INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE FIFTH MEETING OF THE MIDDLE EAST GNSS TASK FORCE

(GNSS TF/5)

Cairo, 12 - 14 September 2005

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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History of the Meeting

PART I - HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Fifth meeting of MIDANPIRG GNSS Task Force was held at the ICAO Middle East Regional Office, Cairo, 12 - 14 September 2005.

2. OPENING

2.1 Mr. A. Zarroug, Regional Officer/Air Transport, warmly welcomed all the participants to Cairo. He noted that the ISTB trials planned for the first quarter of 2001 had been carried out in October 2002. Based on the results of these trials, the recent technological developments and the outcome of the 11th Air Navigation Conference, Mr. Zarroug invited the meeting to eventually amend its work programme and to review the Strategy of GNSS Implementation in the Region. Finally, he wished the meeting every success in its deliberations.

2.2 Mr. Ali Humaid Al Adawi, Director Air Navigation Services, Directorate General of Civil Aviation & Meteorology, Sultanate of Oman, the chairman of the meeting, also welcomed all the participants and concurred with the opening remarks of Mr. Zarroug. He expressed his hope for a fruitful dialogue among the experts of the Task Force.

3. ATTENDANCE

3.1 The meeting was attended by a total of 21 participants, which included experts from 7 States, one International Organization, and 2 Stakeholders. The list of participants is at Attachment A.

4. OFFICERS AND SECRETARIAT

4.1 Mr. M. Traore, RO/CNS from the ICAO Middle East Regional Office acted as the Secretary of the meeting. Mr. M. Smaoui, RO/AIS, also supported 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 Provisional Agenda

Agenda item 2: Follow up action on MIDANPIRG Conclusions and Decisions related to GNSS matters

Agenda item 3: GNSS implementation

- 3.1 System engineering studies carried out by ESA/Galileo
- 3.2 WAAS demonstrations in the MID Region
- 3.3 NAVISAT progress report
- 3.4 Implementation of Navigation Systems in the MID Region

Agenda item 4: Recent developments and researches

Agenda item 5: GNSS implementation in the MID Region

5.1 GNSS implementation (timelines)
5.2 Strategy for GNSS implementation

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 5/1: GNSS SBAS DEMONSTRATION TEST BEDS

DRAFT CONCLUSION 5/2: MITIGATION OF GNSS VULNERABILITIES IN THE MID REGION

DRAFT CONCLUSION 5/3: REVISED STRATEGY FOR THE IMPLEMENTATION OF GNSS NAVIGATION CAPABILITIES IN THE MID REGION

DRAFT DECISION 5/4: REVISED TERMS OF REFERENCE AND WORK PROGRAMME FOR THE GNSS TASK FORCE

DRAFT DECISION 5/5: RESTRUCTURING OF MIDANPIRG SUBSIDIARY BODIES

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

1.1 The Secretariat presented the meeting with the Provisional Agenda for the GNSS TF/5 meeting. The Provisional Agenda was adopted as shown in paragraph 6 of the history of the meeting.

GNSS TF/5
Report on Agenda Item 2

REPORT ON AGENDA ITEM 2: REVIEW STATUS OF CONCLUSIONS AND DECISIONS FROM MIDANPIRG/5, MIDANPIRG/7, MIDANPIRG/8 AND MIDANPIRG/9 WHICH ARE RELATED TO GNSS MATTERS

2.1 Under this Agenda Item, the meeting was presented with an extensive list of conclusions adopted by MIDANPIRG/7, 8 and 9 meetings related to GNSS matters. Some of conclusions, though obsolete, were presented to the meeting to explain the deletions and changes occurred. The current conclusions are shown at **Appendix 2A** to the report on Agenda Item 2.

2.2 The meeting agreed that the MIDANPIRG/5 Decision 5/17 was not anymore valid and therefore should be deleted.

2.3 The meeting noted that appropriate actions had been initiated in relation to most of the Conclusions shown at **Appendix 2A** to the report on Agenda Item 2. The follow up of the different Conclusions will be reviewed under the related Agenda Items.

2.4 The meeting in reviewing MIDANPIRG Conclusions agreed that:

2.4.1 MIDANPIRG/7 Conclusion 7/41 – *Target Date for the approval of GNSS as supplemental means for en-route and non-precision approaches in the MID Region.* In order to reflect the outcome of the 11th Air Navigation Conference, MID States that have not yet amended their legislations and regulations are invited to do so. Follow-up of this conclusion is presented under Agenda Item 5.

2.4.2 MIDANPIRG/8 Conclusion 8/36 – *WGS-84 Implementation in the MID Region.* Some MID States have not yet completed part or all of the implementation and publication of WGS-84 coordinates, especially geoid undulation. This issue will be raised under Agenda Item 5.1.

2.4.3 MIDANPIRG/8 Conclusion 8/52 – *Protecting GNSS from harmful interference in the MID Region*. ICAO Office is to urge the States that had not yet deleted their country's name from footnotes 5.362B and 5.362C to do so.

2.4.4 MIDANPIRG/9 Conclusion 9/33 – *Further Test Activities and Studies of EGNOS in the MID Region*, Conclusion 9/34 – *WAAS Demonstration Test Beds*, Conclusion 9/35 – *Cost-Benefit Consideration for Augmentation Systems*. Different parties involved are invited to speed up their tasks in order for the Task Force to consider the suitable augmentation system to be implemented in the MID Region.

2.4.5 MIDANPIRG/9 Conclusion 9/36 – *Revised Strategy of the GNSS Implementation in the MID Region*. The strategy is to be reviewed taking into account users requirements and the outcome of the 11th Air Navigation Conference.

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Appendix 2A to the Report on Agenda Item 2

LIST OF CONCLUSIONS/DECISIONS RELATED TO GNSS MATTERS

Status of MIDANPIRG/7, MIDANPIRG/8 and MIDANPIRG/9 Conclusions/Decisions related to GNSS matters		
Conclusions/Decisions	***Action taken***	***Remarks***
CONCLUSION 7/41: TARGET DATE FOR THE APPROVAL OF GNSS AS A SUPPLEMENTAL MEANS FOR EN-ROUTE AND NON-PRECISION APPROACHES IN THE MID REGION That, a) the AIRAC date for the implementation of GNSS in the mid region as a supplemental means for en-route is 18 April 2002; b) States may wish to implement GNSS for Non Precision Approaches with effect from 18 April 2002; and c) States that have not yet amended their legislation and regulations are urged to do so in order to meet the above AIRAC date.	On-going	New Conclusion to be drafted
CONCLUSION 8/36: WGS-84 IMPLEMENTATION IN THE MID REGION That, States a) not having done so, are urged to achieve the total implementation of the WGS-84 System; b) use the ICAO uniform format (FASID Table AIS-5) for reporting the status of implementation of WGS-84; and c) report the status of implementation of WGS-84 on a regular basis until the system is fully implemented.	On-going	Will be reviewed under Agenda Item 5.1
CONCLUSION 8/52: PROTECTING GNSS FROM HARMFUL INTERFERENCE IN THE MID REGION That considering, Para. (c) of Conclusion 7/8, regarding the Implementation of GNSS in the MID Region, footnotes **5.362B** and **5.362C** of ITU WRC – 2003 Conference, reporting the additional allocation of the band 1 559 – 1 610 MHz (which is used for elements of GNSS) to fixed service and in order to protect GNSS from harmful interference in the MID Region: i) MID Region States who have not done so should immediately refrain from using or allocating the band 1 559 – 1 610 MHz to fixed service; ii) MID Region States whose name is still in the footnotes should request ITU to delete their country's name from footnotes 5.362B and 5.362C; and iii) Aeronautical Community using GNSS in the MID Region when detecting harmful interference should immediately inform ICAO MID Region office using the Harmful Interference Report Form.	Only some States reacted	Will be reviewed under Agenda Item 6

Status of MIDANPIRG/7, MIDANPIRG/8 and MIDANPIRG/9 Conclusions/Decisions related to GNSS matters		
Conclusions/Decisions	***Action taken***	***Remarks***
CONCLUSION 9/33: FURTHER TEST ACTIVITIES AND STUDIES OF EGNOS IN THE MID REGION That, a) EGNOS test bed on the ENAV experience during the MIDAN activities be continued until adequate data representative of the Region be available; b) the feasibility of using additional Ranging Integrity Monitoring System (RIMS) for achieving APV1 and APV2 requirements and a proposal for time scale be evaluated by Galileo Joint Undertaking; and c) European Space Agency (ESA) defines the EGNOS architecture scenarios on the number/location of RIMS required for achieving APV1 and APV2 requirements throughout the MID Region in order to support the regional cost-benefit analysis (CBA).	On-going	Will be reviewed under Agenda Item 3.1
CONCLUSION 9/34: WAAS DEMONSTRATION TEST BEDS That, the States of the MID Region willing to participate in the study of the WAAS demonstration test beds provide facilities for the reference stations when required.	No progress	Will be reviewed under Agenda Item 3.2
CONCLUSION 9/35: COST-BENEFIT CONSIDERATION FOR AUGMENTATION SYSTEMS That, a) no commitment is to be made on the augmentation systems until all other options and implementation trends with associated cost-benefit analyses are fully considered; and b) implementation strategy to be considered with user requirements and implementation trends/options endorsed in adjacent regions in accordance with the operational concept and planning principles of the Global air navigation plan for CNS/ATM systems.	Linked with Conclusion 9/33	Will be reviewed under Agenda Item 3.1
CONCLUSION 9/36: REVISED STRATEGY OF THE GNSS IMPLEMENTATION IN THE MID REGION That, the revised strategy for the implementation of GNSS in the Middle East Region be adopted as indicated in Appendix 5N to the report on Agenda Item 5.	To take into account the outcome of the 11th ANC	Will be reviewed under Agenda Item 5.2

GNSS TF/5
Report on Agenda Item 3

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

3.1 Under this Agenda Item, Galileo Joint Undertaking (GJU) provided the meeting with the European contribution to the strategy for the GNSS implementation in the MID Region, based on the GNSS service implementation plan that has been prepared to extend EGNOS to some neighbouring Regions to Europe. This plan consists of three activities allowing achieving APV service in the Region:

a) infrastructure scenarios definition and implementation plan;
b) definition and establishment of an institutional framework; and
c) application development, demonstration, training and awareness

3.2 In this regard, and in accordance with the MIDANPIRG Conclusion 9/33: *Further Test Activities and Studies of EGNOS in the MID Region,* the meeting invited the European Space Agency and Galileo Joint Undertaking to provide a cost estimate related to the EGNOS extension to the MID Region and to proceed with the preparation and detailed infrastructure implementation plan in order to cover the whole Middle East Region.

3.3 Following to MIDANPIRG Conclusion 9/35, the meeting agreed to develop a cost benefit analysis before making an implementation decision regarding the choice of augmentation system for the Region. The cost benefit analysis will compare the cost efficiency of the scenarios that will be defined according to different GNSS configurations for the Region.

3.4 The Galileo Joint Undertaking (GJU) and Innovative Solutions International (ISI) indicated the possibility of providing input material for this study that would be reviewed and consolidated by the GNSS Task Force. GJU and ISI would identify different funding schemes (e.g European Cooperation Funds, US Trade and Development Agency) to conduct the study.

3.5 Innovative Solutions International (ISI) provided the meeting with an overview of the Middle East Augmentation System Test Bed (MIDAS TB) based on the technology and expertise already in operation in CANADA, US and Japan. The presentation stressed upon the importance of the MIDAS-TB for the States to be able to have the technological and operational choice of systems, keeping their independence from the any Satellite Service Providers. In addition, it will reinforce their understanding of these technological trends as well as help them to define their own national requirements in terms of Satellite Navigation, within a CNS/ATM global transition plan.

3.6 Emphasis was also put on the benefits to implement without delay, NPAs in the terminal areas, as the first step towards satellite-based CNS/ATM implementation. Mention was also made of the need for each State, or the MID Region as a whole to address the monitoring capability issues involved by these new satellite navigation technologies, which operational reliability and integrity are under the State's responsibility. A report of the MIDAS-TB implementation will be delivered at the next GNSS TF/6 meeting.

3.7 The meeting also noted that the proposal from US Trade and Development Agency (USTDA) for feasibility studies of the possibility of implementing a GNSS/SBAS in the Middle East Region is due to start in year 2007. The meeting renewed its support for trials of all kinds of options for GNSS augmentation scenario in the Region and therefore formulated the following Draft Conclusion that will replace the MIDANPIRG Conclusion 9/34:

DRAFT CONCLUSION 5/1: GNSS SBAS DEMONSTRATION TEST BEDS

That, the States of the MID Region willing to participate in the study of the GNSS SBAS demonstration test beds provide facilities for the reference stations when required.

3.8 As regards the NAVISAT progress report, the meeting noted that the document did not contain yet the business plan and the economical analysis that will be released before the end of year 2005. The coverage range of the NAVISAT signal should be available to States who will in return provide their inputs in order to finalize the report.

3.9 During discussions on GNSS activities, the meeting reviewed both the Package One (Evaluation and Planning of Radio navigation Facilities in the MID Region) and Package Two (Implementation of Requirements).

3.10 The meeting adopted the Package One with the following remarks:

- addition of a map showing the implementation sites of navigation facilities
- addition of a map of radar coverage
- development of Iranian, Iraqi and Kuwait VSAT networks based on information received from States and IATA
- summary to be aligned with the outcome of 11th Air Navigation Conference

3.11 The meeting was of the view that Package Two represented a starting step, though it refers to only the option of the augmentations available in the Middle East Region. Therefore the meeting adopted the Package Two with the following remarks:

- inclusion of other augmentation systems
- development of a detailed infrastructure implementation
- addition of the satellite coverage

3.12 Based on the above, the meeting agreed that the documents (Package one and Package Two) were enough mature to be incorporated into a unique document called “Improvement of Navigation Systems in the MID Region”. The document at **Appendix 3A** to the report on Agenda Item 3 could be complementary to the Strategy of the GNSS implementation in the Region and as such should be updated on a regular basis.

GNSS TF/5
Appendix 3A to the Report on Agenda Item 3

MID Region Air Navigation Systems Development and Implementation Plan

Document Reference:	MIDANPIRG GNSS – TF/AG
Author:	GNSS TF Action Group
Revision Number:	Version 02 / 2005
Date:	September 2005

Introduction

The objective of this document is to perform a review of the existing navigation systems and communication infrastructure, as well as their related development and implementation plan.

The analysis of the existing navigation infrastructure will show minimum constraints for the operational requirements and will contribute to the benefits provided by the satellite-based navigation regarding the cost benefit analysis.

The analysis of the existing communication infrastructure will allow defining what may be re-used for GNSS augmentation and what needs to be implemented. This will influence the system architecture and the cost benefit analysis.

The MID Region Air Navigation Systems Development and Implementation Plan might be used for the transition from the traditional navigation to GNSS-based navigation.

The Middle East Service implementation plan consists of three main activities, in order to achieve APV performance in the Middle East region:

- infrastructure scenarios definition and implementation plan;
- definition and establishment of an institutional framework;
- application development, demonstration, training and awareness

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CHAPTER 1

Evaluation of the existing facilities

1.1 Review of Flight Information Regions (FIRs)

1.1.1 The Middle East Region is organized into 14 Flight Information Regions that support the Air routes areas.

1.2 Review of existing navigation aids

1.2.1 The present radio-navigation aids infrastructure is composed of locators, NDBs, VOR/DME and ILS. Most of these requirements comply with the Middle East Air navigation Plan and the others are implemented by States for their own national needs.

1.2.2 The table CNS 3 of the MID FASID is at **Attachment A** which shows the detailed distribution of the approach radio navigation aids implemented in the Region.

En-route navigation Aids

1.2.3 The Middle East Region is well covered by en-route navigation aids, however improvement is expected in the northeast part where it is noted a low density of aids.

- 183 VOR are operational and 74 have not yet been implemented
- 188 DME are operational, 3 unserviceable and 72 have not yet been implemented
- 27 NDBs and 12 Locators are operational

Note: Radar Coverage of the MID Region is at **Attachment B**.

Precision Approach Aids

1.2.4 All countries have implemented at least one CAT I precision approach located at their international airports. Some of the States have at their disposal CAT II and CAT III precision approach equipments at their main airports.

1.2.5 There are currently 75 ILS installed out of 94 required for the Region. Out of these 75 ILS, 60 are serviceable. This means that 64 per cent of the requirement for precision approach capability is fulfilled.

1.2.6 In the meantime, 73 per cent of DME and 72 per cent of VOR are implemented.

Non Precision Approach Aids

1.2.7 The other airports of the Middle East Region have either instrument approach runways, allowing NPA approaches with the instruments, or non-instrument approach runways.

1.2.8 Out of the 207 runways of the 144 airports included in the table CNS 3, there are 94 instrument approach runways and 113 non-instrument runways. Most instrument approach runways are provided with a VOR/DME.

1.2.9 In consequence, NPA approaches are currently possible on 54 per cent of the runways.

Note: Implementation of Radio Navigation Facilities is at **Attachment C**.

1.3 Review of existing communication Infrastructures

1.3.1 The communication means provided by States, at national or international level, include the following services:

- The Aeronautical Mobile Service (AMS) which includes all communications with aircraft for air traffic control and airspace management. These services are mainly achieved by vocal communications either on VHF (continental area) or HF (remote and oceanic area).
  Most of the continental area of the Middle East Region is covered by extended and improved VHF communications
- The Aeronautical Fixed Service (AFS) that includes all point-to-point communications for Air Traffic Control, Meteorology, Search and Rescue. These services are provided by vocal and data communications.

1.3.2 The major elements of the AFS are the AFTN (Aeronautical Fixed telecommunications Network) for data communications and the ATS/DS network (Air traffic Services Direct Speech) for voice communications. It is worth noting that many States have improved their AFTN systems by using reliable digital high-speed links.

Domestic satellite networks

1.3.3 Five VSAT domestic networks are operating in the Middle East Region and are aimed at extending VHF communications, improving AFTN and ATS/DS communications with secondary airports. The results gained from this experience have led the MID States to agree for the study of the so called the MID VSAT network intended to cover all Middle East Region and, at the same time, to ensure connectivity with the adjacent Regions (EUR, AFI and ASIA-PAC). Another domestic satellite network is operating in Sudan.

Egyptian satellite network

1.3.4 The domestic network has a star configuration and is composed of one hub station installed in Cairo and twelve VSAT remote stations spread over the Cairo FIR. These remote stations support the VHF extended coverage, AFTN, ATS/DS, Radar coverage, AIS and the maintenance communications.

1.3.5 The network is now congested and does not allow anymore any integration with other networks. The Egyptian Authorities are planning a new domestic VSAT network to solve this inadequacy.

Yemenite satellite network

1.3.6 The domestic network is composed of one hub station and six VSAT remote stations spread over the Sana'a FIR. These remote stations can support the VHF extended coverage, AFTN, ATS/DS, Radar coverage and the maintenance communications. The configuration of the network allows its extension and integration to other networks.

Sudanese satellite network

1.3.7 The Aeronautical Telecommunication Service is in the process of full restructuring with the implementation of nine VHF remote stations spread in the Khartoum FIR. These remote stations which are supported by a domestic VSAT network, are still under tests. The main objective of the network is to provide aeronautical fixed and aeronautical mobile services in Khartoum FIR.

1.3.8 Moreover, the current provisions allow the Ministry of Aviation to implement and to operate a VSAT network for safety purposes, as an usual telecommunications service provider.

Afghanistan satellite network (to be developed)

Iranian satellite network (to be developed)

Iraqi satellite network (to be developed)

Kuwait satellite network (to be developed)

CHAPTER 2

Development Plans

2.1 Introduction

2.1.1 The Middle East Regional Navigation Plan provides the principles and the direction that shall be consistently followed by all States, services providers and users within the Region.

2.2 Directions

Communications

2.2.1 According to the global recommendations set by ICAO, the direction to follow is the evolution towards satellite communications means that will support both voice and data transmissions (including GNSS augmentation data transmissions).

2.2.2 During the long transition period, extended and VHF data communications means should be developed and deployed to allow a broader coverage and reliable data transmissions in the remote areas.

Navigation

2.2.3 The VOR equipment will remain the main navigation means on traditional ATS routes. The traffic shall be passed gradually from ATS routes to RNAV ones, and the airspace shall be consequently restructured.

2.2.4 The ILS equipment will be maintained at least until 2010, and any equipment withdrawal will be announced to the users several years in advance.

2.2.5 En route as well as approaches will be gradually supported by GNSS whose operational performances will be extensively demonstrated during various experimental campaigns.

Surveillance

2.2.6 The implementation and usage of SSRs and ADS should be broadened.

2.3 Near term development plans

Communications

2.3.1 The development plans for the communication infrastructures are part of the overall improvement plan for air traffic control and airspace management with future system technologies.

2.3.2 The main example of network project is the MID VSAT project. MIDANPIRG/8 meeting approved the feasibility study of the MID VSAT project that should be refined by updated information received from States.

MID VSAT Network

2.3.3 The planned MID VSAT network will cover all MID Region and ensure connectivity with the neighboring Regions (AFI, EUR and ASIA-PAC).

2.3.4 The F type stations could be used by States on the main airports, with the respective transmission rates of 64, 128 and 256 Kbps. Voice and data are transmitted over Frame Relay, where:

- the VHF and ATS/DS voice communications use 8 Kbps channel
- the AFTN data applications use 2.4 Kbps channel
- the radar and supervision data applications use 9.6 Kbps channel

2.3.5 Coordination has been made with other similar projects, especially with NAFISAT project (AFI Region) to operate TDMA technique over INTELSAT 1002.

Navigation

2.3.6 The existing navaids infrastructure will continue to be used for a certain time in the future, as no alternative for its replacement is available yet. Improvement to the existing infrastructure is sought through replacement of very old facilities, better maintenance and regular flight checking.

2.3.7 Decommissioning of the VOR/DME and ILS equipments is not contemplated before 2015. Any equipment withdraw will be announced to its potential users several years in advance.

NAVISAT network

2.3.8 This network is based on a dual mission concept, namely Communication and Navigation. It is a regional project that will help in overriding the existing problems that impede the implementation of CNS/ATM system in the Region.

2.3.9 The Communication component includes mainly all safety-related communications for the purpose of ATM between aircraft and Air Traffic Control Centers. The portion of the ground-ground voice and data exchange between operational centers will supplement the MID VSAT network.

2.3.10 The Navigation component will support and complement the Space Based Augmentation Systems (SBAS) by using dedicated navigation transponders. The full utilization of the system can be achieved if the ground network is implemented over the Region through the extension of EGNOS or WAAS.

CHAPTER 3

Infrastructure scenarios definition and implementation plan

3.1 Already, ESA has performed preliminary analysis on candidate configurations of Reference Stations (RIMS) which would be required to cover the Middle East region through an extension of EGNOS. Two main scenarios have been identified:

- a centralized; and
- a decentralized approach

3.2 Both would imply the installation of an additional 7 to 9 RIMS. The Middle East RIMS data would then be transmitted in real time to the EGNOS facilities in Europe through suitable system interfaces. This data would in turn be integrated with all other EGNOS RIMS data, processed in real time and broadcast to all European and Middle East users through EGNOS GEO satellites.

3.3 The centralized approach is developed according to an architectural and operational model based on bilateral interfaces between the Europe system and the Middle East RIMS.

3.4 The decentralized approach is a model whereby a Regional Centre (RC) would act as a system hub for the Middle East region, in order to interface the European system. The major difference here is that the RC would be allocated a number of specific functionalities with respect to the overall monitoring, operations and validation.

3.5 The Middle East region falls outside the boundary of the European processing area and so would require a regional extension. This implies some very specific technical activities, such as extending the integrity of the satellites outside the nominal area and adding additional monitoring for the ionosphere.

Note: Satellite Coverage in the MID Region is at **Attachment D**.

3.6 The timeline is as follows:

- a definition phase (step 0), currently in progress;
- the deployment of pre-operational RIMS, to be completed for the entire Middle East territories (step 1) by early 2007; and
- APV operational capability implementation (step 2), to be completed by the end of 2007.

3.7 A longer term scenario, to meet the ultimate goal of CAT-1 service capability for the entire Middle East region. A number of technical concepts are currently under detailed definition, which also capitalize on the EGNOS implementation, in order to provide integrity to Galileo and evolve towards the provision of both GPS and Galileo augmentation services.

CHAPTER 4

Definition and establishment of an institutional framework

4.1 An institutional framework must be developed and agreed upon between European entities and entities in the Middle East region. It must address matters regarding system operations, service provision, funding, ownership and other legal aspects (e.g. liabilities, certification).

4.2 An initial concept of an operational and institutional service framework should be developed, in co-ordination with all concerned Middle East and European partners. It is proposed that European and Middle East representatives work jointly to assess the different options to establish this framework during a definition phase lasting until early 2006.

CHAPTER 5

Application development, demonstration, training and awareness

5.1 It is necessary to extend the MEDA demonstration, training and awareness activities over the full Middle East region, which should continue throughout the service implementation activity in order to stimulate all concerned actors.

5.2 Pre-operational and operational services should be used for additional demonstration activities addressing all application domains, including civil aviation. Application development based on GNSS, for the different user domains, should also be introduced. In aviation, this would include:

- preparation of the aeronautical environment for aviation certification (e.g., safety analysis, ATC interface, flight inspection,..);

- preparation of the operational APV procedures;
- on board receivers installation;
- demonstration of the operational benefits.

5.3 This kind of activity will be initiated for the MEDA region in the fourth quarter of 2005 and could be extended to the rest of the Middle East region as additional budget becomes available.

CHAPTER 6

Summary

6.1 The existing satellite navigation systems can be used as supplemental means for en-route navigation, terminal and NPA for some airports.

6.2 In term of fixed communications, many Centers are already operating reliable digital high-speed circuits which are leased with PTT.

6.3 However, the Middle East Region must put all efforts in the implementation of a dedicated MID VSAT network which will be used for ground– ground data and voice communications and also serves as an important step in planning for transition to CNS/ATM systems.

6.4 The completion of the Middle East Regional GNSS service implementation plan is based on an on-going co-operation between Middle East region and international actors.

6.5 This document provides a general background on the Middle East Regional GNSS service implementation plan. Building on previous work, a number of activities have been identified for the short to medium term, including:

- the development of an infrastructure implementation plan;
- the definition of an operational and institutional service framework
- application development, demonstration, training and awareness activities.

6.6 In coordination with the relevant MEDA and Middle east partners, ESA will proceed with the preparation of a detailed infrastructure implementation plan while the GJU will support all activities related to service implementation, i.e. the latter two. Both of these shall feed into ongoing actions by the ICAO partners.

6.7 It has been assessed through this preliminary analysis that with 7 extra RIMS (Scenario 1) on top of the EGNOS system, it is possible to approve an APV service at 99% availability in a majority of the Middle East region, including the Red Sea, South Caspian Sea and The Persian Gulf.

6.8 It has been assessed through this preliminary analysis that with 9 extra RIMS (Scenario 2) on top of the EGNOS system, it is possible to provide an APV service at 99% availability in the whole Middle East region, including most of the Red Sea and the Persian Gulf.

6.9 The APV service introduction roadmap in MID region for EGNOS and Galileo is as follows:

- Permanent EGNOS test Bed 2006
- Pre-operational system 2007
- Operational system 2008
- Combined EGNOS & Galileo for CAT 1 service 2012

ATTACHMENT A

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:

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										

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			
ALEXANDRIA/ Borg El Arab Int'l	32 PA 1 14 NPA	A/L T	I* (I) D	X	XI	XI	XI	100/45			
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~~	A/L	II (I)	X	X	X					
	~~33L PA 2~~	A/L	II (I)	X	X	X					
	~~15L PA 2~~	A/L	II (I)	X	X	X					
	~~33R PA 2~~	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 OBSERVACIONES
									GBAS	SBAS	
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			
BOPAN		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
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			
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			

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
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			
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			

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
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 31 PA 3	A/L A/L E	I* (I) III (I)		X I X I X I	X I X I X I		 300/45			
AL AIN/Al Ain Intl	01 PA 1 19 NPA	A/L A/L E	I*		X I X I X I	X I X I X I		 300/45			
DUBAI/Dubai Intl	12L PA 3 30R PA 3 12R PA 2 30L PA 2	A/L A/L A/L A/L E	III (I) III (I) II (I) II (I)		X I X I X I X I X I	X I X I X I X I X I		 300/45			
FUJAIRAH/Fujairah Intl	11 NPA 29 PA 1	A/L A/L T	I* (I)		X I X I X I	X I X I X I		 40/25			
RAS AL KHAIMAH/Ras al Khaimah Intl	16 NPA 34 PA 1	A/L A/L	I* (I)	X X	X I	X I					
SHARJAH/Sharjah Intl	12 NPA 30 PA 1	A/L A/L E	I* (I)	X I	X I X I	X X X I		 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
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			

ATTACHMENT B

Radar Coverage of the MID Region

(to be developed)

ATTACHMENT C

Implementation of Radio Navigation Facilities

(to be developed)

ATTACHMENT D

Satellite Coverage of the MID Region

(to be developed)

REPORT ON AGENDA ITEM 4: RECENT DEVELOPMENTS AND RESEARCHES

4.1 Under this Agenda Item, the meeting was presented with a set of recommendations at **Appendix 4A** to the report on Agenda Item 4. The meeting noted that particular emphasis was put on the gradual transition from the current terrestrial navigation infrastructure to the increased use of satellite navigation infrastructure.

4.2 Regarding the issue related to the impact of electromagnetic interference on radio navigation systems, the meeting noted that ICAO will develop a guidance material to assist States in assessing potential interference from FM broadcasting stations.

4.3 As a matter of priority and in order to protect GNSS from harmful interference, the meeting stressed again that the Experts are to follow the issue related the deletion of country's name from the footnotes 5.362B and 5.362C of the ITU WRC-2003. In this regard, the meeting was informed that the ICAO Office sent a reminder letter to draw the attention on the importance of this subject. The following States did not react yet: Egypt – Iraq – Israel – Jordan - Kuwait – Lebanon – Qatar – Saudi Arabia and Syria.

4.4 In this regard, the meeting was of the view that the tasks of ICAO Audit Team could be extended to cover also the GNSS interference issues, which should be considered as deficiencies. Accordingly, the meeting drafted the following Draft Conclusion:

DRAFT CONCLUSION 5/2: MITIGATION OF GNSS VULNERABILITIES IN THE MID REGION

That, within the framework of the Universal Safety Oversight Program (USOAP), the ICAO Audit Team address special attention to interference issues and propose guidance on the control and removal of these discrepancies.

4.5 The meeting noted with interest the outcome of the 11th Air Navigation Conference related to the present and envisaged GNSS services and architectures, integration and back-up options.

4.6 The meeting was also presented with an overview of introduction on the deployment of vertical guidance for aRea **NAV**igation approaches (**RNAV**). The meeting recognized that the use of GNSS for approaches with vertical guidance is safer and more efficient than the non-precision approaches (**NPA**). In this regard, the meeting noted that the **BaroVNAV** minima are higher than the **APV** minima (down to decision height of 250 ft), which are themselves higher than CAT I minima (200 ft). However, it was highlighted that GNSS approaches with vertical guidance would not require ground infrastructure.

4.7 Based on the operational requirements in the Region, the meeting agreed to consider both approaches with vertical guidance (BaroVNAV and GNSS) when refining the Strategy for the implementation of GNSS in the Middle East Region.

GNSS TF/5
Appendix 4A to the Report on Agenda Item 4

Air Navigation Recommendations related to the GNSS development status

Recommendation 6/1: Transition to satellite-based air navigation

That,

a) ICAO continue to develop as necessary provisions which would support seamless GNSS guidance for all phases of flight and facilitate transition to satellite-based sole navigation service with due consideration of safety of flight, technical, operational and economics factors;

b) air navigation service providers move rapidly, in coordination with airspaces users, with a view to achieving, as soon as possible, worldwide navigation capability to at least APV I performance; and

c) States and airspace users take note of available and upcoming SBAS navigation services providing for APV operations and take necessary steps towards installation and certification of SBAS capable avionics.

Recommendation 6/2: Guidelines on mitigation of GNSS vulnerabilities

That States in their planning and introduction of GNSS services,

a) assess the likelihood and effects of GNSS vulnerabilities in their airspace and utilize, as necessary, the mitigation methods as outlined in the guidelines contained in Appendix A to the report on Agenda Item 6;

b) provide effective spectrum management and protection of GNSS frequencies to reduce the possibility of unintentional interference;

c) take full advantage of on-board mitigation techniques, particularly inertial navigation;

d) where determined that terrestrial navigation aids need to be retained as part of an evolutionary transition to GNSS, give priority to retention of DME in support of INS/DME or DME/DME RNAV for en-route and terminal operations, and of ILS or MLS in support of precision approach operations at selected runways; and

e) take full advantage of the future contribution of new GNSS signals and constellations in the reduction of GNSS failures and vulnerabilities.

Recommendation 6/3: Assessment of atmospheric effects on SBAS performance in equatorial regions

That ICAO, in order to aid the work on mitigation of ionospheric effects on SBAS performance in equatorial regions, assess the results of data collection being carried out in States and develop appropriated guidance material.

Recommendation 6/4: Automated means for reporting and assessing the effects of outages on GNSS operations

That ICAO consider standardization of an automated means of monitoring and reporting scheduled and unscheduled GNSS outages and assessing their effects on GNSS operations and develop, as necessary, the requisite provisions.

Recommendation 6/8: GNSS/INS integration

That ICAO develops provisions for the integration of GNSS/INS in order to reduce the vulnerability of GNSS to RF interference and aid the development of advanced GBAS capabilities.

Recommendation 6/9: Support and participation in SBAS pre-operational implementation activities

That,

a) States that develop and introduce satellite-based augmentation systems and other SBAS service providers commence or continue to provide their technical and financial support and participation in the activities leading to the extension of their SBAS service areas into neighboring States and Regions; and

b) States participating in SBAS implementation activities coordinate with other participating States to optimize their effort, minimize duplication of service and facilitate participation of service providers.

Recommendation 6/12: Development of guidance material on applications of new GNSS elements and their combinations

That States, in developing standards for new GNSS elements and signals, address the issues associated with the use of multiple signals and their combinations, and develop guidance on the most promising combinations of GNSS elements.

Recommendation 6/13: Potential constraints on using multiple GNSS signals

That States, in their planning for implementation 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.

Recommendation 6/14: GNSS services in the 960-1215 MHz band

That,

a) States, be encouraged to take into account the need to minimize potential interference to GNSS services in their planning of the development of DMEs; and

b) an appropriate ICAO body be tasked to review the issues listed in paragraph 6.4.2.4 of the report on Agenda Item 6 of the Air Navigation Conference.

REPORT ON AGENDA ITEM 5: GNSS IMPLEMENTATION IN THE MID REGION

5.1 Under this Agenda Item, the Secretariat provided the meeting with an updated status implementation of WGS-84 in the MID Region. The meeting recalled that MIDANPIRG/9 noted that although the implementation of WGS-84 should have been completed since 1998, some MID States have still not completed part or all of the implementation and publication of the WGS-84 coordinates. It was highlighted in this regard that the geoid undulation appears to be a specific domain with low degree of implementation among the MID States. However, the meeting noted with appreciation that geoid undulation has been implemented recently in Iran, Jordan, Oman and Yemen. The meeting was also informed that work is progressing satisfactorily and approaching its final phase in Saudi Arabia for the publication of the geoid undulation values.

5.2 The Status of implementation of WGS-84 within the fifteenth MID Region States can be summarized as follows:

a) 5 States have fully implemented WGS-84;
b) 3 States haven't yet implemented WGS-84; and
c) 7 MID States haven't yet implemented the geoid undulation.

5.3 Accordingly the meeting reviewed and updated the timelines related to WGS-84 implementation in the MID Region.

5.4 The meeting was also informed about the issue of quality of the WGS-84 data. In this regard, the meeting noted that the quality of WGS-84 data might not be assured if all parties involved from the origin to the end-user do not apply the quality system process required in Annex 15 (paragraph 3.2). In relation to WGS-84 coordinates, contracting States shall ensure that the integrity of aeronautical data is maintained throughout the data process from survey/origin to the next intended user. To this end, protection of electronic aeronautical data while stored or in transit shall be totally monitored by the Cyclic Redundancy Check (CRC) tool using a 32, 24 or 16 bit CRC algorithm, as appropriate (depending on the classification of data and its integrity level, i.e.: critical data, essential data or routine data).

5.5 Taking into account the 11th Air Navigation Conference *Recommendation 6/11: Amendment to the Global Air Navigation*, the meeting considered that the strategy adopted in the Region follows an evolutionary path from the existing ground-based systems to SBAS providing a NPA through APV capabilities over the whole Middle East Region.

5.6 Based on the above, the meeting agreed to update the timelines for implementation of GNSS systems. The meeting also recognized that the delays in the certification, availability and installation of appropriate avionics could be a cause of the non-implementation of GNSS systems in the Region. The updated table of timelines is at **Appendix 5A** to the report on Agenda Item 5.

5.7 The meeting revised the strategy for the implementation of GNSS capabilities in the MID Region taking into account the following:

a) availability of the two Packages (Evaluation and Planning of Radionavigation Facilities and Implementation of Requirements);
b) status of implementation of WGS-84;
c) trials and demonstrations; and
d) outcome of the 11th Air Navigation Conference.

5.8 The meeting invited States and airspace users to take note of the available and upcoming SBAS navigation services for APV operations and to step towards the installation and certification of SBAS capable avionics.

5.9 Emphasis was also put on the 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 systems elements. Moreover, the meeting encouraged States to provide effective spectrum management and protection of GNSS frequencies to reduce the possibility of unintentional interference.

5.10 The meeting reviewed and updated the Revised Strategy for the Implementation of GNSS Navigation Capabilities in the MID Region. The updated Timelines and the Revised Strategy for the Implementation of GNSS capabilities in the MID Region led to the development of a Synopsis of MID GNSS strategy. The Revised Strategy for the Implementation of GNSS navigation capabilities in the MID Region is at **Appendix 5B** to the report on Agenda Item 5. The Synopsis of the MID GNSS strategy is attached to the **Appendix 5B** to the report on Agenda Item 5.

5.11 Accordingly, the meeting formulated the following Draft Conclusion which will replace MIDANPIRG/9 Conclusion 9/36:

DRAFT CONCLUSION 5/3: REVISED STRATEGY FOR THE IMPLEMENTATION OF GNSS NAVIGATION CAPABILITIES IN THE MID REGION

*That, the Revised Strategy for the Implementation of GNSS Navigation Capabilities in the MID Region be amended as shown at **Appendix 5B** to the report on Agenda Item 5.*

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

CNS/ATM IMPLEMENATION PLAN

UPDATED TIMELINES

TIMELINES:

Global

Regional

National

Table 9-1

Middle East — Navigation System Implementation

		1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09	2010
GNSS Development of SARPs	GNSS performance criteria to support operational requirements																	
	Development of GNSS NPA procedures																	
	Use of GNSS with augmented systems																	
	Long-term satellite navigation system																	
RNP Development of SARPs	En-route																	
	Terminal/NPA																	
	Precision approach																	
Space Segment Availability	GPS																	
	GLONASS																	
	GALILEO																	
	GEO satellite overlay																	
Satellite-Based Augmentation System	US WASS																	
	Europe EGNOS																	
	Japan MSAS																	
Aircraft Equipage	GNSS Avionics																	
Trials & Demonstrations																		
Global	GNSS + ABAS																	
MID Region																		
States	Afghanistan																	
	Bahrain	TBD																
	Egypt	TBD																
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel	TBD																
	Jordan	N/A																
	Kuwait																	
	Lebanon	TBD																
	Oman	TBD																
	Qatar																	
	Saudi Arabia	TBD																
	Syrian Arab Republic																	
	United Arab Emirates	N/A																
	Yemen	TBD																
Global	GNSS + ABAS + SBAS																	
MID Region																		
States	Afghanistan																	
	Bahrain	TBD																
	Egypt	TBD																
	Iran, Islamic Rep. of	TBD																
	Iraq																	
	Israel	TBD																

Middle East — Navigation System Implementation

		1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09	2010
	Jordan	N/A																
	Kuwait																	
	Lebanon	TBD																
	Oman	TBD																
	Qatar																	
	Saudi Arabia	TBD																
	Syrian Arab Republic																	
	United Arab Emirates	NO																
	Yemen	TBD																
Global	GNSS + ABAS + GBAS																	
MID Region		TBD																
States	Afghanistan																	
	Bahrain	TBD																
	Egypt	TBD																
	Iran, Islamic Rep. of	TBD																
	Iraq																	
	Israel	TBD																
	Jordan	N/A																
	Kuwait																	
	Lebanon	TBD																
	Oman	TBD																
	Qatar																	
	Saudi Arabia	TBD																
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen	TBD																
Implementation and operational use																		
Global	WGS-84																	
MID Region																		
States	Afghanistan																	
	Bahrain																	
	Egypt																	
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel																	
	Jordan																	
	Kuwait																	
	Lebanon																	
	Oman																	
	Qatar																	
	Saudi Arabia																	
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen																	
Global	En-route																	
MID Region																		
States	Afghanistan																	
	Bahrain																	
	Egypt																	

Middle East — Navigation System Implementation

		1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09	2010
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel																	
	Jordan	N/A																
	Kuwait																	
	Lebanon																	
	Oman																	
	Qatar																	
	Saudi Arabia																	
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen																	
Global	Terminal/NPA																	
MID Region																		
States	Afghanistan																	
	Bahrain																	
	Egypt	TBD																
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel	TBD																
	Jordan	N/A																
	Kuwait																	
	Lebanon																	
	Oman																	
	Qatar																	
	Saudi Arabia																	
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen																	
Global	APV (BaroVNAV)																	
MID Region																		
States	Afghanistan																	
	Bahrain																	
	Egypt																	
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel																	
	Jordan																	
	Kuwait																	
	Lebanon																	
	Oman																	
	Qatar																	
	Saudi Arabia																	
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen																	
Global	APV (SBAS) I or II																	
MID Region																		
States	Afghanistan																	

Middle East — Navigation System Implementation																		
		1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09	2010
	Bahrain																	
	Egypt																	
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel																	
	Jordan																	
	Kuwait																	
	Lebanon																	
	Oman																	
	Qatar																	
	Saudi Arabia																	
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen																	
Global	Precision approach																	
MID Region		TBD																
States	Afghanistan																	
	Bahrain																	
	Egypt	TBD																
	Iran, Islamic Rep. of																	
	Iraq																	
	Israel	TBD																
	Jordan	N/A																
	Kuwait	TBD																
	Lebanon																	
	Oman	TBD																
	Qatar																	
	Saudi Arabia																	
	Syrian Arab Republic																	
	United Arab Emirates																	
	Yemen	TBD																

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

REVISED STRATEGY FOR THE IMPLEMENTATION OF GNSS NAVIGATION CAPABILITY IN THE MID REGION

Considering:

a) That safety is the highest priority.

b) That elements of Global Air Navigation Plan for CNS/ATM System on GNSS and requirements for the GNSS implementation will be incorporated into the CNS part of FASID.

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

d) That regional augmentation systems include both satellite-based and ground-based systems.

e) That human, environmental and economic factors will affect the implementation.

f) The availability of avionics including limitations of some receiver designs; the ability of aircraft to achieve RNP requirements and the level of user equipage.

g) The development of GNSS systems including satellite constellations and improvement in system performance.

h) 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.

i) The development status of aircraft-based augmentation systems.

The general strategy for the implementation of GNSS in the MID Region is detailed below. This strategy is based on the regional navigation requirements of:

i) RNP 10 for en-route in remote/oceanic areas;
ii) Basic RNAV;
iii) Non Precision Approaches
iv) Approaches with vertical guidance; and
iv) Precision approaches at selected airports.

1) There should be an examination 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.

2) Evolutionary introduction of GNSS Navigation Capability should be consistent with the Global Air Navigation Plan for CNS/ATM systems.

3) Implementation should be in full compliance with ICAO Standards and Recommended Practices and PANS.

4) Introduce the use of GNSS for navigation in remote/oceanic areas.

5) Introduce the use of GNSS with appropriate augmentation systems, as required, for en-route navigation, non-precision approach, APV BaroVNAV, APV I and APV II.

States and airspace users take note of the available and upcoming SBAS navigation services providing for APV operations and take necessary steps towards installation and certification of SBAS capable avionics.

6) Any external augmentation system deemed necessary for the implementation of GNSS for a particular flight phase in an area under consideration (SBAS/GBAS including ground-based regional augmentation system) should be implemented in full compliance with ICAO SARPs.

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.

7) To the extent possible, States should work co-operatively on multinational basis to implement GNSS augmentation system in order to facilitate seamless and inter-operable systems.

8) States consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance with the exception to State aircraft.

9) States undertake a coordinated R & D program on GNSS implementation and operation.

10) ICAO and States should undertake education and training programs to provide necessary knowledge in GNSS theory and operational application.

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

12) 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.

13) A synopsis of the MID Strategy is in **Attachment 1**.

Synopsis of the MID GNSS Strategy

- **Phase One (up to 2009)**
  - a- GNSS with appropriate augmentation system for en-route navigation, terminal and NPA
  - b- GNSS for approaches with vertical guidance(APV BaroVNAV + ABAS)
  - c- Decommissioning of NDBs

- **Phase Two (2010 to 2015)**
  - a - GNSS with appropriate augmentation system for en-route navigation terminal and NPA
  - b - Complete decommissioning of NDBs
  - c - GNSS for approaches with vertical guidance(APV BaroVNAV + ABAS,APV I and APV II)
  - d - Decommissioning of VORs
  - e - ILS maintained at airports

- **Phase Three (2016 onwards)**
  - a - GNSS with appropriate augmentation system for en-route navigation terminal, NPA , APV, and CAT I precision approach
  - b - Complete decommissioning of VORs
  - c - Rationalization of DMEs
  - d - Decommissioning of ILS CAT I
  - e - CAT II/III requirements implemented by GBAS where operationally required and economically beneficial

GNSS TF/5
Report on Agenda Item 6

REPORT ON AGENDA ITEM 6: ANY OTHER BUSINESS

6.1 Under this Agenda Item, the meeting deemed it necessary to amend the Terms of Reference and Work program of the GNSS Task Force to take into account the progress made on the implementation of GNSS for en-route and non-precision approach in the MID Region. The meeting also highlighted the augmentation systems issue related to the monitoring of the cost-benefit considerations and the timelines for the different tasks. The revised Terms of reference is attached as **Appendix 6A** to the report on Agenda Item 6. Accordingly, the meeting formulated the following Draft Decision which will replace Draft Decision 4/5 of GNSS TF/4:

DRAFT DECISION 5/4: REVISED TERMS OF REFERENCE AND WORK PROGRAMME FOR THE GNSS TASK FORCE

*That, the revised Terms of Reference and Work Programme of the GNSS Task Force be adopted as presented at **Appendix 6A** to the report on Agenda Item 6.*

6.2 The meeting recalled MIDANPIRG discussions related to the low level attendance to the ICAO meetings in the Region. The meeting reiterated its deep concern regarding this issue especially with regard to the attendance to the GNSS TF meetings. This situation could jeopardize all efforts related to the GNSS implementation in the MID Region. In this regard, the meeting formulated the following draft decision:

DRAFT DECISION 5/5: RESTRUCTURING OF MIDANPIRG SUBSIDIARY BODIES

That, due to the lack of attendance to the GNSS Task Force meetings, the CNS/ATM/IC Sub Group is to consider the restructuring of the MIDANPIRG subsidiary bodies (Task Forces) related to the ATM and CNS fields, with a view to improve the efficiency of those Task Forces and leading to more active participation of States.

GNSS TF/5
Appendix 6A to the Report on Agenda Item 6

GLOBAL NAVIGATION SATELLITE SYSTEMS TASK FORCE
(GNSS TF)

TERMS OF REFERENCE AND WORK PROGRAMME
(Revised - September 2005)

1. TERMS OF REFERENCE

In accordance with the operational concept and general planning principles of the global air navigation plan for CNS/ATM, the GNSS Task Force shall:

1) Monitor necessary studies, demonstrations, trials, test beds and cost benefit analyses related to the use of GNSS for all phases of flight in the MID region.

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

3) Develop a coordinated strategy/plan for the implementation of GNSS in the MID region in an evolutionary manner, taking into consideration the new CNS technologies and the requirements and expectations of the airspace users and ATM partners.

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

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

6) Identify and address as appropriate, possible sources of funding to facilitate GNSS implementation in the MID Region.

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

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

9) Develop guidance material and processes covering the operational approval of GNSS.

2. WORK PROGRAMME

Ref	Tasks	Priority	Target Completion Date
1	Monitor the progress achieved by the MIDAN Demo related to the feasibility study pertaining to the possible use of EGNOS as GNSS augmentation system in the MID Region.	~~B~~ A	2005
2	Monitor the study related to the possible use of WAAS as GNSS augmentation system in the MID Region.	B	2007
3	Monitor the progress of the NAVISAT study.	~~B~~ A	2006
4	Follow up the progress achieved in GNSS activities in adjacent regions.	B	2008
5	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.	B	2008
6	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.	B	?
7	Identify and co-ordinate GNSS implementation priorities in the MID Region.	B	2005
8	Provide assistance to States in planning and implementation of GNSS in the MID Region including the development of GNSS procedures.	B	2008
9	Suggest ways and means for rectifying the problems as they arise related to the implementation of GNSS.	B	2008
10	Provide necessary knowledge in GNSS theory and operational application.	B	2008
11	Assist States to establish proper training and education programmes related to the implementation of GNSS.	B	2008

3. PRIORITIES

A High priority tasks, on which work should be speeded up.
B Medium priority tasks, on which work should begin as soon as possible, but without detriment to priority A tasks.
C Tasks of lesser priority, on which work should begin as time and resources allow, but without detriment to priority A and B tasks.

4. COMPOSITION

The GNSS Task Force is composed of the 15 MID Region Provider States and IATA.

GNSS TF/5
Attachment A to the Report

FIFTH MEETING OF THE GNSS TASK FORCE
GNSS TF/5

(Cairo, 12 – 14 September 2005)

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