ICAO CAPACITY & EFFICIENCY

General requirements for IFP and Status of PBN implementation in the MID Region

Elie El Khoury
RO ATM/SAR
ICAO MID Regional Office, Cairo

Cairo/22 January 2017

Presentation Outline

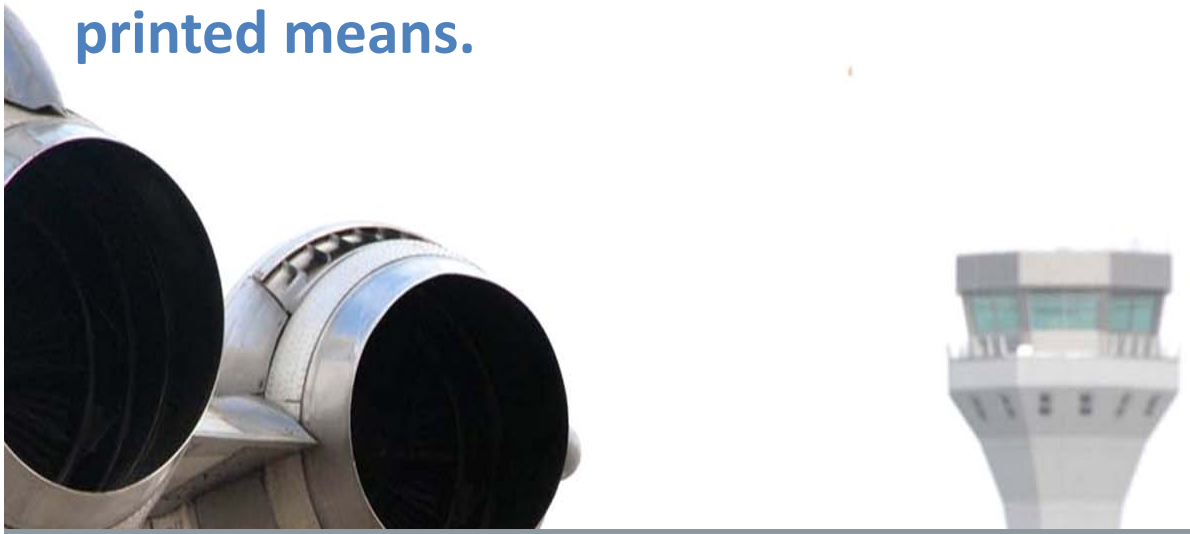
- Definition of IFP
- General requirements for IFP
- PBN
- Targets
- Status of implementation
- Challenges
- Recommendations

What is IFP?

Instrument Flight Procedure (IFP)

A published procedure used by aircraft flying in accordance with the instrument flight rules which is designed to achieve and maintain an acceptable level of safety in operations.

A description of a series of predetermined flight manoeuvres by reference to flight instruments, published by electronic and/or printed means.



General requirements

- Legislations/Regulations
- Design Organization/Office
- Experts Qualifications and Training
- Resources
- Quality Assurance
  - Information/data
  - Design Process
  - Safety Assessment
  - Procedures Validation
  - Design Publication
  - *Software validation*

Legislations/Regulations

- States shall promulgated regulations as a bases for procedure design in accordance with ICAO PANS-OPS provisions
- State/CAA should carry out all safety oversight related tasks over the service providers, including:
  - Recruitment of competent PANS-OPS inspectors
  - review and revision of regulations
  - training of technical staff
  - development of guidance material
  - issuance of approvals
  - conducting of surveillance
  - resolution of identified safety concerns
  - Etc.

Design Organization/Office

- A design organization/Office should be established equipped with appropriate tools to enable the Designers to carry on their tasks

- the service provider should ensure that the designs of instrument flight procedure are in accordance with applicable ICAO provisions and the State's Regulations

Designer Qualifications and Training

Training Programme and Training Plans should be developed and appropriately implemented to ensure that:

- **The person designing or amending a flight instrument procedure demonstrates required competency level for flight procedure design.**
- **Designers shall acquire and maintain this competency level through training and supervised on-the-job training (OJT).**

Resource Requirements

This would include:

- **having available equipment appropriate for the design, design validation, and maintenance of the types of procedures**
- **access to relevant and current data including, but not limited to, aeronautical data, land contour data, and obstacle data for the design, design validation, and maintenance of the procedures**
- **ready access to documentation that may be necessary for the design, design validation, and maintenance of the types of procedures**

✓ ***the integrity of aeronautical database and aeronautical data used for designing an IFP shall be ensured***

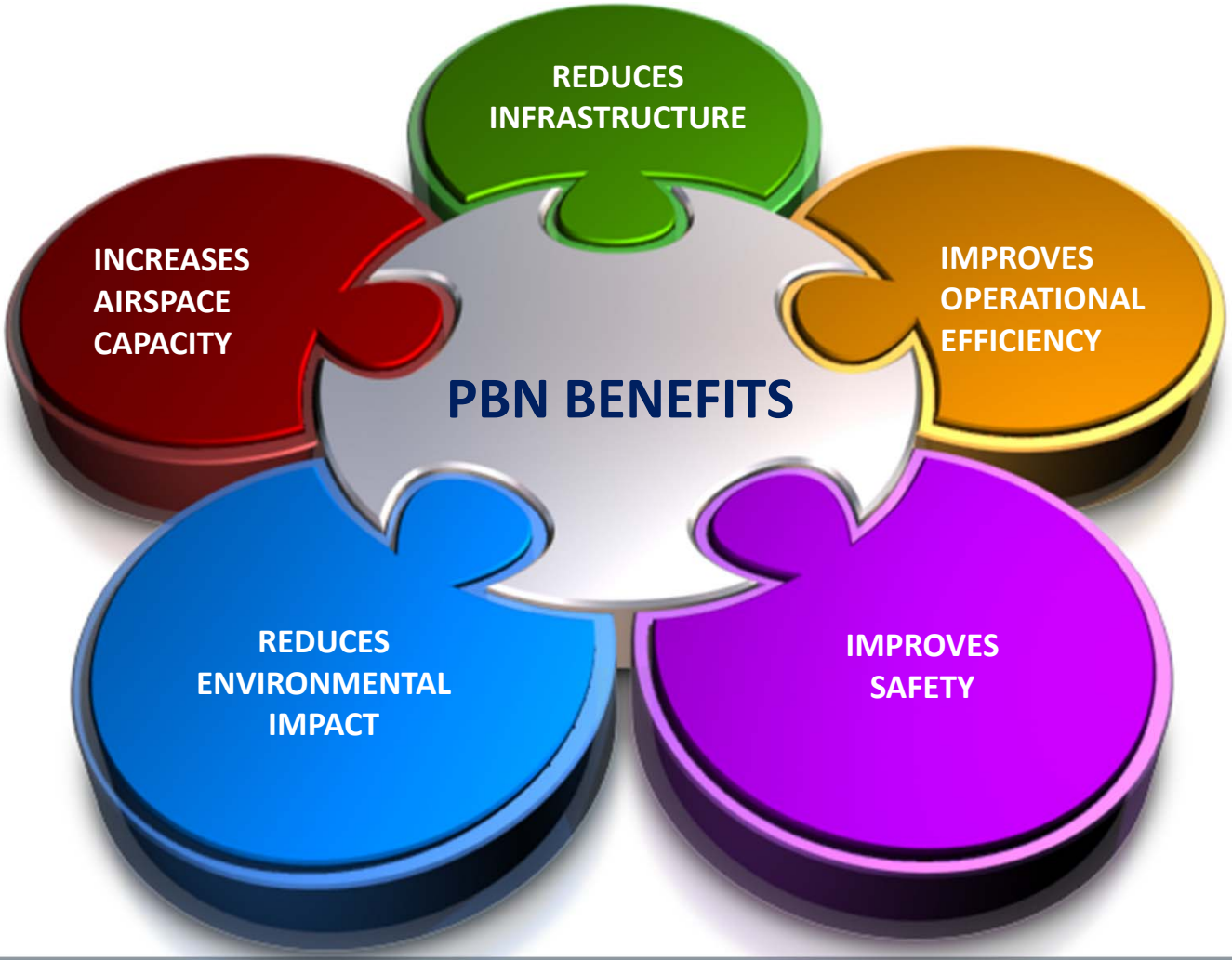
✓ ***The data used shall be current, traceable, and meets the required level of verifiable accuracy for the design***

Quality Assurance

- A quality assurance system should be implemented in accordance with the provisions of ICAO Doc 9906
- Instrument flight procedures based on conventional ground-based navigational aids have always demanded a high level of quality control.
- The implementation of area navigation and associated airborne database navigation systems, however, means that even small errors in data can lead to catastrophic results.
- This significant change in data quality requirements (accuracy, resolution and integrity) has led to the need for a systemic quality assurance process (often part of a State Safety Management System).
- Data quality management, procedure designer training, and validation of software are all integral elements of a quality assurance programme.

Air Navigation Priority?

Why PBN?


REDUCES INFRASTRUCTURE
INCREASES AIRSPACE CAPACITY
IMPROVES OPERATIONAL EFFICIENCY
PBN BENEFITS
REDUCES ENVIRONMENTAL IMPACT
IMPROVES SAFETY

Key PBN Related Outcomes

- States urged to comply with the global and regional targets
- States urged to continue to support ICAO PBN initiatives with resources
- ICAO to develop additional PBN provisions aligned with the Aviation System Block Upgrades (ASBUs), GANP and GASP
- ICAO to clarify regulatory oversight requirements for PBN implementation
- ICAO to provide implementation support
  - PBN training and education
  - Implementation projects and tools
  - Flight Procedures Programmes (FPPs)

What has ICAO done to help States with implementation? . . .

Flight Procedures Programmes (FPPs)

- Beijing, China
  - Co-located with Regional Sub-Office

- Dakar, Senegal
  - FPP Office established 2014 (covers all African States)

- MID Region (Beirut, Lebanon)

ICAO/IATA PBN GO Teams

- Expert Teams Visits to address specific implementation issues
  - Phase I (PBN Requirements Assessment) completed
  - Phase II (Airspace Design and Operations Approvals) completed
- ICAO Visits are specific to address Region and/or State requirements for PBN Implementation
  - On request basis
- Focus/Services provided will be:
  - PBN Assessments / Gap Analysis
  - PBN Plan Development
  - Training
  - Implementation Assistance

Completed Global Visits Phase (I and II)

Thailand (2)	UAE (2)
Mexico	Kenya
Germany	India
Ecuador	Russia
South Africa	USA (CAR/SAM)
China	

PBN Documentation Framework

- PANS Ops Volume I
- PANS Ops Volume II
- PBN Manual (Doc 9613)
- RNP AR Procedure Design Manual (Doc 9905)
- PBN Ops Approval Manual (Doc 9997)
- Manual on PBN Use in Airspace Design (Doc 9992)
- CDO Manual (Doc 9931)
- CCO Manual (Doc 9993)
- GNSS Manual (Doc 9849)
- Procedure QA Manual (Doc 9906)

PBN Tailored Products and Services

- PBN iKit
- PBN Start
- PBN Training
- PBN Publications/Bundles
- PBN Symposia/Workshops
- PBN Implementation Assistance
- PBN Business Planning
- PBN Financial Aid

Provided through ICAO HQ, Regional Offices, FPPs, ICAO Authorized Training Centers, On-line ICAO Store

PBN Training

- Computer Based Training Courses (CBTs)

PBN Overview
PBN Ops Approval
PBN Airspace Design

PBN for Pilots

PBN for ATCOs

- PBN Classroom Courses

PBN Ops Approval
PBN Airspace Design

Procedure Design Courses

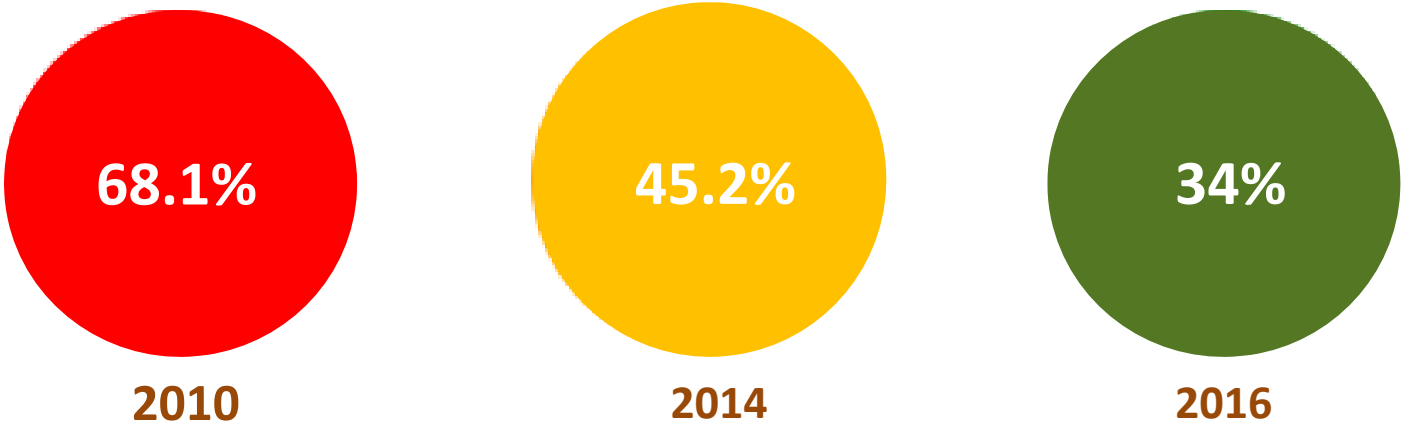
A37-11 PBN Global Targets

States complete a PBN Implementation Plan to achieve:

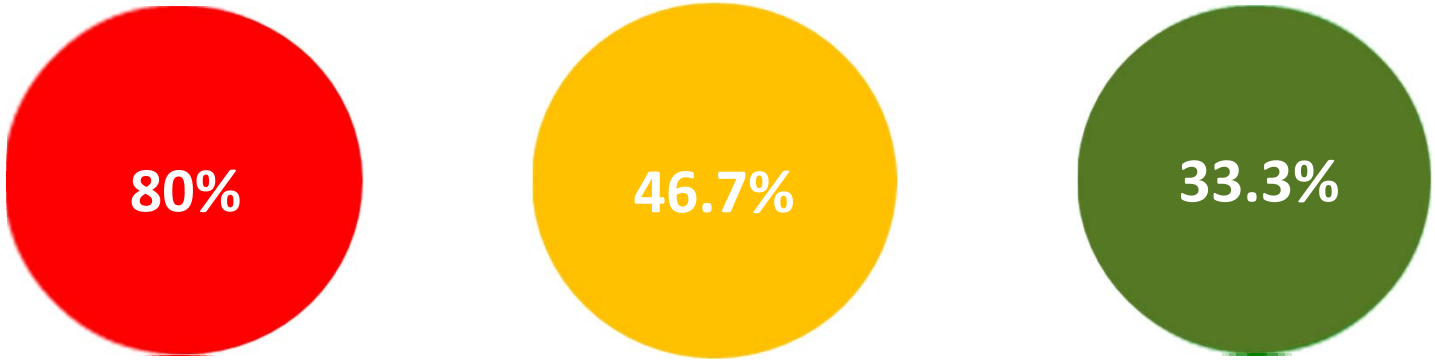
- Approach procedures with vertical guidance (APV (Baro-VNAV) including LNAV-only minima for all instrument runway ends by 2016:
  - 30% by 2010, 70% by 2014

- Straight-in LNAV only procedures as an exception to the above where there is:
  - no local altimeter setting; and
  - no aircraft equipped for APV with max certified mass of 5700kg or more

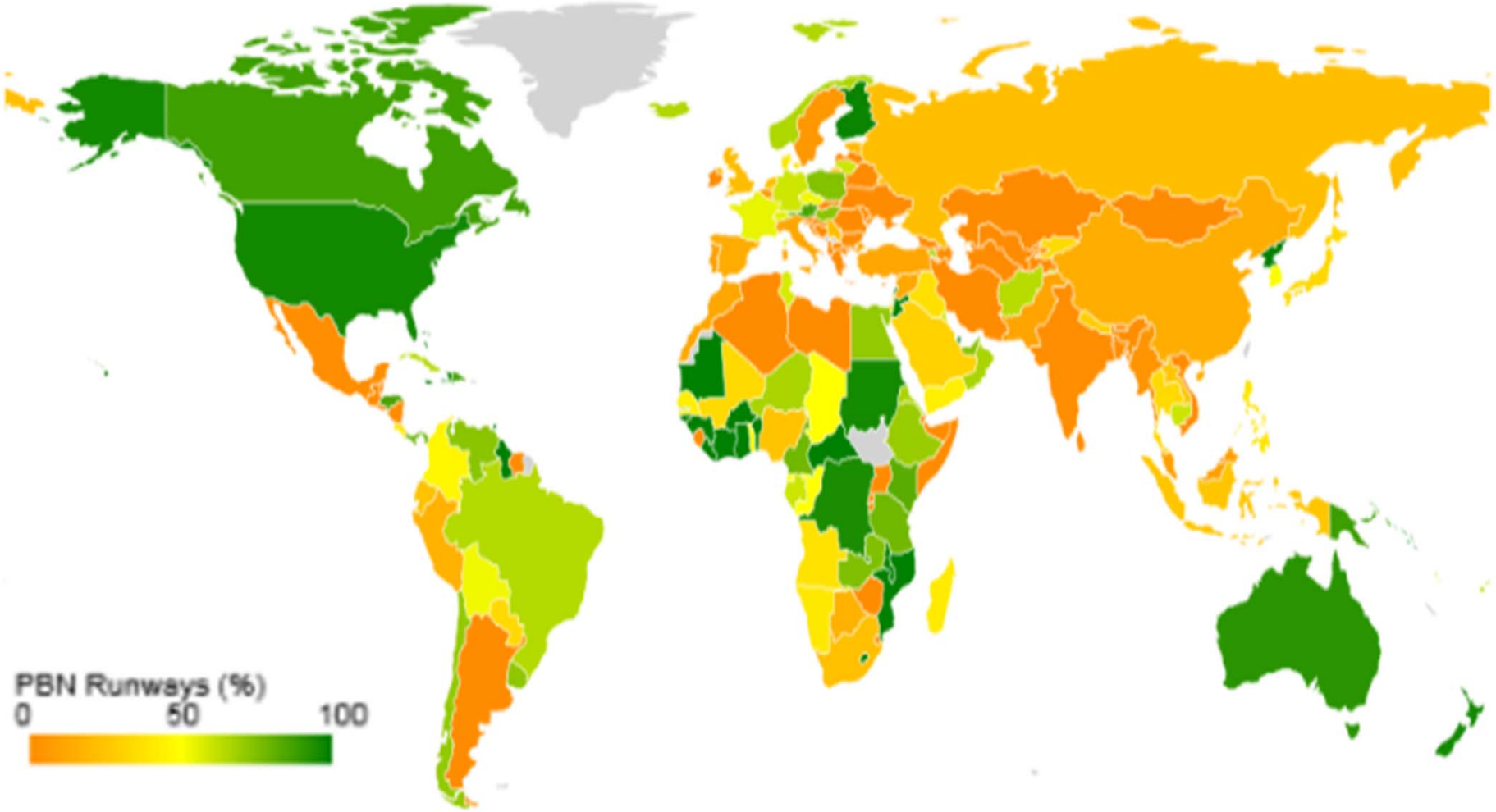
Percentage of States meeting the A37-11 Resolution Targets



Percentage of MID States meeting the A37-11 Resolution Targets



Status of PBN RWYs in the world



PBN Regional Targets

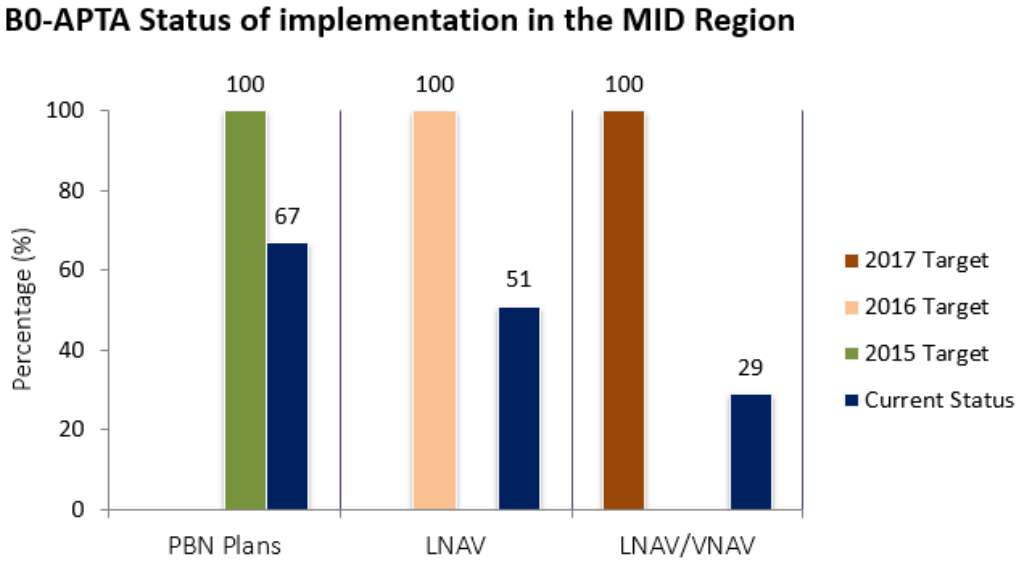
MID Region Air Navigation Strategy

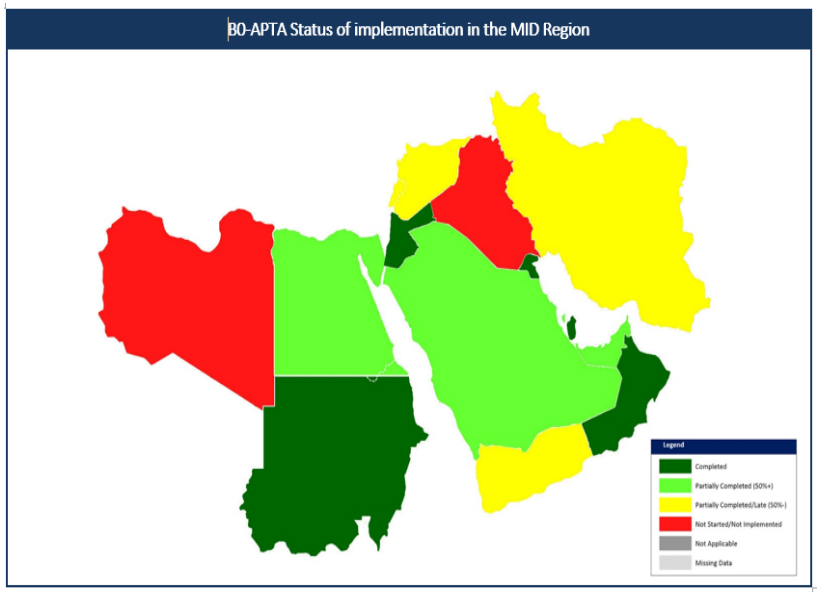
B0 – APTA: Optimization of Approach Procedures including vertical guidance

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
States' PBN Implementation Plans	All States	Indicator: % of States that provided updated PBN implementation Plan Supporting metric: Number of States that provided updated PBN implementation Plan	100% by Dec. 2018
LNAV	All RWYs Ends at International Aerodromes	Indicator: % of runway ends at international aerodromes with RNAV(GNSS) Approach Procedures (LNAV) Supporting metric: Number of runway ends at international aerodromes with RNAV (GNSS) Approach Procedures (LNAV)	All runway ends at Int'l Aerodromes, either as the primary approach or as a back up for precision approaches by Dec. 2016
LNAV/VNAV	All RWYs ENDs at International Aerodromes	Indicator: % of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV) Supporting metric: Number of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV)	All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches by Dec. 2017

DGCA-MID/3-Doha Declaration: Implement PBN approach procedures with vertical guidance, for all runways ends at international aerodromes, either as the primary approach or as a back-up for the precision approaches by 2017

Status of PBN (APTA) Implementation in the MID Region





Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-APTA	PBN Plan															
	LNAV															
	LNAV/VNAV															

Implementation Concerns

- Runway excursions
- CFIT
- Unstable approaches
- Lack of procedures with vertical guidance (APV)
- Lack of State PBN Implementation Plans
- Non-compliance with meeting A37-11 targets
- Air Operators not PBN equipped
- Delays in granting PBN Ops Approvals

Challenges

The following challenges have been identified as the main impediments to the advancement of PBN implementation in the Region:

- shortage of PANS-OPS, Airspace Planners and OPS-approval experts;
- insufficient procedure design work in some States to attain or maintain competency;
- lack of airspace and procedure design training: initial, OJT, and/or recurrent;
- lack of capabilities to implement Quality Assurance;
- lack of regulatory expertise to oversee the process leading to procedure publication;
- low Level of Civil/Military Cooperation;
- unstable political and security situation in some States;
- implementation of eTOD Area 2;
- fleet equipage;
- Operational Improvements Assessment;
- catering for non-compliance (mixed equipage environment);
- fully integrated system (IFP, AIM, eTOD);
- airspace changes to accommodate current and projected traffic increase and further improve safety, capacity and efficiency;
- GNSS Signal Vulnerability;
- maintain Target Level of Safety (TLS);
- stakeholders (ATCOs, Pilots, etc.) training and readiness.

Recommendations

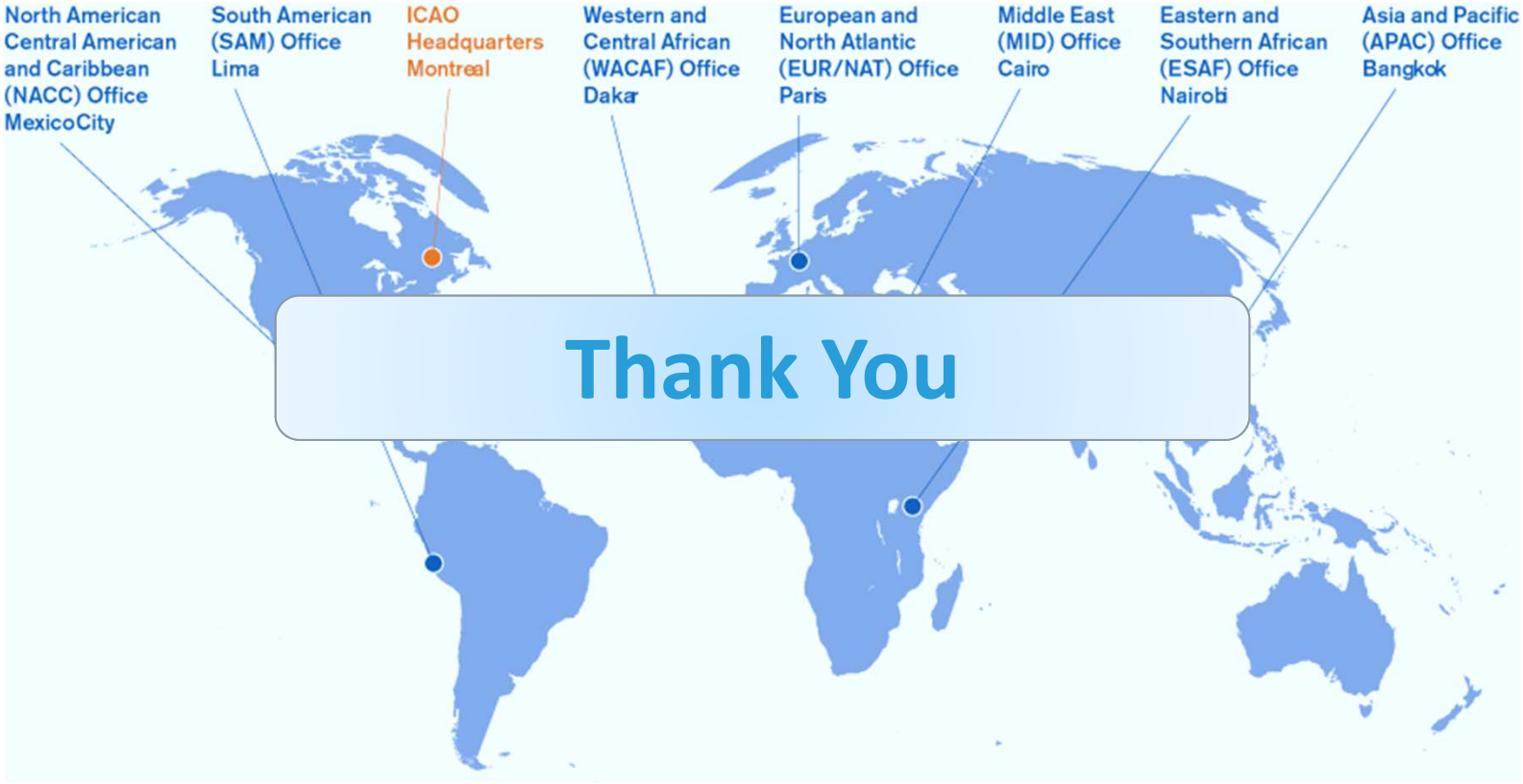
States were encouraged to:

- ✓ ensure the recruitment/training of qualified experts in the fields of FPD, airspace planning, and operations approval;
- ✓ work cooperatively;

The MID FPP would provide the optimum solution and foster the implementation of PBN

design processes;

- ✓ share experience and best practices with each other; and
- ✓ use IFSET and/or other tools for the assessment of the benefit accrued from the implementation of PBN.


North American Central American and Caribbean (NACC) Office MexicoCity
South American (SAM) Office Lima
ICAO Headquarters Montreal
Western and Central African (WACAF) Office Dakar
European and North Atlantic (EUR/NAT) Office Paris
Middle East (MID) Office Cairo
Eastern and Southern African (ESAF) Office Nairobi
Asia and Pacific (APAC) Office Bangkok

Thank You