PBN Manual, Vol. 1B Ch. B 3.3.2				
	Step 3- Identify trade-offs with airspace concept and navigation functional requirements (if necessary)	PBN Manual, Vol. 1B Ch. B 3.3.3				
			➢ **Navigation specifications**			

Process 3 **Planning and implementation**	**Step 1**- Formulate safety plan	PBN Manual, Vol. 1B Ch. B 4.3.1 ➢ Navigation specifications				
	Step 2- Validate airspace concept for safety	PBN Manual, Vol. 1B Ch. B 4.3.2				
	Step 3- Procedure design	PBN Manual, Vol. 1B Ch. B 4.3.3				
	Step 4- Procedure ground validation	PBN Manual, Vol. 1B Ch. B 4.3.4				
	Step 5- Implementation decision	PBN Manual, Vol. 1B Ch. B 4.3.5				
	Step 6- Flight inspection and flight validation	PBN Manual, Vol. 1B Ch. B 4.3.6				
	Step 7- ATC system integration considerations	PBN Manual, Vol. 1B Ch. B 4.3.7				
	Step 8- Awareness and training material	PBN Manual, Vol. 1B Ch. B 4.3.8				
	Step 9- Establishing operational implementation date	PBN Manual, Vol. 1B Ch. B 4.3.9				
	Step 10- Post-implementation review	PBN Manual, Vol. 1B Ch. B 4.3.10		**DEC 2012**		
			➢ **Training programmes** ➢ **RNP approaches with Baro VNAV**			

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NATIONAL PERFORMANCE OBJECTIVES AND ACTION PLAN
OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE

PERIOD: Long Term (2016 +)
APPLICATION: Approach Phase

Benefits

Environment:

Efficiency :

Strategy

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Preliminary						
	• Review AFI PBN Implementation Plan Key Targets (Terminal-Approach)	***AFI PBN Implementation Plan*** Long Term: 2016 + [Ch. 25-26]				
	• Review State PBN Implementation Plan Key Targets (Terminal Approach)	***State PBN Implementation Plan*** Long Term: 2016 + [Ch. 5.3]				

PROCESS	TASKS	INPUT SOURCE	OUTPUT	TARGET DATE	ACTION PERSON/GROUP	STATUS
Terminal Applications Implementation						
Process 1 **Determine Requirements**	**Step 1**- Formulate airspace concept	PBN Manual, Vol. 1B Ch. B 2.3.1 ➢ ATM needs (civil/military)				
	Step 2- Assessment of existing fleet capability and available navaid infrastructure	PBN Manual, Vol. 1B Ch. B 2.3.2 ➢ IATA Survey ➢ State Survey				
	Step 3- Assessment of existing ATS surveillance system and communications infrastructure and ATM system	PBN Manual, Vol. 1B Ch. B 2.3.3				
	Step 4- Identify necessary navigation performance and functional requirements	PBN Manual, Vol. 1B Ch. B 2.3.4				
			➢ **Navigation functional requirements** ➢ **Fleet capability** ➢ **CNS/ATM capabilities**			

Process 2 **Identifying ICAO navigation specification for implementation**	**Step 1**- Review ICAO navigation specifications	PBN Manual, Vol. 1B Ch. B 3.3.1 ➢ Navigation functional requirements ➢ Fleet capability ➢ CNS/ATM capabilities				
	Step 2- Identify appropriate ICAO navigation specification to apply in the specific CNS/ATM environment ➢ RNP APCH ➢ RRNP AR APCH ➢ New specification?	PBN Manual, Vol. 1B Ch. B 3.3.2				
	Step 3- Identify trade-offs with airspace concept and navigation functional requirements (if necessary)	PBN Manual, Vol. 1B Ch. B 3.3.3				
			➢ **Navigation specifications**			

Process 3 **Planning and implementation**	**Step 1**- Formulate safety plan	PBN Manual, Vol. 1B Ch. B 4.3.1 ➢ Navigation specifications				
	Step 2- Validate airspace concept for safety	PBN Manual, Vol. 1B Ch. B 4.3.2				
	Step 3- Procedure design	PBN Manual, Vol. 1B Ch. B 4.3.3				
	Step 4- Procedure ground validation	PBN Manual, Vol. 1B Ch. B 4.3.4				
	Step 5- Implementation decision	PBN Manual, Vol. 1B Ch. B 4.3.5				
	Step 6- Flight inspection and flight validation	PBN Manual, Vol. 1B Ch. B 4.3.6				
	Step 7- ATC system integration considerations	PBN Manual, Vol. 1B Ch. B 4.3.7				
	Step 8- Awareness and training material	PBN Manual, Vol. 1B Ch. B 4.3.8				
	Step 9- Establishing operational implementation date	PBN Manual, Vol. 1B Ch. B 4.3.9				
	Step 10- Post-implementation review	PBN Manual, Vol. 1B Ch. B 4.3.10		**DEC 2012**		
			➢ **Training programmes** ➢ **RNP approaches with Baro VNAV**			

ATS/AIS/SAR SG/11
Appendix 6D to the Report on Agenda Item 6

PBN ROUTE NETWORK DEVELOPMENT WORKING GROUP (PRND WG)

A) TERMS OF REFERENCE

1. Review the AFI ATS route network in order to assess its capacity and constraints.

2. Based on the airspace user needs and in coordination with stakeholders (States, International Organizations, user representative organizations and other ICAO Regions), AFI Regional Performance Objectives, the Regional PBN Implementation Plan, as well as related ICAO provisions and guidance material, identify requirements and improvements for achieving and maintaining an efficient route network in the AFI Region.

3. Propose a strategy and prioritized plan for development of improvements to the route network, highlighting:

   - areas that require immediate attention
   - interface issues with adjacent ICAO Regions
   - the implementation of PBN

4. Develop a working depository for route proposals that will be used as a dynamic reference document for ongoing discussions on routes under development/modification. In this respect, the TF should explore the utility that can be realized from the route catalogue concept/ATS route database.

5. Engage the necessary parties regarding routes under consideration.

6. In coordination with the ARMA, carry out safety assessment of the proposed changes to the ATS route network.

7. After adoption by the ATS/AIS/SAR SG, or as delegated by the same, submit completed route proposals for amendment of the Basic ANP Table ATS-1, to the AFI Regional Offices for processing

8. Assess the role that may contributed by a special project for a comprehensive review of the AFI ATS route network as envisaged by APIRG 15 and make recommendations, with detailed project description if the role a project is confirmed. (see WP 13)

B) COMPOSITION

The PRND WG will comprise:

a) experts nominated by AFI Provider States from both civil aviation entities and military authorities;

(Sub-Group to provide specific States, ideally 8 to 15)

b) ARMA, IATA, IFALPA and IFATCA

c) representatives from adjacent States and concerned international organizations (on ad-hoc basis).

C) WORKING ARRANGEMENTS

The Working Group shall:

a) report to the ATS/AIS/SAR SG Sub Group through the PBN TF (or its successor); and

b) meet as required and at least once a year

c) use electronic communication between members as much as feasible

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ATS/AIS/SAR SG/11
Appendix 6C to Agenda Item 6

USER PRIORITIES FOR ATS ROUTES

IATA - Update ATM Priority Actions – APIRG/15 (2005)		
ROUTES	**STATUS**	**REMARKS**
UG745	Implemented	Johannesburg-Nespruit_Maputo
UG615	Implemented	Nouakchott-Mopti
UG624	Implemented	Bangui-Garoua
UG625	Implemented	Libreville-Moros-Bangui
UG622	Partial Implementation	IPONO-(UG622)-RIPOL-ZR Implemented. KTM-(DCT)-IPONO not implemented by Sudan.
UG402	Algeria, Niger, Burkina Faso and Benin	Tamanrasset-(DCT)-GAO-(DCT)-TYE. Request States to expedite implementation.
UG403	Algeria and Niger	MNA-(DCT)-Hogar-(DCT)-Tobouk-(DCT)-Edara-(DCT)-FL. Request States to expedite implementation.
UG404	Morocco, Algeria, Mali and Niger	Casablanca-Niamey. Request States to expedite implementation.
UG629	Morocco, Algeria, Mali, Niger and Nigeria	CBA-OZT-Gao-Lagos. Request ICAO co-ordinate full implementation.
UG981	Niger, Nigeria, Cameroun, E. Guinea and Gabon	Gao-(DCT)-Pot-(DCT)-LV. Request States to expedite implementation.
UG616	Niger, Nigeria.	Ripol-Kano. Request ICAO to co-ordinate full implementation.
UB527	Implemented	Malakal-Kenana
UG424	Implemented	Dar-Es-Salaam to Lubumbashi

IATA - Update ATM Priority Actions – APIRG/15 (2005)		
ROUTES	**STATUS**	**REMARKS**
UG618	Partial Implementation	Lubumbashi-Bukavu-SAGBU Implemented; SAGBU-Malakal NOT Implemented: *No longer a priority – No scheduled flights from Egypt/Europe in this route.*
UB607	Partial Implementation	Goma-El Obeid Implemented; El Obeid-New Valley-El Daba NOT Implemented: *No longer a priority – No scheduled flights from Egypt/Europe in this route.*
UB525	Ethiopia, Sudan and Egypt	Addis Ababa-Luxor. Request States to expedite implementation.
UL612	DR Congo, Sudan and Egypt	Goma-El Dhaba. Request States to expedite implementation. Similar Route as UB607 above. *No longer a priority – No scheduled flights from Egypt/Europe in this route.*
UM220	Sudan	Lodwar-Abu Simbel. Request States to expedite implementation. RNAV ROUTE
UM365	Sudan	Geneina-Port Sudan. Request ICAO co-ordinate full implementation. RNAV ROUTE
UM665	Sudan	Addis Ababa-Morowe. Request States to expedite implementation. (Route in New Request)
UR400	Sudan	Abu Simbel to Kassala. Request ICAO co-ordinate full implementation.
UM365	Sudan	Geneina-Port Sudan. Request ICAO co-ordinate full implementation. RNAV ROUTE

Users Priority Route Proposals for 2010		
Routes description	**Countries**	**Remarks**
1-BDR-(DCT)-NUBAR	Ethiopia and Sudan	Modify Route UB525 recommended by APIRG 16.
2-TIKAT-MRW	Sudan	Modify Route UM665 recommended by APIRG 16.
3-GWZ-ALEMU	Ethiopia	Re-instatement of Route UR611 in Ethiopian airspace.
4-15GWZ-SAGBU	Sudan	Re-instatement of Route UB535 in Sudan airspace.
5-LOV-BUN	Kenya, Uganda and DR Congo	Preferred Route is 15GWZ-SAGBU shown above.
6-W886-GM-(DCT)-MPK	Ethiopia, Sudan and ASECNA	Extend W886 direct to Bangui.
7-MLK-(DCT)-FL	Sudan and ASECNA	Malakal direct to Ndjamena.
8-KGI-(DCT)-LV	DR Congo and ASECNA	Kisangani direct to Libreville.
9-LOV-(DCT)-MWZ	Kenya, Uganda and Tanzania	Connecting Southbound route to Lubumbashi. Replace UG618.
10-OXILO-(DCT)-LAG	Nigeria	Extend UA861 direct to Lagos.
11-MLK-(DCT)-LAG	Sudan, ASECNA and Nigeria	This Route is preferred to OXILO-(DCT)-LAG route above.
12-DLA-(DCT)-ACC	ASECNA, Nigeria and Ghana	DLA direct to ACC or ABJ.
13-NV-(DCT)-LUB	Kenya, Tanzania, Zambia and DR Congo	Nairobi direct Lubumbashi.
14-NV-(DCT)-BKK	Kenya, Seychelles, India,…	Oceanic Route (Flex Routing). Involve other Regions.
15-WHV-AKAZU-ITNEL-BZ	Angola, DR Congo	Route published but suspended by NOTAM (UA617F).
16-ERKEL-(DCT)-BIRNI	Niger	
17-BRN-(DCT)-ATMUL	Egypt	

Users Priority Route Proposals for 2010		
Routes description	**Countries**	**Remarks**
18-LUKRO-KANO	Nigeria	
19-JDW-IPONO	**Sudan**	**Hajj Route IPONO direct to Jeddah**
20-TAMALE-(DCT)-ABUJA	Nigeria	Tamale-Kilmo-FIR already exists. Connect FIR-(DCT)-GW-(DCT)-ABUJA
21-TAMALE-(DCT)-MPK	Nigeria, ASECNA	Connecting West Africa to East Africa

Appendix 6F to the Report on Agenda Item 6

Terms of reference of

National Performance-Based Navigation Programme Managers (NPPMs)

National PBN Programme Managers (NPPMs):

1) Are responsible for ensuring that proper mechanisms are put in place for the effective implementation of PBN, including:

   - Establishment of a National PBN Implementation Group.
   - Development of a National PBN Implementation Plan.

2) Act as Focal Points and Coordinators of the activities of States' PBN Implementation Groups, including but not limited to the following:

   a) Study of PBN operations technology and the Global and Regional guidance material.
   b) Review of the regional air navigation plan and take account of regional ATM objectives and regional ATM requirements in terms of communication, navigation and surveillance elements.
   c) Coordination with adjacent States.
   d) Consistent with ICAO's regional air navigation plan, identification of the principal objectives of the State for implementation of CNS/ATM systems.
   e) Review of the current and planned infrastructures in terms of airports, airspace, air routes, communications, navigation and surveillance elements.
   f) Assessment of the current traffic density and carry out air traffic forecasts with emphasis on aircraft movements and regional flows of traffic.
   g) Evaluation of the current ATM system, focusing on route structure, separation standards, equipage, maintenance, operations and procedures in order to identify any weaknesses.
   h) As a result of gap analyses, development of functional requirements that would result in improvements/benefits both in the short term and the long term, keeping in view users' requirements.
   i) Establishment of PBN operational objectives and supporting CNS elements that are most suitable for the scenario, taking into account the planning situation in adjacent States, the development status of ICAO guidance material (SARPs, PBN Manual, etc.) and the regional approach to air navigation planning.
   j) Establishment of implementation time lines for new systems and decommissioning time lines for current ground systems that are not required as a result of the transition to PBN operations.
   k) Carrying out of cost-benefit analyses to determine the most appropriate plan, using the iteration process.
   l) Harmonization with the regional plan.
   m) Formalization and maintenance of the planning document; and initiation of actions for the implementation of PBN.

3) Ensure that to the extent practical, the composition of the National PBN Implementation Group should include members from participating organizations, such as:

   a) The national administration;
   b) The regulating agency;
   c) ATM service provider;

d) Airspace users;
e) The airport authority;
f) Research and development organizations;
g) Military authorities, including air defense; and
h) Other relevant bodies.

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

5) Facilitate the State's expeditious communication with ICAO with regard to PBN implementation

6) Ensure that updates regarding progress in the implementation of PBN are provided to ICAO.

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 studies, the PBN strategy and Implementation Plan for the AFI Region, based on the ICAO PBN Implementation goals as reflected in assembly resolution 36-23.

d) Assist States that may require support in the implementation of PBN.

2. Work Programme

a) Study and assess the Regional RNAV and RNP requirements.

b) Initially focus assistance to States that may require support on development of the State PBN implementation plans.

c) Identify priority routes and terminal areas where RNAV and RNP should be implemented.

d) Identify priority runways for Approach Procedures with Vertical Guidance (APV) to be implemented based on the ICAO RNP APCH navigation specification (APV).

e) Develop an amendment proposal to the AFI Regional Supplementary Procedures concerning the implementation of PBN in the Region.

f) Identify guidance material and training needs.

g) Follow up on the developments in ICAO affecting the Global Plan and PBN in Particular, in order to update the Regional plans accordingly.

h) Coordinate with other ICAO Regions as necessary to address implementation interface issues.

i) Undertake other functions relevant to implementation of PBN as assigned by APIRG.

j) Develop and update (as necessary) the Regional PBN Implementation Strategy and Plan.

k) Develop the PBN performance objectives and related action plans for en-route, terminal and approach phases of flight; 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.

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RECOMMENDATIONS FROM THE MARCH 2010 AIAG MEETING

1. States and operators and air navigation service providers (ANSPs) should take necessary measures to ensure necessary training, particularly in the field of Human Factors (particularly CRM/Team Resource Management type of training) in order to improve awareness and appropriate response to potential incidents;

2. ANSPs providers are urged to monitor fatigue among air traffic controllers (ATC) operational personnel and carry out necessary training to improve proficiency;

3. The safety management concept of “Just culture” should be promoted, in order to move away from the environment of authorities “seriously reprimanding ATCs” which was evident in many investigation reports;

4. VHF/HF communications need to be enhanced in order to enable positive Air Traffic Control. Controller-pilot data link communications (CPDLC) for en-route operations in accordance with the Regional Air Navigation Plan (ICAO Doc 7474) should also be implemented;

5. Airspace re-organization including appropriate classification of airways and re-sectorization should be undertaken where required;

6. Authorities should take necessary measures including training to ensure the ATC procedures are clarified to ATC personnel;

7. States be urged to ensure the implementation of positive Control by ATC where appropriate; and

8. Encourage the use of In-Flight Broadcast Procedure (IFBP) in airspace of its applicability.

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Report on Agenda Item 8

CONTINGENCY TEMPLATE

ATM REGIONAL CONTINGENCY PLAN FOR CTA/UTA/FIR

OBJECTIVE: This contingency plan contains arrangements to ensure the continued safety of air navigation in the event of partially or total disruption of air traffic services (ATS) and is related to ICAO Annex 11- *Air Traffic Services* Chapter 2, paragraph 2.28. The contingency plan should be designed to provide alternative routes, using existing airways in most cases, which will allow aircraft operators to fly trough or avoid airspace within the (*XXX*) CTA/UTA/FIR.

AIR TRAFFIC MANAGEMENT

ATS Responsibilities

Tactical ATC considerations during periods of overloading may require re-assignment of routes or portions thereof.

Alternative routes should be designed to maximize the use of existing ATS route structures and communication, navigation and surveillance services.

In the event that ATS cannot be provided within the (*XXX*) CTA/UTA/FIR, the Civil Aviation Authority shall publish the corresponding NOTAM indicating the following:

a) Time and date of the beginning of the contingency measures;

b) Airspace available for landing and overflying traffic and airspace to be avoided;

c) Details of the facilities and services available or not available and any limits on ATS provision (e.g., ACC, APP, TWR and FIS), including an expected date of restoration of services if available;

d) Information on the provisions made for alternative services;

e) ATS contingency routes;

f) Procedures to be followed by neighbouring ATS units;

g) Procedures to be followed by pilots; and

h) Any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

In the event that the CAA is unable to issue the NOTAM, the (alternate) CTA/UTA/FIR will take action to issue the NOTAM of closure airspace upon notification by corresponding CAA or the ICAO ESAF Regional Office.

Separation

Separation criteria will be applied in accordance with the *Procedures for Air Navigation Services-Air Traffic Management* (PANS-ATM, Doc 4444) and the *Regional Supplementary Procedures* (Doc 7030).

Level Restrictions

Where possible, aircraft on long-haul international flights shall be given priority with respect to cruising levels.

Other measures

Other measures related to the closure of airspace and the implementation of the contingency scheme with the (*XXX*) CTA/UTA/FIR may be taken as follows:

a) Suspension of all VFR operations;

b) Delay or suspension of general aviation IFR operations; and

c) Delay or suspension of commercial IFR operations.

TRANSITION TO CONTINGENCY SCHEME

During times of uncertainty when airspace closures seem possible, aircraft operators should be prepared for a possible change in routing while en-route, familiarization of the alternative routes outlined in the contingency scheme as well as what may be promulgated by a State via NOTAM or AIP.

In the event of airspace closure that has not been promulgated, ATC should, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and to stand by for further instructions.

ATS providers should recognize that when closures of airspace or airports are promulgated, individual airlines might have different company requirements as to their alternative routings. ATC should be alert to respond to any request by aircraft and react commensurate with safety.

TRANSFER OF CONTROL AND COORDINATION

The transfer of control and communication should be at the common FIR boundary between ATS units unless there is mutual agreement between adjacent ATS units. ATS providers should also review current coordination requirements in light of contingency operations or short notice of airspace closure.

PILOTS AND OPERATOR PROCEDURES

Pilots need to be aware that in light of current international circumstances, a contingency routing requiring aircraft to operate off of normal traffic flows, could result in an intercept by military aircraft. Aircraft operators must therefore be familiar with international intercept procedures contained in ICAO Annex 2 *–Rules of the Air*, paragraph 3.8 and Appendix 2, Sections 2 and 3.

Pilots need to continuously guard the VHF emergency frequency 121.5 MHz and should operate their transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where secondary surveillance radar (SSR) is used for ATS purposes. Transponders should be set on a discrete code assigned by ATC or select code 2000 if ATC has not assigned a code.

If an aircraft is intercepted by another aircraft, the pilot shall immediately:

a) Follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with international procedures;

b) Notify, if possible, the appropriate ATS unit;

c) Attempt to establish radio communication with the intercepting aircraft by making a general call on the emergency frequency 121.5 MHz and 243 MHz if equipped; and

d) Set transponder to code 7700, unless otherwise instructed by the appropriate ATS unit.

If any instructions received by radio from any source conflict with those given by the intercepting aircraft, the intercepted aircraft shall request immediate clarification while continuing to comply with the instructions given by the intercepting aircraft.

OVERFLIGHT APPROVAL

Aircraft operators should obtain overflight approval from States/Territories/International Organizations for flights operating through their jurisdiction of airspace, where required. In a contingency situation, flights may be rerouted at short notice and it may not be possible for operators to give the required advanced notice in a timely manner to obtain approval. States/Territories/International Organizations responsible for the airspace in which contingency routes are established should consider making special arrangements to expedite flight approvals in these contingency situations.

CONTINGENCY UNIT

The ATM national contingency unit assigned the responsibility of monitoring developments that may dictate the enforcement of the contingency plan and coordination of contingency arrangements is:

Name of Agency:
Contact Person:
Telephone:
Fax:
Email:

During a contingency situation, the National Contingency Unit will liase with the involved FIRs through the ICAO ESAF Regional Office.

The ICAO ESAF Office will:

a) closely monitor the situation and coordinate with all affected States/Territories/International Organizations and the IATA Regional Office, so as to ensure air navigation services are provided to international aircraft operations in the AFI Region;

b) take note of any incidents reported and take appropriate action;

c) provide assistance as required on any issue with the Civil Aviation Administrations involved in the contingency plan; and

d) keep the President of the Council of ICAO, the Secretary General, C/RAO, D/ANB and C/ATM continuously informed on developments, including activation of the contingency plan.

REROUTING SCHEME

In the event of closure the (*XXX*) CTA/UTA/FIR, aircraft operators should file their flight plans using the alternative contingency routes listed in the scheme below in order to ensure avoidance in that airspace (CTA/UTA/FIR).

Present ATS ROUTE	**CONTINGENCY ROUTINGS**	**FIRs INVOLVED**
In lieu of:	**(ATS unit)** provides ATC on the following routings: ***CR1:*** ***CR2:*** ***CR3:***	**XXX**: In coordination with **XXX**
In lieu of:	**(ATS unit)** provides ATC on the following routing: ***CR4:***	**XXX**: In coordination with **XXX**

All aircraft should establish and maintain contact on published VHF or HF frequencies with the (*XXX*) ATS unit (APP/ACC/FIC) responsible for the airspace being traversed.

List of points of contact of all concerned States/Territories/International Organizations, IATA and ICAO ESAF/WACAF Office.

State /Organization	***Point of contact***	**Telephone**	**e-mail**
IATA			
ICAO	Mr. G P Moshabesha Regional Director	Tel.: +254 20 762 2395 Fax: +254 20 762 1092	geoffrey.moshabesha@icao.unon.org
	Mr. B Sekwati Deputy Regional Director	Tel: +254 20 762 2370 Fax: +254 20 762 1092	boitshoko.sekwati@icao.unon.org
	Mr. S M Machobane, RO ATM & SAR	Tel.: +254 20 762 2372 Fax: +254 20 762 1092	seboseso.machobane@icao.unon.org
ICAO/WACAF	Mr Amadou O. Guitteye, Regional Director	Tel.: +221 33 839 9368 Fax: +221 33 823 6926	aguitteye@dakar.icao.int
	Mr Mam S. Jallow Deputy Regional Director	Tel.: +221 33 839 9389 Fax: +221 33 823 6926	mjallow@dakar.icao.int
	Mr Sadou Marafa RO ATM/SAR	Tel.: +221 33 839 9390 Fax: +221 33 823 6926	smarafa@dakar.icao.int

NOTE:
For each contingency plan, information relating to communication with ICAO Regional Office will depend on the Regional Office that is accredited to the specific State.

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CONTINGENCY MODEL

XXXXXXXX (*state)*AIR TRAFFIC MANAGEMENT

CONTINGENCY PLAN

YYYYYYYY FIR

PREPARED BY

Xxxxxxxxn (*state)* RRRRRRRRRRRR (*ANSP)*

XXXXXXXX

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FOREWORD

The Contingency Plan will come into effect as determined by the XXXX Civil Aviation Authority (XXCAA), who is the authority for civil aviation operations in Xxxxxxxx (*State)*.

This Plan has been developed in coordination with the Xxxxxx (*State)* airspace management stakeholders (*you may list within the parenthesis such stakeholders as, aviation industry representative bodies, communications technologies companies/corporations, involved ministries, military, SAR organization*) and with the close co-operation and collaboration with the civil aviation authorities and air navigation service providers responsible for the adjacent.

The Plan will be activated by promulgation of a NOTAM issued by the Xxxxxxxxn (*State)* International NOTAM Office (NOF) as far in advance as is practicable. However, when such prior notification is impracticable for any reason, the Plan will be put into effect through notification by the designated authority, as authorized by the XXCAA. In the event that this is also no practical, notification may be made by ICAO in accordance with arrangements made with the XXCAA.

Arrangements have been made with civil aviation authorities responsible for adjacent airspaces and action on their part in the event of activation of the Plan will be in accordance with Operational Coordination Agreements (OCA) established between the States concerned. Aircraft flying through the Yyyyyyyy FIR during operation of the Contingency Plan are expected to comply with the requirements of this Plan and to cooperate with other airspace users as necessary for continued safety of air navigation.

This Plan has been prepared in coordination with the International Civil Aviation Organization (ICAO) to meet the provisions of ICAO Annex 11 ─ *Air Traffic Services* Chapter 2 (2.30), to provide for the safe and orderly continuation of international flights through Xxxxxxxxn airspace.

It is to be understood that contingency arrangements that constitute a temporary deviation from the approved Regional Air Navigation Plan are subject to approval as necessary, by the President of the ICAO Council on behalf of the Council.

Proposed amendments to this plan shall be forwarded to:

Director General
XXCAA
.....
…….
……
.....

RECORD OF AMENDMENTS

Amendment Number	Effective Date	Date Entered	Entered By	Paragraph/ Reference

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ATM CONTINGENCY PLAN FOR INTERNATIONAL FLIGHTS TO TRANSIT THE AIRSPACE OF THE YYYYYYYY FIR

Effective: Date……Time……

1. OBJECTIVE

1.1 The Air Traffic Management (ATM) Contingency Plan contains arrangements to ensure the continued safety of air navigation in the event of partial or total disruption of air traffic services in the Yyyyyyyy FIR in accordance with ICAO Annex 11 ─ *Air Traffic Services*, Chapter 2, section 2.30 (*check that the section number has not changed after an amendment of the Annex*). The Contingency Plan provides the ATS procedures and contingency route structure using existing airways in most cases that will allow aircraft operators to transit the Yyyyyyyy FIR.

1.2 This Contingency Plan does not address arrangements for aircraft arriving and departing at Xxxxxxxxn airports or for domestic flight operations within the territory of Xxxxxxxx.

2. STATES AND FIRS AFFECTED

2.1 In the event that the Director General, XXCAA activates this Contingency Plan, adjacent States and civil aviation authorities responsible for air navigation services in the adjacent FIRs (*review the statement depending on the structure of responsibilities in the adjacent airspace*) will be notified in accordance with the Operational Coordination Agreement (OCA) established between Xxxxxxxxx and the States concerned. The adjacent States, FIRs and ACCs directly affected by this Contingency Plan are as follows:

a) State

…….. (ACC)

b) State

……. FIR (ACC)

c) State

e) State

……. FIR (ACC)

f) Xxxxxxxx

Yyyyyyyy FIR (ACC)

2.2 The contact details of the civil aviation authorities and organizations concerned are contained in **Appendix A.** These details will be kept up to date in accordance with OCAs and the Plan updated accordingly**.**

3. MANAGEMENT OF THE CONTINGENCY PLAN

3.1 The contingency measures set out in this Plan are based on known, foreseeable or probable impact of interruptions in ATS caused by natural occurrences or other circumstances, which, in one way or another may partially or totally disrupt the provision of ATS and/or related support services in the Yyyyyyyy FIR.

3.2 The following arrangements have been put in place to support management of the Contingency Plan in order to ensure that international flights may continue in a safe and orderly manner through the Yyyyyyyy FIR.

Central Coordinating Committee

3.3 Whenever circumstances permit, as soon as practicable in advance of, or after a contingency event has occurred, the Director General, XXCAA shall convene the Central Coordinating Committee (CCC) comprising representatives from:

1) XXCAA

2) …… (ATS providers for the Yyyyyyyy FIR and operators of major airports)

3) Xxxxxxxxn Air Force

4) Representative from the airlines

5) Meteorology Agency of Xxxxxxxxxx

6) Other participants as required

3.4 The CCC shall oversee the conduct of the Contingency Plan and in the event that the Yyyyyyyy ACC premises are out of service for an extended period, make arrangements for and facilitate the temporary relocation of the Yyyyyyyy ACC at the *Temp ACC (name of temporary ATS unit taking over)* and the restoration of ATS services. The terms of reference for the CCC will be determined by the XXCAA.

3.5 Contact details of the members of the CCC are provided in **Appendix B**.

ATM Operational Contingency Group

3.6 The ATM Operational Contingency Group (AOCG) will be convened by the CCC with a primary responsibility to oversee the day to day operations under the contingency arrangements, and coordinate operational ATS activities, 24 hours a day, throughout the contingency period. The terms of reference of the AOCG will be determined by the CCC. The AOCG will include specialized personnel from the following disciplines:

- Air traffic services (ATS)
- Aeronautical telecommunication (COM)
- Aeronautical meteorology (MET)
- Aeronautical information services (AIS)
- ATS equipment maintenance service provider

The mission of the AOCG shall include taking the following action:

i) review and update of the Contingency Plan as required;

ii) keep up to date at all times of the contingency situation;

iii) organize contingency teams in each of the specialized areas;

iv) keep in contact with and update the ICAO Rrrrrrrrrrr Regional Office, operators and the IATA Regional Office;

v) exchange up-to-date information with the adjacent ATS authorities concerned to coordinate contingency activities;

vi) notify the designated organizations in Xxxxxxxx of the contingency situation sufficiently in advance and/or as soon as possible thereafter; and

vii) issue NOTAMs according to the corresponding contingency situation, this plan or as otherwise needed (example NOTAMS are provided in **Appendix C**). If the situation is foreseeable sufficiently in advance, a NOTAM will be issued 48 hours in advance.

4. CONTINGENCY ROUTE STRUCTURE

4.1 In the event of disruption of the ATC services provided by Yyyyyyyy ACC, contingency routes will be introduced to ensure safety of flight and to facilitate limited flight operations commensurate with the prevailing conditions. Existing ATS routes form the basis of the contingency routes to be used, and a flight level assignment scheme introduced to minimize potential points of conflict and to limit the number of aircraft operating simultaneously in the system under reduced air traffic services.

4.2 The contingency route structure for international flights is detailed in **Appendix D.** Additional contingency routes will be introduced as and when circumstances require, such as in the case of volcanic ash clouds forming.

4.3 In regard to domestic operations, if circumstances dictate, all flights shall be temporarily suspended until a full assessment of the prevailing conditions has been determined and sufficient air traffic services restored. A decision to curtail or restart domestic operations will be made by the CCC.

4.4 Aircraft on long-haul international flights and special operations (e.g. Search and Rescue (SAR), State aircraft, humanitarian flights, etc), shall be afforded priority for levels at FL290 and above.

4.5 International operators affected by the suspension of all operations from Xxxxxxxxn airports will be notified by the relevant airport authority when operations may be resumed, and flight planning information will be made available pertaining to that airport. International flights who have received such approval may be required to flight plan via domestic routes to join international contingency routes.

4.6 International operators may elect to avoid the Yyyyyyyy FIR to the east routing via the Nnnnn, Kkkkkkk and Sbsbsbsb FIRs to the Jjjjjjj, Rtrtrtrt lllllll and ttttt FIRs. The contingency routes to be used in this scenario will be provided by the ATS authorities concerned.

5. AIR TRAFFIC MANAGEMENT AND CONTINGENCY PROCEDURES

Reduced ATS and provision of flight information services (FIS)

5.1 During the contingency critical period, ATS including ATC, may not be available, particularly with regard to availability of communications and radar services. In cases where service are not available, a NOTAM will be issued providing the relevant information, including an expected date and time of resumption of service. The contingency plan provides for limited flight information and alerting services to be provided by adjacent ACCs.

5.2 FIS and flight monitoring will be provided by the designated ATS authorities for the adjacent FIRs on the contingency routes that enter their respective FIRs. A chart depicting the airspace arrangement is provided in **Appendix E**.

5.3 The primary means of communication will be by VHF or HF radio except for aircraft operating automatic dependent surveillance (ADS) and controller/pilot data link communication (CPDLC) systems. When CPDLC has been authorized for use by the relevant ATC authority, this will become the primary means of communication with HF as secondary. In the case of ADS automatic position reporting, this replaces voice position reporting and CPDLC or HF will become the secondary means. Details of the communication requirements are provided in **Appendix F.**

ATS Responsibilities

5.4 During the early stages of a contingency event, ATC may be overloaded and tactical action taken to reroute aircraft on alternative routes not included in this Plan.

5.5 In the event that ATS cannot be provided in the Yyyyyyyy FIR a NOTAM shall be issued indicating the following:

a) time and date of the beginning of the contingency measures;

b) airspace available for landing and overflying traffic and airspace to be avoided;

c) details of the facilities and services available or not available and any limits on ATS provision (e.g., ACC, APPROACH, TOWER and FIS), including an expected date of restoration of services if available;

d) information on the provisions made for alternative services;

e) any changes to the ATS contingency routes contained in this Plan;

f) any special procedures to be followed by neighbouring ATS units not covered by this Plan;

g) any special procedures to be followed by pilots; and

h) any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

5.6 In the event that the Xxxxxxxxn International NOTAM Office is unable to issue the NOTAM, the (alternate) International NOTAM Office at Jjjjjj and/or Nnnnn will take action to issue the NOTAM of closure airspace upon notification by the XXCAA or its designated authority, e.g. the ICAO Rrrrrrrrrrr Regional Office.

Aircraft Separation

5.7 Aircraft separation criteria will be applied in accordance with the *Procedures for Air Navigation Services-Air Traffic Management* (PANS-ATM, Doc 4444) and the *Regional Supplementary Procedures* (Doc 7030).

5.8 The longitudinal separation will be 15 minutes. However, this may be reduced to 10 minutes in conjunction with application of the Mach number technique in light of developments and as authorized by the XXCAA by the appropriate OCA.

5.9 The route structure provides for lateral separation of 100 NM and in cases where this is less, and for crossing routes, a standard vertical separation will be applied.

Flight level restrictions

5.10 Where possible, aircraft on long-haul international flights shall be given priority with respect to cruising levels.

Operational restrictions

5.11 VFR flights shall not operate in the Yyyyyyyy FIR if there are extensive disruptions to ATC facilities, except in special cases such as State aircraft, Medivac flights, and any other essential flights authorized by the XXCAA.

5.11.1 IFR General Aviation flights will receive a lower priority than all other flights and may be suspended depending on circumstances

5.11.2 IFR commercial flights will receive a high priority together with State and Medivac flights.

Other measures

5.12 Other measures related to the limited availability of airspace and the implementation of the contingency scheme within the Yyyyyyyy FIR may be taken as follows:

5.12.1 Suspension of all VFR operations

5.12.2 Delay or suspension of general aviation IFR operations

5.12.3 Delay or suspension of commercial IFR operations

Aircraft position reporting

5.13 Pilots will continue to make routine position reports in line with normal ATC reporting procedures.

Procedures for ATS Units

5.14 The ATS units providing ATC services will follow their unit emergency operating procedures and activate the appropriate level of contingency procedures in line with the operational Letter of Agreement. These procedures include the following:

a) the Yyyyyyyy ACC on determining that ATS may be reduced due to a contingency event, will inform pilots by the controller responsible of the emergency condition and advise if it is likely that the ACC will be evacuated and ATS suspended. In the event of it becoming necessary to evacuate the ACC building, the unit evacuation procedures will be activated, and time permitting, controllers will make an emergency evacuation transmission on the radio frequency in use providing pilots with alternate means of communication;

b) during the period when the contingency procedures are in effect, flight plan messages must continue to be transmitted by operators to the to the Yyyyyyyy ACC via the AFTN using normal procedures;

c) on notification by XXCAA, Xxxxxxxx, the ATS authorities operating the ACCs of the adjacent FIRs, viz. aaaaaaaa. Dddddddd, gggggggg, hhhhhhhh will activate the contingency procedures in accordance with their respective Operational Coordination Agreement;

d) the adjacent ACC responsible for aircraft entering for transit of the Yyyyyyyy FIR must communicate not less than 30 minutes beforehand, the estimated time over 0500 S;

e) the ACC responsible for aircraft entering the Yyyyyyyy FIR will instruct pilots to maintain the last flight level assigned and speed (MACH number if applicable) while overflying the Yyyyyyyy FIR;

f) the ACC responsible will not authorize any change in flight level or speed (MACH number, if applicable) later than 10 minutes before the aircraft enters the Yyyyyyyy FIR, except in the case specified in h) below;

g) the ACC responsible prior to aircraft entering the Yyyyyyyy FIR will inform aircraft that they must communicate with the next (downstream) ATC unit 10 minutes before the estimated time of 0500 S; and

h) operators may also chose to avoid the Xxxxxxxx airspace, and the controlling authorities of the FIRs concerned will provide alternative contingency routes as appropriate and these will be published by NOTAM.

Transition to contingency scheme

5.15 During times of uncertainty when airspace closures seem possible, aircraft operators should be prepared for a possible change in routing while en-route, familiarization of the alternative routes outlined in this Contingency Plan, as well as those which may be promulgated by a State via NOTAM or AIP.

5.16 In the event of airspace closure that has not been promulgated, ATC should, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and to standby for further instructions.

5.17 If circumstances lead to the closure of the Xxxxxxxxn airspace and no contingency routes are available through the Yyyyyyyy FIRs, aircraft will be required to route around the Xxxxxxxxn airspace. As much warning as possible will be provided by the XXCAA (*Appropriate ATS authority*) in the event of the complete closure of Xxxxxxxxn airspace.

5.18 ATS Units should recognize that when closures of airspace or airports are promulgated, individual airlines might have different company requirements regarding alternative routing arrangements. ATC should endeavour to accommodate such requests within the confines of safety rules and procedures.

Adjustment of Coordination Requirements

5.19 The ATS providers concerned should review the effectiveness of current coordination requirements and procedures in light of contingency operations or short notice of airspace closure, and make any necessary adjustments to the Contingency Plan and OCAs.

6. PILOTS AND OPERATOR PROCEDURES

Filing of flight plans

6.1 Flight planning requirements for the Yyyyyyyy FIR are to be followed in respect to normal flight planning requirements contained in the Xxxxxxxx Aeronautical Information Publication (AIP) and as detailed at **Appendix G.**

Overflight approval

6.2 In a contingency situation, flights may be rerouted at short notice and it may not be possible for operators to give the required advanced notice in a timely manner to obtain approval. However, the requirements and procedures for overflight approval of the Xxxxxxxxn airspace provided in the GEN part (GEN 1.2) of the Xxxxxxxx AIP continue to be applicable.

6.3 With regard to other FIRs, aircraft operators are to obtain overflight approval from States responsible for such airspaces in accordance with the procedures and requirements of such States.

6.4 Coordination for special arrangements to expedite flight approvals for aircraft transiting the Yyyyyyyy FIR in these contingency situations is addressed in the OCA. Aircraft operation should note however, that the overflight approvals remain the responsibility of the States

whose flight territory is to be overflown.

Pilot operating procedures

6.5 Aircraft overflying the Yyyyyyyy FIR shall follow the following procedures:

a) all aircraft proceeding along the ATS routes established in this Contingency Plan will comply with the instrument flight rules (IFR) and will be assigned a flight level in accordance with the flight level allocation scheme (FLAS) applicable to the route(s) being flown as specified in **Appendix D**;

b) flights are to file flight plan using the Contingency Routes specified in **Appendix D**, according to their airport of origin and destination;

c) pilots are to keep a continuous watch on the specified contingency radio frequency as specified in **Appendix F** and transmit, using the English language, position information and estimates in accordance with normal ATC position reporting procedures;

d) pilots are to maintain during their entire flight time within Yyyyyyyy FIR, the flight level last assigned by the last ACC responsible prior to the aircraft entering the Yyyyyyyy FIR, and under no circumstances change this level and Mach Number, except in cases of emergency and for flight safety reasons. In addition, the last SSR transponder assigned shall be maintained or, if no transponder has been assigned, transmit on SSR code 2000;

e) aircraft are to reach the flight level last assigned by the responsible ACC at least 10 minutes before entering the Yyyyyyyy FIR or as otherwise instructed by the ATC unit in accordance with the OCA with Xxxxxxxx;

f) pilots are to include in their last position report prior to entering the Yyyyyyyy FIR, the estimated time over the entry point of the Yyyyyyyy FIR and the estimated time of arrival over the relevant exit point of the Yyyyyyyy FIR;

g) pilots are to contact the next adjacent ACC as soon as possible, and at the latest, ten (10) minutes before the estimated time of arrival over 0500 S;

h) whenever emergencies and/or flight safety reasons make it impossible to maintain the flight level assigned for transit of Yyyyyyyy FIR, pilots are to climb or descend well to the right of the centerline of the contingency route, and if deviating outside the Yyyyyyyy FIR, to inform immediately the ACC responsible for that airspace. Pilots are to make blind broadcast on 121.5 MHz of the relevant emergency level change message (comprising the aircraft call sign, the aircraft position, the flight levels being vacated and crossed, etc);

i) not all operational circumstances can be addressed by this Contingency Plan and pilots are to maintain a high level of alertness when operating in the contingency airspace and take appropriate action to ensure safety of flight.

j) Pilots should maintain continuous listening watch on VHF emergency frequency 121.5 MHz (406Mhz). Transponders should be kept in operation and set to the last assigned SSR code or if ATC has not assigned a code, select

code 2000.

Interception of civil aircraft

6.6 Pilots need to be aware that in light of current international circumstances, a contingency routing requiring aircraft to operate off of normal traffic flows, could result in an intercept by military aircraft. Aircraft operators must therefore be familiar with international intercept procedures contained in ICAO Annex 2 –*Rules of the Air*, paragraph 3.8 and Appendix 2, Sections 2 and 3.

6.7 Should conditions prevailing in the airspace over the territory and territorial waters of Xxxxxxxx during contingency period result in the interception of civil aircraft by military aircraft, the pilot shall immediately take the following action:

a) Follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with international procedures;

b) Notify, if possible, the appropriate ATS unit;

c) Attempt to establish radio communication with the intercepting aircraft by making a general call on the emergency frequency 121.5 MHz and 243 MHz if equipped;

d) Set transponder to code 7700, unless otherwise instructed by the appropriate ATS unit; and

e) If any instructions received by radio from any source conflict with those given by the intercepting aircraft, the intercepted aircraft shall request immediate clarification **while continuing to comply** with the instructions given by the intercepting aircraft.

NOTE

a) Detailed interception procedures are provided in the ENR part (ENR 1.12) of the Xxxxxxxn AIP
b) The above interception procedures are consistent with provisions contained in Annex 2 (Section 3.8) to the Chicago Convention.

7. COMMUNICATION PROCEDURES

Procedures for Reduced/loss of Radio

7.1 When operating within the contingency airspace of the Yyyyyyyy FIR, pilots should use normal radio communication procedures where ATS services are available. These will be in accordance with the communication procedures in this Plan or as otherwise notified by NOTAM.

7.2 If communication is lost on the normal ATS frequencies, pilots should try the next applicable frequency, e.g. if en-route contact is lost then try the next appropriate handover frequency. It should be expected that loss of communication may be temporary. As such, if following loss of communication pilots are unable to establish two-way radio communication on other frequencies, pilots should consider periodic attempts on the frequency on which two-way radio communication was lost. In any case, in the absence of two-way communication with ATC, pilots should continue to make routine position reports on appropriate frequencies, and broadcast positions on the specified contingency frequencies.

Communication frequencies

7.3 A list of frequencies to be used for the contingency routes and the ATS units providing FIS and air-ground communication monitoring for the Yyyyyyyy FIR is detailed at **Appendix F**.

8. AERONAUTICAL SUPPORT SERVICES

Aeronautical Information Services (AIS)

8.1 NOTAM services will be used optimally to mitigate against loss of radio and other forms of communication. The NOTAMs will be used as necessary to support coordination and operational procedures that would be established before, during and after any contingency phase.

8.2 In the event of unavailability of AIS in Xxxxxxxxn, NOTAM services will be provided by neighboring AIS authorities in accordance with OCAs.

Meteorological Services (MET)

8.3 It is expected that the Xxxxxxxx MET services would continue to be available in the event of an ATS contingency situation. However, should ATS services for the Yyyyyyyy FIR be withdrawn, timely MET information may not be immediately available to pilots in flight. Alternative means of obtaining up to date MET information concerning the Yyyyyyyy FIR will be provided to the extent possible through the adjacent ATS authorities.

9. SEARCH AND RESCUE

Notification and Coordination

9.1 The SAR authority responsible for the Yyyyyyyy SRR is

Name ……(SAR Organization)
Fax ……
AFTN ……
E-mail ……..

SAR Point of Contact (SPOC) (*if different from above*)

9.2 ACCs involved in this Contingency Plan are required to assist as necessary to ensure that Search and Rescue (SAR) authorities are provided with the information necessary for SAR services in the Yyyyyyyy SRR.

9.3 In the event that the Yyyyyyyy ACC is not available, the responsibility for coordinating with the Cccccccc RCC for aircraft emergencies and incidents involving the Yyyyyyyy FIR will be undertaken by adjacent FIRs in accordance with the OCAs.

The ICAO ESAF Office will:

a) Closely monitor the situation and coordinate with all affected States and organizations including the IATA Regional Office, so as to ensure to the extend practical the continuity of air navigation and the provision of air navigation services to international air traffic in the AFI Region area of accreditation;

b) Note any incidents reported and take appropriate action;

c) Provide assistance as necessary on any issue with the Civil Aviation Administrations involved in the contingency plan; and

d) Keep the President of the Council of ICAO, the Secretary General, D/ANB and C/ATM continuously informed on developments, including activation of the contingency plan.

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APPENDIX A

List of points of contact of all concerned States, IATA and ICAO ESAF Office.

State /Organization	Point of contact	Telephone	e-mail
IATA			
ICAO	Mr. G P Moshabesha, Regional Director	Tel.: +254 20 762 2395 Fax: +254 20 762 1092	geoffrey.moshabesha@icao.unon.org
	Mr. B Sekwati Deputy Regional Director	Tel: +254 20 762 2370 Fax: +254 20 762 1092	boitshoko.sekwati@icao.unon.org
	Mr. S M Machobane, RO ATM & SAR	Tel.: +254 20 762 2372 Fax: +254 20 762 1092	seboseso.machobane@icao.unon.org

NOTE
For each contingency plan, information relating to communication with ICAO Regional Office will depend on the Regional Office that is accredited to the specific State.

APPENDIX D (i)

Contingency route structure during partial availability of the Yyyyyyyy airspace or services

Present ATS ROUTE	CONTINGENCY ROUTINGS	FIRs INVOLVED
In lieu of:	**(ATS unit)** provides ATC on the following routings: ***CR1:*** ***CR2:*** ***CR3:***	**XXX**: In coordination with **XXX**
In lieu of:	**(ATS unit)** provides ATC on the following routing: ***CR4:***	**XXX**: In coordination with **XXX**

APPENDIX D (ii)

Contingency route structure during total unavailability of the Yyyyyyyy airspace

Present ATS ROUTE	CONTINGENCY ROUTINGS	FIRs INVOLVED
In lieu of:	**(ATS unit)** provides ATC on the following routings: ***CR1:*** ***CR2:*** ***CR3:***	**XXX**: In coordination with **XXX**
In lieu of:	**(ATS unit)** provides ATC on the following routing: ***CR4:***	**XXX**: In coordination with **XXX**

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AFI SAR SERVICES INTEGRATION TASK FORCE (ASSI TF)
TERMS OF REFERENCE AND COMPOSITION

Terms of Reference

The ASSI Task Force is established to support the development of the concept of sub-regional search and rescue (SAR) arrangements and cooperation between neighbouring States; provide a forum for discussions and identifying solutions to impediments in the effective provision of SAR services in the Region; and developing regional guidance to meeting ICAO provisions in the field of SAR.

Work Programme

As part of its work programme, the ASSI Task Force will:

a. Periodically review and update Regional performance objectives with regard to SAR

b. Identify and coordinate task related to establishment and functions of sub-regional SAR organizations

c. Develop Regional strategies and guidance to support establishment of joint aviation/maritime rescue coordination centres

d. Review SAR deficiencies identified within the AFI region, taking into consideration existing capacity and other constraints being experienced by States and SAR organizations, and propose solutions

e. Support the cooperation between ICAO and IMO in their continuing collaboration with African States to implement sub-regional, joint RCCs at strategic locations on the African continent

Reporting

The ASSI Task Force shall meet at least once a year and report to the ATS/AIS/SAR Sub-Group.

Composition:

The ASSI Task will comprise:

a) experts nominated by AFI States from both civil aviation entities, SAR organizations and ANSPs;

***Note**: The meeting accepted with appreciation the (starting) membership of Kenya, Seychelles and Uganda.*

b) Interested International and Sub-Regional Organizations;

c) Expertise on SAR from States outside the AFI Region and from other entities may be invited by the Task Force based on the contribution that may be provided by such expertise.

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AFI Flight Plan Transition Task Force (FPLT TF)
Terms of Reference

Terms of reference:

1) Conduct a comprehensive review of Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, effective 15 November 2012) in order to identify, study and address implementation complexities arising from the adoption of amended PANS ATM Chapter 4, Chapter 11, Appendix 2 and Appendix 3 provisions relating to the ICAO Flight Plan and associated ATS Message formats; and

2) Collect and analyze information on the status of AFI ANSP flight plan processing systems including ongoing upgrades to such systems;

3) On the basis of the above, and in accordance with relevant additional ICAO provisions and the SP AFI RAN Re. 6/5, develop a coordinated AFI transition strategy and plan with associated timelines to enable the streamlined coordinated implementation of the amended Flight Plan and ATS Message provisions contained in Amendment 1 to the Fifteenth Edition of the PANS ATM.

Considerations:

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

a) Likelihood that changes within the systems in the AFI Region could differ from systems in other ICAO Regions and accordingly provide recommendable Regional action with global goals
b) Inter and intra regional issues;
c) Impact on inter-system co-ordination messaging (e.g. ATS AIDC)
d) Contingency arrangements for States that cannot comply by the due date;
- How to handle staged implementations by States and/or airspace users,
- Expectations across ANSPs with different implementation dates, and

e) Systems that transition early will need to be capable of handling both new and current instruction sets.
f) Inter-system exchanges need to take account of differing automation capabilities in order to avoid excessive message rejection;
g) Establishment of an Information Management system to track implementation timelines for various States/systems;
h) Management of Repetitive Flight Plans;
i) Implications for presentation formats, including paper & electronic flight progress strips;
j) Impacts to users (flight planning systems etc); and

k) Appropriately timed withdrawal of existing State or Regional specific requirements to ensure consistency with new instruction set
l) Existing ICAO guidance material

Membership

Core members:

- ATM specialist and systems engineering experts (CNS) from AFI States and ANSPs with existing and planned automated flight plan processing systems
- ASECNA, IATA, IFALPA, IFATCA,

***Note**:*
The meeting accepted with appreciation the membership of Algeria, Kenya, Senegal and Tanzania as core members.

Other members

AFI States and ANSPs other than the above
Expertise from States, ANSPs outside the AFI Region that may be invited by the Task Force based on beneficial inputs they may contribute

Note:
Industry participation including systems providers, if required, is to be included under responsibility of State delegations

Reporting

The Task Force shall report progress to the ATS/AIS/SAR Sub-Group. However, owing to the limited time available for planning and in some cases acquisition of systems, valuable planning information emanating from the Task Force may, after coordination with Secretary of APIRG be provided to States without waiting for forthcoming meetings of the MID ATS/AIS/SAR Sub-Group.

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AFI-CAD GUIDANCE MATERIAL

The Guidance Material for the establishment of AFI-CAD emanated from the Recommendations of the AFI-CAD/ Study Group/1 meeting and subsequently endorsed by ICAO under Conclusion 16/41 of the APIRG/16 Meeting. Consequently, the Guidance Materials are listed herewith in the form of Recommendations attached to the Framework as necessary requirements for the establishment of AFI-CAD.

Recommendation 1:	**Basic Criteria** The AFI AIS/MAP TF/4 meeting then concluded that : a) whether the service provision is subcontracted or not: i. the service shall at all times be AFI States owned service. The service provider shall ensure the service is at all times perceived and recognized as being an AFI States provided service. ii. the service provision shall be an activity of cost-recovery nature and shall not generate profit on its own behalf (bearing in mind that the AFI CAD facilitates the safety, regularity and efficiency of international air navigation); iii. the service provision shall be subjected to a " trial phase" of operation at the end of which the service may be reviewed if there has been insufficient take-up by clients and/or if the service levels have not been met; iv. all clients' service level agreements shall be between the client and the Agency entrusted by the AFI States. v. the Agency shall not be allowed to sell, trade or commercialize the data and/or services of the AFI CAD on its own behalf and/or profit.

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Recommendation 2 :	**AFI CAD services** ***That AFI CAD should provide the following major services:*** a) the International NOTAM Operation (INO) providing facilities for world-wide NOTAM, SNOWTAM, ASHTAM and AFTN or equivalent message handling and for pre-flight Information Bulletins (PIB) generation. b) the Static Data Operation (SDO) providing facilities for AFI Static Aeronautical Data/information handling and reporting. Moreover, a minimum set of data is also maintained to allow the correct functioning of the INO system.
Recommendation 3 :	**AFI CAD Clients** That the recommended AFI CAD clients are the following: a) the Data Providers which are AIS Organizations providing aeronautical information to the Centralized AFI Database; b) the Data Users which are Air Transport Community and beyond.
Recommendation 4 :	**Proposed AFI CAD System Design** That the proposed AFI CAD System should be designed to provide the following: a) a single repository for aeronautical information and IAIP elements of participating States; b) data questioning enhancement through multilevel consistent data checking processes, including cross border data verification; c) a secure channel/vehicle for timely and efficient electronic distribution of aeronautical information and IAIP elements; d) harmonization and interoperability will be ensured by common and standardized: - System interface and data exchange model (AIXM), - Static data model (AICM).

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Recommendation 5 :	**AFI CAD System Data Operations Services** That the proposed System Data Operations Services will then provide the Centralized AFI Database clients with the following system services: a) support to edit and provide (to the system) aeronautical information; b) electronic access to and delivery of aeronautical information; c) browsing and downloading of participating State's aeronautical information; and d) generation of reports.
Recommendation 6 :	**Access to AFI CAD** That the Data Operations System Services will be accessed by clients via direct electronic interface in one or more of the following three ways: i. The Client Interface terminal (CIT). A terminal located at the client site, connected to the AFI CAD, and allowing download, modification (only by data providers) and reporting of aeronautical information as determined by the clients Service Level Agreement (SLA); ii. The Client Interface (CI). A technical toolkit allowing clients' own systems to access and interact with the AFI CAD to upload, download, modify (only Data Providers can modify) and report aeronautical information as determined by the clients' SLA; iii. INTERNET: Access to the Centralized AFI AIS Data Base will also be allowed via the Internet.
Recommendation 7 :	***Development of AFI CAD user requirements specifications*** That States and/or Organizations in a position to do so, provide the required technical expertise to assist the Study Group to develop user requirements specifications (URS) for AFI CAD.

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Recommendation 8 :	**Scope of Services Provided** That : a) Regarding the data operations service domains, the services provided shall ensure: i. Co-ordination of the resolution of data conflicts detected by the system data checking processes ; ii. for non-participating States (world wide) : - NOTAM processing (verification, validation, etc…) - entry of the statistic data required by the system NOTAM function. b) As currently defined, the service does <u>not</u> include the provision of AIS services on behalf of participating States, i.e. the service <u>shall not comprise</u> the following activities : i. creation of NOTAMs ii. origination and publication of AIP, AIP supplements, AIP amendments, AIC and charts. c) As part of the provision of the service, the service provider will deliver to the centralized AFI Region AIS Data Base client the following services : i. 24 hour operational and technical help desk ii. Client training iii. Management and monitoring of the delivery of aeronautical information and AIP elements.

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Recommendation 9:	**Institutional Arrangements** That AFI States shall: a) Identify or set up an agency to develop, establish and operate the centralized AFI CAD; b) Determine the most effective and appropriate ways of funding, implementing and delivering the service. c) Commit to the timely provision of the required information to the AFI CAD; *Note: This shall not preclude them from providing the same data to other agents and/or entities.* d) Continue to be responsible for providing an AIS singularly or jointly with one or more other States or by delegating the authority for the provision of the service to a non-governmental agency in accordance with Annex 15 of the Chicago Convention; e) Maintain the intellectual property rights for the data provided to the AFI CAD; f) Provide advice and other appropriate support to any administration outside the AFI Region to consider the introduction of an aeronautical information database system compatible with the AFI CAD; g) Promote the use of the AFI CAD by taking active steps to provide appropriate information to the public on the services available from the AFI CAD and encourage the use of the service; h) Define a legal and financial framework to be applied to States participating in the AFI CAD, and non members of the AFI Region States, covering contribution to the funding of the data operations service provision; i) Define a charging policy that: - complies with the principle of free exchange of aeronautical information amongst States AIS, in accordance with Annex 15 of the Chicago Convention; - Continues to allow recovery by States of the costs incurred for the provision of AIS services; - Avoids double charging of the Data Users.

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Recommendation 10 :	**Suggestions for Financial Model** *a)* *Business Plan* i. Setup Capital: The business plan to be adopted must define the total set-up costs and where this capital will be obtained (eg Loans, Donations/Aid, State Contributions). Each states responsibility in this regard must be defined and be enforceable in any AFI CAD membership agreement ii. Financial Sustainability: The business plan to be adopted must also define how financial sustainability will be ensured (eg by State Contributions, fees to be charged for access by users, en-route charges, etc). This must also show how continuous improvement and safety monitoring systems will be maintained and funded. iii. Service Provider: The resources that the Service Provider will bring to the project must be defined and enforced in the Service Providers contract. It should not be the sole responsibility of the member states or the Agency to fund this project as it should be based on the User/ Beneficiary Pays principle. b) **Financial Plans**: The financial model for AFI CAD as discussed above also needs to address the following operational considerations i. Continuous Operational Cost Recovery: Continuous Operational Cost Recovery must be ensured as a minimum requirement. If this does not occur AFI CAD will not be a viable concern. ii. Cost Benefit Analysis: A Cost Benefit Analysis reflecting the advantages and disadvantages of all business models discussed above needs to be performed before a particular model can be recommended and accepted by AFI CAD member states. iii. Future Cost Benefits: To AFI CAD (eg via provision of services additional to what is presently being provided) will need to assessed to ensure organizational structuring to take advantage of these future benefits.
Recommendation 11 :	**Evaluation criteria for the identification of the AFI-CAD Operating Centers:** 1. Geographical Location 2. Communication Infrastructure 3. Sustainability of Economy 4. Political Stability 5. Information Technology – currently available and sustainable 6. Provision of training – Training ability / infrastructure

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	7. Power supply : – availability – reliability – sustainability 8. Human Resource availability – i. AIM ii. Management iii. Project Management iv. Information Technology v. Training 9. Financial availability / sustainability 10. Previous experience – Track record 11. Common consensus 12. Infrastructure – Buildings 13. Evaluation to be conducted by an International Organization with a proven track record of successfully completing similar evaluations (e.g. ICAO/ United Nations/ EUROCONTROL, etc.)
Recommendation 12 :	**Introduction of QMS by AFI-CAD States** That each contracting AFI – CAD Member State shall take all necessary measures to introduce a properly organized QMS containing procedures, processes and resources necessary to implement the quality management at each function stage. The execution of such quality management shall be in accordance with Annex 15, Chapter 3 paragraph 3.2.1.
Recommendation 13 :	**Measurement tool for evaluation of AIS Services** That Appendix K to APIRG/15 report as per Attachment A to DP/7 be adopted by AFI States as a measurement tool for evaluation of services in order to provide room for improvement and the prevention of non-conformity**.**
Recommendation 14 :	**Framework for development of the QMS** That AFI – CAD member States adopt the template for a project proposal in Appendix XX to Attachment A of DP/7(AFI-CAD/2) as a framework for development of the QMS in terms of defining scope, assessing the potential benefits, continuing the program, determining the roles and responsibilities of those involved in the development and implementation of the QMS, and specifying deliverables, target dates and the resources needed.
Recommendation 15 :	**Timelines for the development and implementation of the AFI – CAD** That ICAO would synchronize the most suitable timelines for the development and implementation of the AFI – CAD based on the evolution of events.

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Recommendation 16 :	**Development of the required training modules** That AFI – CAD through the cooperation with GroupEAD develops the required training modules for AFI-CAD member States.
Recommendation 17 :	**Development of the required format of a service level agreement** That AFI – CAD through the cooperation with GroupEAD develops the required format of a service level agreement for the AFI – CAD member States.
Recommendation 18 :	**Compilation of the URS Document :** That it is therefore necessary to compile the user and other requirements in one document based on the input from: - the Framework and Guidance Material of the AFI-CAD, as per Appendix H of the APIRG/16 Report, - the EUROCONTROL URS Documents (General, Common Services, Static Data, NOTAM, AIP, Charting), - the AFI States based on filled Questionnaires (cf. DP/04) to include further AFI Requirements. -
Recommendation 19:	**Institutional Framework:** a. Establishment of a supervisory management board composed of Technical Representatives appointed by the Civil Aviation Directors. They should also be empowered to make decisions. b. Appoint a Technical team competitively, to participate in the project processes from its initiation stage to completion, so that all members gain an understanding of the project tasks and objectives c. Appoint Service Provider competitively to develop, implement and manage the AFI-CAD. The Service Provider may also take responsibility for Hardware and Software maintenance
Recommendation 20 :	**Procurement Process:** • That the Business plan includes the development of procurement procedures acceptable to participating member states. • That the Business Plan includes the development of a logical acquisition system, which would include an efficient and transparent procurement process for implementation of the AFI-CAD • That participating states should ensure that the procurement is done in a transparent manner acceptable to the participating states.

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Recommendation 21:	**Location of AFI-CAD** That the Technical Board should determine the centre and sub-centers location subject to the agreed set criteria listed in Recommendation11. There is need to take into account the geographical locations and requisite infrastructure currently available.
Recommendation 22 :	**Realization of the AFI-CAD** That in order to realize the maximum benefits of the AFI Region centralized AIS Database all AFI Region States need to fully participate in its development, implementation and operations.

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eTOD Regulator Checklist to Support Implementation Planning

Awareness

- Determine the affected stakeholders in your State:
  - Ministry responsible for Transportation;
  - Civil Aviation Authority;
  - AISP;
  - ANSP;
  - Military;
  - National Geodetic, Cadastral or State Survey organisation;
  - Commercial survey companies or associations such as the Royal Institute of Chartered Surveyors (UK);
  - Military survey organisation;
  - Aerodrome operator or airport association(s);
  - National airlines;
  - General Aviation;
  - Helicopter operators or helicopter operator associations including
  - Air Ambulance and civil SAR;
  - Local authorities or those responsible for aerodrome safeguarding
  - construction approval in the vicinity of the aerodrome;
  - Ministry responsible for local government, land planning and environment;
  - Power transmission companies;
  - Regulatory authority for radio and television broadcasts;
  - GSM antenna operators;
  - Local port authorities if ports exist within close proximity to an airport.

- From the foregoing, identify the Focal Point(s) in your State;
- Consider holding an eTOD awareness day or regional awareness days;
- Consider the establishment of a State Working Group to identify costs and determine an implementation plan.

The Four Areas

- Establish the State's policy with regard to implementing the current SARPS;
- Determine a State policy for what data will be made available for each of the four Areas, for which aerodromes and when;
- Determine a State policy for how and by whom the eTOD will be made available.

Regulation

- Confirm the State policy for the safeguarding of aerodromes from obstacle penetration, consider how effective the policy is and determine if available data can be demonstrated to be in compliance with eTOD requirements. In the absence of a declared or established policy, consider establishing one;
- Consider the application of National regulation to allocate responsibility for the provision of eTOD;
- Consider and map the development and implementation of an obstacle permission process *(note: there are currently several commercial tools to support this process);*
- Consider the nature, scope, content, time and processes associated with the development of legislation for any obstacle permission process;
- Determine which data sources should be regulated, how standards may be placed upon them and with whom responsibility for data and the data processes should rest.

Data Sources

- Collate a list of possible sources of terrain and obstacle data;
- Establish a meeting to discuss the appropriateness and possible use of these data sources;
- Determine where liability for each data source resides.

Survey

- Determine the common survey formats to be used by surveyors and geodetic institutes;
- Determine the survey requirements for each of the four Areas, including resurvey intervals;
- Prepare example contracts for surveyors to ensure that the data provided meets the necessary numerical requirements;
- Determine the responsibilities that may be placed upon surveyors to ensure that they use the correct standards, and how this may be confirmed.

Cross-border Harmonisation

- Consider how cross-border harmonisation could be organised, if applicable;
- Consider the establishment of agreements with neighbouring States to exchange and harmonise common data.

Oversight Monitoring

- Determine a means of providing oversight management for monitoring progress;
- Determine a policy for the audit of involved organizations.

APPENDIX

Insert Organisation Name Here

Insert Organisation Logo Here

eTOD Implementation Plan Template

AFI eTOD WG/1

Edition	**:**	**0.1**
Edition Date	**:**	**xx xxxx 200x**
Status	**:**	**Working Draft**

DOCUMENT APPROVAL

The following table identifies all management authorities that have successively approved the present issue of this document

AUTHORITY DATE	NAME AND SIGNATURE
Author/Editor	**[Insert Author details here]**
Quality Assurance	**[Insert reviewer details here]**

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Purpose and Scope

This document provides the plan for **[Name of State]** relating to the implementation of electronic Terrain and Obstacle Data (eTOD).

This covers the following activities:

- The Four Areas;
- Regulation;
- Data Sources;
- Survey;
- Cross-border Harmonisation;
- Oversight Mechanism;
- Charging and Cost Recovery;
- Data Validation and Verification;
- Data Provision and Maintenance.

[Supporting material may be found in ATTACTMENT- A. It is intended that at an appropriate stage of its development, this material is transferred to the eTOD Manual.

Text in blue is that which needs to be replaced by the developers of the implementation plan in the State. Text in green may be used as guidance in developing the implementation plan.

It should be noted that some sections of this template may not be applicable / appropriate for a State to include in its implementation plan. The sections are not intended to be mandatory and a State may select to include whichever sections it deems appropriate. Moreover, the issues addressed by the template are not exhaustive and States may add to the template, as required.]

2. THE FOUR AREAS

2.1 State Policy with Regard to Current SARPS

2.1.1 Purpose of this Section

This section documents the **[Name of State]** policy relating to the implementation of the SARPS in place on **[enter date here]**.

2.1.2 State Policy

[Provide the State policy here.]

2.1.3 Considerations

[Discussions should take place in a State with representatives of the aviation community to help define a national policy for the implementation of Chapter 10, ICAO Annex 15. The discussions should include, as a minimum, the Regulator, Military and ANSP. Mindful that any change proposals have not yet been submitted to ICAO for consideration, it is important that the State determines, as a minimum, what it intends to do with regards Areas 1 and 4 as these have an effective date of

20th November, 2008. In cases where there is data available, which meets the necessary numerical requirements, no action other than making it available needs to be taken. However, should this data not be available or data that is available does not meet the numerical requirements or the requirements of quality, including data validation, it is suggested that the State files a difference to ICAO.]

2.1.4 Text of ICAO Difference

[Provide the State ICAO difference text here, if applicable.]

2.2 State Policy for Scope of eTOD for Four Areas

2.2.1 Purpose of this Section

This section documents the **[Name of State]** policy for the scope of data provision for Areas 1, 2, 3 and 4, and for which aerodromes Areas 2 and 3 are applicable. The policy should include the quality requirements, such as accuracy, resolution, etc.

2.2.2 State Policy for Area 1

[Provide the State Policy for Area 1 here.]

2.2.3 State Policy for Area 2

[Provide the State Policy for Area 2 here.]

2.2.4 State Policy for Area 3

[Provide the State Policy for Area 3 here.]

2.2.5 State Policy for Area 4

[Provide the State Policy for Area 4 here.]

2.3 State Policy of How, When and by Whom eTOD will be Made Available

2.3.1 Purpose of this Section

This section documents the **[Name of State]** policy of how, when and by whom eTOD will be made available.

2.3.2 State Policy

[Provide the State Policy for the availability of eTOD.]

3. REGULATION

3.1 Applicable Regulation

3.1.1 Purpose of this Section

This section documents ICAO, AFI Region and other international and national regulations applicable to eTOD.

3.1.2 International Regulation

[List international regulation for eTOD here.]

3.1.3 National Regulation

[List any national regulation for eTOD here.]

3.1.4 Considerations

[In addition to ICAO regulation, the Aeronautical Data Quality Implementing Rule should be included.

It may be determined during State discussions that some form of national Regulation may be needed to expedite the implementation of eTOD and ensure that all actors accept their responsibilities. Any national Regulation related to eTOD should be listed in 3.1.3.

Consideration should also be given to guidance material, such as ISO 9001, ISO 19100, OGC standards, (draft) Doc 9881, etc.]

3.2 State Policy on Aerodrome Safeguarding

3.2.1 Purpose of this Section

This section documents the **[Name of State]** policy for the safeguarding of aerodromes.

3.2.2 State Policy

[Provide the State policy for aerodrome safeguarding here.]

3.3 Obstacle Permission Process

3.3.1 Purpose of this Section

This section documents the obstacle permission process of **[Name of State]** and any legislation that applies.

3.3.2 Process

[Provide the State obstacle permission process here and list any legislation that applies.]

3.3.3 Considerations

[It is recommended that a State considers the development of an obstacle permission process. This may take best practice from South Africa and other

States which have a declared policy. In addition, States may wish to consider the development of legislation to enforce this process on those responsible for the erection and maintenance of obstacles.]

3.4 Regulation of Data Sources

3.4.1 Purpose of this Section

This section documents the **[Name of State]** approach to regulating data sources, to ensure that the appropriate standards and processes are applied.

3.4.2 Regulation

[Provide the State's policy for regulating data sources**.]**

4. DATA SOURCES

4.1 Purpose of this Section

This section lists the organisations that have been consulted to assess if the data they originate and maintain meets the appropriate requirements of eTOD. To be fully able to assess the data source, States should determine if the type of data source provider, i.e., State-owned, commercial organisation, etc, in order to be able to fully assess the impact of using its data.

Where data is available and is suitable for use, this section provides information about the liability, cost/cost recovery and licence issues associated with it. Where arrangements are made for data source providers to make data available for aviation use, to the State, formal arrangements should be established between the data source providers and the receiving body. This section should list the formal arrangements in place which are related to the provision of eTOD.

The use of a Service Level Agreement is one example of a formal arrangement being established.

4.2 Data Sources Consulted

4.2.1 Data Source Provider

[For each data source provider identified, provide information about its status, i.e., State-owned, commercial organisation and list any particular areas of issue that arise from this.]

4.2.2 Liability

[For each data source identified, provide information about where the liability for the data lies.]

4.2.3 Cost Model

[For each data source identified, provide information related to the costs for the data.]

4.2.4 Licensing

[For each data source identified, provide information related to the licensing of the data.]

4.2.5 Formal Arrangements

[List the formal arrangements in place for the provision of eTOD.]

4.3 Considerations

[The owners of the following data sources or the following organisations, as an example, should be consulted:

- Geodetic institutes;
- Power / energy supply companies;
- Wind farm operators;
- Mapping agencies;
- Authority(ies) responsible for the authorisation of radio/TV and other broadcast antenna;
- Cell phone operators;
- Port authorities.

States should establish their own list of data sources which they will consult in the process of trying to identify eTOD providers. Following this, it is recommended that a meeting is held with each possible data source to discuss the appropriateness and possible use of their data and where liability lies.

States should assess the cost model and licensing of the data from a data source, taking into account whether the organisation is State-owned or a commercial organisation. Clearly, commercial organisations that already provide data for a charge to its users will not be willing to loose this revenue stream, this making the cost model and licensing for these products, more complex.

Formal arrangements should be made between data source providers and the receiving party. This will clearly state the quality requirements for the data, means of provision, etc. It is recommended that where a data source provider will provide data regularly, over a period of time, a Service Level Agreement is used to capture this agreement. Where data provision is likely to be a one-off or a very infrequent occurrence, it is recommended that a contract is established between the two parties.]

5. SURVEY

5.1 Survey Formats

5.1.1 Purpose of this Section

This section documents the common survey formats to be used by surveyors and geodetic institutes.

5.1.2 Formats

[List the common survey formats to be used here.]

5.2 Survey Requirements

5.2.1 Purpose of this Section

This section documents the survey requirements for each of the four Areas.

5.2.2 Survey Requirements for Area 1

[Provide the survey requirements for Area 1 here.]

5.2.3 Survey Requirements for Area 2

[Provide the survey requirements for Area 2 here.]

5.2.4 Survey Requirements for Area 3

[Provide the survey requirements for Area 3 here.]

5.2.5 Survey Requirements for Area 4

[Provide the survey requirements for Area 4 here.]

5.3 Survey Contracts

5.3.1 Purpose of this Section

States may, if they wish, include in their implementation plans details of requirements that should be included in survey contracts. If this is the case, this section will include the requirements that should be included in survey contracts for each of the four Areas, to ensure that the data provided through the contract meets the necessary numerical and quality requirements.

5.3.2 Survey Contracts

[Provide the text to be used in survey contracts here.]

5.4 Surveyor Vetting

5.4.1 Purpose of this Section

This section documents how surveyors are vetted to ensure that they adhere to the correct standards and discharge their legal responsibilities in accordance with the contract.

5.4.2 Vetting Process

[Provide the State vetting process for surveyors here.]

5.4.3 Considerations

It should be noted that this section may not be relevant to every State. Responsibility for the vetting of surveyors may rest elsewhere and, therefore, this section only applies to those States that have responsibility for this.

6. CROSS-BORDER HARMONISATION

6.1 State Agreements / Arrangements

6.1.1 Purpose of this Section

This section documents the arrangements in place with other States for the exchange, provision and receipt of common eTOD.

6.1.2 Arrangements

[List the arrangements in place with neighbouring States for the exchange, provision and receipt of common eTOD.]

6.1.3 Considerations

[It is recommended that some form of harmonisation activity is undertaken with neighbouring States, perhaps through the medium of a Service Level Agreement

(SLA). Further, it is recommended that, where appropriate, States could make arrangements for data within its boundary to be provided to the other State, where it is needed for the other State's aerodrome. Alternatively, arrangements could be made to share the survey costs or to use one survey company, all with the intention of lowering the cost of data acquisition.

To assist with the exchange of data between States and other users, it is recommended that a common TOD exchange format is adopted.]

7. OVERSIGHT MECHANISM

7.1 Progress Monitoring

7.1.1 Purpose of this Section

This section details the mechanism by which the State intends to monitor the implementation of eTOD.

7.1.2 Monitoring Policy

[Detail how the State will monitor the implementation of eTOD, including how any obligations to meet ICAO Requirements .]

[List the State policy for monitoring eTOD implementation.]

7.2 Audit

7.2.1 Purpose of this Section

This section details the **[Name of State]** plan for the audit of the organisations involved in the implementation and subsequent management and maintenance of eTOD.

7.2.2 State Plan

[Provide the State's plan for the audit of organisations**.]**

8. COST RECOVERY AND CHARGING

8.1 Cost Recovery

8.1.1 Purpose of this Section

This section identifies how **[Name of State]** will finance eTOD. It states from whom the finance will be obtained and the cost recovery mechanisms associated with the initial and ongoing costs for eTOD, for each of the four Areas.

8.1.2 Initial Costs

8.1.2.1 Cost Recovery for Area 1

[Provide the means of cost recovery for Area 1 here.]

8.1.2.2 Cost Recovery for Area 2

[Provide the means of cost recovery for Area 2 here.]

8.1.2.3 Cost Recovery for Area 3

[Provide the means of cost recovery for Area 3 here.]

8.1.2.4 Cost Recovery for Area 4

[Provide the means of cost recovery for Area 4 here.]

8.1.3 Ongoing Costs

8.1.3.1 Cost Recovery for Area 1

[Provide the means of cost recovery for Area 1 here.]

8.1.3.2 Cost Recovery for Area 2

[Provide the means of cost recovery for Area 2 here.]

8.1.3.3 Cost Recovery for Area 3

[Provide the means of cost recovery for Area 3 here.]

8.1.3.4 Cost Recovery for Area 4

[Provide the means of cost recovery for Area 4 here.]

8.1.4 Considerations

[Consideration should be given to the need to recover costs not only in the initial implementation but as an ongoing activity including the:

- Increased costs for AISPs in managing the data;
- Increased costs for regulators in monitoring and auditing those associated with eTOD implementation and provision;
- Indirect costs such as the adaptation of procedures due to new / updated obstacle data.]

8.2 Charging Mechanisms

8.2.1 Purpose of this Section

This section identifies the charging mechanisms in place in **[Name of State]** to recover the costs associated with the initial and ongoing provision of eTOD.

8.2.2 Mechanisms

[Provide the charging mechanisms for eTOD here.]

9. DATA VALIDATION AND VERIFICATION

9.1 Assessment of Existing Data

9.1.1 Purpose of this Section

This section identifies how existing data should be assessed to determine if it meets the eTOD requirements.

9.1.2 State Policy

[Provide the State Policy for assessment of existing data here.]

9.1.3 Considerations

[Consideration should be given to whether means already exist in the State to validate data, including its associated metadata, to determine its appropriateness.

Consideration should be given to the following:

- Does the data meet the ICAO numerical requirements?
- Does the data have the associated metadata?
- Does the data have full traceability?

Methods for the assessment of different data types should be determined / identified.]

9.2 Data Validation and Verification

9.2.1 Purpose of this Section

This section details the approach of **[Name of State]** to the validation and verification of existing and new data.

9.2.2 Approach to Data Validation and Verification of Existing Data

[Provide the State's approach to data validation and verification of existing **data.]**

9.2.3 Approach to Data Validation and Verification of New Data

[Provide the State's approach to data validation and verificati**on of new data.]**

9.2.4 Considerations

[Consideration should be given to whether means already exist in the State to validate data, including its associated metadata.

The approach should ensure that the data has full traceability

10. DATA PROVISION AND MAINTENANCE

10.1 Data Exchange Formats

10.1.1 Purpose of this Section

This section details the data exchange formats to be used for eTOD.

10.1.2 Data Formats

[List the exchange formats to be used for eTOD.]

10.2 Means / Media

10.2.1 Purpose of this Section

This section details the means / media by which each data set shall be made available.

10.2.2 Means of Provision: XXXX

[Insert explanation of how the means will be used to make the data sets available.]

10.2.3 Considerations

[It is intended that a subsection is provided for each means of provision, for example, Means of Provision: DVD, Means of Provision: Internet, etc.]

10.3 Data Maintenance

10.3.1 Purpose of this Section

This section details the State policy for the update / maintenance of data, including periodicity.

10.3.2 State Policy

[Provide the State's policy for data mai**ntenance.]**

ATTACHMENT- A GUIDANCE FOR INCLUSION IN eTOD MANUAL

A.1 Identification of all Stakeholders

It is important that the stakeholders in the State are identified so that there is full awareness of eTOD and that there is an efficient flow of information between the parties involved. It is anticipated that the stakeholders will meet, as appropriate, to plan and implement the eTOD policies for the State.

A.2 eTOD Awareness Day

It is recommended that a national awareness day or a series of regional seminars are held to raise the awareness of stakeholders to the requirements of eTOD. This would allow all parties, especially those that do not usually attend the TOD WG or Aeronautical Information (AI) Team, to be briefed on the requirements of ICAO and the AFI Region progress towards the implementation of eTOD. The attendance by personnel of the following organisations should be considered, though the list is by no means exhaustive:

- Ministry of Transport;
- Civil Aviation Authority;
- AISP;
- ANSP;
- Military;
- Aerodrome operators;
- Survey organisations – civil and military;

- Geodetic institutes;
- Airline representatives;
- General Aviation.

In the interests of economy, States may wish to co-host such workshops and to share their experiences and best practices associated with eTOD for the common good.

A.3 State Working Group

This section would include information related to the establishment of a State

Working Group for TOD.

This has been demonstrated as a successful initiative in States and has, therefore, been taken as an example of best practice.

A.3.1 Considerations

It is recommended that such a working group be formed by, amongst others:

- State Regulator responsible for TOD provision;
- State AIS for publication;
- Military AIS (when applicable to data provision);
- State survey organisation;

- Military survey organisation, if applicable;

- Representative(s) of national aerodromes;

- Representation (probably at a national level) of local authorities or those with the responsibility for safeguarding and/or approving construction in the vicinity of an aerodrome

- Authorities or organisations responsible for the authorisation or maintenance of obstacles, such as:

  ◊ Broadcast transmission antennas;

  ◊ GSM masts;

  ◊ Electricity transmission pylons;

  ◊ Wind turbine farms.

- In States, where aerodromes may be adjacent to ports, representatives of the

  Port Authority.

A.4 Focal Points

This section will include guidance about which organisations should be considered to establish contact points in a State. This would include:

- Ministry of Transport

- The Civil Aviation Authority;

- The Military;

- The ANSP;

- The civil AIS / AIM;
- Aerodrome authorities;
- National geodetic institutions.

A.5 Cross-border Harmonisation

Consideration should be given to means by which States may share common data. It is recommended that meetings are held with neighbouring States to discuss possible ways forward. Consideration should also be given to the use of common exchange formats.

South African
Electronic Terrain and Obstacle Data (eTOD)
Implementation Plan

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Appendix D to the Report on agenda item 11

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The following table identifies all management authorities that have successively approved the present issue of this document.

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Appendix D to the Report on agenda item 11

EXECUTIVE SUMMARY

Amendment 33 to ICAO Annex 15 (effective 12/07/2004) introduced requirements for States to ensure that electronic sets of Terrain and Obstacle Data (TOD) are available. The data shall be provided for four distinct areas, with each having specific data collection requirements.

Implementation of these requirements has caused significant concerns, mainly as a result of the high costs associated with data collection and processing, and the lack of a clear business case to support this expenditure.

This document provides the plan for South Africa relating to the implementation of electronic Terrain and Obstacle Data (eTOD). The purpose of providing terrain and obstacle data in an electronic format is stated in ICAO Annex 15, 10.1, where a set of applications / operations is listed.

The requirements for providing electronic terrain and obstacle data can be grouped as follows:

- Data collection requirements (geographical area): Areas 1,2,3 and 4;
- Data quality requirements (data accuracy, integrity and resolution);
- Database requirements (terrain database and obstacle database);
- Availability requirements (when / how data to be made available by States).

As regards Area 1 Electronic Terrain Data, South Africa will fully comply with Chapter 10, ICAO Annex 15, and therefore does not intend to file any difference with regards the technical content requirements. However not all of Electronic Obstacle Data complies with the data integrity requirements, therefore South Africa will not fully comply with Chapter 10, ICAO Annex 15, and has filed differences (alternative method of compliance differences have been filed on 10.2.5, 10.4.2 and 10.5.6). The issue is that we are dealing with legacy data whose integrity cannot be guaranteed at present. Circular Error of Probabilities (CEPs) will be provided with all data whose positional integrity does not fully comply with Chapter 10, ICAO Annex 15. The SACAA has taken responsibility for the provision of Area 1 data. For Area 2, IFR Aerodrome with ATS Service Provider, eTOD will be provided by the ATS Service Provider in conjunction with the SACAA, and for IFR Aerodrome without an ATS Service Provider, eTOD will be the responsibility of the Aerodrome License Holder in conjunction with the SACAA. Area 3 and Area 4 will be the responsibility of the Aerodrome License Holder.

Two databases shall be provided: a terrain database and an obstacle database. Neither of the databases shall contain data belonging to the other. All the eTOD data will reside with the SACAA in a Geodatabase that will be maintained by the Procedure Design & Cartography Department, and the data will be maintained by the respective data providers for each area.

Terrain and obstacle data shall comply with ISO 19100 series requirements in terms of data modelling. The eTOD implementation shall be in compliance with ICAO provisions contained in Annex 15, as amended, and Document 9881, and will be managed by the SACAA as a national programme supported by necessary resources, a high level framework and detailed planning, including priorities and timelines for the implementation of the programme.

Data validation and verification will be done to ensure that the data meets the ICAO numerical requirements, has the associated metadata and has full data source traceability. Updating of the database shall be done on a regular basis to account for errors, new or amendments to existing data sets. In that way, applications that use data continue to be trustworthy.

The SASACAA will adopt/follow a collaborative approach involving all concerned parties in the implementation of eTOD and establish a multi-disciplinary team defining clearly the responsibilities and roles of the different Administrations within and outside the SACAA in the implementation process i.e. AIS Department, Aerodrome Operators, Military, National Mapping Agency, *et cetera*.

For eTOD implementation, commercial geospatial data vendors will be used in order to acquire Area 1 terrain data, and with regard to obstacle data the SACAA's obstacle dataset will be used, together with additional data from ATNS, ACSA, ESKOM, Local Municipalities Telecommunication companies, Petroleum & Gas companies, as well as the SA National Defense Force.

Currently there are arrangements to include as part of the South African eTOD implementation the terrain data for Lesotho and Swaziland, but there no arrangements for cross-border harmonization with Namibia, Botswana, Zimbabwe and Mozambique at present. It is recommended that some form of harmonisation activity is undertaken with neighbouring States, perhaps through the medium of a Memorandum of Understanding (MOU).

A South African eTOD Implementation Workgroup has been established, consisting of stakeholders in the South African aviation community, to manage and oversee the eTOD implementation in South Africa.

1. INTRODUCTION

This document provides the plan for South Africa relating to the implementation of electronic Terrain and Obstacle Data (eTOD). This covers the following activities:

- The Four Areas;
- Regulation;
- Data Sources;
- Cross-border Harmonisation;
- Oversight Monitoring;
- Charges and Cost Recovery;
- Data Validation and Verification;
- Data Provision and Maintenance.

1.1 Geographic Information

Geographic phenomena could broadly be divided into two categories: discrete and continuous. Discrete phenomena are objects with well-defined boundaries or spatial extent (buildings, bridges, etc.), and continuous phenomena vary over space and have no specific extent (elevations, temperatures, etc.) These two categories are not mutually exclusive as many elements of the landscape could be categorized as discrete or continuous.

Geographic information is treated and presented as vector data or raster data. Vector data deals with discrete phenomena – features, which spatial characteristics are presented by a set of one or more geometric primitives (point, curve, surface). Raster data deals with geographic phenomena that vary continuously over the space and contain a set of values each associated with one of the elements in a regular arrangement of points or cells in space.

2. ICAO eTOD REQUIREMENTS

2.1 ICAO eTOD SARPS

The purpose of providing terrain and obstacle data in an electronic format is stated in ICAO Annex 15, 10.1, where a set of applications / operations is listed.

All these applications / operations should ideally be supported by relevant provisions at the ICAO level in a compliant and harmonised manner that would be easily referenced and understood.

2.2 Text of ICAO Difference

With regard to Electronic Terrain Data, South Africa will fully comply with the technical content requirements for Chapter 10, ICAO Annex 15, and therefore does not intend to file any difference. However not all of Electronic Obstacle Data complies with the data integrity requirements, therefore South Africa will not fully comply with Chapter 10, ICAO Annex 15, and has filed differences (alternative
method of compliance differences have been filed on 10.2.5, 10.4.2 and 10.5.6). The issue is that we are dealing with legacy obstacle data whose integrity cannot be guaranteed. Circular Error of Probabilities (CEPs) will be provided with all data whose positional integrity does not fully comply with Chapter 10, ICAO Annex 15. The SACAA text will state that not all Electronic Obstacle Data complies with the integrity requirements of Chapter 10, ICAO Annex 15.

2.3 State Policy for Scope of eTOD for Four Areas

The requirements for providing electronic terrain and obstacle data can be grouped as follows:

- Data collection requirements (geographical area): Areas 1,2,3 and 4;
- Data quality requirements (data accuracy, integrity and resolution);
- Database requirements (terrain database and obstacle database);
- Availability requirements (when / how data to be made available by States).

Area	Definition
Area 1	Entire State territory including aerodromes / heliports
Area 2	For IFR aerodromes / heliports, designated TMAs or 45 km radius, whichever is smaller (45 km where no TMA is established)
Area 3	RWY edges up to 90 metres from RWY centre line and 50 metres from the edges of the rest of the movement areas
Area 4	60 m on either side of the extended runway centre line while the length shall be 900 m from the runway threshold measured along the extended runway centre line (only for precision approach Cat II / III RWYs)

2.3.1 Area 1

Terrain Data

The SACAA has taken responsibility for the provision of Area 1 data and will consist of a complete 20 m seamless DEM of South Africa (including Swaziland and Lesotho as well as a 35 km buffer into neighbouring countries).

- Datum: WGS84
- Spheroid: WGS84
- Projection: Lamberts Conformal Conic

- Format: DTED1/ESRI Binary

Quality Attributes	Area 1 – the State
Horizontal Accuracy	50.0 m
Data Integrity	Routine (10^{-3})
Vertical Accuracy	30.0 m
Vertical Resolution	1.0 m
Confidence Level	90 %
Post Spacing	3 arc second (approx. 90 m)

Obstacle Data

This is the responsibility of the South African Civil Aviation Authority and will consist of every known obstacle within Area 1 whose height above the ground is equal to or greater than 60 m.

Quality Attributes	Area 1 – the State
Horizontal Accuracy	50.0 m
Data Integrity	Routine (10^{-3})
Vertical Accuracy	30.0 m
Vertical Resolution	1.0 m
Confidence Level	90 %
Maintenance Period	As required

The integrity of legacy obstacle data cannot be guaranteed, Circular Error of Probability will therefore be specified for every non-compliant obstacle, and differences have been filed in this respect.

2.3.2 Area 2

Area 2 is the responsibility of the ATS Service Provider, and for IFR Aerodrome without an ATS Service Provider, eTOD will be provided by the ATS Service Provider in conjunction with the SACAA.

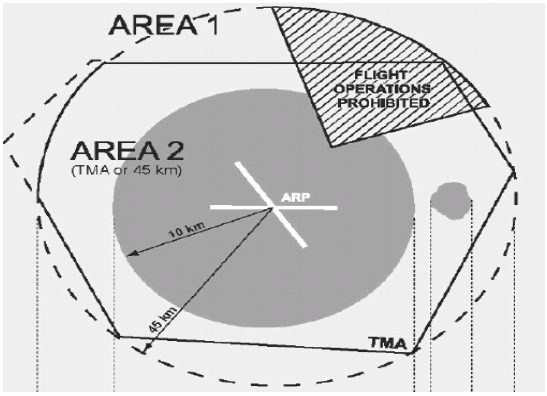
Area 2 is the most complex area in terms of the operations supported. It addresses to the following functions:

- Take-off and landing
- Arrival, approach and departure procedures
- Contingency procedures
- Instrument flight procedure design
- Aeronautical chart production (SID/STAR/IAC, PATC, AOC, etc.)
- Aerodrome / heliport obstacle restriction and removal

Terrain Data

Terrain data for Area 2 has a geographical footprint as follows:

- Within 10 km from the ARP;
- Between 10 km from the ARP extending to the TMA boundaries or to 45 km, whichever is smaller, for terrain that penetrates the horizontal plane of 120 metres above the lowest RWY elevation.

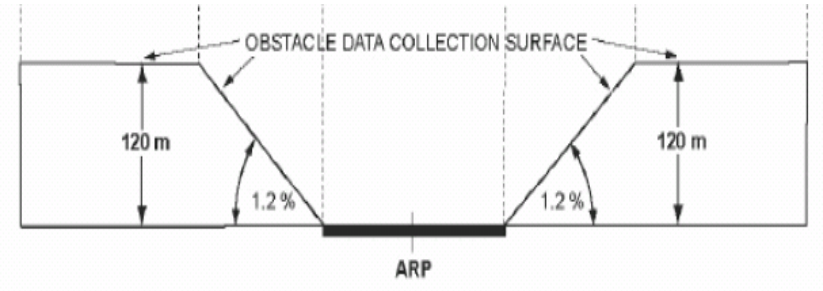


Quality Attributes	Area 2 – Terminal Airspace
Horizontal Accuracy	5.0 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	3.0 m
Vertical Resolution	0.1 m
Confidence Level	90 %
Post Spacing	1 arc second (approx. 30 m)

Obstacle Data

Obstacle data for Area 2 has a geographical footprint as follows:

- The conical surface whose origin is at the edges of the 180 m wide rectangular area and at the nearest runway elevation measured along the runway centre line, extending at 1.2 % slope until it reaches 120 m above the lowest runway elevation of all operational runways at the aerodrome;
- Between 10 km from the ARP extending to the TMA boundaries or to 45 km, whichever is smaller, the horizontal plane of 120 metres above the lowest RWY elevation.



Area 2 Profile View

Quality Attributes	Area 2 – Terminal Centred Area
Horizontal Accuracy	5.0 m
Data Integrity	Essential (10^{-5})
Vertical Accuracy	3.0 m
Vertical Resolution	0.1 m
Confidence Level	90 %
Maintenance Period	As required

The integrity of legacy data cannot be guaranteed, Circular Error of Probability will therefore be specified if applicable, and differences have been filed in this respect.

2.3.4 Area 3

Area 3 is adjacent to the movement area and extends from the edges of the RWYs up to 90 metres from the RWY centreline and for the rest of the movement area, 50 metres from its edges.

Eleventh Meeting of the APIRG Air Traffic Services/Aeronautical Information Service/Search And Rescue/Sub-Group (ATS/AIS/SAR SG/11) (Nairobi, Kenya, 26 - 30 April 2010)

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LIST OF ATS/AIS/SAR SG/11 CONCLUSIONS AND DECISIONS

Conclusions/Decisions No. Strategic Objectives		Title of Conclusion /Decision
Draft Decision	**11/01**	**Dissolution of APIRG RVSM Task Force activities**
Draft Decision	**11/02**	**ARMA Scrutiny Group**
Draft Conclusion	**11/03**	**Updated list of AIS/MAP FASID Tables AIS-1 to AIS-8**
Draft Conclusion	**11/04**	**Implementation of WGS-84 and electronic terrain and obstacle data**
Draft Conclusion	**11/05**	**Submission of WGS-84 Implementation Survey Questionnaires**
Draft Conclusion	**11/06**	**Adoption of the AIS to AIM Transition Roadmap**
Draft Conclusion	**11/07**	**e-TOD implementation awareness campaigns**
Draft Conclusion	**11/08**	**Development and management of a national e-TOD program**
Draft Conclusion	**11/09**	**Coordination and exchange of experience for the implementation of e-TOD requirements**
Draft Conclusion	**11/10**	**Responsibility for the provision of e-TOD**
Draft Conclusion	**11/11**	**ANP requirements related to e-TOD**
Draft Decision	**11/12**	**Establishment of AFI region e-TOD working group**
Draft Decision	**11/13**	**Dissolution of the AIS/MAP Task Force and establishment of the AIS-AIM Implementation Task Force**
Draft Conclusion	**11/14**	**Aircraft PBN Equipage Surveys**
Draft Conclusion	**11/15**	**Training in support of PBN implementation**
Draft Conclusion	**11/16**	**PBN enabling Legislation**
Draft Conclusion	**11/17**	**Participation of representatives of States involved in PBN approval process**
Draft Conclusion	**11/18**	**Funding of the PBN Implementation Program**
Draft Decision	**11/19**	**Dissolution of the GNSS Implementation and PBN Task Force and establishment of the PBN/GNSS Task Force**
Draft Conclusion	**11/20**	**IATA Guidelines for Operational Approvals**
Draft Conclusion	**11/21**	**Dissemination of AIAG reports**
Draft Conclusion	**11/22**	**Direct transitions to/from AORRA (Phase II) airspace**

Conclusions/Decisions	No.	Title of Conclusion /Decision Strategic Objectives
Draft Conclusion	**11/23**	**Lowering of RNAV / RNP routes UM214 and UM215**
Draft Conclusion	**11/24**	**Improvement of air-ground communications**
Draft Conclusion	**11/25**	**Ground / ground infrastructure performance**
Draft Conclusion	**11/26**	**ATM performance framework**
Draft Conclusion	**11/27**	**Resolution of missing flight plans problem**
Draft Conclusion	**11/28**	**Implementation of strategic lateral offsets in the AFI Region**
Draft Conclusion	**11/29**	**AFI PBN implementation Regional Plan**
Draft Conclusion	**11/30**	**National PBN implementation plan**
Draft Conclusion	**11/31**	**PBN implementation tools**
Draft Decision	**11/32**	**PBN Route Network Development Working Group (PRND WG)**
Draft Conclusion	**11/33**	**Dissemination of a letter inviting proposals for establishment of the AFI Flight Procedures Programme (FPP)**
Draft Conclusion	**11/34**	**National PBN Programme Managers (NPPM)**
Draft Conclusion	**11/35**	**Airspace planning and aircraft equipment survey**
Draft Conclusion	**11/36**	**Implementation of safety management in the AFI Region**
Draft Conclusion	**11/37**	**Status of implementation of safety management provisions in the AFI Region**
Draft Conclusion	**11/38**	**Development and promulgation of contingency plans**
Draft Decision	**11/39**	**AFI SAR services integration Task Force (ASSITF)**
Draft Conclusion	**11/40**	**Search and rescue services**
Draft Decision	**11/41**	**Establishment of the AFI flight plan transition Task Force (FPLT TF)**
Draft Conclusion	**11/42**	**Convening of a workshop on implementation of new ICAO flight plan model provisions**
Draft Conclusion	**11/43**	**SIP Project for complete WGS-84 Implementation in the AFI Region**
Draft Conclusion	**11/44**	**e-TOD Checklist**
Draft Conclusion	**11/45**	**Adoption of the e-TOD Implementation Plan Template and National eTOD Implementation Sample Plan**

Conclusions/Decisions	No.	Title of Conclusion /Decision Strategic Objectives
Draft Conclusion	**11/46**	**Coordination between states and data providers/ integrators for the provision of e-TOD**
Draft Conclusion	**11/47**	**Resources and Management of national e-TOD Programmes**
Draft Conclusion	**11/48**	**Elimination of air navigation deficiencies in the ATM, AIS/MAR and SAR fields.**
Draft Conclusion	**11/49**	**Development of the AFI Web-based air navigation deficiency database**
Draft Decision	**11/50**	**Appellation and Terms of Reference of the ATM/AIS/SAR Sub-group**
