



International Civil Aviation Organization

**THE THIRD MEETING OF PERFORMANCE BASED NAVIGATION
IMPLEMENTATION COORDINATION GROUP (PBNICG/3)**

Bangkok, Thailand, 08 – 10 March 2016

Agenda Item 2: Global and Regional PBN Updates

GLOBAL PBN UPDATE

(Presented by the Secretariat)

SUMMARY

This paper presents an update by ICAO PBN Programme Manager about the latest developments regarding PBN.

1. INTRODUCTION

1.1 This paper presents an update by the ICAO PBN Programme Manager about the latest developments regarding PBN as per 20 January 2016.

2. DISCUSSION

2.1 The presentation placed at **Appendix A** develops the following items:

- Why PBN?
- Current Status of PBN implementation worldwide
- Way Forward

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this papers; and
- b) discuss any relevant matters as appropriate.



PBN Update for PBNICG/3

Erwin Lassooij

PBN Programme Manager

20 January 2016

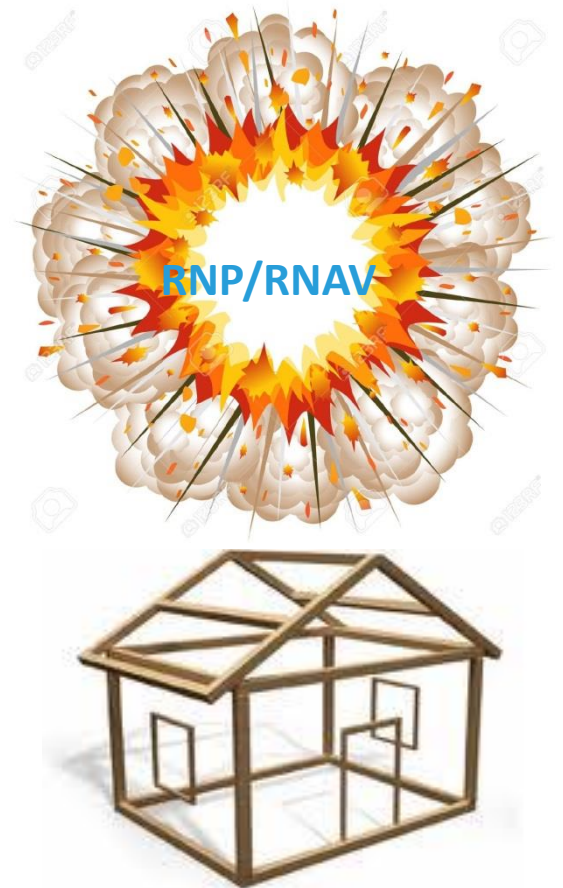
Outline

- Why PBN?
- Current Status
- Way Forward



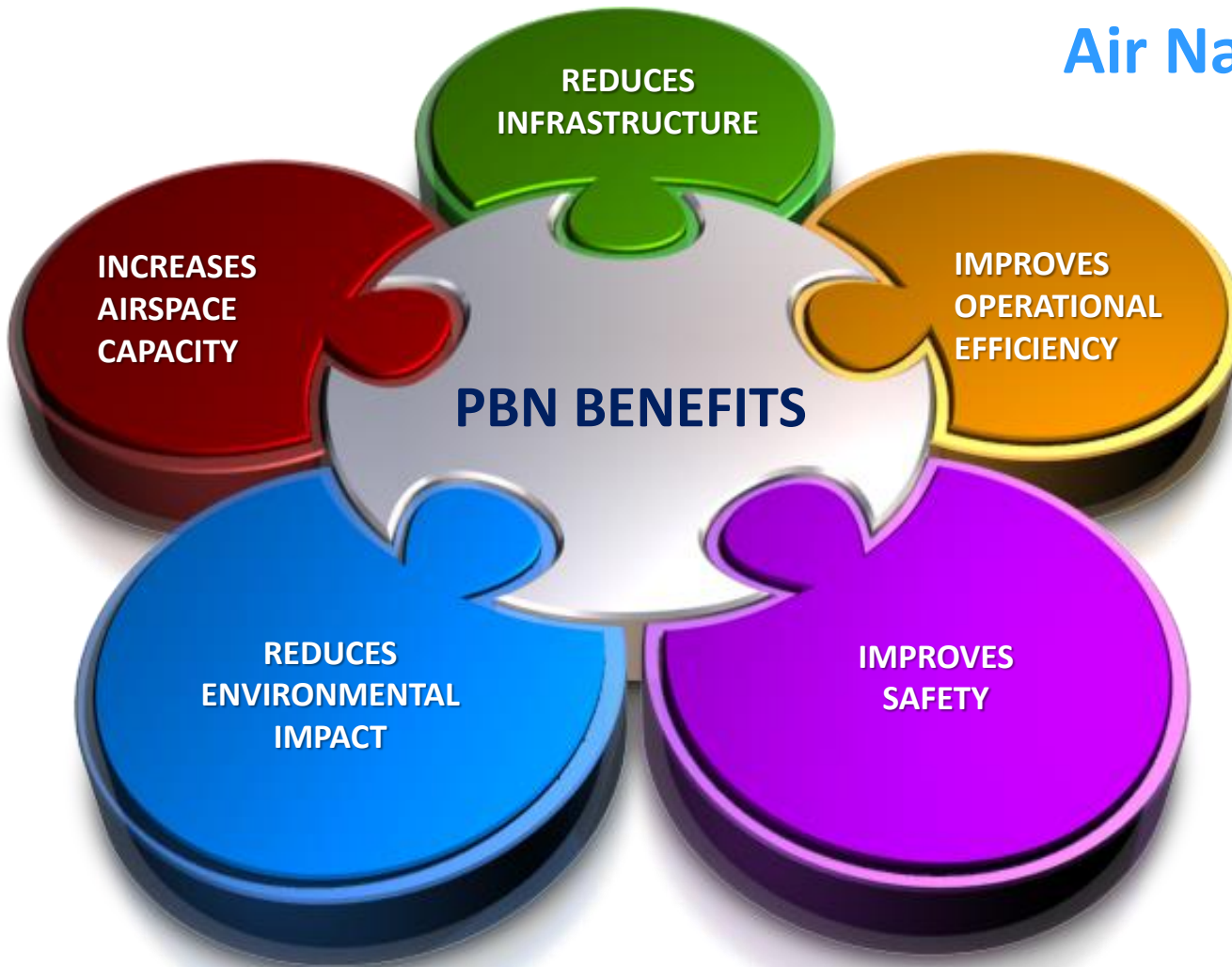
Why PBN? – Regional Disparity

- RNAV and RNP being applied inconsistently across the globe
- No central focus or control
- Need for standardization
- Need for overarching provisions
- Build the framework first!



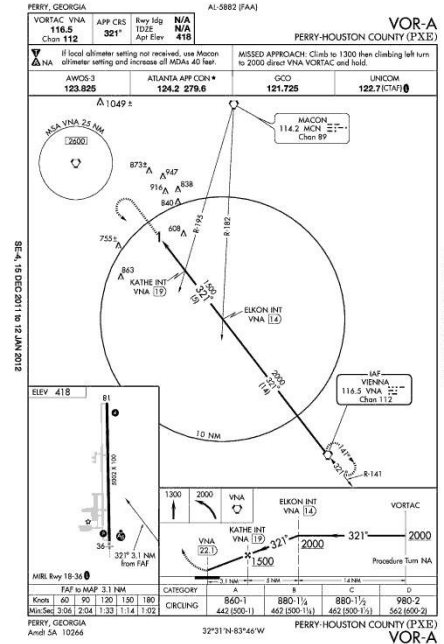
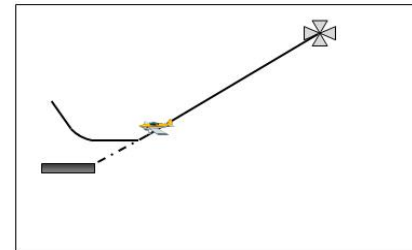
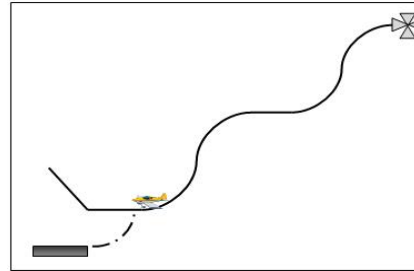
Why PBN?

Air Navigation Priority



Why PBN?

- Safety
 - Approach procedures to runways that do not currently have an approach
 - Straight-in approach procedures (vice circling)
 - Approach procedures with vertical guidance (APV)
 - Back up procedures to existing conventional precision approaches



The devastating Asiana Airlines crash landing that killed two and injured nearly 200, happened in the final seconds of a 10 and a half hour flight from Seoul, South Korea, to San Francisco on July 6, 2013. The aircraft was carrying 291 passengers and 16 crew members. Here's a timeline of events:

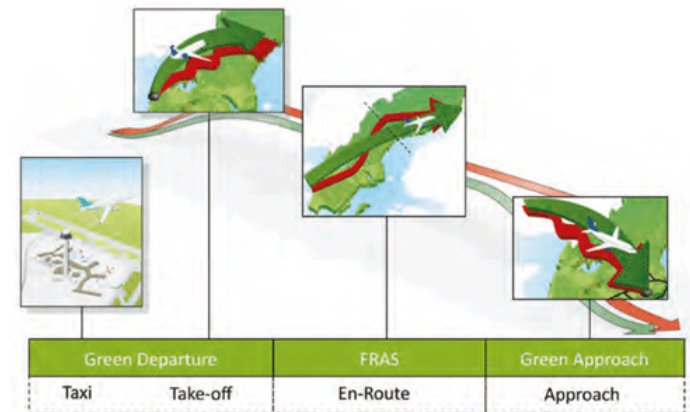
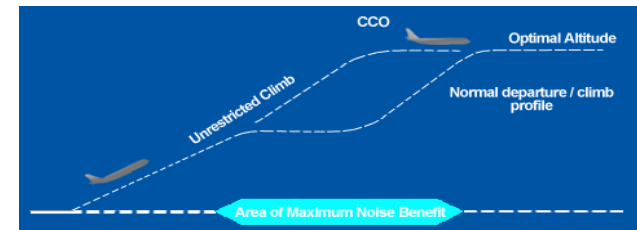
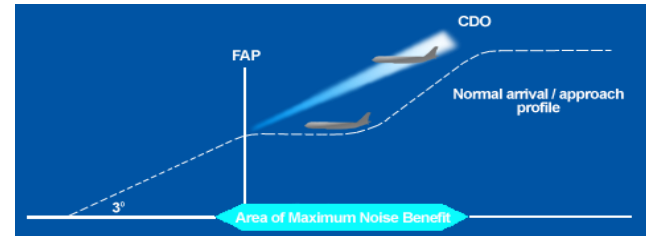
Click on the dates below to find out more

11:27 a.m. PT Plane Crashes 11:35 a.m. PT 1 p.m. PT 4:18 p.m. PT 7:47 p.m. PT Video 1 Video 2

Share Tweet 14 View BY TIMELINE BY LIST

Why PBN?

- Efficiency/Environment
 - Increased airport accessibility
 - Reduced infrastructure operating costs
 - Supports Continuous Descent and Climb operations
 - Increased airspace capacity
 - Improved and more flexible use of terminal airspace (arrivals and departures)
 - User preferred routing
 - Reduced fuel burn and CO₂ emissions
 - Avoidance of noise sensitive areas



Why PBN? A37-11

Approach procedures with vertical guidance (APV (Baro-VNAV) including LNAV-only minima for all instrument runway ends by **2016**

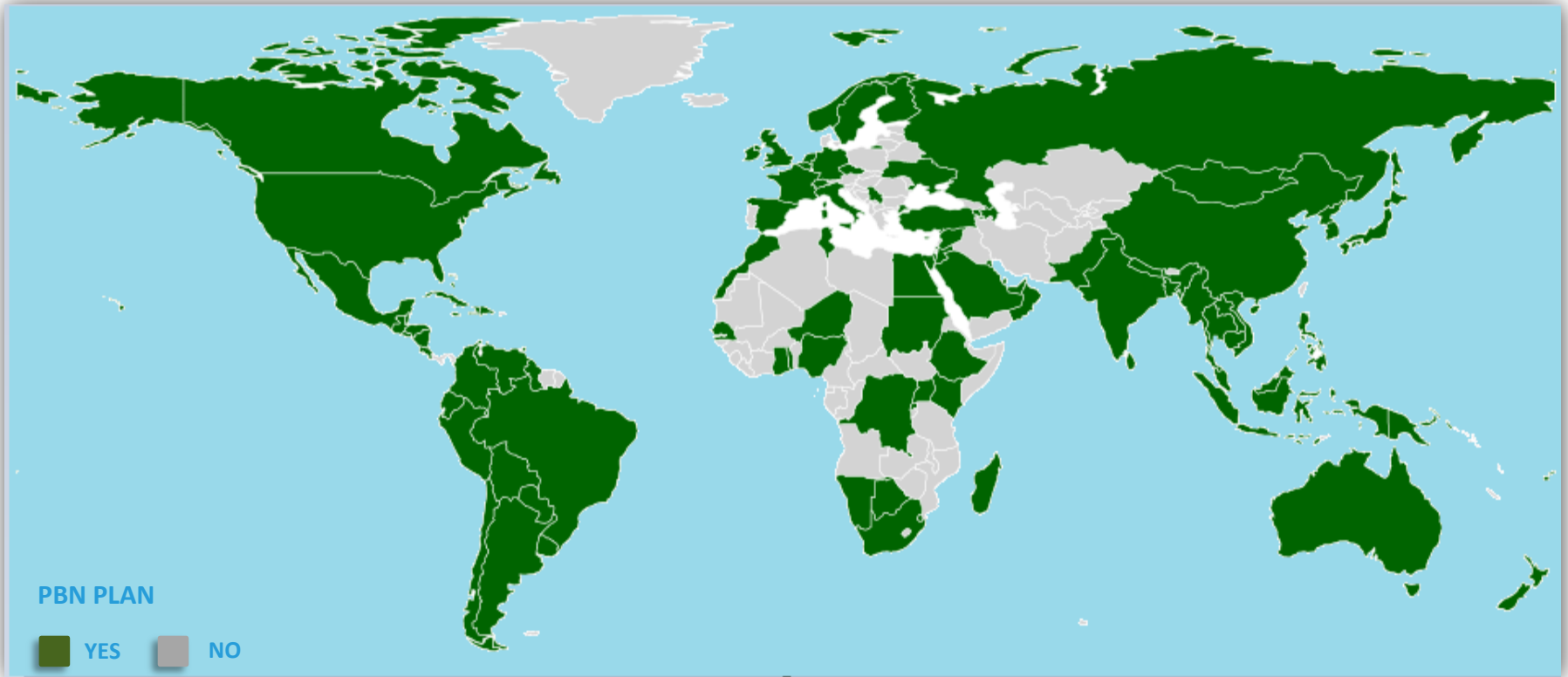


*Time is running out to meet the Performance-based Navigation (PBN) objectives of **A37-11***

Current Status - Where are we today?

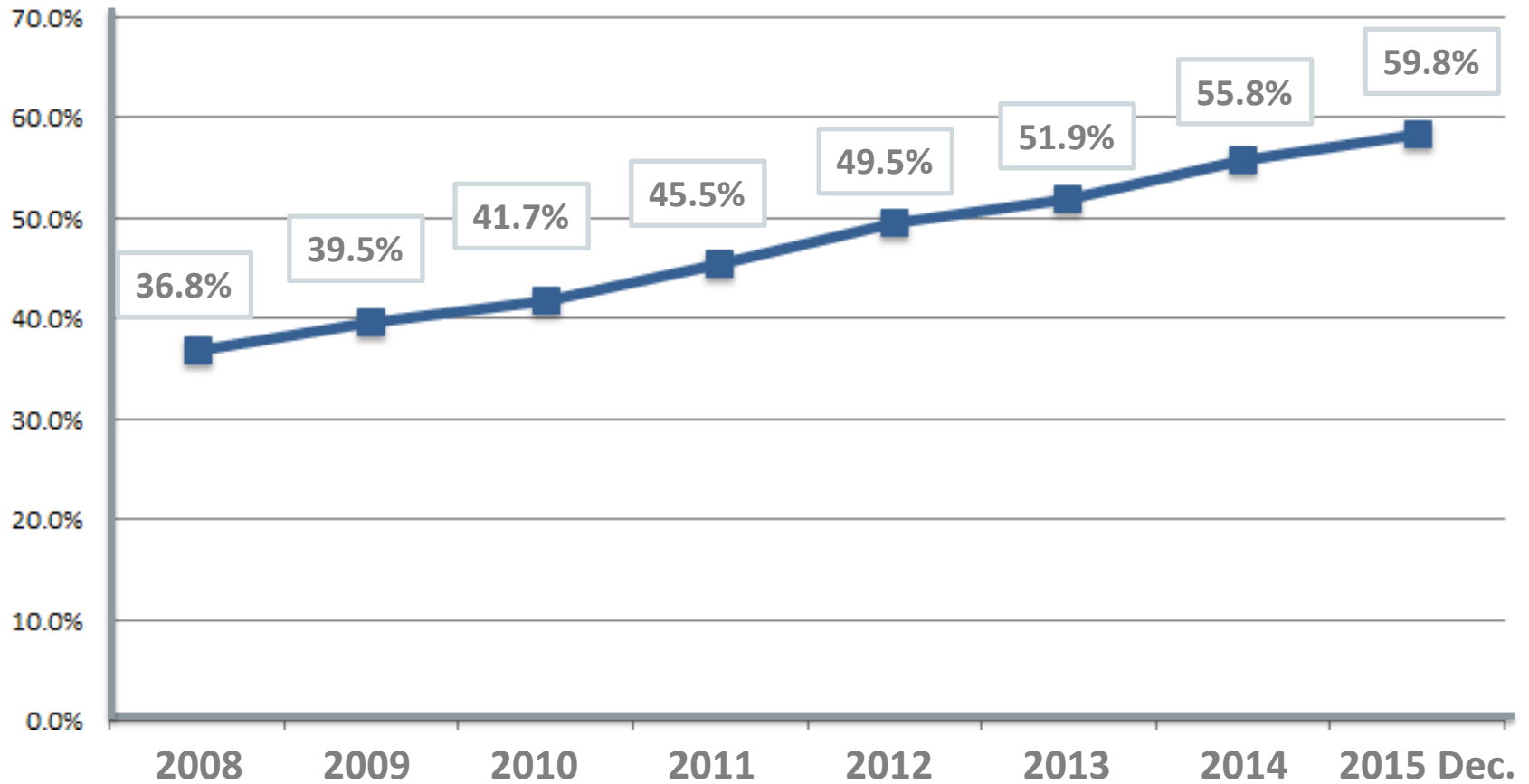


Global Status of PBN Implementation Plans

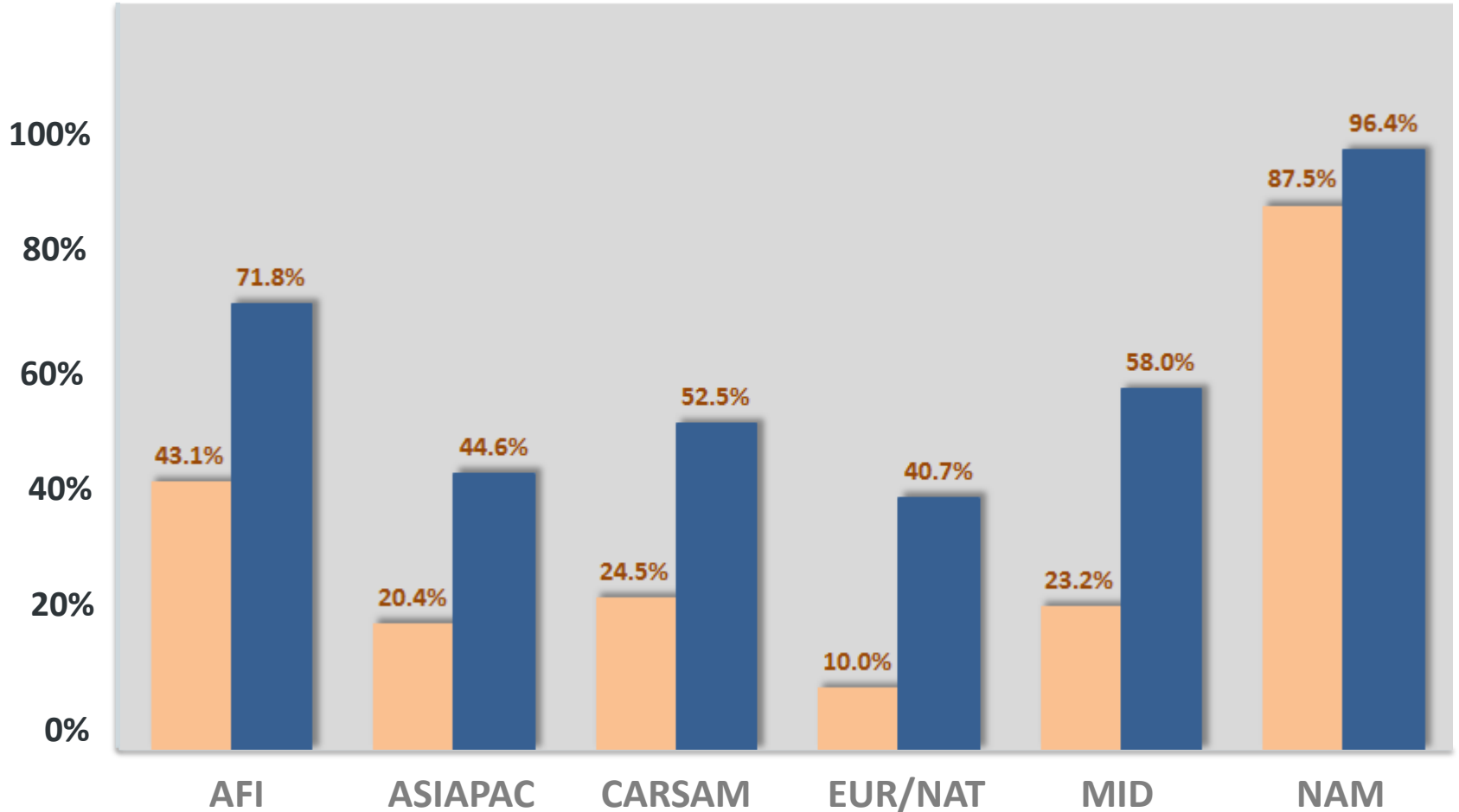


109 States

Percentage of PBN Runways for World

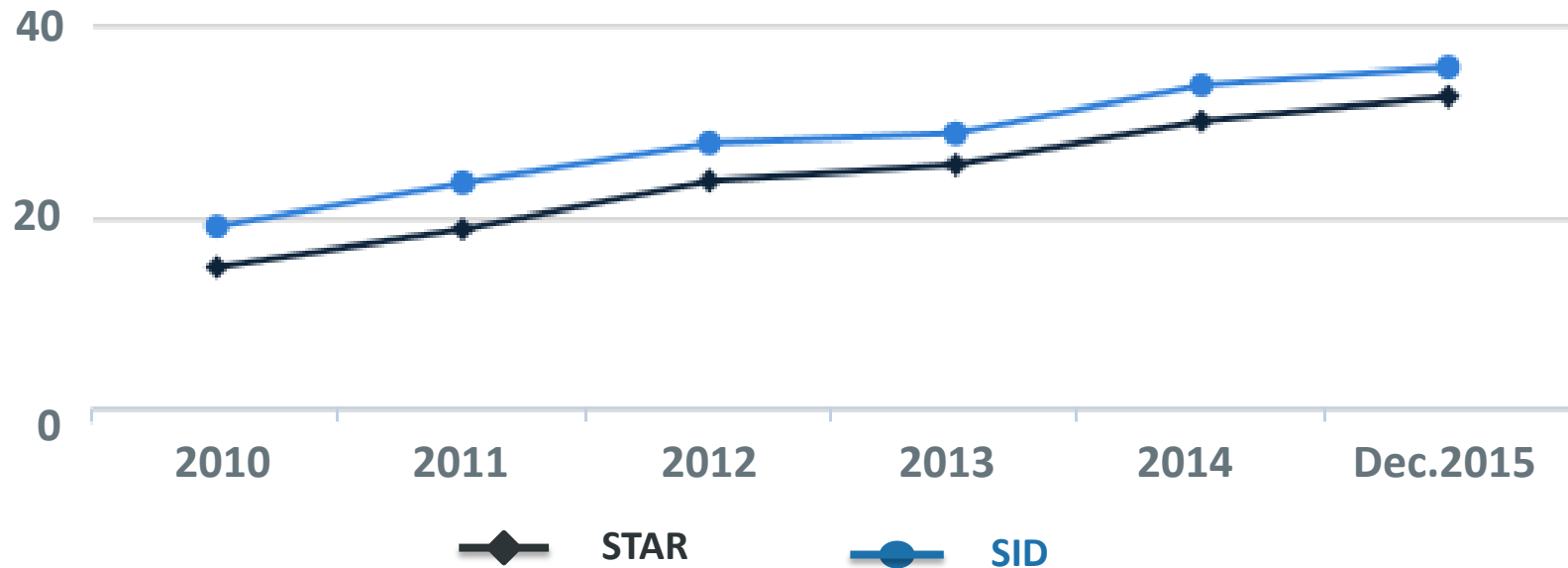


Percentage of PBN Runways for Each Region



PBN IMPLEMENTATION TRENDS

% of PBN SID/STAR for the world
(rate refers to the total number of instrument runways)



- *This data is based on the International Aerodromes as listed in the Regional Air Navigation Plans*
- *World States include the total number of ICAO Member States*

What is ICAO doing to help States with implementation? . . .



State Feedback



PBN Programme - Focus

- Regional Coordination and Support
- Development of the PBN concept
- Providing guidance/information on PBN
- Products and Services
- Promotion



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Coordination with RO's

- PBN Focal points established
- PBN TF's, ICGs – awareness and coordination among States
- Implementation Projects
- Workshops
- Regional symposia



Flight Procedures Programme (FPP)

- Very successful programme overall
- Beijing, China
 - Phase III approved
 - Extended another 3 years to 2020
- Dakar, Senegal
 - FPP Office established 2014 (covers all African States)
- MID FPP – Coming July 2016



Partnerships



Industry Declaration in support of Performance-based Navigation (PBN)

We, as representatives of the air transportation community,

Affirming our joint responsibility to seek continual improvements to the safety, access, capacity, efficiency and environmental sustainability of the air transportation system,

Recognizing that Performance-based Navigation (PBN) provides a catalyst for these improvements to air traffic operations, while enabling a seamless and cost effective solution throughout the entire flight,

Recognizing the work of ICAO in formulating and publishing globally harmonized Area Navigation (RNAV) and Required Navigation Performance (RNP) provisions, now known as Performance-based Navigation (PBN),

Recalling that Resolution A36-23 of the 36th ICAO General Assembly whereby States are urged to implement PBN procedures in accordance with the established timetable,

We resolve:

To support the timetable set out by ICAO for the global implementation of PBN,

To collectively work to facilitate the implementation of PBN, and

To assist States, regions and other stakeholders in their development and execution of a complete PBN implementation plan.

We call upon:

All leaders of the civil aviation community, to fully support implementation of PBN into the air navigation system according to the ICAO provisions and established timetable.

- Training
- Workshops
- Implementation support
- Promotion
- Go Teams



Roberto Kobeh González, Council President



Giovanni Bisignani, Director General and CEO



Alexander ter Kuile, Secretary General



Marc Baumgartner, President & CEO



Capt. Carlos Limon, President



Donald D. Spruston, Director General



François Gayet, Chairman



Angela Gittens, Director General



Matthew S. Zuccaro, President



William R. Voss, President & CEO

PBN Programme - Focus

- Regional Coordination and Support
- **Development of the PBN concept**
- Providing guidance/information on PBN
- Products and Services
- Promotion



PBNSG Main Tasks

- Reconvened to further mature the PBN Concept
 - Update the PBN Manual
 - Use of RF Legs
 - Safety case guidance
 - Functionality updates
 - Develop guidance material to close the gap
 - Mixed mode operations
 - RNP AR departures
 - Ops approvals
 - Reversion capability
 - Improved terminal efficiency
- Coordinate with other ICAO Panels
 - to ensure consistency within the PBN framework



PBNSG Inter-Panel Coordination

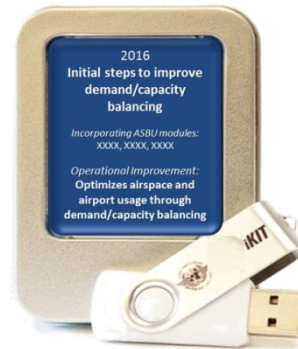
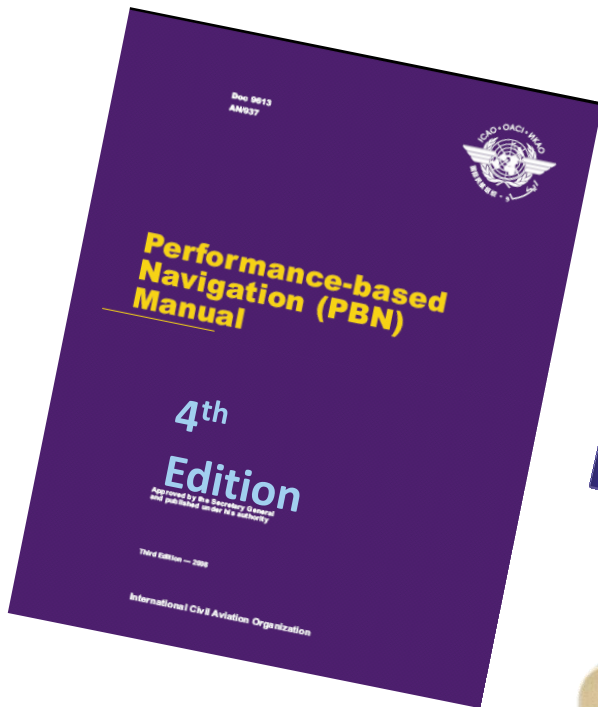
PANEL	COORDINATION AREAS
IFPP	Instrument flight procedures – updated and new PBN criteria (RNP AR DP), charting database harmonization, PBN to XLS, LP/LPV harmonization, temperature compensation
FLTOPSP	Making PBN the norm in flight training & operations Visual Guided Approach Concept
NSP	GBAS for positioning in the terminal area, terrestrial navigation strategy, advanced RAIM, multi-frequency/multi-constellation issues
SASP	Reduced separation standards resulting from PBN
ATMOPSP	ATM procedures, PBN Phraseology
ATMRPP	PBN Flight Plan Codes, FF-ICE
RPASP	Coordinate use of PBN in RPA operations

PBN Programme - Focus

- Regional Coordination and Support
- Development of the PBN concept
- **Providing guidance/information on PBN**
- Products and Services
- Promotion



PBN Documentation Framework



- PBN Manual (Doc 9613) 4th Edition
- PBN Ops Approval Manual (Doc 9997)
- Manual on PBN Use in Airspace Design (Doc 9992)
- RNP AR Procedure Design Manual (Doc 9905)
- PANS Ops Volume I & II
- CDO Manual (Doc 9931)
- CCO Manual (Doc 9993)
- Procedure QA Manual (Vol 1 to Vol 6) (Doc 9906)

PBN Programme - Focus

- Regional Coordination and Support
- Development of the PBN concept
- Providing guidance/information on PBN
- **Products and Services**
- Promotion



PBN Tailored Products & Services

- PBN Start
- PBN Publications and Bundles
- PBN Symposia/Workshops
- PBN Implementation Assistance
- PBN Business Planning
- PBN Training
- Recognitions



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
(under development)

- PBN Classroom Courses

PBN Ops Approval
PBN Airspace Design

IFP Design Courses

PBN Recognition of Compliance – IFP Organizations

- Recognition of Compliance of Instrument Procedure Design organizations
- To assist States with PBN Implementation
- Organizations recognized by ICAO (9):
 - Airways New Zealand
 - ASAP s.r.o. (Slovakia)
 - Beijing Transafe Technology and Trade Company, Limited (China)
 - 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)
 - Shanghai Eastern China Civil Aviation Procedure Design and Research Institute – SECAF (China)



PBN Programme - Focus

- Regional Coordination and Support
- Development of the PBN concept
- Providing guidance/information on PBN
- Products and Services
- **Promotion**



Global Promotion of PBN

ICAO CAPACITY & EFFICIENCY

Over 40 participants attend successful PBN Airspace Design Workshop in Dakar, Senegal.

Manual on the Use of Performance-based Navigation (PBN) in Airspace Design



PBN UPDATE: ICAO Facilitates successful PBN Implementation workshops in Turkey and Belarus.

Assembly Resolution A37-11 calls for 100% of runways to have a PBN approach by 2016

Time is running out!

ICAO SAFETY

Visit us today!
icao.int/safety/pbn

ICAO CAPACITY & EFFICIENCY

Implementing Performance Based Navigation Air Navigation's #1 Priority

Are you having difficulty implementing Performance-based Navigation (PBN)?

Are you missing out in achieving the safety and efficiency benefits that PBN provides?

Can we help tailor a solution for your needs!

For development and capability assessments to training and implementation assistance, we have the answers, team and resources to help you achieve your goals.

For more information on our PBN Implementation Services please visit: icao.int/PBNImplementation

Banners – Flyers – Articles – Website – Seminars – Symposia – Social Media – Email promotions

Way forward – Where are we going?



The Strategic Vision

- Integrate PBN into the mainstream
 - Effective Regulatory Oversight
 - Operations and training
- Match current and emerging operational requirements
 - Removal of redundant specifications and systems
 - Nav specs tailored to long term requirements
 - Enable ASBU block 2 and 3 implementation (TBO, FRTO, CCO, CDO, RSEQ, APTA)
 - Efficient airspace design using advanced functionality

The Strategic Vision

- Develop a robust dependable system
 - Redundancy
 - Reversion capability
- Attain seamless interoperability between Industry and ICAO
 - Avionics, PBN Nav Specs, Flight Planning, Ops Approvals, Airworthiness, training,

Summary

- PBN is foundation for many ATM operational improvement
- PBN Framework is established and update to detailed guidance material is nearly completed
- Assistance to States available now
 - Products and Services
 - Partnerships
- Plan for the future is needed to:
 - Bring PBN into mainstream navigation
 - Provide adequate enablers for future (block 2 and 3 operational requirements)
 - Provide stakeholder confidence in their investments



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THANK YOU