PBN UPDATE

07-10 April 2015
Major highlights
Key PBN Related Outcomes

- States urged to comply with A37-11 targets
- States 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)
- Need for continuous implementation support
  - PBN Training and Education
  - Implementation projects
  - Flight Procedures Programme
So where are we today?
Global PBN Instrument Approach Growth
Global PBN SID & STAR Growth
PBN Versus Conventional Routes

- PBN: 38%
- Conventional: 62%
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
Global Implementation Status

Only 102 States (or 53%) have a PBN Implementation Plan
Global Implementation Status (2)

Although 69% of all instrument runways have at least 1 PBN approach...

...only 30% of ICAO Member States are on track to meet the 2014 targets of Assembly Resolution A37-11

6 June 2014
What has ICAO done to help States with implementation? . . .
Coordination with RO’s

- PBN Focal points
- PBN TF’s – awareness and coordination among States
- Implementation Projects
- Go-Teams
Flight Procedures Programme (FPP)

- **Beijing, China**
  - Upgraded to Regional Sub-Office

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

- **MID Region?**
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) will be completed in early July (Last visit to China)

- **Future GO Team Visits will be specific to Region and State requirements for PBN Implementation**
  - On request basis

- **Focus/Services provided will be:**
  - PBN Assessments / Gap Analysis
  - PBN Plan Development
  - Training
  - Implementation Assistance

<table>
<thead>
<tr>
<th>Completed Global Visits Phase (I and II)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand (2)</td>
</tr>
<tr>
<td>Mexico</td>
</tr>
<tr>
<td>Germany</td>
</tr>
<tr>
<td>Ecuador</td>
</tr>
<tr>
<td>South Africa</td>
</tr>
</tbody>
</table>
PBN Documentation Framework

- PANS Ops Volume II
- 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 (Vol 1 to Vol 6) (Doc 9906)
  * New
PBN Products

*to assist with implementation*

- PBN related Publications and Annexes
  - Bundled specifically for Stakeholders
  - Hard and soft copies

- eLibrary Solutions

- PBN ikit

- CBT Training (iLearn)

Available through ICAO e-store: www.store1.icao.int
PBN Products and Services

• PBN Start
• PBN Training
• PBN Publication and Bundles
• PBN Workshops
• PBN Implementation Assistance
• PBN Financial Aid

Provided through ICAO HQ, Regional Offices, FPPs, ICAO Authorized Training Centers, On-line ICAO Store
PBN Endorsement – IFP Organizations

- Endorsement of Instrument procedure design organizations
- Consistent with other endorsements (training)
- To assist States with PBN Implementation
- Organizations approved by ICAO:
  - Airways New Zealand
  - ASAP s.r.o. (Slovakia)
  - CAAC Central-Southern Airport Design & Research Institute (China)
  - China Academy of Civil Aviation Science and Technology (CAST)
  - GE Aviation (USA)
  - Hughes Aerospace (USA)
  - Ingegneria Dei Sistemi S.p.A (Italy)
Future PBN SARPs and guidance
FLTOPSP  PBN Tasks

• Making PBN the norm in operations rather than the exception
  – Clarify that not all PBN Nav Specs require a specific approval
  – This work will need some amendments to the PBN and PBN OPS Approval manuals

• Use of Area Navigation (RNAV) on Conventional Routes and Procedures
  – Revise PANS-OPS provisions to address PBN for “Overlay” instrument approaches
  – Revise PANS-OPS provisions to address PBN for en-route “Alternate” and “Substitute” means of navigation
FLTOPSP PBN Tasks

• Create a GA framework to be used for PBN, and other approvals, equivalent to the CAT Operation Specifications.

• Develop material augmenting existing guidance on CDFA

• Address Reciprocity/Harmonization issues with PBN Operational Approvals
IFPP  PBN Main Tasks

• Provisions for:
  – GBAS CAT II/III
  – GBAS with GP inoperative
  – Visual procedures using PBN
  – RNP AR Departures
  – Fixed Radius Transitions
IFPP  PBN Main Tasks

• Provisions for Helicopter PBN operations

• PBN Charting Information/Harmonization
  – PBN Box and Identification
  – RNAV arrival and departure charts

• PBN with XLS final approach

• PBN Regulatory requirements
NSP Main Tasks

- GBAS CAT II/III (“GAST D”) SARPs validation
- Development of Galileo SARPs
- Development of Beidou SARPs
- Multi-frequency, multi-constellation (MFMC) issues
- Fixes to existing GNSS SARPs as required
- Development of terrestrial navaids strategy (including rationalization)
- Advanced RAIM
SASP Main PBN Tasks

• **PBN Separation Minima for Terminal Airspace**
  - RNP-1, A-RNP, RNP APCH or RNP AR APCH
  - Safety assessment for terminal area separation minima for surveillance and non-surveillance airspace

• **GBAS Landing System (GLS) for parallel rwy ops**
  - Procedures and guidance required
  - Comparative assessment (ILS/MLS vs GLS and RNP) to derive GLS requirements
SASP Main PBN Tasks

• Reduced Divergence Departures – Separation Minimum for Equivalent Lateral Separation Operation (ELSO)
  – Take advantage of PBN to provide more efficient operations in increasingly constrained airspace

• Stabilized RNP approaches to parallel runways
  – Take advantage of PBN capable aircraft
  – Undertake new safety assessment
ATMOPSP Main PBN Tasks

• PBN Related Phraseology
  – CDO and CCO
PBNSG Main Tasks

• To further mature the PBN Concept
  – Update the PBN Manual
  – Develop guidance material on
    • Free routes
    • Mixed mode operations
    • RNP AR departures

• Coordinate with other ICAO Panels regarding:
  – Need for Visual RNAV procedures
  – A PBN toolset to address GNSS outage and reversion operations
  – Provisions for the judicious use of RF
  – PBN to XLS final
  – Equivalency of DME infrastructure requirements for RNAV 1 and RNP 1
PBN PROGRAMME OFFICE

- Initiates proposals on issues pertaining to the planning, management, policy and procedural aspects of developing the PBN programme.
- Manages and oversees all PBN projects within the PBN programme.
- Manages and oversees the preparation of PBN programme reports, presentations and publications for ANB.
- Leads, supervises and manages matters of intra/inter bureau and inter-agency coordination, internal/external audits, business planning and results-based budgeting regarding the PBN programme.
- Leads, supervises and manages the work of the individuals assigned to PBN projects.
- Leads and oversees large scale programmes such as Asia/Pacific Regional sub-office (APAC RSO), APAC Flight Procedure Programme (FPP) and African FPP in line with the ANB programme.