



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**REPORT OF THE AFI PERFORMANCE BASED NAVIGATION/
GLOBAL NAVIGATION SATELLITE SYSTEM TASK FORCE**

PBN/GNSS TF/2

(Dakar, Senegal, from 13 to 15 June 2011)

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitations of its frontier or boundaries.

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History of the Meeting

PART I – HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Second meeting of the AFI Performance Based Navigation/Global Navigation Satellite System Task Force (PBN/GNSS TF/2) was held at the Conference hall of ASECNA Headquarters in Dakar, Senegal, from 13 to 15 June 2011.

2. OPENING

2.2 The PBN/GNSS TF/2 meeting was officially opened on 13 June 2011, by Mr. Mam Sait Jallow, ICAO Regional Director, Western and Central African (WACAF) Regional Office.

2.3 Mr. Jallow welcomed all delegates to Dakar, to the PBN/GNSS TF/2 meeting and recalled that the convening of this meeting is a follow up action to a number of provisions and requirements called for notably by Assembly Resolution A36-23 of 2007, SP AFI RAN 08 recommendations and Decision 17/49 of the APIRG/17 meeting.

2.4 Mr. Jallow expressed his hope that this meeting will be the opportunity to determine measures to be taken at the regional and national levels, the implementation of which will foster and speed up the achievement of the ICAO PBN Implementation goals as reflected in ICAO Assembly resolution 36-23, and laid out through the SP AFI RAN meeting recommendations and APIRG conclusions.

2.5 While recognizing the fact that expertise in this field is lacking in many AFI States and that awareness and training are critical in facilitating progress in the implementation of PBN, Mr. Jallow recalled the significant efforts made by ICAO in supporting States' implementation actions by, inter alia, organizing PBN Seminars, Workshops and courses.

2.6 The Regional Director, on behalf of ICAO and all the participants, expressed his sincere gratitude and thanks to ASECNA for once again accepting to provide the facilities for holding this important event.

2.7 Finally, Mr. Jallow wished the participants successful deliberations and an enjoyable stay in Dakar and declared the Second meeting of the AFI Performance Based Navigation/Global Navigation Satellite System Task Force formally open.

3. ATTENDANCE

3.2 The Task Force meeting was attended by a total of 66 participants from twenty four (24) States and Four (4) organisations. The list of participants is at the **Attachment A** to the Report.

4. OFFICERS AND SECRETARIAT

4.2 The meeting was chaired by Mr. Popoola Adebisi, General Manager Air Navigation Services, Nigerian Civil Aviation Authority (NCAA), who had been elected as Chairperson of the Task Force since the first meeting in Nairobi (12-14 October 2010). Mr. Seboeso Machobane, Regional Officer, ATM/SAR (ICAO ESAF Office) was the Secretary of the meeting. He was supported by Messrs. Sadou Marafa, Regional Officer, ATM/SAR (ICAO WACAF Office) Prosper Zo'o-Minto'o, Regional Officer CNS (ICAO ESAF Office), François Salambanga, Regional Officer CNS (ICAO WACAF Office).

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5. LANGUAGE

Discussions were conducted in the English language and documentation was issued in the same.

AGENDA

6.1 The following Agenda was adopted:

| STRATEGIC OBJECTIVES | AGENDA ITEM NO. | SUBJECT |
|-----------------------------|------------------------|--|
| A | 1 | Election of Chairperson and Adoption of the Agenda |
| A | 2 | Review and follow up of Recommendations, Conclusions and Decisions applicable to the Task Force |
| A | 3 | PBN and GNSS Regional Performance Objectives; Update on Actions |
| A | 4 | Status of implementation of PBN in the AFI Region |
| A | 5 | AFI GNSS Implementation Strategy |
| A | 6 | Review of Terms of Reference (TOR) of the PBN/GNSS Task Force and Work Programme |
| A | 7 | Date and Venue of the next meeting |
| | 8 | Any other business |

6. CONCLUSIONS AND DECISIONS**DEFINITION**

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

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

History of the Meeting

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

LIST OF CONCLUSIONS AND DECISIONS

6.2 The list PBN/GNSS TF/2 Conclusions and Decisions is at **Attachment B** to this Report.

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Report on Agenda Item 1

PART II: REPORT ON AGENDA ITEMS

**REPORT ON AGENDA ITEM 1: ADOPTION OF PROVISIONAL AGENDA AND ELECTION OF THE
CHAIRPERSON AND RAPPORTEUR**

1.1 The meeting reviewed and agreed on the proposed agenda for the Second Meeting of the AFI Performance Based Navigation/Global Navigation Satellite System Task Force (PBN/GNSS TF/2), copy of which had been forwarded to States and international organizations as an attachment to the invitation State Letter. The agenda was adopted as indicated in paragraph 6 of the History of the Meeting.

1.2 On the issue of electing the chairman for the AFI Performance Based Navigation/Global Navigation Satellite System Task Force, the meeting recalled that the PBN/GNSS TF/1 meeting held in Nairobi in October 2010 had agreed that the elected Chairperson should chair at least two meetings in order to enable him/her to actively support the work of the Task Force in between meetings, and to provide a progress report to the following meeting that he/she chairs. Accordingly, Mr. Popoola Adebisi, General Manager Air Navigation Services, Nigerian Civil Aviation Authority (NCAA), who had been elected since the first meeting, continued his work as Chairperson of the Task Force.

1.3 Mr. Popoola Adebisi acknowledged the continuing confidence in him by the Task Force for servicing its proceedings as Chairperson, and promised to continue doing his utmost in his tasks.

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Report on Agenda Item 2

**REPORT ON AGENDA ITEM 2: REVIEW AND FOLLOW UP ON RECOMMENDATIONS, CONCLUSIONS
AND DECISIONS APPLICABLE TO THE TASK FORCE**

2.1 The meeting recalled that the Special AFI RAN Meeting (SP AFI/08 RAN), Durban, South Africa 24-29 November 2008, had formulated eight (8) Recommendations that are applicable to PBN and GNSS implementation, and noted that the APIRG/17 meeting, Ouagadougou, Burkina Faso 2-6 August 2010 adopted 106 Conclusions and Decisions, of which 21 were directly applicable to the work of the PBN/GNSS Task Force. The Task Force further recalled that at its first meeting in Nairobi, Kenya 12 -14 October 2010, eight (8) Draft Conclusions were formulated.

2.2 In reviewing the above Recommendations, Decisions and Conclusions, the Task Force noted that Air Navigation Commission was of the view that the number of Conclusion from APIRG/17 was significantly high and in some cases the formulation of the Conclusions had lacked effectiveness to foster implementation. It was acknowledged that the situation presents a challenge with regard to implementation prioritization and follow-up by parties concerned, including States, international organizations and the Secretariat.

2.3 In this context, the Task Force agreed that, the focus of deliberations should be on existing Conclusions and Decisions. Furthermore, the meeting agreed to limit its number of Conclusions and Decisions from its deliberations. The Task Force also reviewed existing Conclusions and Decisions with the objective of identifying those that might be merged with others that are considered similar or closely related; identify those that are adequately addressed by other Conclusions, Decisions, procedures, or activities; and identify those that may be included in the terms of reference and work programmes of relevant APIRG subsidiary bodies or be included in the APIRG handbook to serve general purposes.

2.4 The meeting reviewed progress on follow up action items relating to each of the Recommendations, Conclusions and Decisions in the context of discussions under various agenda items, and updated the information on follow up action.

2.5 The meeting reviewed the issue of operational benefits that were intended in APIRG 17 Conclusion 17/51. It was agreed that rather than the coordination process which could take long, the Regional Offices send a State Letter to concerned States (along ATS routes UM214 and UM 215) urging them to establish the lowest usable flight level on the RNAV routes UM214 and UM215 as flight level 250 for operational reasons. It was recognized that such a lower limit would serve not only intercontinental flights between the Southern part of AFI and the Northern AFI/EUR Region, but would also make the routes more accessible to intra-Continental traffic.

2.6 Based on the above, the meeting updated the follow-up action and target dates as necessary, relating to the RAN Recommendations and the APIRG Conclusions and Decisions with proposed consolidation at **Appendix 2A** and **Appendix 2B** respectively, to the report on agenda item 2. The PBN/GNSS TF/1 Conclusions and Decisions with updates are at **Appendix 2C** to the report on agenda item 2.

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Appendix 2A to Report on Agenda Item 2

RECOMMENDATIONS OF SP AFI RAN 2008

| Recs No. Strategic Objectives* | Title of Recommendations | Text of Recommendations | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|--------------------------------|---|--|--|---------------------------|---------------------------------------|--------------|---|
| Rec 3/3: A & D | Performance-based approach and measurement | That APIRG and regional safety groups develop indicators that are specific, measurable, achievable, realistic and time bound and attach them to the performance framework forms (PFFs) in the appropriate box, using the following metrics and/or others determined to be appropriate indicators for the African continent | Include tasks in the APIRG & Subsidiary bodies programme | APIRG & Subsidiary bodies | Performance indicators for AFI Region | APIRG 17 | Matrixes under development in coordination with ICAO HQ For AIM See Appendix 3.6F of APIRG/17. |
| Rec 6/9: A & D | Performance-based navigation (PBN) performance objectives | That APIRG adopt the Performance Objectives as contained in the performance framework forms in Appendix D to the Report on Agenda Item 6: a) optimization of the air traffic services (ATS) route structure in en-route airspace; b) optimization of the ATS route structure in terminal airspace; and c) implementation of vertically guided required navigation performance (RNP) approaches. | <ul style="list-style-type: none"> ➤ Implement recommendation. <ul style="list-style-type: none"> • Identify action parties and specific target dates. • Update PFFs. • Follow-up • Provide guidance for States. ➤ Implement States recommendations. <ul style="list-style-type: none"> • Identify action parties and specific target dates. • Update PFFs. • Follow-up | APIRG (PBN/TF) | Updated PFFs | PBN TF/4 | See APIRG 17 Conclusion 17/41 |

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| Recs No. Strategic Objectives* | Title of Recommendations | Text of Recommendations | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|--------------------------------|--|--|--|--|---|--|-------------------------------|
| | | That States develop their national action plans to meet the requirements of the regional performance framework forms, as a matter of priority to meet the PBN implementation goals established by Assembly Resolution A36-23. | | | | | |
| Rec 6/10: D | Support for establishment of an Africa ICAO flight procedure office | That: a) States and international organizations support the implementation of an AFI flight procedures office; and b) ICAO disseminate a letter, with supporting documentation, inviting interested States and international organizations to submit proposals for establishment and hosting of the FPO. | Provide support to FPO. State letters to invite States to make proposal | States and International Organisations ICAO HQ. | Support for FPO Invitation to establish FPO. | Based on APAC FPO experience to be reviewed by APIRG/17. | See APIRG 17 Conclusion 17/52 |
| Rec 6/11: A & D | Implementation of WGS-84 and eTOD | That APIRG adopt the AIM Performance Objective: Implementation of world geodetic system-1984 (WGS-84) and electronic terrain and obstacle data (eTOD) as contained in the performance framework form in Appendix E to the Report on Agenda Item 6. | Implement Recommendation | APIRG | Full implementation of WGS-84 & eTOD | | See APIRG 17 Conclusion 17/90 |

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Appendix 2A to Report on Agenda Item 2

| Recs No. Strategic Objectives* | Title of Recommendations | Text of Recommendations | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|--------------------------------|---|--|------------------|--------------------|---|--|---|
| Rec 6/28 A & D | Implementation of a Global ATM System ICAO technical cooperation project Long-term project | States were encouraged to join ICAO TC project for implementation of performance-based air navigation plan. A project for assistance to States in the implementation of PBN has been developed and the draft presented at APIRG/17 meeting. | | ICAO States | Regional project for assistance to States in the implementation of performance-based air navigation systems | Implementation on continuous basis Update at APIRG/17 meeting | Adopted. To be continuously reviewed In TC programme for 2011 to get resources |

*Note: ICAO has established the following Strategic objectives for the period 2011-2013

A: Safety: Enhance global civil aviation safety;

B: Security: Enhance Global civil aviation security;

C: Environmental Protection and Sustainable Development of Air Transport: Foster harmonised and economically viable development of international civil aviation that does not unduly harm the environment.

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Appendix 2B to Report on Agenda Item 2

APIRG17 CONCLUSIONS & DECISIONS RELATED TO PBN

| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|---|--|---|---------------------------|--|---------------------|---|
| Conclusion 17/28 | NEED FOR A HIGH LEVEL MEETING ON AFI GNSS STRATEGY | That, in order to assist AFI States in making an informed decision on the regional strategy for the introduction of GNSS applications, AFCAC organize as a matter of urgency a high level meeting in coordination with ICAO, ASECNA, IATA, AFRAA and other relevant stakeholders. | Convene High level meeting | AFCAC | Informed strategy on GNSS application | 31 March 2011 | Meeting Held on November 2010 Implemented/ Completed |
| Conclusion 17/29 | NEED FOR AN INDEPENDENT COST-BENEFIT ANALYSIS | That, considering the lack of consensus between stakeholders on available cost-benefit analyses related to SBAS implementation in the AFI Region, a cost benefit analysis based on objective assumptions should be performed by independent experts, and submitted to the high level meeting to be organized by AFCAC on AFI GNSS strategy, for consideration. | Identify and appoint Experts Perform cost benefit analysis | ICAO AFCAC | Cost benefit analysis based on objective assumptions | 30 June 2011 | Terms of reference developed and transmitted to AFCAC Two reminding letters respectively from ICAO ESAF and ICAO WACAF Offices issued to AFCAC |
| Conclusion 17/40 Conclusion 17/40, 17/41, to be consolidate and merged | CNS PERFORMANCE OBJECTIVES | That, the CNS performance objectives and performance framework form developed by ICAO SP AFI RAN (2008) be amended as shown at Appendix 3.3G to this report. | Amend CNS performance objective and PFFs | ICAO ROs States | Amended CNS Objectives and PFFs | 31 Mar 2011 | No action is required |

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Appendix 2B to Report on Agenda Item 2

| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|----------------------------------|---|--|-------------------------------|--|---------------------------------------|---------------------------------|
| <p>Conclusion 17/41</p> <p>Conclusion 17/40, 17/41, to be consolidated and merged</p> | <p>ATM PERFORMANCE FRAMEWORK</p> | <p>That, the AFI performance framework forms formulated by the Special AFI/08 RAN Meeting regarding performance objectives in the fields of ATM and SAR are updated as at Appendix 3.4A to this report.</p> <p><i>Appendix 3.4A (1) Implementation of the new ICAO Flight Plan Provisions;</i> <i>Appendix 3.4A (2) Optimization of the ATS route Structure in en-route airspace;</i> <i>Appendix 3.4A (3) Optimization of the ATS route Structure in terminal airspace;</i> <i>Appendix 3.4A (4) Optimization of vertically guided RNP approaches;</i> <i>Appendix 3.4A (5) Search and Rescue.</i></p> | <p>Update ATM/SAR performance objectives and PFFs.</p> <p>Align National PFF</p> | <p>ICAO ROs</p> <p>States</p> | <p>Updated ATM/SAR performance objectives and PFFs.</p> <p>Harmonized planning</p> | <p>31 Mar 2011</p> <p>31 Mar 2011</p> | <p>Updated by PBN/GNSS TF/I</p> |

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| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|---|---|---|------------------------|--|-------------------------------------|-----------------------------|
| Conclusion 17/46 Proposed to be updated by PBN/GNSS TF/1 Draft Conclusion 1/06 | AFI PBN IMPLEMENTATION REGIONAL PLAN | That: a) The AFI Regional PBN implementation plan is updated and endorsed as at Appendix g 3.4D to this report, to more accurately reflect PBN implementation goals in Assembly Resolution A36-23, guidance in the PBN Manual (9613), and Regional planning guidance provided by APIRG; and b) The Regional PBN Implementation Plan be included in the AFI Doc 003. | Implementation PBN Regional plan Update Doc003 | States ICAO ROs | Updated AFI Regional PBN implementation plan Updated Doc003 | According to plan 31Mar 2011 | |

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| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|--|--|--|---|-----------------------------|---|---|--------------------------|
| <p>Conclusion 17/47</p> <p>Proposed to be updated by PBN/GNSS TF/1 Draft Conclusion 1/01</p> | <p>NATIONAL PBN IMPLEMENTATION PLAN</p> | <p>That States:</p> <p>(a) Use the Regional PBN implementation plan template at Appendix 3.4E to this report , for the development of a national PBN implementation plan and consider the action planning provided by the Joint PBN/GNSS/I Task Forces Meeting to support planning;</p> <p>(b) Provide feedback to the ESAF and WACAF Regional Offices by 30 October 2010 regarding progress in the development of their national plans, indicating any challenges, if any, that are delaying the development of the plan, as well as measures taken or to be taken to overcome such challenges; and</p> <p>(c) Complete their National PBN plans as soon as possible.</p> | <p>Develop National PBN implementation Plan</p> <p>Provide feedback on progress of national plans</p> | <p>States</p> <p>States</p> | <p>National PBN implementation Plan</p> <p>Updated progress on national plan implementation</p> | <p>ASAP, latest 30 June 2011</p> <p>30 Oct 2010</p> | |
| | | | | | | | |

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| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|---|--|-------------------------------------|--------------------|-------------------------------|-------------------|----------------------------------|
| <p>Conclusion 17/48</p> <p>Proposed to be updated and merged by PBN/GNSS TF/1 Draft Conclusion 1/01</p> | <p>PBN IMPLEMENTATION TOOLS</p> | <p>That States:</p> <p>(a) Use project management plans and implementation action plans provided by the PBN Task Force, as well as project management softwares (such as Microsoft project or freely available applications), to support PBN implementation activities; and</p> <p>(b) Carry out a gap analysis using the project plan template attached to the report, or similar approach, in order to more accurately develop their PBN implementation plans.</p> | | | | | |
| <p>Decision 17/49</p> | <p>DISSOLUTION OF THE GNSS IMPLEMENTATION AND PBN TASK FORCES AND ESTABLISHMENT OF THE PBN/GNSS TASK FORCE</p> | <p>That, the GNSS implementation and PBN Task Forces are dissolved and the PBN/GNSS Task Force is established with the terms of reference in Appendix 3.4F to this report.</p> | <p>Convene PBN/GNSS TF meetings</p> | <p>PBN/GNSS TF</p> | <p>As per TOR</p> | <p>Continuous</p> | <p>Continuous process</p> |

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| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|--|--|--|--------------------|-------------------------------|--------------|---|
| Decision 17/50 | PBN ROUTE NETWORK DEVELOPMENT WORKING GROUP (PRND WG) | That, the AFI PBN Route Network Development Working Group (PRND WG) is established with the terms of reference, composition and working arrangements as at Appendix 3.4G to this report. | Convene PRND WG meetings | PRND EG TF | As per TOR | Continuous | Continuous process |
| Conclusion 17/51 Proposed to be updated and superseded by PBN/GNSS TF/1 Draft Conclusion 1/02 | LOWERING OF RNAV/RNP ROUTES UM214 AND UM215 | That, the ICAO Regional Offices carry out further consultations with the States concerned about the lowering of RNAV / RNP routes UM214 and UM215 from FL330 down to FL320, taking into account operational considerations. | | | | | |
| Conclusion 17/52 | DISSEMINATION OF A LETTER INVITING PROPOSALS FOR ESTABLISHMENT OF THE AFI FLIGHT PROCEDURES PROGRAMME (FPP) | That, pursuant to special AFI/08 RAN meeting Recommendation 6/10, ICAO disseminates, as a matter of urgency, the letter inviting interested States and international organizations to submit proposals for establishment and hosting of the AFI FPP. | Establish pre-requisites State Letter | ICAO ROs | Establishment of AFI FPP | 30 Nov 2010 | Completed State Letter issued, responses received from 9 States and ASECNA (17 States) Concept review from APAC to be finalized Dec. 2011 |

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Appendix 2B to Report on Agenda Item 2

| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|---|---|--------------------------------|--------------------|---|--------------------|--------------------------|
| <p>Conclusion 17/53</p> <p>Proposed to be updated and superseded by PBN/GNSS TF/1 Draft Conclusion 1/05</p> | <p>TRAINING IN SUPPORT OF PBN IMPLEMENTATION</p> | <p>That, in order to support the implementation of PBN in the AFI Region:</p> <p>a) PBN Task Force identify priority training needs for implementation for PBN;</p> <p>b) AFI Regional Offices organize seminars/workshops for training of relevant personnel directly involved in the implementation of PBN.</p> | | | | | |
| <p>Conclusion 17/54</p> | <p>PBN ENABLING LEGISLATION</p> | <p>That, AFI States that have not already done so, include in their legislation and/or regulations provisions to enable the implementation of PBN.</p> | <p>Develop PBN Legislation</p> | <p>States</p> | <p>Legislation for PBN implementation</p> | <p>31 Jul 2011</p> | |
| <p>Conclusion 17/55</p> <p>Propose to be deleted, requirements to be moved to TOR of PBN/GNSS TF</p> | <p>PARTICIPATION OF REPRESENTATIVES OF STATES INVOLVED IN PBN APPROVAL PROCESS</p> | <p>That, in order to support the PBN planning and implementation processes, AFI States are urged to include in their delegations to meetings of the PBN Task Force, experts and officials involved in the PBN approval process of aircraft operators.</p> | | | | | |

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Appendix 2B to Report on Agenda Item 2

| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|--|--|--|--|--|---|--------------------------------|--|
| Conclusion 17/56 | FUNDING OF THE PBN IMPLEMENTATION PROGRAMME | That, regulatory bodies, operators, service providers and other stakeholders be granted budgetary allocations for acquisitions and other activities necessary for ensuring that all the requirements be met in a timely manner in order to safely implement PBN in the AFI Region. | Make budgetary allocation for safe implementation of PBN | States, Regulatory bodies, Operators, Stakeholders | Sufficient funds | 2010-2016 | |
| Conclusion 17/57 Proposed to be deleted | IATA GUIDELINES FOR OPERATIONAL APPROVALS | That, IATA facilitates stakeholders' access to its guidelines developed to assist operators in obtaining airworthiness and operational approvals for PBN, for guidance and reference as required. | Facilitate access to guidelines | IATA | Access to guidelines | 2010-2012 | IMPLEMENTED/NO LONGER VALID. OBSOLETE |
| Conclusion 17/58 | NATIONAL PBN PROGRAMME MANAGER (NPPM) | That, in order to facilitate the implementation of PBN and Regional coordination: a) AFI States that have not already done so nominate/designate NPPMs as soon as possible and assign them the terms of reference as at Appendix 3.4H to this report .and provide ICAO with contact details of the NPPMs; and b) States update the NPPMs contact information provided to ICAO whenever changes have been made. | Nominate/Designate NPPMs Update NPPMs contacts | States States | Nominated / Designated NPPMs Updated NPPM contacts | 30 Nov 2010 30 Nov 2010 | States have nominated. Initial nomination and some updates have been effected Updates from States slow to come |

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| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|---|---|--|--|--|--|---|
| <p>Conclusion 17/59</p> <p>Secretariat to redraft, to reduce length and achieve more focus. To be submitted to CNS/SG and ATM/AIM/SAR SG in July 2011</p> | <p>AIRSPACE PLANNING AND AIRCRAFT EQUIPMENT SURVEY</p> | <p>That, in order to facilitate airspace planning and decisions related to air navigation infrastructure:</p> <p>a) ICAO in coordination with IATA and AFRAA conduct regular surveys on aircraft equipage within the AFI Region;</p> <p>b) AFI States and air navigation service providers (ANSPs) are urged to support the ICAO/IATA global survey on aircraft equipment aimed at developing a database with accurate information on present and future avionics capabilities of airline fleets;</p> <p>c) AFI States make efforts to bring awareness to the aircraft operators regarding the ICAO efforts on aircraft equipage data, and that joint efforts between civil aviation authorities and ANSPs be embarked upon to bring quicker results; and</p> <p>d) AFI States ensure that initiatives for air navigation system enhancements are matched with fleets capabilities and readiness.</p> | <p>Conduct regular surveys on aircraft equipage</p> <p>Support the ICAO/IATA global survey on aircraft equipment</p> <p>State Letter to concerned States</p> <p>Bring awareness to the aircraft operators regarding the ICAO efforts on aircraft equipage.</p> <p>Ensure that initiatives for air navigation system enhancements are matched with fleets capabilities and readiness.</p> | <p>ICAO ROs IATA AFRAA</p> <p>States ANSPs</p> <p>ICAO ROs</p> <p>States</p> <p>States</p> | <p>Updated surveys on aircraft equipage</p> <p>Updated surveys on aircraft equipage</p> <p>Awareness to Operators on acft equipage</p> <p>Awareness</p> <p>Matching of air nav systems with fleet capabilities and readiness</p> | <p>31 Mar 2011</p> <p>31 Mar 2011</p> <p>31 Mar 2010</p> <p>Continuous</p> <p>Continuous</p> | <p>Annual updates</p> <p>Annual updates</p> <p>Continuous process</p> <p>Continuous process</p> |

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| Cons/Decs No. Strategic Objectives* | Title of Cons/Decs | Text of Cons/Decs | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|---|---|---|---|--|--|---------------------------------------|----------------------------|
| | | <p>c) The AFI Region e-TOD implementation strategy under Appendix 3.6G to this report be adopted for implementation; and</p> <p>d) The revised Terms of Reference of the AFI Region e-TOD working group are at Appendix 3.6H to this report be adopted.</p> | <p>Adopt e-TOD implementation strategy</p> <p>Adopt TOR of e-TOD WG</p> | <p>ICAO ROs States</p> <p>ICAO ROs</p> | <p>Adoption of e-TOD implementation strategy</p> <p>Adopted TOR for e-TOD WG</p> | <p>31 Mar 2011</p> <p>31 Mar 2011</p> | |
| <p>Conclusion 17/96</p> <p>To be consolidated with 17/90 into a concise text, taking consideration of 17/105</p> | <p>PROJECT TO COMPLETE WGS-84 IMPLEMENTATION IN THE AFI REGION</p> | <p>That, ICAO takes necessary action to initiate a project for the completion of implementation of WGS-84 within AFI States having difficulties to complete WGS-84 implementation.</p> | <p>Proposal for AFI SIP</p> | <p>ICAO ROs</p> | <p>Assist States having difficulties in WGS-84 implementation</p> | <p>2012</p> | <p>Continuous Process.</p> |

*Note: ICAO has established the following Strategic objectives for the period 2011-2013

A: Safety: Enhance global civil aviation safety;

B: Security: Enhance Global civil aviation security;

C: Environmental Protection and Sustainable Development of Air Transport: Foster harmonised and economically viable development of international civil aviation that does not unduly harm the environment.

2C-1
PBN/GNSS TF/2
Appendix 2C to Report on Agenda Item 2

PBN/GNSS TF/1 DRAFT CONCLUSIONS

| Draft Conclusions No. | Title of Conclusions | Text of Conclusions | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|-----------------------|---|---|------------------|--------------------|----------------------------------|---|---|
| Draft Conclusion 1/01 | NATIONAL PBN IMPLEMENTATION PLAN | <p>That States,</p> <p>(a) that have not already done so, complete their national PBN implementation plans as a matter of urgency, using the template at Appendix C to the report on agenda item 2;</p> <p>(b) consider the use of planning tools provided by the PBN/GNSS Task Force, as well as project management software; and</p> <p>(c) provide updates to Regional Offices.</p> <p>(This Draft Conclusion is to supersede APIRG Conclusions 17/47 and 17/48)</p> | | | | <p>30 September 2011</p> <p>30 Oct 2010</p> | <p>Many States have still developed plans</p> <p>Continuous process</p> <p>Continuous process</p> |
| Draft Conclusion 1/02 | LOWERING OF RNAV/RNP ROUTES UM214 AND UM215 | <p>That, concerned States States that have not already done so, be urged to establish the lowest usable flight level on the RNAV routes UM214 and UM215 as flight level 250 for operational reasons.</p> <p>This Draft Conclusion is to supersede APIRG Conclusions 17/51</p> | | ICAO ROs | Lower limit of FL250 implemented | AIRAC date of 13 Jan 2011 | |

2C-2
PBN/GNSS TF/2
Appendix 2C to Report on Agenda Item 2

| Draft Conclusions No. | Title of Conclusions | Text of Conclusions | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|----------------------------------|---|--|------------------|--------------------|-------------------------------|--------------|--------------------------|
| Draft Conclusion 1/03 | AFI PBN REGIONAL PERFORMANCE FRAMEWORK FORMS | <p>That;</p> <p>e) the AFI PBN Regional Performance Framework Forms are updated as at Appendix 3A-1 to 3A-3, to the report on agenda item 3;</p> <p>d) noting that the 2009 deadline established in Assembly Resolution A36-23 for the completion of State PBN implementation Plans has passed, States that have not done so, complete their national PBN implementation plans as a matter of urgency.</p> | | | | | |
| New Draft Conclusion 2/X1 | AFI PBN REGIONAL PERFORMANCE FRAMEWORK FORMS | <p>That;</p> <p>(a) the AFI PBN Regional Performance Framework Forms are updated as at Appendix 3X-1 to 3X-3, to the report on agenda item 3;</p> <p>(b) noting that the 2009 deadline established in Assembly Resolution A36-23 for the completion of State PBN implementation Plans has passed, States that have not done so, complete their national PBN implementation plans as a matter of urgency.</p> <p>This draft Conclusion supersedes PBN/GNSS TF/1 Draft Conclusion 1/3.</p> | | | | | |

2C-3
PBN/GNSS TF/2
Appendix 2C to Report on Agenda Item 2

| Draft Conclusions No. | Title of Conclusions | Text of Conclusions | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|------------------------------|---|--|---------------------------------|--------------------|-------------------------------|--------------|-----------------------------|
| Draft Conclusion 1/04 | DEVELOPMENT AND IMPLEMENTATION OF PBN NATIONAL PLANS | <p>That:</p> <p>(a) ICAO Regional Offices assess the PBN plans submitted by the States against the available global and regional guidance pertaining to PBN; and</p> <p>(b) ICAO should pursue its efforts towards establishing an effective PBN programme with a view to assisting States in overcoming PBN implementation challenges.</p> <p>Deleted in view of APIRG Concl; 17/105 and PBN/GNSS TF/1 Draft Conclusion 1/01.</p> | | | | | |
| Draft Conclusion 1/05 | TRAINING IN SUPPORT OF PBN IMPLEMENTATION | <p>That, in order to support the implementation of PBN in the AFI Region, AFI Regional Offices organize seminars/workshops for training of relevant personnel directly involved in the implementation of PBN</p> <p>This draft Conclusion is to supersede APRIG Conclusion 17/53</p> | Organize Seminars and workshops | ICAO ROs | Seminars and Workshops | 2010-2012 | Seminar scheduled Dec. 2011 |

2C-4
PBN/GNSS TF/2
Appendix 2C to Report on Agenda Item 2

| Draft Conclusions No. | Title of Conclusions | Text of Conclusions | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|-----------------------|--|--|--|-------------------------------|---|--|--------------------------|
| Draft Conclusion 1/06 | AFI PBN IMPLEMENTATION REGIONAL PLAN | <p>That:</p> <p>(a) the AFI Regional PBN Implementation Plan is updated as at Appendix 4B to the report on agenda item 4; and</p> <p>(b) the Plan be included in the AFI Doc</p> <p>This draft Conclusion is to supersede APRIG Conclusion 17/46</p> | <p>Implementation PBN Regional plan</p> <p>Update Doc003</p> | <p>States</p> <p>ICAO ROs</p> | <p>Updated AFI Regional PBN implementation plan</p> <p>Updated Doc003</p> | <p>According to plan</p> <p>31Mar 2011</p> | |
| Draft Conclusion 1/07 | IMPLEMENTATION OF PHASE I OF AFI GNSS STRATEGY | <p>That AFI States which have not yet done so:</p> <p>(a) complete the implementation of WGS 84 coordinates; and</p> <p>(b) ensure that all the prerequisites are met when implementing GNSS applications for en route and non-precision approach (NPA) operations in accordance with the current Phase 1 of AFI GNSS Strategy, and in support of PBN operations.</p> <p>Part (a) of the Draft Conclusion to be merged with APIRG Concl.17/90 and 17/96.</p> <p>Part (b) of the draft Conclusion to be included in GNSS Implementation Strategy</p> | Proposal for AFI SIP | ICAO ROs Dakar and Nairobi. | Assist States having difficulties in WGS 84 implementation | 2012 | Continuous Process. |

2C-5
PBN/GNSS TF/2
Appendix 2C to Report on Agenda Item 2

| Draft Conclusions No. | Title of Conclusions | Text of Conclusions | Follow-up Action | To be initiated by | Deliverable/ Intended Outcome | Target Dates | Status of Implementation |
|-----------------------|---|--|------------------|--------------------|-------------------------------|--------------|--------------------------|
| Draft Conclusion 1/08 | REVISED TERMS OF REFERENCE OF THE PBN/GNSS TASK FORCE | That, the terms of reference of the APIRG PBN/GNSS Task Force are revised as at Appendix 6A to the report on agenda item 6. | | | | | |

*Note: ICAO has established the following Strategic objectives for the period 2011-2013

A: Safety: Enhance global civil aviation safety:

B: Security: Enhance Global civil aviation security;

C: Environmental Protection and Sustainable Development of Air Transport: Foster harmonised and economically viable development of international civil aviation that does not unduly harm the environment.

REPORT ON AGENDA ITEM 3: PBN AND GNSS REGIONAL PERFORMANCE OBJECTIVES

3.1 The meeting recalled that the SP AFI RAN 08 meeting held in Durban, South Africa referred to APIRG a series of Performance Framework Forms (PFF) relating to air navigation field as a mechanism to identify the performance objectives as well as to establish timeframes for the regional planning and implementation process.

3.2 The meeting noted that performance objectives and the associated PFFs recommended by the SP AFI RAN 08 meeting for the AFI Region were submitted to the APIRG 17 meeting (Ouagadougou, 02-06 August 2010) which updated and adopted them.

3.3 Thereafter, taking into consideration the outcome of the 37th Session of the Assembly on the matter of PBN implementation including amendment of Assembly Resolution A36-23, the first meeting of the PBN/GNSS Task Force (PBN/GNSS TF/1) which was held in Nairobi, Kenya, from 12 to 14 October 2010, reviewed and updated the PBN/GNSS related PFFs.

3.4 The Task Force recalled that the PFFs developed and updated within the framework of APIRG are applicable to the AFI Region as a whole. In this regard, it was emphasized that in accordance with Assembly Resolution A36-23 as amended by A37-11, each State should establish its own national performance objectives and develop its PFFs accordingly, based on the Regional PFFs.

3.5 It was also recalled that as part of the effort to support States with regard to the application of the performance objective approach to planning, an ICAO Special Implementation Project (SIP) performance framework workshop was conducted in Nairobi from 6 to 10 December 2010, to improve familiarity and usage of PFFs system.

3.6 Based on the above, the meeting revised the TORs and formulated the following Draft Conclusion

DRAFT CONCLUSION 2/1: AFI PBN Regional Performance Framework Forms

That:

The AFI PBN Regional Performance Framework Forms are updated as at Appendix 3A to the report on agenda item 3.

Report on Agenda Item 3
APPENDIX 3A
AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL
PERFORMANCE OBJECTIVES FOR PBN

| AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN EN-ROUTE AIRSPACE | | | | |
|---|---|---|-------------------|-------------------|
| Benefits | | | | |
| Environment | • reduction in gas emissions | | | |
| Efficiency | • ability of aircraft to conduct flight more closely to preferred trajectories | | | |
| Safety | • increase in airspace capacity | | | |
| | • facilitate utilization of advanced technologies (e.g., FMS-based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency | | | |
| Strategy Short term (2010) Medium term (2011-2015) | | | | |
| ATM OC COMPONENTS | TASKS | TIMEFRAME START-END | RESPONSIBILITY | STATUS |
| AOM | <i>En-route airspace</i> | 2008 | | |
| | • develop regional implementation plan | 2008-2009 | AFI PBN TF | Completed |
| | • develop regional action plan | 2009-2010 | AFI PBN TF | Completed |
| | • establish collaborative decision making (CDM) process | 2010 | States | Continuous |
| | • develop airspace concept based on AFI PBN regional implementation plan, in order to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN, e.g. RNAV 10 and RNAV 5, and taking into account interregional harmonization | 2009-2012 | AFI PBN TF/States | In progress |
| | • harmonize national and regional PBN implementation plans | 2010-2016 | AFI PBN TF/States | On-going |
| | • develop performance measurement plan | 2010-2012 | States | In progress |
| | • formulate safety plan | 2010-2012 | States | To be developed |
| | • publish national regulations for aircraft and operators approval using PBN manual as guidance material | 2010-2011 | States | To be developed |
| | • identify training needs and develop corresponding guidelines | 2010-2011 | States | In progress |
| | • identify training programmes and develop corresponding guidelines | 2010-2011 | AFI PBN TF/States | in progress |
| | • formulate system performance monitoring plan | 2010-2011 | AFI PBN TF/States | To be developed |
| | | • implementation of en-route ATS routes | 2010-2012 | AFI PBN TF/States |
| | • monitor implementation progress in accordance with AFI PBN implementation plan and State implementation plan | 2010 and beyond | AFI PBN TF/States | On-going |

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

| AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE | | | | |
|---|--|----------------------------|-----------------------|---------------------------------------|
| Benefits | | | | |
| Environment | • reduction in gas emissions | | | |
| Efficiency | • ability of aircraft to conduct flight more closely to preferred trajectories | | | |
| Safety | • increase in airspace capacity | | | |
| | • improved availability of procedures | | | |
| | • facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency | | | |
| Strategy | | | | |
| Short term (2010) | | | | |
| Medium term (2011-2015) | | | | |
| ATM OC COMPONENT S | TASKS | TIMEFRAME START-END | RESPONSIBILITY | STATUS |
| AOM | <i>Terminal airspace</i> | 2008 | | |
| | • develop regional implementation plan | 2009 | AFI PBN TF | Completed |
| | • develop regional action plan | 2009-2010 | AFI PBN TF | Completed |
| | • develop State PBN implementation plan | 2009 (see note1) | States | In progress (X States have completed) |
| | • establish collaborative decision making (CDM) process | 2010 | States | In progress |
| | • develop airspace concept based on AFI PBN roadmap, in order to design and implement an optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), holding and associated instrument flight procedures, on the basis of PBN and, in particular RNAV 1 and Basic-RNP 1 | 2009-2012 | PBN TF/States | In progress |
| | • develop performance measurement plan | 2010-2012 | States | In progress |
| | • formulate safety plan | 2010-2012 | States | To be developed |
| | • publish national regulations for aircraft and operators approval using PBN manual as guidance material | 2010-2011 | States | To be developed |
| | • identify training needs and develop corresponding guidelines | 2010-2011 | States | In progress |
| | • identify training programmes and develop corresponding guidelines | 2010-2011 | AFI PBN TF | To be developed |
| | • formulate system performance monitoring plan | 2010-2012 | AFI PBN TF/States | In progress |
| | • develop a regional strategy and work programme implementation of SIDs and STARs | 2009-2012 | AFI PBN TF/States | In progress |
| | • monitor implementation progress in accordance with AFI PBN implementation roadmap and State implementation plan | 2010 and beyond | AFI PBN TF/States | On going |
| Linkage to GPIs | GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: FMS-based arrival procedures. | | | |

Note 1: States that have not already done so, should complete their national PBN implementation plans as soon as possible

OPTIMIZATION OF VERTICALLY GUIDED RNP APPROACHES

Benefits

| | |
|--|---|
| Environment Efficiency Safety | <ul style="list-style-type: none"> • reduction in gas emissions • increased accessibility to aerodromes, including continuity of access • increased runway capacity • reduced pilot workload • availability of reliable lateral and vertical navigation capability |
|--|---|

Strategy

| ATM OC COMPONENTS | TASKS | TIMEFRAME START-END | RESPONSIBILITY | STATUS |
|--|---|---------------------|-------------------|-----------------|
| AOM | <i>Terminal airspace</i> | 2008 | | |
| | • develop regional implementation plan | 2008 – 2009 | AFI PBN TF | Completed |
| | • develop regional action plan | 2009-2010 | AFI PBN TF | Completed |
| | • develop State PBN implementation plan | 2009 (*) | States | In progress |
| | • establish collaborative decision making (CDM) process | 2010 | States | In progress |
| | • develop airspace concept based on AFI PBN implementation plan, in order to design and implement RNP APCH with Baro-VNAV or LNAV only (see note 1) in accordance with relevant Assembly resolutions , and RNP AR APCH where beneficial | 2009 – 2012 | AFI PBN TF/States | In progress |
| | • develop performance measurement plan | 2010-2012 | States | In progress |
| | • formulate safety plan | 2010-2012 | States | To be developed |
| | • publish national regulations for aircraft and operators approval using PBN manual as guidance material | 2010-2011 | States | To be developed |
| | • identify training needs and develop corresponding guidelines | 2010-2011 | States | In progress |
| | • identify training programmes and develop corresponding guidelines | 2010-2011 | AFI PBN TF/States | To be developed |
| | • implementation of APV procedures | 2010 - 2016 | AFI PBN TF/States | In progress |
| • Formulate system performance monitoring plan | 2010-2012 | AFI PBN TF/States | in progress | |
| linkage to GPIs | GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARS; GPI/12: FMS-based arrival procedures | | | |

(*)States that have not already done so, should complete their national PBN implementation plans as soon as possible.

Note 1: where altimeter setting does not exist or aircraft are not suitably equipped for APV

REPORT ON AGENDA ITEM 4: STATUS OF IMPLEMENTATION OF PBN IN THE AFI REGION

4.1 The Task Force recalled that at its first meeting in Nairobi, Kenya 12-14 October 2010, it reviewed and updated the AFI Regional PBN Implementation Plan and aligned it with the Assembly Resolution A37-11, which replaced A36-23. Furthermore, the Performance Framework Forms (PFFs) for Regional Performance Objectives applicable to airspace optimization including the implementation of PBN were updated. In this regard, States that had not already developed and implemented the applicable parts of their national PBN implementation plans were urged to do so as soon as possible, noting that the target of December 2009 in Assembly Resolution A36-23 had long passed.

4.2 The Task Force noted that since the PBN/GNSS TF/1 meeting in October 2010, the APIRG/17 Conclusions had been forwarded to States under State Letters requesting update from the States on the implementation of the Conclusions. However, while some States have reported significant progress in the implementation of PBN, generally responses to the State Letters have been significantly low. States participating at the meeting updated the status on development of National PBN Plans **as at Appendix 4A to the report on agenda item 4.**

4.3 It was reiterated that in order for APIRG and ICAO to assess the Regional status of implementation, challenges impeding implementation, and for appropriate measures to be taken to foster implementation, it is important for States and their Air Navigation Service Providers (ANSPs) to provide details on their national status of implementation.

4.4 It was noted with appreciation that pursuant to APIRG 17 Conclusion 17/53, the Regional Offices requested a Special Implementation Project (SIP) for a PBN Seminar/Workshop, which the Secretary General has approved. However, since approval of the SIP, appropriate availability of expertise to conduct the Seminar/Workshop has been a challenge on which ICAO is working to address.

4.5 The meeting deliberated at length on measures to effectively advance the implementation of PBN. It was noted that in many cases, there was a perennial challenge among many States, whereby officials charged with PBN implementation are not ones being included in training seminars. Another challenge was the lack of retention of expertise.

4.6 The Task Force recognized that while training remains important, it is not an end on itself. Training should be regarded as a tool that should put in the hands of those who are charged with delivery. Additionally, measures should be taken to ensure that decision makers are duly sensitized. In light of the foregoing the meeting agreed on the following:

- (a) The forthcoming PBN Seminar should have at least one day in which presentations will be targeted at Directors General/CEOs, in order to facilitate necessary sensitization;
- (b) ICAO should, as part of missions visiting States include communication aimed at sensitizing DGs/CEOs on the requirements and benefits of PBN; and
- (c) National PBN implementation committees should be empowered accordingly

4.7 The meeting established a Small Working Group on Training Requirements (SWG-TR) to identify training. The SWG-TR, convened in the morning of 14 June 2011 and completed its business. Outcome of the SWG-TR as approved by the PBN/GNSS TF/2 meeting is at **Appendix 4B** to the report on agenda item 4.

4A-1
PBN/GNSS TF/2
Appendix A to Report on Agenda Item 4

APPENDIX A

INTERNATIONAL CIVIL AVIATION ORGANISATION

**STATES THAT HAVE DEVELOPED AND SUBMITTED PBN IMPLEMENTATION PLANS
TO THE REGIONAL OFFICES**

| STATE | | NATIONAL PBN PLAN SUBMITTED | STATES | | NATIONAL PBN PLAN SUBMITTED |
|-------|--------------------------|-----------------------------|--------|-----------------------|-----------------------------|
| 01 | Algeria | | 28 | Lybia | |
| 02 | Angola | | 29 | Madagascar | YES |
| 03 | Benin | | 30 | Malawi | |
| 04 | Botswana | YES | 31 | Mali | |
| 05 | Burkina Faso | | 32 | Mauritania | |
| 06 | Burundi | | 33 | Mauritius | YES |
| 07 | Cameroon | | 34 | Morocco | |
| 08 | Cape Verde | | 35 | Mozambique | |
| 09 | Central African Republic | | 36 | Namibia | |
| 10 | Chad | | 37 | Niger | |
| 11 | Comoros | | 38 | Nigeria | YES |
| 12 | Congo | | 39 | Rwanda | |
| 13 | Cote D'Ivoire | | 40 | Sao Tome and Principe | |
| 14 | Dem. Republic of Congo | YES | 41 | Senegal | |
| 15 | Djibouti | | 42 | Seychelles | YES |
| 16 | Egypt | YES | 43 | Sierra Leone | |
| 17 | Equatorial Guinea | | 44 | Somalia | |
| 18 | Eritrea | | 45 | South Africa | YES |
| 19 | Ethiopia | YES | 46 | Sudan | |
| 20 | Gabon | | 47 | Swaziland | |
| 21 | Gambia | | 48 | Tanzania | |
| 22 | Ghana | YES | 49 | Togo | YES |
| 23 | Guinea | | 50 | Tunisia | |
| 24 | Guinea- Bissau | | 51 | Uganda | YES |
| 25 | Kenya | YES | 52 | Zambia | |
| 26 | Lesotho | | 53 | Zimbabwe | |
| 27 | Liberia | | | | |

4B-1
PBN/GNSS TF/2
Appendix B to Report on Agenda Item 4

**Training to be Considered by States for Inclusion in National Training Programmes
to Support the Implementation of PBN**

1. AIR NAVIGATION SERVICE PROVIDERS

a) ATS

ATS Personnel: As per ICAO PBN Manual (Doc 9613)

b) CNS (ATSEPs)

Maintenance personnel: PBN Awareness/Concept

Engineering personnel: Equipment/Infrastructure technical standards/specifications

c) AIM

AIM personnel: SWIM (System Wide Information Management) as part of PBN

d) MET

MET personnel: PBN Awareness + WXX Model a PBN enabler

e) Airspace Planning

Airspace planning personnel: PBN Advanced Application

f) PANS OPS

Procedure Designers: as per ICAO Doc 9906

g) ANS SMS

ANS SMS Personnel: PBN Awareness

h) Top level management

Top level management Personnel: PBN Awareness

4B-2
PBN/GNSS TF/2
Appendix B to Report on Agenda Item 4

2. CAA/Regulatory

a) Flight Operations

Flight Operations Inspectors: Draft ICAO PBN Operations Approval Handbook training

b) Airworthiness

Airworthiness Inspectors: Draft ICAO PBN Operations Approval Handbook training

c) ANS Inspectorates/Regulators

Inspectorate and regulatory personnel: Same as ANSPs + ANS Approvals and Oversight

d) SSP

SSP Personnel: PBN Awareness

e) Top level management

Top level management personnel: PBN Awareness

3. Industry

a) Flight Operations

Flight Crew/Dispatchers: As per ICAO PBN Manual (Doc 9613)

b) Continuing Airworthiness/Engineering

Maintenance Engineers: PBN Awareness + Relevant Nav Specification

REPORT AGENDA ITEM 5: REVIEW OF GNSS IMPLEMENTATION STRATEGY

5.1 Under this agenda item the secretariat presented to the meeting the list of perceived hurdles to the implementation of GNSS worldwide. These hurdles were collected by ICAO Regional Offices as a response to the request of the Secretariat of the Navigation System Panel (NSP) to conduct a survey in order to address as many of these hurdles as possible in the revised GNSS Manual (ICAO Doc 9849).

Based on the results of the survey and the categorization of the type of hurdles (**Open* (16hurdles) or Close** (33 Hurdles)**), the meeting noted that although in many cases it was possible to address specific hurdles by adding guidance material to the draft GNSS Manual, some hurdles, however, require action by other ICAO bodies, by States or by equipment manufacturers.

The meeting was also provided with barriers experienced in the other ICAO Regions. The meeting agreed that in order to ensure a successful implementation of GNSS in AFI region AFI States/organizations should clearly identify among the hurdles provided, those who should be critical to the implementation of GNSS and develop an adequate Action Plan aiming to overcoming them. The following conclusion was formulated.

Conclusion 2/2: Identification of hurdles to the implementation of GNSS in AFI Region

That:

Based on ICAO provision in GNSS Manual (ICAO Doc 9849), AFI States/Administrations should identify from the list of hurdles provided, those who should be critical and develop an adequate Action Plan aiming to overcoming them.

5.2 The meeting reviewed the status of implementation of GNSS in AFI Region and was provided with information pertaining to the development of GNSS implementation process within other ICAO regions. The meeting noted technical and environmental conditions similar to those experienced in AFI region. It was agreed to take into consideration the experience gained in the other ICAO regions and develop or update the adequate documents that must govern the GNSS strategy, GNSS implementation Plan, GNSS capacity building, GNSS safety assessment in AFI region. The following conclusion was formulated.

Conclusion 2/3: Updating AFI PBN/GNSS Action Plan

That taking into consideration the status of implementation of PBN in ICAO Regions, AFI States /Administrations identify from the area of PBN/GNSS planning, strategy, capacity building and safety assessment, the guidance materials from which, can be driven additional provision to update the current AFI PBN/GNSS Implementation Plan and strategy.

5.3 The secretariat provided the meeting with the outcome actions undertaken in order to implement APIRG/Conclusion 17/28 (Need for a High Level Meeting on AFI GNSS Strategy).The meeting was informed that a high level meeting was held in Dakar on November 2010 with the participation of ICAO.

5.4 The meeting was also briefed on the ongoing actions conducted by ICAO for the implementation of APIRG/17 Conclusion 17/29 (Need for an Independent Cost-Benefit Analysis) It was noted that the Terms of Reference for the Cost Benefit Study were developed and provided to AFCAC for consideration.

5.5 The meeting discussed in length on the suitable GNSS technology to be implemented within AFI Region in support PBN operations. IATA confirmed to the meeting that the users do not support implementation of SBAS. The meeting was informed that the African Union has accepted the principle of a Memorandum of Understanding for the usage of extended EGNOS (SBAS) within AFI region for various satellite localization and navigation purposes.

Moreover some AFI States/ Administrations are inclined to use SBAS for their domestic Air Navigation Operations in order to take advantages of the opportunity that can be driven from this technology for national airports.

5.5 The meeting therefore tasked a Working Group composed by Air navigation Services Providers and IATA to review the Strategy of Implementation of GNSS by clearing defining the condition of implementation of SBAS within AFI region:

- a) Subjected to APIRG Conclusion 17/29: *Need of an independent Cost Benefit Analysis*
- b) Full compliance with ICAO technical requirements;
- c) Case to case Cost Benefit agreement before implementation;
- d) The Civil Aviation stakeholders in particular governments should guarantee that there will be no cross-subsidization of non-civil aviation users of SBAS. The users pays principle is to be applied across all sectors;

The revised strategy is presented in APPENDIX 5A to the Report on agenda item 5

N.B: *Hurdles are considered **CLOSED*** when: they were directly addressed by text in the GNSS Manual; other action has been taken to close them; or, when no action is possible, otherwise they are **OPEN*****



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
WESTERN AND CENTRAL AFRICA OFFICE**

APPENDIX A

**Concept of the GNSS Strategy for the AFI Region
Amendment proposals to AFI CNS/ATM
Implementation Plan (Doc 003)**

1. INTRODUCTION

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

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

2. GENERAL CONSIDERATION

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

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

3. EVOLVING FUNCTIONALITY

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

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

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

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

- b) Terminal areas: sufficient capability to meet TMA navigation requirements everywhere in the AFI region. GNSS is approved as sole-means for TMAs, taking into account technical and legal developments, and institutional aspects.
- c) Terminal area VOR/DME/NDB, and Locators not associated with ILS, will not be replaced during Phase II.
- d) Approach and landing phase: sufficient capability for APV1 in the whole AFI Region. ILS will continue to be provided at aerodromes¹.

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

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

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

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

5. Summary of AFI GNSS Strategy

AFI GNSS Strategy – Synopsis

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

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

GNSS INFRASTRUCTURE IN SUPPORT OF PBN REQUIREMENTS

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

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

- **Conditions of Implementation of SBAS**

- e) Subjected to APIRG Conclusion 17/29: *Need of an independent Cost Benefit Analysis*
- f) Full compliance with ICAO technical requirements;
- g) Case to case Cost Benefit agreement before implementation;
- h) The Civil Aviation stakeholders in particular governments should guarantee that there will be no cross-subsidization of non civil aviation users of SBAS. The users pays principle is to be applied across all sectors;

REPORT ON AGENDA ITEM 6: REVIEW OF THE TERMS OF REFERENCE OF THE PBN/GNSS TASK FORCE

6.1 The meeting recalled that the APIRG/17 meeting, Ouagadougou, Burkina Faso 2-6 August 2010 agreed on the establishment of the PBN/GNSS Task Force and the relevant Terms of Reference and work programme.

6.2 The meeting noted that the PBN/GNSS TF1 meeting revised the TOR and work programme of the PBN/GNSS Task Force to better reflect the work assigned to the Task Force, in particular by extending the expertise expected to be made available by States, to participate in the business of the Task Force.

6.3 In the same spirit, noting the various information/data needed for the PBN/GNSS implementation process, the meeting was of the view that aeronautical information experts as well as other air traffic related data managers should participate in the work of the Task force.

6.4 In view of the above the meeting developed proposed updated TOR and work programme, and formulated the following Draft Decision:

Draft Decision 2/4: Revised Terms of Reference of the PBN/GNSS Task Force

That, the terms of reference of the APIRG PBN/GNSS Task Force are revised as at Appendix 6A to the report on agenda item 6.

**APPENDIX A
TERMS OF REFERENCE AND WORK PROGRAMME
FOR THE AFI PBN/GNSS TASK FORCE**

1. TERMS OF REFERENCE

- a) Carry out specific studies in support of the implementation of Performance Based Navigation (PBN) in the AFI Region, according to the ICAO Strategic Objectives and Global Plan Initiative (GPI) 5 and related GPIs (GPIs 7, 10, 11, 12, 20, 21 including CNS related GPIs).
- b) Identify other issues/action items arising from the work of ICAO or for consideration by ICAO in order to facilitate regional and global harmonization of existing applications as well as future implementation of Performance Based Navigation operations.
- c) Determine and recommend, on the basis of the studies, the PBN strategy and Implementation Plan for the AFI Region, based on the ICAO PBN Implementation goals as reflected in assembly resolution 36-23.
- d) Assist States that may require support in the implementation of PBN.

2. WORK PROGRAMME

| Activity/Task | Assigned person/organ | Target date |
|---|-----------------------|-------------|
| <ol style="list-style-type: none"> a) Study and assess the Regional RNAV and RNP requirements. b) Initially focus assistance to States that may require support on development of the State PBN implementation plans. c) Identify priority routes and terminal areas where RNAV and RNP should be implemented. d) Identify priority runways for Approach Procedures with Vertical Guidance (APV) to be implemented based on the ICAO RNP APCH navigation specification (APV). e) Develop an amendment proposal to the AFI Regional Supplementary Procedures concerning the implementation of PBN in the Region. f) Identify guidance material and training needs. g) Follow up on the developments in ICAO affecting the Global Plan and PBN in particular, in order to update the Regional plans accordingly. h) Coordinate with other ICAO Regions as necessary to address implementation interface issues. i) Undertake other functions relevant to implementation of PBN as assigned by APIRG. j) Develop and update (as necessary) the Regional PBN Implementation Strategy and Plan. k) Develop the PBN performance objectives and related action plans for en-route, terminal and approach phases of flight. l) Report to APIRG through its ATM and CNS Sub- groups. | | |

3. THE TASK FORCE SHALL BE GUIDED BY THE FOLLOWING PRINCIPLES

3. The Task Force shall in its work be guided by the following principles:

- a) Implementation of PBN shall follow the ICAO PBN goals and milestones.
- b) Avoid undue equipage of multiple on board equipment and/or ground-based systems;
- c) Avoid the need for multiple airworthiness and operational approvals for intra- and interregional operations;
- d) Continue application of conventional air navigation procedures during the transition period, to guarantee the operations by users that are not RNAV- and/or RNP-equipped;
- e) The first regional PBN Implementation Strategy and Plan should address the short term (2008-2012), medium term (2013-2016) and take into account long term global planning issues;
- f) Cognizance that the primary objective of ICAO is that of ensuring the safe and efficient performance of the global Air Navigation System, ensure that pre- and post-implementation safety assessments will be conducted to ensure the application and maintenance of the established target levels of safety;
- g) Take into account the introduction of new technologies, encourage implementation and development in GNSS;
- h) Coordinated implementation with other relevant Regional Plans;
- i) Apply ICAO guidance material and information as may be applicable to the Region to facilitate the implementation of PBN.

4. COMPOSITION OF THE TASK FORCE:

States: AFI States and States having territories in the AFI Region

(The next Task Force Meeting to decide on a list of core member States/organizations, preferably not exceeding 15).

The Task Force comprises of the following expertise from the AFI Region:

Regulatory authorities and ANSP professionals who are charged with the responsibilities relating to PBN implementation.

These may be from various fields of air navigation service, as well as airworthiness and operations. However they will primarily be from the following field/areas:

1. Air Navigation Services (ATM, AIM CNS (including GNSS experts)
2. Data managers (whose functions included ATM, CNS and aircraft navigation capabilities related data)
3. Flight Operations and Airworthiness professionals who are charged with the responsibilities for operational approvals

~~*The Task Force comprises of the following expertise:*~~

~~*Regulatory authorities and ANSP professionals who are charged with the responsibilities relating to PBN implementation. These may be from various fields of air navigation services*~~

~~*or flight operations;*~~

Professionals from Regulatory authorities who are charged with the responsibilities for operational approvals. These will include such officials as from air navigation service, flight operations and airworthiness fields.

Note: States are requested to include in their delegations: PBN experts, GNSS (CNS) experts, as well as official experts involved in the PBN approval process of aircraft operators.

Organizations: ASECNA, IATA, IFALPA, IFATCA and ESA. Additional representatives and expertise from International/Regional Organizations as well as States from other ICAO Regions may be invited when required.

---END---

REPORT ON AGENDA ITEM 7: DATE AND VENUE OF THE NEXT MEETING

7.1 The meeting recalled that, in accordance with the APIRG Procedural Handbook, the Task Force is expected to decide on the dates and venue of its next meeting.

7.2 In this regard, it also noted that the next ATM/AIS/SAR SG/12 meeting was scheduled to be held from 25 to 29 July 2011 in Dakar, Senegal. The latter will report to APIRG/18 (Uganda, 16-18 November 2011) on PBN and GNSS issues.

7.3 It was acknowledged that, in order foster, harmonize and accelerate implementation actions in the AFI Region, a higher frequency of the PBN/GNSS Task Force meetings was recommendable, and in this regard it had been envisaged that the third meeting of the PBN/GNSS Task Force could be convened before the end of the year 2011. The meeting would be convened in Nairobi, Kenya, or in a State in the ESAF area. The feasibility of the convening the meeting in 2011 is however, under review.

7.4 The meeting nevertheless agreed on the convening of PBN/GNSS TF/3 meeting in the last quarter of 2011 or first quarter of 2012. The final dates and venue of the meeting will be coordinated with other activities of the Regional Offices, and States and Organizations will be advised accordingly in due time.

7.5 The meeting agreed also on the provisional agenda for the third PBN/GNSS Task Force meeting which is attached at Appendix 7A to the report on agenda item 7.

Provisional Agenda for PBN/GNSS TF/3

| STRATEGIC OBJECTIVES | AGENDA ITEM NO. | SUBJECT |
|----------------------|-----------------|---|
| A | 1. | Election of Chairperson and Adoption of the Agenda |
| A | 2. | Review and follow up of Recommendations, Conclusions and Decisions applicable to the Task Force |
| A & C | 3. | Status of implementation of PBN in the AFI Region <i>(National Implementation Plans, PBN Airspace Planning, PBN Routes, PBN Procedures)</i> |
| A | 4. | AFI GNSS Implementation Strategy <i>(The Strategy is to be reviewed based on latest developments in APIRG, AFCAC/AU, as well as in the availability of GNSS technologies)</i> |
| A & C | 5. | Review of Terms of Reference (TOR) of the PBN/GNSS Task Force and Work Programme |
| A & C | 6. | PBN and GNSS Regional Performance Objectives; <i>(Update of PFFs)</i> |
| A | 7. | Date and Venue of the next meeting |
| | 8. | Any other business |

1
PBN/GNSS TF/2
Attachment A – List of participants



Second Meeting of the APIRG Performance Based Navigation and Global Navigation Satellite System Implementation Task Force (PBN/GNSS TF/2)

(Dakar, Senegal, 13 - 15 June 2011)

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PBN/GNSS TF/2
Attachment B to the Report

DRAFT CONCLUSIONS

DRAFT CONCLUSION 2/1: AFI PBN REGIONAL PERFORMANCE FRAMEWORK FORMS

THAT THE AFI PBN REGIONAL PERFORMANCE FRAMEWORK FORMS ARE UPDATED AS AT APPENDIX 3A TO THE REPORT ON AGENDA ITEM 3.

DRAFT CONCLUSION 2/2: IDENTIFICATION OF HURDLES TO THE IMPLEMENTATION OF GNSS IN AFI REGION

THAT BASED ON ICAO PROVISION IN GNSS MANUAL (ICAO DOC 9849), AFI STATES/ADMINISTRATIONS SHOULD IDENTIFY FROM THE LIST OF HURDLES PROVIDED, THOSE WHO SHOULD BE CRITICAL AND DEVELOP AN ADEQUATE ACTION PLAN AIMING TO OVERCOMING THEM.

DRAFT CONCLUSION 2/3: UPDATING AFI PBN/GNSS ACTION PLAN

THAT TAKING INTO CONSIDERATION THE STATUS OF IMPLEMENTATION OF PBN IN ICAO REGIONS, AFI STATES /ADMINISTRATIONS IDENTIFY FROM THE AREA OF PBN/GNSS PLANNING, STRATEGY, CAPACITY BUILDING AND SAFETY ASSESSMENT, THE GUIDANCE MATERIALS FROM WHICH, CAN BE DRIVEN ADDITIONAL PROVISION TO UPDATE THE CURRENT AFI PBN/GNSS IMPLEMENTATION PLAN AND STRATEGY.

DRAFT DECISION

DRAFT DECISION 2/4: REVISED TERMS OF REFERENCE OF THE PBN/GNSS TASK FORCE

THAT THE TERMS OF REFERENCE OF THE APIRG PBN/GNSS TASK FORCE ARE REVISED AS AT APPENDIX 6A TO THE REPORT ON AGENDA ITEM 6.