



KINGDOM OF BAHRAIN

Ministry of Transportation
and Telecommunications

MIDANPIRG PBN SG/4 Meeting Cairo, Egypt, 19-21 January 2020

Kingdom of Bahrain



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Outline

- **Brief of the Bahrain`s National PBN Implementation Plan**
- **Status of Implementation**
- **Post assessment results of the PBN Implementation**
- **Lessons Learned**
- **Challenges**
- **Thoughts/Recommendations**



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Bahrain National PBN Implementation Plan

- The commitment of BCAA to meet the ICAO Assembly Resolution A36-23 dates back to 2019
- The resolution has called for each state to develop a national PBN implementation plan
- The global implementation of the RVSM in the world, necessitated the optimization of the airspace structures
- The main enabler towards optimum airspace structure is the implementation of Performance-Based Navigation (PBN)
- BCAA executed a major airspace restructure in Bahrain FIR inline with the National PBN implementation plan
- The establishment of RNAV1 – 2102
- the aim of this national implementation PBN plan was to align the implementation with the MID regional plan at the regional level and to address the PBN implementation strategy at the national level.



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Bahrain National PBN Implementation Plan

The PBN implementation plan`s strategic objectives:

- High-level National strategy for the PBN implementations in accordance with the Global Air Navigation
- Alignment with Aviation System Block Upgrades (ASBU) threads related the concepts of the PBN, Area Navigation (RNAV) and Required Navigation Performance (RNP)
- Applicable to instrument approaches, standard departure (SID) routes, standard arrival (STAR) routes, and ATS routes in continental areas in accordance with the implementation goals in the Assembly resolution
- Guidance/direction for CNS/ATM Systems and operational requirements/procedures
- Avoidance of mandating multiple on board equipment and multiple navigation systems on the ground
- Avoid of multiple airworthiness & operational approvals/requirements for intra- and inter-regional operations
- Meet commercial and economic interests in terms of cost effectiveness for both airspace users and ANSP



Bahrain National PBN Implementation Plan

Stakeholders

The PBN Implementation Plan was developed and executed by BCAA in collaboration with the stakeholders concerned, the main stakeholders of the aviation community that were involved in the development process of the road map are:

- Airlines and operators (Gulf Air, DHL & Bahrain Royal Flight)
- Air Navigation Service Providers (BCAA)
- Regulating agencies (BCAA)
- Bahrain Airport Company (BAC) – Operator
- National/international organizations and Military Authorities (BDF, USAF, RBAF)



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Bahrain`s Status of Implementation

Overview of the National PBN capabilities

- Regulations & PANS-OPS Inspectorate
 - BCAA Civil Aviation Law as a Primary Aviation Legislation
 - Air Navigation Technical Regulation

BCAA has established and implemented effective aviation safety strategies, regulatory frameworks and processes in line with a State Safety Program (SSP) achieving highest practicable levels of safety and PANS-OPS oversight.

- Airspace concept
 - RNAV! FIR – 2012
 - RNAV1 (GNSS) TMA 2015



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Bahrain`s Status of Implementation

Overview of the National PBN capabilities

- Procedure Design Entity (outsourced)
- Number of procedure designers (outsourced)
- Automated tools (WGS-84 DATA - AUTOCAD CIVIL 3D - ASAP PHX...etc.)



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Status of Implementation

RWY Ends	ILS / CAT	LNAV	LNAV / VNAV	LPV	RNP AR	RNAV SID	RNAV STAR
30R	2	LNAV	LNAV/VNAV	-	N/A	IN PROGRESS	RNAV STAR
12L	2	LNAV	LNAV/VNAV	-	N/A	IN PROGRESS	RNAV STAR
30L	-	LNAV	LNAV/VNAV	-	N/A	N/A	N/A
12R	-	LNAV	LNAV/VNAV	-	N/A	N/A	N/A



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Post assessment and lessons learned of PBN Implementation

- Airspace review (project/study)
- Airspace assessment – Analyses
- Stakeholders involvement
- User demand
- Rewards (cost efficient – Enhanced airspace utilization- Environmental/Co2 emission)
- Regulatory role
- ANSP requirements
- Gradual implementation



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Challenges

- rapid industrial growth
- Expansion of major airlines fleet
- New low-cost airlines
- Airspace complexity
- Adjacent FIRs route structures
- Contingency developments
- Stakeholders awareness
- Training



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Thoughts/Recommendations

How to overcome the identified challenges

- The involvement of key stakeholders
- Collaboration with adjacent FIRs
- Awareness and training campaign
- Airspace review, assessment & analyses



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Thank you