

APIRG/CNS/SG/5 – Nairobi September 2013

INTERNATIONAL CIVIL AVIATION ORGANIZATION



Fifth Meeting of the APIRG Communications, Navigation and Surveillance Sub-group (CNS/SG/5)

(Nairobi, Kenya, 16-19 September 2013)

Draft Summary Report

Prepared by ICAO Secretariat

September 2013

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1. Introduction

The Fifth Meeting of the APIRG Communications, Navigation and Surveillance Sub-group (CNS/SG/5) was held at the SAFARI Club Hotel, Nairobi, Kenya from 16 to 19 September 2013.

2. Objectives

The main objective of the meeting was inter alia to review:

- a) the status of implementation of AFI Air Navigation Plan requirements for aeronautical telecommunications and the performance of the telecommunications infrastructure;
- b) strategies of eliminating the identified deficiencies, and update the list of deficiencies affecting aeronautical telecommunications based on follow-up action taken by the States and Organizations concerned;
- c) the regional implementation strategies for communications, navigation and surveillance systems based on operational requirements and available technologies, and accordingly develop guidance material for consideration by States and air navigation service providers when planning and implementing their air navigation system components;
- d) the outcome of the Twelfth Air Navigation Conference (AN-Conf/12) (Montreal, Canada, 19-30 November 2012) in the CNS field; and
- e) the draft regional air navigation implementation plan for CNS aligned with the Aviation System Block Upgrade (ASBU) methodology;
- f) the Terms of Reference Composition and Work Programme of the Sub Group Force.

3. Attendance

The meeting was attended by twenty two (22) participants from Nine (09) Contracting States, one international organization ASECNA (representing 18 Contracting States. A list of participants is provided at **Appendix A**.

4. Officers and Secretariat

4.1 In absence of the current Chairperson Mr **Richards Ruhesi (Uganda)** and vice Chairperson Mr **Boubacar Diallo (Guinea)** the meeting appointed Mr. **Moses Lusambili**, Civil Aviation Caretaker Authority for Somalia as Chairman of the CNS/SG/5 meeting.

4.2 **Mr. Prosper Zo'o-Minto'o**, Regional Officer, Communications, Navigation and Surveillance from the ICAO Eastern and Southern Africa Office (Nairobi), acted as Secretary of the APIRG Communications, Navigation and Surveillance Sub-Group (CNS/SG), and was assisted by) **Mr. Francois-Xavier Salambanga**, Regional Officer, Communications, Navigation and Surveillance (CNS) from the ICAO Regional Office for Western and Central Africa (Dakar),

5. Working language

5.1 The meeting was conducted in English and French language with simultaneous translation.

6. Opening

The meeting was opened by **Mr. Boitshoko Sekwati**, ICAO Deputy Regional Director for Eastern and Southern Africa.

6.1 In his address he emphasized the expectations of APIRG from the outcome of the CNS Sub-Group meeting, the need to complete the implementation of the AFI Air Navigation Plan in the field of communications, navigation and surveillance and to find solutions to the deficiencies in this matter. He highlighted the new ICAO planning methodology based on the concept of Aviation System Blocks Upgrade (ASBU) developed by the ICAO 12th Air Navigation Conference and invited the meeting to consider the CNS technologies Roadmap contained in the new Global Air Navigation Plan (GANP Doc. 9750 4th Ed.) when revising the strategies and plans of implementation of CNS system for the provision of the future Air Navigation Service in the Region.

6.2 He recalled the meeting the work undertaken by ICAO to ensure the provision of adequate frequency spectrum for civil aviation in particular the action conducted in conjunction with the APIRG AFI Frequency Management Group (AFI/FMG) to secure the Fixed Satellite Service (FSS) C-Band spectrum used by the Aeronautical communication VSAT based networks in the AFI region as backbone of the AFI aeronautical communication infrastructure. He invited the meeting to seek for the best practices for the planning and implementation of CNS facilities as well as for the promotion of ICAO position for the ITU World Radiocommunication Conference (WRC) scheduled to take place on November 2015.

6.3 He reminded the meeting of the need for CNS SG to maintain a close collaboration with the ATM/AIM/SAR Sub-Group in order to ensure that the ATM requirements are understood and considered when planning CNS systems.

7. Agenda

The meeting adopted the following agenda:

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

Agenda Item 2: Terms of reference, work programme and composition of the Communications, Navigation and Surveillance Sub-Group as defined by APIRG/18

Agenda Item 3: Follow up of APIRG/18 and CNS/SG/4 Conclusions and Decisions

Agenda Item 4: Aeronautical Fixed Service (AFS)

7.1 Review of the implementation and performance of the Aeronautical Fixed Telecommunication Network (AFTN) and the Air Traffic Services Direct Speech (ATS/DS) Network in the AFI Region, identification of deficiencies and remedial action for their elimination.

7.2 Review of the report of the First meeting of AFI Integrated Regional Telecommunication Infrastructure Task Force (IRTI/TF/1).

7.3 Review of the report of the second meeting of the AFI AMHS Implementation Task Force (AMHS/I/TF/2).

Agenda Item 5: Aeronautical Mobile Service (AMS)

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

5.2 Extension of VHF Radio coverage in the AFI Region - Related issues.

Agenda Item 6: Aeronautical radio navigation service (ARNS)

6.1 Review of the implementation and performance of the Aeronautical radio navigation service in the AFI Region, identification of deficiencies and remedial action for their elimination.

Agenda Item 7: Aeronautical Surveillance

- 7.1 Review of the status of implementation of the current aeronautical surveillance plan.
 7.2 Review of the report of the Third meeting of the AFI Surveillance Implementation Task Force.

Agenda Item 8: Aeronautical Radio Frequency Spectrum issues

8.1 Review of the report of the Third Meeting of the AFI frequency Management Group (AFI FMG/3)

Agenda Item 9: Outcome of the Twelfth Air Navigation Conference (AN-Conf/12, 2012) – CNS related issues

9.1 Development of a regional air navigation implementation plan for communications, navigation and surveillance systems

Agenda Item 10: Future work programme and composition of the CNS/SG

Agenda Item 11: Any other business

7. Summary of Draft conclusions & decisions

The following Draft conclusions and decisions were formulated by CNS/SG/5 meeting:

| Number | Title |
|-----------------------|--|
| Agenda Item 1 | Election of Chairman and Vice-Chairman of the Sub-Group |
| | NIL |
| Agenda Item 2 | Terms of reference, work programme and composition of the Communications, Navigation and Surveillance Sub-Group as defined by APIRG/18 |
| | NIL |
| Agenda Item 3 | Follow up of APIRG/18 and CNS/SG/4 Conclusions and Decisions |
| Draft Decision 5/01 | Review and update of the conclusions and decisions of APIRG/13 to APIRG/18 meetings That: In accordance with APIRG/18 decision 18/1 (<i>Review and Update of APIRG Conclusions and Decisions</i>) the conclusions and decisions in the CNS area are reviewed and updated as attached at Appendix C to this report. |
| Agenda Item 4 | Aeronautical Fixed Service (AFS) |
| Item 4.1 | <i>Review of the implementation and performance of AFTN and ATS/DS Networks</i> |
| Draft conclusion 5/02 | Investigation on missing operational messages (Flight Plans and OPMETs) That: a) States/Organizations establish not later than 31 January 2014, Local Working Groups involving all stakeholders personnel (ATCs, AIM, MET, COM, ATSEP, Airlines) tasked to investigate on missing operational messages (Flight Plans and OPMETs) and propose adequate remedial actions; b) Take benefit of the procedure of investigation and mitigation actions on missing Flight Plans developed and experienced by Air Navigation Service Providers such as ASECNA and ATNS to conduct periodic detailed investigation and report quarterly to the Regional Offices with copy to CNS/SG . c) ASECNA circulate as a matter of urgency but no later than 31 October |

| Number | Title |
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| | 2013,the procedure of investigation and mitigation actions on missing Flight Plans developed and currently implemented. |
| Draft conclusion 5/03 | <p>Planning and Trials on telephony Voice over IP for ATS/DS</p> <p>That:</p> <p>States/Organizations when planning and implementing ICAO ASBU Block 0 Modules, consider Voice over IP-VoIP (<i>Ground/Ground application supported by the Aeronautical Telecommunication Network ATN</i>) as an alternative to the current point to point based ATS/DS voice system and conduct when possible on the AFI aeronautical VSAT networks, coordinated trials on VoIP prior to implementation.</p> |
| | |
| Item 4.2 | <i>Review of the report of the First meeting of AFI Integrated Regional Telecommunication Infrastructure Task Force (IRTI/TF/1)</i> |
| Draft Conclusion 5/04 | <p>Harmonization of the collection of the statistics on the performance of the VSAT networks</p> <p>That:</p> <p>1) The best practices adopted by APIRG for Aeronautical Fixed Services (AFS) be amended to include the Performance Data Collection Forms (PDCFs) shown at Appendix D to this report, and circulate these PDCFs to States before 31 October 2013;</p> <p>2) As from 1 January 2014, in order to harmonize the monitoring, collection and reporting of technical and operational data on Aeronautical Fixed Services (AFS) characteristics and performance, States ensure that Air Navigation Services Providers (ANSPs):</p> <p>a) apply the four-level assessment model including space segment, radiofrequency equipment, modulators/demodulators, end-user equipment; and</p> <p>b) use the software tools available in their processing systems to increase accuracy of the reported data, and facilitate comparative analyses of these data.</p> |
| Draft Decision 5/05 | <p>Development of an Integrated Regional Telecommunication Infrastructure</p> <p>That:</p> <p>The activities related to the development of an integrated regional telecommunication infrastructure should continue based on the Action Plan, Principles and Recommendations developed by the Integrated Regional Telecommunication Infrastructure (IRTI) Task Force, as provided at Appendix E to this report.</p> |
| Draft Decision 5/06 | <p>Planning and Implementation of ATN applications</p> <p>That:</p> <p>a) All aspects of the planning and implementation of the Aeronautical Telecommunication Network (ATN) applications (including AIDC, VoIP, Air-Ground Data Link applications) should be addressed by the CNS Sub-group in its future activities.</p> <p>b) ATN applications interconnectivity/interoperability should be achieved a through a coordinated and harmonized framework; and</p> <p>c) The Secretariat accordingly develop proposals for a revised organizational structure with the terms of reference, work programmes and composition of the proposed auxiliary bodies for consideration by APIRG/19.</p> |
| Draft Decision 5/07 | Terms of reference, future work programme and composition of the Task Force |

| Number | Title |
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| | <p>That: The terms of reference, future work programme and composition of the Task Force on the Development of an Integrated Regional Telecommunication Infrastructure be amended as proposed in Appendix F to this report.</p> |
| Item 4.3 | <i>Review of the report of the second meeting of the AFI AMHS Implementation Task Force AMHS/I/TF/2)</i> |
| Draft Decision 5/08 | <p>Finalization of the guidelines for the implementation of AMHS systems in the AFI region</p> <p>That: The AFI/AMHS Task Force finalize no later than end of March 2014 the guidelines for the implementation of AMHS in the AFI region (AFI AMHS Manual, AFI IP Infrastructure Test Guidelines, AFI AMHS Training Guidelines)</p> |
| Draft Conclusion 5/09 | <p>Training on AMHS systems</p> <p>That:</p> <p>a) In accordance with the provision of the AFI AMHS Training Guidelines, under development, States/Organizations expedite the development and the implementation of consolidated training plans and programmes in order to reinforce the capacity of their operational and technical personnel</p> <p>b) In so doing they should take advantage of existing training capabilities offered by AFI training centers and on the EUR ATS Messaging Management Centre (AMC) Web based training platform; ICAO pursue its efforts in supporting the AFI States through training, Regional Workshops and seminars on AMHS systems</p> |
| Draft Conclusion 5/10 | <p>Interconnection and Interoperability of AMHS systems</p> <p>That: Based on the survey on the status of implementation of AMHS in the AFI region and the evolving status of implementation of AMHS in AFI neighboring regions States/Organizations who have already implemented AMHS undertake the interconnection of AMHS systems within and across the region in the framework of the implementation of ICAO Aviation Systems Blocks Upgrades modules in accordance with the guidelines for the implementation of AMHS in the AFI region</p> |
| Draft Decision 5/11 | <p>Terms of Reference Composition and Work Programme of the AFI/AMHS/Task Force</p> <p>That: The revised Terms of Reference Composition and Work Programme of the AFI/AMHS/Task Force are adopted as attached at Appendix G</p> |
| Agenda Item 5 | Aeronautical Mobile Service (AMS) |
| Item 5.1 | <i>Review of the implementation and performance of the Aeronautical Mobile Service</i> |
| Draft Conclusion 5/12 | <p>Planning and Implementation of Air Ground Data Link</p> <p>That:</p> <p>a) States/Organizations consider HF Data Link, VHL Data Link and Mode S Data Link (ATN air ground supported applications) as communication enabling media to improving Aeronautical Mobile Service (AMS);</p> <p>b) In collaboration with the industry Air Navigations Services providers undertake trials on HF Data Link, VHL Data Link and Mode S Data Link in line</p> |

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| | with the guidelines of ICAO Manual on Required Communication Performance-RCP (Doc.9869). |
| Item 5.2 | <i>Extension of VHF Radio coverage in the AFI Region - Related issues</i> |
| Draft Conclusion 5/13 | <p>Improvement of AMS</p> <p>That:</p> <p>The concerned States (Angola and DRC) expedite the implementation of AMS improvements using existing VSAT networks by no later than 30 June 2014, and report progress made to CNS/SG/6.</p> |
| Agenda Item 6 | Aeronautical radio navigation service (ARNS) |
| Draft Conclusion 5/14 | <p>Mitigation of GNSS vulnerabilities in the AFI Region</p> <p>That States should :</p> <p>a) Assess and report GNSS vulnerabilities in their airspace, including :</p> <ol style="list-style-type: none"> 1) Unintentional interference (environment), intentional interference (security); 2) Ionospheric scintillation in equatorial regions; 3) Other vulnerabilities; and <p>b) Implement appropriate mitigation measures depending on</p> <ol style="list-style-type: none"> 1) the airspace in question; and 2) the operations that must be supported. |
| Draft Decision 5/15 | <p>That:</p> <p>The terms of reference of the CNS/SG be amended to include the need to of States to be assisted in implementing GNSS and mitigating related vulnerabilities.</p> |
| Agenda Item 7 | Aeronautical Surveillance |
| Item 7.1 | <i>Review of the status of implementation of the current aeronautical surveillance plan.</i> |
| Draft Decision 5/16 | <p>Establishment of a Data Link Central Monitoring and Reporting Agency (DL/CMRA)</p> <p>That:</p> <p>The ICAO Regional Offices coordinate with States/Organizations the establishment of a Data Link Central Monitoring and Reporting Agency (DL/CMRA) to ensure proper operation of data link applications in the AFI Region.</p> |
| Item 7.2 | <i>Review of the report of the Third meeting of the AFI Surveillance Implementation Task Force</i> |
| Draft conclusion 5/17 | <p>ADS-B Trials</p> <p>That:</p> <p>In the timeframe of ICAO Aviation System Block Upgrades (ASBU) Block 0, AFI States/Organizations conduct trials on ADS-B in collaboration with the users taking into consideration the emerging ADS-B space based technology.</p> |
| Draft conclusion 5/18 | <p>Interoperability of AFI Aeronautical Surveillance Systems</p> <p>That:</p> <p>In order to enable a seamless ATM operation within the AFI Region;</p> |

| Number | Title |
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| | <p>a) States/Organizations make necessary arrangements through Memoranda of Understanding (MoU) to ensure the interconnection and the interoperability of the existing aeronautical surveillance systems in the timeframe of ASBU Block 0 and facilitate surveillance data exchange and sharing;</p> <p>b) When assisting States, AFCAC be requested to support the continuous provision of aeronautical surveillance services along ATS routes within all AFI Areas of Routing (AR-1 to AR-6) as one of the key enablers to a safer and integrated air transport system in the AFI region.</p> <p>c) ICAO continue to assist States/Organizations in their efforts toward the implementation of an integrated aeronautical surveillance capability throughout the AFI region by convening workshops seminars and technical coordination meetings</p> |
| Draft Decision 5/19 | <p>Revised Terms of Reference, composition and Future Work programme of the AFI/ AS/I/TF</p> <p>That: Taking into consideration the provision of the 4th Edition of the Global Air Navigation Plan (GANP, Doc.9750), the Terms of Reference, Composition and Work Programme of the AFI/ AS/I/TF is revised as presented in Appendix H</p> |
| Agenda Item 8 | Aeronautical Radio Frequency Spectrum issues |
| Draft conclusion 5/20 | <p>Coordination between CAAs and National Telecommunication Regulation Authorities</p> <p>That: With the assistance of ICAO Regional Offices, States which have not done so establish by the end of December 2014 a coordination framework and procedure between CAAs and National Telecommunication Regulation Authorities to facilitate efficient dialogue and resolution of issues related to the provision, the optimum operation and protection of aeronautical telecommunications spectrum taking due account of their specific institutional arrangements.</p> |
| Draft conclusion 5/21 | <p>Monitoring and Reporting of interference on aeronautical spectrum</p> <p>That: With reference to the participation in studies called upon by Resolution 154 (WRC12), States ensure that:</p> <p>a) The aeronautical frequencies are duly registered in ITU data base through the National Authority of Regulation of Telecommunication and recorded in ICAO Global Frequency Data Base through ICAO Regional Offices;</p> <p>b) Information regarding interferences to aeronautical spectrum such as those caused by IMTs to the VSATs C-band 3.4 – 4.2 GHz is recorded and provided to ITU for consideration by WRC Working Parties.</p> |
| Draft conclusion 5/22 | <p>Support to ICAO position for WRC-15</p> <p>That: In accordance with ICAO Assembly Resolution A32-13, AFI States support ICAO position developed for WRC-15 by:</p> <p>a) Incorporating the ICAO position in the national position to WRC-15</p> <p>b) Coordinating this position with the aviation stakeholders (ANSPs, Airlines, Airport Operators, etc.)</p> <p>c) Ensuring regular and active participation of AFI FMG States focal points of</p> |

| Number | Title |
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| | <p>contact in sub regional/ regional meetings and in ITU working parties meeting/study groups covering different aeronautical agenda items.</p> <p>d) Ensuring the full involvement of Civil Aviation Representatives in WRC-15 preparatory activities and the participation of States AFI/FMG focal points of contact in the Conference.</p> |
| Draft Decision 5/23 | <p>Draft WRC-15 Resolution for the protection of the C band operated by the aeronautical VSAT networks</p> <p>That:</p> <p>a) The AFI/FMG Rapporteur in coordination with ICAO ESAF and WACAF offices elaborate and circulate to the AFI/FMG focal points of contact a draft resolution for inputs and comments;</p> <p>b) The final draft Resolution be submitted to the WRC-15 as per ITU-R established procedures</p> |
| Draft conclusion 5/24 | <p>Support to Draft WRC-15 Resolution for the protection of the C band operated by AFI aeronautical VSAT networks</p> <p>That:</p> <p>States/Organizations support the Draft WRC-15 Resolution to be developed by the AFI Frequency Management Group (AFI/FMG) in order to ensure the protection of the C band operated by the aeronautical VSAT networks and achieve the safe operation of aircraft and reliable distribution of meteorological information in AFI region.</p> |
| Draft Decision 5/25 | <p>Revised Terms of Reference, composition and Future Work programme of AFI/FMG</p> <p>That:</p> <p>Taking into consideration the provision of the 4th Edition of the Global Air Navigation Plan (GANP, Doc. 9750) developed in accordance with the Recommendation of ICAO 12th Air Navigation Conference, AFI/FMG Terms of Reference, Composition and Work Programme is revised as presented in Appendix I to this report.</p> |
| Agenda Item 9 | <p>Outcome of the Twelfth Air Navigation Conference (AN-Conf/12, 2012) – CNS related issues</p> |
| Draft Conclusion 5/26 | <p>Development of an Air Navigation Implementation Action Plan for the AFI Region</p> <p>That States:</p> <p>a) review and provide their comments on the Communications, Navigation and Surveillance (CNS) component of the Draft Regional Air Navigation Implementation Action Plan aligned with ICAO Aviation System Block Upgrades (ASBUs) to be submitted to APIRG/19 for approval, on the basis of the material contained in Appendix J to this report; and</p> <p>b) participate in the Regional Workshop on ICAO Aviation System Block Upgrades (ASBUs) to be organized in Nairobi, Kenya, from 21 to 25 October 2013.</p> |
| Agenda Item 10 | <p>Future work programme and composition of the CNS/SG</p> |
| | <p>That the future work programme and composition of the CNS Sub-group be amended as per Appendix K to this report.</p> |
| Agenda Item 11 | <p>Any other business</p> |
| Draft conclusion 5/27 | <p>Planning and implementation of Air Navigation systems based on AFI identified</p> |

| Number | Title |
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| | <p data-bbox="464 237 874 271">Areas of Routing (AR-1 to AR-6)</p> <p data-bbox="464 277 539 311">That:</p> <ol data-bbox="464 318 1445 488" style="list-style-type: none"> <li data-bbox="464 318 1445 421">1) The planning and implementation of Air Navigation systems by States/Organizations should be based on the Areas of Routing identified in the AFI region; and <li data-bbox="464 427 1445 488">2) The implementation strategies should include cooperation with AFCAC and regional/sub-regional economic and financial institutions. |

Part II: Report on Agenda Items

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

1.1 Under this agenda item, the meeting noted the absence of the Chairperson and the Vice Chairperson and considering the Terms of Reference of APIRG CNS/SG the meeting appointed Mr. **Moses Lusambili**, Civil Aviation Care Taker Authority for Somalia as Chairman of the CNS/SG/5 meeting.

Agenda Item 2: Terms of reference, Work programme and composition of the Communications, Navigation and Surveillance Sub-Group as defined by APIRG/18

2.1 Under this Agenda Item, the CNS/SG reviewed its mandate, composition and work programme assigned by APIRG/18.

2.2 The meeting was informed that in the framework of the alignment of the Regional ANPs with the regional Supplements Algeria, Morocco, Spain (Canarias) and Tunisia will be part of the EUR/NAT ANP while, Egypt Libya and Sudan will be part of MD ANP. It was therefore agreed that the composition of CNS/SG be revised accordingly.

Agenda Item 3: Follow up of APIRG/18 and CNS/SG/4 Conclusions and Decisions

3.1 Under this Agenda Item, the meeting analyzed the status of implementation of APIRG/18 and CNS/SG/4 Conclusions and Decisions.

The status of implementation of CNS/SG/4 conclusions and decisions as endorsed by APIRG/18, as well as other relevant conclusions and decisions from APIRG/18 is presented at **Appendix B**

3.2 The meeting focused on Decision 18/1 of APIRG/18 requesting APIRG Sub-Groups to review and update all APIRG Conclusions and Decisions from APIRG/13 to APIRG/17 and identify those which are no longer valid. The meeting agreed on the methodology consisting in conducting this analysis by considering the following domains:

- Communication-Fixed & Mobile;
- Navigation–Conventional & GNSS;
- Surveillance and;
- Spectrum.

3.3 The meeting assigned States and Organizations to proceed on the analysis. The summary of the work of these groups is presented in **Appendix C** to this report.

The following draft Decision was formulated:

Draft Decision 5/01-Review and update of the conclusions and decisions of APIRG/13 to APIRG/18 meetings

That:

In accordance with APIRG/18 decision 18/1 (Review and Update of APIRG Conclusions and Decisions) the conclusions and decisions in the CNS area are reviewed and updated as attached at Appendix C to this report.

Agenda Item 4: Aeronautical Fixed Service

4.1 Under this Agenda Item, the meeting reviewed the implementation status and the performance of the AFI Aeronautical Fixed Service networks (AFTN and ATS/DS) in the AFI Region, and proposed remedial actions for the elimination of deficiencies in these fields.

Item 4.1 Review of the implementation and performance of AFTN and ATS/DS Networks

AFTN Network

4.2 Considering the requirements for AFTN communications contained in the AFI Air Navigation Plan (ANP), FASID Table CNS 1A (AFTN Rationalized Plan) the meeting noted that the AFTN main circuits have been implemented in accordance with the AFI Rationalized Plan, with digital circuits. However, some AFTN circuits (such as Addis-Ababa/Asmara, Addis-Ababa/Djibouti) have not yet been implemented. Examining the AFTN performance the meeting noted significant improvements, notably with the implementation of aeronautical satellite telecommunications networks.

4.3 The meeting also analyzed the pending issue on missing operational messages such as Flight Plans and OPMETs and was informed of the action conducted in the SAT Area by ANSPs and States in order to mitigate the missing Flight Plans.

4.4 ASECNA presented encouraging results from the implementation of a procedure of investigation and mitigation of missing Flight Plans currently applied to its centers. The meeting also noted ATNS initiative in the matter.

4.5 The meeting urged States/Organizations to establish Local Working Groups involving all stakeholders personnel (ATCs, AIM, MET, COM, ATSEP, Airlines) tasked to investigate on missing operational messages (Flight Plans and OPMETs) and propose adequate remedial actions. ASECNA was requested to circulate its procedure to enable States/Organizations take benefit from the experience gained by such exercise.

The following Draft Conclusion was formulated:

Draft conclusion 5/02-Investigation on missing operational messages (Flight Plans and OPMETs)

That:

- a) States/Organizations establish not later than 31 January 2014, Local Working Groups involving all stakeholders personnel (ATCs, AIM, MET, COM, ATSEP, Airlines) tasked to investigate on missing operational messages (Flight Plans and OPMETs) and propose adequate remedial actions;**
- b) Take benefit of the procedure of investigation and mitigation actions on missing Flight Plans developed and experienced by Air Navigation Service Providers such as ASECNA and ATNS to conduct periodic detailed investigation and report quarterly to the Regional Offices with copy to CNS/SG.**
- c) ASECNA circulate as a matter of urgency but no later than 31 October 2013, the procedure of investigation and mitigation actions on missing Flight Plans developed and currently implemented.**

ATS/DS Network

4.6 The meeting reviewed the status of implementation of the ATS/DS Network as recorded in the AFI Air Navigation Plan (ANP), FASID Table CNS 1D (ATS/DS Plan).

Significant improvements were also noted, notably with the implementation of aeronautical satellite telecommunications networks and the non-availability of ATS/DS encountered from time to time results from the obsolescence of some VSAT technologies.

The meeting also noted that in the AFI region, the ATS/DS Network is based on point to point circuits and the absence of an ATS voice switching and signaling system does not facilitate the automation of backup links for ATS/DS. However, the backup service is generally provided by Sat phone or public switch lines.

4.7 Although the assessment of the availability of ATS/DS is not standardized by ICAO, the data collected during the informal meetings show a good pace of availability of ATS/DS. However some implemented circuits need to be improved/restored.

The meeting also noted that ATS/DS based on Voice over IP (VoIP) should be an alternative to the current point to point based ATS/DS circuits and encouraged States/Organizations to conduct trials on telephony VoIP prior to implementation.

The following draft conclusion was formulated:

Draft conclusion 5/03-Planning and Trials on telephony Voice over IP for ATS/DS

That:

States/Organizations when planning and implementing ICAO ASBU Block 0 Modules, consider Voice over IP-VoIP (Ground/Ground application supported by the Aeronautical Telecommunication Network ATN) as an alternative to the current point to point based ATS/DS voice system and conduct when possible on the AFI aeronautical VSAT networks, coordinated trials on VoIP prior to implementation.

Item 4.2 Review of the report of the First meeting of AFI Integrated Regional Telecommunication Infrastructure Task Force (IRTI/TF/1)

4.8 The meeting reviewed the report of the First meeting of the AFI Integrated Regional Telecommunication Infrastructure, and noted the need to harmonize the methodology of collection of the statistics on the performance of the VSAT Networks. It was agreed that the Performance Data Collection Form (PDCF) be adopted and the four levels model be considered for the performance assessment conducted. The following draft conclusion was formulated:

Draft Conclusion 5/04-Harmonization of the collection of the statistics on the performance of the VSAT networks

That:

- 1) The best practices adopted by APIRG for Aeronautical Fixed Services (AFS) be amended to include the Performance Data Collection Forms (PDCFs) shown at Appendix D to this report, and circulate these PDCFs to States before 31 October 2013;**
- 2) As from 1 January 2014, in order to harmonize the monitoring, collection and reporting of technical and operational data on Aeronautical Fixed Services (AFS) characteristics and performance, States ensure that Air Navigation Services Providers (ANSPs):**

- a) **apply the four-level assessment model including space segment, radiofrequency equipment, modulators/demodulators, end-user equipment; and**
- b) **use the software tools available in their processing systems to increase accuracy of the reported data, and facilitate comparative analyses of these data.**

4.9 The meeting also proposed that the activities related to the development of an integrated regional telecommunication infrastructure should continue based on the Action Plan, Principles and Recommendations developed by the Integrated Regional Telecommunication Infrastructure (IRTI) Task Force. The following draft decision was formulated:

Draft Decision 5/05-Development of an Integrated Regional Telecommunication Infrastructure That:

The activities related to the development of an integrated regional telecommunication infrastructure should continue based on the Action Plan, Principles and Recommendations developed by the Integrated Regional Telecommunication Infrastructure (IRTI) Task Force, as provided at Appendix E to this report.

4.10 The meeting also discussed on issues related to ATN ground/ground and air/ground components and noted that CNS SG should address in its future activities all aspects of the planning and implementation of the Aeronautical Telecommunication Network (ATN) applications (including AIDC, VoIP, and Air-Ground Data Link applications). It was agreed that the organizational structure of CNS SG including its auxiliary bodies should be revised to consider the planning and implementation of these ATN applications. The following draft decisions were formulated:

Draft Decision 5/06-Planning and Implementation of ATN applications

That:

- a) **All aspects of the planning and implementation of the Aeronautical Telecommunication Network (ATN) applications (including AIDC, VoIP, Air-Ground Data Link applications) should be addressed by the CNS Sub-group in its future activities.**
- b) **ATN applications interconnectivity/interoperability should be achieved a through a coordinated and harmonized framework; and**
- c) **The Secretariat accordingly develop proposals for a revised organizational structure with the terms of reference, work programmes and composition of the proposed auxiliary bodies for consideration by APIRG/19.**

Draft Decision 5/07-Terms of reference, future work programme and composition of the Task Force

That:

The terms of reference, future work programme and composition of the Task Force on the Development of an Integrated Regional Telecommunication Infrastructure be amended as proposed in Appendix F to this report.

Item 4.3 Review of the report of the second meeting of the AFI AMHS Implementation Task Force AMHS/I/TF/2)

4.11 The meeting reviewed the report of the second meeting of the AFI AMHS Implementation Task Force AMHS/I/TF/2) and addressed issues related to the development of AFI AMHS guide lines (AFI AMHS Implementation Strategy, AFI AMHS Implementation Plan and Guidance Materials...). It was agree that the guidelines for the implementation of AMHS in the AFI Region be finalized by end of March 2014. The following draft decision was formulated:

Draft Decision 5/08-Finalization of the guidelines for the implementation of AMHS systems in the AFI region

That:

The AFI/AMHS Task Force finalize no later than end of March 2014 the guidelines for the implementation of AMHS in the AFI region (AFI AMHS Manual, AFI IP Infrastructure Test Guidelines, AFI AMHS Training Guidelines)

4.12 The meeting noted inter alia the general need for training for the operational and technical staff involved in the planning, implementation and operation of AMHS. It was agreed that due to complexity of AMHS systems an efficient training needs guidelines. The meeting was informed that Botswana and South Africa were tasked to develop a draft Training Guidelines document to be circulated for comments and completion. States and organization were encouraged to develop and implement training plans and programmes in order to reinforce the capacity of their operational and technical personnel. The following draft conclusion was formulated:

Draft Conclusion 5/09-Training on AMHS systems

That:

- a) In accordance with the provision of the AFI AMHS Training Guidelines, under development, States/Organizations expedite the development and the implementation of consolidated training plans and programmes in order to reinforce the capacity of their operational and technical personnel; and**
- b) In so doing they should take advantage of existing training capabilities offered by AFI training centers and on the EUR ATS Messaging Management Centre (AMC) Web based training platform; ICAO pursue its efforts in supporting the AFI States through training, regional workshops and seminars on AMHS systems.**

4.13 Considering the status of implementation of AMHS in the AFI region the meeting agreed on the need to expedite trials on the interconnection and interoperability of AMHS systems. States/organizations who have already implement AMHS were encouraged to undertake the interconnection of AMHS systems within and across the region in the framework of the implementation of ICAO Aviation Systems Blocks Upgrades modules in accordance with the guidelines for the implementation of AMHS in the AFI region and those who are in the process of planning or implementation were encouraged to take into consideration the existing systems in their neighborhood to conclude agreement for the interconnection. The following draft conclusion was formulated:

Draft Conclusion 5/10-Interconnection and Interoperability of AMHS systems

That:

Based on the survey on the status of implementation of AMHS in the AFI region and the evolving status of implementation of AMHS in AFI neighboring regions States/Organizations who have already implemented AMHS undertake the interconnection of AMHS systems within and across the region in the framework of the implementation of ICAO Aviation Systems Blocks Upgrades modules in accordance with the guidelines for the implementation of AMHS in the AFI region

4.14 The meeting recognized that the primary ToRs of the AFI AMHS Implementation Task Force were developed based on the ICAO Global Plans Initiatives (GPIs) and noted that the ICAO 12th Air Navigation Conference developed the ICAO ASBU concept (based on Blocks and Modules) from which

will derive the Global Air Navigation Plan and the AFI regional Air Navigation Plans to be implemented by APIRG.

4.17 It was therefore agreed that the AFI/AMHS/Implementation process may be tailored in the framework of this new concept. The meeting updated the Terms of Reference composition and Work Programme of the Task Force on AMHS Implementation as attached in **Appendix G**.

The following draft decision was formulated:

Draft Decision 5/11-Terms of Reference Composition and Work Programme of the AFI/AMHS/Task Force

That:

The revised Terms of Reference Composition and Work Programme of the AFI/AMHS/Task Force are adopted as attached at Appendix G.

Agenda Item 5: Aeronautical Mobile Service

Item 5.1 Review of the implementation and performance of the Aeronautical Mobile Service

5.1 Under this Agenda Item, the meeting reviewed the implementation status and the performance of the aeronautical mobile service in the AFI Region, and proposed remedial actions for the elimination of deficiencies in this field.

5.2 The meeting noted a low pace of implementation of air/ground data link in the AFI region. It was noted that HF Data link, VHF Data Link and Mode S Data Link as air ground applications support are communication enabling media that should improve Aeronautical mobile Service.

5.3 States and Organizations were encouraged to undertake trials on HF Data Link, VHL Data Link and Mode S Data Link in line with the guidelines of ICAO Manual on Required Communication Performance-RCP (Doc.9869). The following draft conclusion was formulated:

Draft Conclusion 5/12-Planning and Implementation of Air Ground Data Link

That:

a) States/Organizations consider HF Data Link, VHL Data Link and Mode S Data Link (ATN air ground supported applications) as communication enabling media to improving Aeronautical Mobile Service (AMS);

b) In collaboration with the industry Air Navigations Services providers undertake trials on HF Data Link, VHL Data Link and Mode S Data Link in line with the guidelines of ICAO Manual on Required Communication Performance-RCP (Doc.9869).

Item 5.2 Extension of VHF Radio coverage in the AFI Region - Related issues

5.4 Under this agenda item the meeting noted effort from States/Organizations to implement extended VHF coverage in continental airspace and CPDLC mainly in oceanic and continental remote airspaces.

However it was reported the poor quality of the VHF coverage in Kinshasa and Luanda FIRs.

The meeting expressed its concern on these deficiencies and urged concerned states to expedite the implementation of AMS improvement using the existing VSAT networks. The following draft conclusion was formulated:

Draft Conclusion 5/13-Improvement of AMS

That:

The concerned States (Angola and DRC) expedite the implementation of AMS improvements using existing VSAT networks by no later than 30 June 2014, and report progress made to CNS/SG/6.

Agenda Item 6: Aeronautical Radio Navigation Service (ARNS)

6.1 Under this Agenda Item, the meeting reviewed the implementation status and the performance of the aeronautical radio navigation service in the AFI Region as reported by States and Organizations.

The meeting was presented with the outcome of the ICAO 12th Air Navigation Conference related to GNSS.

6.2 The issue of GNSS vulnerabilities was discussed and States /Organizations were strongly encouraged to undertake mitigation action in order to secure GNSS operation in the AFI Region. The following draft conclusion was formulated:

Draft Conclusion 5/14-Mitigation of GNSS vulnerabilities in the AFI Region

That States should:

- a) **Assess and report GNSS vulnerabilities in their airspace, including:**
 - 1) **Unintentional interference (environment), intentional interference (security);**
 - 2) **Ionospheric scintillation in equatorial regions;**
 - 3) **Other vulnerabilities; and**
- b) **Implement appropriate mitigation measures depending on**
 - 1) **the airspace in question; and**
 - 2) **the operations that must be supported.**

6.3 The meeting also noted that the framework of the current PBN/GNSS Task Force does not enable a detailed technical consideration of GNSS issues in particular those related to GNSS vulnerability and GNSS spectrum protection. It was agreed that the Terms of Reference and Work Programme of the CNS SG should be amended to consider the need of State/Organizations to be assisted in implementing GNSS and mitigating related vulnerabilities. The following draft decision was formulated:

Draft Decision 5/15- Implementing GNSS and mitigating related vulnerabilities

That:

The Terms of Reference of the CNS/SG be amended to include the need of States to be assisted in implementing GNSS and mitigating related vulnerabilities.

Agenda Item 7: Aeronautical Surveillance

7.1 Under this Agenda Item, the meeting reviewed the status of implementation of the current AFI Air Navigation Plan (ANP) requirements for aeronautical surveillance and addressed the report of the third meeting of the AFI Surveillance Implementation Task Force.

Item 7.1 Review of the status of implementation of the current aeronautical surveillance plan.

7.2 The meeting reviewed the status of implementation of surveillance systems and related projects as reported by the AFI Aeronautical Surveillance Implementation Task Force (AFI/AS/I/TF/3).

It was noted the need to assess the performance of surveillance systems in particular for ADS-C and CPDLC.

7.3 The meeting concluded on the need to establishing a **Data Link Central Monitoring and Reporting Agency (DL/CMRA)** to ensure a proper operation of data link applications in the AFI Region. The following draft decision was formulated:

Draft Decision 5/16-Establishment of a Data Link Central Monitoring and Reporting Agency (DL/CMRA)

That:

The ICAO Regional Offices coordinate with States/Organizations the establishment of a Data Link Central Monitoring and Reporting Agency (DL/CMRA) to ensure proper operation of data link applications in the AFI Region.

Item 7.2 Review of the report of the Third meeting of the AFI Surveillance Implementation Task Force

7.4 The meeting reviewed the report of the Third meeting of the AFI Surveillance Implementation Task Force with regard to the Roadmap for surveillance technology developed by the 12th Air Navigation conference.

7.5 The meeting was briefed on the successful results of the trials on ADS-B conducted by ASECNA in the Indian Ocean Region in collaboration with the users and was informed on the intention of ATNS to conduct trials on ADS-B and Multilateration.

7.6 The meeting applauded such initiatives and encouraged States and Organization to conduct trials on ADS-B taking into consideration the forthcoming space based ADS-B reported by the 12th Air Navigation conference. The following draft conclusion was formulated:

Draft conclusion 5/17-ADS-B Trials

That:

In the timeframe of ICAO Aviation System Block Upgrades (ASBU) Block 0, AFI States/Organizations conduct trials on ADS-B in collaboration with the users taking into consideration the emerging ADS-B space based technology.

7.7 The meeting discussed in length on the interoperability of surveillance systems as a key requirement of seamless ATM operation within the AFI Region.

7.8 States and organizations were encouraged to make necessary arrangements such as conclusion of Memoranda of Understanding (**MoU**) to ensure the interconnection and the interoperability of the existing aeronautical surveillance systems in the timeframe of ASBU Block 0 and facilitate surveillance data exchange and sharing.

7.9 The meeting also noted that the provision of a seamless ATM should be facilitated if considered along and within the Six (06) Areas of Routing (**A-R1 to A-R6**) and expressed the necessity for AFCAC to support the continuous provision of aeronautical surveillance services along ATS routes within all AFI Areas of Routing (**AR-1 to AR-6**) as one of the key enablers to a safer and integrated air transport system in the AFI region

7.10 The sub regional economic integration institutions were also identified as possible facilitators for the inter-operability of ATM systems. The following draft conclusion was formulated:

Draft conclusion 5/18-Interoperability of AFI Aeronautical Surveillance Systems

That:

In order to enable a seamless ATM operation within the AFI Region;

- a) States/Organizations make necessary arrangements through Memoranda of Understanding (MoU) to ensure the interconnection and the interoperability of the existing aeronautical surveillance systems in the timeframe of ASBU Block 0 and facilitate surveillance data exchange and sharing;**
- b) When assisting States, AFCAC be requested to support the continuous provision of aeronautical surveillance services along ATS routes within all AFI Areas of Routing (AR-1 to AR-6) as one of the key enablers to a safer and integrated air transport system in the AFI region; and**
- c) ICAO continue to assist States/Organizations in their efforts toward the implementation of an integrated aeronautical surveillance capability throughout the AFI region by convening workshops seminars and technical coordination meetings.**

7.11 The meeting aligned the Terms of Reference and Work Programme of the AFI Surveillance Implementation Task Force with the surveillance technology roadmap defined by the 12th Air Navigation conference. The following draft decision was formulated:

Draft Decision 5/19- Revised Terms of Reference, Composition and Future Work programme of the AFI/ AS/I/TF

That:

Taking into consideration the provision of the 4th Edition of the Global Air Navigation Plan (GANP, Doc.9750), the Terms of Reference, Composition and Work Programme of the AFI/ AS/I/TF is revised as presented in Appendix H.

Agenda Item 8: Aeronautical Radio Frequency Spectrum issues

8.11 Under this Agenda Item, the meeting reviewed the report of the third meeting of the AFI Frequency Management Group. The summary of the Final Acts of the ITU World Radiocommunication Conference held in Geneva in 2012 (**WRC-12**) related to international civil aviation spectrum provision and protection was presented to the meeting as well as the ICAO Position for the ITU WRC-2015.

8.12 The meeting agreed that the earliest preparation of WRC-15 may ensure success in sharing ICAO position for WRC-15 and noted that a close coordination framework and procedure between CAAs and National Telecommunication Regulation Authorities are necessary to facilitate efficient dialogue and resolution of issues related to the provision, the optimum operation and protection of aeronautical telecommunications spectrum.

8.13 States were encouraged to establish such framework with the assistance of the ICAO Regional Offices. The following draft conclusion was formulated:

Draft conclusion 5/20-Coordination between CAAs and National Telecommunication Regulation Authorities

That:

With the assistance of ICAO Regional Offices, States which have not done so establish by the end of December 2014 a coordination framework and procedure between CAAs and National Telecommunication Regulation Authorities to facilitate efficient dialogue and resolution of issues

related to the provision, the optimum operation and protection of aeronautical telecommunications spectrum taking due account of their specific institutional arrangements.

8.14 The meeting discussed issues related to interferences on aeronautical frequency spectrum and recalled States on the necessity to duly register aeronautical frequencies in ITU data base through the National Authority of Regulation of Telecommunication in order to ensure any claim for protection.

The following draft conclusion was formulated:

Draft conclusion 5/21-Monitoring and Reporting of interference on aeronautical spectrum

That:

With reference to the participation in studies called upon by Resolution 154 (WRC12), States ensure that:

- a) The aeronautical frequencies are duly registered in ITU data base through the National Authority of Regulation of Telecommunication and recorded in ICAO Global Frequency Data Base through ICAO Regional Offices;**
- b) Information regarding interferences to aeronautical spectrum such as those caused by IMTs to the VSATs C-band 3.4 – 4.2 GHz is recorded and provided to ITU for consideration by WRC Working Parties.**

8.15 Examining the ICAO position for WRC-15 the meeting agreed on actions to be conducted in order to involve all stakeholders in the conference preparation meetings.

The following draft conclusion was formulated:

Draft conclusion 5/22-Support to ICAO position for WRC-15

That:

In accordance with ICAO Assembly Resolution A32-13, AFI States support ICAO position developed for WRC-15 by:

- a) Incorporating the ICAO position in the national position to WRC-15**
- b) Coordinating this position with the aviation stakeholders (ANSPs, Airlines, Airport Operators, etc.)**
- c) Ensuring regular and active participation of AFI FMG States focal points of contact in sub regional/ regional meetings and in ITU working parties meeting/study groups covering different aeronautical agenda items.**
- d) Ensuring the full involvement of Civil Aviation Representatives in WRC-15 preparatory activities and the participation of States AFI/FMG focal points of contact in the Conference.**

8.16 The meeting discussed issue related to a draft WRC-15 Resolution for the protection of the C band operated by the aeronautical VSAT networks as follow up to Resolution 154 (WRC-12). The meeting was informed that the first meeting of the African Telecommunication Union (ATU) was briefed on ICAO position for WRC-15 and on the requirements of the AFI aeronautical VSATs Networks operating in the C-Band. It was agreed that a draft resolution was to be elaborated and forwarded to ITU-R in accordance with established procedures. The following draft decision was formulated:

Draft Decision 5/23- Draft WRC-15 Resolution for the protection of the C band operated by the aeronautical VSAT networks

That:

- a) **The AFI/FMG Rapporteur in coordination with ICAO ESAF and WACAF offices elaborate and circulate to the AFI/FMG focal points of contact a draft resolution for inputs and comments;**
- b) **The final draft Resolution be submitted to the WRC-15 as per ITU-R established procedures**

8.17 The meeting urged States/Organizations to actively support the future Resolution in order to ensure the protection of the C band operated by the aeronautical VSAT networks and achieve the safe operation of aircraft and reliable distribution of meteorological information in AFI region. The following draft conclusion was formulated:

Draft conclusion 5/24- Support to Draft WRC-15 Resolution for the protection of the C band operated by AFI aeronautical VSAT networks

That:

States/Organizations support the Draft WRC-15 Resolution to be developed by the AFI/Frequency Management Group (AFI/FMG) in order to ensure the protection of the C band operated by the aeronautical VSAT networks and achieve the safe operation of aircraft and reliable distribution of meteorological information in AFI region.

8.18 The meeting revised the Terms of Reference composition and future work Programme of the AFI Frequency management Group as presented at **Appendix I**. The following draft decision was formulated:

Draft Decision 5/25-Revised Terms of Reference, Composition and Future Work programme of AFI/FMG

That:

Taking into consideration the provision of the 4th Edition of the Global Air Navigation Plan (GANP, Doc. 9750) developed in accordance with the Recommendation of ICAO 12th Air Navigation Conference, AFI/FMG Terms of Reference, Composition and Work Programme is revised as presented in Appendix I to this report.

Agenda Item 9: ICAO Twelfth Air Navigation Conference (AN/Conf/12)

9.1 Under this Agenda Item, the meeting reviewed the outcome of the AN-Conf/12 of relevance to its mandate and discussed the development of a regional air navigation implementation plan for CNS systems, aligned with the ICAO Concept of Aviation System Block Upgrades (ASBUs).

9.2 In particular a Draft Regional Air Navigation Implementation Action Plan aligned with ICAO Aviation System Block Upgrades (ASBUs^o) was presented to the meeting for review and comments prior to submission to APIRG/19. The following draft conclusion was formulated:

Draft Conclusion 5/26- Development of an Air Navigation Implementation Action Plan for the AFI Region

That States:

- a) **review and provide their comments on the Communications, Navigation and Surveillance (CNS) component of the Draft Regional Air Navigation Implementation Action**

Plan aligned with ICAO Aviation System Block Upgrades (ASBUs) to be submitted to APIRG/19 for approval, on the basis of the material contained in Appendix J to this report; and

b) participate in the Regional Workshop on ICAO Aviation System Block Upgrades (ASBUs) to be organized in Nairobi, Kenya, from 21 to 25 October 2013.

Agenda Item 10: Future work programme and composition of the CNS Sub-group

10.1 Under this Agenda Item, the work programme and composition of the CNS Sub-group were reviewed and updated by the meeting as shown in **Appendix K** to this report. The proposed work programme and composition of the CNS Sub-group will be submitted to the next meeting of the APIRG.

Agenda Item 11: Any other business

11.1 Under this Agenda Item, the Sub-group discussed the outcome of the plenary session hold with the AFI ATM/AIM/SAR Sub Group and considered that the Planning and implementation of Air Navigation systems should have as foundation the AFI identified Areas of Routing (AR-1 to AR-6) and agreed that the implementation strategies should include cooperation with AFCAC and regional/sub-regional economic and financial institutions. The following draft conclusion was formulated:

Draft conclusion 5/27-Planning and implementation of Air Navigation systems based on AFI identified Areas of Routing (AR-1 to AR-6)

That:

- a) The planning and implementation of Air Navigation systems by States/Organizations should be based on the Areas of Routing identified in the AFI region; and**
- b) The implementation strategies should include cooperation with AFCAC and regional/sub-regional economic and financial institutions.**



Appendix A

LIST OF PARTICIPANTS

**Fifth Meeting of the APIRG Communications, Navigation and Surveillance Sub-Group
(CNS/SG/5)
(Nairobi, Kenya, 16-19 September 2013)**

| STATE | NO. | NAME | OFFICIAL TITLE / DESIGNATION | EMAIL |
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| ICAO Secretariat | 29. | Jean Raymond Munyamako | Interpreter | |
| ICAO Secretariat | 30. | Michael Nginye | Interpreter | |
| ICAO Secretariat | 31. | Serge Kalumuna | Interpreter | |

Appendix B

Status of implementation of APIRG/18 Conclusions and Decisions

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|----------------------------|---|---|---|--|----------------------------------|---|
| D18/1 | Review and Update of APIRG Conclusions and Decisions | That APIRG Sub-Groups: a) review all APIRG Conclusions and Decisions from APIRG/13 to APIRG/17 and identify those which are no longer valid; (CNS/SG 5) b) adopt a system of reviewing the validity of Conclusions and Decisions every two successive APIRG meetings; and (Future) c) <u>transfer Conclusions and Decisions</u> which have reached maturity and still relevant to appropriate <u>guides, handbooks</u> and manuals for the AFI Region. (CNSG 5) | APIRG Sub-Group Secretaries | Adequate management of Conclusions and Decisions | 2013 | To be addressed by CNS/SG/5 |
| C18/17 | Addressing missing flight plans | That AFI States should: a) address the loss of ATS messages using AFTN, including missing flight plans, as a matter of urgency; b) continuously monitor missing flight plans through: i) the AFI Tactical Action Group (TAG); and ii) conduct regular surveys on missing flight plans for a longer period (e.g. 30 days), or at regular intervals, under the coordination of the ICAO Regional offices; and c) ensure that their ATC systems' clocks are synchronized with the GPS time in order to meet Annexes 2 and 11 relevant provisions. | States TAG States States | Availability of ATS messages Appropriate remedial action taken Deficiencies identified for remedial action Harmonized time reference and consistent transit times | 2013 | States to provide updates under Agenda item 4. To be discussed during common session with ATM/AIM/SAR/SG /13 |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|----------------------------|---|---|----------------|--|--|---|
| C18/19 | AFI AMHS Implementation Strategy | That AFI States adopt and implement the AHMS Strategy shown at Appendix 3.4A to this report. | States | Coordinated implementation of AHMS | 2015 | AMHS Implementation Strategy notified to States. To be discussed under CNS/SG/5 Agenda item 4. |
| C18/20 | AFI ATN architecture plan | That AFI States implement the AFI ATN Architecture Plan shown at Appendix 3.4C to this report. | States | Integrated data communication infrastructure | 2015 | AFI ATN architecture is being addressed by IRTI/TF Task Force. To be discussed under CNS/SG/5 Agenda item 4. |
| C18/21 | Adoption of the global operational data link document (GOLD) | That in order to ensure regional and global harmonization of data link operations; AFI States adopt the Global Operational Data Link Document (GOLD) in replacement of the previous FANS 1/A Operations Manual. | States | Harmonized guidelines for data link operations | 2012 <i>GOLD circulated to all AFI States via State letter. It is being adopted by States/FIRs implementing ADS-C/CPDLC procedures.</i> | GOLD circulated to States. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|--|--|-------------------------------------|--|---|--|
| C18/22 | Implementation of AFI FMG Action Plan | That AFI States and Organizations implement the Action Plan proposed by the AFI Frequency Management Group as shown at Appendix 3.4D to this report. | States ESAF/WACAF Offices | Efficient frequency management in AFI | 2015 | To be discussed under CNS/SG/5 Agenda item 9. |
| C18/23 | Information on Aircraft Equipage In Air Navigation System Planning And Implementation | That AFI States: a) Support surveys conducted on aircraft equipage and capabilities by providing the ICAO Regional offices with detailed information concerning their registered aircraft; and b) Use the information for planning and implementation of air navigation systems. | States APIRG | Accurate information available on fleet capabilities Consistent planning and implementation based on performance- based approach | 2013 | Regional surveys are yet to be conducted. However, IATA Global Survey on Aircraft Equipage 2012 is available and will be discussed under CNS/SG/5 Agenda item 11. |
| C18/24 | Contingency Planning for AFI VSAT Networks Operations | Those, AFI aeronautical VSAT network managers develop contingency plans in coordination with their space segment provider (Intelsat) to ensure continuity of service in case of disruption or failure of their operated satellites. | States | Contingency plans developed to ensure business continuity | 2013 | Issue under consideration. Presentation made to IRTI/TF/1 by INTELSAT on available options. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|---|--|-----------------------|---|---|---|
| C18/25 | Adoption of best practices for AFI VSAT Networks | That the AFI States and Air Navigation Services Providers (ANSPs) operating aeronautical VSAT Networks adopt the best practices stated at Appendix 3.4G to this report, as well as any other best practices to be developed or adopted by APIRG. | States | Interoperability between VSAT networks through compliance with SARPs and common industry best practices | 2012 <i>Proposed best practices adopted by AFI VSAT networks managers (AFISNET, NAFISAT, SADC VSAT2). Status of implementation is monitored through established network management committees.</i> | Implementation by States/ANSPs is in progress. |
| C18/26 | Modernization of VSAT Networks | That AFI States and Organizations adopt and implement strategies to modernize network continue to meet regionally/inter-regionally agreed performance requirements. | States | High performance and sustainable communication infrastructure | 2015 | Implementation in progress. Updates to be provided for AFISNET, CAFSAT, NAFISAT, SADC/2. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|--|---|-----------------------|--|---|---|
| C18/27 | Arrangements to ensure sustainability of NAFISAT and SADC VSAT/2 networks | That, based on experience gained and available capabilities NAFISAT and SADC VSAT/2 participating States should establish administrative and funding arrangements in a timely manner to ensure that AFS requirements continue to be met. | States | Sustainable operation of NAFISAT and SADC VSAT networks | 2013 | Extension of current arrangements agreed between concerned States and the Network Provider. |
| D18/28 | Establishment of A Task Force for The AFI Aeronautical VSAT Networks Regional Project | That a Task Force be established to address issues related to the development of a regional project aimed to enhance the overall performance of AFI aeronautical VSAT networks, and converge towards a consolidated regional ATN infrastructure, with the terms of reference shown at Appendix 3.4H to this report. | APIRG | Coordinated transition towards a consolidated regional communication infrastructure | 2012 <i>Task Force established. First meeting scheduled for May 2013</i> | Implemented. To be discussed under CNS/SG/5 Agenda item 4. |
| D18/29 | Multinational facility/service for an integrated AFI aeronautical telecommunication network (ATN) infrastructure. | That the AFI integrated IP-based regional/interregional digital communication network be established as a multinational facility/service as defined in the Regional Air Navigation Plan (Doc 7474), that embraces a consolidated AFI Aeronautical Telecommunication Network (ATN) infrastructure. | APIRG States | Development of an integrated communication infrastructure based on guidelines established for multinational facility/service | 2013 | Development of an integrated regional telecommunication infrastructure is in progress. To be discussed under CNS/SG/5 Agenda item 4. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|--|---|--------------------------------|--|---|--|
| C18/30 | Implementation of resolution COM6/24 (154) (WRC-12) | That, considering the critical role of VSAT technology in the provision of air navigation services within the AFI Region and its adjacent ICAO regions, AFI States support the implementation of Resolution COM6/24 (WRC-12) aimed at securing international protection of aeronautical frequency spectrum, by participating in related studies, surveys and meetings as may be organized under the coordination of ICAO. | States ESAF/WACAF Office | Resolution on international protection of C-Band supporting aeronautical VSAT operations by ITU WRC-15 | 2015 | Implementation in progress. To be discussed under CNS/SG/5 Agenda item 8. |
| C18/31 | Updated AFI GNSS Strategy | That AFI States adopt and implement the GNSS Strategy contained at Appendix 3.4K to this report. | States APIRG | Harmonized implementation of GNSS applications | 2012 <i>AFI States notified of the updated strategy for guidance in implementing GNSS operations</i> | AFI States notified of the updated AFI GNSS strategy. |
| D18/32 | Monitoring of SBAS development in ICAO Regions in the equatorial area | That APIRG CNS and ATM/AIM/SAR Sub-groups monitor SBAS developments in other ICAO regions in the equatorial area, for consideration as appropriate when developing/updating its strategy for a cost-effective implementation of GNSS in the AFI Region. | APIRG | Cost-effective implementation of SBAS | 2013 | GNSS developments are monitored by the Secretariat. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|--|--|-----------------------|--|---|-----------------------------|
| C18/33 | Funding of AFI SBAS Cost-Benefit Analysis | That in coordination with AFCAC, ICAO facilitate the search for funding to support the conduct of an independent cost-benefit analysis on an AFI satellite-based augmentation system (SBAS). | ICAO AFCAC | Independent cost-benefit analysis on SBAS implementation available to States and users | 2013 | Not implemented. |
| C18/34 | AFI Surveillance Strategy | That the AFI States adopt and implement the Aeronautical Surveillance Implementation Strategy shown at Appendix 3.4L to this report. | States APIRG | Coordinated and consistent implementation of situational awareness systems | 2012 onwards <i>AFI States notified of the updated strategy for guidance in implementing aeronautical surveillance systems A TCB Project covering 5 ASECNA managed FIRs is being implemented</i> | Implementation in progress. |

APPENDIX C

Review of Conclusions/Decisions of APIRG/18

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|---|---|---|--|---|---|
| D18/1 | Review and Update of APIRG Conclusions and Decisions | That APIRG Sub-Groups: a) review all APIRG Conclusions and Decisions from APIRG/13 to APIRG/17 and identify those which are no longer valid; (CNS/SG 5) b) adopt a system of reviewing the validity of Conclusions and Decisions every two successive APIRG meetings; and (Future) c) transfer Conclusions and Decisions which have reached maturity and still relevant to appropriate guides, handbooks and manuals for the AFI Region. (CNSG 5) | APIRG Sub-Group Secretaries | Adequate management of Conclusions and Decisions | 2013 | To be addressed by CNS/SG/5 |
| C18/17 | Addressing missing flight plans | That AFI States should: a) address the loss of ATS messages using AFTN, including missing flight plans, as a matter of urgency; b) continuously monitor missing flight plans through: i) the AFI Tactical Action Group (TAG); and ii) conduct regular surveys on missing flight plans for a longer period (e.g. 30 days), or at regular intervals, under the coordination of the ICAO Regional offices; and c) ensure that their ATC systems' clocks are synchronized with the GPS time in order to meet Annexes 2 and 11 relevant provisions. | States TAG States States | Availability of ATS messages Appropriate remedial action taken Deficiencies identified for remedial action Harmonized time reference and consistent transit times | 2013 | States to provide updates under Agenda item 4. To be discussed during common session with ATM/AIM/SAR/SG /13 |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|---|---|-----------------------|--|--|---|
| C18/19 | AFI AMHS Implementation Strategy | That AFI States adopt and implement the AHMS Strategy shown at Appendix 3.4A to this report. | States | Coordinated implementation of AHMS | 2015 | AMHS Implementation Strategy notified to States. To be discussed under CNS/SG/5 Agenda item 4. |
| C18/20 | AFI ATN architecture plan | That AFI States implement the AFI ATN Architecture Plan shown at Appendix 3.4C to this report. | States | Integrated data communication infrastructure | 2015 | AFI ATN architecture is being addressed by IRTI/TF Task Force. To be discussed under CNS/SG/5 Agenda item 4. |
| C18/21 | Adoption of the global operational data link document (GOLD) | That in order to ensure regional and global harmonization of data link operations; AFI States adopt the Global Operational Data Link Document (GOLD) in replacement of the previous FANS 1/A Operations Manual. | States | Harmonized guidelines for data link operations | 2012 <i>GOLD circulated to all AFI States via State letter. It is being adopted by States/FIRs implementing ADS-C/CPDLC procedures.</i> | GOLD circulated to States. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|--|--|-------------------------------------|--|---|--|
| C18/22 | Implementation of AFI FMG Action Plan | That AFI States and Organizations implement the Action Plan proposed by the AFI Frequency Management Group as shown at Appendix 3.4D to this report. | States ESAF/WACAF Offices | Efficient frequency management in AFI | 2015 | To be discussed under CNS/SG/5 Agenda item 9. |
| C18/23 | Information on Aircraft Equipage In Air Navigation System Planning And Implementation | That AFI States: a) Support surveys conducted on aircraft equipage and capabilities by providing the ICAO Regional offices with detailed information concerning their registered aircraft; and b) Use the information for planning and implementation of air navigation systems. | States APIRG | Accurate information available on fleet capabilities Consistent planning and implementation based on performance- based approach | 2013 | Regional surveys are yet to be conducted. However, IATA Global Survey on Aircraft Equipage 2012 is available and will be discussed under CNS/SG/5 Agenda item 11. |
| C18/24 | Contingency Planning for AFI VSAT Networks Operations | Those, AFI aeronautical VSAT network managers develop contingency plans in coordination with their space segment provider (Intelsat) to ensure continuity of service in case of disruption or failure of their operated satellites. | States | Contingency plans developed to ensure business continuity | 2013 | Issue under consideration. Presentation made to IRTI/TF/1 by INTELSAT on available options. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
|------------------------------------|---|--|-----------------------|---|---|---|
| C18/25 | Adoption of best practices for AFI VSAT Networks | That the AFI States and Air Navigation Services Providers (ANSPs) operating aeronautical VSAT Networks adopt the best practices stated at Appendix 3.4G to this report, as well as any other best practices to be developed or adopted by APIRG. | States | Interoperability between VSAT networks through compliance with SARPs and common industry best practices | 2012 <i>Proposed best practices adopted by AFI VSAT networks managers (AFISNET, NAFISAT, SADC VSAT2). Status of implementation is monitored through established network management committees.</i> | Implementation by States/ANSPs is in progress. |
| C18/26 | Modernization of VSAT Networks | That AFI States and Organizations adopt and implement strategies to modernize network continue to meet regionally/inter-regionally agreed performance requirements. | States | High performance and sustainable communication infrastructure | 2015 | Implementation in progress. Updates to be provided for AFISNET, CAFSAT, NAFISAT, SADC/2. |

| Conclusion/ Decision No | Title of Conclusion/Decision | Text of Conclusion/Decision | Responsibility | Deliverable | Reporting/ Completion date | Action Taken |
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— END —

APPENDIX D

Performance Data Collection Form (PDCF)

A-Global Static parameters

Center

Date

| Parameters | Values | Remarks |
|--|--|---------------------|
| Fixed Parameters | | |
| Intelsat link Name | IS 901 @°E | |
| Transponder Number | 36/36 | |
| Satellite Earth Station Coordinates | LONG = ddd, mm O/E LAT = dd, mm N/S | Under WGS 84 Format |
| | AZ = ddd, mm O/E EL = dd, mm N/S | |
| Antenna Type and Size | ...m | |
| Antenna Gain | Tx : ...dBi Rx : ...dBi | |
| SSPA type | X W | |
| Up Converter Frequency | MHz | |

| | | |
|--|-----|--|
| Down Converter Frequency | MHz | |
| B-Global Dynamic parameters | | |
| EIRP | | |
| G/T | | |
| C/N0 | | |
| BER | | |
| MTBF | | |
| MTTR | | |
| Parameter for Carrier Performance | | |
| Carrier failure rate | | |
| C/N0 | | |
| BER | | |

**C-Services
Performance**

**Performance
of AFTN**

Centre :

Accra

Date /

| Country | Terminal I | Terminal II | Support | COM Protocol | Speed | Transit Time | Routing | Monthly Availability2011 | | | | | | | | | | | | ½ Annual Average Availability | |
|---------|------------|-------------|---------|--------------|-------|--------------|---------|--------------------------|----|----|----|----|----|----|----|----|----|----|----|-------------------------------|--|
| | | | | | | | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 1 | |
| | | | | | | | | TX | RX | TX | RX | TX | RX | TX | RX | TX | RX | TX | RX | | |
| Ghana | Accra | Niamey | AFISNET | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |

**Qualitative
performance
of ATS/DS**

Centre :Kano

Date /

| Country | Terminal I | Terminal II | Support | Connexion Time | Nb of Attempts | One Way Latence Time | Call set up time | Voice Quality (1 to 5) | Monthly Availability2011 | | | | | | ½ Annual Average Availability | | | |
|---------|------------|-------------|---------|----------------|----------------|----------------------|------------------|------------------------|--------------------------|---|----|----|----|----|-------------------------------|--|--|--|
| | | | | | | | | | 1 | 2 | 03 | 04 | 05 | 06 | | | | |
| Nigeria | Kano | Niamey | AFISNET | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Qualitative
performance
of Future
CNS Services

| Country | Terminal 1 | Terminal II | Support | Provided Service | COM Protocol | Speed | Transit Time | Routing | Availability 2005-2010 | | | | | | Remarks |
|-----------|------------|-------------|---------|------------------|--------------|-------|--------------|---------|------------------------|---|---|---|---|----|---------|
| | | | | | | | | | 5 | 6 | 7 | 8 | 9 | 10 | |
| Mauritius | Maurice | Ivato | AFISNET | AIDC | | | | | | | | | | | |
| Liberia | Roberts | Dakar | AFISNET | AMHS | | | | | | | | | | | |

APPENDIX E

INTEGRATED REGIONAL TELECOMMUNICATION INFRASTRUCTURE PROJECT – ACTION PLAN

TECHNICAL ASPECTS

- 1) Background of Work completed by the Technical Group of the AFI Aeronautical VSAT Managers (Douala, Cameroon, 28 February – 01 March 2012)
 - a) Design of ATN Overlay Architecture:
 - i) Based on the architecture design of original ATN Task Force
 - ii) Circuits were inserted to ensure at least two interconnections between adjacent networks
 - iii) Additional circuits included to provide further redundancy
 - iv) The results are shown in Appendix 3.4H to APIRG/18 report.
 - b) The technical solution for the ATN overlay network was based on the following fundamental criteria:
 - i) All four networks (AFISNET, CAFSAT, SADC, and NAFISAT) have made substantial investment in existing infrastructure, which must be retained and utilized.
 - ii) Three of the networks operate on the same satellite i.e. IS 1002 which will ensure seamless operation
 - iii) A single satellite access method is proposed for the technical solution to ensure interoperability
 - iv) Although the ATN network will mainly support IP based applications, legacy protocols must continue to be supported
 - v) The overlay network must be secure, i.e. independent of terrestrial services, etc.
 - c) The cost estimates calculated by the Technical Group are therefore based on the above criteria. The cost furthermore include the following line items:
 - i) RF Outdoor Equipment (SSPA where required)
 - ii) Indoor Unit
 - iii) Modem/Frame Relay Access Device
 - iv) Equipment Rack and Miscellaneous
 - v) Un-interrupted Power Supply (UPS)
 - vi) Spare Equipment
 - vii) Site Installation, Integration and Commissioning

- viii) Engineering, Project Management and Training
- ix) Packing, Freight and Insurance
- x) Duties and Taxes

d) The cost estimates of the proposed solution are shown in the table 1 below: The estimates are based on the following spares options:

- i) Option 1: Total centralized maintenance, i.e. one set per network
- ii) Option 2: Total decentralized maintenance, i.e. one set per VSAT node
- iii) Option 3: Hybrid consisting of:
 - (1) Decentralised maintenance for CAFSAT & NAFISAT
 - (2) Centralized maintenance for SADC and NAFISAT
- iv) Table 1 below is a summary of the initial cost calculations for the AFI ATN overlay network

Table 1

| Cost Comparison of VSAT Solutions for an AFI ATN Network - IDU in 1 + 1 Configuration | | | | | |
|---|----------------|---------------|-----------------|---------------|--------------------------------|
| Region --> | NAFISAT Region | SADC Region | AFISNET Region | CAFSAT Region | Total Cost for AFI ATN Network |
| Excluding Spares Options | | | | | |
| Option D (TDMA) IDU 7000 | \$ 560,685.91 | \$ 610,341.82 | \$ 631,273.03 | \$ 604,376.50 | \$ 2,406,677.26 |
| Including Option 1 Spares | | | | | |
| Option D (TDMA) IDU 7000 | \$ 583,615.91 | \$ 671,671.82 | \$ 692,603.03 | \$ 627,306.50 | \$ 2,575,197.26 |
| Including Option 2 Spares | | | | | |
| Option D (TDMA) IDU 7000 | \$ 755,865.91 | \$ 920,721.82 | \$ 1,016,313.03 | \$ 767,026.50 | \$ 3,459,927.26 |
| Including Option 3 Spares | | | | | |
| Option D (TDMA) IDU 7000 | \$ 593,215.91 | \$ 662,071.82 | \$ 1,016,313.03 | \$ 767,026.50 | \$ 3,038,627.26 |

2) Way Forward of Technical Group of Integrated Regional Telecommunication Infrastructure Task Force

The following topics must be addressed by the Technical Group and timelines proposed:

- a) Revise and Provide input to Financial and Administrative Groups:
 - i) Revisit the calculations shown in table 4.1 above, done for the recommended technical solution, as well as costing for the maintenance options, and submit to Financial & Administrative groups – Target date: **August 2013**
- b) Revision of the AFI ATN routing architecture
 - i) The AFI ATN routing architecture must be revised to include circuits between Addis Ababa and Cairo/Johannesburg. As part of the process ATNS will

- discuss the implementation of the AMHS circuits and the conducting of trials with Eritrea
- ii) Revise the AFI ATN architecture, taking into account the re-alignment of the NAFISAT ANPs and SUPPs to the EUR and MID Regions – **ongoing**
 - c) Complete work in respect of maintenance options
 - i) This is still not completed and will be addressed by Technical Group – Target date: **November 2013**
 - d) Review and update the status of implementation of the best practices as adopted by the APIRG/18 Meeting
 - i) Initial analyses to be revisited by the Technical Group and report drafted – Target date: **November 2013**
 - e) Conduct a gap analysis against agreed best practices for networks
 - i) Initial analyses to be revisited by Technical Group and a report drafted
 - ii) Backup of satellite services: Technical discussions to be conducted with Intelsat to finalise calculations of backup options. It is foreseen that additional cost will have to be incurred that is not included in the initial cost calculation for the ATN Overlay – Target Date: **November 2013**
 - f) Develop a convergence plan with priorities and timelines to close identified gaps & other work for technical group
 - i) Align timelines with the timelines proposed in the AMHS Task Force:
 - (1) 2012 to 2014 – National deployment – domestic AMHS
 - (2) 2013 – 2015 - Regional deployment – AFI States will implement MTA to MTA, AMHS connections using TCP/IP via established AFI networks
 - (3) 2014 – 2018 – Inter-regional deployment – ATN/IPS connections
 - g) Alignment of Regional Air Navigation Plans & Supplementary Procedures:
 - i) Analyse the possible impact of the alignment of ANPs and SUPPs on its work
 - ii) Agree on the way forward for the development of an integrated regional telecommunication infrastructure for the Africa-Indian Ocean Region:
 - iii) Amendment proposal for AFI Regional Air Navigation Plan as appropriate Architecture will have to be revised taking into account the re-alignment of the NAFISAT States, refer to paragraph 2 b) above
- 3) Timelines for Technical Group
- a) The timelines based on the target dates as proposed are shown in the Gantt chart below:

| ID | Task Name | Duration | Start | Finish | 2014 | | | | 2015 | | | | 2016 | | | | 2017 | | | | 2018 | | | | 2019 |
|----|--|------------|--------------|--------------|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|
| | | | | | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | |
| 1 | Time Frame for Technical Team | 1437 days? | Fri 13-06-28 | Mon 18-12-31 | | | | | | | | | | | | | | | | | | | | | |
| 2 | Revisit cost estimates & Provide input to Financial & Admin. Groups | 46 days | Mon 13-07-01 | Mon 13-09-02 | | | | | | | | | | | | | | | | | | | | | |
| 3 | Revise AFI ATN Routing Architecture | 110 days | Mon 13-07-01 | Sat 13-11-30 | | | | | | | | | | | | | | | | | | | | | |
| 4 | Complete work i.r.o. maintenance options | 110 days | Mon 13-07-01 | Sat 13-11-30 | | | | | | | | | | | | | | | | | | | | | |
| 5 | Review and update the status of implementation of the best practices as adopte | 110 days | Mon 13-07-01 | Sat 13-11-30 | | | | | | | | | | | | | | | | | | | | | |
| 6 | Conduct a gap analysis against agreed best practices for networks | 110 days | Mon 13-07-01 | Sat 13-11-30 | | | | | | | | | | | | | | | | | | | | | |
| 7 | Develop a convergence plan with priorities and timelines to close ider | 1437 days? | Fri 13-06-28 | Mon 18-12-31 | | | | | | | | | | | | | | | | | | | | | |
| 8 | 2012 to 2014 – National deployment | 393 days? | Mon 13-07-01 | Wed 14-12-31 | | | | | | | | | | | | | | | | | | | | | |
| 9 | 2013 – 2015 - Regional deployment | 655 days? | Fri 13-06-28 | Thu 15-12-31 | | | | | | | | | | | | | | | | | | | | | |
| 10 | 2014 – 2018 – Inter-regional deployment | 1304 days? | Wed 14-01-01 | Mon 18-12-31 | | | | | | | | | | | | | | | | | | | | | |
| 11 | Analyze possible impact of the alignment of ANPs and SUPPs on its work | 284 days | Mon 13-07-01 | Thu 14-07-31 | | | | | | | | | | | | | | | | | | | | | |

Appendix E

INTEGRATED REGIONAL TELECOMMUNICATION INFRASTRUCTURE PROJECT – ACTION PLAN LEGAL AND ADMINISTRATIVE ASPECTS

a)Oversight Model

Type of Agreement – *International treaty or administrative agreement*

- Administrative agreements as are currently in place

Institutional framework – *Organization to set up, fund, maintain and operate Network*

- Keep the current structures that manage the various networks. Include an overall co-ordination body made up of representatives from the various network management groups, two members each that will rotate, one member from the secretariat (ICAO or AFCAC to be determined).

Funding Mechanism – *The costs involved are shared among the participating States in a fair and equitable manner*

- As currently decided by each body.
- Each body will financially support the costs related to the coordination body equally.

Oversight body – *Defines nature of organization to implement and manage facility*

- Strategic oversight will lie with the coordination body
Alignment of technology, rollout, requirements, services etc.
- Safety and technical oversight (audit function) will be coordinated with ICAO.
- Operational administrative, technical and safety oversight will continue as currently run within each network setup.

Mandate of Oversight body – *Ensure set up, operation, maintenance, expansion and funding*

- Ensure set up, operation, maintenance, expansion and funding as per the current network body structures of AFISNET, CAFSAT, NAFISAT and SADC VSAT
- The safety and technical audit function is to be carried out against applicable SARPS, regional plans and APIRG requirements in coordination with ICAO.

Mandate of Network provider – *Functions and supporting services*

- As currently mandated by the governing bodies of the AFISNET, CAFSAT, NAFISAT and SADC VSAT.
- Implement, operate, maintain the network and ensure present and future performance in line with strategic objectives and oversight body requirements

Any delegated ANSP aspects – *Information on expected consequences on the overall AFI air navigation system or any part thereof*

- Provision of aeronautical ground to ground interconnection services on behalf of States

Handling of Pre-implementation costs – *Determination of the costs attributed should be in a manner acceptable to all the participating States*

- States are responsible for costs within the current structures of AFISNET, CAFSAT, NAFISAT and SADC VSAT.

Cost Determination – *Format of annual costs, i.e. Capex, operational, maintenance, administrative overheads, depreciation and/or amortization and per-implementation*

- All expenses

Cost sharing – *Each state to assume responsibility for its share of the costs involved (partnership with users)*

- States are responsible for costs within the current structures of AFISNET, CAFSAT, NAFISAT and SADC VSAT.

Cost Recovery mechanism – *To be “multinationally” financed or refinanced by a State, group of States or by an agency as established under the authority of an agreement by States*

- Cost recovery is managed within the current structures of AFISNET, CAFSAT, NAFISAT and SADC VSAT.

Budget Approval – *Proper financial control will require costs and revenues to be estimated in advance*

- Budget approval is handled within the current structures of AFISNET, CAFSAT, NAFISAT and SADC VSAT.

Financial audit and taxation – *Addressed in the context of the overall operations*

- Managed within the current structures of AFISNET, CAFSAT, NAFISAT and SADC VSAT.
- It is however recommended that all bodies are audited by an external audit body annually and taxation is handled as per the requirements of the state.

Any other issues –

- None

b) States’ Commitment

Financial, Managerial and other contracting aspects –

- There are currently agreements in place within the AFISNET, CAFSAT, NAFISAT and SADC VSAT structures that should continue, however the agreements that are in place should ensure that the following elements are defined:
 - Objective
 - Obligations of the parties
 - Definition and description of the network and services
 - Establishment, operation and maintenance of the network
 - Legal, financial and other responsibilities and liabilities
- Proposed Coordinating body requires:
 - Terms of reference / mandate
 - Objective
 - Defined membership
 - Tenure

- Obligations of the parties
- Legal, financial and other responsibilities and liabilities

C, D and E) Legal, Governance and Financial Issues

Managerial and other contracting aspects should be included as listed:

- Governing bodies and decision making arrangements
- Organisation and staffing
- Consultation
- Pre-implementation considerations
- Cost Determination
- Cost sharing
- Recovery of costs from users
- Budgeting
- Authority to approve the budget
- Financial auditing
- Taxation and other government levies
- Procedures for settlement of disputes
- Accessions, withdrawals, amendments to and termination of agreement
- Any other relevant business

Maintenance

The aspect of maintenance across all networks should be managed as part of the individual contracts with the applicable service providers in terms of the agreements in place in the AFISNET, CAFSAT, NAFISAT and SADC VSAT agreements as amended when necessary. This should include but not be limited to:

- Service level agreement
- Support plan

Participating members of the administrative group

- Botswana, Cameroon, Egypt, Ethiopia, Kenya (chairman), Libya, Mozambique, Nigeria, Seychelles, South Africa, Sudan and Zambia

-END-

Appendix F

TASK FORCE ON THE INTEGRATED REGIONAL TELECOMMUNICATION INFRASTRUCTURE PROJECT

PROPOSED REVISED TERMS OF REFERENCE

1. Vision

- a) Improve the contribution of the aeronautical telecommunication infrastructure in addressing safety endeavours in the AFI Region.
- b) Enhance Air Navigation Safety, Capacity and Efficiency through elimination of deficiencies associated with AFI aeronautical infrastructure.

2. Objectives

- a) Develop a sustainable and integrated/interoperable regional IP-based Data Communication Network primarily based on VSAT Technology to provide effective aeronautical telecommunications services in AFI region;
- b) Upgrade technical capabilities of existing VSAT networks to comply with the ICAO SARPs and guidance material, user requirements and global best practices;
- c) Ensure financial sustainability of the networks through equitable and fair allocation of costs to States and users;
- d) Create harmonious and seamless administrative oversight framework for the networks;
- e) Ensure States' commitment to this initiative;
- f) Develop the AFI ATN Strategy and Implementation Plan; and
- g) Apply appropriate cost-effective technologies aligned with the Global Air Navigation Plan (Doc 9750) Aviation System Block Upgrades (ASBU) Methodology and associated technology roadmaps for communications, navigation and surveillance (CNS), information management (IM) and avionics.

3. Deliverables

The deliverables expected from the Task Force include:

3.1. Technical:

Purpose of the multinational air navigation facility/service and its operational and technical justifications.

This should include the overall plan and targets for the development and the establishment of the facility/service.

The likely implications if any, on regulations, working routines, equipment, premises and maintenance should be included. Information on the expected consequences on the overall AFI air navigation system or any part thereof should also be included.

Deliverables

- a) *Detailed gap analysis based on ICAO SARPs and guidance material, user requirements and global best practices;*
- b) *Architectural requirements;*
- c) *Recommendations for a road-map, to be implemented by States; and*
- d) *Maintenance.*

Need for an amendment to the AFI Regional Air Navigation Plan.

Assess the need if the establishment of a multinational facility/service will necessitate an amendment to the AFI Regional Air Navigation Plan, to be carried out in accordance with established procedures.

Deliverable

Amendment proposals to the Air Navigation Plan as appropriate.

Composition of the Technical Team:

- Egypt, Botswana, Mozambique, Nigeria, Rwanda, France/Reunion, South Africa (**Team Leader**), Swaziland, Tanzania, Uganda, ASECNA, Roberts FIR, IATA,

3.2. Financial

Financial implications and cost-effectiveness.

Related information should include estimates of the total costs of the multinational facility/service covering, as required, research and development, implementation, operation and maintenance, administration, and capital costs. how all costs incurred prior to the operational phase will be financed; assessing savings which may accrue from the implementation of the facility/service and comparing these savings to the total cost estimates; proposals as to how cost shares of States participating in the provision of the project are to be determined. Also, assessment needs to be provided on impact on users from charges for the facility/service concerned.

Financial aspects

The participation of States in the provision of a multinational facility/service is based on the assumption that any State having supported and agreed to the implementation of such a facility/service and making use of it should also shoulder its respective share of the costs involved.

Deliverables

- a) *Cost estimates;*
- b) *Funding (project teams and integrated network model);*

- c) *Cost recovery methods (cost sharing amongst States, billing); and*
- d) *Maintenance.*

Composition of the Financial Team:

- South Africa, France, Kenya, Uganda, ASECNA (**Team Leader**), IATA

3.3 Administrative/Legal:

Managerial implications and other contractual aspects

The participating States would need to formalize in an agreement the terms under which the multinational facility/service is to be provided. A primary aim of the agreement should be to ensure that the costs involved are shared among the participating States in a fair and equitable manner.

Deliverables

- a) *Oversight model;*
- b) *States' commitment;*
- c) *Legal issues; Governance;*
- d) *Maintenance; and*
- e) *Draft agreement(s)*

Composition of the Administrative/Legal Team:

- Egypt, Namibia, Kenya (**Team Leader**), South Africa Tanzania, ASECNA and IATA.

-END-

APPENDIX G

TERMS OF REFERENCE OF THE AFI AMHS IMPLEMENTATION TASK FORCE

Terms of Reference:

- 1) Conduct a comprehensive review of ICAO Standards and Recommended Practices for the Aeronautical Message Handling System (AMHS) application as specified in Annex 10 Volume II[3], chapter 4.6 and Annex 10 Volume III, Part I[26], chapter 3.5.3), ICAO Doc.9880 Part II[5] and Doc 9896;
- 2) Collect and analyze information on the status of AFI ANSP Aeronautical Message Handling System plan processing systems including ongoing upgrades to existing systems;
- 3) On the basis of the above, based on ICAO Global Air Navigation Plan and in accordance with relevant additional ICAO provisions, develop a coordinated AFI transition strategy and plan with associated timelines to enable the streamlined coordinated implementation of AMHS.

Considerations:

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

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

3-WORK PROGRAMME

| Task No. | ASBU Performance Improvement Area and Block0 Modules | Subject | Target date |
|----------|---|--|---|
| 1 | <p>PIA-2: Globally interoperable systems and data; B0-FICE: Increased interoperability through ground/ground integration;</p> <p>B0-DATM: Service improvement through digital information Management</p> | <p>Review of ICAO SARPs and Guidance Material</p> <p><i>Team Leader: Secretariat</i></p> <p><i>Team members: All Task Force Core members</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • ICAO Annex 10 (Vol. 2 and Vol.3) • ICAO Doc 9880, 9896 | CNS/SG/6 Deliverable: |
| 2 | <p>PIA-2: Globally interoperable systems and data; B0-FICE: Increased interoperability through ground/ground integration;</p> <p>B0-DATM: Service improvement through digital information Management</p> | <p>Conduct of a Regional and Interregional (direct connection) Survey on:</p> <ol style="list-style-type: none"> 1. AFS circuits specifications (circuit type, modulation rate, protocol, ITU code, VSAT network) 2. AMHS implementation status (implementations, plans, levels of service, protocols, implementation challenges, level of knowledge on AMHS and ATN, etc.) <p><i>Team Leader: Secretariat</i></p> <p><i>Team members: All Task Force Core members</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • APIRG/15,16,17 and 18 Report • ICAO Annex 10 (Vol. 2 and Vol.3) • ICAO Doc 9880 • ICAO Doc 9896 | CNS/SG/6 Deliverable: |
| 3 | <p>PIA-2: Globally interoperable systems and data; B0-FICE: Increased interoperability through ground/ground integration;</p> <p>B0-DATM: Service improvement through digital information Management</p> | <p>Finalize the revised AFI AMHS Implementation Strategy</p> <p><i>Team Leader: ASECNA</i></p> <p><i>Team members: Botswana, Burkina Faso, Madagascar, South Africa (ATNS), Tanzania and ASECNA</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • CAR/SAM AMHS Implementation Strategy | CNS/SG/5 Deliverable: August 2013 |
| 4 | <p>PIA-2: Globally interoperable systems and data; B0-FICE: Increased interoperability through ground/ground integration;</p> <p>B0-DATM: Service improvement through digital information Management</p> | <p>Redraft the AFI AMHS Implementation Plan</p> <ol style="list-style-type: none"> 1. Draft AFI AMHS Architecture 2. Draft AFI AMHS Network Service Access Point Addressing Plan 3. Draft AFI AMHS Implementation Plan <ol style="list-style-type: none"> a. AFI FASID CNS1B Table b. AFI FASID CNS1C Table | CNS/SG/5 Deliverable: August 2013 |

| | | | |
|---|---|--|---|
| | | <p><u>Team Leader: Nigeria</u> <i>Team members: Angola, Ethiopia, Kenya, Mozambique, Rwanda, Sudan, Uganda, Zimbabwe and ASECNA</i> References:</p> <ul style="list-style-type: none"> • <i>Report of the fifth meeting of APIRG CNS/SG</i> • <i>AFI Air Navigation Plan, FASID (CNS)</i> • <i>ICAO Annex 10 (Vol. 2 and Vol.3)</i> | |
| 5 | <p>PIA-2: Globally interoperable systems and data; B0-FICE: Increased interoperability through ground/ground integration; B0-DATM: Service improvement through digital information Management</p> | <p>Revised AFI AMHS Manual and the Appendixes 1. AFI IP AMHS infrastructure test guidelines 2. AFI AMHS training guidelines</p> <p><u>Team Leader: South Africa (ATNS)</u> <i>Team members: Somalia (CACAS), South Africa, Tanzania, Uganda and ASECNA</i> References:</p> <ul style="list-style-type: none"> • <i>ICAO EUR AMHS Manual (Doc 020)</i> • <i>ICAO Annex 10 (Vol. 2 and Vol.3)</i> • <i>ICAO Doc 9880</i> • <i>ICAO Doc 9896</i> | <p>CNS/SG/5 Deliverables: August 2013</p> |

3-COMPOSITION

Core members: *Algeria, Angola, Botswana, Burkina Faso, Burundi, Egypt, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mali, Mauritania, Niger, Nigeria, Rwanda, Senegal, South Africa (ATNS), Sudan, Tanzania, Tunisia, Uganda, Zimbabwe, ASECNA, IFATSEA and Roberts FIR.*

Other members: *All AFI States and Air Navigation Service Providers (ANSPs) with implemented and planned AMHS systems.*

Note: *Members should nominate suitable experts involved in aeronautical telecommunications operations and systems engineering.*

Working arrangements: TBD.

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APPENDIX H

TERMS OF REFERENCE OF THE AFI AERONAUTICAL SURVEILLANCE TASK FORCE (AFI ASI/TF)

Terms of Reference:

- 4) Ensure that the implementation and operation of aeronautical surveillance systems meet ICAO Standards and Recommended Practices as specified in Annex 10 Volume IV[4]- ***Surveillance and collision avoidance Systems***, the provision of the ***Aeronautical Surveillance Manual, Doc. 9924*** and those of relevant ICAO Manuals related to surveillance operation and systems;
- 5) Develop the AFI regional criteria for the planning and implementation of aeronautical surveillance systems as key enablers to the improvement of the Performance of the Air Navigation System as defined in the ***Manual on Global Performance of the Air Navigation System (Doc. 9883)***;
- 6) Ensure that the AFI regional aeronautical surveillance implementation strategy and plans consider the regional ATM operational performance requirements along the AFI Routing Areas in line with the provisions contained in the ***Manual on ATM System Requirements (Doc. 9882)***;
- 7) Conduct timely assessment of the status of implementation, operation and sustainability of aeronautical surveillance systems in the AFI region for growth and technology development to support safety and operational effectiveness for current and future surveillance systems and allow for the transition between present and next generation technologies;
- 8) Ensure that appropriate mechanisms (Technical/operational interfaces, procedures, agreements) are developed to facilitate interconnectivity and interoperability of surveillance systems within and across the AFI region;
- 9) On the basis of the above and in the framework of the implementation of ICAO Aviation System Blocks Upgrades (ASBU), revise and coordinate AFI strategy and plan for the provision, the operation and the interoperability of aeronautical surveillance systems within the AFI Region in accordance with the Roadmap for the surveillance systems contained in the ***Global Air Navigation Plan (GANP, Doc.9750)*** and taking into account relevant additional ICAO provisions.

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APPENDIX H

TERMS OF REFERENCE OF THE AFI AERONAUTICAL SURVEILLANCE TASK FORCE (AFI ASI/TF)

Considerations

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

- l) Operational performance requirements for aeronautical surveillance in the AFI Region, en-route, terminal areas (TMAs) and aerodromes operations;
- m) Near term and long term benefits of relevant candidate surveillance systems.
- n) Strategy from legacy to future system including specific demand during transition
- o) Inter and intra-regional issues taking into consideration ICAO Aviation System **B**lock Upgrades (**ASBU**) planning requirements (Interconnectivity, interoperability, Data sharing...);
- p) Personnel training for safe aeronautical surveillance system operation and maintenance;
- q) Minimized impact of market mechanism on aeronautical surveillance systems procurement and operation.

APPENDIX H

**TERMS OF REFERENCE OF THE AFI AERONAUTICAL SURVEILLANCE TASK FORCE
(AFI ASI/TF)**

3-WORK PROGRAMME

| Task No. | ASBU Performance Improvement Area | ASBU Applicable Block 0 Modules | Subject | Target date |
|-----------------|---|--|--|------------------------------|
| 1 | PIA: 1-2-3-4 | All that apply | <p>Review of ICAO SARPs and Guidance Material</p> <p><i>Team Leader: Secretariat</i></p> <p><i>Team members: All AFI/ASI Core members</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • ICAO Annex 10 (Vol. 4), Docs.4444 • ICAO Docs.: 8071; 9684; 9688; 9694; 9750; 9863. 9871;9882;9883;9924 | CNS/SG/5 Deliverable: |
| 2 | PIA-1: Airport Operations | <p>APTA: Optimization of Approach Procedures including vertical guidance</p> <p>ACDM: Improved Airport Operations through Airport-CDM</p> | <p>Categorization of Aerodromes and Terminal Areas</p> <ul style="list-style-type: none"> ▪ Data Collection: Statics parameters, Movement figures; ▪ Statistics modeling and categorization <p><i>Team Leader: ASECNA</i></p> <p><i>Team members: All AFI States/ANSPs</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • <i>Surveillance Data collection Template</i> • <i>Statistics models</i> | CNS/SG/5 Deliverable: |
| 3 | PIA 2: Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information Management | <p>FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration</p> <p>FRTO: Improved Operations through Enhanced En-Route Trajectories</p> | <p>Categorization of en Route Airspaces</p> <ul style="list-style-type: none"> ▪ Data Collection: Statics parameters, Movement figures; ▪ Statistics modeling and categorization <p><i>Team Leader: Seychelles-CACAS</i></p> <p><i>Team members: All AFI States/ANSPs</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • <i>Surveillance Data collection Template</i> • <i>Statistics models</i> | CNS/SG/5 Deliverable: |
| 4 | PIA 2: Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information | <p>FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration</p> | <p>Development of guidelines for surveillance data sharing & exchange;</p> <p>Models of MoU and draft agreements</p> <p><i>Team Leader: Nigeria</i></p> <p><i>Team members: All AFI States/ANSPs</i></p> | |

APPENDIX H

**TERMS OF REFERENCE OF THE AFI AERONAUTICAL SURVEILLANCE TASK FORCE
(AFI ASI/TF)**

| | | | | |
|---|---|--|--|------------------------------|
| | Management | FRTO: Improved Operations through Enhanced En-Route Trajectories | <i>References:</i> <ul style="list-style-type: none"> • <i>Current models in other regions (EUR, SAM)</i> • <i>Technical interface documents</i> | |
| | PIA 2: Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information Management | FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration | Development of regional strategies for coordination between States and stakeholders 3. Coordination with AFCAC <i>Team Leader: Secretariat</i> <u><i>Support:</i></u> 4. Coordination with Sub Regional Economic Unions a) ECOWAS/UEMOA <i>Team Leader: Nigeria/Ghana?</i> <u><i>Support: ECOWAS/UEMOA AFI/FMG Members</i></u> b) CEMAC <i>Team Leader: Cameroon/Congo?</i> <u><i>Support: CEMAC AFI/FMG Members</i></u> c) SADC <i>Team Leader: South Africa/Botswana</i> <u><i>Support: SADC ASI Members</i></u> d) EAC <i>Team Leader: Kenya/Uganda</i> <u><i>Support: EAC ASI Members</i></u> India Ocean | CNS/SG/5 Deliverable: |
| | | PIA 3 Optimum Capacity and Flexible Flights – Through Global Collaborative ATM | | |
| 5 | PIA 2: Globally Interoperable Systems and Data - Through Globally Interoperable | FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration | Review and update Status of deployment of Surveillance systems <i>Team Leader: Secretariat</i> | CNS/SG/5 Deliverable: |

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**TERMS OF REFERENCE OF THE AFI AERONAUTICAL SURVEILLANCE TASK FORCE
(AFI ASI/TF)**

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|-------------------------|--|--|---|----------------------------------|
| | <p>System Wide Information Management</p> | <p>FRTO: Improved Operations through Enhanced En-Route Trajectories</p> | <p><i>Team members: All AFI/ASI States members</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • <i>Template on the collection of Status of current AFI surveillance systems</i> | |
| | <p>PIA 3 Optimum Capacity and Flexible Flights – Through Global Collaborative ATM</p> | <p>ASUR: Initial capability for ground surveillance</p> <p>ASEP: Air Traffic Situational Awareness(ATSA)</p> <p>OPFL: Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B</p> <p>ACAS: ACAS Improvements</p> <p>SNET: Increased Effectiveness of Ground-Based Safety Nets</p> | | |
| <p align="center">4</p> | <p align="center">PIA: 1-2-3-4</p> | <p align="center">All that apply</p> | <p>Training on Surveillance Systems</p> <p>Organization of seminars/workshops on surveillance, Team Leader: Secretariat</p> <p><i>Support: ANSPs (ASECNA, ATNS, GCAA, NAMA) Regional /International Organization (ECOWAS/UEMOA, CEMAC, SADC, ITU, ATU, AFCAC) Industry (Intelsat, SITA, IATA..)</i></p> <p><i>References:</i></p> <ul style="list-style-type: none"> • <i>Report on previous ASI TF and APIRG meetings</i> • <i>ICAO Annex 10 (Vol. 4</i> • <i>ICAO Training Manual (Doc. 7192 Part E-2 - Air Traffic Safety Electronic Personnel (ATSEP)</i> | <p>CNS/SG/5 Deliverable:</p> |

APPENDIX H

TERMS OF REFERENCE OF THE AFI AERONAUTICAL SURVEILLANCE TASK FORCE (AFI ASI/TF)

3-COMPOSITION

Cores members:

Working Group for the development of the AFI ENROUTE Surveillance strategy

Team Leader: *Seychelles/CACAS*

Members: *South Africa-Nigeria-Ghana-DRC -Mauritius-Angola-IATA*

Working Group for the development of the AFI TERMINAL AREA Surveillance strategy

Team Leader: ASECNA

Members: *Zambia-South Africa- Tanzania- IATA*

-END-

APPENDIX I

TERMS OF REFERENCE OF THE AFI FREQUENCY MANAGEMENT GROUP (AFI FMG)

Terms of Reference:

- 10) Ensure that the allocation and operation of aeronautical frequency meet ICAO Standards and Recommended Practices for the provision and operation of Aeronautical spectrum application as specified in Annex 10 Volume V[5], and the provision of the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Doc. 9718;
- 11) Promote and support with developed credible arguments, ICAO position for the World Radiocommunication Conference of the International Telecommunication Union;
- 12) Ensure timely availability and appropriate protection of adequate spectrum to create a sustainable environment for growth and technology development to support safety and operational effectiveness for current and future CNS systems and allow for the transition between present and next generation technologies;
- 13) Coordinates within and across the AFI region on spectrum management activities to present consistent and robust rationale and ensure that appropriate AFI regional protection criteria for aeronautical systems are defined and implemented;
- 14) On the basis of the above, develop and coordinate AFI strategy and plan for the provision, the operation and the protection of aeronautical spectrum within the AFI Region in the framework of ICAO Global Air Navigation Plan (**GANP, Doc.9750**) and in accordance with relevant additional ICAO provisions.

Considerations:

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

- r) Efficient use of aeronautical spectrum allocated through efficient frequency management and use of best practices;
- s) Continued access to protected spectrum for legacy systems;
- t) Access to protected spectrum to expand legacy systems when required;
- u) Access to protected spectrum for future systems in line with ASBU CNS roadmaps;
- v) Special protection requirements of aeronautical safety services from interference;
- w) Efficient spectrum management both for future and legacy CNS systems;

APPENDIX I

TERMS OF REFERENCE OF THE AFI FREQUENCY MANAGEMENT GROUP (AFI FMG)

- x) Strategy from legacy to future system including frequency demand during transition
- y) The aeronautical frequency assignment criteria in the AFI Region could differ from those applicable in other ICAO Regions and accordingly provide recommendable Regional action with global goals;
- z) Inter and intra-regional issues taking into consideration ICAO Aviation System **Block Upgrades (ASBU)** planning requirements;
 - aa) Personnel training for safe spectrum operation;
 - bb) Minimized impact of market mechanism on aviation spectrum allocation and operation

3-WORK PROGRAMME

APPENDIX I

TERMS OF REFERENCE OF THE AFI FREQUENCY MANAGEMENT GROUP (AFI FMG)

| Task No. | ASBU Performance Improvement Area and Block0 Modules | Subject | Target date |
|-----------------|--|--|--|
| 1 | PIA: 1-2-3-4 Bloc 0 Modules: All supported by AFS; AMS; ARNS; ASS | Review of ICAO SARPs and Guidance Material <i>Team Leader: Secretariat</i> <i>Team members: All AFI/FMG Core members</i> <i>References:</i> <ul style="list-style-type: none"> • ICAO Annex 10 (Vol. 5) • ICAO Doc 9718 | CNS/SG/5 Deliverable: |
| 2 | PIA: 1-2-3-4 Bloc 0 Modules: All supported by AFS; AMS; ARNS; ASS | AFI Aviation Spectrum requirements: Monitor and report to APIRG the status of available capacity in the various aviation bands <i>Team Leader: Secretariat</i> <i>Team members: All AFI/FMG Core members</i> <i>References:</i> <ul style="list-style-type: none"> • ICAO Annex 10 (Vol. 5) • ICAO Doc 9718 | CNS/SG/5 Deliverable: |
| 3 | PIA: 1-2-3-4 Bloc 0 Modules: All supported by AFS; AMS; ARNS; ASS | Frequency planning and assignment: Ensure the effective coordination process for new frequency assignments <i>Team Leader: Secretariat</i> <i>Team members: All AFI/FMG Core members</i> <i>References:</i> <ul style="list-style-type: none"> • ICAO Annex 10 (Vol. 5) • ICAO Doc 9718 • AFI COM Lists 1,2&3 | CNS/SG/5 Deliverable: |
| 4 | PIA: 1-2-3-4 Bloc 0 Modules: All supported by AFS; AMS; ARNS; ASS | Development of regional strategies and coordination between States and stakeholders in preparation to ITU WRCs 5. Coordination with ITU <i>Team Leader: Secretariat</i> <i>Support: AFI/FMG Rapporteur</i> 6. Coordination with Regional Telecommunication Regulators Union (ATU) <i>Team Leader: AFI/FMG Rapporteur</i> <i>Support: Secretariat</i> 7. Coordination with Sub Regional Telecommunication Regulators | CNS/SG/5 Deliverable: |

APPENDIX I

TERMS OF REFERENCE OF THE AFI FREQUENCY MANAGEMENT GROUP (AFI FMG)

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|---|--|---|--------------------------|
| | | <p><i>associations:</i></p> <p>e) WATRA: http://www.watra.org <i>Team Leader: Nigeria</i> <i>Support: ECOWAS/UEMOA AFI/FMG Members</i></p> <p>f) CATRA: http://www.artac.cm <i>Team Leader: Cameroon</i> <i>Support: CEMAC AFI/FMG Members</i></p> <p>g) CRASA: http://www.crasa.org <i>Team Leader: Botswana</i> <i>Support: SADC AFI/FMG Members</i></p> <p>4. Coordination with stakeholders for the establishment of the AFI Users of Satellite Communication for Civil Aviation (AUSCA) <i>Team Leader: AFI/FMG Rapporteur</i> <i>Team members: All AFI/FMG Core members</i></p> | |
| 5 | <p align="center">PIA: 1-2-3-4 Bloc 0 Modules: All supported by AFS; AMS; ARNS; ASS</p> | <p>Review and update AFI database COM Lists <i>Team Leader: Secretariat</i> <i>Team members: All APIRG States members</i> <i>References:</i></p> <ul style="list-style-type: none"> • <i>Template on the collection of Aeronautical Frequency</i> • <i>COM List 1, 2 &3 Data base</i> | CNS/SG/5 Deliverable: |
| 6 | <p align="center">PIA: 1-2-3-4 Bloc 0 Modules: All supported by AFS; AMS; ARNS; ASS</p> | <p>Training on Aeronautical frequency spectrum allocation, operation and management Organization of seminars/workshops on frequency spectrum allocation, operation and management <i>Team Leader: Secretariat</i> <i>Support: ANSPs (ASECNA, ATNS, GCAA, NAMA) Regional /International Organization (ECOWAS/UEMOA, CEMAC, SADC, ITU, ATU, AFCAC) Industry (Intelsat, SITA, IATA..)</i> <i>References:</i></p> <ul style="list-style-type: none"> • <i>Report on AFI/FMG and APIRG meetings</i> • <i>ICAO Annex 10 (Vol. 5)</i> • <i>ICAO Manual on Radio frequency Spectrum for Civil Aviation , Doc. 9718 (Vol. & & 2)</i> | CNS/SG/5 Deliverable: |

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TERMS OF REFERENCE OF THE AFI FREQUENCY MANAGEMENT GROUP (AFI FMG)

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|--|--|--|--|
| | | <ul style="list-style-type: none">• <i>ICAO Training Manual (Doc. 7192 Part E-2 - Air Traffic Safety Electronic Personnel (ATSEP))</i> | |
|--|--|--|--|

3-COMPOSITION

ANGOLA; BOTSWANA; BURUNDI; CAMEROON; ETHIOPIA; GAMBIA; GHANA; KENYA; MADAGASCAR; MALI; MAURITANIA; NIGERIA; RWANDA; SENEGAL; SOUTH AFRICA; TANZANIA; UGANDA; ASECNA; ROBERTS FIR

-END-

**APPENDIX J
AIR NAVIGATION SYSTEM
IMPLEMENTATION PLAN FOR THE AFI
REGION**



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**AIR NAVIGATION SYSTEM
IMPLEMENTATION PLAN
FOR THE AFI REGION**

Communications, Navigation and Surveillance

Version 1.0

September 2013

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| 3.3 | Air navigation report forms (ANRF) | |

ATTACHMENTS TO THE DOCUMENT

ATTACHMENT A - Air navigation report forms (ANRF)

ATTACHMENT B - Glossary of acronyms

1. Chapter 1: Planning considerations

1.1 Introduction

1.1.1 As traffic volume increases throughout the world, the demands on air navigation service providers in a given airspace increase, and air traffic management becomes more complex. Increased traffic density brings about an increase in the number of flights that cannot fly their optimum path.

1.1.2 It is foreseen that the implementation of the components of the ATM operational concept will provide sufficient capacity to meet the growing demand, generating additional benefits in terms of more efficient flights and higher levels of safety. Nevertheless, the potential of new technologies to significantly reduce the cost of services will require the establishment of clear operational requirements.

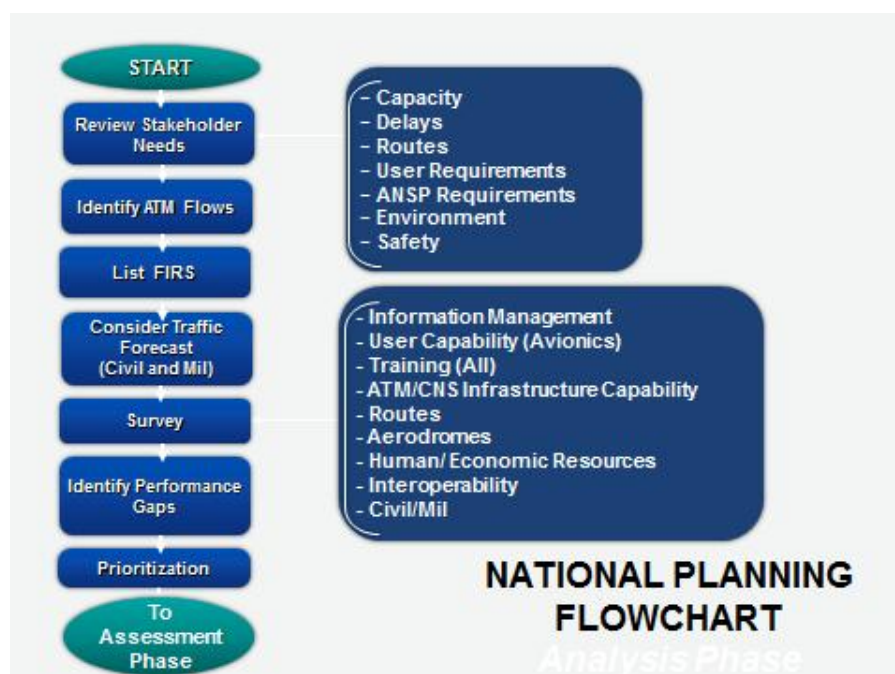
1.1.3 Taking into account the benefits of the ATM operational concept, it is necessary to make many timely decisions for its implementation. An unprecedented cooperation will be required at both global and regional level.

1.1.4 ICAO introduced the Aviation System Block Upgrades (ASBU) methodology as a systemic manner to achieve a harmonized implementation of the air navigation services.

1.2 Planning Methodology

1.2.1 The methodology used for the analysis phase is shown in Figure 1, hereunder.

Figure 1 – Planning process (analysis)



1.2.2 An assessment made to the data obtained in the analysis phase enabled the identification of opportunities for the improvement of the operational performance. The ASBU modules and respective elements were analysed upon and selected with the aim of meeting the operational increases considered as necessary. The evaluation process used is indicated in Figure 2, hereunder:

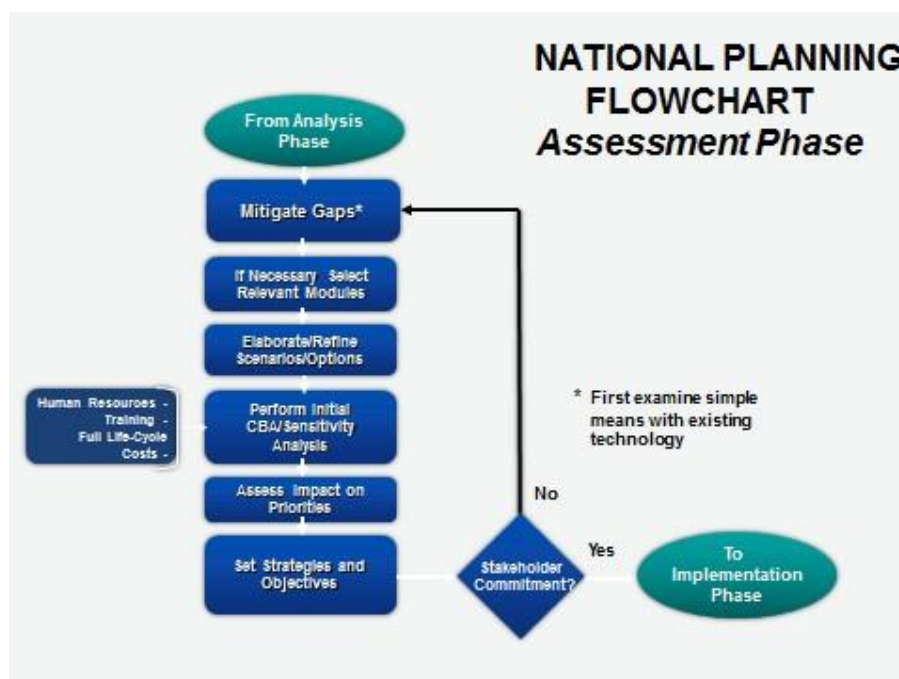


Figure 2 – Planning process (assessment)

1.2.3 The work for the AFI Region should be organised based on project management techniques and clearly defined performance objectives to support the Global Plan strategic objectives aligned with the ICAO strategic plan.

1.2.4 All of the activities listed in the performance objectives will be designed based on strategies, concepts, action plan models and roadmaps that may be shared in order to align the inter- regional work with the main objective of maximising interoperability and transparency.

1.2.5 Planning of all the activities should ensure an efficient use of resources, avoiding duplicated or unnecessary activities or tasks, so as to make sure that such activities/tasks can be easily adjusted to the AFI Region. Planning must also encourage the optimisation of human resources, financial savings, and the use of electronic media, such as the Internet, videoconferences, teleconferences, e-mail, telephone and others.

1.2.6 The new processes and work methods must make sure that performance objectives can reflect based on timetables and regional progress reports to Regional Civil Aviation Authorities, APIRG, the ICAO Council and the ICAO Air Navigation Commission.

1.2.7 Based on this Implementation Plan, the States should develop their own national plan, containing the work programme, timetable, responsible parties and status of implementation, in order to monitor and report on the progress made in such activities. Additionally, it should also consider detailed information about the activities required for implementation, the means to provide feedback on the progress made through an annual reporting process, which will help administrations to prioritise the required actions and support, and identify annual assistance requirements of each ICAO Region.

1.2.8 The development of work programmes is based on the experience gained and lessons learned during the previous cycle of the CNS/ATM implementation process. Consequently, this Implementation Plan is aimed at maintaining a uniform regional harmonisation and improving implementation efficiency, taking advantage of infrastructure capacity and existing regional applications.

1.3 Planning tools: Implementation strategy within ASBU framework

1.3.1 An ASBU designates a set of improvements that can be implemented globally from a defined point in time to enhance the performance of the ATM system. There are four components of a block upgrade.

1.3.2 Module – is a deployable package (performance) or capability. A module will offer an understandable performance benefit, related to a change in operations, supported by procedures, technology, regulations/standards as necessary, and a business case. A module will be also characterized by the operating environment within which it may be applied. The date allocated to a module in a block is that of the initial operating capability (IOC).

1.3.3 Of some importance is the need for each of the modules to be both flexible and scalable to the point where their application could be managed through any set of regional plans and still realize the intended benefits. The preferential basis for the development of the modules relied on the applications being adjustable to fit many regional needs as an alternative to being made mandated as a one-size-fits-all application. Even so, it is clear that many of the modules developed in the block upgrades will not be necessary to manage the complexity of air traffic management in many parts of the world.

1.3.4 Thread – describes the evolution of a given capability through the successive block upgrades, from basic to more advanced capability and associated performance, while representing key aspects of the global ATM concept

1.3.5 Block – is made up of modules that when combined enable significant improvements and provide access to benefits.

1.3.6 The notion of blocks introduces a form of date segmentation in five year intervals. However, detailed considerations will call for more accurate implementation dates, often not at the exact assigned block date. The purpose is not to indicate when a module implementation must be completed unless dependencies among modules logically suggest such a completion date.

1.3.7 Performance improvement area (PIA) – sets of modules in each block are grouped to provide operational and performance objectives in relation to the environment to which they apply, thus forming an executive view of the intended evolution. The PIAs facilitate comparison of ongoing programmes.

1.3.8 The four PIAs are as follows:

- a) airport operations;
- b) globally interoperable systems and data – through globally interoperable system-wide information management;
- c) optimum capacity and flexible flights – through global collaborative ATM; and
- d) efficient flight paths – through trajectory-based operations.

1.3.9 Figure 3 illustrates the relationships between the modules, threads, blocks, and PIAs. Figure 4 explains the concept of the thread.

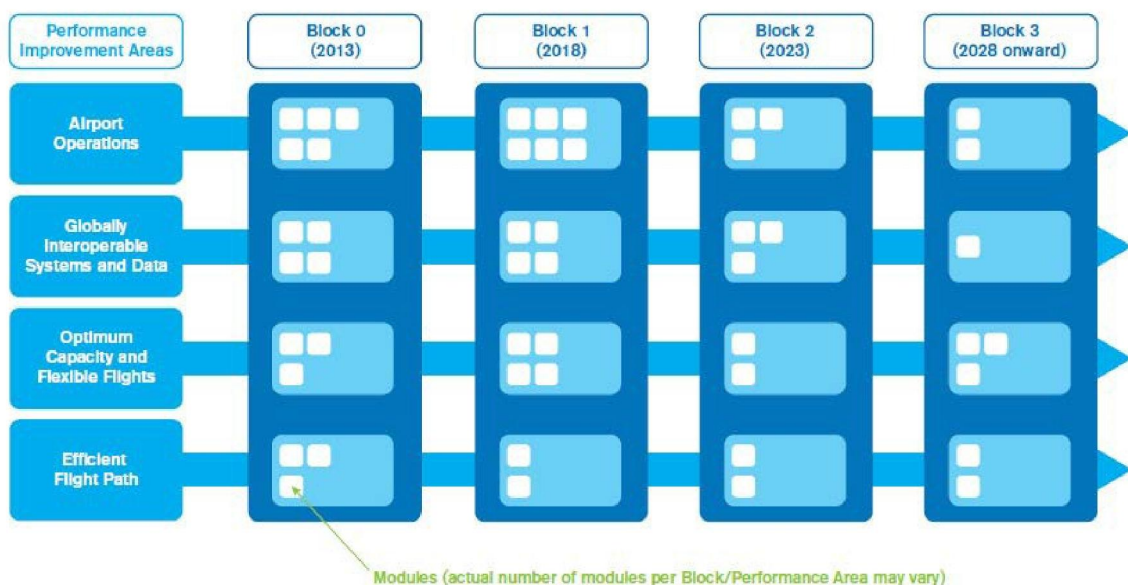


Figure 3. Summary of blocks mapped to performance improvement areas

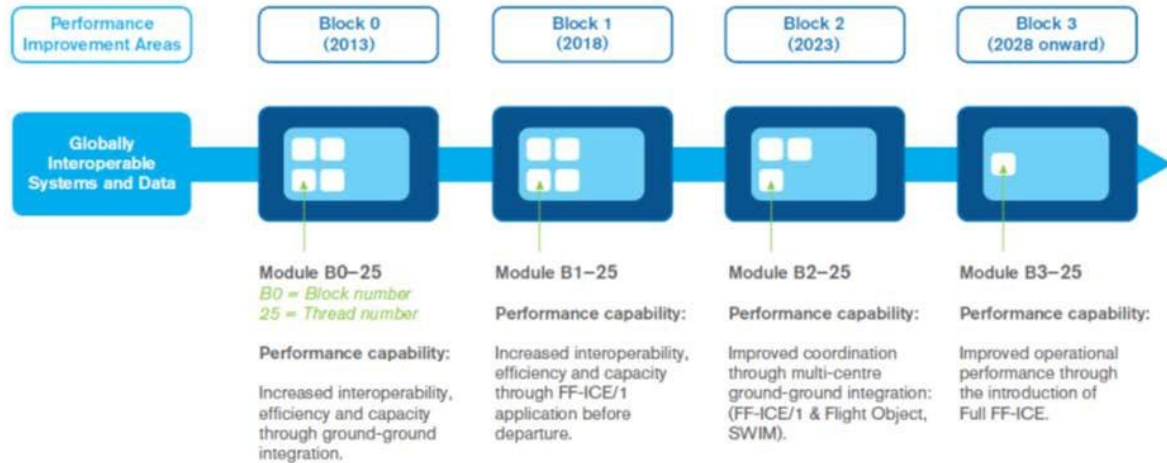


Figure 4. Module thread associated to a specific performance improvement area

1.3.10 In Figure 4, the modules under each block carry the same module number indicating that they are a part of the same thread.

1.3.11 Note that each block includes a target date reference for its availability. Each of the modules that form the Blocks must meet a readiness review that includes the availability of standards (to include performance standards, approvals, advisory/guidance documents, etc.), avionics, infrastructure, ground automation and other enabling capabilities. In order to provide a community perspective, each module should have been fielded in two regions and include operational approvals and procedures. This allows States wishing to adopt the Blocks to draw on the experiences gained by those already employing those capabilities.

1.3.12 Figure 5 illustrates the timing of each block relative to each other. Note that early lessons learned are included in preparation for the IOC date. For the Conference it is recognized that Blocks 0 and 1 represent the most mature of the modules. Blocks 2 and 3 provide the necessary vision to ensure that earlier implementations are on the path to the future.

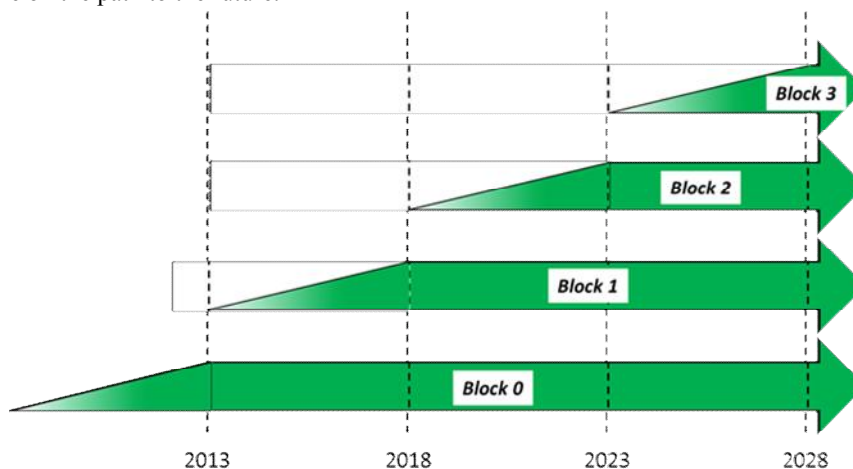


Figure 5. Timing relationships between blocks

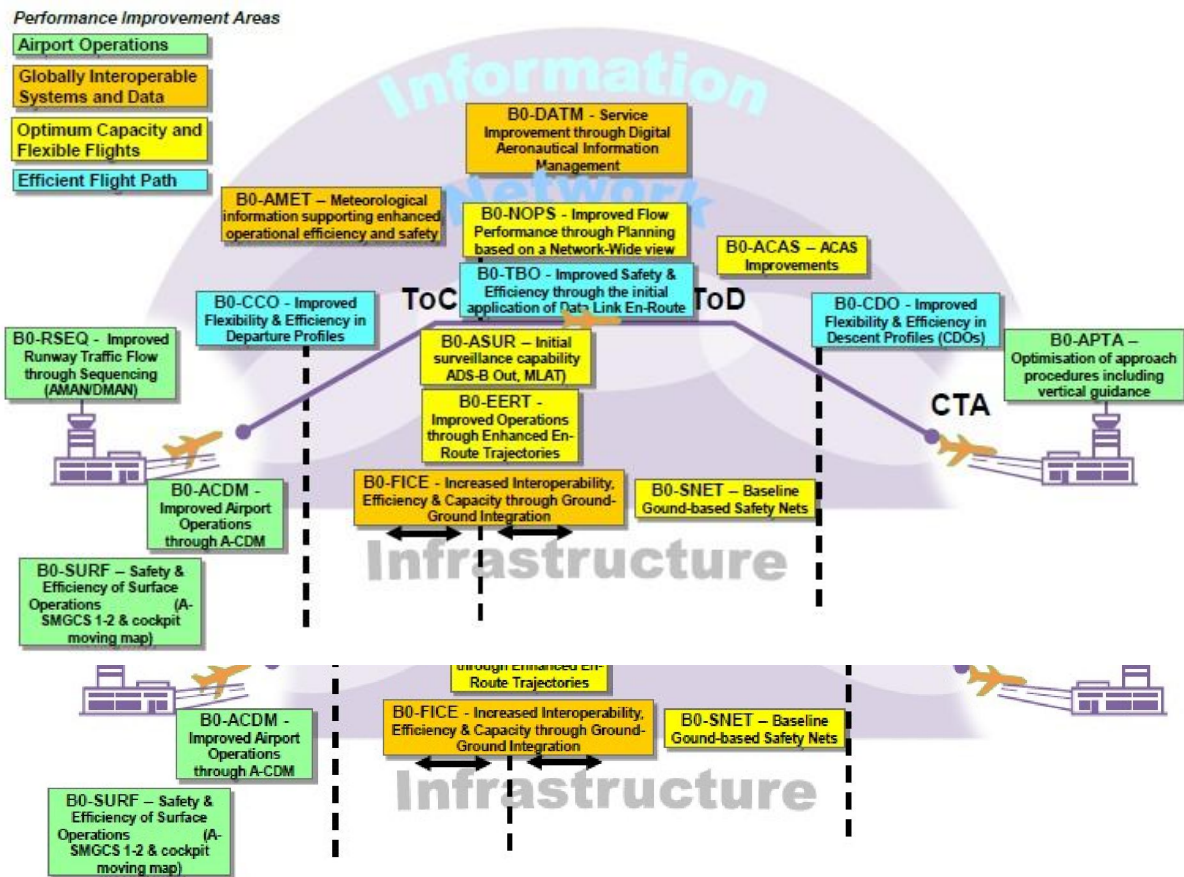


Figure 6. Block 0 in perspective

1.4 ASBU modules under consideration in the AFI Region

1.4.1 The Fourth Edition of the *Global Air Navigation Plan* introduces ICAO’s ASBU methodology and supporting technology roadmaps based on a rolling fifteen-year planning horizon. Although the GANP has a global perspective, it is not intended that all ASBU modules are to be applied around the globe. Some of the ASBU modules contained in the GANP are specialized packages that should be applied where specific operational requirements or corresponding benefits exist.

1.4.2 Although some modules are suitable for entirely stand-alone deployment, an overall integrated deployment of a number of modules could generate additional benefits. The benefits from an integrated implementation of a number of modules may be greater than the benefits from a series of isolated implementations. Similarly, the benefits from the coordinated deployment of one module simultaneously across a wide area (e.g. a number of proximate airports or a number of contiguous airspaces/flight information regions) may exceed the benefits of the implementations conducted on an ad hoc or isolated basis.

1.4.3 An example of a need for global applicability would be performance-based navigation (PBN). Assembly Resolution A37-11 urges all States to implement approach procedures with vertical guidance in accordance with the PBN concept. Therefore, the ASBU modules on PBN approaches should be seen as required for implementation at all airports. In the same way, some modules are well suited for regional or sub-regional deployment and should take this into account when considering which modules to implement regionally and in what circumstances and agreed timeframes.

1.4.4 Based on the above paragraphs, it is important to clarify how each ASBU module fits into the framework of the AFI regional air navigation system. To assist in this regard, a module categorization and prioritization system has been developed below with the objective of ranking each module in terms of implementation priority. On the basis of operational requirements and taking into consideration benefits associated, AFI Region has chosen 15 out of 18 Block 0 Module for implementation as they respond to air navigation capacity and efficiency requirements for the Region for the period from 2012 to 2018.

1.4.5 The categories of 15 Block 0 Modules are as follows:

- **Essential (E):** These are the ASBU modules that provide substantial contribution towards global interoperability, safety or regularity. The (3) modules for AFI Region are FICE, DATM and ACAS
- **Desirable (D):** These are the ASBU modules that, because of their strong business and/or safety case, are recommended for implementation almost everywhere. The (9) modules for AFI Region are APTA, ACDM, NOPS, ASUR, SNET, AMET, TBO, CDO, and CCO
- **Specific (S):** These are the ASBU modules that are recommended for implementation to address a particular operational environment or mitigate identified risks. The modules for AFI Region are NIL
- **Optional (O):** These are the ASBU modules that address particular operational requirements and provide additional benefits that may not be common everywhere. The (3) modules for AFI Region are SURF, RSEQ and FRTO

1.4.6 The modules considered and associated to each of the Performance Improvement Areas (PIA) are the following:

| Performance Improvement Areas (PIA) | Performance Improvement Area Name | Module | Module Name |
|-------------------------------------|---|-------------|--|
| PIA 1 | Airport Operations | B0-15 RSEQ | Improve Traffic flow through Runway Sequencing (AMAN/DMAN) |
| | | B0-65 APTA | Optimization of Approach Procedures including vertical guidance |
| | | B0-75 SURF | Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2) |
| | | B0-80 ACDM | Improved Airport Operations through Airport-CDM |
| PIA 2 | Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information Management | B0-25 FICE | Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration |
| | | B0-30 DATM | Service Improvement through Digital Aeronautical Information Management |
| | | B0-105 AMET | Meteorological information supporting enhanced operational efficiency and safety |
| PIA 3 | Optimum Capacity and Flexible Flights – Through Global Collaborative ATM | B0-10 FRTO | Improved Operations through Enhanced En-Route Trajectories |
| | | B0-35 NOPS | Improved Flow Performance through Planning based on a Network-Wide view |
| | | B0-84 ASUR | Initial capability for ground surveillance |
| | | B0-101 ACAS | ACAS Improvements |
| Performance Improvement Areas (PIA) | Performance Improvement Area Name | Module | Module Name |
| | | B0-102 SNET | Increased Effectiveness of Ground-Based Safety Nets |
| PIA 4 | Efficient Flight Path – Through Trajectory-based Operations | B0-05 CDO | Improved Flexibility and Efficiency in Descent Profiles (CDO) |
| | | B0-40 TBO | Improved Safety and Efficiency through the initial application of Data Link En-Route |
| | | B0-20 CCO | Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO) |

2. **Chapter 2: Communications, Navigation and Surveillance (CNS)**

2.1 **Introduction**

2.1.1 When implementing CNS systems, AFI States must consider the ATM operational requirements contained in this Plan.

2.1.2 In view of the requirements derived from the implementation of the ATM Operational Concept, AFI States shall consider planning improvements to, and the strengthening of, aeronautical communication, navigation and surveillance services, taking into account ASBU Block 0 modules of the Global Air Navigation Plan.

Communications

2.1.3 Communication systems contemplated in this plan respond to short- and medium-term expectations of the operational requirements in the Region. Accordingly, this plan has taken into account the following communication systems:

- a) Aeronautical message handling system (AMHS);
- b) ATS inter-facility data communication (AIDC and OLDI);
- c) Controller/pilot data Relationship communications (CPDLC);
- d) Data link automatic terminal information service (D-ATIS);
- e) Voice meteorological information for aircraft in flight (VOLMET) and data link (D-VOLMET);
- f) Voice clearance delivery (CLRDR); and
- g) AFI Aeronautical Telecommunications network (ATN).

Navigation

2.1.4 The function of navigation systems is to support en-route, terminal, approach and landing operations and surface movements.

2.1.5 The navigation systems contemplated in this plan respond to short- and medium-term operational requirements of the Region. In this respect, this plan for navigation systems has taken into account the ground navigation infrastructure and the GNSS requirements concerning the operations foreseen in the AFI PBN Roadmap.

Surveillance

2.1.6 The function of surveillance systems is to provide aircraft position information to air traffic service units (ATS).

2.1.7 The surveillance systems contemplated in this plan respond to short- and medium-term operational requirements in the Region. Accordingly, this plan considers the following:

- a) ADS-B; b) ADS-C; c) MLAT; d) SSR; and
- e) The integration of the aforementioned.

2.2 **Analysis of the current situation (2013)**

2.2.1 The current AFI communication, navigation and surveillance services situation in support of air navigation is described below, as per information provided in FASID CNS tables.

Communications - Aeronautical fixed service

2.2.2 AFTN service: Most of the circuits foreseen have been implemented. However, and given their average life cycle, maintenance of the existing centres is a significant problem in some States.

2.2.3 ATS speech service: Most of the circuits foreseen have been implemented. Circuits are digital and operate without any major problem.

2.2.4 AMHS service: This service has been implemented in almost all AFI States.

Flight plan transfer

2.2.6 *OLDI*: It is not available in several AFI States.

2.2.7 *AIDC*: It is not available in several States.

Information delivery network

2.2.8 Currently, satellite digital networks are available in the region to support the required aeronautical fixed services. In order to support the new services foreseen for the short and medium term, an integrated network to represent the regional ATN is in process of implementation.

Aeronautical mobile service

2.2.9 *VHF*: Services have been implemented as indicated in FASID Table CNS 2A, ensuring coverage in most of the selected areas, with problems at lower levels in selected airspaces. In the case of terminal areas and aerodromes, many facilities do not follow the recommendation of having different frequencies for APP and TWR services.

2.2.10 *HF*: Although required in FASID Tables CNS 2 A and 2B, the HF service is not being operationally used in many States of the Region. It is mainly provided at some States that have oceanic areas in their FIRs.

2.2.11 *ATIS*: Implemented according to Table CNS 2A, but in an insufficient number. Use is made of conventional audio recorders and analogue VHF transmitters.

- 2.2.12 *CPDLC*:
- a) Continental airspace: Not yet implemented; and
 - b) Oceanic airspace: Service implemented at some oceanic FIRs, for FANS equipped aircraft.
- 2.2.13 *CLRD*: Implemented in very few airports for terminal area/aerodrome.
- 2.2.14 D-ATIS: Implemented in very few airports.
- 2.2.15 VOLMET: Implemented in only one State of the Region.

Navigation

- 2.2.16 Radio aids: All conventional radio navigation aid systems (NDB, VOR, DME and ILS) have been implemented and fully installed pursuant to Table CNS 3 (radio navigation aids). Regarding NDBs, a deactivation process is underway, starting with those stations where the NDB is installed next to a VOR/DME.
- 2.2.17 ABAS is being implemented in selected airspaces of the Region for en-route, terminal area and NPA operations.

Surveillance

- 2.2.18 Radar systems: Conventional surveillance systems (PSR and SSR) have been implemented and installed almost entirely in the AFI Region according to Table CNS 4 A (surveillance system). The surveillance systems specified in this table cover most of the terminal areas of the States in the Region. However, not all the routes in the Region are covered.
- 2.2.19 Radar data exchange: It only exists in very few States of the Region.
- 2.2.20 ADS-B and MLAT: No services have been enabled to date.
- 2.2.21 ADS-C: Service provided by some oceanic FIRs, with FANS-equipped aircraft.

2.3 Strategy for the implementation of performance objectives

- 2.3.1 CNS implementation shall be based on a harmonised strategy for the AFI Region, with action plans and consistent timetables, taking into account operational requirements and the corresponding cost-benefit analyses, comparing the current structure with the improvements to be achieved when the new systems are implemented. Consideration should also be given to analysing the existence of two or more technologies to meet the same operational requirement.
- 2.3.2 Planning has been based on four global aspects, as listed below:
- a) aeronautical fixed service in the AFI Region;
 - b) aeronautical mobile service in the AFI Region ;
 - c) navigation systems in the AFI Region; and
 - d) air surveillance service in the AFI Region.

Communications

Aeronautical fixed service

2.3.4 AMHS: During this period, it is expected that AMHS systems will be implemented in those States that still have an AFTN system in place. Likewise, during that period, it is expected that each one of the AMHS systems installed will be interconnected to its respective AMHS systems, as specified in FASID Table CNS 1B.

2.3.5 Communication services for the ATFM: States must make the necessary efforts to implement communication services that effectively support ATFM, when and where it is implemented .

2.3.6 AIDC: The States must make efforts to install automated systems in all their ACCs, with AIDC capability, and use them for the automatic transfer of flight plans between adjacent ACCs.

2.3.7 Improvement of the regional ATN network: In order to implement all the new services in a harmonised manner, the current Aeronautical Telecommunication Network requires improvements regarding its technological platform, communication protocols, and an increase in capacity for the delivery of information. To this end, it is expected that, during the cited period, a new ATN network will be available to support all the existing services as well as those foreseen. During this period, a study on the optimum network configuration for the region will be conducted and, once approved, it will start being implemented.

Aeronautical mobile service

2.3.8 VHF: States must ensure coverage of continental VHF communications for lower flight levels when so required by the operations. Likewise, separate VHF channels must be implemented for TWR and APP services in the terminal area.

2.3.9 HF: The HF service must be maintained in keeping with the requirements listed in Table CNS 2B, “HF network designators for AFI aeronautical stations”.

2.3.10 CPDLC: States that have oceanic areas in their FIRs must make efforts for the provision of CPDLC services in the corresponding ACCs. Likewise, for the continental area, a technical/operational study should be carried out within the planning period, to permit its later implementation.

2.3.11 DATIS: The States must start providing DATIS services to replace similar conventional services or where they do not exist.

2.3.12 VOLMET/D-VOLMET: In accordance with the MET requirement, States should start providing VOLMET services through speech communications systems and data links.

2.3.13 Protection of the radio frequency spectrum: The States must make the necessary efforts to ensure the protection and proper use of the radio frequency spectrum assigned to aviation for radiocommunication services.

Navigation

Navigation systems

2.3.14 NDB: States must continue with the NDB phase-out plan, as defined by APIRG. It is estimated that, during the period defined in the plan, most NDB will be deactivated.

2.3.15 VOR/DME: During the period defined in the plan, it is felt that, as part of the transition to the GNSS, VOR/DME systems must be maintained in selected TMAs, gradually starting the deactivation of en-route VOR systems.

2.3.16 DME/DME: Taking into account en route PBN and TMA implementation, as well as the use of DME/DME navigation as a back-up to the GNSS system, States should maintain the current DME systems coverage and, if necessary, States should carry out studies permitting the coverage extension of selected airspaces.

2.3.17 ILS: It is foreseen that, within the planning period, ILS systems will remain operative.

2.3.18 GLS: Approaches based on CATI GLS will begin at airports that have an operational demand that warrants them.

2.3.19 Flight trial support systems: The States must consider modernising their in-flight and ground trial elements so as to be prepared for a PBN environment.

2.3.20 Protection of the radio frequency spectrum: The States must make the necessary efforts to ensure protection and proper use of the radio frequency spectrum assigned to aviation for radionavigation services.

Surveillance

Improvements to the air surveillance service

2.3.21 ADS-B and MLAT: The main means of surveillance will continue to be collaborative surveillance in the form of SSR radars, extensively used in TMA and en-route services, and Mode S in high-density TMAs. The use of ADS-B (ES Mode S receivers) and MLAT will start providing en-route and terminal area surveillance as required; strengthening surveillance in areas covered by SSR Modes A/C and S. ADS-B (ES Mode S) will be gradually implemented on the ground to cover en-route and terminal areas.

2.3.22 A-SMGCS: It is foreseen that surface movement guidance and control systems A-SMGCS will be implemented at airports where previous studies have identified this requirement.

2.3.23 ADS-C: All States responsible of an oceanic FIR shall make operational use of ADS-C surveillance.

2.3.24 Protection of the radio frequency spectrum: The States must make the necessary efforts to ensure protection and proper use of the radio frequency spectrum assigned to aviation for air surveillance services.

2.4 Alignment with ASBU

2.4.1 Of the ASBU Block 0 modules taken under consideration of the AFI Region, the CNS area contributes to PIA 1 modules B0-65, B0-75 and B0-105, PIA 2 module B0-25, PIA 3 modules B0-35, B0-84 and B0-102 and PIA 4 module B0-40.

2.4.2 Following are the CNS ASBU Block 0 modules indicated in paragraph 1.4.1:

- a) *Aeronautical fixed service*, with modules B0-25 and B0-35;
- b) *Aeronautical mobile service*, with module B0-40;
- c) *Navigation*, with module B0-65; and
- d) *Surveillance*, with modules B0-75, B0-84, B0-102 and B0-105

ATTACHMENT A

AIR NAVIGATION REPORT FORM HOW TO USE - EXPLANATORY NOTES

- Air Navigation Report Form (ANRF):** This form provides a standardized approach to implementation monitoring and performance measurement of Aviation System Block Upgrades (ASBU) Modules. The Planning and Implementation Regional Groups (PIRGs) and States could use this report format for their planning, implementation and monitoring framework for ASBU Modules. Also, other reporting formats that provide more details may be used but should contain as a minimum the elements described below. The Reporting and monitoring results will be analysed by ICAO and aviation partners and then utilized in developing the Annual Global Air Navigation Report. The Global Air Navigation Report conclusions will serve as the basis for future policy adjustments aiding safety practicality, affordability and global harmonization, amongst other concerns.
- Regional/National Performance objective:** In the ASBU methodology, the performance objective will be the title of the ASBU module itself. Furthermore, indicate alongside corresponding Performance Improvement area (PIA). Consequently, for ASBU Block 0, a total of 18 ANRFs will need to be developed that reflects respective 18 Modules.
- Impact on Main Key Performance Areas:** Key to the achievement of a globally interoperable ATM system is a clear statement of the expectations/benefits to the ATM community. The expectations/benefits are referred to eleven Key Performance Areas (KPA) and are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. The KPAs applicable to respective ASBU module are to be identified by marking Y (Yes) or N (No).
- Implementation Progress:** This section indicates status of progress in the implementation of different elements of the ASBU Module for both air and ground segments.
- Elements related to ASBU module:** Under this section list elements that are needed to implement the respective ASBU Module. Furthermore, should there be elements that are not reflected in the ASBU Module (example: In ASBU B0-80/Airport CDM, Aerodrome certification and data link applications D-VOLMET, D-ATIS, D-FIS are not included; Similarly in ASBU B0-30/AIM, note that WGS-84 and eTOD are not included) but at the same time if they are closely linked to the module, ANRF should specify those elements. As a part of guidance to PIRGs/States, the FASID (Volume II) of every Regional ANP will have the complete list of all 18 Modules of ASBU Block 0 along with corresponding elements, equipage required on the ground and in the air as well as metrics specific to both implementation and benefits.
- Implementation Status (Ground/Air):** Planned implementation date (month/year) and the current status/responsibility for each element are to be reported in this section. Please provide as much details as possible and should cover both avionics and ground systems. If necessary, use additional pages.

7. **Implementation Roadblocks/Issues:** Any problems/issues that are foreseen for the implementation of elements of the Module are to be reported in this section. The purpose of the section is to identify in advance any issues that will delay the implementation and if so, corrective action is to be initiated by the concerned person/entity. The four areas, under which implementation issues, if any, for the ASBU Module to be identified, are as follows:

- Ground System Implementation:
- Avionics Implementation:
- Procedures Availability:
- Operational Approvals:

Should be there no issues to be resolved for the implementation of ASBU Module, indicate as “NIL”.

8. **Performance Monitoring and Measurement:** Performance monitoring and measurement is done through the collection of data for the supporting metrics. In other words, metrics are quantitative measure of system performance – how well the system is functioning. The metrics fulfil three functions. They form a basis for assessing and monitoring the provision of ATM services, they define what ATM services user value and they can provide common criteria for cost benefit analysis for air navigation systems development. The Metrics are of two types:

- A. **Implementation Indicators/supporting metrics:** This indicator supported by the data collected for the metric reflects the status of implementation of elements of the Module. For example- Percentage of international aerodromes with CDO implemented. This indicator requires data for the metric “number of international aerodromes with CDO”.
- B. **Benefit Metrics:** This Metric allows to asses benefits accrued as a result of implementation of the module. The benefits or expectations, also known as Key Performance Areas (KPA), are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving to measure the module(s)’ implementation benefits, without trying to apportion these benefits between module, have been identified at the end of this table. This approach would facilitate States in collecting data for the chosen metrics.

On the basis of examples of Performance Indicators/supporting Metrics detailed in this document, PIRGs/States to reflect under this section the appropriate metrics that represents the monitoring of respective ASBU Module both in terms of implementation as well as benefits to five KPAs.

The impact on KPAs could be extended to more than five KPAs mentioned above if maturity of the allows and the process is available within the State to collect the data.

**Performance Improvement Area 1:
Airport Operations**

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|--|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL PERFORMANCE OBJECTIVE – B0-65: Optimization of Approach Procedures Including Vertical Guidance | | | | | |
| Performance Improvement Area 1: Airport Operations | | | | | |
| ASBU B0-65: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | Y | Y | Y | Y | Y |

| | |
|--|--|
| ASBU B0-65: Implementation Progress | |
| Elements | Implementation Status (Ground and Air) |
| 4. APV with Baro VNAV | December 2016 – Service Providers and users |
| 5. APV with SBAS | Not applicable |
| 6. APV with GBAS | December 2018 – Initial implementation at some States (services providers) |

| | | | | |
|---|---|--|-----------------------------------|--|
| ASBU B0-65: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground system Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. APV with Baro VNAV | NIL | Insufficient number of equipped aircraft | Insufficient appropriate training | Lack of appropriate training |
| 2. APV with SBAS | Not Applicable | Not applicable | Not applicable | Not applicable |
| 3. APV with GBAS | Lack of cost benefit analysis Adverse ionosphere | Insufficient number of equipped aircraft | Insufficient appropriate training | Lack of appropriate training Evaluation of a real operational requirement |

| | |
|--|---|
| ASBU B0-65: Performance Monitoring and Measurement (Implementation) | |
| Element | Performance Indicators/Supporting Metrics |
| 1. APV with Baro VNAV | Indicator: Percentage of international aerodromes having instrument runways provided with APV with Baro VNAV procedure implemented Supporting metric: Number of international airport having approved APV with Baro VNAV procedure implemented |
| 2. APV with SBAS | Indicator: Percentage of international aerodromes having instrument runways provided with APV SBAS procedure implemented Supporting metric: Number of international airport having APV SBAS procedure implemented. |
| 3. APV with GBAS | Indicator: Percentage of international aerodromes having instrument runways provided with APV GBAS procedure implemented Supporting metric: Number of international airport having APV GBAS procedure implemented. |

| ASBU B0-65: Performance Monitoring and Measurement (Benefits) | |
|--|--|
| Key Performance Areas | Benefits |
| Access & Equity | Increased aerodrome accessibility |
| Capacity | Increased runway capacity |
| Efficiency | Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays |
| Environment | Reduced emissions due to reduced fuel burn |
| Safety | Increased safety through stabilized approach paths. |

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|---|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-75: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2) | | | | | |
| Performance Improvement Area 1: Airport operation | | | | | |
| ASBU B0-75: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | Y | Y | Y | Y | Y |

| | |
|---|--|
| B0-75: Implementation Progress | |
| Elements | Implementation Status (Ground and Air) |
| 1. Surveillance system for ground surface movement (PSR, SSR, ADS B or Multilateration) | June 2018 Service provider |
| 2. Surveillance system on board (SSR transponder, ADS B capacity) | June 2018 Service Provider |
| 3. Surveillance system for vehicle | June 2018 Service Provider |
| 4. Visual aids for navigation | December 2015 Service Provider |
| 5. Wild life strike hazard reduction | December 2015 Aerodrome operator/wildlife committee |
| 6. Display and processing information | June 2018 Service Provider |

| | | | | |
|---|-------------------------------------|---|---------------------------------|--|
| ASBU B0-75: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. Surveillance system for ground surface movement (PSR, SSR, ADS B or Multilateration) | NIL | NIL | Lack of procedures and training | Lack of inspector for approvals operations |
| 2. Surveillance system on board (SSR transponder, ADS B capacity) | NIL | Lack of surveillance system on board (ADS B capacity) On general aviation and some commercial aircraft | Lack of procedures and training | NIL |
| 3. Surveillance system for vehicle | NIL | NIL | Lack of procedures and training | NIL |

| | |
|---|----------------------------|
| ASBU B0-75: Implementation Roadblocks/Issues | |
| Elements | Implementation Area |

| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
|--------------------------------------|--|--------------------------------|--------------------------------------|------------------------------|
| 4. Visual aids for navigation | Implementation of new technologies (such as LED) not compliant with Annex 14 | NIL | NIL | NIL |
| 5. Wild life strike hazard reduction | NIL | NIL | Lack of Aerodrome Wildlife Committee | NIL |

| ASBU B0-75: Performance Monitoring and Measurement (Implementation) | |
|---|---|
| Elements | Performance Indicators/Supporting Metrics |
| 6. Surveillance system for ground surface movement (PSR, SSR, ADS B or Multilateration) | Indicator: Percentage of international aerodromes with SMR/ SSR Mode S/ ADS-B Multilateration for ground surface movement Supporting metric: Number of international aerodrome with SMR/ SSR Mode S/ ADS-B Multilateration for ground surface movement |
| 7. Surveillance system on board (SSR transponder ,ADS B capacity) | Indicator: Percentage of surveillance system on board (SSR transponder, ADS B capacity) Supporting metric: Number of aircraft with surveillance system on board (SSR transponder ,ADS B capacity) |
| 8. Surveillance system for vehicle | Indicator Percentage of international aerodromes with a cooperative transponder systems on vehicles Supporting metric: Number of vehicle with surveillance system installed |
| 9. Visual aids for navigation | Indicator: Percentage of international aerodromes complying with visual aid requirements as per Annex 14 Supporting metric: Number of international aerodromes complying with visual aid requirements as per Annex 14 |
| 10. Wild life strike hazard reduction | Indicator: Percentage of reduction of wildlife incursions Supporting metric: Number of runway incursions due to wild life strike |

| ASBU B0-75: Performance Monitoring and Measurement (Benefits) | |
|--|--|
| Key Performance Areas | Benefits |
| Access & Equity | Improves portions of the manoeuvring area obscured from view of the control tower for vehicles and aircraft. Ensures equity in ATC handling of surface traffic regardless of the traffic's position on the international aerodrome |
| Capacity | Sustained level of aerodrome capacity during periods of reduced visibility |
| Efficiency | Reduced taxi times through diminished requirements for intermediate holdings based on reliance on visual surveillance only. Reduced fuel burn |
| Environment | Reduced emissions due to reduced fuel burn |
| Safety | Reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload |

**Performance Improvement Area 2:
Globally Interoperable Systems and Data – Through Globally
Interoperable System Wide Information Management**

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|--|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-25: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration | | | | | |
| Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management | | | | | |
| ASBU B0-25: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | N | Y | Y | N | Y |

| | |
|---|---|
| ASBU B0-25: Implementation Progress | |
| Elements | Implementation Status (Ground and Air) |
| 1. Complete AMHS implementation at States still not counting with this system | December 2014 Services provider |
| 2. AMHS interconnection | December 2014 Services provider |
| 3. Implement AIDC /OLDI at AFI States automated centres | June 2014 Services provider |
| 4. Implement operational AIDC/OLDI between adjacent ACC's | June 2018 Services provider |
| 5. Implement an integrated regional network | June 2014 Services provider |

| | | | | |
|---|---|--------------------------------|--------------------------------|------------------------------|
| ASBU B0-25: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. Complete AMHS implementation at States still not counting with this system | NIL | NIL | NIL | NIL |
| 2. AMHS interconnection | TPDI negotiations between MTAs | NIL | NIL | NIL |
| 3. Implement AIDC /OLDI at AFI States automated centres | NIL | NIL | NIL | NIL |
| 4. Implement operational AIDC/OLDI between adjacent ACC's | Compatibility between AIDC or OLDI systems from various manufacturers | NIL | NIL | NIL |

| ASBU B0-25: Implementation Roadblocks/Issues | | | | |
|---|-------------------------------------|--------------------------------|--------------------------------|------------------------------|
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 5. Implement an integrated regional network | NIL | NIL | NIL | NIL |

| ASBU B0-25: Performance Monitoring and Measurement (Implementation) | |
|---|--|
| Elements | Performance Indicators/Supporting Metrics |
| 1. Complete AMHS implementation at States still not counting with this system | Indicator: Percentage of States with AMHS implemented Supporting metric: Number of AMHS installed |
| 2. AMHS interconnection | Indicator: Percentage of States with AMHS interconnected with other AMHS Supporting metric: Number of AMHS interconnections implemented |
| 3. Implement AIDC /OLDI at AFI States automated centres | Indicator: Percentage of ATS units with AIDC or OLDI Supporting metric: Number of AIDC or OLDI systems installed |
| 4. Implement operational AIDC/OLDI between adjacent ACC's | Indicator: Percentage of ACCs with AIDC or OLDI systems interconnection implemented Supporting metric: Number of AIDC interconnections implemented, as per AFI FASID Table CNS 1B |
| 5. Implement an integrated regional network | Indicator: Percentage of phases completed for the implementation of the new digital network Supporting metric: Number of implementation phases |

| ASBU B0-25: Performance Monitoring and Measurement (Benefits) | |
|--|---|
| Key Performance Areas | Benefits |
| Access & Equity | NIL |
| Capacity | Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases |
| Efficiency | The reduced separation can also be used to more frequently offer aircraft flight levels closer to the optimum; in certain cases, this also translates into reduced en-route holding |
| Environment | NIL |
| Safety | Better knowledge of more accurate flight plan information |

**Performance Improvement Area3:
Optimum Capacity and Flexible Flights – Through Global
Collaborative ATM**

AIR NAVIGATION REPORT FORM

(ANRF) AFI Regional Planning for ASBU

Modules

| | | | | | |
|---|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – ASBU B0-10: Improved Operations through Enhanced En-Route Trajectories | | | | | |
| Performance Improvement Area3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM | | | | | |
| ASBU B0-10: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | Y | Y | Y | Y | N |

| | |
|--|---|
| ASBU B0 10: Implementation Progress | |
| Elements | Implementation Status Air Ground |
| 1. Airspace planning | Dec.2018 |
| 2. Flexible Use of airspace | Dec. 2016 |
| 3. Flexible Routing | Dec. 2018 |

| | | | | |
|---|--|-----------------------------------|--|------------------------------------|
| ASBU B0-10: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground system Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. Airspace planning | Lack of organize and manage airspace prior to the time of flight Lack of AIDC | | Lack of procedures | |
| 2. Flexible Use of airspace | NIL | | Lack of implementation FUA Guidance | |
| 3. Flexible Routing | ADS-C/CPDLC | Lack of FANS 1/A Lack of ACARS | Lack of LOAs and procedures | Poor percentage of fleet approvals |

| | |
|---|---|
| B0-10: Performance Monitoring and Measurement (Implementation) | |
| Elements | Performance Indicators/Supporting Metrics |
| 1. Airspace planning | Not assigned Indicator and metrics. |
| 2. Flexible Use of airspace | Indicator: % of time segregated airspaces are available for civil operations in the State Supporting Metric: Reduction of delays in time of civil flights. |
| 3. Flexible Routing | Indicator: % of PBN routes implemented Supporting Metric: KG of Fuel savings Supporting Metric: Tons of CO2 reduction |

| | |
|--|-----------------|
| ASBU B0-10: Performance Monitoring and Measurement (Benefits) | |
| Key Performance Areas | Benefits |

| | |
|-----------------|---|
| Access & Equity | Better access to airspace by a reduction of the permanently segregated volumes of airspace. |
| Capacity | Flexible routing reduces potential congestion on trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations. |
| Efficiency | In particular the module will reduce flight length and related fuel burn and emissions. The module will reduce the number of flight diversions and cancellations. It will also better allow avoiding noise sensitive areas. |
| Environment | Fuel burn and emissions will be reduced |
| Safety | NA |

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|--|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – ASBU B0-84: Initial capability for ground surveillance | | | | | |
| Performance Improvement Area3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM | | | | | |
| ASBU B0-84: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | N | Y | N | N | Y |

| | |
|--|---|
| ASBU B0-84: Implementation Progress | |
| Elements | Implementation Status (Air Ground) |
| 5. Implementation of ADS B | June 2018 Users and service provider |
| 6. Implementation of Multilateration | June 2018 Users and service provider |
| 7. Automation system (Presentation) | Dec 2017 Users and service provider |

| | | | | |
|---|--|--|--------------------------------|--|
| ASBU B0-84: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. Implementation of ADS B | Lack of ADS B systems implementation due to recent implementation of conventional surveillance systems | Lack of ADS B implementation in general aviation, and old commercial fleet | Lack of procedures | Lack of inspectors with appropriate capability |
| 2. Implementation of multilateration | Facilities at remote stations Establishment of communications networks | NIL | NIL | Lack of inspectors with appropriate capability |
| 3. Automation system (Presentation) | Lack of any automation functionality | NIL | NIL | NIL |

| B0-84: Performance Monitoring and Measurement (Implementation) | |
|---|--|
| Elements | Performance Indicators/Supporting Metrics |
| 1. Implementation of ADS B | Indicator: Percentage of international aerodromes with ADS-B implemented Supporting metric: Number of ADS B implemented |
| 2. Implementation of Multilateration | Indicator: Percentage of multilateration system implemented Supporting metric: Number of multilateration system implemented |
| 3. Automation system (Presentation) | Indicator: Percentage of ATS units with automation system implemented Supporting metric: Number of automation system implemented in ATS units |

| ASBU B0-84: Performance Monitoring and Measurement (Benefits) | |
|--|--|
| Key Performance Areas | Benefits |
| Access & Equity | NA |
| Capacity | Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima TMA surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage |
| Efficiency | NA |
| Environment | NA |
| Safety | Reduction of the number of major incidents. Support to search and rescue |

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|--|--|--|--|--|--|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-101: ACAS Improvements Performance Improvement Area3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM | | | | | |
|--|--|--|--|--|--|

| | | | | | |
|--|----------------------------|-----------------|-------------------|--------------------|---------------|
| ASBU B0-102: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | N | N | Y | N | Y |

| | |
|---|---|
| ASBU B0-101: Implementation Progress | |
| Elements | Implementation Status (Air Ground) |
| 1. ACAS II (TCAS Version 7.1) | |

| | | | | |
|--|-------------------------------------|--------------------------------|--------------------------------|------------------------------|
| ASBU B0-101: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. ACAS II (TCAS Version 7.1) | | | | |

| | |
|---|--|
| ASBU B0-101: Performance Monitoring and Measurement (Implementation) | |
| Elements | Performance Indicators/Supporting Metrics |
| 1. ACAS II (TCAS Version 7.1) | |

| | |
|---|---|
| ASBU B0-101: Performance Monitoring and Measurement (Benefits) | |
| Key Performance Areas | Benefits |
| Access & Equity | NA |
| Capacity | NA |
| Efficiency | ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations |
| Environment | NA |
| Safety | ACAS increases safety in the case of breakdown of separation |

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|--|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-102: Increased Effectiveness of Ground-Based Safety Nets | | | | | |
| Performance Improvement Area3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM | | | | | |
| ASBU B0-102: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | N | N | N | N | Y |

| | |
|---|---|
| ASBU B0-102: Implementation Progress | |
| Elements | Implementation Status (Air Ground) |
| 2. Short Term Conflict Alert (STCA) | June 2014 /Service Provider |
| 3. Area Proximity Warning (APW) | June 2014 / Service Provider |
| 4. Minimum Safe Altitude Warning (MSAW) | June 2014 |

| | | | | |
|--|-------------------------------------|--------------------------------|--------------------------------|------------------------------|
| ASBU B0-102: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 2. Short Term Conflict Alert (STCA) | NIL | NIL | NIL | NIL |
| 3. Area Proximity Warning (APW) | NIL | NIL | NIL | NIL |
| 4. Minimum Safe Altitude Warning (MSAW) | NIL | NIL | NIL | NIL |

| | |
|---|---|
| ASBU B0-102: Performance Monitoring and Measurement (Implementation) | |
| Elements | Performance Indicators/Supporting Metrics |
| 2. Short Term Conflict Alert (STCA) | Indicator Percentage of ATS units with ground based safety nets (STCA,) implemented Metric Support Number of safety NET (STCA) implemented |
| 3. Area Proximity Warning (APW) | Indicator Percentage of ATS units with ground based safety nets (APW) implemented Metric Support Number of safety NET (APW) implemented |
| 4. Minimum Safe Altitude Warning (MSAW) | Indicator Percentage of ATS units with ground based safety nets (MSAW) implemented Metric Support: Number of Safety NET (MSAW) |

| ASBU B0-102: Performance Monitoring and Measurement (Benefits) | |
|---|--|
| Key Performance Areas | Benefits |
| Access & Equity | NA |
| Capacity | NA |
| Efficiency | NA |
| Environment | NA |
| Safety | Significant reduction of the number of major incidents |

**Performance Improvement Area 4:
Efficient Flight Path – Through Trajectory-based Operations**

AIR NAVIGATION REPORT FORM (ANRF)

AFI Regional Planning for ASBU Modules

| | | | | | |
|---|----------------------------|-----------------|-------------------|--------------------|---------------|
| REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-40: Improved Safety and Efficiency through the initial application of Data Link En-Route Performance Improvement Area4: Efficient Flight Path – Through Trajectory-based Operations | | | | | |
| ASBU B0-40: Impact on Main Key Performance Areas (KPA) | | | | | |
| | Access & Equity | Capacity | Efficiency | Environment | Safety |
| Applicable | N | Y | Y | Y | Y |

| | |
|--|---|
| ASBU B0-40: Implementation Progress | |
| Elements | Implementation Status (Ground and Air) |
| 1. ADS-C over oceanic and remote areas | June 2018 Service provider |
| 2. Continental CPDLC | June 2018 Service provider |

| | | | | |
|---|-------------------------------------|--|---|--|
| ASBU B0-40: Implementation Roadblocks/Issues | | | | |
| Elements | Implementation Area | | | |
| | Ground System Implementation | Avionics Implementation | Procedures Availability | Operational Approvals |
| 1. ADS-C over oceanic and remote areas | NIL | Implementation of ADS general aviation pending | Implementation of GOLD procedures pending | Lack of duly trained inspectors for approval of operations |
| 2. Continental CPDLC | NIL | Implementation of CPDLC general aviation pending | Implementation of GOLD procedures pending | Lack of duly trained inspectors for approval of operations |

| | |
|--|---|
| ASBU B0-05: Performance Monitoring and Measurement (Implementation) | |
| Elements | Performance Indicators/Supporting Metrics |
| 1. ADS-C over oceanic and remote areas | Indicators: Percentage of FIRs with ADS C implemented Supporting metric: Number of ADS C approved procedures over oceanic and remote areas |
| 2. Continental CPDLC | Indicators: Percentage of CPDLC implemented at oceanic and remote area FIRs Supporting metric: Number of CPDLC approved procedures over oceanic and remote areas |

| ASBU B0-35: Performance Monitoring and Measurement (Benefits) | |
|--|--|
| Key Performance Areas | Benefits |
| Access & Equity | NA |
| Capacity | A better localization of traffic and reduced separation allow increased capacity. Reduced communication workload and better organization of controller tasks allowing increasing sector capacity. |
| Efficiency | Routes/tracks and flights can be separated by reduced minima, allowing to apply flexible routings and vertical profiles closer to the user-preferred ones |
| Environment | Reduced emissions as a result of reduced fuel burn |
| Safety | ADS-C based safety nets supports cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and rescue. Reduced occurrences of misunderstandings; solution to stuck microphone situations. |

ATTACHMENT B

GLOSSARY OF ACRONYMS

| | |
|---------|---|
| ABAS | Aircraft-based augmentation system |
| ACC | Area control centre |
| ADS | Automatic dependence surveillance |
| ADS-B | ADS-broadcast |
| ADS-C | ADS-contract |
| AFTN | Aeronautical fixed telecommunication network |
| AGA | Aerodromes and ground aids |
| AIDC | ATS inter-facility data communication |
| AIM | Aeronautical information management |
| AIRAC | Aeronautical information regulation and control |
| AIS | Aeronautical information service |
| AIXM | Aeronautical information exchange model |
| AMHS | ATS message handling system |
| ANP | Regional air navigation plan ANS Air navigation services |
| ANSP | Air navigation service provider |
| AO | Aerodrome operations |
| AOM | Airspace organisation and management |
| AOP | Aerodrome operations |
| APP | Approach control office or service |
| A-SMGCS | Advanced surface movement guidance and control system |
| ASBU | Aviation System Block Upgrades |
| ATC | Air traffic control |
| ATFM | Air traffic flow management |
| ATM | Air traffic management |
| ATMCP | Air traffic management operational concept panel |
| ATM SDM | ATM service delivery management |
| ATN | Aeronautical telecommunication network |
| ATS | Air traffic services |
| AUO | Airspace user operations |
| AWOS | Automated Weather Observing Systems CAR / |
| SAM | Caribbean and South American Regions CDO Continuous descent operations |
| CFIT | Controlled flight into terrain CATC Civil aviation training centre CM Conflict management |
| CNS | Communications, navigation and surveillance |
| CNS/ATM | Communications, navigation and surveillance/air traffic management |

| | |
|----------|--|
| CO2 | Carbon dioxide |
| CPDLC | Controller-pilot Data link communications |
| D-ATIS | Data link-automatic terminal information service |
| DCB | Demand/capacity balancing |
| DCL | Digital flight plan clearances |
| DME | UHF distance-measuring equipment eAIP Aeronautical information publication |
| eTOD | Terrain and obstacle database |
| FANS | Future air navigation systems |
| FASID | Regional plan facilities and services implementation document (Document 8733) FIR Flight information region |
| FL | Flight level |
| FMS | Flight management system |
| FUA | Flexible use of airspace |
| GIS | Geographical information system |
| GLS | GPS-based <i>landing</i> system GML Geography markup language GNSS Global navigation satellite system GPI Global Plan initiatives |
| GPS | Global positioning system |
| GPWS | Ground proximity warning system |
| GREPECAS | CAR/SAM regional planning and implementation group |
| HF | High frequencies |
| HFDL | HF Data link |
| IAVW | International Airways Volcano Watch |
| IFR | Instrument flight rules |
| ILS | Instrument landing system |
| IMC | Instrument meteorological conditions ISO International Standards Organisation |
| IVATF | International Volcanic Ash Task Force KPI Key performance indicators |
| LAR | Latin American aeronautical regulations |
| MET | Meteorological services for air navigation |
| METAR | Aviation routine weather report, which provides the meteorological conditions prevailing at an aerodrome. |
| METWSG | Meteorological Warnings Study Group |
| MLAT | Multilateration – Surveillance system |
| MSAW | Minimum safe altitude warning MWO Meteorological Watch Office |
| NDB | Non-directional radio beacon |
| NGAP | New generation of aviation professionals |
| NM | Nautical miles |
| NPA | Non-precision approach |

| | | |
|---------|---|----------------|
| NOTAM | Notice to personnel concerned with flight operations | |
| ICAO | International Civil Aviation Organization | |
| OLDI | Direct data interchange | |
| OMA | Automatic weather office | |
| WMO | World Meteorological Organization | |
| OPMET | Operational meteorological information | |
| PDC | Predeparture clearance | |
| PFF | Performance Framework Form | |
| PIRG | Planning and implementation regional group | |
| PSR | Primary surveillance radar | |
| QMS | Quality management system | |
| RASG-PA | Regional aviation safety group - Pan-American | |
| REDDIG | South American digital communication network | |
| RNAV | Area navigation | |
| RNP | Required navigation performance | |
| RVR | Runway visual range | |
| RVSM | Reduced vertical separation minimum | |
| SADIS | Satellite distribution system for information relating to | air navigation |
| SAM | South American Region | |
| SARPS | Standards and recommended practices | |
| SID | Standard instrument departure | |
| SIGMET | Significant weather | |
| SLA | Service level agreement | |
| AMSS | Aeronautical mobile-satellite service | |
| SMGCS | Surface movement guidance and control system | |
| SPECI | Special aviation weather report | |
| SSR | Secondary surveillance radar | |
| STAR | Standard instrument arrival | |
| TMA | Terminal control area | |
| TRA | Temporary reservation of airspace | |
| TS | Traffic synchronisation | |
| TWR | Aerodrome control tower or aerodrome control | |
| UAS | Unmanned aircraft systems | |
| VDL | VHF digital Relation-ship | |
| VFR | Visual flight rules | |
| VHF | Very high frequency | |
| VOLMET | Meteorological information for aircraft in flight | |
| VOR | VHF omnidirectional radio range | |
| WAFS | World area forecast system | |
| WATRS | Western Atlantic route system | |
| WGS-84 | World geodetic system — 1984 | |
| XML | Extensible markup language | |

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

1. TERMS OF REFERENCE

- a) Ensure the Continuous and coherent development of the AFI Regional Air Navigation Plan in the fields of aeronautical communications, navigation and surveillance (CNS), including the development of CNS elements of the AFI Air Navigation System Implementation Action Plan in the light of new developments, in harmony with the ICAO Global Air Navigation Plan (Doc 9750) and the plans for adjacent regions;
- b) Identify, review and monitor deficiencies that impede or affect the provision of efficient aeronautical telecommunications and recommend appropriate corrective action;
- c) Prepare, as necessary, CNS/ATM cost/benefit analyses for the implementation options of C, N and S elements; and
- d) Study, as necessary, institutional arrangements for the implementation of C, N and S systems in the AFI Region.

2. WORK PROGRAMME

| Item | Task description | Priority | Target date |
|--|---|----------|-------------|
| Communications | | | |
| 1. | Follow up and monitor the implementation of VHF coverage in the AFI region in accordance with AFI/7 Rec. 5/12. | A | APIRG/20 |
| 2. | Update the AFI AFTN routing directory | A | APIRG/20 |
| 3. | In coordination with the ATM/AIM/SAR Sub-group, participate in the development of a communication infrastructure to support an AFI Central AIS Database (AFI CAD) | A | Continuous |
| 4. | Monitor the development, and coordinate the implementation of guidance material for the implementation of the Aeronautical Telecommunication Network (ATN) and supported ground-ground and air-ground applications. | A | APIRG/20 |
| 5. | Review and update, if needed, the ICAO Register of AMHS managing domains and addressing information pertaining to AFI. | A | Continuous |
| Navigation | | | |
| 6. | Follow up and monitor the implementation of the AFI GNSS Strategy. | A | Continuous |
| Surveillance | | | |
| 7. | Analyze and review CNS aspects of the report of the Aeronautical Surveillance Implementation Task Force. | A | APIRG/20 |
| Communications, Navigation and Surveillance – General matters | | | |
| 8. | Analyze, review and monitor the implementation and operation of aeronautical communications, navigation and surveillance (CNS) systems, identify CNS deficiencies and propose measures for their elimination, as | A | Continuous |

| Item | Task description | Priority | Target date |
|------------------------------|---|----------|-------------|
| | required. | | |
| 9. | Give further consideration, as necessary, to the concept of multinational ICAO AFI air navigation facility/service addressed in the AFI/7 Report under Agenda Item 14 (AFI/7, Conclusion 10/6c). | C | Continuous |
| 10. | In co-ordination with the ATS/AIS/SAR Sub-group, continue the evolutionary and harmonized development of the AFI CNS/ATM Systems Implementation Plan (AFI/7 Concl. 13/1). | A | Continuous |
| 11. | In co-ordination with the ATS/AIS/SAR Sub-group, develop, as necessary, comprehensive business cases for competing CNS/ATM elements implementation options for the identified routing areas. | B | Continuous |
| 12. | Co-ordinate plans developed by States, international organizations, airlines and industry for the implementation of the regional CNS/ATM systems implementation plan; and monitor CNS/ATM systems research and development, trials and demonstrations within the AFI Region and information from other regions. | B | Continuous |
| 13. | Coordinate the implementation of ICAO Global Air Navigation Plan, Aviation Systems Block Upgrades and Technology Roadmaps pertaining to CNS and develop associated regional performance objectives. | A | Continuous |
| Aeronautical Spectrum | | | |
| 14. | Coordinate regional activities aimed at promoting ICAO position for ITU-WRC meetings, and improving aeronautical spectrum management and control in the Region. | A | Continuous |
| 15. | Review the report of the AFI Frequency Management Group | A | APIRG/20 |

Priority:

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

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

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

3. COMPOSITION:

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

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