



International Civil Aviation Organization

Performance Based Navigation Sub-Group (PBN SG)

First Meeting

(Cairo, Egypt, 1 – 3 April 2014)

Agenda Item 4: PBN Implementation in the MID Region

MEASURES TO FOSTER THE PBN IMPLEMENTATION IN THE MID REGION

(Presented by the Secretariat)

SUMMARY

This paper presents an update on the MID Region PBN Support Team and the outcome of the PBN Workshops organized by the ICAO MID Regional Office.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDANPIRG/14 Report
- PBN implementation Workshop, Tunis
- PBN Go Team Visit Phase II, UAE

1. INTRODUCTION

1.1 The meeting may wish to note that MIDANPIRG/14 meeting was apprised of PBN activities in other ICAO Regions in order to harmonize the implementation between Regions and share experiences. It was noted that all Regions had been conducting Regional Seminars and Workshops related to PBN and GNSS. In this regard, the meeting encouraged States to conduct PBN Workshop/Seminars at National level.

2. DISCUSSIONS

2.1 The meeting may wish to recall that, MIDANPIRG/13 established the MID PBN Support Team (MPST) with Terms of Reference (ToR) as at **Appendix A** to this working paper. It was agreed that the ICAO MID Regional Office provide the leadership, UAE be the champion of the MPST, IATA provide the required support and MID States assign members and allocate necessary resources to assist the MPST. Accordingly, the meeting encouraged MID States to support the work of the MPST.

2.2 It is to be highlighted that MIDANPIRG/14 noted with appreciation that Egypt, Jordan, Oman, and Qatar requested MPST Visit, to be conducted starting the second quarter of 2014. However, no MPST Visit has been conducted yet. In this regard, the meeting is invited to review and agree on the scope/work programme of the MPST and update its ToR accordingly.

2.3 The meeting may wish to note that the PBN Go-Team Visit Phase II was successfully held in Abu Dhabi, UAE, 19-30 January 2014. The event was organized jointly by IATA and ICAO and hosted by the Emirates General Civil Aviation Authority (GCAA). The event included a PBN Airspace Planning Concept Workshop. The Summary of Discussions of the event is at **Appendix B** to this working paper.

2.4 In the same vein, a PBN Implementation Workshop/PBN Go-Team was successfully held in Tunis, Tunisia, 24-28 February 2014. The event was organized by ICAO (EUR and MID) with the support of EUROCONTROL and hosted by the Tunisian Civil Aviation Authority. The Summary of Discussions of the event is at **Appendix C** to this working paper.

2.5 The meeting may wish to note that the PBN Workshops were very fruitful and especially the support/assessment mission for the hosting State (e.g. Tunisia) was very beneficial.

2.6 Based on the above and in line with MIDANPIRG/14 outcome related to PBN, the meeting is invited to encourage States to coordinate with ICAO the hosting of additional PBN Workshops. The Workshops would include a support mission to the hosting State to assess their current PBN implementation status and provide a list of recommendations to foster the PBN implementation with clear follow-up actions.

2.7 For effective results the following criteria might be taken into consideration when planning for the Workshop:

- Duration 5 days;
- Number of participants: max 50;
- Audience: regulators, airspace planners, procedure designers, air traffic controllers and Communication, Navigation and Surveillance (CNS) experts and airlines; and
- The provisional Agenda of the Workshop might include the following:
 - first 3 days:
 - a) Opening session;
 - b) Airspace Planning Concept;
 - c) Introduction to PBN;
 - d) Use of PBN in Airspace Management;
 - e) Latest developments related to PBN; and
 - f) Groups Work on Case Studies to apply the Lessons Learned;
 - fourth day will be dedicated to the hosting State to present their PBN implementation Status, and their PBN implementation Plan;
 - last day:
 - a) presentation of the assessment results of the host State's PBN Status;
 - b) provision of appropriate recommendations aiming to foster the PBN implementation; and
 - c) wrap up and closing.

2.8 It is to be highlighted that the preparatory phase of the support mission should start three months in advance, in order to collect, review and assess the required documentation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) review and update as deemed necessary the MPST ToR at **Appendix A** to this working paper;
- b) discuss and take appropriate action regarding the proposal at para 2.6-2.8.

APPENDIX A

TERMS OF REFERENCE FOR MID PBN SUPPORT TEAM (MPST)

1. TERMS OF REFERENCE:

- a) promote PBN and convince Stakeholders to support PBN;
- b) gap Analysis and PBN Implementation Plan update/improvement; and
- c) implementation of PBN. This would result in the engagement at a working level to coordinate and provide assistance to States.

2. WORK PROGRAMME:

- a) promotion of PBN by increasing awareness and education to motivate States to invest and implement;
- b) make use of the PBN Go Team Visit to the UAE, and adapt this to provide the support at a greater frequency;
- c) collection of required data and practices to maintain data integrity;
- d) conducting safety assessments;
- e) completion and improvement of PBN implementation plans;
- f) guidance to establish the regulatory framework, approvals process and other mechanisms necessary for implementation and sustainment of PBN capabilities;
- g) provide guidance and assistance to operators in obtaining operational approval for utilising RNP and other PBN procedures;
- h) assist in operational approval;
- i) providing guidance to States in PBN en-route implementation, airspace route design and harmonization across FIRs; and
- j) undertake other functions relevant to implementation of PBN as assigned by the PBN/GNSS TF and report to PBN/GNSS TF

3. COMPOSITION OF THE TASK FORCE

Experts from MID Region States, UAE as champion, IATA support and representative from Industry, International/Regional Organizations may be invited when required.



PBN GO-TEAM VISIT PHASE II
Abu Dhabi, UAE
19-30 January 2014

SUMMARY OF DISCUSSIONS

I. General

1. Place and Duration

The PBN Go-Team Visit Phase II was successfully held in Abu Dhabi, UAE, 19-30 January 2014. The event was organized jointly by ICAO and IATA and hosted by the Emirates General Civil Aviation Authority (GCAA).

2. Attendance

The workshop was attended by 33 representatives from States' regulators, airspace planners, procedure designers, air traffic controllers and Communication, Navigation and Surveillance (CNS) engineers, airlines and Organizations. The list of participants is at **Attachment A** to this Summary.

3. Agenda

The agenda was developed around the main following topics:

1. Welcome and Opening Remarks.
2. Course Overview and PBN processes.
3. Airspace Handbook.
4. Designing routes.
5. Procedure Design Considerations.
6. CCO and CDO Design Methods.
7. Good Design Practice.
8. Civil/Military cooperation in ATM.
9. Case Study 1
10. Safety Criteria and Assumptions.
11. Validation and Implementation.
12. Case Study 2.
13. Timelines.
14. Routes and Holds.
15. En-route structure and NAV SPECS.
16. Integrating enroute structures.
17. Case Study 3.
18. Review and Next Steps.

A copy of the detailed Agenda/Work Programme is available at the ICAO MID Regional Website.

From extensive feedback it was confirmed that the Agenda was well balanced, informative and interesting and that it met the expectations of the participants.

4. Objective

The purpose of the PBN Go Team Visit was to support States in enhancing their PBN capabilities in order to improve the Global and Regional PBN implementation. The visit was supposed to provide instructions/discussions in 2 main areas as follows:

- a) Airspace Planning Concept Workshop, 19-30 January 2014; and
- b) PBN Operations Approval, 26-30 January 2014.

Unfortunately, the Operations Approval Course was cancelled due the low level of participation.

II. Summary and Outcome of Discussions

The Airspace Planning Concept Workshop provided a balance between the time allocated to presentations covering the PBN Airspace Planning Concept and a forum for open discussions, exchange of knowledge and experience. Much thought and effort had been put into the development of the presentations by the speakers who have been thanked for the time and effort they dedicated to the Workshop/Go Team and the enthusiasm and commitment to their subjects.

All the presentations are available at: <http://www.icao.int/MID/Pages/2014/PBN%20Go-Team%20Visit.aspx>

The discussions were grouped into three Topics as follows:

1. The concept of airspace planning, PBN and the use of PBN in airspace management

The objective of these sessions was to provide an overview of the development of a PBN Airspace Concept' and the methodology to be used in developing such concepts.

Presentations were delivered by the following speakers:

- Mr. Joel Morin, Assistant Director, ATM Harmonization & Global Policy, Safety and Flight Operations Division, IATA HQ;
- Mr. Walter White, Consultant, ProSky; and
- Jeffrey Williams, Senior VP, Senior Aviation Advisor, Tetrattech

2. Case Studies

During these sessions the participants were divided into two groups, to apply the lessons learned related to PBN, on a generic module, which provided an opportunity for effective discussions and more understandings of PBN, ATM operations and airspace management.

The three Case Studies addressed the following:

1. designed routes and airspace in TMA;
2. routes designed for dual airports; and
3. Enroute design and multi-TMA integration practice

3. Review and Next Steps

During the final session Mr. Erwin Lassooij, ICAO PBN Manager, provided the meeting with an overview regarding the status of PBN implementation at the global and regional levels. Mr Erwin highlighted the outcome of the PBN Go team Visit Phase II to UAE and encouraged participants to take into consideration the below lessons learned:

- Team concept: diverse points of view and sources of information add strength
- Setting goals and scope early helps insure success
- Smaller projects allow for quick success
- Take advantage of RNAV flexibility to design for shortest route
- Design routes first then design airspace to contain routes
- Design routes to minimize conflicts
- Avoid the 100% trap – 80% of something is better than 100% of nothing
- Right size the airspace according to tasks required
- Avoid CDO route shortcuts to the extent possible
- Shortcut CCO to the extent possible

It was also agreed that the ICAO MID Regional Office to follow up with the MID States and provide the appropriate first level of support. However, ICAO HQ will be providing support to PBN implementation through the issuance of Standards and Guidance Materials and by conducting customized Go Teams.

III. Closing

The event was closed by Ms. Nancy Graham, ICAO Director of Air navigation Bureau and Mr. Ahmed Al Jallaf, Assistant Director General, ANS, GCAA, UAE, who distributed the Certificates to the participants.

The importance of gathering all stakeholders and providing forums for discussion of PBN issues was highlighted. In this respect, the participants expressed their gratitude to IATA and ICAO for organizing the PBN event and to UAE for hosting the Workshop in Abu Dhabi; and invited ICAO to continue on this pace and organize more PBN Workshops.



PBN Implementation Workshop / PBN Go-Team

Tunis, Tunisia

24-28 February 2014



SUMMARY OF DISCUSSIONS

I. General

1. Place and Duration

The PBN Implementation Workshop/PBN Go-Team was successfully held in Tunis, Tunisia, 24-28 February 2014. The event was organized by ICAO (EUR and MID) with the support of EUROCONTROL and hosted by the Tunisian Civil Aviation Authority.

2. Attendance

The workshop was attended by 63 representatives from States' regulators, airspace planners, procedure designers, air traffic controllers and Communication, Navigation and Surveillance (CNS) experts, airlines and International Organizations. The list of participants is at **Attachment A** to this Summary.

3. Agenda

The agenda was developed around the main following topics:

1. ICAO PBN objectives and plans.
2. What is Area Navigation?
3. Introduction to PBN.
4. Overview of PBN specifications.
5. Overview of PBN specifications.
6. What is an Airspace concept?
7. Case study.
8. Design airspace.
9. Nav specs and procedure design.
10. Design airspace volumes.
11. Validation and implementation.
12. Group final presentation.
13. Presentations on practical examples of implementation.
14. PBN ATCO training issues.
15. Designer training and procedure design issues. Quality assurance process and oversight.
16. GNSS / BLUEMED.
17. EUROMED GNSS II/MEDUSA project.
18. Presentations by Tunisia.
19. Wrap-up and Closing.

A copy of the detailed Agenda/Work Programme is available at the ICAO MID Regional Website.

From extensive feedback it was confirmed that the Agenda was well balanced, informative and interesting and that it met the expectations of the participants.

4. Objective

The purpose of the Workshop/Go Team was to support States in enhancing their PBN capabilities in order to improve the Global and Regional PBN implementation. Moreover, the Workshop/Go Team aimed to assess the status of the PBN implementation in Tunisia and provide a list of recommendations to foster the PBN implementation.

II. Summary and Outcome of Discussions

The Workshop provided a balance between the time allocated to presentations covering the PBN Airspace Concept and a forum for open discussions, exchange of knowledge and experience. Much thought and effort had been put into the development of the presentations by the speakers who have been thanked for the time and effort they dedicated to the Workshop/Go Team and the enthusiasm and commitment to their subjects.

All the presentations are available at: http://www.icao.int/MID/Pages/2014/PBN_Workshop.aspx

The sessions were grouped into four (4) main Topics as follows:

1. The concept of airspace planning, PBN and the use of PBN in airspace management

The objective of these sessions was to provide an overview of the development of a PBN Airspace Concept and to introduce the EUROCONTROL 'European Airspace Concept Handbook for PBN Implementation' and the methodology to be used in developing such concepts.

Presentations were delivered by Mrs. Franca Pavlicevic, Head of Navigation & CNS Research Unit and Mr. Charlie Eliot, Senior ATM Training Expert, from Eurocontrol.

2. Case Study

During these sessions the participants were divided into two groups, to apply the PBN concept in airspace planning, on a generic module, which provided an opportunity for effective discussions and more understandings of PBN, ATM operations and airspace management.

The Case Study was concluded with presentations of proposals by each group.

3. Go Team Expert presentations

During these sessions five presentations were delivered as follows:

- Presentations on practical examples of implementation, Mr. Frank Lumnitzer, Director Procedure design and aviation consulting, Aviaconsult;
- PBN ATCO training issues, Mr. Bertrand Foucher, ATM expert, ENAC;
- Designer training, procedure design issues, quality assurance process and oversight, Mr. David Szymanski, Head of PANS-OPS Office, ENAC;
- GNSS / BLUEMED, Mr. Patrizio VANNI, GNSS Expert, ENAV S.p.A; and
- EUROMED GNSS II/MEDUSA project, Mrs. Antonella Di Fazio, Coordinator, EUROMED GNSS II MEDUSA Project.

4. PBN implementation in Tunisia

During this session Mr. Radhouan Aissaoui, Head of Air Navigation Studies Department, Office de l'Aviation Civile et des Aéroports (OACA), Tunisia, presented the PBN implementation status in Tunisia and the challenges they are facing.

Mr. Mohamed Smaoui, ICAO MID Regional Office Deputy Regional Director, presented the outcome of the Go Team visit to Tunisia, as follows:

General planning and implementation issues:

- a) Assessment of DME-DME infrastructure coverage.
- b) Establish/amend regulations to require a GNSS interference assessment as part of regular flight inspections and validations and GNSS recording for post implementation monitoring.
- c) Expedite the PBN operational approvals of the national operators.
- d) Initiate PBN SIDs/STARs implementation taking into consideration continuous operations (CCO and CDO).
- e) Take necessary measures to implement Assembly Resolution 37-11 in a timely manner (APV).
- f) Ensure that flight validation is carried out for new procedures.
- g) Implement e-TOD for Area 1 and eventually for Area 4 if Cat II is planned.
- h) Ensure that ATM systems support PBN implementation.
- i) Ensure that operators, ATCOs and oversight authorities are trained on PBN.
- j) Align the chart naming by 2022 in accordance with the new ICAO requirements on charting for PBN.
- k) Reinforce the multidisciplinary approach to PBN implementation.

Specific AIP related issues:

- a) Navigation specifications and applications need to be specified in the AIP.
- b) RNAV approach procedures referencing to VOR/DME sensors shall be corrected/deleted.
- c) A difference filed in AIP GEN 1.7 related to Annex 2 Chapter 5 5.1.2 needs to be clarified. Otherwise, this would not permit use of RNAV1, RNAV2, RNP1, RNP2, and RNP4.

- d) AIC IFR NR04/05 Act of the “Ministre du Transport“ N° 574 dated on 30/11/2004, establishing the requirements applicable to the installation of GPS equipment on-board aircraft for the use in Tunisian airspace should be verified to clarify the following:
- Include AIC IFR 04/05 regulation in AIP
 - Recheck article 8 in order to allow GPS as standalone sensor in terminal airspace
 - Recheck article 10 point B – there is no need to have a GPS based approach procedure published by state of registry
 - Recheck article 11 point C – BRNAV is set in context to RAIM which is not correct
 - Recheck article 12 – LPV procedures would not be possible
- e) AIC IFR NR04/05 Act of the “Ministre du Transport“ N° 574 dated on 30/11/2004, establishing the requirements applicable to the installation of GPS equipment on-board aircraft for the use in Tunisian airspace should be verified to clarify the following:
- Recheck article 15 – Migrate terms “GPS standalone” to meet requirements for “RNP APCH”.
- f) AIC IFR NR16/05 Act of the “order of the Minister of Transport N°157 dated on 31/08/2005, related to the airworthiness and operational approval for RNP-4 operations in RNP- 4 airspace should be verified to clarify the following:
- Recheck applicability of RNP4 AIC IFR as RNP4 is a specification designated for use in oceanic/remote areas.
 - Refer to PBN Manual ICAO Doc 9613.
- g) AIC IFR NR06/07 Act of the “order of the Minister of Transport N°164 dated on 06/12/2006, laying down the requirements for the implementation of Basic RNAV (B-RNAV) in Tunisian airspace should be verified to clarify the following:
- Recheck applicability and correctness of AIC
 - Verify the correct use of RNP with RNAV terms.

Next Steps

- a) An updated national PBN Plan should be made available to ICAO at the earliest convenience not later than 31 December 2014.
- b) Follow-up actions will be undertaken in close cooperation between ICAO and Tunisia as required.

III. Closing

The participants were provided with a Certificate of Attendance.

The importance of gathering all stakeholders and providing forums for discussion of PBN issues was highlighted. In this respect, the participants expressed their gratitude to ICAO for organizing the PBN Workshop and to Tunisia for hosting the Workshop in Tunis; and invited ICAO to continue on this pace and organize more PBN Workshops.