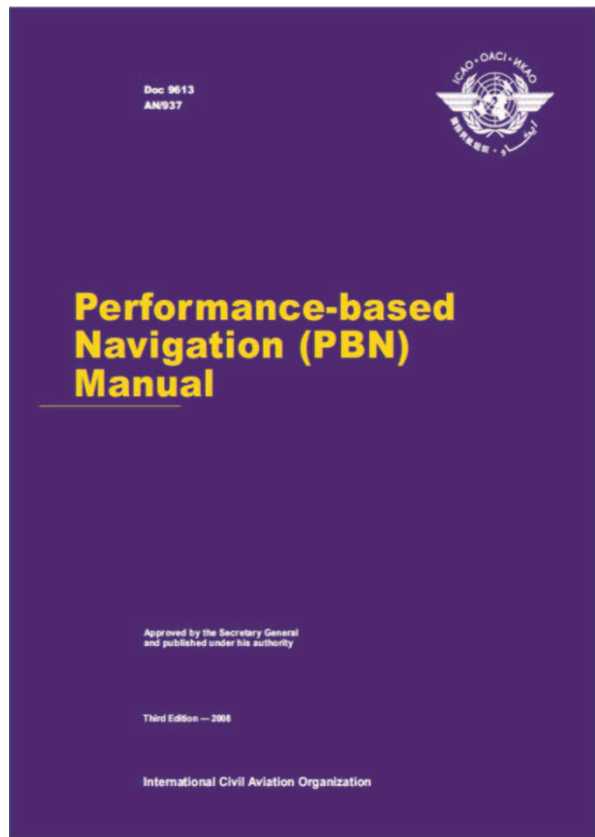




AFI Flight Procedures Program Performance-based Navigation

Steering Committee. 16-17 December 2014

Performance-based Navigation (PBN)



- Based on performance requirements for aircraft (ASBU)
- Operating on:
 - ATS route
 - approach procedure
 - designated airspace.
- **Airspace Concept**

PBN Benefits (Safety-Capacity-Efficiency)

➤ Safety (Supports Stable Approach)

- GNSS approaches with vertical guidance (BaroVNAV)

➤ Route flexibility (on-board avionics)

- not constrained to NAVAIDs-based routes

➤ Reduction of CO2 emissions (e.g. CCO/CDO)

- efficient arrival and departure procedures

➤ Airport and airspace access (Reduced Minima)

- all weather conditions

A scenic landscape photograph of a tea plantation. The foreground shows terraced tea fields on a hillside. In the background, there are large, rugged mountains with some clouds, under a clear blue sky.

SAFETY BENEFITS

Remove Visual Procedures

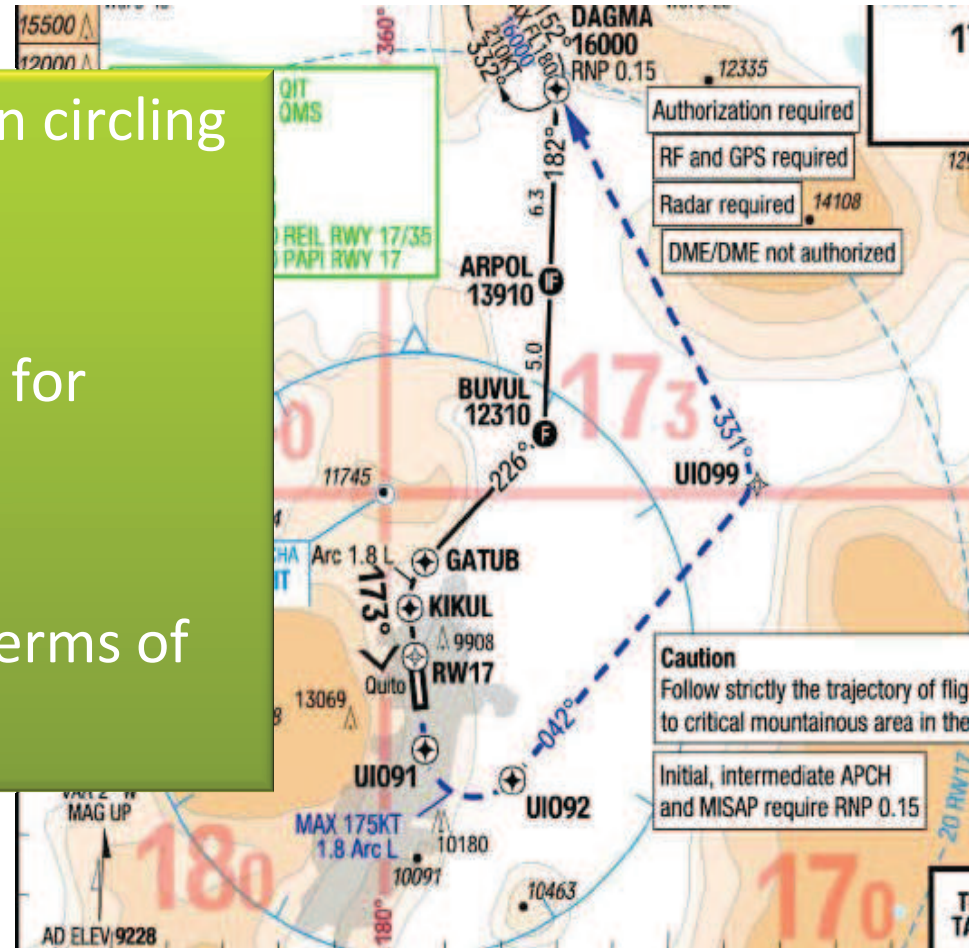


Removal of Circling

Straight-in is 25 times safer than circling to land

Circling maneuvers responsible for several accidents

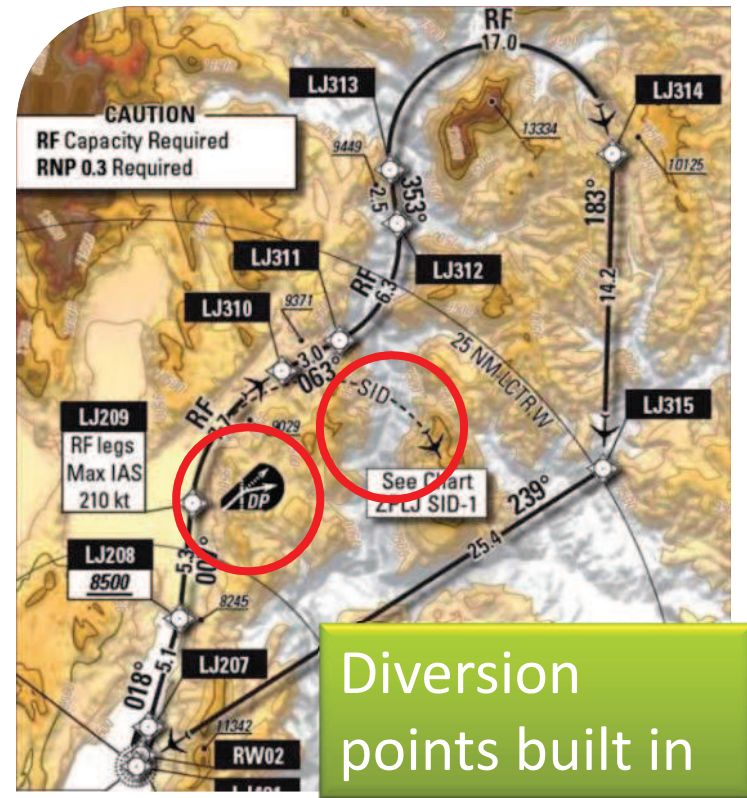
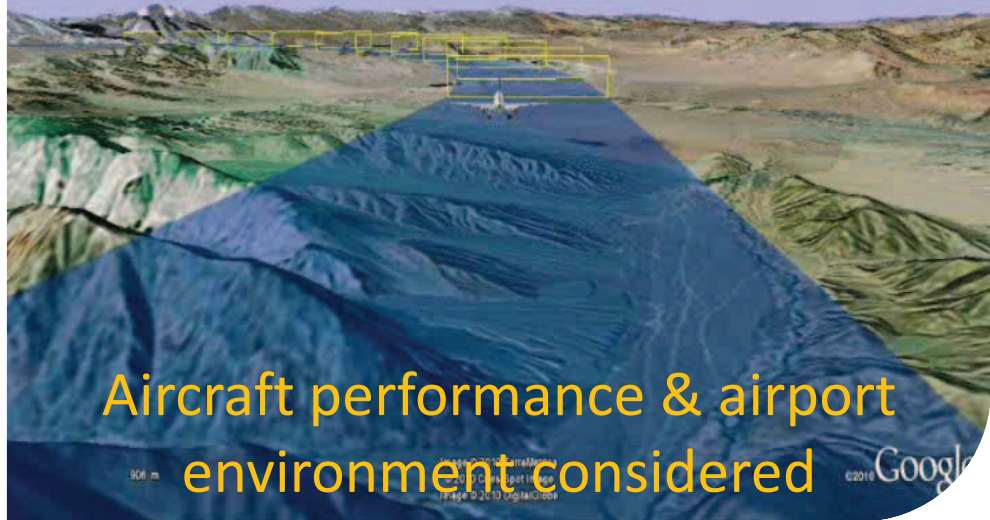
Approaches need flexibility in terms of (curved path) trajectories



Non-Normal Procedures

RNP ARs cover

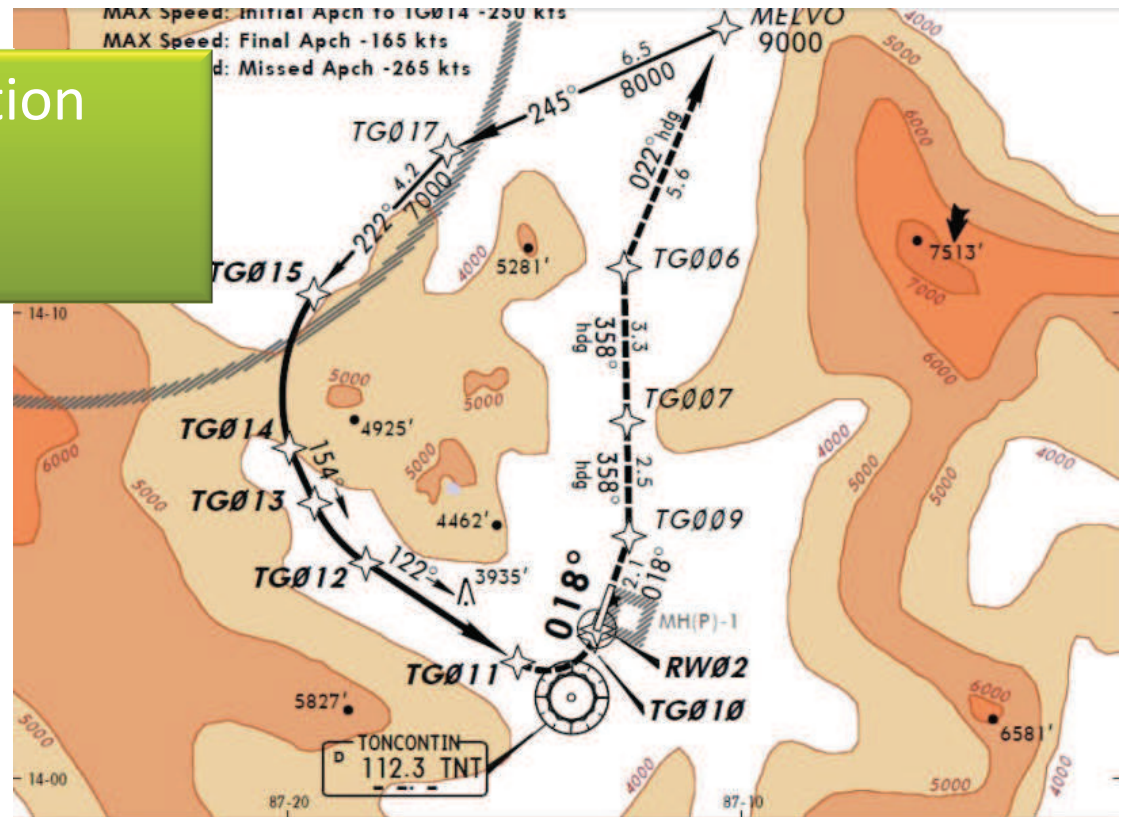
- Missed approach Engine out
- Departures & EO SID



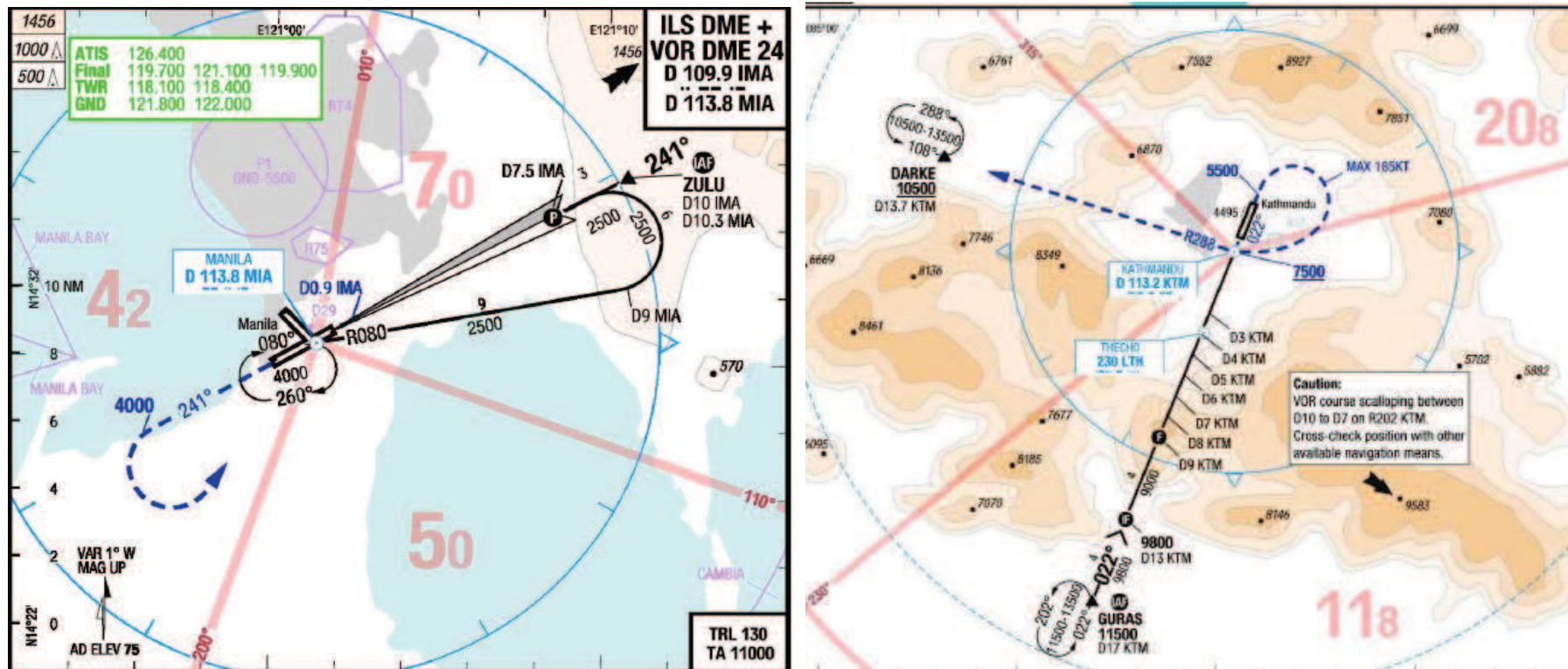
Safely Improved Airport Access

Optimized obstacle protection

Reduced visibility criteria



Independent from NAVAIDs

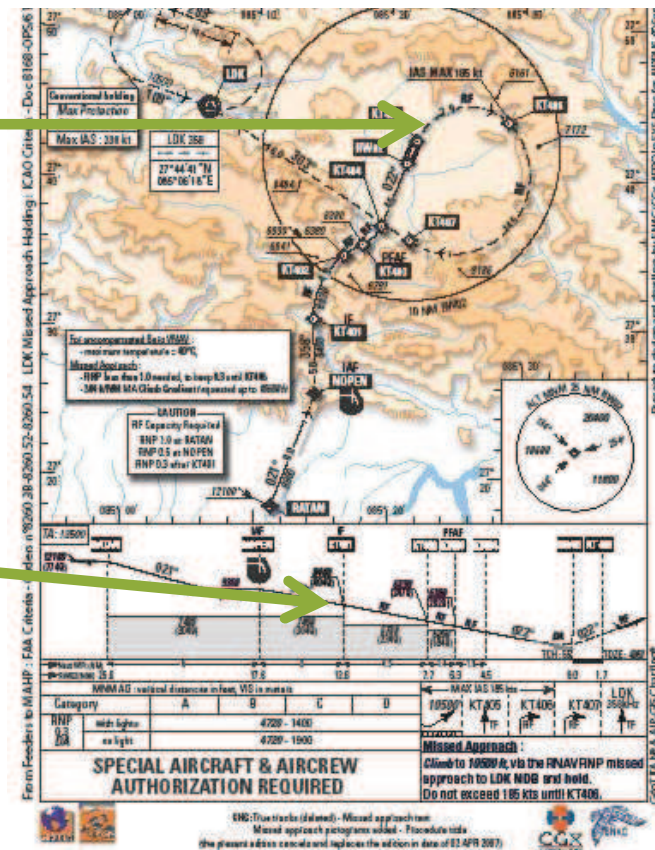


Approaches Managed & Stabilized

Fully managed Missed Approach

Fully Protected Trajectories

Fully managed & stable
Smooth 3° descent to RWY

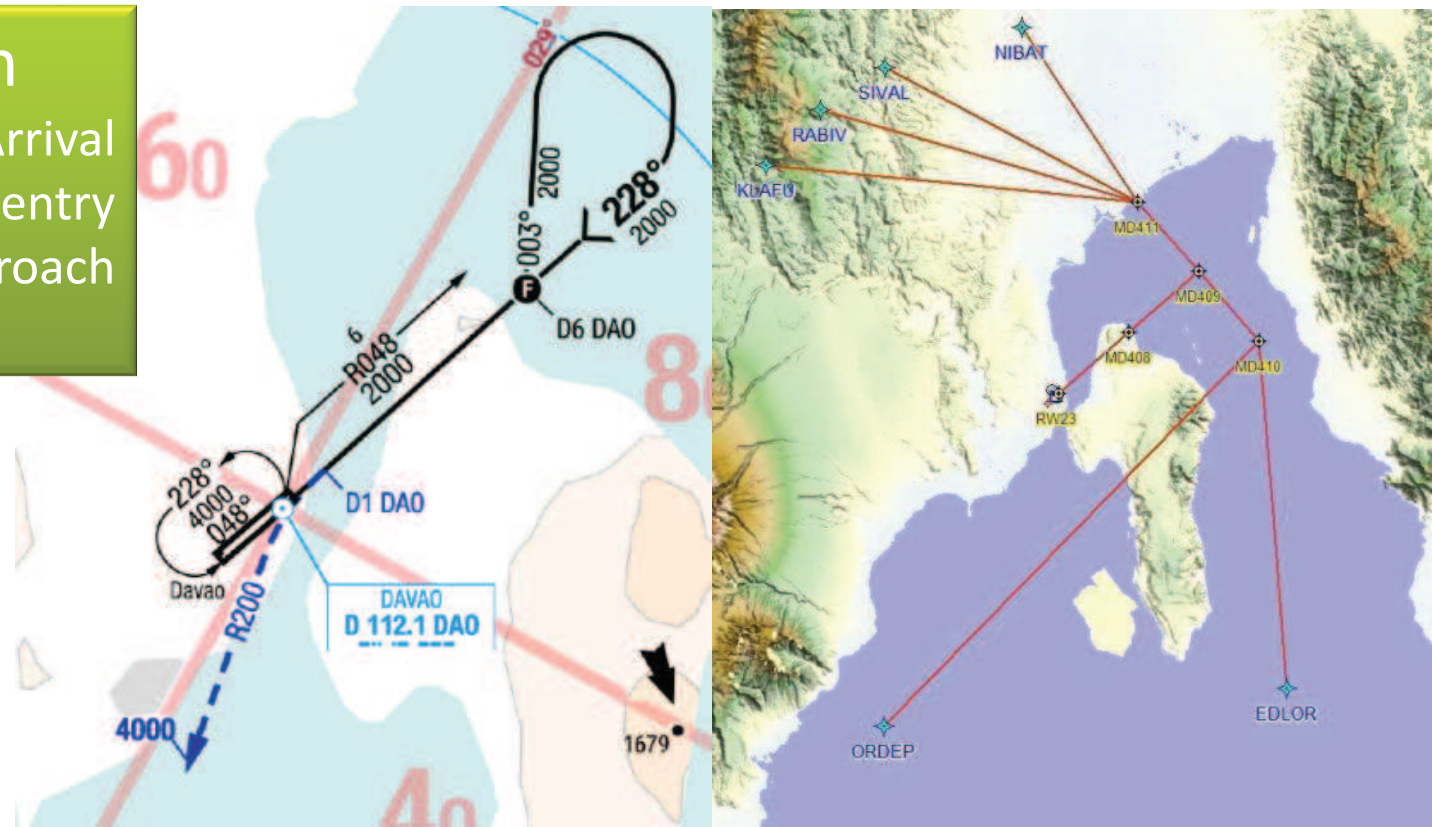


A photograph of several commercial aircraft flying in a formation against a bright blue sky with wispy white clouds. The aircraft are silhouetted against the sky, with their engines and landing gear visible. A large green rectangular box is overlaid on the center of the image, containing the text "Capacity / Efficiency".

Capacity / Efficiency

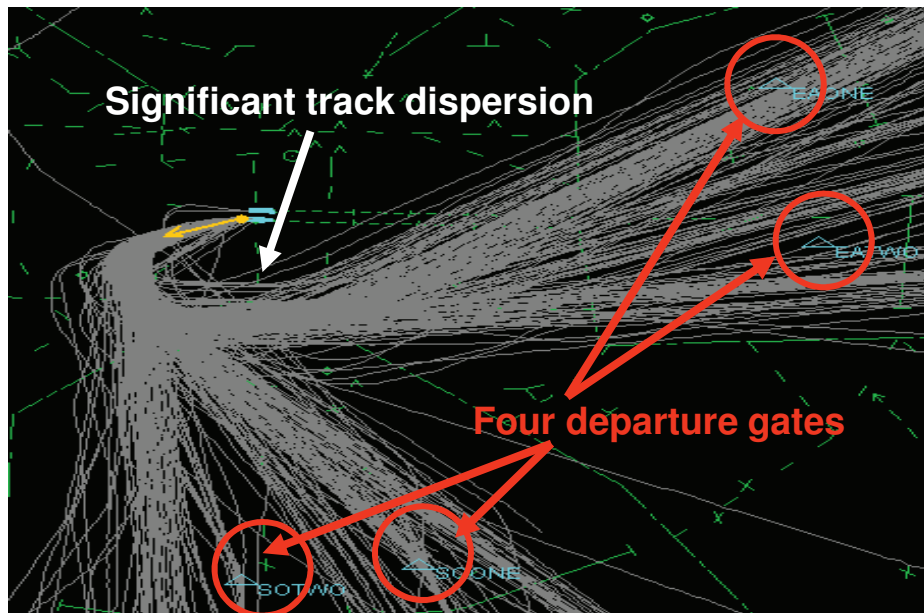
Benefits

VOR Approach
 20 NM Arrival
 17 NM Hold entry
 33 NM approach
 = 70 NM



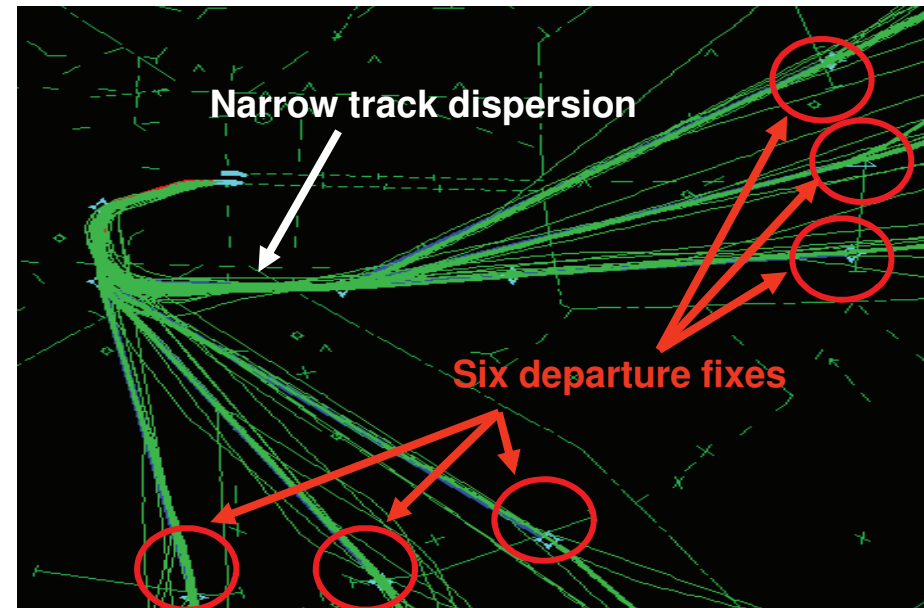
RNAV SIDs – The Atlanta Example

Before RNAV



- All ATC instructions issued via SID.
- 40-50% reduction in communications
- Departure gates increased to 6 from 4.
- Significant reduction in ground delays

After RNAV

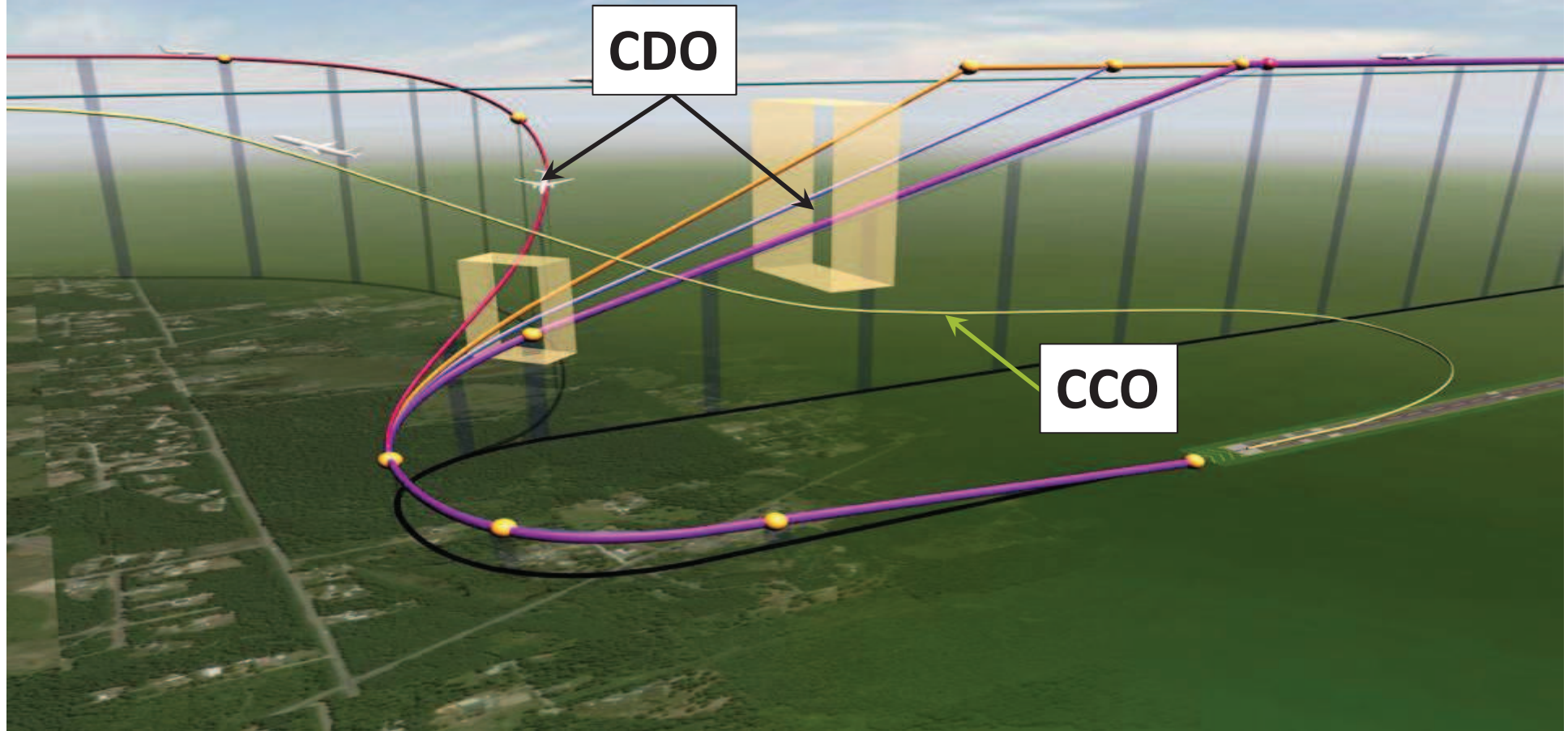


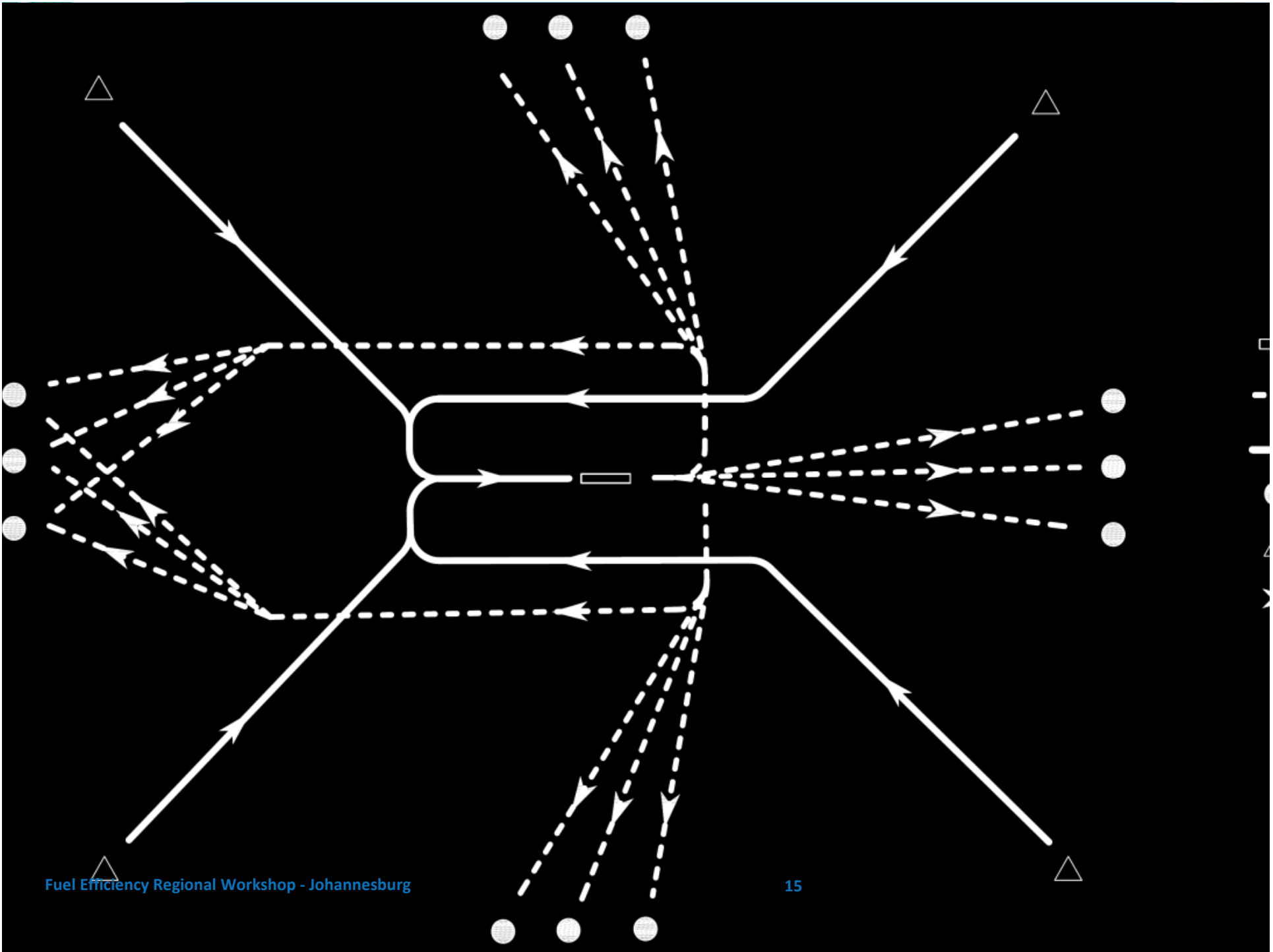
- Flight distance reduction
- Proceduralized separation
- Approximate annual savings US\$25 M



Integrating CCO and CDO Designs

Altitude windows safely separate aircraft and allow predictable flight performance





Integrating CDOs and CCOs Designs

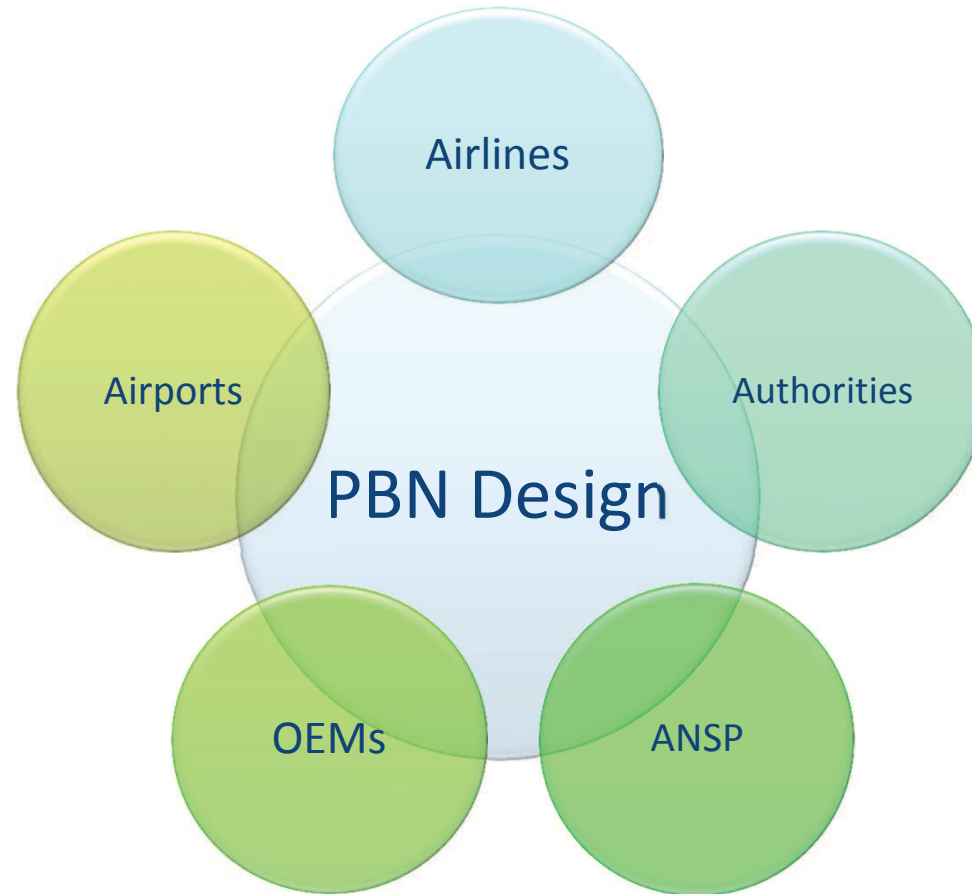
➤ Fewer Radio Transmission

- Less chance of read back errors
- Reduction in Pilot-Controller workload
- Safety improvement

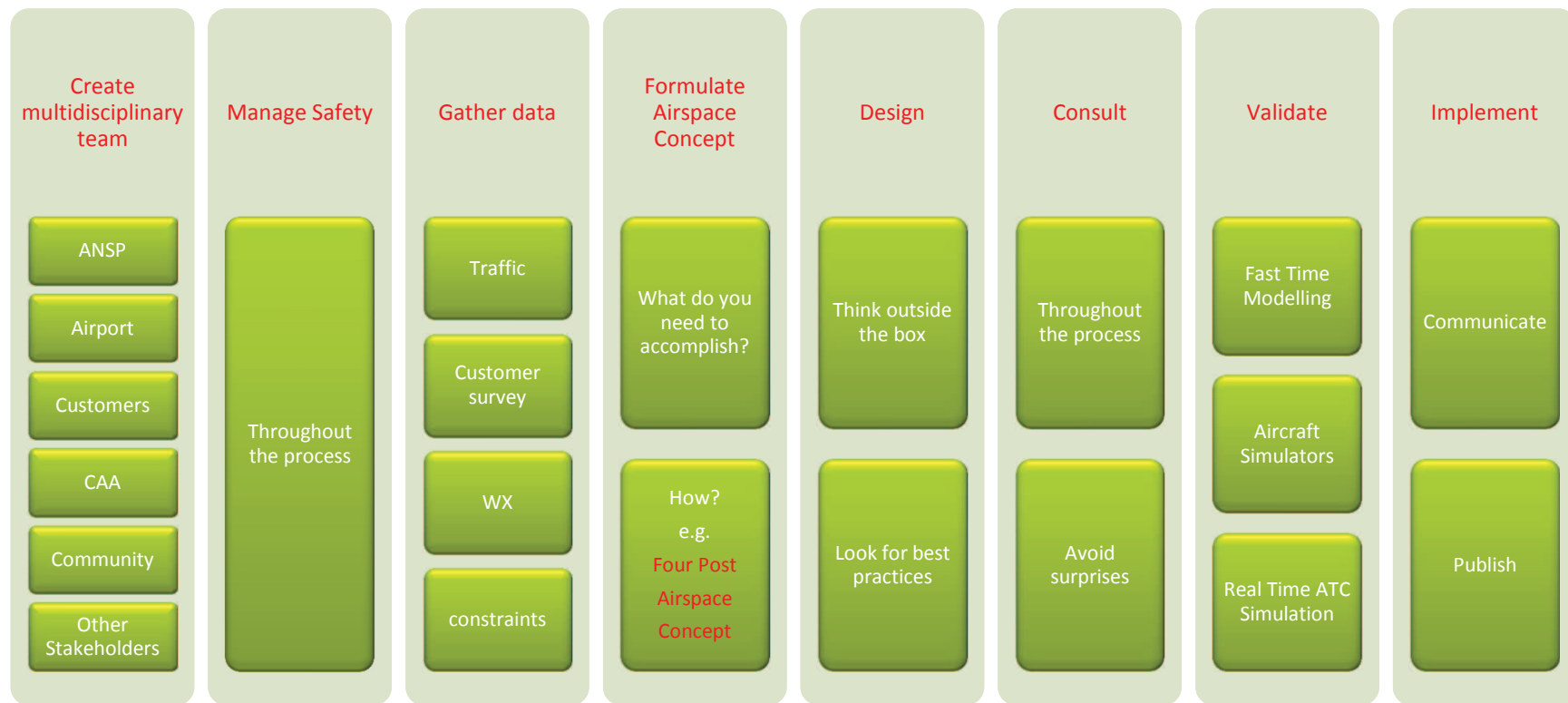
➤ Greater Predictability

- Airspace Containment
- Flight Path
- Turn points

PBN brings people together...CDM



What IATA Expects- Clear Roadmap (AFI-Plan)





-to represent, lead and serve the airline industry-