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CAPACITY & EFFICIENCY

ATM Situational Awareness

ADS-B Operational Concept

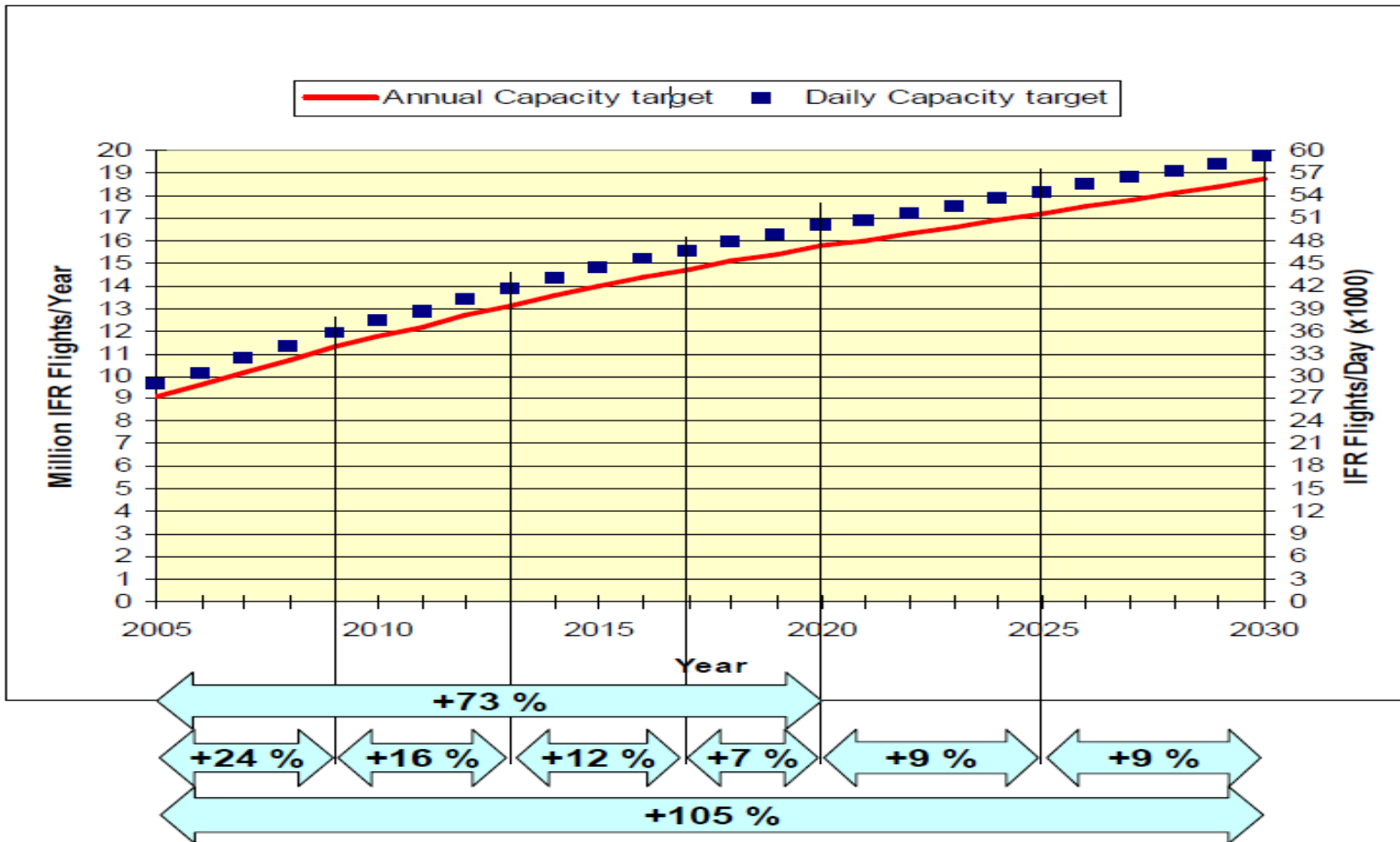
Victor Hernandez

RO ATM/SAR



Overview

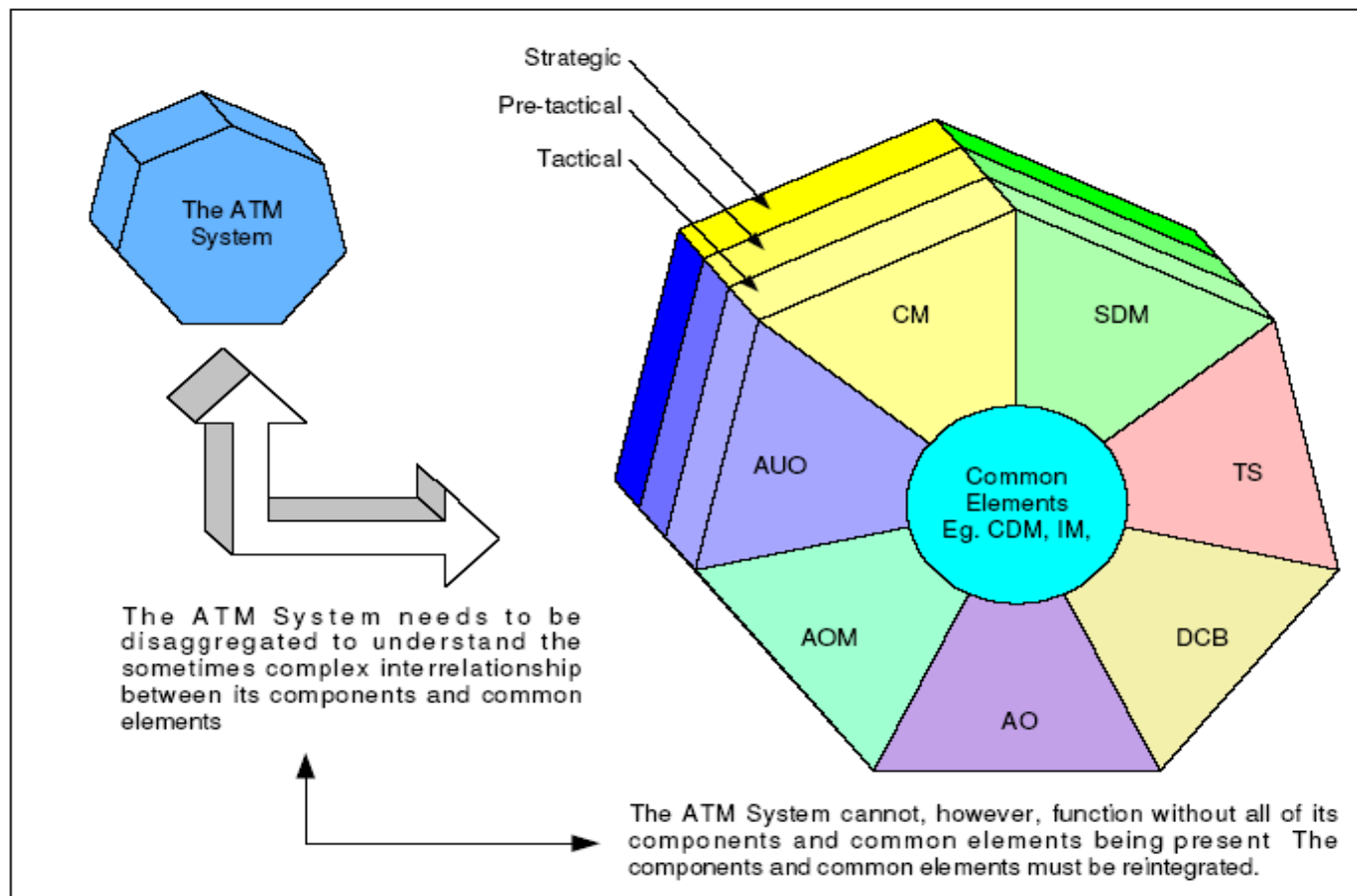
- ✓ Global traffic grow
- ✓ Global provisions
- ✓ Regional strategy for ATM situational awareness
- ✓ ATM requirements
- ✓ ADS-B Operational Concept





- Global ATM Operational Concept (Doc 9854)
↓
- Global Planning (Doc 9750)
↓
- Regional Planning (Doc 8733)
RPB-ANIP
↓
- National Planning

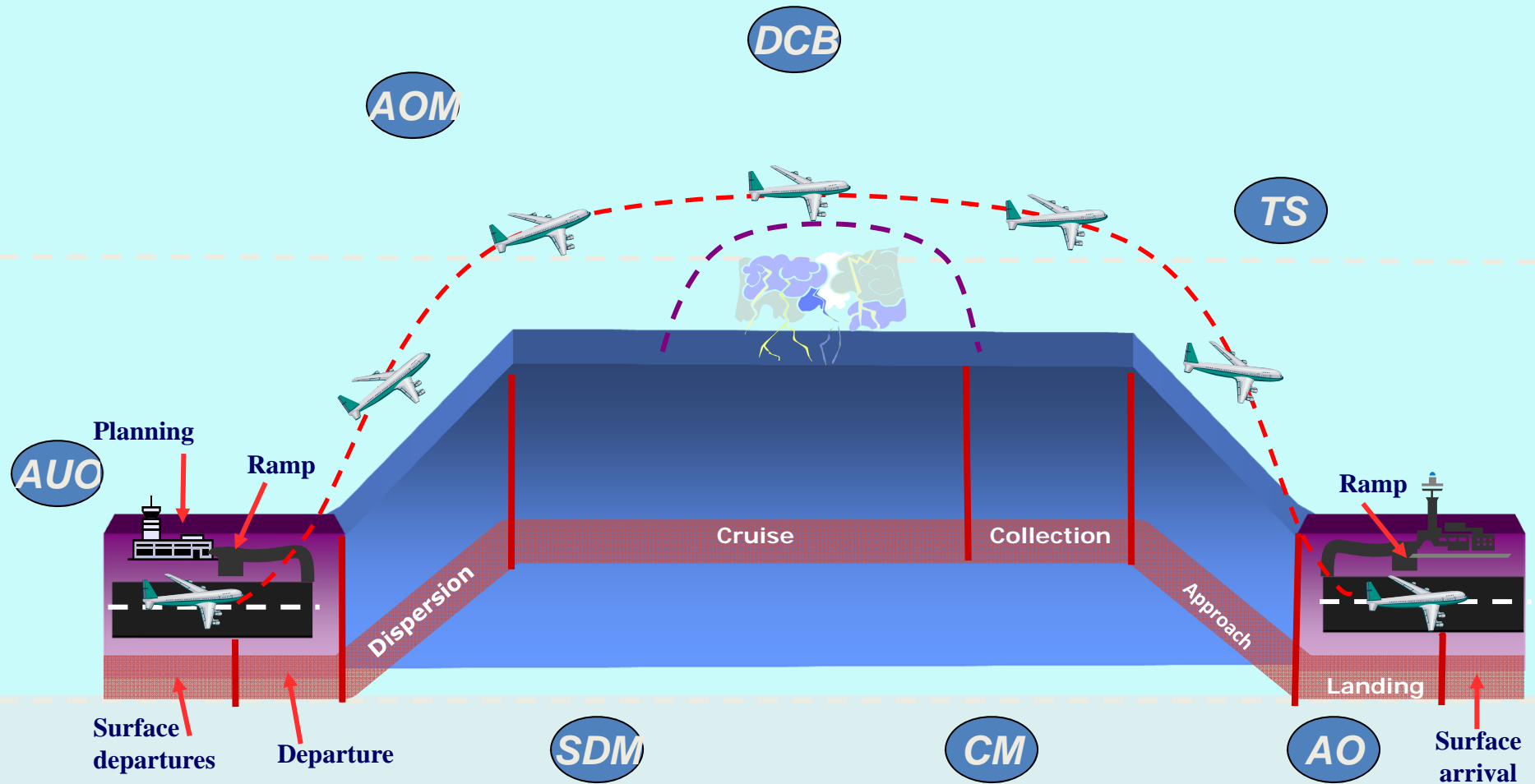




SDM = ATM Service Delivery Management, TS = Traffic Synchronization, DCB = Demand Capacity Balancing, AO = Aerodrome Operations, AOM = Airspace Organization and Management, AUO = Airspace User Operations, CM = Conflict Management, (CDM = Collaborative Decision Making, IM = Information Management)

ATM System

(Doc 9854)



COMMUNICATION (COM) - NAVIGATION (NAV) - SURVEILLANCE (SUR)



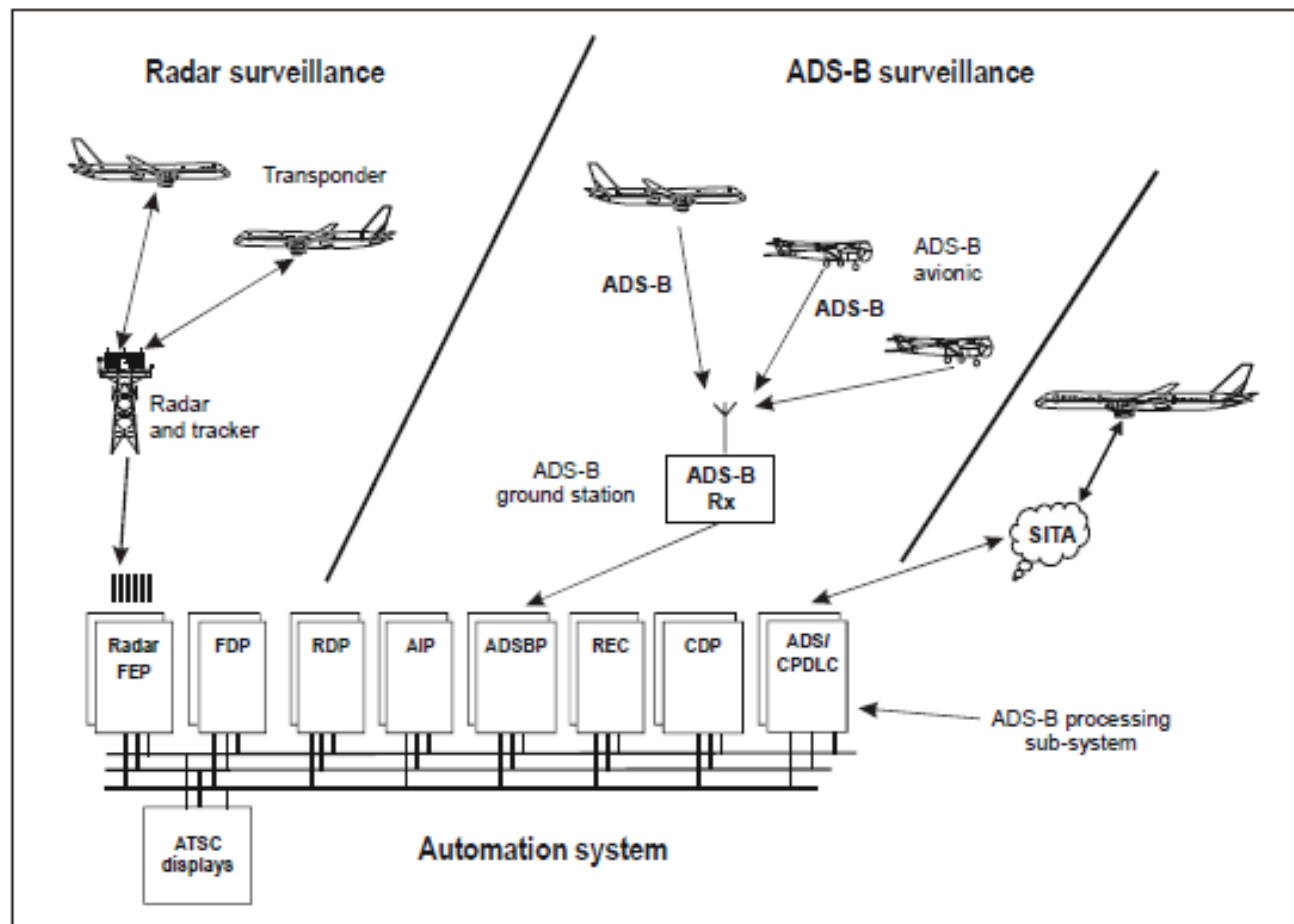
ATM Automation

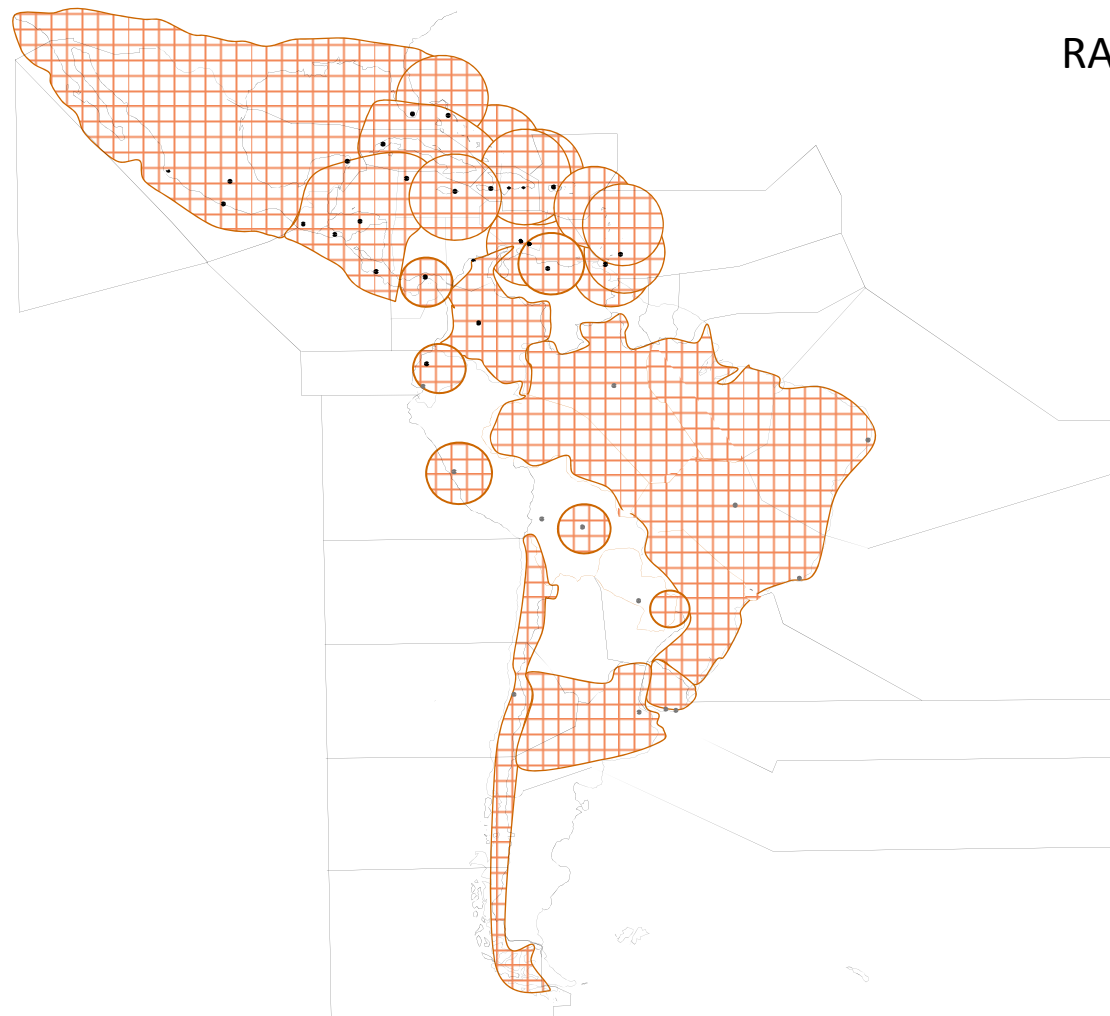
- **GREPECAS CONCLUSION 12/31:**
 - **REGIONAL STRATEGY FOR THE INTEGRATION OF ATM AUTOMATED SYSTEMS**



Regional strategy

PHASE	Capabilities
Phase I	- Flight data processing System (FDPS) CPL, FLP, RPL
Phase II	- ATS Radar Data Processing System /RDPS; monoradar; multiradar; Radar data sharing.
Phase III	- Digital automated communications (Automated traffic hand off, AIDC/ CPDLC, etc).
Phase IV	- CDM implementation for AOM [Airspace Organization and Management], CM [conflict management], DCB [Demand/Capacity Balancing], AO [Aerodrome Operation], TS [Traffic Synchronization], AUO [Airspace User Operation], ASDM [ATM Service Demand Management], AIS, MET, Statistics, etc.



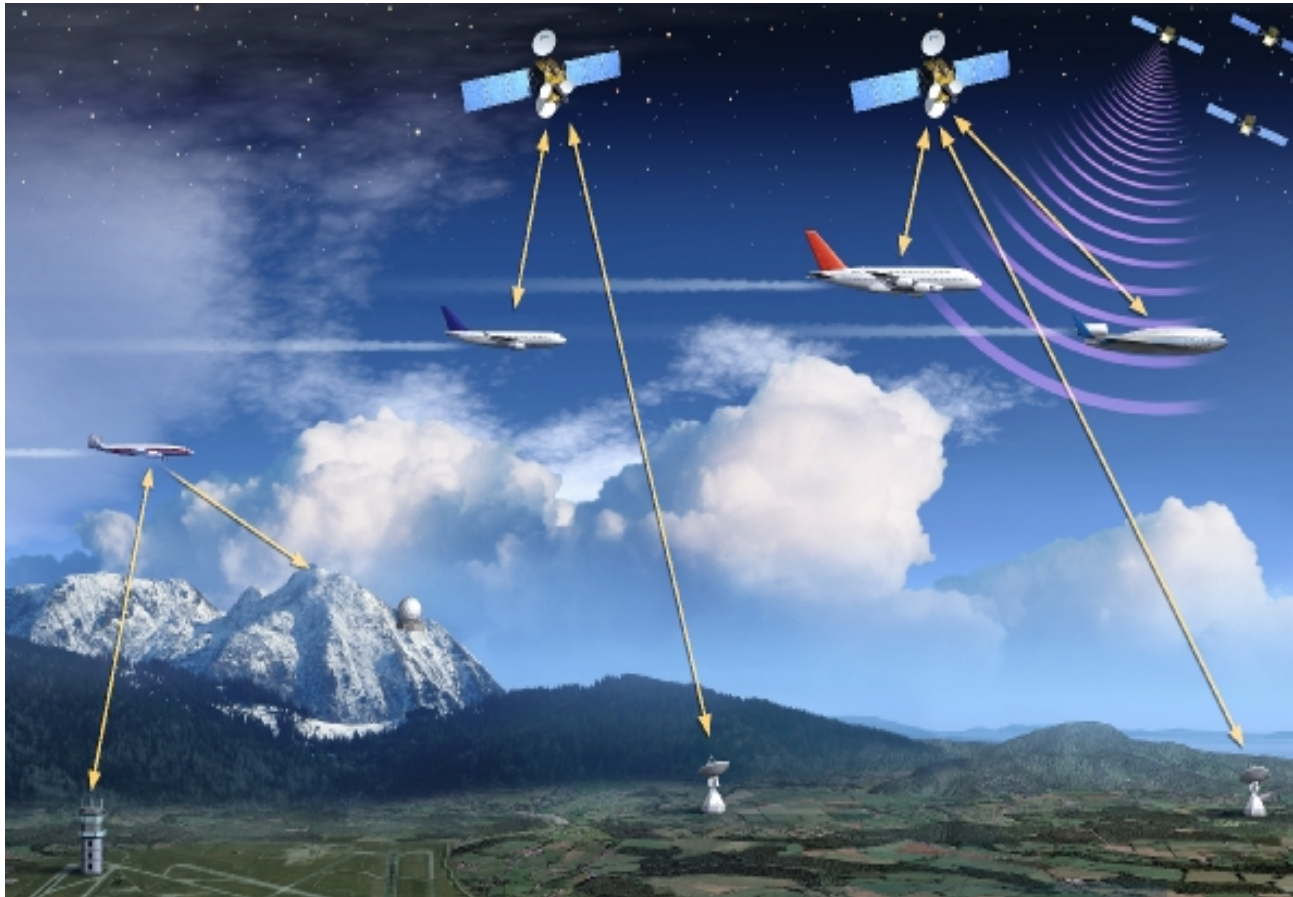


RADAR Coverage
CAR/SAM



Annex 11 - Doc 4444

- Radar (PSR, SSR)
- ADS-B
- CPDLC
- Multilateration





Data element	Performance characteristics	SSR		ADS-B		MLAT	
		Ground	Airborne	Ground	Airborne	Ground	Airborne
Position	Accuracy	X (fixed)		-	X NIC/NUC	X (dynamic)	
	Integrity	X (fixed)		-	X SIL/NUC	X (fixed)	
	Update rate	X		X	X	X	
	Latency	X		X	X	X	
	Reliability	X		X	X	X	
Position NIC or NUC	Latency			X	X		
	Update rate			X	X		
	Reliability			X	X		
Position SIL	Latency			X	X		
	Reliability			X	X		
Velocity vector	Accuracy	X		- (or X)	X	X (dynamic)	
	Integrity	X		- (or X)	X	X	
	Update rate	X		X	X	X	
	Latency	X		X	X	X	
	Reliability	X		X	X	X	
Altitude	Accuracy	-	X	-	X	-	X
	Integrity	-	X	-	X	-	X
	Update rate	X	X	X	X	X	X
	Latency	X	X	X	X	X	X
	Reliability	X	X	X	X	X	X
Identification/identity	Integrity	-	X	-	X	-	X
	Reliability	X	X	X	X	X	X
	Latency	X	X	X	X	X	X
	Update rate	X	X	X	X	X	X
Emergency/SPI	Reliability	X	X	X	X	X	X
	Update rate	X	X	X	X	X	X
	Latency	X	X	X	X	X	X



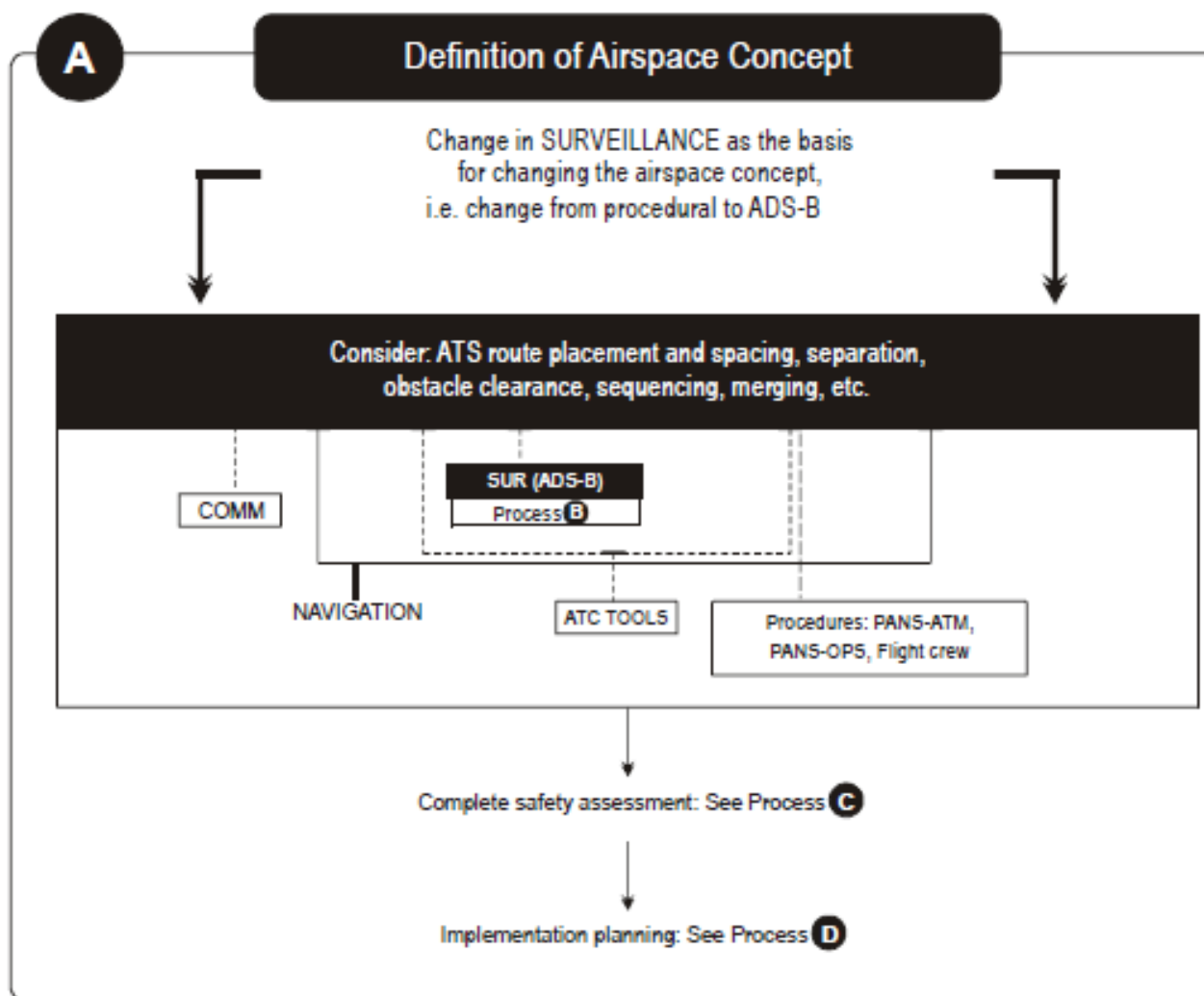
ATM requirements

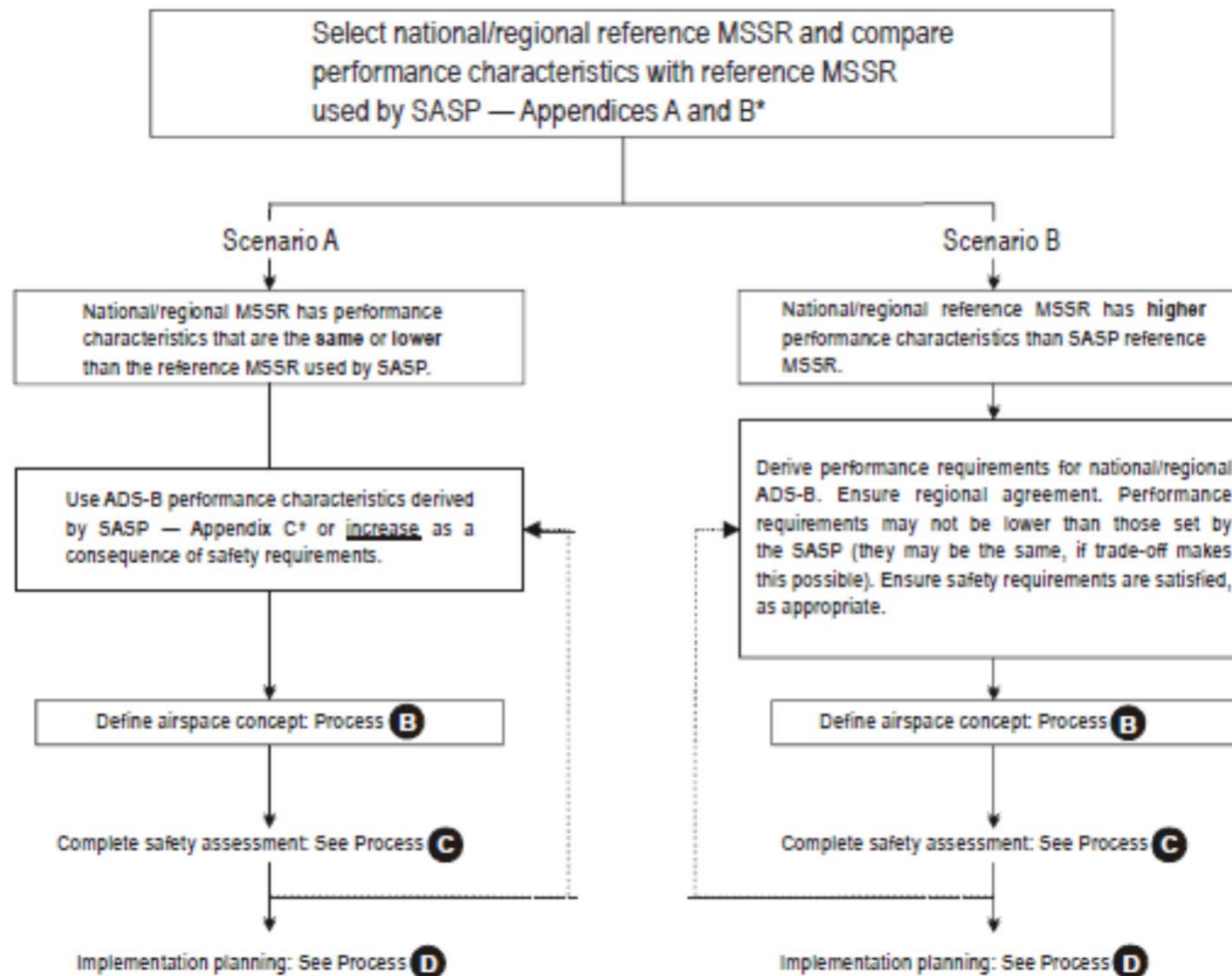
- **a) Conception.** Response to necessities and expectations framework.
- **b) Specification.** Specify operational requirements
- **c) Design.** Operational service; system interoperability.
- **d) Selection.** Services and technologies for implementation.
- **e) Planning.** Services, installations and capabilities
- **f) Operation.** Operational implementation.



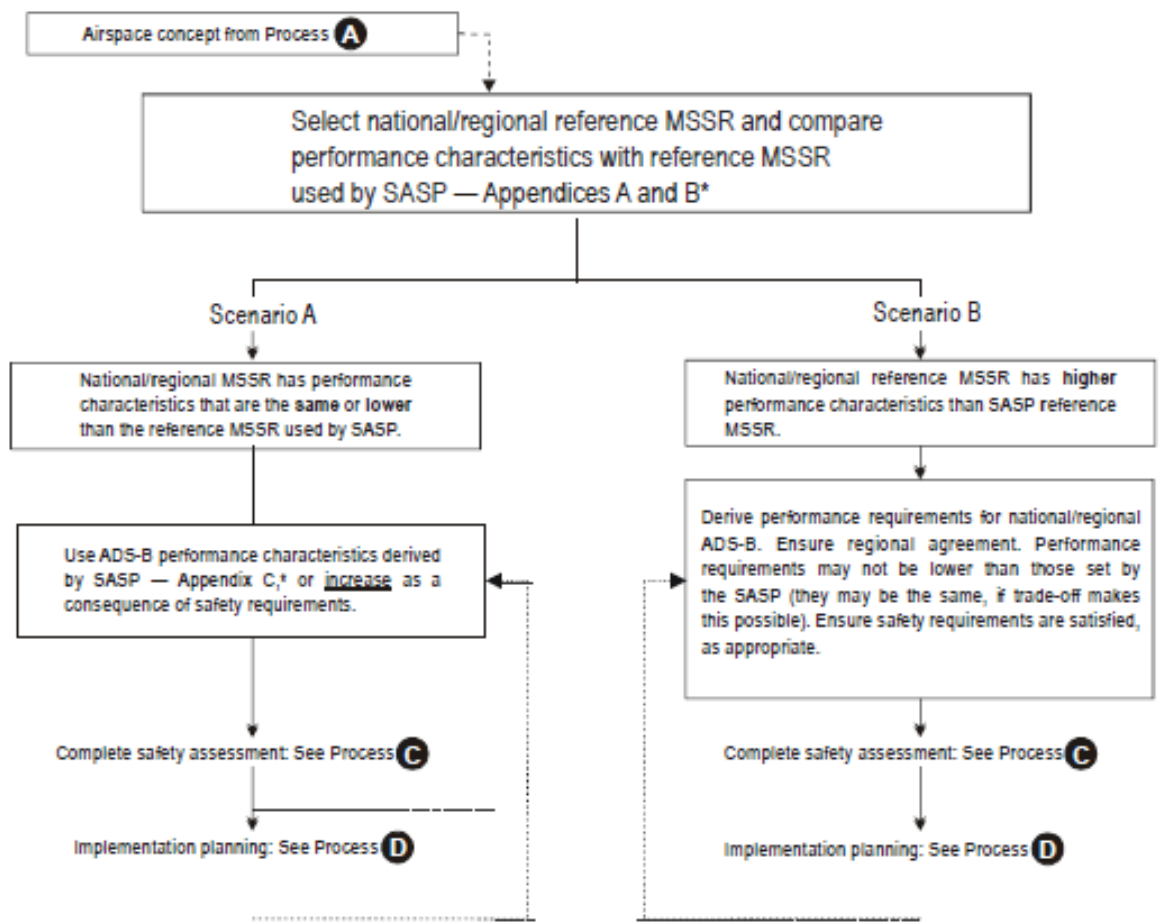
Implementation process (Cir 326)

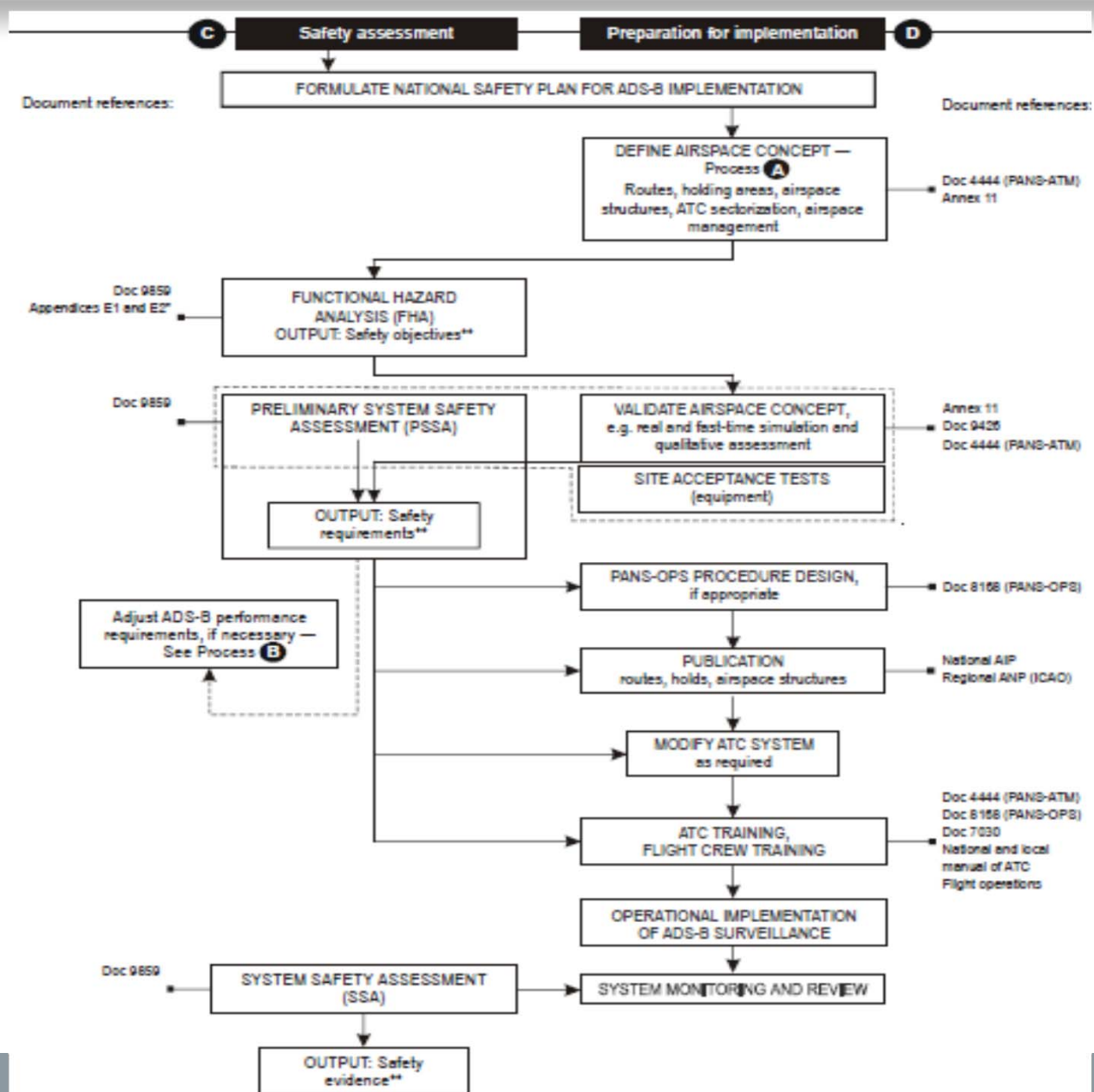
- a) Definition of an airspace concept;
- b) Identification of ADS-B or MLAT performance requirements;
- c) Safety assessment (initial, implementation and operational); and
- d) Preparation for implementation.





B Identification of ADS-B Performance Requirements







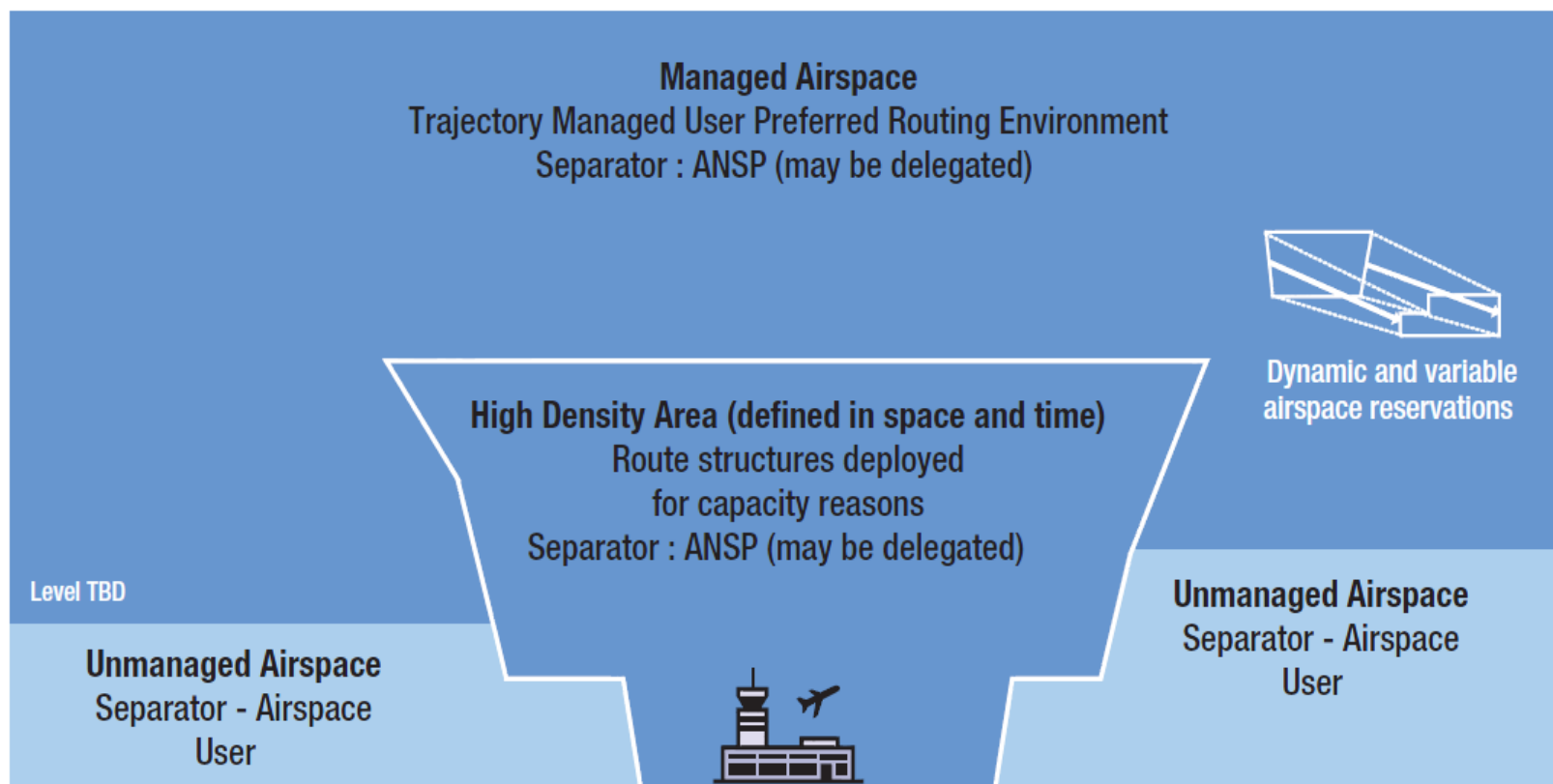


Based on trajectories

- Airspace redesign and Management
- Airspace capacity
- Aircraft Separation (Doc 4444)
- ATS communication
- ATC emerging techniques and procedures (Training)

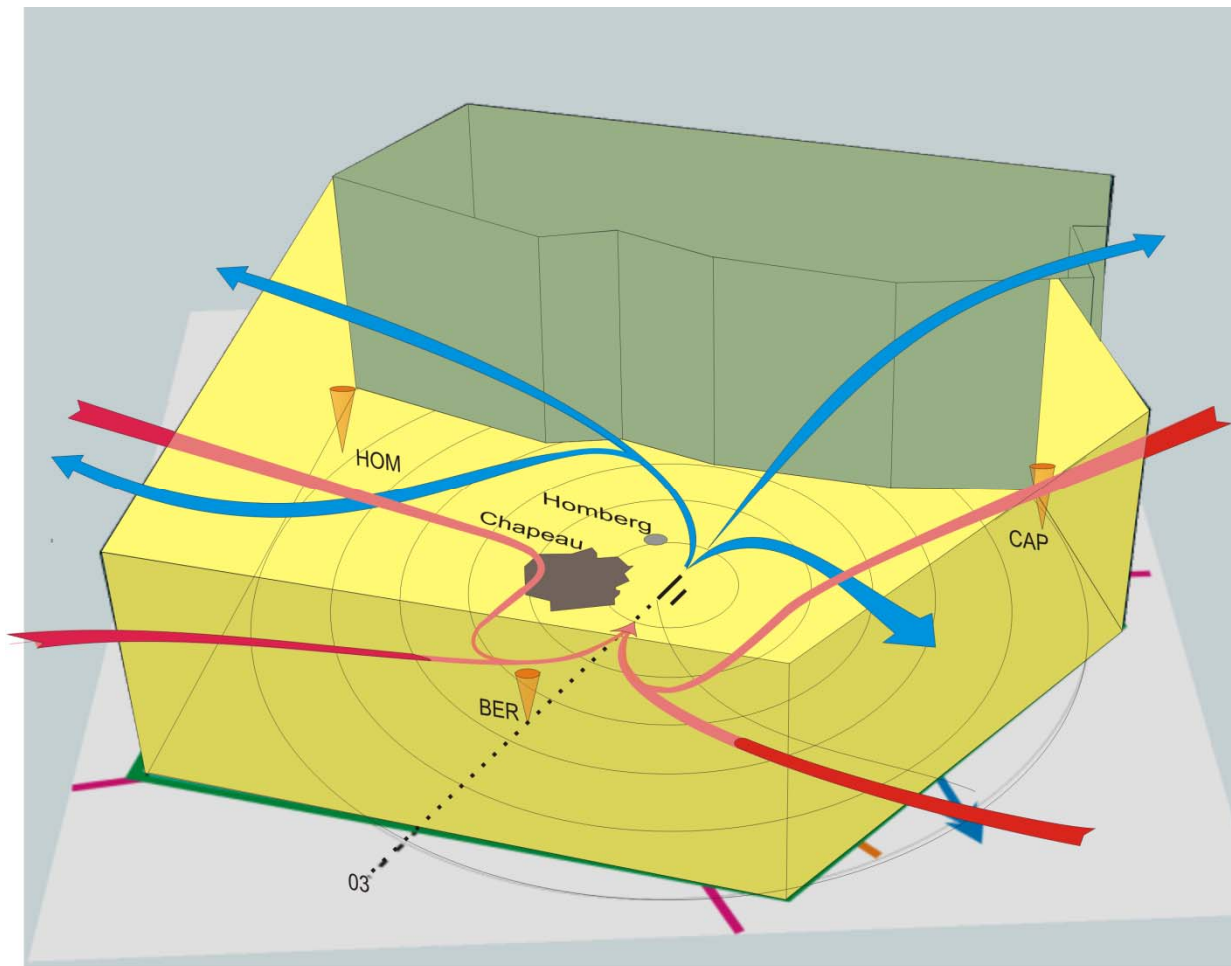


Airspace Organization and Management (AOM)



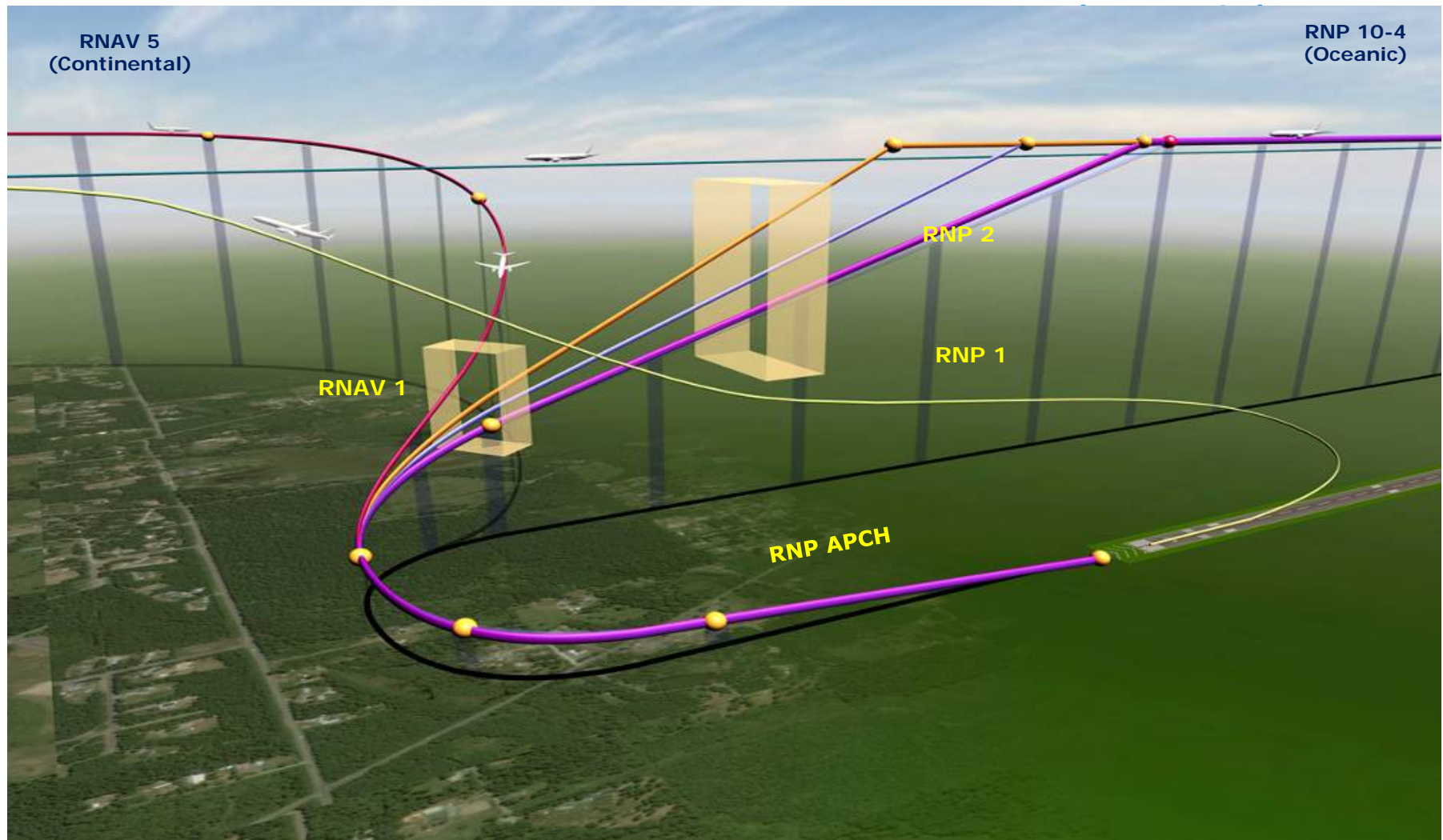


PBN Airspace Redesign





PBN Airspace Concept





ATM situational awareness

- ATS provision to air operations
- Ensure flight plan data / tracks according to user requirements
- Priority of global/regional ATS provision (individual
- Coordination of flight plans / tracking through collaborative decision making (CDM) with all stakeholders



Enhance ATS & Aerodrome capacity

- Improve aerodrome capacity – GATE-TO-GATE:
 - Required infrastructure - long term
 - Realistic schedule
 - Demand and Capacity Balancing (DCB)

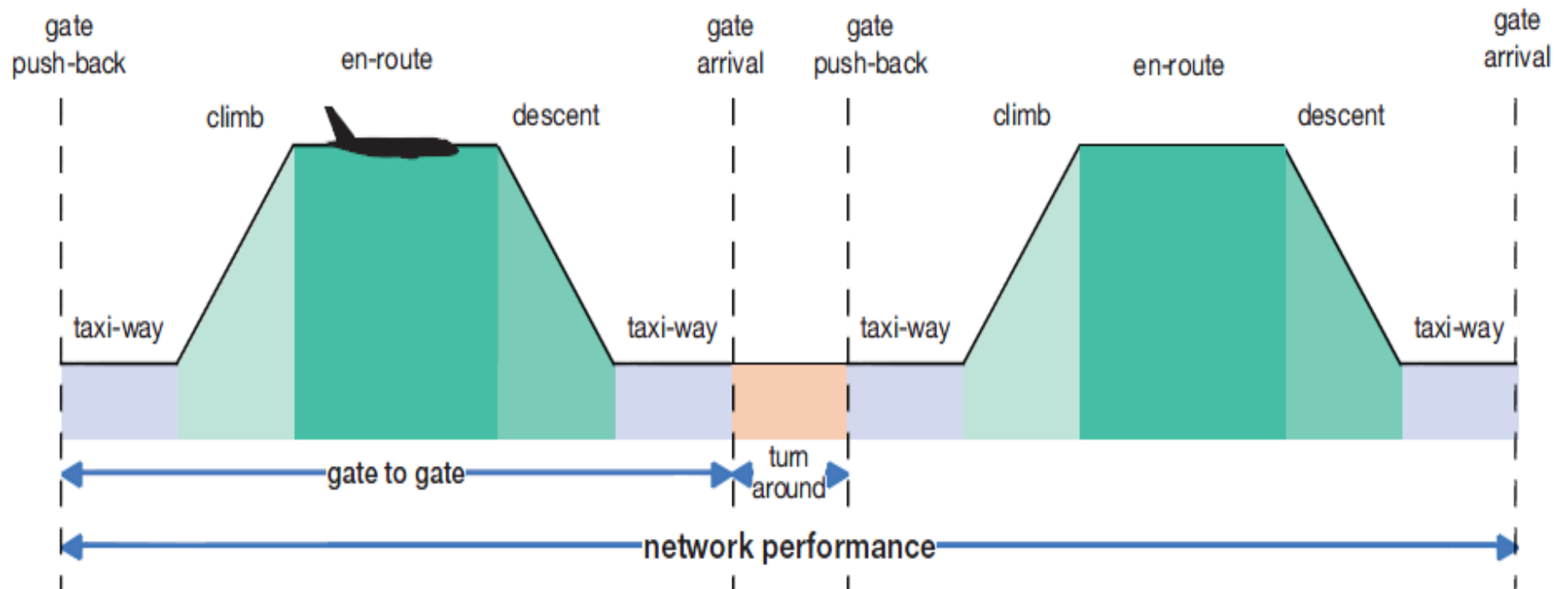
- Minimize impact of adverse weather

- Aerodrome network



“Gate to Gate”

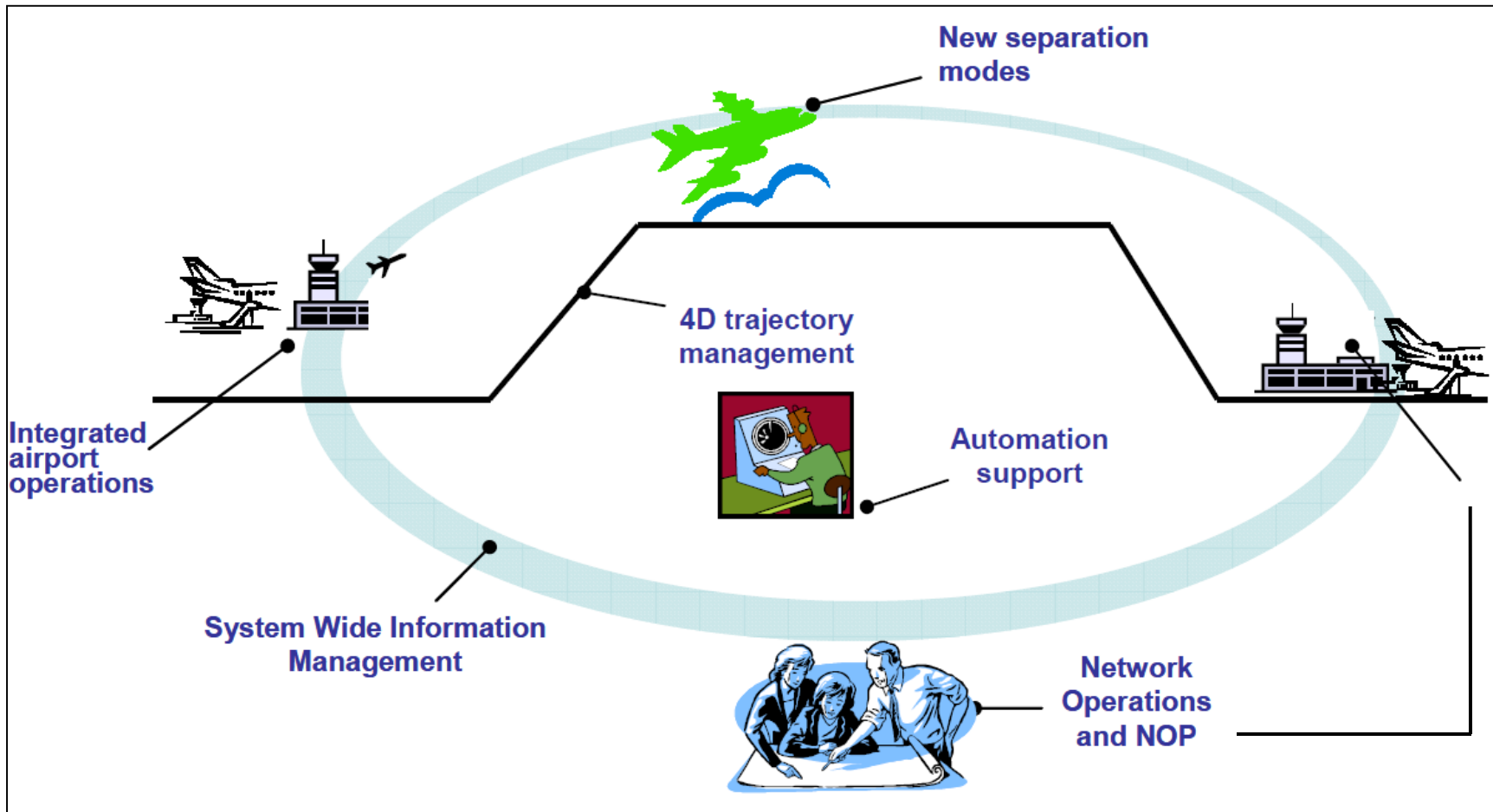
Push back, Taxi, Take Off, Climb, Enroute, Descent, Taxi



AO — Aerodrome Operations



- AMAN / D-AMAN
- ATC management to all departures and arrivals
- know position and movement of all vehicles and aircraft operations
- Reduce runway occupancy time (ROT)
- safe operations in all weather conditions





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