INTERNATIONAL CIVIL AVIATION ORGANIZATION

A United Nations Specialized Agency

ATM Planning
Airspace Organization and Management (AOM)

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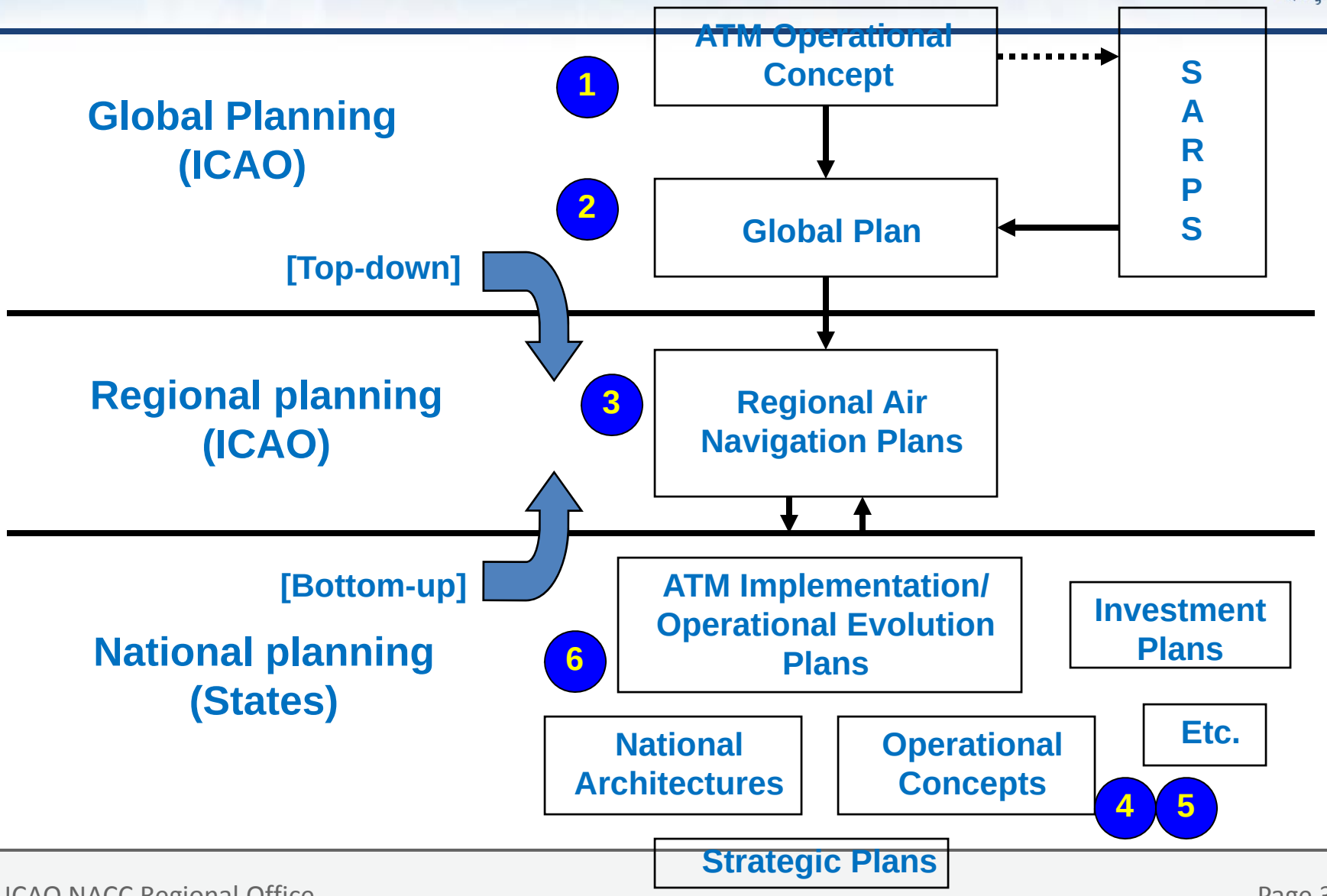
INTERNATIONAL CIVIL AVIATION ORGANIZATION

Overview

- ATM Operational Concept
- Global Air Navigation plan (GANP)
- Global Planning Initiatives (GPIs)
- Regional Performance Objectives (RPO)
- Aviation Block (ASBU)

PLANNING STRUCTURE



Global Air Traffic Management (ATM) Operational Concept – Doc 9854

- A global vision that;
  - ✓ Describes how an integrated global ATM system should operate
  - ✓ Describes what is envisaged on the basis of services
  - ✓ Describes how the services form an integrated system
  - ✓ Utilizes an information rich environment that solves most problems strategically, through a collaborative process
  - ✓ Provides States and industry with clearer objectives for the design and implementation of ATM and supporting CNS systems

Global ATM Operational Concept

Vision Statement

- To achieve an interoperable global air traffic management system, for all users during all phases of flight, that meets agreed levels of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements.

Air Traffic Management

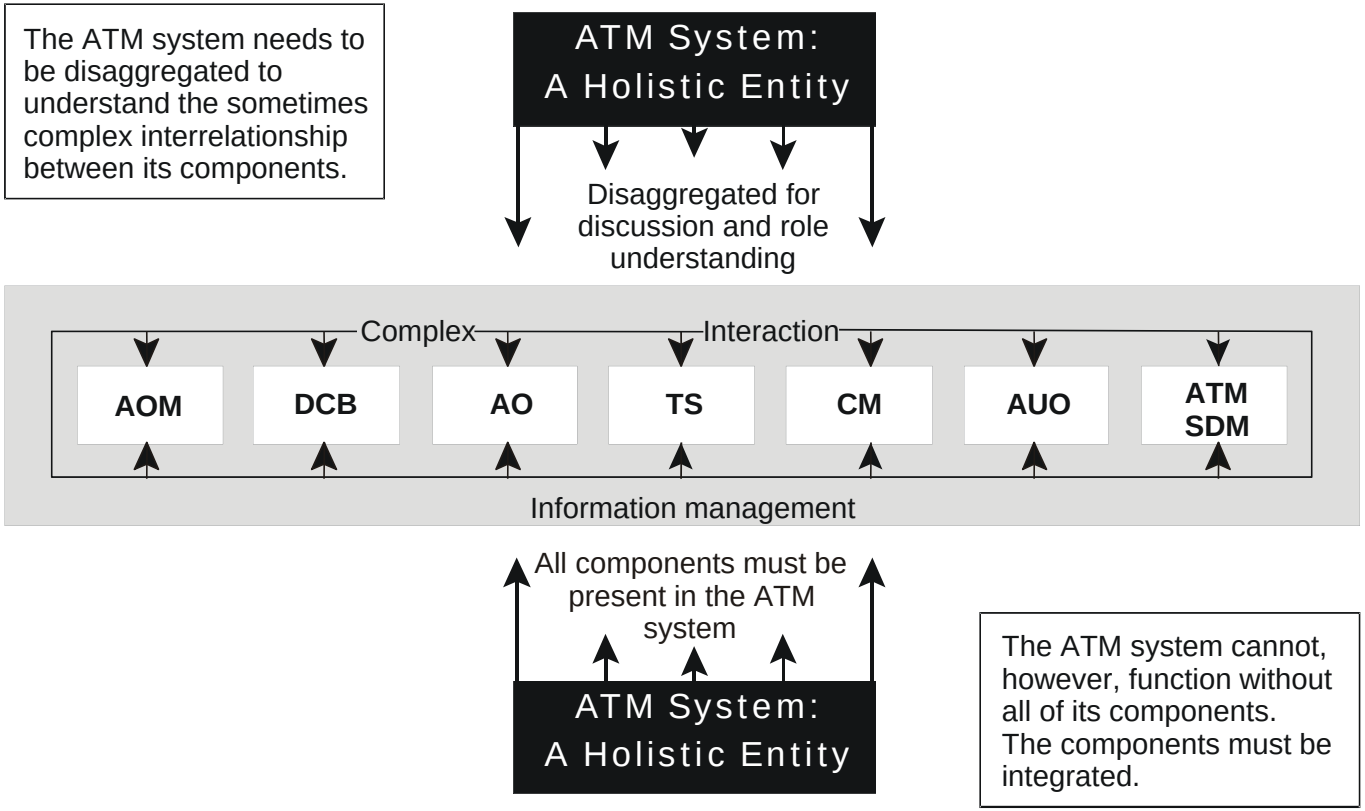
- Air traffic management is the dynamic, integrated management of air traffic and airspace — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties.

Scope

- The air traffic management operational concept describes the services that will be required to operate the global air traffic system up to and beyond 2025. The operational concept addresses what is needed to increase user flexibility and maximize operating efficiencies in order to increase system capacity and improve safety levels in the future air traffic management system.

ATM Components

The ATM system needs to be disaggregated to understand the sometimes complex interrelationship between its components.



The ATM system cannot, however, function without all of its components. The components must be integrated.

AOM — Airspace organization and management
DCB — Demand/capacity balancing
AO — Aerodrome operations
TS — Traffic synchronization
CM — Conflict management
AUO — Airspace user operations
ATM SDM — ATM service delivery management

Airspace Organization and Management (AOM)

Doc 9854

- structured to accommodate the different types of air activity, volume of traffic, and differing levels of service and rules of conduct
- From the most complex to the least complex airspace.
- All airspace will be the concern of ATM and will be a useable resource
- Any restriction on the use of any particular volume of airspace will be considered transitory
- All airspace management will be dynamic and flexibly
- Airspace boundaries will be adjusted to particular traffic flows and should not be constrained by national or facility boundaries

Airspace Organization

Doc 9854

- airspace management will be dynamic, flexible and based on services demanded. Airspace organizational boundaries, divisions and categories will be adapted to traffic patterns and changing situations and will support the efficient operation of the other ATM services identified in this chapter; including strategic planning processes and will allow actual operations to dictate a more optimum configuration;

- airspace will be organized to facilitate the seamless handling of flights and the ability to conduct flights along optimum flight trajectories from gate to gate without restriction or delay

- airspace planning will be based on accommodating dynamic flight trajectories whenever practicable. Structured route systems will be established only in areas where the demand for dynamic trajectories cannot be accommodated

- airspace will be organized to be easily learned, understood and used by the ATM community

Airspace Management

Doc 9854

Airspace organization and the provision of services will be selected and applied to best meet the needs of airspace users

- all airspace will be managed flexibly
- accommodate dynamic flight trajectories and provide optimum system solutions
- the size, shape and time regulation of segregated airspace will be set to minimize the impact on operations
- airspace use will be coordinated and monitored in order to accommodate the legitimate requirements of all users and to minimize any constraints on operations
- airspace reservations will be planned in advance with changes made dynamically whenever possible.
- required to enhance capacity or to avoid areas where access has been limited or where hazardous conditions exist
- uniform airspace organization and management principles will be applicable to all regions. Complex operations may limit the degree of flexibility
- areas that should strive for the earliest and shortest implementation are those where ATM community expectations are not being met

Aerodrome Operations (AO)

- Reduce runway occupancy time
- The ability to safely manoeuvre in all weather conditions
- Precise surface guidance to and from a runway
- The position and intent of all vehicles and aircraft operating on the manoeuvring and movement areas will be known

Demand and Capacity Balancing (DCB)

- **Strategic** - assets will be optimized
- **Pre-tactical** - adjustments will be made to assets, resource allocations, projected trajectories, airspace organization, and allocation of entry/exit times
- **Tactical** - dynamic adjustments to the organization of airspace to balance capacity; dynamic changes to the entry /exit times

Traffic Synchronization (TS)

- Dynamic 4-D trajectory control and negotiated conflict-free trajectories
- Choke points will be eliminated
- Optimisation of traffic sequencing will achieve maximization of runway throughput.

Airspace User Operations (AUO)

- ATM data for an airspace user's situational awareness and conflict management
- Airspace user operational information will be made available to the ATM system
- Individual aircraft performance, flight conditions, and available ATM resources will allow dynamically-optimised 4-D trajectory planning
- Collaborative decision making
- Aircraft should be designed with the ATM system as a key consideration

Conflict Management (CM)

- Collaborative decision making
- Aircraft should be designed with the ATM system as a key consideration

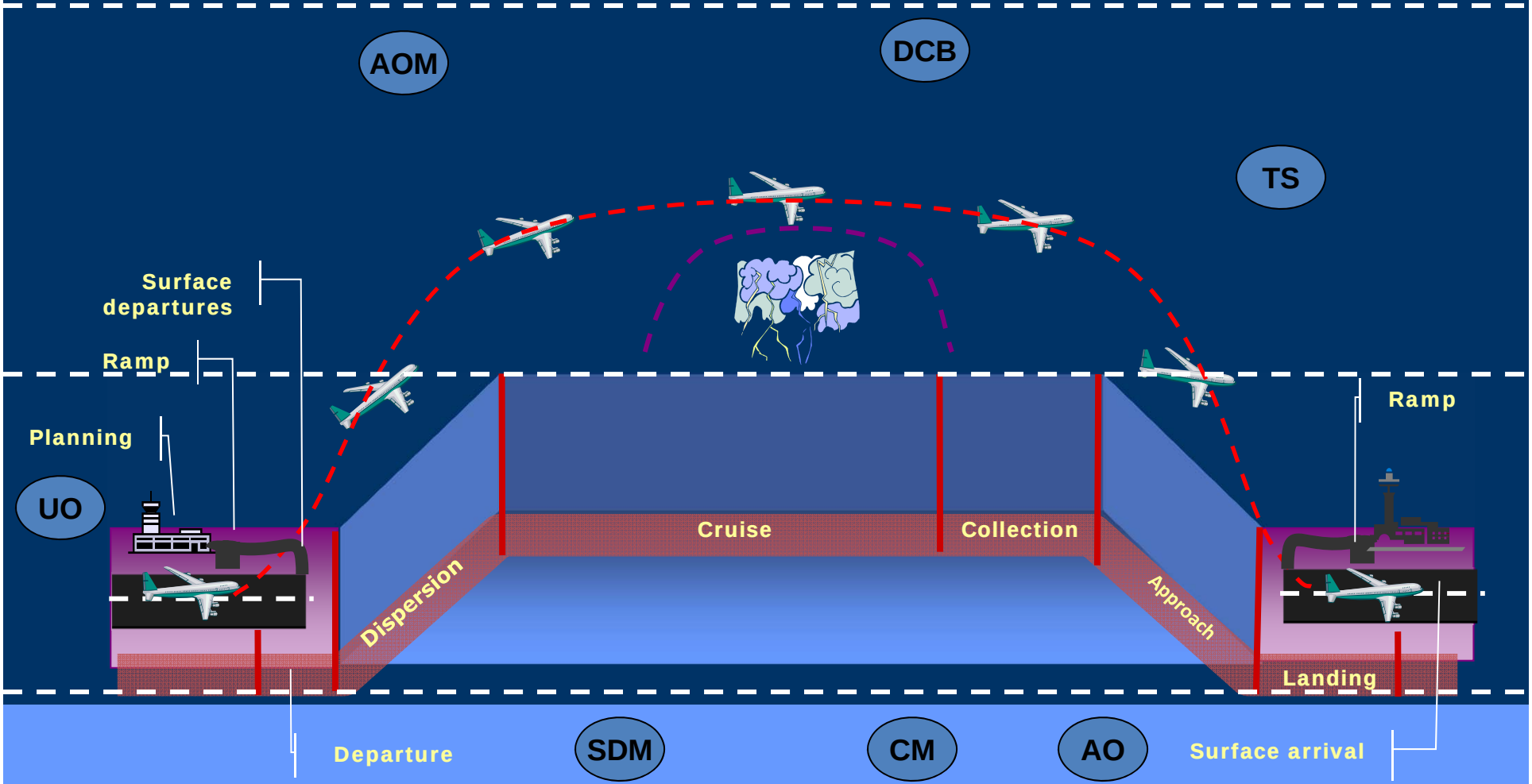
ATM Service Delivery Management (SDM)

Principles include:

- Trajectory, profile, and aircraft or flight intent
- Management by trajectory
- Clearance

Gate to Gate

Phases of flight (Doc 9854)



COMMUNICATION (COM) NAVEGATION (NAV) SURVEILLANCE (SUR) / ASBU

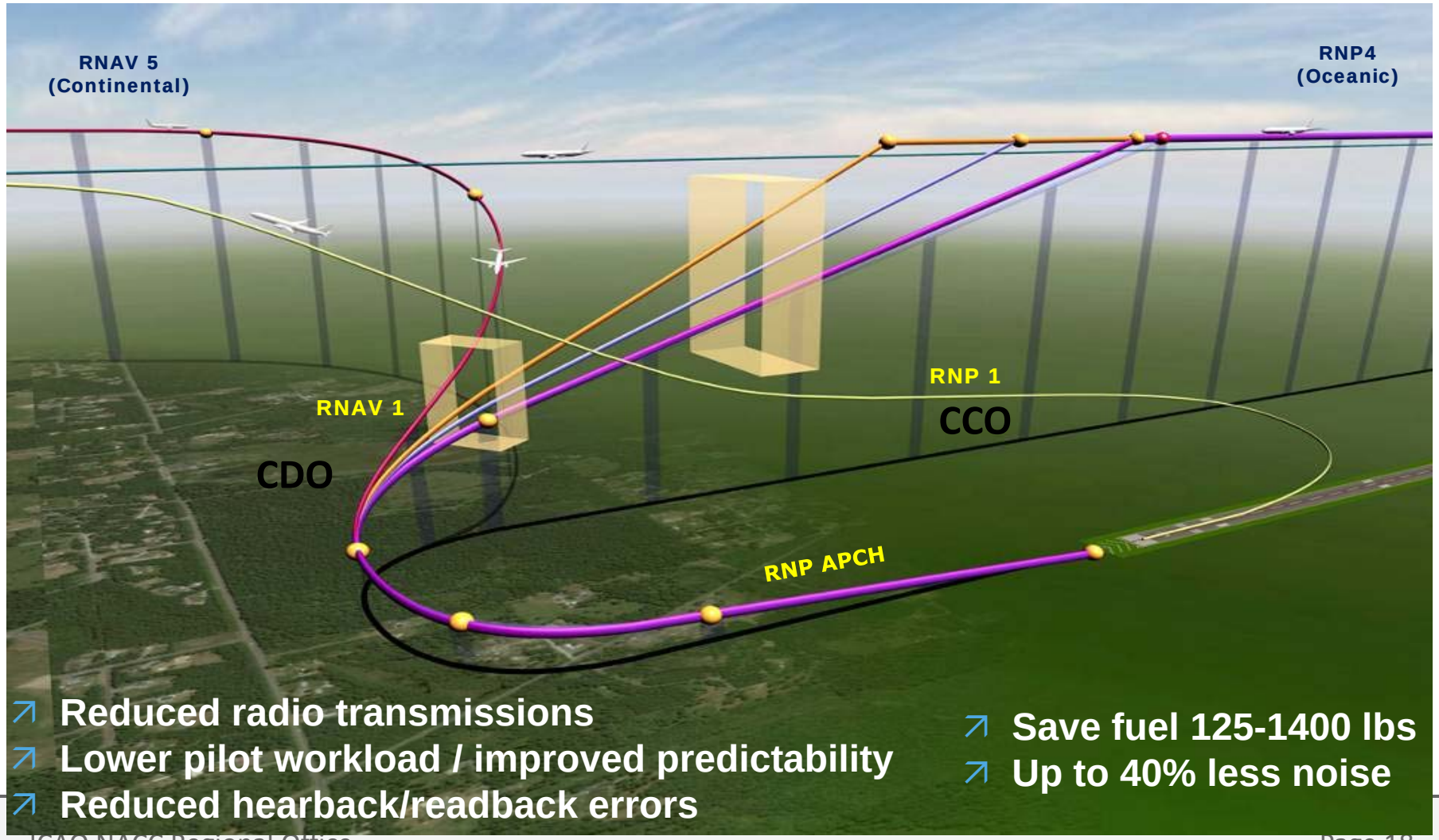
RPOs linkage with modules Block 0

ASBU / RPO	PIA1 Airport Operations					PIA2 SWIM			PIA3 Global Collaborative ATM							PIA4 Trajectory-based Operations		
	B015 RSEQ	B065 APTA	B070 WAKE	B075 SURF	B080 ACDM	B025 FICE	B030 DAIM	B0105 AMET	B010 FRTO	B035 NOPS	B084 ASUR	B085 ASEP	B086 OPFL	B0101 ACAS	B102 SNET	B005 CDO	B020 CCO	B040 TBO
PBN Implementation		X							X							X	X	
FUA									X									
DCB	X			X	X					X								
ATM Situational Awareness	X			X							X				X			X
Improve SAR																		
Improve Cap/Efficiency Aerodrome Operations				X	X													
COM					X	X												X
AIM							X											
MET								X										

RPO completed: RPO5 New ICAO Flight Plan model implementation
RPO merged into other RPO: RPO on WGS-eTOD implementation and RPO on WRC- State support and best use of radiofrequency spectrum

PBN Airspace Concept

Altitude windows safely separate aircraft and allow predictable flight performance

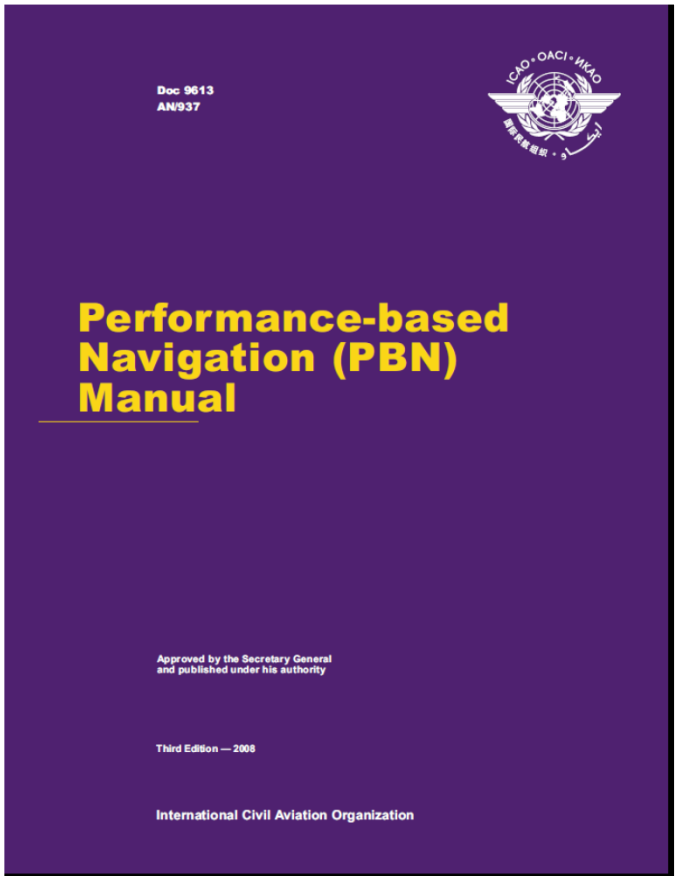


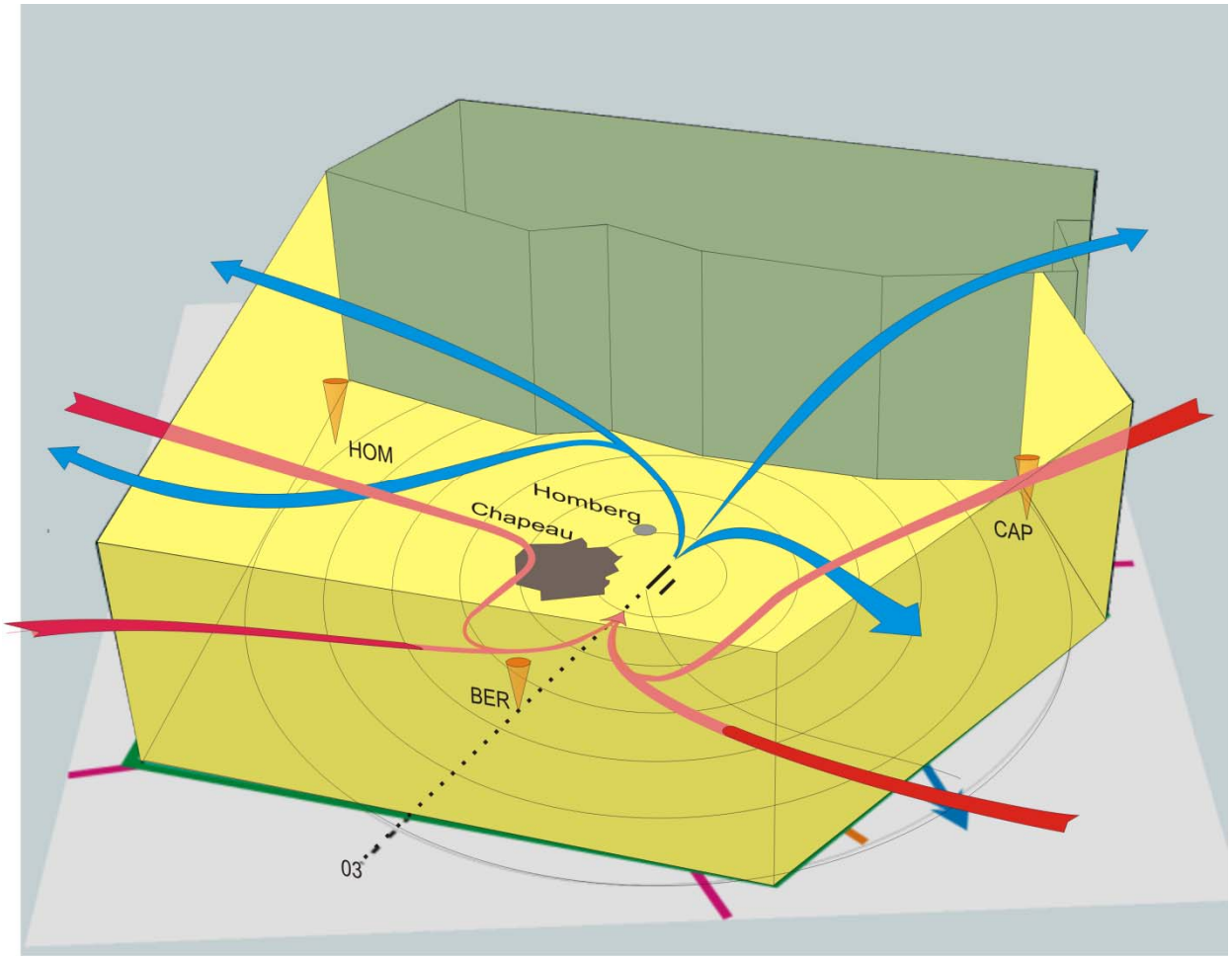
- **En-route Continental**
  - Accuracy
  - Offset route capability
  - Turn performance
  - Nav aid requirements
- **En-route Oceanic and Remote**
  - Accuracy
  - Self contained Navigation capability (inertial)
  - GNSS

- **Terminal Airspace**
  - Accuracy
  - TMA leg types
  - Work load implication
  - data base etc.
- **Approach**
  - Straight in or curved approach
  - Missed approach requirements
  - Multiple runways

ICAO PBN Manual Doc 9613

- Volume I
  - ***Airspace Concept***
  - ***Implementation Processes***
- Volume II
  - ***Navigation Specifications***




HOM
Homberg
Chapeau
CAP
BER
03

Airspace Design Team

- Lead by ATM/airspace specialist
- ATC (Approach and Area controllers)
- ATM & CNS specialist
- Procedure designers
- Technical pilots
- ……

Without international rules air travel would be in chaos.

Thank You

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