INTERNATIONAL CIVIL AVIATION ORGANIZATION

THE MIDDLE EAST AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

REPORT OF THE SEVENTH MEETING OF GNSS TASK FORCE (GNSS TF/7)

(Cairo, Egypt, 08-09 April 2008)

The views expressed in this Report should be taken as those of the MIDANPIRG GNSS Task Force and not of the Organization. This Report will, however, be submitted to the MIDANPIRG and any formal action taken will be published in due course as a Supplement to the Report.

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

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PART I: HISTORY OF THE MEETING

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1. PLACE AND DURATION

1.1 The Seventh meeting of MIDANPIRG GNSS Task Force was held at the ICAO Middle East Regional Office, Cairo, 08 - 09 April 2008.

2. OPENING

2.1 Mr. Jehad Faqir, Deputy Regional Director, warmly welcomed all the participants to Cairo and to the GNSS TF/7 Meeting. He brought to the attention of the meeting the decision of the ATM/SAR/AIS SG/9 and RVSM/PBN TF/1 meetings for the combination of the GNSS TF with PBN to form one task force PBN/GNSS, he also draw attention of the meeting to 36th assembly resolution particularly A36-23 on the PBN which has specific target dates that needs to be met, he also high lighted the major role that GNSS plays being the only navigation infrastructure that supports all the navigation specification. Finally he reminded the meeting that it is important to update the status of the GPIs and the Terms Of Reference (TOR) of the task force and wished the meeting every success in its deliberations.

3. ATTENDANCE

3.1 The meeting was attended by a total of 30 participants, which included experts from eight (8) States and two (2) International Organizations. The list of participants is at **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by the Senior Navaids Engineer Mr. Mohammed Hassan Al-Asfoor from Bahrain and Mr. R. A. Gulam, RO/CNS from the ICAO Middle East Regional Office acted as the Secretary of the meeting.

5. LANGUAGE

5.1 The discussions were conducted in English. Documentation was issued in English.

6. AGENDA

6.1 The following Agenda was adopted:

Agenda Item 1: Adoption of the Provision Agenda

Agenda Item 2: Follow-up action on MIDANPIRG and GNSS TF/6 Conclusions and Decisions related to GNSS matters

Agenda Item 3: GNSS Recent Developments, Trials and Demonstrations in the MID Region

Agenda Item 4: GNSS and Navigation System Implementation in the MID Region

4.1 Review of GNSS and Navigation System Implementation in the MID Region

4.2 Strategy for GNSS implementation
4.3 MID Region GNSS implementation plan

Agenda Item 5: Future Work Programme

Agenda Item 6: Any other business

7. CONCLUSIONS AND DECISIONS – DEFINITION

7.1 The Sub-Group records its actions in the form of Draft Conclusions and Draft Decisions for further action and adoption by the MIDANPIRG as its Conclusions and Decisions with the following significance:

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

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

7.2 In the same context, the Sub-Group can record its actions in the form of Conclusions and Decisions where no further action is required by the MIDANPIRG or already authorized by MIDANPIRG.

8. LIST OF DRAFT CONCLUSIONS AND DECISIONS

DRAFT CONCLUSION 7/1: PROTECTION OF GNSS SIGNAL

DRAFT CONCLUSION 7/2: PROPOSAL FOR AN AMENDMENT TO MID ANP/FASID CNS 3 TABLE

DRAFT CONCLUSION 7/3: STRATEGY FOR THE IMPLEMENTATION OF GNSS IN THE MID REGION

DRAFT DECISION 7/4: ESTABLISHMENT OF THE PBN/GNSS TASK FORCE

DRAFT DECISION 7/5: WORKING ARRANGEMENTS OF THE PBN/GNSS TASK FORCE

PART II: REPORT ON AGENDA ITEMS

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REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

1.1 The meeting was presented with the Provisional Agenda for the GNSS TF/7 meeting. The Provisional Agenda was adopted as shown in paragraph 6 of the history of the meeting.

REPORT ON AGENDA ITEM 2: FOLLOW-UP ACTION ON MIDANPIRG AND GNSS TF/6 CONCLUSIONS AND DECISIONS RELATED TO GNSS MATTER

2.1 The meeting was presented with the list of Conclusions and decisions adopted by MIDANPIRG/10, and the follow up actions taken by concerned parties, including relevant Draft Conclusions and Decisions developed by the GNSS TF/6, ATM/SAR/AIS SG/9 and RVSM/PBN TF/1 meetings, as at **Appendix 2A** to the Report on Agenda Item 2.

2.2 The meeting noted that appropriate actions had been initiated in relation to most of the Conclusions. The follow-up of the different conclusions will be reviewed under the related Agenda Items.

2.3 In reviewing the GNSS TF/6 Draft Conclusion 6/2: *Use of Project Management Methodology for the implementation of GNSS,* the meeting was of the opinion that the software could be MS project but it was also clarified that the conclusion encourage States to use the Project management methodology and did not specify any software and States could use any kind of software.

2.4 Concerning MIDANPIRG/10 Conclusion 10/8: *EGNOS Studies in the MID Region.* The meeting received an oral update on study on EGNOS extension in the ARG-3 Region, the meeting noted that the study was divided in two tasks: task 1 concerned the technical assessment of the EGNOS extension, and task 2 the definition of the EGNOS Service Implementation. Task 2 was formally completed at the end of January. The activities for Task 1 are now complete, but not formally closed as a Final Review is still to be organised.

2.5 The meeting was advised that GNSS Supervisory Authority (GSA) tried to organise a workshop to present the results of the ARG-3 extension study and the plans for the next phase, with participation of EC and ESA on European side and ACAC partners. Originally this workshop was planned for April, which was fitted with the presentation of the results at the GNSS TF/7. The workshop did not take place in April, consequently GSA decided that they will not be in a position to present the results of the ARG-3 extension study at the GNSS Task Force of April 8th/9th. Instead, they would like to use the future ARG-3 workshop to present the results of the study, GSA will keep GNSS TF updated.

GNSS TF/7
Appendix 2A to the Report on Agenda Item 2

GNSS TF/6, MIDANPIRG/10 AND ATM/SAR/AIS SG/9
DRAFT FOLLOW-UP ACTION PLAN

DRAFT CONC/DEC NO. --- STRATEGIC OBJECTIVE	TITLE OF CONCLUSION/ DECISION	TEXT OF CONCLUSION/DECISION	FOLLOW-UP ACTION	TO BE INITIATED BY	DELIVERABLE	TARGET DATE
Draft Dec. 6/1 D and E	MID Checklist for GNSS Based Operation	That, MID States introducing GNSS-based operations use the guidance checklist as shown at **Appendix 4B** to the Report on Agenda Item 4.	Monitor Implement	• States • GNSS TF	GNSS Implementation Plan	June 2008
Draft Conc. 6/2 D	Use of Project Management Methodology for Implementation of GNSS	That, MID States are encouraged to use the "Project Management" methodology software for the follow-up and update of the tasks related to implementation of GNSS in their States.	Updates to Project Plan	• States • GNSS TF	Project document (support when needed)	Ongoing
Draft Conc. 6/3 A and D	Proliferation of Operational Approval Requirements	That, in order to avoid proliferation of operational approval requirements, MID States implement PBN using ICAO SARPs and guidance material.	Harmonized Implementation of PBN	• States • ICAO	PBN Plan Seminars	Dec. 2009 Nov. 2007
Draft Conc. 6/4 D	GNSS Cost Allocation Policy	That, MID States consider ICAO provisional policy guidance on GNSS cost allocation in the course of discussions and negotiations with GNSS service providers.	Monitor	• States • GNSS TF	Fair Cost Allocation (support when needed)	Ongoing
Draft Conc. 6/5 D and E	Revised Strategy for the Implementation of GNSS in the MID Region	That, the Revised Strategy for implementation of GNSS in the MID Region to be updated as at **Appendix 5A** to the Report on Agenda Item 5.	Monitor	• ICAO • States • GNSS TF	Implement Strategy	June 2008

DRAFT CONC/DEC NO. --- STRATEGIC OBJECTIVE	TITLE OF CONCLUSION/ DECISION	TEXT OF CONCLUSION/DECISION	FOLLOW-UP ACTION	TO BE INITIATED BY	DELIVERABLE	TARGET DATE
Draft Dec. 6/6 D	Revised TOR of the GNSS Task Force	That, the terms of reference and work programme of the GNSS TF be updated as at Appendix 6A to the Report on Agenda Item 6.	Conduct tasks	GNSS TF	GNSS TF/7 Report	June 2008
Conc. 10/8 D	EGNOS Studies in the MID Region	That, European Space Agency (ESA) and GNSS Supervisory Authority (GSA) define the EGNOS architecture and feasibility of using additional Ranging Integrity Monitoring Stations (RIMS) for achieving APV and to support the regional cost benefits analysis in the MID Region.	• Follow up with ESA and GSA • Cost benefit analysis (CBA)	• ICAO MID Regional Office • States	• ESA and GSA inputs • CBA Reports	May 2008 Sept. 2008
Conc. 10/14 A, C, D and E	Implementation of Work Programme in support of Strategic Performance Objectives	That, in support of the evolution from a systems-based approach to a performance-based approach to planning and implementation of air navigation, the following projects are to be reflected in the MID Region implementation plan: a) improvement of the MID ATS route structure (FUA, dynamic and flexible ATS route management, improved Civil/Military coordination, etc); b) enhancement of MID States' TMA management; c) MID RMA operations continuity; d) support of the introduction and implementation of SMS in the MID States; e) development of MID States' contingency plans;	Follow up progress on each project	• ICAO MID Regional Office • States • MIDANPIRG subsidiary bodies	• Feedback from States • National Plans • Status of implementation of GPIs	Nov 2008.

DRAFT CONC/DEC NO. --- STRATEGIC OBJECTIVE	TITLE OF CONCLUSION/ DECISION	TEXT OF CONCLUSION/DECISION	FOLLOW-UP ACTION	TO BE INITIATED BY	DELIVERABLE	TARGET DATE
		f) improvement of the quality and efficiency of aeronautical information services provided by MID States; g) provision of eTOD by MID States; h) establishment of Initial FPL Processing System (IFPS) in the MID Region; i) implementation of ATN in the MID Region; j) improvement of communication infrastructure; k) implementation of GNSS; l) implementation of Certification of aerodromes and SMS at aerodromes in the MID Region; m) preparedness to accommodate NLAs at some existing/new aerodromes in the MID Region; n) support the establishment and implementation of Runway surface pavement maintenance programme in the MID Region; o) enhancement of Runway incursion prevention programme; and p) enhancement of surface movement guidance and control systems (SMGCS) at MID Aerodromes.				

DRAFT CONC/DEC NO. --- STRATEGIC OBJECTIVE	TITLE OF CONCLUSION/ DECISION	TEXT OF CONCLUSION/DECISION	FOLLOW-UP ACTION	TO BE INITIATED BY	DELIVERABLE	TARGET DATE
Draft Dec. 9/10 D	Reassignment of RVSM and PBN Functions	That, taking into consideration the status of implementation of RVSM and PBN in the MID Region: a) the RVSM/PBN Task Force is renamed PBN Task Force with TOR as at Appendix 9A to the report on Agenda Item 9; b) prior to the formal establishment of the PBN Task Force, the RVSM/PBN Task Force focus primarily on matters related to PBN implementation in the MID Region; and c) MIDANPIRG Steering Group (MSG) and the CNS/ATM ATM IC SG explore the possibility of combining the PBN and GNSS Task Force		ICAO MID Office	PBN/GNSS TF establishment	Oct 2008

REPORT ON AGENDA ITEM 3: GNSS RECENT DEVELOPMENTS, TRIALS AND DEMONSTRATIONS IN THE MID REGION

3.1 The meeting recalled that the current status reporting provisions in Annex 10 were developed at a time when there was usually a direct relationship between the loss of a radio navigation aid and the associated service provided to aircraft. However, with GNSS there is no direct relationship between the status of a particular satellite and the overall radio navigation services available to an aircraft (since different satellites may be used at different times and/or by different aircraft). Furthermore, operational capability is increasingly diverse between different aircraft, depending on the degree of sophistication and sensor integration of the available avionics.

3.2 The meeting noted that Navigation Systems Panel (NSP) Working Group of the Whole developed in its third meeting recommendations for amendments to Annex 10 Aeronautical Telecommunications, Volume I - Radio Navigation Aids, addressing issues associated with the implementation of GNSS. The NSP meeting also recommended consequential changes to Annex 11 — Air Traffic Services and Annex 15 — Aeronautical Information Services.

3.3 The meeting further noted that the purpose of the proposed amendments is to facilitate the wider implementation of the existing GNSS Standards and Recommended Practices (SARPs) and the achievement of the associated safety and efficiency benefits. They provide resolutions of implementation issues that have arisen so far and reflect the evolution of existing GNSS systems and equipment. The meeting noted that this amendment will be part of Amendment 83 and the applicability date will be for 20 November 2008.

3.4 The meeting was updated on the subject of whether a State should conduct monitoring of the GNSS signal in order to use GNSS for navigation in their State with specific regard to the requirement to provide status monitoring for ABAS operations, the meeting noted that the official interpretation is provided in ICAO Document 9849 (GNSS Manual, para.5.6.5.7.)

3.5 In this regard the meeting was further updated that even when status monitoring and NOTAMs need to be provided, there is no requirement to have a real-time ground based system. NOTAMs can be based on the status information that is provided by the satellite operator and can be obtained by the State authorizing the operation, as can the information on scheduled outages. Real-time ground-based status monitoring is therefore NOT a minimum requirement, as per the above mention amendment. A detailed note on GNSS monitoring is at **Appendix 3A** to the Report on Agenda Item 3.

3.6 The meeting noted that the main concern of the users is to have assurance from the service providers that a common failure of the GNSS system will not occur at the same time, in this regard the meeting was of the opinion that ICAO HQ to address the issue with service providers.

3.7 The meeting noted that GNSS (and ABAS using RAIM in particular) is available on a worldwide basis, not much needed to be done in terms of infrastructure assessment. However, it should be noted that the responsibility for providing services based on GNSS within the airspace of a particular State remains within that State.

3.8 Consequently, the ANSP should assess that the interference environment is satisfactory for the planned procedures. Furthermore the meeting was updated that this can be accomplished by a variety of means, explained in ICAO Doc 9846, GNSS Manual, Doc 8071, Testing of Radio Navigation Aids and Annex 10 such as through specific ground and/or airborne interference measurements, by reviewing existing GNSS recordings.

3.9 The meeting was updated on the results of the ITU World Radiocommunication Conference 2007 (WRC-07), 22 October to 16 November 2007, Geneva, Switzerland related to GNSS signal protection. Is this regard the meeting recalled that ICAO position for WRC-07 was reviewed by the Air Navigation Commission (174-7) on 20 February 2007 and subsequently approved by Council (181/4) on 28 May 2007. The updated ICAO Position, detailed in State letter E 3/5-07/49, dated 22 June 2007, was submitted to the ITU WRC-07 on 13 June 2007.

3.10 The meeting noted that during WRC-07, protection of the Global Navigation Satellite Service (GNSS) signals in the band 1 559-1 610 MHz (Global Positioning System (GPS), GLOobal NAvigation Satellite System (GLONASS) was improved by downgrading the fixed service (FS) operating in this band in thirty-four countries to a secondary status. Consequently, operation of the FS in these countries has to protect the GNSS. Until the end of 2009, this band is still allocated on a primary basis in nine countries in Africa and the Middle East. Although the use of this band by the FS needs to be terminated by 2015, as of 2009 the GNSS service operating in this band will be protected on a global basis.

3.11 ICAO policies and practices related to the radio frequency spectrum matters are outlined in Assembly Resolution A36-25 which urges ICAO Contracting States to support aviation requirements for spectrum and instructs ICAO to make sufficient resources available to enable increased participation in spectrum management activities

3.12 The meeting agreed that Interference-free operation of GNSS would require coordination with the radio regulators and/or operators and civil aviation experts are to educate the regulator and operators on importance to delete their States names from foot notes *5.362B and 5.362C States concerned are:*
5.362B: Jordan, Lebanon, Libya, Saudi Arabia, Syria
5.362C: Bahrain, Egypt, Iraq, Israel, Jordan, Kuwait, Lebanon, Qatar, Sudan, Syria and Yemen

3.13 Based on the above the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 7/1: PROTECTION OF GNSS SIGNAL

That, MID States that have their names in footnote 5.362B and 5.362C are urged to take necessary measures to delete their names from these footnote as soon as possible in order to protect the GNSS signal.

3.14 The meeting received a progress report on the NAVISAT project along with the implementation plan which is at **Appendix 3B** to Report on Agenda Item 3.

3.15 The meeting had concerns on the technique of sharing information and recalled that there is MIDANPIRG Conclusion 10/10 calling for information sharing, in this regard and it was agreed that States to provide the results of the trials and any other useful information that they would like to Share through the MID Form and also posting on ICAO MID office websites.

GNSS TF/7
Appendix 3A to the Report on Agenda Item 3

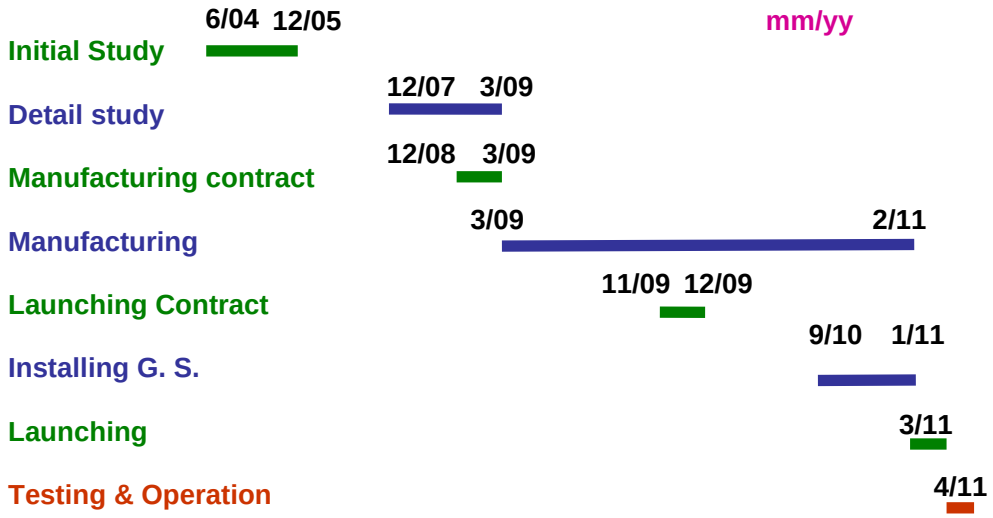
NOTES ON GNSS MONITORING

The subject of whether a State should conduct monitoring of the GNSS signal in order to use GNSS for navigation in their State comes up repeatedly in international fora. With specific regard to the requirement to provide status monitoring for ABAS operations, the official interpretation is provided in ICAO Document 9849 (GNSS Manual), para. 5.6.5.7:
"A decision on whether or not to develop a status monitoring and NOTAM system for ABAS operations should be made by taking into account the nature of ABAS approvals. In many cases ABAS operations are predicated on having a full complement of traditional NAVAIDs available for back-up when ABAS cannot support service."
Even when status monitoring and NOTAMs need to be provided, there is no requirement to have a real-time ground based system. NOTAMs can be based on the status information that is provided by the satellite operator and can be obtained by the State authorizing the operation, as can the information on scheduled outages.
Real-time ground-based status monitoring is therefore NOT a minimum requirement. A State could use it an independent real-time ground based system as one resource-intensive way to provide status monitoring, but in that case, a number of issues arise.
Specifically for Basic GNSS systems, that is systems equipped with aircraft based augmentation system based on RAIM (Receiver Autonomous Integrity Monitoring), the key issue with generating NOTAMs based on a real-time status monitoring system is the fact that all the following factors can differ between aircraft:
- the receiver RAIM algorithms of different receivers can be different; - the satellites in view can be a different set; - the receiver mask angle can vary; - integration with other sensors/aids (DME/DME, baro, inertial) may or may not be available to the navigation system; - by definition, status monitoring system cannot provide scheduled outage information, and hence even a State operating such system ultimately needs to rely on information provided by the GNSS operator.
Hence the prediction is best done using the avionics themselves or appropriate PC software used for flight planning (GPS satellite NOTAMs have to be input into the software).
Ground-based monitoring tool have some "psychological" advantages insofar as the air navigation service provider may feel more in control of the situation. However, this perception should not obscure the following facts:
- RAIM availability is user specific (as discussed above) and cannot be generalized; - monitoring does not change anything – it is just information which can be applicable or not and cannot be projected forward (it is not a prediction);
- conflicting status information between ground-based status monitoring and avionics could create a human factors issue insofar as pilots would have to decide which source to trust;
- if, in order to resolve the conflict, pilots were asked always to trust the avionics in case of conflict, the ground-based system would be effectively proven to be useless;
- if, on the other hand, the ground based system information should be made to prevail, integrity and/or availability could be affected depending on whether the ground-based system overestimates or underestimates the quality of the signals at the aircraft's location and the capabilities of on-board navigation system.

Thus, in addition to being resource-intensive, a ground-based monitoring system is problematic insofar as it may actually worsen the actual performance of the overall navigation system, without providing any improvement with respect to the on-board monitoring capabilities provided by ABAS.

GNSS TF7
Appendix 3B to the Report on Agenda Item 3

NAVISAT updated Implementation plan



REPORT ON AGENDA ITEM 4: GNSS AND NAVIGATION SYSTEM IMPLEMENTATION IN THE MID REGION

4.1 The meeting noted that the GNSS TF/6, conducted a through review of the Document "Improvement of Navigation System in the MID Region". However the document still missing more detailed information on various topics the meeting was of the view that this document should be enhanced to be become useful and reliable document.

4.2 The meeting appreciated the efforts done by GNSS TF/6 in developing "MID Region checklist for the introduction of GNSS based operation" and was of the same view as above that, this needs to be further refined in order that MID States take full benefit of this check list.

4.3 Consequently the meeting formed a small working group comprising at least one participant from each attending State and IATA as observer, to review and update the document "Improvement of Navigation Systems in the MID Region" and its attachments. Based on the outcome of the small working group, the meeting agreed on the tasks assigned to each participant as at **Appendix 4A** to the Report on Agenda Item 4, the meeting also agreed to include "MID Region checklist for the introduction of GNSS based operation "as an extra attachment to the document. The meeting also agreed that the updated document to be circulated to States and presented to the next meeting.

4.4 The small working group composed of: Bahrain (Mohamed Alasfoor), Egypt (Mohamed Alkadi),Iraq (Iman Ameer), Jordan (Mahmoud Sabrah), Kuwait (Jassim Almuhannadi), Oman (Mohamed Al- Abri), Saudi Arabia (Mazen Bazhair), UAE (Stan Facey) and IATA (Ahmed Qinawi).

4.5 The meeting further noted that CNS Table 3 of the FASID which is also part of the above documents needs update and agreed that once updates are received ICAO MID Regional office will commence the process for the amendment of the FASID CNS3 Tables as per the established procedures. Based on the above the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 7/2: PROPOSAL FOR AN AMENDMENT TO MID ANP/FASID CNS 3 TABLES

*That, a proposal for amendment to MID ANP/FASID CNS3 tables contained at **Appendix 4B** to the Report on Agenda Item 4 be prepared by the MID Regional Office for approval according to established procedures.*

4.6 The meeting noted that the 36th Session of the ICAO Assembly held in Montreal 18-28 September 2007 had adopted Resolution A36-23: *Performance based navigation global goals*, urging Contracting States to implement RNAV and RNP air traffic services (ATS) routes and procedures in accordance with ICAO PBN concept described in the *Performance Based Navigation Manual* (Doc 9613).

4.7 The meeting further noted that the resolution also calls on the States and Planning and Implementation Regional Groups (PIRGs) to develop PBN implementation plans by 2009 to ensure globally harmonized and coordinated implementation of PBN.

4.8 The meeting also noted that the PBN Manual Doc 9613, discuss in details the navigation specifications, related applications and associated infrastructure (terrestrial navigation aids and GNSS) which reflects the position of the GNSS Navaid being supporting all the Navigation specification, as per the following Table 1:

	GNSS	IRU	D/D	D/D/IRU	D/VOR
RNAV 10	√	√			
RNAV 5	√	√	√	√	√
RNAV 2/1	√		√	√	
RNP 4	√				
Basic-RNP 1	√				
RNP APCH	√				
RNP AR APCH	√				

Table1 Overview of navigation specification and supporting infrastructure

4.9 Based on the above, the meeting was of the view that the STRATEGY FOR THE IMPLEMENTATION OF GNSS IN THE MID REGION needs to be revised, consequently the meeting revised the ***STRATEGY FOR THE IMPLEMENTATION OF GNSS IN THE MID REGION*** and agreed on the following Draft Conclusion:

DRAFT CONCLUSION 7/3: STRATEGY FOR THE IMPLEMENTATION OF GNSS IN THE MID REGION

That, the Revised Strategy for implementation of GNSS in the MID Region to be as at ***Appendix 4C*** *to the Report on Agenda Item 3.*

4.10 The meeting recalled that, MIDANPIRG/10 under Conclusion 10/13 endorsed the MID Region Strategy for the Implementation of the Global Plan Initiatives (GPIs). The meeting noted that the GPIs were considered for the first time by the CNS/ATM/IC SG/3 in February 2007, and that more detailed work regarding implementation, which will include review of tasks under each GPI identified for the MID Region, refinement of target dates and update of the status of implementation, was going to be carried out by the MIDANPIRG subsidiary bodies.

4.11 Furthermore, MIDANPIRG/10 noted that, on advice from the ICAO Council, all Bureaux and Regional Offices have initiated development of their own Operational Plans in which critical tasks are broken down into smaller, contributing tasks. Accordingly, there would have to be a transition process in which ultimately PIRGs and their subsidiary bodies would need to develop project proposals. In this regard, the meeting noted that in support of the evolution from a system-based approach to a performance-based approach to planning and implementation of air navigation, MIDANPIRG/10, under Conclusion 10/14 approved the list projects and it was highlighted that concerning GNSS field **Implementation of GNSS** project was endorsed.

4.12 The meeting was of the view that the actions, tasks and target dates relevant to the GNSS in the attachment to the strategy for the implementation of GPIs need to be refined and updated with a view to be proposed to the CNS/ATM/IC SG/4 meeting. Accordingly, the meeting reviewed and updated the list as at **Appendix 4D** to the Report on Agenda Item 4.

GNSS TF/7
Appendix 4A to the Report on Agenda Item 4

TASKS FOR THE IMPROVEMENT OF DOCUMENT

Deliverables	**To be delivered by**	**Target Date**
Introduction	ICAO and Kuwait	14 May
TOC	ICAO and Kuwait	14 May
Chapter 1	All - Consolidation by ICAO	22 May
Satellite network	all to provide update according to sample from Iraq	02 May
Updates on Sat net	All	20 May
Chapter 2	All updates and GNSS Plans	30 May
Chapter 3	ESA follow-up Egypt	30 August
Chapter 4	Bahrain with IATA	30 July
Chapter 5	Saudi	30 July
Chapter 6	UAE	30 Sep
Attachment A	All by next week for FASID (reply is a must even if you don't have updates)	14 April
All other attachment		14 May
Check list	Jordan /Oman	30 August
Amendment proposal for the GNSS part	ICAO based on inputs provided	01 June

Notes:

1- All State letters to DG and copy to participants for the above tasks.
2- The group will work through e-means (exchange of emails, net meeting etc.) to complete the assigned tasks.

TABLE CNS 3 — RADIO NAVIGATION AIDS (MID REGION)

TABLA CNS 3 — AYUDAS PARA LA RADIONAVEGACIÓN (REGIÓN MID)

EXPLANATION OF THE TABLE

Column

1 Name of the country, city and aerodrome and, for en-route aids, the location of the installation.

2 The designator number and runway type:

NINST - non-instrument runway
NPA — non-precision approach
PA-1 — precision approach runway, Category I
PA-2 — precision approach runway, Category II
PA-3 — precision approach runway, Category III

3 The functions carried out by the aids appear in columns 4 to 8 and 10 to 12:

A/L — Approach and landing
T — Terminal
E — En-route

4 ILS — Instrument landing system. Roman numeral I and II indicate the acting category of the ILS, I, II or III. (I) indicates that the facility is implemented

The letter "D" indicates a DME requirement to serve as a substitute for a marker beacon component of an ILS

Note.— Indication of category refers to the standard of facility performance to be achieved and maintained in accordance with pertinent specifications in ICAO Annex 10 and not to the specifications of the ILS equipment itself, which are not necessarily the same.

An asterisk (*) *indicates that the ILS requires a Category II signal quality, but without reliability and availability provided by redundant equipment and automatic changeover.*

5 Radio beacon localizer, be it associated with an ILS or to be used as an approach aid to an aerodrome.

6 Radiotelemetrical equipment. When an "X" appears in column 6 in line with the VOR in column 7, this indicates the need that the DME be installed at a common site with the VOR.

7 VOR VHF omnidirectional radio range.

8 NDB – Non Directional Beacon

9 The distance and altitude to which signal protection of the VOR or VOR/DME are required, indicated in nautical miles (NM) and in thousands of feet.

10, 11 GNSS-global navigation satellite system (includes GBAS and SBAS).

GBAS (ground-based augmentation system) implementation planned to be used in precision approach and landing CATI, CATII, CAT III.

SBAS (Satellite-based augmentation system) implementation planned to be used for route navigation, for terminal, for non precision approach and landing. An "X" indicates service availability,; exact location of installation will be determined.

Note.- GPS receiver is under standard rules and ABAS (aircraft-based augmentation system)

12 **Remarks**

Note.- Columns 5 to 12 use the following symbols:

X- Required but not implemented
XI- Required and implemented

EXPLICATION DU TABLEAU
(To be completed by HQ)

TABLE CNS 3

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
AFGHANISTAN											
GHAZNI		E				X		200/45			
KABUL/Kabul	11 NPA	A/L			X	X					
	29 PA 1	A/L	I*	X	X	X					
		T			X	X					
		E			X	X		300/45			
KANDAHAR/Kandahar	05 NPA	A/L		x		X					
	23 NPA	A/L				X					
		T				X		300/45			
		E				X		300/45			
BAHRAIN											
BAHRAIN/Bahrain Intl	12R NPA				X I	X I					
	30L NPA				X I	X I					
	12L PA2	A/L	II (I)		XI	XI					
	30R PA2	A/L	II (I)	X	XI	XI		300/45			
EGYPT											
EL-ARISH/ El-Arish Int'l	16 NPA	A/L			XI	XI		150/45			
	34 NPA										
ASYUT/ Asyut Int'l	13 NPA	A/L			XI	XI		200/45			
	31 NPA	E									
ALEXANDRIA/ Alexandria Intl	04 PA 1	A/L	I*		XI	XI	XI	100/45			
	22 NPA	E			XI	XI		150/45			
	18 NPA										
	36 NPA										
ALEXANDRIA/ Borg El Arab Int'l	32 PA 1	A/L	I* (I) D	X	XI	XI	XI	100/45			
	14 NPA	T									

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
CAIRO/ Almaza Int.	18 NPA 36 NPA 05 NINST 23 NINST	A/L					XI	25/45			
CAIRO/Cairo Intl	05R PA 2 23R PA 2 23L PA 2 05L PA 2 16 NPA 34 NPA	A/L A/L A/L A/L T E	II II(I) II (I) II (I)	X X X X	XI	XI		150/45 200/45			
HURGHADA/ Hurghada Intl	16 NPA 34 PA 2	A/L T E	I*(I)		XI XI	XI XI		 100/45			
LUXOR/ Luxor Intl	02 NPA 20 PA 1	A/L T E	I* (I)		XI XI	XI XI		 150/45			
MARSA ALAM/ Marsa Alam Int'l	15 NPA 33 NPA	A/L			XI	XI		150/45			
SHARK EL OWEINAT/ Shark El Oweinat Int'l	01 NPA 19 NPA	L					XI	100/45			
PORT –SAID/ Port –Said Int'l	10 NPA 28 NPA	L			XI	XI		200/45			
ST. CATHERINE/ St. Catherine Intl	17 NPA 35 NINST	L					XI	150/45			
SHARM EL SHEIKH/ Sharm El Sheikh Intl	04L PA1 22R NPA 04R NPA 22L NPA	A/L T E	I (II)	X	XI XI	XI XI	XI	100/45 200/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
ASWAN/ Aswan Intl	17 PA1 35 PA1	A/L T E	II	X	XI XI	XI XI		150/45			
TABA/ Taba Int'l	04 NPA 22 NPA	A/L T			X	XI	XI	150/45 100/45			
IRAN, ISLAMIC REPUBLIC OF											
ABADAN	32L PA 1	A/L E	I* (I)		XI	XI		200/45			
AHWAZ	30 PA 1	A/L E	I* (I)		XI	XI		300/45			
ARDABIL	~~31~~ 33 PA 1	A/L E	I* (I)		XI	XI		200/45			
ASALOYEH	30 PA 1	A/L E	I*		XI	XI		300/45			
BANDAR ABBAS/Intl	21L PA1	A/L E	I* (I)		XI	XI		200/45			
BANDAR LENGEH	NPA	A/L E			XI	XI		200/45			
BANDAR MAHSHAHR / MAHSHAHR	NPA	A/L E			XI	XI		300/45			
BIRJAND		E			XI	XI		300/50			
BOJNORD	NINST	E			XI	XI		150/45			
BUSHEHR	~~NPA~~ 30 PA2	A/L E	I*		XI	XI		300/45			
CHAH BAHAR / KONARAK	NPA	A/L E			XI	XI		200/45			
DARBAND		E			XI	XI		300/45			
DEH-NAMAK		E			XI	XI		300/45			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
ESFAHAN / Shahid Beheshti Intl	26R PA 1	A/L E	I*(I)		XI	XI		300/45			
HAMADAN	NPA	A/L E			XI	XI		200/45			
ILAM	NPA	A/L E			XI	XI		300/45			
IRAN-SHAHR	NPA	A/L E			X	X		300/45			
JAM/TOHID	NPA	A/L			XI	XI		300/45			
KARAJ / PAYAM	NPA	A/L			XI	XI		200/45			
KERMAN	~~NPA~~ 34 PA1	A/L E	I*(I)		XI	XI		200/45			
KERMANSHAH / Shahid Ashrafi Esfahani	29 PA1	A/L E	I* (I)		XI	XI		300/45			
KHARK ISLAND /Khark	NPA	A/L E			XI	XI		300/45			
KHORAM ABAD	29 PA 1	A/L E	I*		XI	XI		200/45			
KISH ISLAND	NPA	A/L E			XI	XI		200/45			
MALAYER		E			XI	XI		300/45			
MASHHAD / Shahid Hashemi Nejad Intl	31R PA1	A/L E	I* (I)		XI	XI		300/45			
NOSHAHR	NPA	A/L E			X	X		200/45			
OMIDIYEH	NPA	A/L			XI	XI		200/45			
RASHT	27 PA 1	A/L E	I* (I)		XI	XI		300/45			
SABZEVAR	NPA	A/L E			XI	XI		300/45			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
ANARAK		E			XI	XI		300/45			
SANANDAJ	NPA	A/L E			XI	XI		200/45			
SARI/Dashte-Naz	NPA	A/L E			XI	XI		300/45			
SAVEH		E			XI	X		300/45			
SHIRAZ / Shahid Dastghaib Intl	29L PA 1	A/L E	I* (I)		XI	XI		300/45	X		
SIRJAN	NPA	A/L E			XI	XI		200/45			
TABRIZ Intl	30R PA 1	A/L E	I* (I)		XI	XI		200/45			
TEHRAN/Imam Khomaini Intl	29R PA 2	A/L	II* (I)		XI	XI		300/45			
TEHRAN/Mehrabad Intl	29L PA 1	A/L E	I* (I)	XI	XI	XI		300/45	X		
UROMIYEH	~~NPA~~ 21 PA1	A/L E	I* (I)		XI	XI		200/45			
YAZD / Shahid Sadooghi	NPA	A/L E			XI	XI		300/45			
ZAHEDAN	~~NPA~~ 35 PA1	A/L E	I* (I)		XI	XI		200/45			
ZANJAN	NPA	E			XI	XI	XI	200/45			
IRAQ											
AIN ZALAH		E			X	X		100/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
BAGHDAD/~~Saddam~~ Baghdad Int'l	~~15R PA 2~~ NINST	A/L	II (I)	X	X	X					
	~~33L PA 2~~ NINST	A/L	II (I)	X	X	X					
	~~15L PA 2~~ NINST	A/L	II (I)	X	X	X					
	~~33R PA 2~~ NINST	A/L	II (I)	X	X	X					
		E			X	X		200/45			
BASRAH/Intl	~~14 PA 2~~	A/L	II (I)	X	X	X					
	~~32 PA 2~~	A/L	II (I)	X	X						
		E				X		300/45			
HASHIMIYA		E			X	X		200/45			
(HADITHA)		E			X	X		100/50			
MANDALY		E									
MOSUL	PA~~2~~ 1	A/L		X	X	X					
SAMARA		E			X	X		200/45			
HAWIJA		E			X	X		100/50			
SHATRA		E			X	X		100/50			
ISRAEL											
ELAT/Elat	03 NPA	A/L			XI	XI					
	21 NINST	E			XI	XI					
					X	X		300/45			
HAIFA/Haifa	16 NINST										
	34 NINST										
JERUSALEM/Atarot	12 NINST	A/L									
	30 PA 1	A/L	I*								
METZADA		E			X	X		150/45			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
NATANIA		E			X	X		150/45			
OVDA/Intl	20R NPA	A/L	I		X	X		150/50			
	02L NINST										
TEL AVIV/Ben Gurion	03 NPA				XI	XI					
	21 NINST	A/L			XI	XI					
	08 NINST	A/L	I* (I)	X	XI						
	26 PA 1	A/L	I* (I)	X	XI	XI					
	12 PA 1	E			XI	XI					
	30 NPA	E			XI	XI					
						X		150/50			
						X		200/50			
TEL AVIV/Sde-Dov	03 NINST	A/L									
	21 NINST	A/L									
ZOFAR		E			X	X		150/45			
JORDAN											
AMMAN/MARKA	24 PA 1	A/L	I (I)	XI	XI	XI	X				
		E			X	XI		150/50	X		
AMMAN/Queen Alia	08R NPA	A/L			XI	XI				X	
	26L PA ~~2~~ 1	A/L	I*	XI	XI	XI	X				
	08L ~~N~~PA 1	A/L			XI	XI	X				
	26R ~~N~~PA1	A/L			XI	XI					
AQABA/~~Aqaba~~ king Hussein	~~02~~ 01 PA 1	A/L	I*	XI	XI	XI	X	200/50	X		
		E			X	X		200/50			
METSA		E			X	X		150/50			
QATRANEH		E			X	X		100/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS
									GBAS	SBAS	OBSERVACIONES
1	2	3	4	5	6	7	8	9	10	11	12
KUWAIT											
KUWAIT/Intl	15R PA 2	A/L	II (I)	XI	XI						
	33L PA 2	A/L	II (I)	XI	XI						
	15L PA 2	A/L	II (I)		XI						
	33R PA 2	A/L	II (I)		XI						
		T			XI	XI		300/50			
		E			XI	XI		300/50			
LEBANON											
~~BAYSUR~~		~~E~~				~~X~~		~~180/40~~			
BEIRUT/Beirut Intl	~~18~~ 16 PA 1	A/L	I* (I) D	X	X I	~~X I~~					
	~~21~~ 17 PA 1	A/L	I* (I) D	X	X I	~~X I~~					
	03 PA 1	A/L	I* (I) D	X	X I	~~X I~~					
	21 PA1	~~E~~ AL	I* (I) D	X	X I	~~X I~~		~~150/45~~			
CHEKKA		E			Xi	XI		~~80~~ 150/50			
~~SAIDA~~ kHALDE		E/T			Xi	XI		150/50			
BOD		E/T					XI	150			
BAB		E/T					XI	150			
OMAN											
HAIMA		E			X I	X I		200/45			
IZKI		E			X I	X I		200/45			
MARMUL		E			X I	X I		200/45			
MUSCAT/Seeb Intl	08 PA 1	A/L	I* (I) D		X I						
	26 PA 1	A/L	I* (I) D		X I						
		E			X I	X I		200/45			
SALALAH/Salalah	07 NPA	A/L			X I	X I					
	25 PA 1	A/L	I* (I) D		X I	X I					
		E			X I	X I		200/45			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
SUR		E			X I	X I		200/45			
QATAR											
DOHA/Doha Intl	16 NPA	A/L			X	X					
	34 PA 1	A/L	I* (I)	X	X	X					
		E			X	X		300/45			
SAUDI ARABIA											
AL JOUF	10 NPA	A/L			XI	XI					
	28 NPA	A/L			XI	XI					
	28 PA 1	A/L	I*		XI	XI					
		T			X	X		300/50			
AL SHIGAR		E			XI	XI		300/50			
ARAR	10 NPA	A/L			XI	XI					
	28 NPA	A/L			XI	XI					
		T			X	X					
		E			XI	XI		300/50			
BAHA	07 NPA	A/L			XI	XI					
	25 NPA	A/L			XI	XI					
	25 NPA	A/L		X							
	25 PA 1	A/L	I*		XI	XI					
		T			X	X		300/50			
BIR DURB		E			X	X		300/50			
BISHA	18 NPA	A/L			XI	XI					
	36 NPA	A/L			XI	XI					
	18 PA1	A/L	I*		X						
		T			X	X					
		E			X	X		300/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
BOPAN		E			XI	XI		300/50			
DAFINAH		E			XI	XI		300/50			
DAMMAM (King Fahad Intl)	16L PA 1	A/L	I (I)		XI	XI					
	34R PA 1	A/L	I (I)		XI	XI					
	16R PA 1	A/L	I (I)		XI	XI					
	34L PA 1	A/L	I (I)		XI	XI					
		T			XI	XI					
		E			XI	XI		300/50			
GASSIM	15 NPA	A/L			XI	XI					
	33 NPA	A/L			XI	XI					
	15 PA 1	A/L	I*		X						
		T			X	X					
		E			X	X		300/50			
					I						
GURIAT	10 NPA	A/L			XI	XI					
	28 NPA	A/L		X							
	28 NPA	A/L			XI	X					
		T			X	X					
		E			X	X		300/50			
HAFR AL-BATIN	16 NPA	A/L			XI	XI					
	34 NPA	A/L			XI	XI					
		T			X	X					
		E			XI	XI		300/50			
HAIL	18 NPA	A/L			XI	XI					
	36 NPA	A/L			XI	XI					
	18 PA 1	A/L	I *		X						
		T			X	X					
		E			X	X		300/50			
HALAIFA		E			XI	XI		300/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
JEDDAH/King Abdul Aziz Intl	16R PA 2	A/L	II (I)		XI	XI					
	34L PA 2	A/L	II (I)		XI	XI					
	16L PA 1	A/L	I* (I)		XI	XI					
	34R PA 1	A/L	I* (I)		XI	XI					
	16C PA 2	A/L	II (I)		XI	XI					
	34C PA2	A/L	II (I)		XI	XI					
		T			XI	XI					
		E			XI	XI		300/50			
JUBAIL	17 NPA	A/L				X					
	35 NPA	A/L				X					
	35 PA 1	A/L	I*		X						
		T			X			300/50			
MADINAH/Prince Mohammad Bin Abdulaziz	17 PA 1	A/L	I*		XI	XI					
	35 PA 1	A/L	I*	X	XI	XI					
	36 PA 1	A/L	I*	X	XI	XI					
	18 NPA	A/L			XI	XI					
		T			XI	XI					
		E			XI	XI		300/50			
MAGALA		E			XI	XI		300/50			
RABIGH		E			XI	XI I		300/50			
RAFHA	11 NPA	A/L			XI	XI					
	29 NPA	A/L			XI	XI					
		T			X	X					
		E			XI	XI		300/50			
RAGHBA		E			XI	XI		300/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
RIYADH/King Khalid Intl	15L PA 1	A/L	I* (I)		XI	XI					
	33R PA 1	A/L	I* (I)		XI	XI					
	15R PA 1	A/L	I* (I)		XI	XI					
	33L PA 1	A/L	I* (I)		XI	XI					
		T			XI	XI					
		E			XI	XI		300/50			
TURAIF	10 NPA	A/L			XI	XI					
	28 NPA	A/L			XI	XI					
		T			X	X					
		E			XI	XI		300/50			
WADI AL-DAWASIR	10 NPA	A/L			XI	XI					
	28 NPA	A/L			XI	XI					
	10 PA 1	A/L	I*		XI						
		T			X	X					
		E			XI	XI		300/50			
WEDJH	15 NPA	A/L			XI	XI					
	33 NPA	A/L			XI	XI					
	33 NPA	A/L		X							
	33 PA 1	A/L	I*								
		T			X	X					
		E			XI	XI		300/50			
YENBO	10 NPA	A/L			XI	XI					
	28 NPA	A/L			XI	XI					
	28 PA 1	A/L	I*		XI						
		T			X	X					
		E			XI	XI		300/50			
SYRIAN ARAB REPUBLIC											
ALEPPO/Neirab	27 ~~N~~ PA2	A/L		X		X					
		E				X		150/50			

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
DAMASCUS/Intl	05L ~~N~~PA2	A/L			X	X					
	23R PA ~~1~~ 2	A/L	I* (I)	X	X	X					
	05R ~~N~~PA2	A/L			X	X					
		E			X	X		150/50			
KARIATAIN		E			X	X		150/50			
LATAKIA/Bassel -Al- Assad	17 NPA	A/L		X	X	X					
TANF		E				X		160/40			
UNITED ARAB EMIRATES											
ABU DHABI/Abu Dhabi Intl	13 PA 1	A/L	I* (I)		X I	X I					
	31 PA 3	A/L	III (I)		X I	X I					
		E			X I	X I		300/45			
AL AIN/Al Ain Intl	01 PA 1	A/L	I*		X I	X I					
	19 NPA	A/L			X I	X I					
		E			X I	X I		300/45			
DUBAI/Dubai Intl	12L PA 3	A/L	III (I)		X I	X I					
	30R PA 3	A/L	III (I)		X I	X I					
	12R PA 2	A/L	II (I)		X I	X I					
	30L PA 2	A/L	II (I)		X I	X I					
		E			X I	X I		300/45			
FUJAIRAH/Fujairah Intl	11 NPA	A/L			X I	X I					
	29 PA 1	A/L	I* (I)		X I	X I					
		T			X I	X I		40/25			
RAS AL KHAIMAH/Ras al Khaimah Intl	16 NPA	A/L		X	X I	X I					
	34 PA 1	A/L	I* (I)	X							

Station	RWY Type	Function	ILS	L	DME	VOR	NDB	Coverage	GNSS		REMARKS OBSERVACIONES
									GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12
SHARJAH/Sharjah Intl	12 NPA	A/L			X I	X					
	30 PA 1	A/L	I* (I)	X I	X I	X					
		E				X I		300/45			
YEMEN											
ADEN/Intl	08 NPA	A/L			X	X					
	26 PA 1	A/L	I* (I)	X	X	X					
		E			X	X		300/50			
AL-GHAIDAH		E			X	X		300/50			
HODEIDAH	03 NPA	A/L		X	X	X					
	21 NPA	A/L		X	X	X					
		E			X	X		200/45			
RIYAN/Intl	06 NPA	A/L			X	X					
	24 NPA	A/L			X	X					
		E			X	X		300/50			
SANA'A/Intl	18 PA 1	A/L	I* (I)	X	X	X I					
	36 NPA	A/L			X	X I					
		E			X	X I		200/45			
SIYUN		E			X	X		150/45			
TAIZ/Intl	01 NPA	A/L		X	X	X					
	19 NPA	A/L		X	X	X					
		E			X	X		200/45			

GNSS TF/7
Appendix 4C to the Report on Agenda Item 4

STRATEGY FOR THE IMPLEMENTATION OF GNSS IN THE MID REGION

The following is the Strategy for the implementation of GNSS aligned with PBN in the MID Region:

Considering that:

a) Safety is the highest priority.

b) Elements of Global Air Navigation Plan on GNSS and requirements for the GNSS implementation will be incorporated into the CNS part of FASID.

c) GNSS Standards and Recommended Practices (SARPs), PANS and guidance material for GNSS implementation are available.

d) Human, environmental and economic factors will affect the implementation.

e) The availability of avionics, their capabilities and the level of user equipage.

f) The development of GNSS systems including satellite constellations, augmentation systems and improvement in system performance.

g) The airworthiness and operational approvals allowing the current GNSS applied for en-route and non-precision approach phases of flight without the need for augmentation services external to the aircraft.

h) The effects of ionosphere on GNSS and availability of mitigation techniques;

i) The PBN concept and the availability of PBN guidance material

The general strategy for the implementation of GNSS in the MID Region is detailed below.

1) Introduction of GNSS Navigation Capability should be consistent with the Global Air Navigation Plan.

2) Implementation of GNSS and Augmentations should be in full compliance with ICAO Standards and Recommended Practices and PANS

3) Assessment of the extent to which the GNSS system accessible in the Region can meet the navigational requirements of ATM service providers and aircraft operators in the Region

4) Introduce the use of GNSS with appropriate augmentation systems, as required, for en-route navigation and Implementation of approach procedures with vertical guidance A 36-23 (APV) (Baro -VNAV and or augmented GNSS) for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 per cent by 2010, 70 per cent by 2014

5) States, in their planning and introduction of GNSS services, take full advantage of future benefits accrued from using independent core satellite constellations, other GNSS elements and their combinations, and avoid limitations on the use of specific system elements.

6) Facilitate the use of GNSS; as enabler for PBN for enroute, terminal, approach and departure navigation. States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in adjacent flight information regions along major traffic flows to allow for a seamless transition to GNSS based navigation.

7) States should to the extent possible work co-operatively on a multinational basis under ICAO MID Office Guidance to implement GNSS in order to facilitate seamless and inter-operable systems and undertake coordinated R&D programmes on GNSS implementation and operation

8) States consider segregating traffic according to navigation capability and granting preferred routes to aircraft that are appropriately equipped for PBN to realize the benefits of such equipage taking due consideration of the need of State aircraft.

9) ICAO and States should undertake education and training programs to provide necessary knowledge in AIM concept, PBN, GNSS theory and operational application.

10) States establish multidisciplinary GNSS implementation teams, using section 5.2.2 and Appendix C of ICAO Document 9849, GNSS Manual.

11) States, in their planning for implementation of GNSS services, provide effective spectrum management and protection of GNSS frequencies to reduce the possibility of unintentional interference.

GNSS TF/7
Appendix 4D to the Report on Agenda Item 4

MID REGION STRATEGY FOR THE IMPLEMENTATION OF THE GLOBAL PLAN INITIATIVES (GPIs)

Considering:

a) the ICAO strategic objectives;

b) the ICAO Business Plan;

c) the Global Air Traffic Management Operational Concept;

d) the revised Global Air Navigation Plan and associated GPIs; and

e) the outcome of ALLPIRG/5 meeting; and

Recognizing that:

i) the evolution continues from a systems-based to a performance-based approach to planning and implementation of the air navigation infrastructure; and

ii) the Global Air Navigation Plan is a significant component in the development of regional and national plans and that, together with the global ATM operational concept, it provides an effective architecture for achieving a safe, harmonized, interoperable, and seamless Global ATM system.

The MID Region strategy for the implementation of the Global Plan Initiatives (GPIs) is detailed below:

A) the MID Region implementation plan should:

1) be evolutionary and consistent with the Global Air Navigation Plan taking into consideration the region priorities;

2) cope with the development of an ATM Performance framework;

3) satisfy performance needs just in time and at minimal cost;

4) provide States with clearer objectives for the implementation of ATM and supporting CNS systems;

5) identify the GPIs that would be most effective in achieving the objectives of the region while ensuring continuation of the work already accomplished;

6) take into account the Initiatives across regions, to align work programmes and to develop national and regional plans that facilitate achieving a Global ATM system;

B) the GPIs status of implementation in the MID Region is at **Attachment 1**;

C) the progress achieved and the challenges identified in the implementation of GPIs should be monitored and reviewed on a regular basis; and

D) taking into consideration the above, the implementation plan should be considered as a living document, which should be updated on a regular basis.

ATTACHMENT 1

IMPLEMENTATION OF GNSS IN THE MID REGION

GPI-21: NAVIGATION SYSTEMS
GPI-23: AERONAUTICAL RADIO SPECTRUM

Strategic Objectives	Actions	Description/Tasks	Target Date	Action by	Status	Benefits
C, D	Implement GNSS	– Carry out GNSS trials, demonstrations and test beds;	2010	ICAO, States	NO UPDATES	– Optimal use of advanced technologies; – Operational Efficiency; Reduction in environmental impact.
		– Determine the most appropriate augmentation system for the MID Region based on cost-benefit analysis				
		- Implement GNSS for En-route;				
		- Implement GNSS for NPAs;				
		– Introduce, in an evolutionary manner, the use of GNSS with appropriate augmentation system in the MID Region;				
		– Monitor implementation progress.				
		Get users needs and equipage of fleet				
		Define training needs				
		Publish GNSS trail results				
		States to Amend Legislation				

Strategic Objectives	Actions	Description/Tasks	Target Date	Action by	Status	Benefits
A, D	Implement Radio Spectrum Management and processes to protect the aeronautical spectrum	– Ensure Regional coordination for the protection of the aviation spectrum at WRC2007, and beyond – Disseminate ICAO policy statements of requirements for aeronautical radio frequency spectrum; – Implement frequency spectrum management.	2009	ICAO, States	ICAO position was supported during WRC-07	– Assurance of aviation spectrum Administer the use of the allocated aviation spectrum

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GNSS TF/7
Report on Agenda Item 5

REPORT ON AGENDA ITEM 5: FUTURE WORK PROGRAMME

5.1 The meeting recalled that MIDANPIRG/10, under Decision 10/11 endorsed the Terms of Reference and Work Programme of the GNSS Task Force also recalled that GNSS TF/6 had updated the TOR under Draft Decision 6/6.

5.2 The meeting noted that the ATM/SAR/AIS SG/9 meeting in view of increasing MIDANPIRG efficiency and taking into consideration the strong relationship between GNSS and PBN implementation, was of the view that merging the GNSS and PBN Task Forces should be explored and ATM/SAR/AIS SG/9 agreed to the following Draft Decision:

DRAFT DECISION 9/10: REASSIGNMENT OF RVSM AND PBN FUNCTIONS

That, taking into consideration the status of implementation of RVSM and PBN in the MID Region:

*a) the RVSM/PBN Task Force is renamed PBN Task Force with TOR as at **Appendix 9A** to the report on Agenda Item 9;*

b) prior to the formal establishment of the PBN Task Force, the RVSM/PBN Task Force focus primarily on matters related to PBN implementation in the MID Region; and

c) MIDANPIRG Steering Group (MSG) and the CNS/ATM IC SG explore the possibility of combining the PBN and GNSS Task Forces.

5.3 The meeting recalled that RVSM/PBN TF/1 noted the overlaps between the TOR of the GNSS TF and the above proposed PBN TF. The increasingly dominant supporting of GNSS to the PBN concept as detailed in Doc 9613, further more GNSS is the only navigation infrastructure that supports all PBN Navigation specifications, as compared to other navigation infrastructure which support some but not all PBN Navigation Specifications was of the same view of the ATM/SAR/AIS SG/9 for combing GNSS and PBN Tasks forces according the meeting agreed to the draft decision 1/1 of the RVSM/PBN TF/1 with the following modification:

DRAFT DECISION 7/4: ESTABLISHMENTS OF THE PBN/GNSS TASK FORCE

That, taking into consideration the need to harmonize the implementation of PBN and to enhance coordination of expertise regarding GNSS:

a) the PBN/GNSS TF is established with TOR as in Appendix 5A to the Report on Agenda Item 5; and

b) GNSS matters not related to PBN may be discussed separately from PBN matter.

5.4 The meeting reviewed the proposed TOR for the combined PBN/GNSS TF and was of the view of adding GNSS issues to the TOR therefore the meeting updated the TOR for the combined PBN/GNSS TF as per **Appendix 5A** to the report on agenda item 5.

5.5 In view that there might be certain PBN and/or GNSS aspects such as Space Based Augmentation Systems (SBAS) development etc.., which may not be optimally discussed by the combined Task Force members as a whole and in order to facilitate the efficiency and effectiveness the meeting agreed to RVSM/PBN TF/1 Draft Decision 1/2. By adopting a working arrangement that allows discussions on specific aspects without engaging the whole Task Force based on the above, the meeting agreed to the following Draft Decision of the RVSM/PBN TF/1:

DRAFT DECISION 7/5: WORKING ARRANGEMENTS OF THE PBN/GNSS TASK FORCE

That, taking into consideration the need for efficiency and effectiveness in the implementation of PBN and GNSS, the PBN/GNSS Task Force will maintain a flexible schedule, allowing the convening of meetings as dictated by work demand.

5.6 In vision of combination the GNSS TF with PBN and the establishment of the PBN/GNSS TF. The meeting agreed that the secretariats of the GNSS TF and RVSM/PBN TF coordinate and inform the group on the next meeting date venue and Agenda.

5.7 In accordance with the ICAO Business plan and the requirements for performance monitoring, the meeting developed a follow-up action plan as at **Appendix 5B** to the Report on Agenda Item 5.

GNSS TF/7
Appendix 5A to the Report on Agenda Item 5

PROPOSED TERMS OF REFERENCE FOR 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 MID, according to the ICAO Strategic Objectives and Global Plan Initiative (GPI) 5 and related GPIs (GPIs 7, 10, 11, 12, 20, 21).

b) Identify other issues/action items arising from the work of ICAO or for consideration by ICAO in order to facilitate regional and global harmonization of existing applications as well as future implementation of Performance Based Navigation operations.

c) Determine and recommend, on the basis of the study, the PBN strategy and Implementation Plan for the MID 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.

e) Monitor the progress of updated studies, projects, trials and demonstrations by the MID Region States, and information available from other Regions.

f) Provide a forum for active exchange of information between States related to the implementation of GNSS.

g) Identify deficiencies and constraints that would impede implementation of GNSS, and propose solutions that would facilitate the rectification of such problems.

h) Identify and address, to the extent possible, institutional financial and legal matters related to the GNSS implementation in the MID Region.

i) Develop a system of post-implementation reviews to ensure the effective and safe introduction of PBN and non-PBN GNSS operation.

2. Work Programme

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

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

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

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

e) Develop an amendment proposal to the MID 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 the ATM/SAR/AIS SG or MIDANPIRG.

j) Complete the development of the Regional PBN Implementation Strategy and Plan in 2008.

k) Report to the ATM/SAR/AIS SG and keep the CNS SG closely briefed.

l) Monitor the progress achieved related to the feasibility study pertaining to the possible use of EGNOS as GNSS augmentation system in the MID Region.

m) Monitor the progress of the NAVISAT study.

n) Review and identify intra and inter regional co-ordination issues related to the implementation of GNSS and where appropriate recommend actions to address those issues.

o) Examine to what extent the GNSS system accessible in the Region can meet the navigational requirements of ATM service providers and aircraft operators in the Region.

p) Identify and co-ordinate GNSS implementation priorities in the MID Region.

q) Provide assistance to States in planning and implementation of GNSS in the MID Region including the development of GNSS procedures.

r) Suggest ways and means for rectifying the problems as they arise related to the implementation of GNSS.

s) Provide necessary knowledge in GNSS operational application.

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 inter-regional 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

MID Region States

ORGANIZATIONS *(AS OBSERVERS)*

IATA, ICAO, IFALPA, IFATCA, EUROCONTROL, ACAC and additional representative from International/Regional Organizations may be invited when required.

GNSS TF/7
Appendix 5B to the Report on Agenda Item 5

GNSS TASK FORCE
DRAFT FOLLOW-UP ACTION PLAN

DRAFT CONC/DEC NO. --- STRATEGIC OBJECTIVE	TITLE OF CONCLUSION/ DECISION	TEXT OF CONCLUSION/DECISION	FOLLOW-UP ACTION	TO BE INITIATED BY	DELIVERABLE	TARGET DATE
Conc. 7/1	Protection of GNSS Signal	That, MID States that have their names in footnote 5.362B and 5.362C are urged to take necessary measures to delete their names from these footnote as soon as possible in order to protect the GNSS signal.	State Letter State CAA Follow up with regulators	ICAO MID Office State	SL Deletion of State Name from FN	Before next WRC-11
Conc. 7/2	Proposal for an amendment to MID ANP/FASID CNS 3	That, a proposal for amendment to MID ANP/FASID CNS 3 tables contained at **Appendix 4B** to the Report on Agenda Item 4 to prepared by MID Regional Office for approval according to established procedures.	Updated CNS3 FASID TABLE	States ICAO MID Office	Amendment proposal	Dec 2008
Conc. 7/3	Strategy for the Implementation of GNSS in the MID	That, the Revised Strategy for implementation of GNSS in the MID Region to be as at **Appendix 4C** to the Report on Agenda Item 3.	Implement Strategy	TF State	States Plans	Oct 08
Dec. 7/4	Establishments of the PBN/GNSS Task Force	That, taking into consideration the need to harmonize the implementation of PBN and to enhance coordination of expertise regarding GNSS: a) the PBN/GNSS TF is to be established with TOR as in **Appendix 5A** to the Report on Agenda Item 5; b) GNSS matters not related to PBN may be discussed separately from PBN matters.	Establishment of the PBN/GNSS TF Progress in the TF Work Programme	MSG TF	Approval of the MSG and MIDANPIRG PBN/GNSS TF REPORT	Dec 08

DRAFT CONC/DEC NO. --- STRATEGIC OBJECTIVE	TITLE OF CONCLUSION/ DECISION	TEXT OF CONCLUSION/DECISION	FOLLOW-UP ACTION	TO BE INITIATED BY	DELIVERABLE	TARGET DATE
Dec. 7/5	Working arrangements of the PBN/GNSS Task Force	That, taking into consideration the need for efficiency and effectiveness in the implementation of PBN and GNSS, the PBN/GNSS Task Force will maintain a flexible schedule, allowing the convening of meetings as dictated by work demand.	Flexible Schedule	ICAO MID Office	PBN/GNSS TF REPORT	Dec 08

REPORT ON AGENDA ITEM 6: ANY OTHER BUSINESS

6.1 The meeting was of the opinion that ICAO MID Office combines all IPS/WPS for the meetings in one ZIP file so that it will facilitate the downloading of the package of the meetings instead of downloading each IP and WP separately.

ATTACHMENT A

GNSS TF/7
Attachment A to the Report

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