



| ICAO

CAPACITY & EFFICIENCY

PBN CONCEPT OVERVIEW

Erwin Lassoij - PBN Programme Manager - 26 March 2014



The Concept is Mature

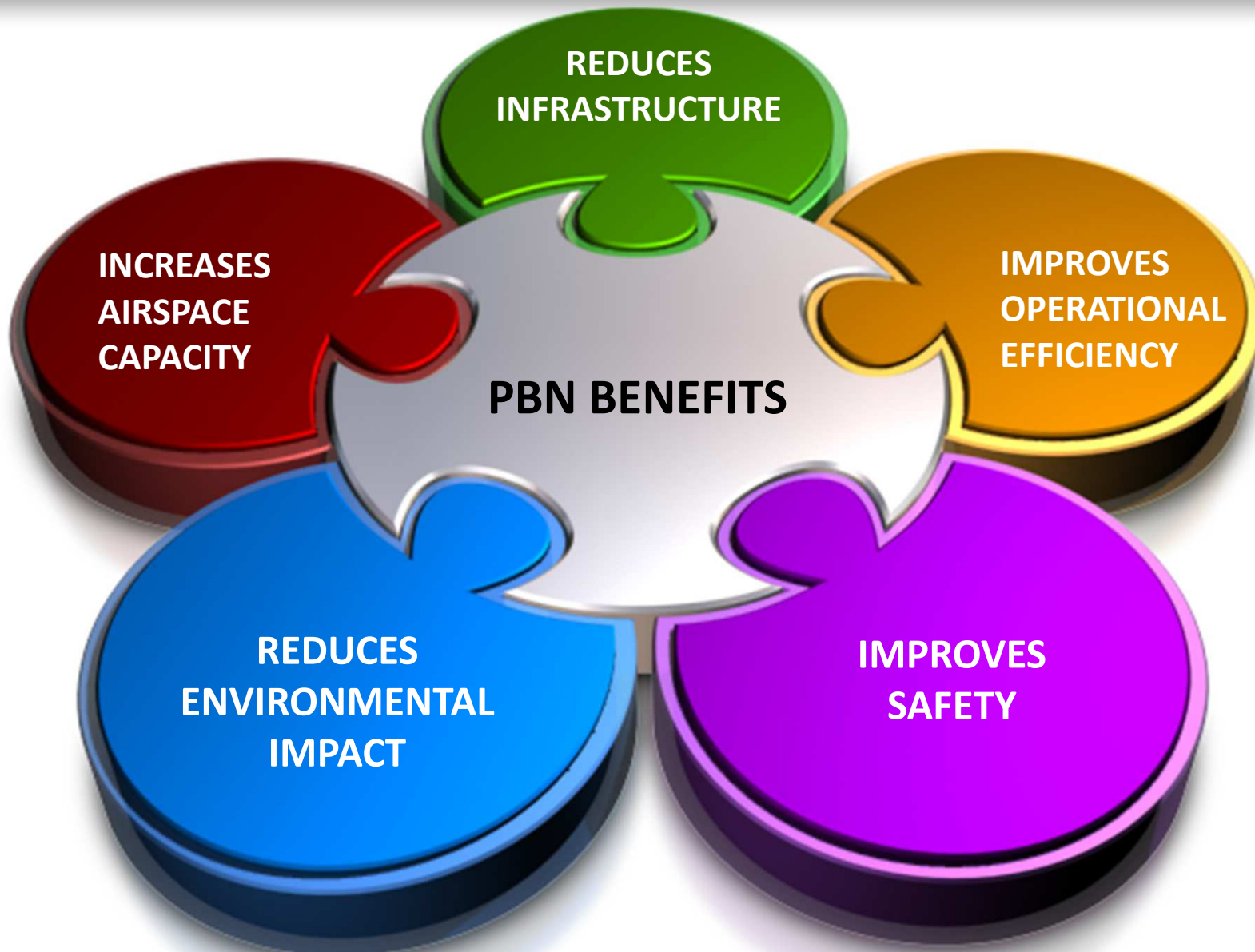




Some tweaks are still required . . .

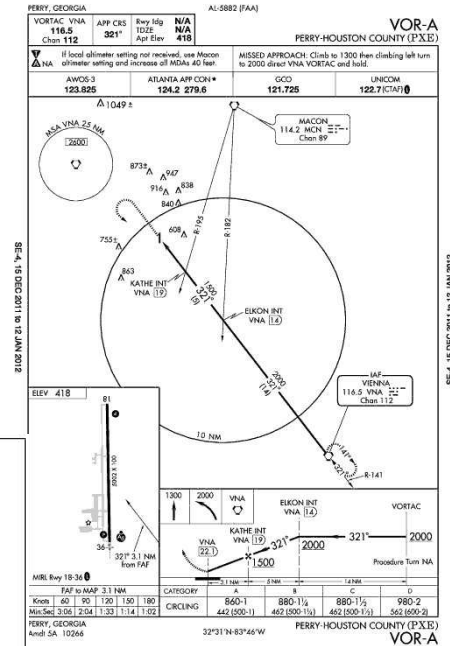
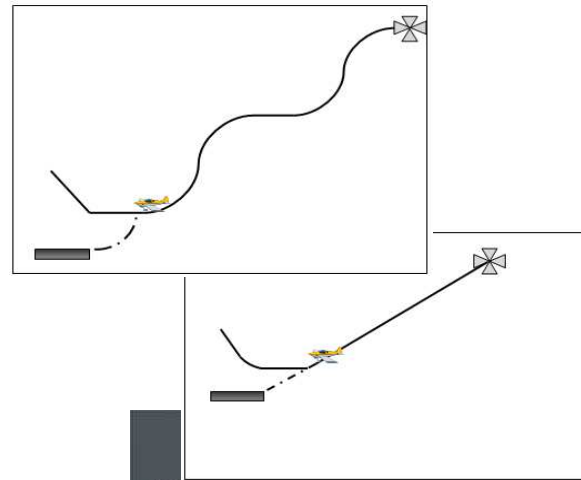


. . . but implementation can proceed



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



JULY 7, 2013:
ASIANA AIRLINES FLIGHT 214
CRASH LANDING IN SAN FRANCISCO
 A TIMELINE OF EVENTS

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 -

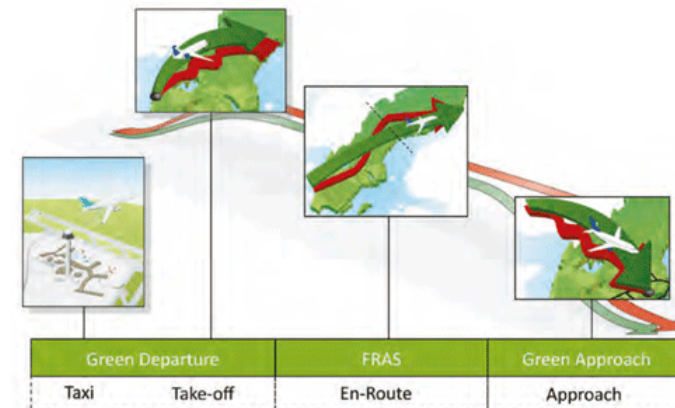
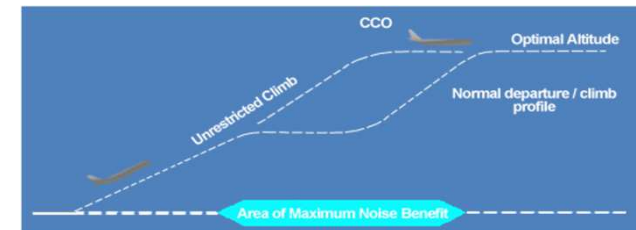
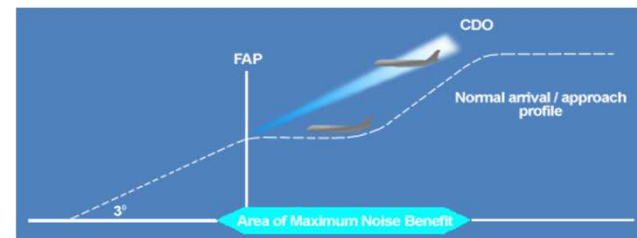
11:27 a.m. PT Plane Crashes 11:35 a.m. PT 1 p.m. PT 4:18 p.m. PT 7:47 p.m. PT Video 1 Video 2

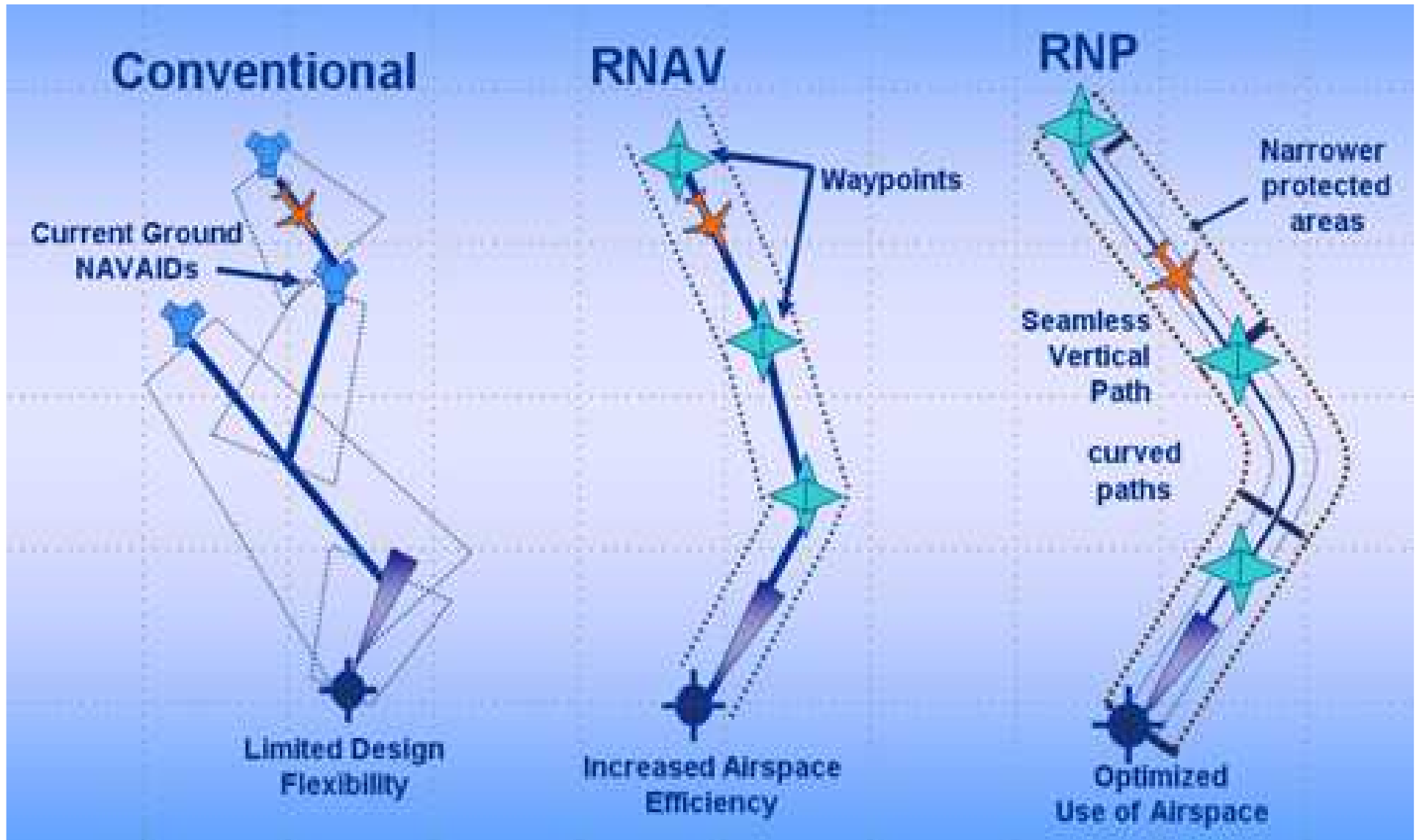
Share Tweet 114 View BY TIMELINE BY LIST

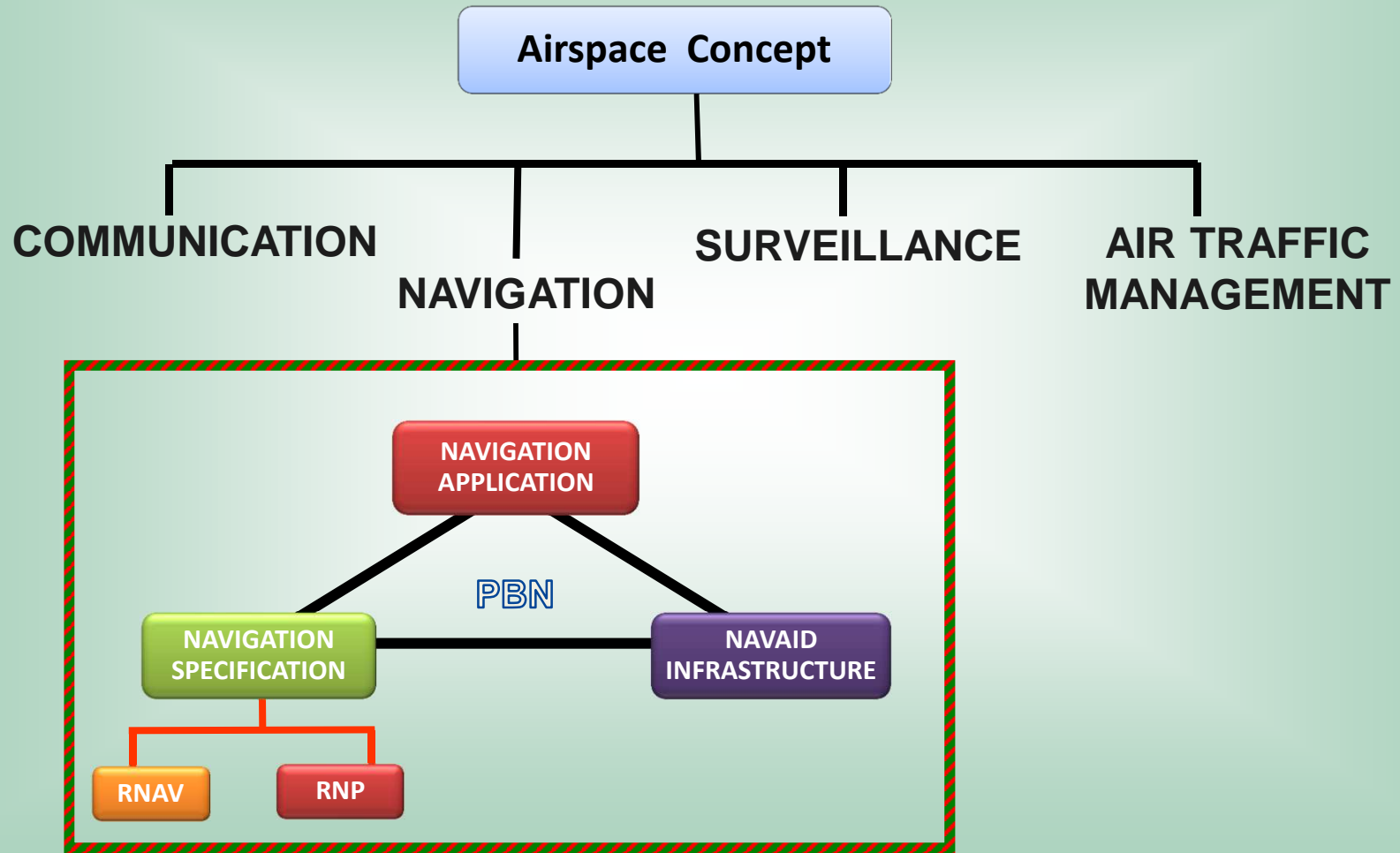
Why PBN?

- Efficiency

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



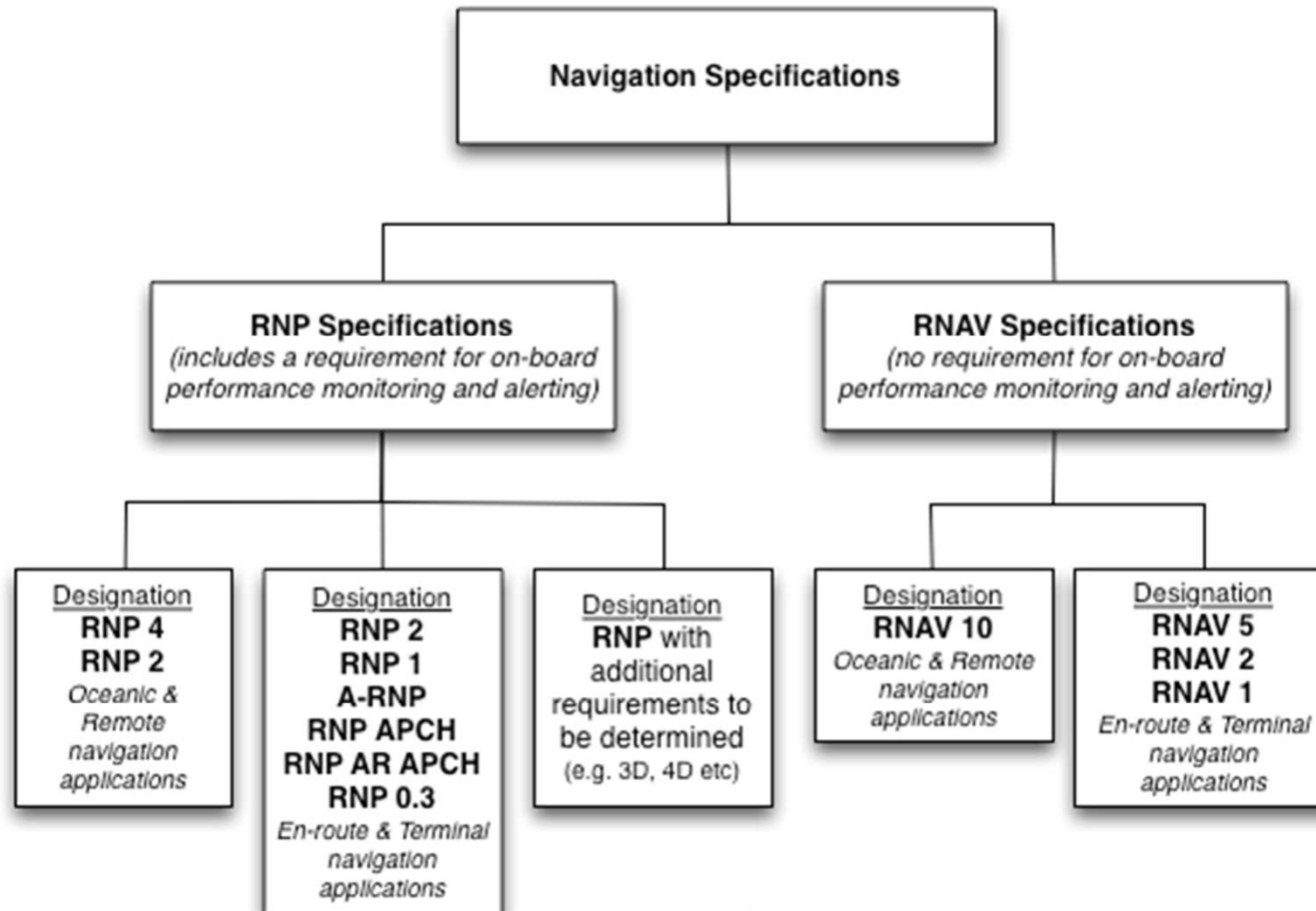






Performance Based Capability



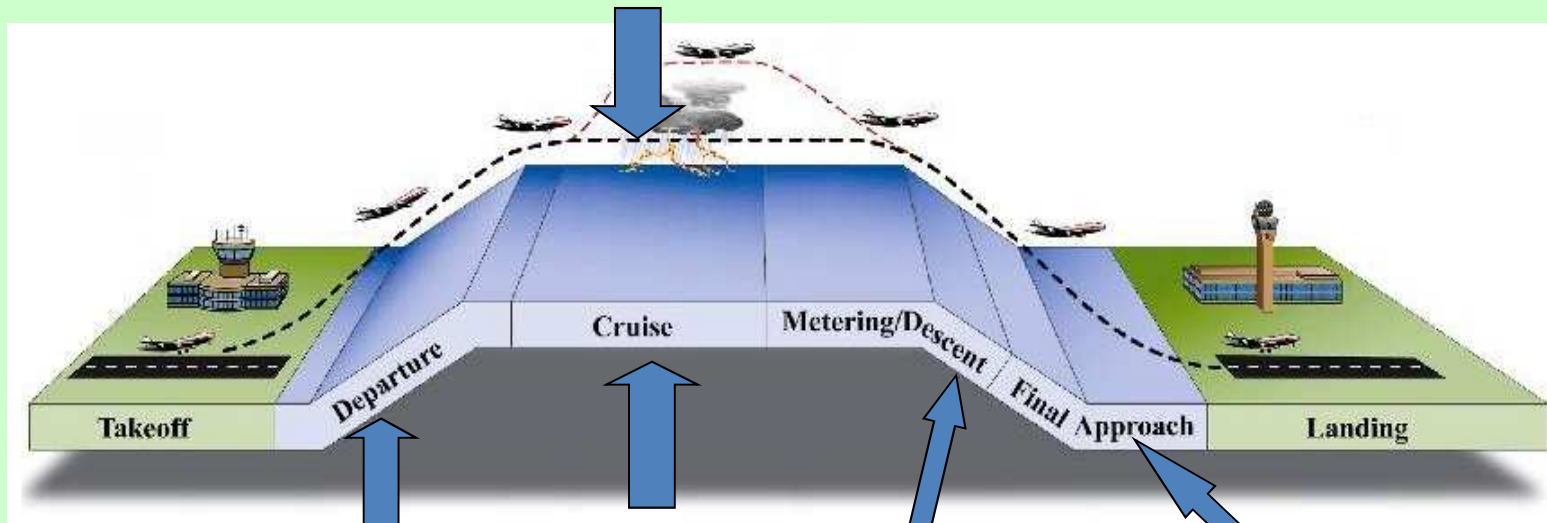


- Added Functionality**
- Radius-to-fix (RF) (terminal and approach)
 - Fixed Radius transitions (enroute)



An Example

OCEANIC and Remote – RNAV 10 & RNP 4



RNAV 1/2 &
Basic RNP1
SIDs

RNAV 5/2/1

RNAV 1/2 &
Basic RNP1
STARs

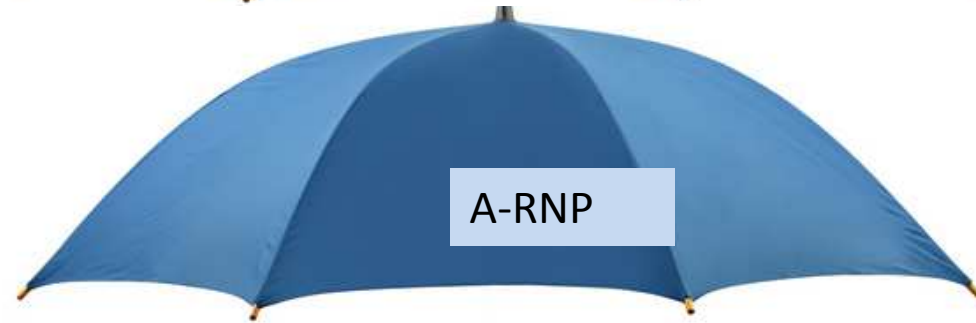
RNP Approach
RNP-AR
Approach



Advanced RNP



A-RNP + options



A-RNP

RF legs
Parallel offset
RNAV holding

Continental enroute: RNP 2,1
Final approach: RNP 0.3

Optional Performance/Functionality
RNP Scalability
RNP 2 oceanic/remote
Fixed Radius Transition (FRT)
Time of Arrival Control
Barometric VNAV



RNAV 1

RNAV 5

RNP APCH

RNAV 10

RNAV 2

RNP 1

RNP 4



Documentation Framework



- PANS Ops Volume II
- PBN Manual (Doc 9613) 4th Edition
- RNP AR Procedure Design Manual (Doc 9905)
- PBN Ops Approval Manual (Doc 9997)
- Manual on Use of PBN 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 and Improved Instrument Procedure Design Criteria that Supports PBN Specifications

Description

- Rationalization of Procedure Design Identification and charting
 - Conversion of RNAV to RNP approaches
- Flight procedure to support 4 new navigation specifications
- Improved Baro-VNAV design criteria
- Improved SBAS/GBAS performance requirements
- Improved Helicopter criteria
 - Vertical guidance
 - Departures to the en-route environment

Timeline

- **November 2014**
 - Applicability of new provisions

PBN Products

to help you 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





eLibrary

- Built for Stakeholders
 - Simplifies search for relevant PBN information
 - From all ICAO Documentation
 - By April, 3 eLibrary based bundles:
 - PBN for Regulators (PBN_REGS)
 - PBN for ANSP-Airspace Designers (PBN_ANSP_AD)
 - PBN for Aircraft Operators (PBN_AC_OPS)
 - More stakeholder bundles to follow:
 - Executives
 - Manufacturers
 - ANSPs – Master, AIM/AIS, ATC, Instrument Flight Procedures
- Available through ICAO e-store: www.store1.icao.int*



The Future of PBN GO Teams

- One more GO Team visit planned under Phase II
 - China (June/July 2014)
- 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 Plans
 - 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)



Flight Procedures Programme (FPP)

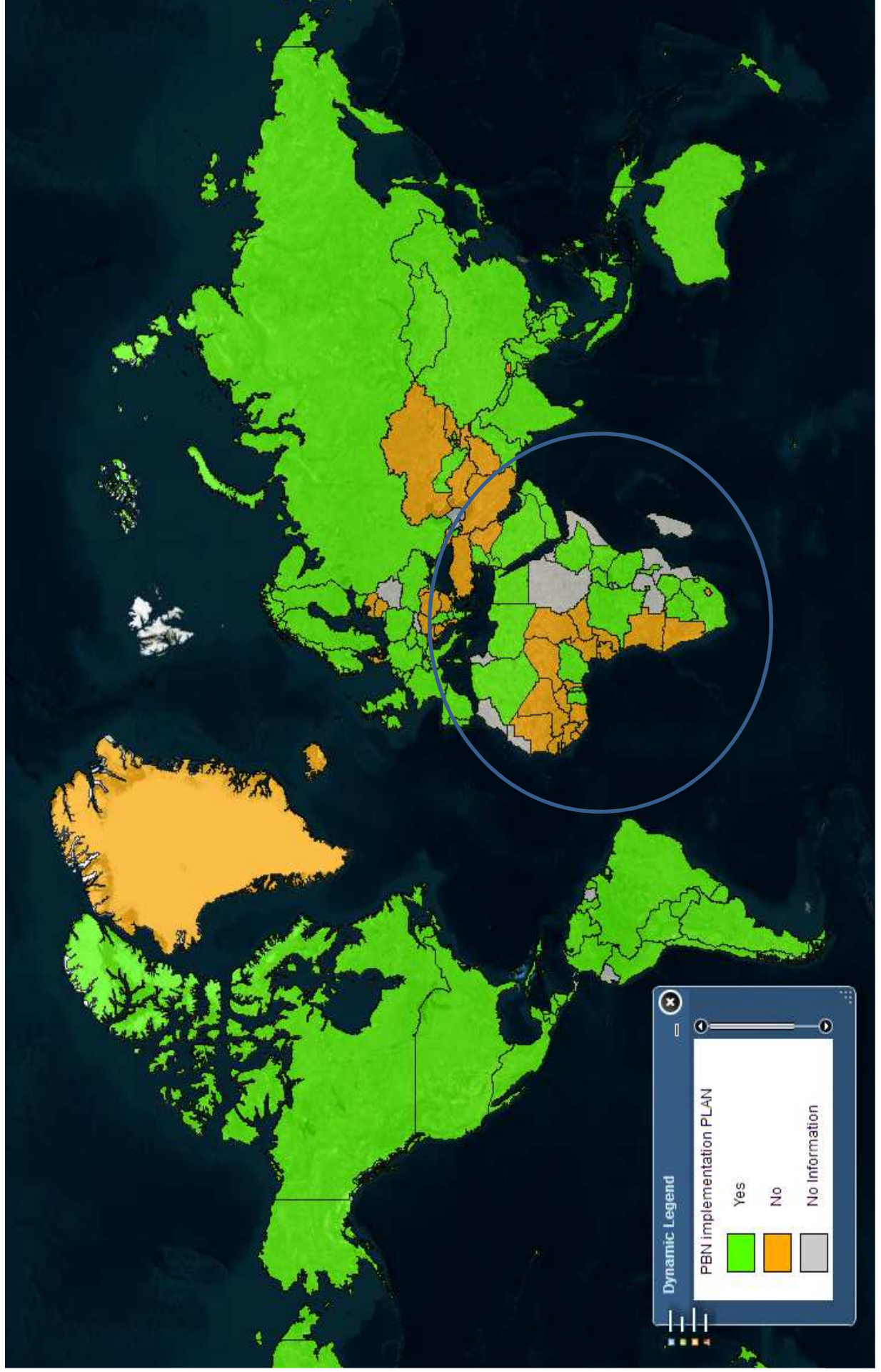
- Beijing, China
 - Since 2010
 - Now embedded within the APAC Regional Sub-Office
- Dakar Senegal





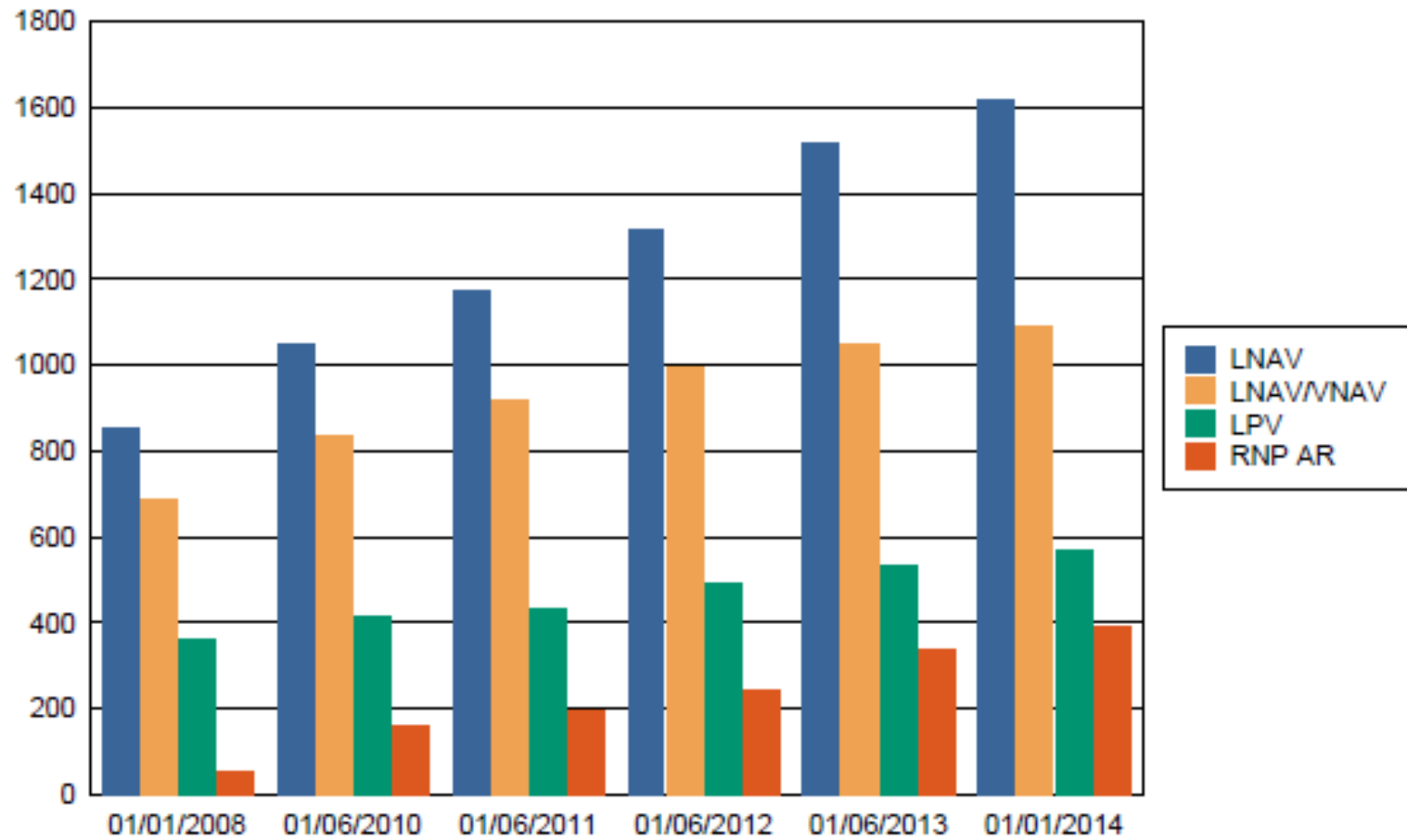
How are we progressing?





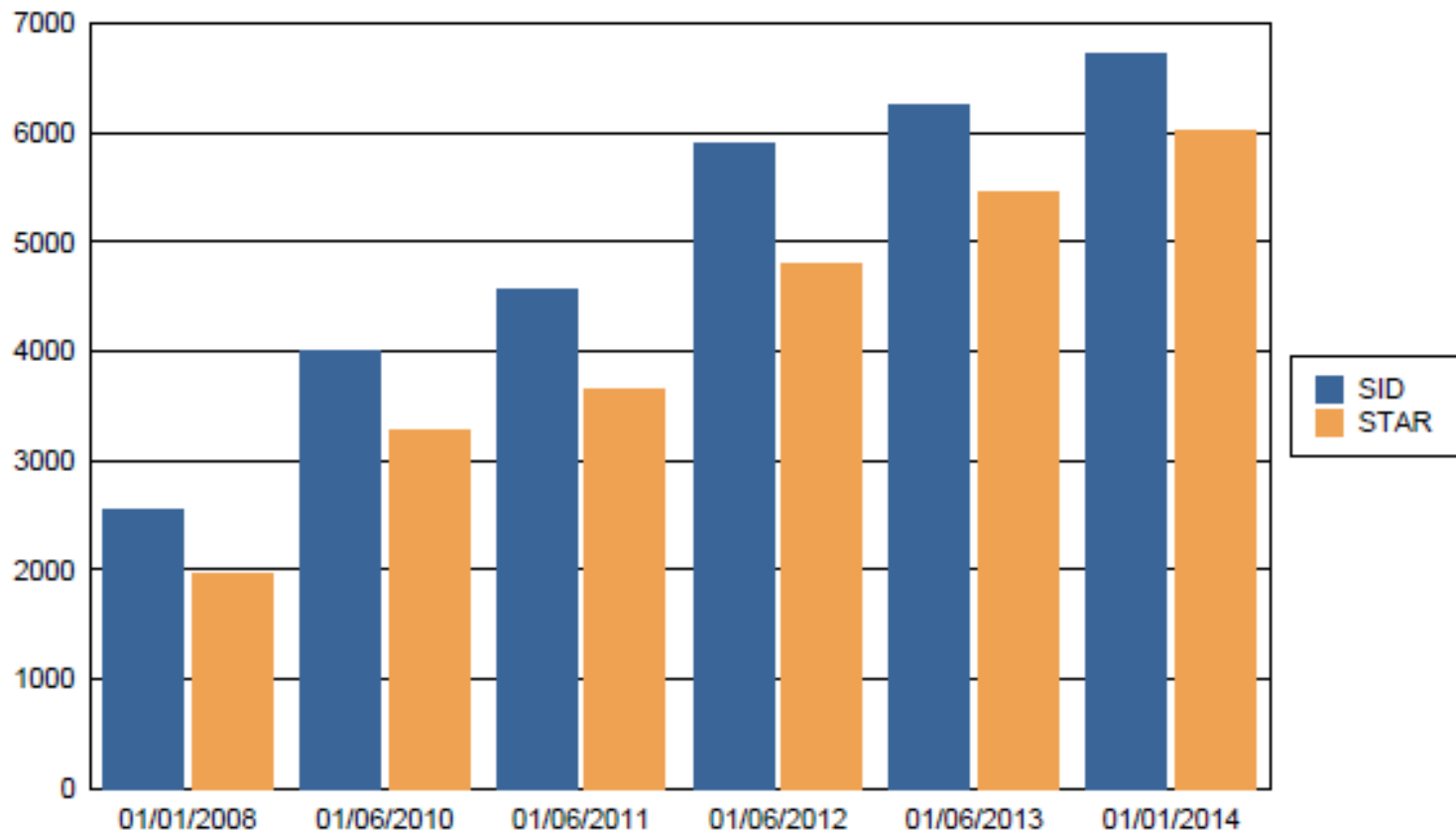


International Airport Approach Type – All regions



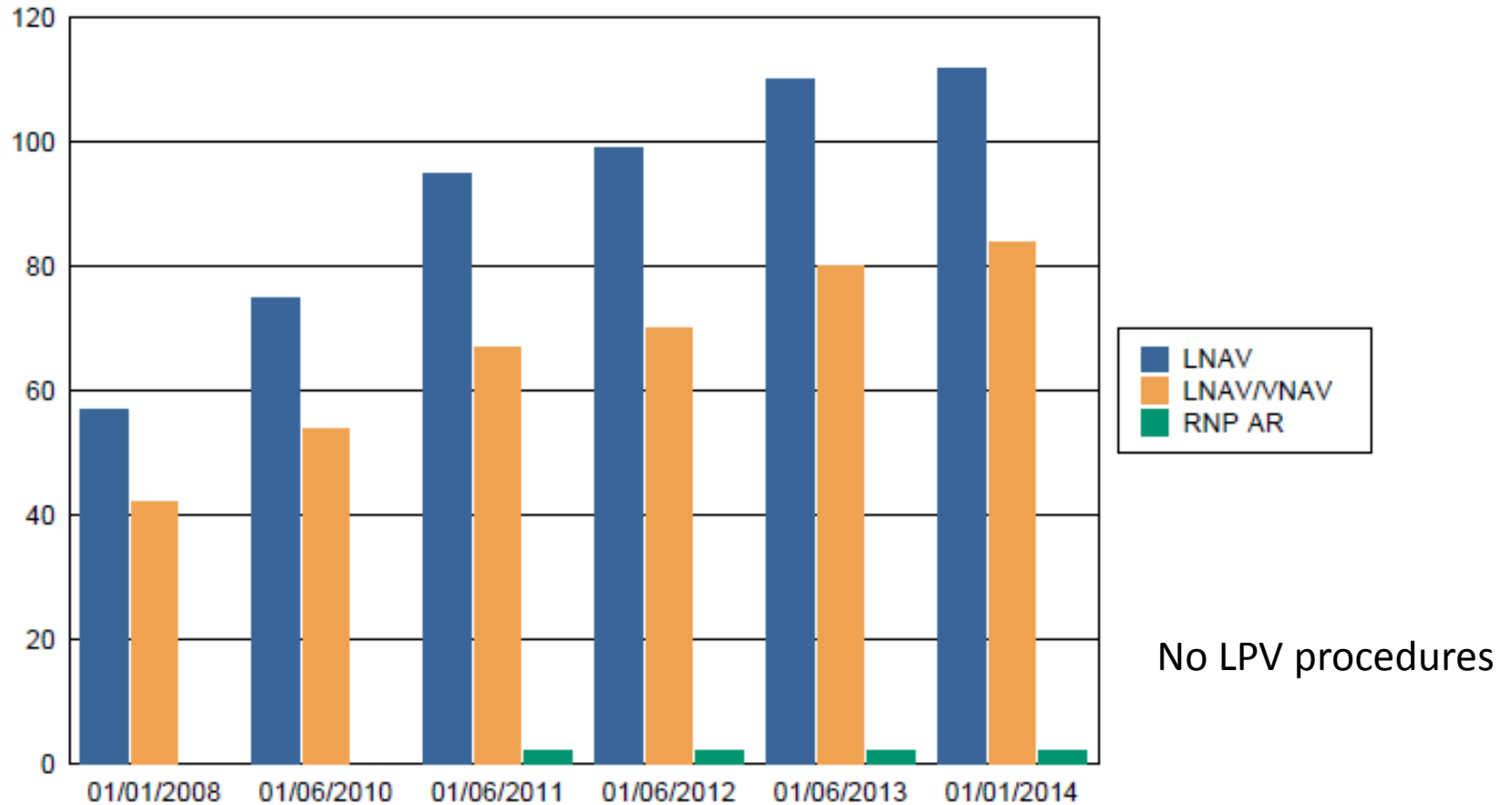


International SID & STAR – All regions



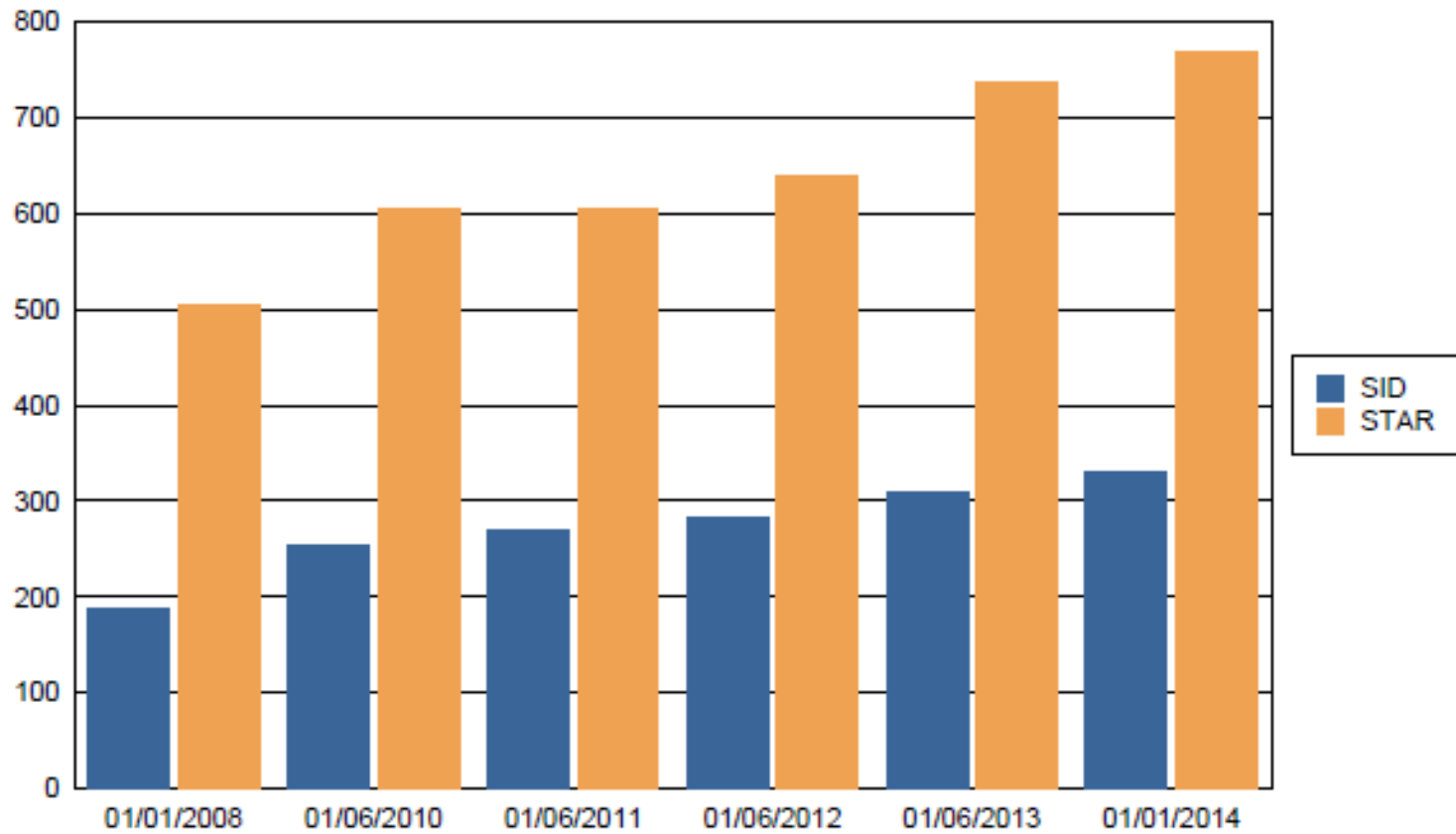


AFI REGION – PBN Instrument Approaches



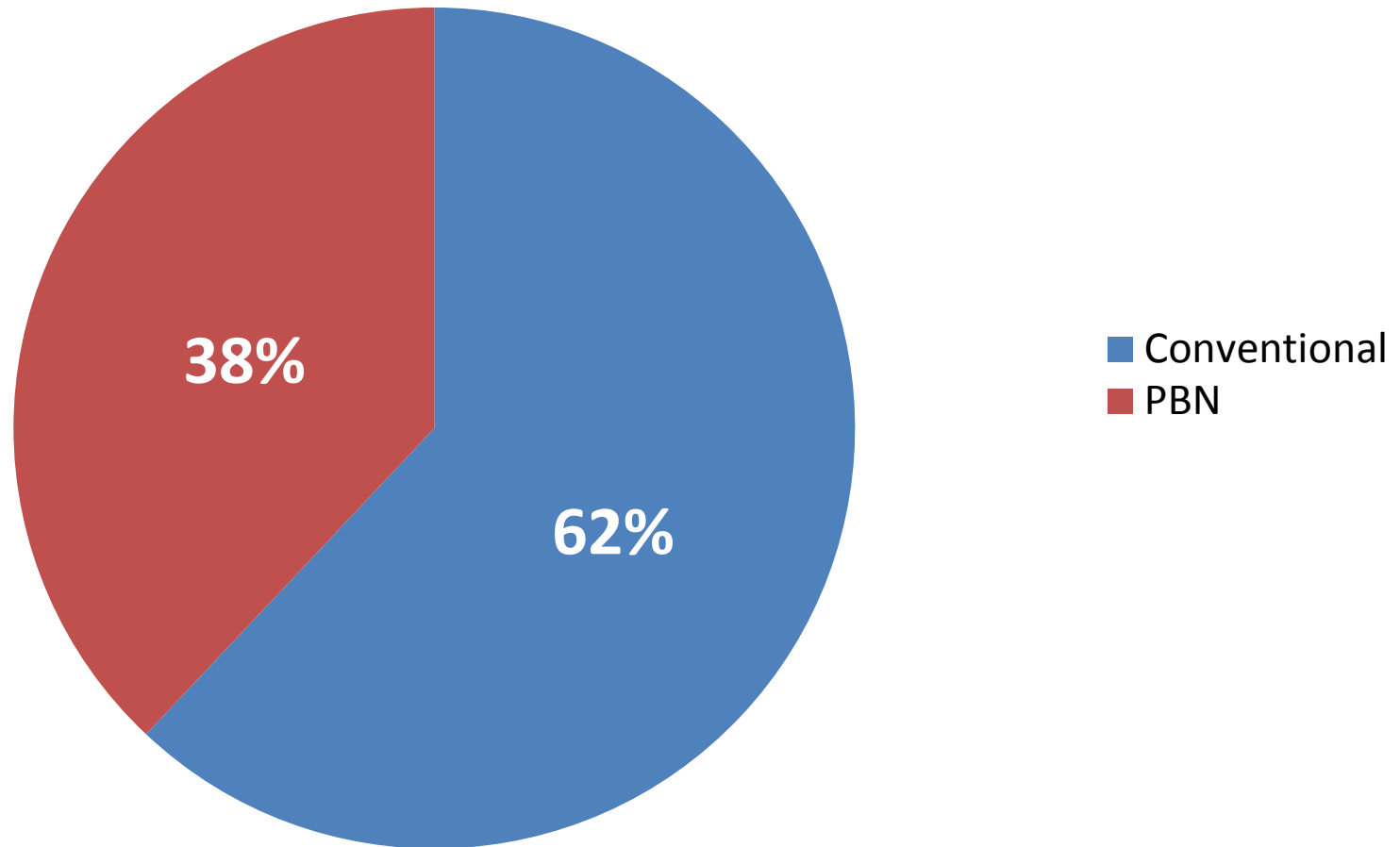


International SID & STAR – AFI



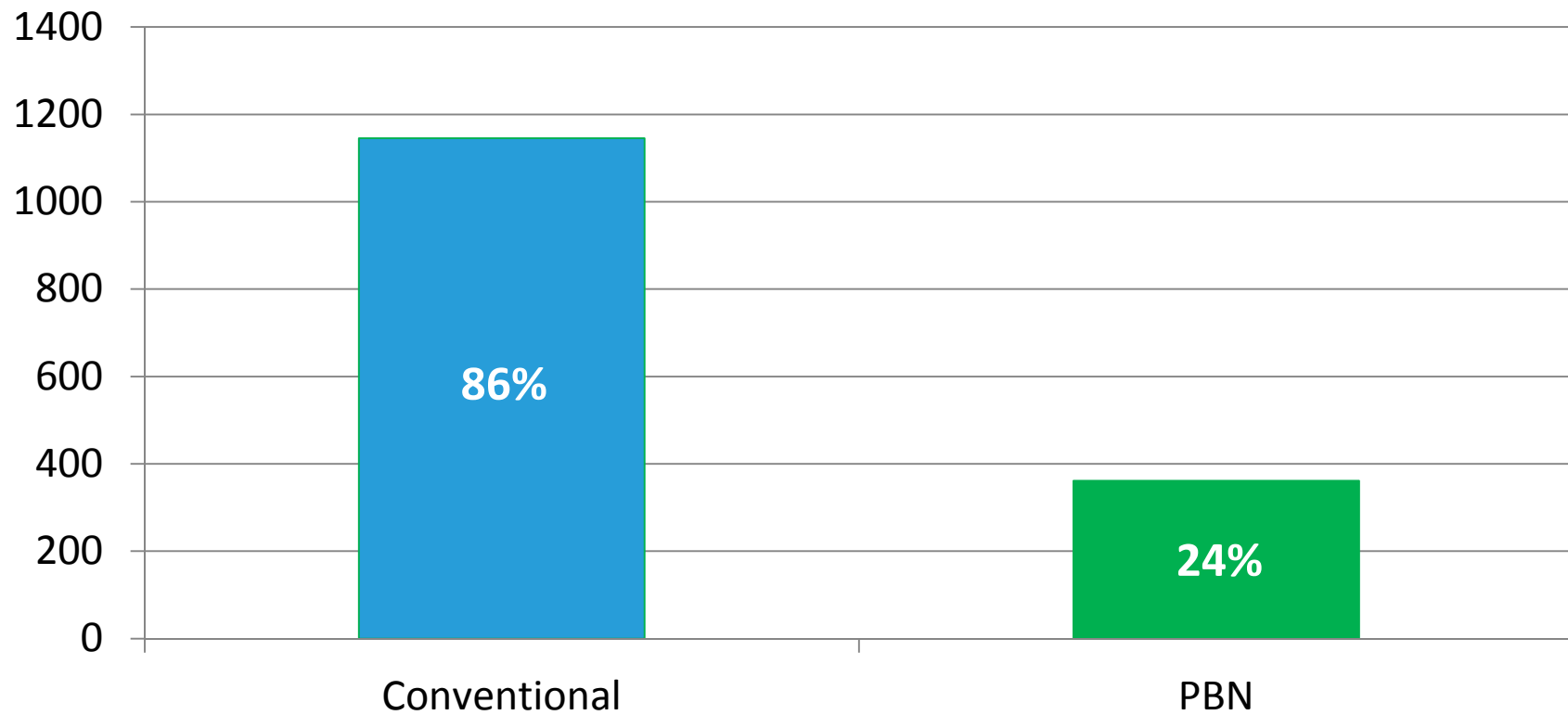


ROUTES - WORLD



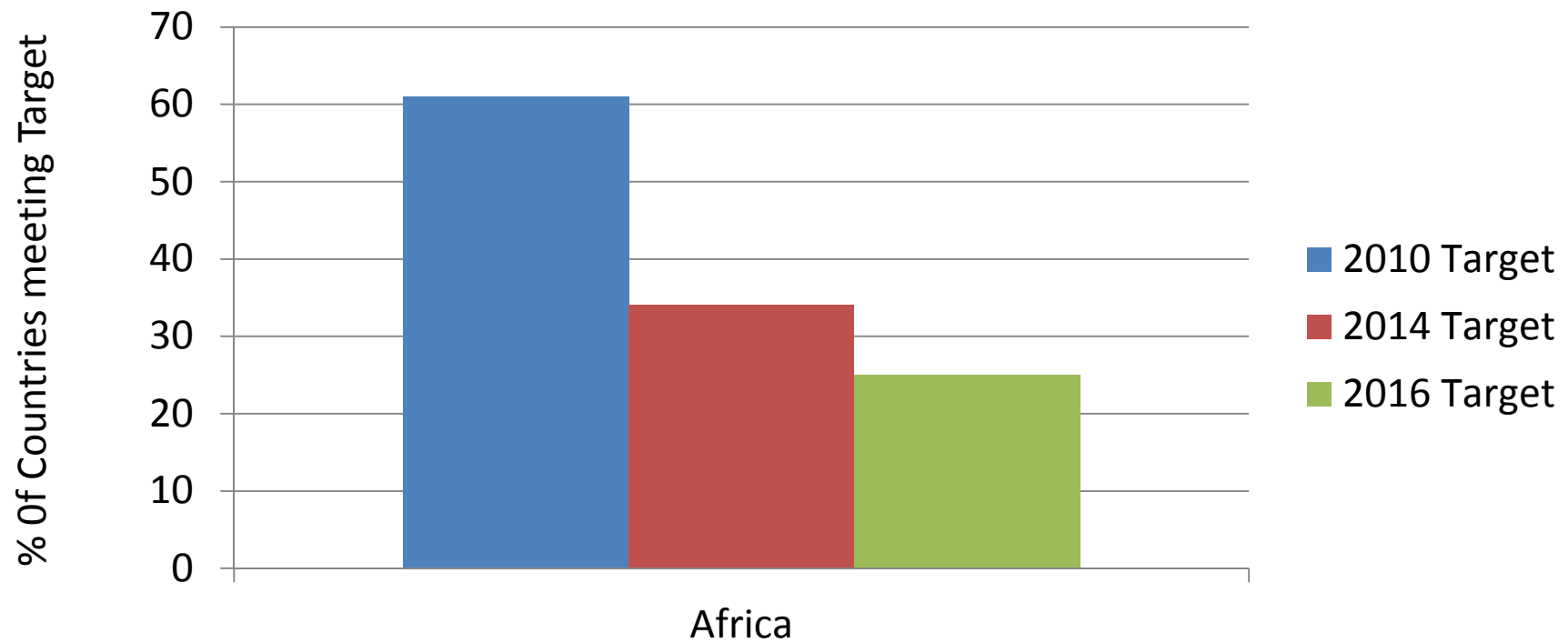


Routes - AFI





A37-11 Targets - AFI





Priorities for Africa

Improve Safety of Approach Operations

Implement PBN instrument approach procedures to meet A37-11 timelines

Improve efficiency of flight paths

Airspace optimization, Properly connecting enroute-to-TMA, enable CDO/CCO operation

Starting Point: Complete State PBN Implementation Plans where required





Summary

- PBN Concept is mature
 - Instrument procedure design criteria continues to evolve
 - Minor enhancement in Nav. Spec. forthcoming
- Documentation and Tools are available
 - iKit, Go Teams, Manuals, on-line courses, FPP
- PBN implementations have momentum
 - Progressing globally
 - Specific States and Region are behind
- AFI Priority
 - Implementation Plans, PBN instrument approach procedures, Integration of efficient flight paths

Don't Wait

