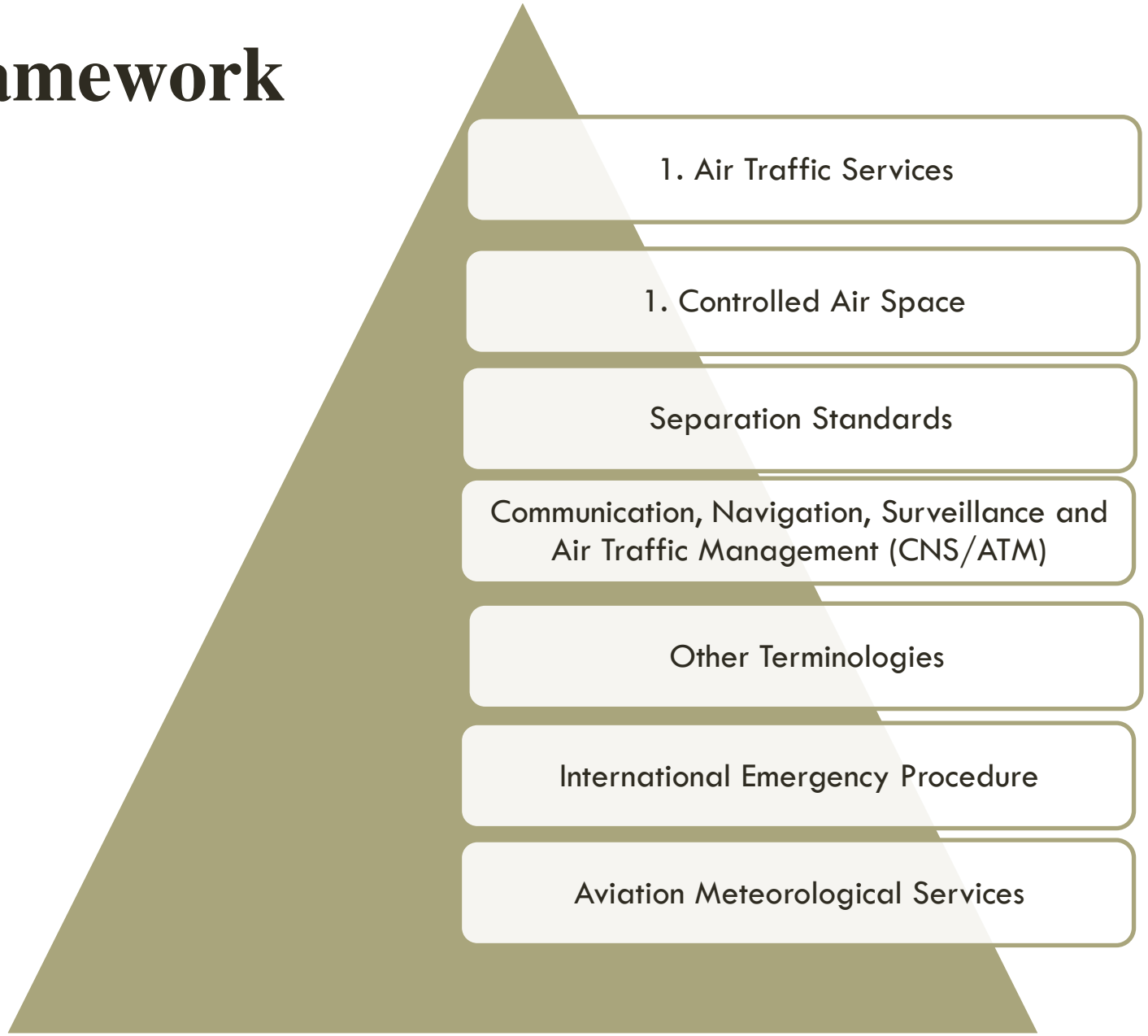
MODULE I

INTRODUCTION TO AIR SPACE AND AIR TRAFFIC MANAGEMENT

Conceptual Framework



Air Traffic Services

Air Traffic Services (ATS) are for the purpose of preventing collisions

Between aircraft, and

On the maneuvering area, between aircraft and obstructions, and expediting and maintaining an orderly flow of traffic; provide advice and information useful for the safe and efficient conduct of flights; notify appropriate organizations regarding aircraft in need of search and rescue aid and assist such organizations as required.

ATS AIRSPACES

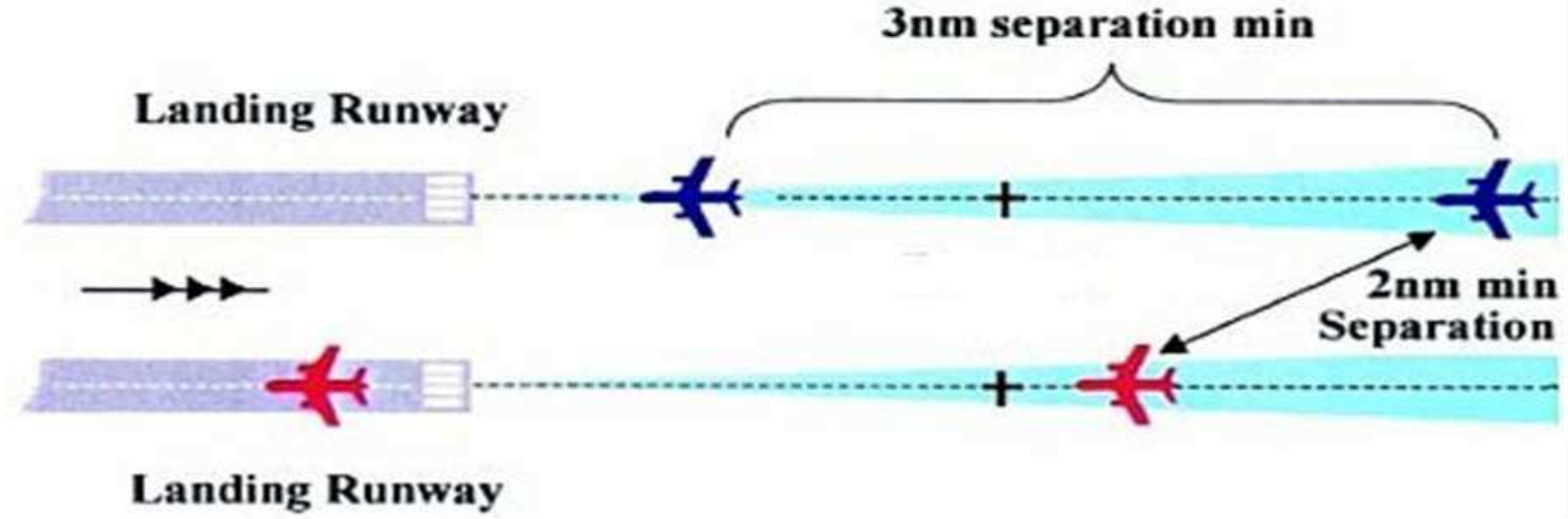
- **Controlled Airspaces**
- **Uncontrolled Airspaces**
- **FIR**
- **Control Area**
- **Terminal Control Area**
- **Control Zone**
- **Aerodrone Traffic Zone**

AIR SPACE CLASSIFICATION

1. Class A
2. Class B
3. Class C
4. Class D
5. Class E
6. Class F
7. Class G

SEPARATION STANDARDS

Aircraft are radar sequenced and speed controlled to achieve the necessary radar separation on to the ILS localisers (min sepn = 3nm between a/c on the same localiser or 2nm between a/c on adjacent localisers)



COMMUNICATION NAVIGATION, SURVEILLANCE AND AIR TRAFFIC MANAGEMENT (CNS/ATM)

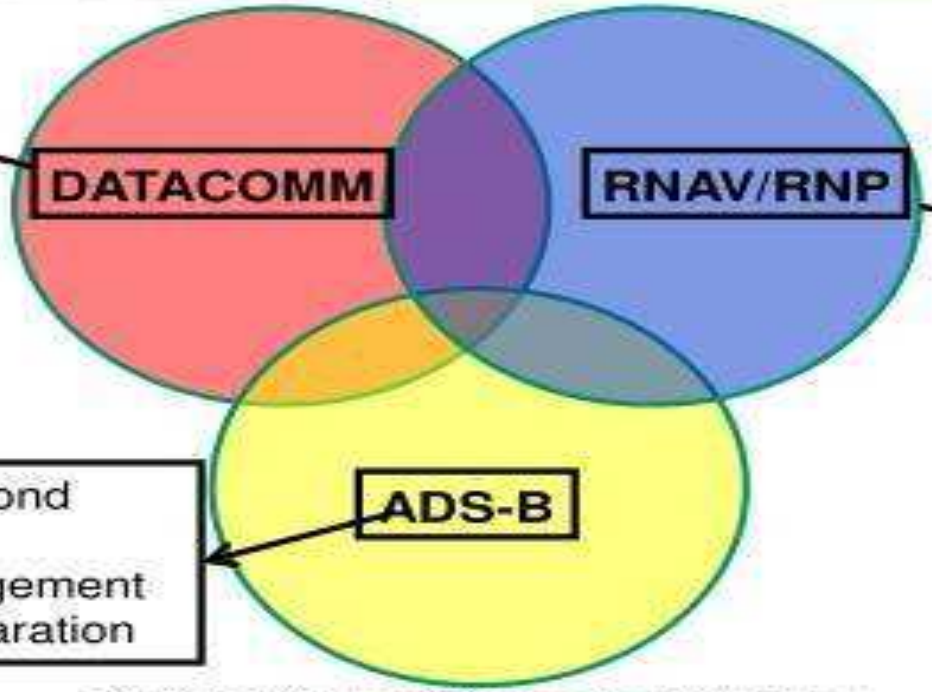
CNS/ATM, NextGen and Timeline

Targeted Mandate or Requirement DATE	1999	2005	2009	2015+	2020	TBD	TBD
Where Required	Europe	Europe 2002 CONUS 2005	Europe	Worldwide Performance-based Airspace	Gulf of Mexico 2010 Canada (Hudson Bay) 2010 Australia 2013 Europe 2019 CONUS 1 Jan 2020	CONUS Evolving	CONUS Evolving
CAPABILITY	8.33 kHz	RVSM	Mode S	RNP RNAV	ADS-B (Out)	ADS-B (In)	DATACOM

Communication Navigation Surveillance / Air Traffic Management

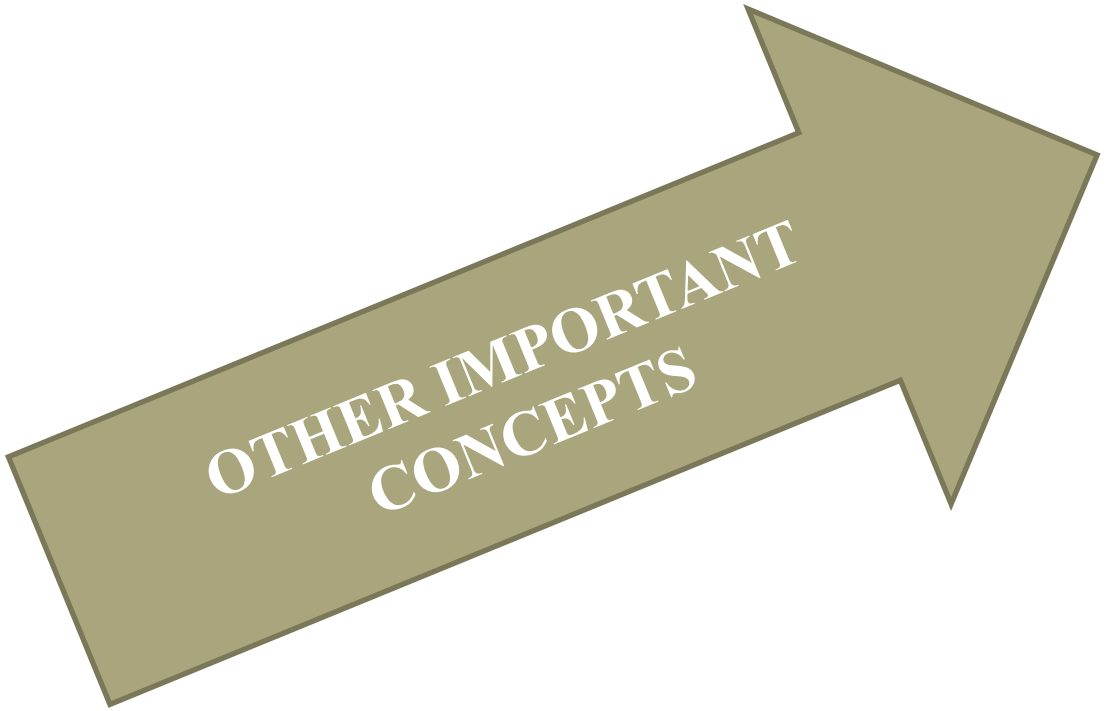
NextGen (FAA)

- Digital Clearances
- D-ATIS
- Dynamic Traffic Management (Re-routes)



- Precision GPS Performance-based Navigation
- Optimized Departures, Routing, Arrivals and Approaches

- Surveillance Expanded Beyond Radar Limitations
- Improved Separation Management
- ADS-B Assisted Visual Separation



- Advisory Area.
- Advisory Route.
- Air Route.
- Airway.
- ATS Route.
- Area Control Centre.
- Air Traffic Control Centre.
- Approach Control Office.
- Aerodrome Control Tower.
- Reporting Point.
- Runway Visual Range(RVR): Visibility
- VMC: Visual Meteorological Conditions.
- IMC

INTERNATIONAL EMERGENCY PROCEDURE

States of Emergency are classified as being of two standards:

Aviation Meteorological Services

Forecasting

Observation

Information

Watch

Briefing

Climate

Costomer oriented service

LEGAL FRAMEWORK FOR AIR SPACE AND AIR TRAFFIC MANAGEMENT

- The CNS/ATM System
- Air Traffic Services
- Air Navigation Services
- Meteorological Information
- Liability of States
- Liability of Air Traffic Service Providers

CLEAR AIR TURBULENCE

- Turbulence and Clear Air Turbulence: Meaning
- Factors causing Clear Air Turbulence
- Impacting Strategies at Airports
- Flight Documentation
- Effect of Air Turbulence on Aircrafts
- Can Turbulence cause plane crash?

What is turbulence?

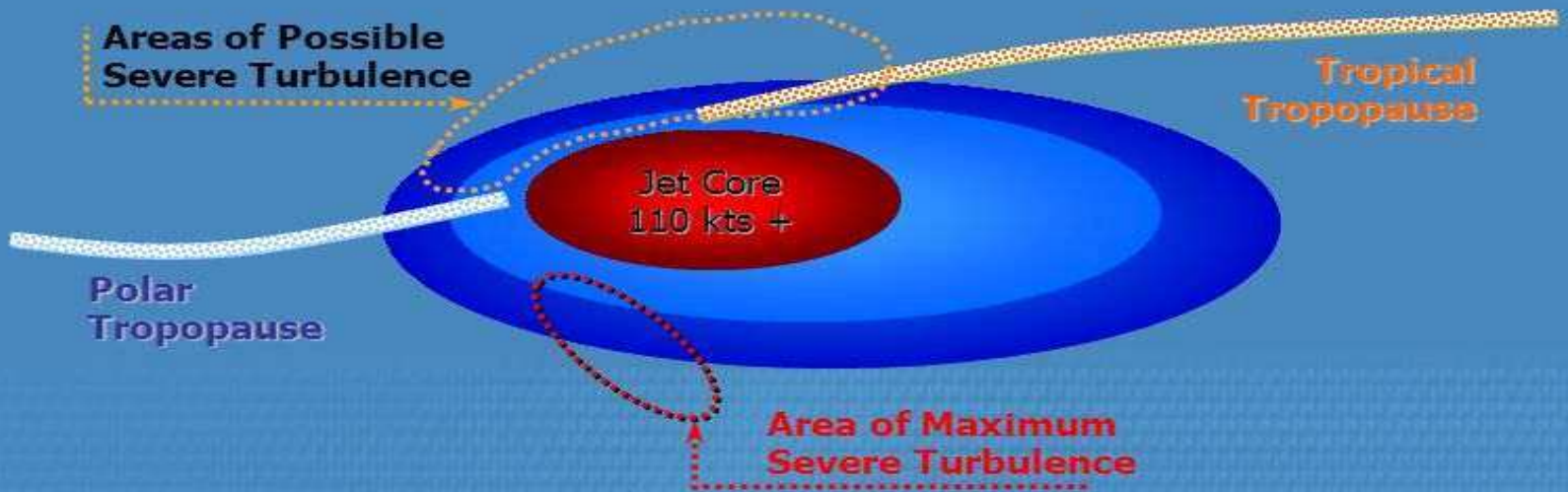
A sudden, violent shift in airflow

Causes:

- Wind
- Storms
- Jet stream
- Objects near the plane (particularly mountain ranges)

Clear Air Turbulence

- As discussed, maximum wind speeds are found at the boundary layer between the troposphere and stratosphere known as the tropopause. Jet streams stronger than 110 knots (at the core) are apt to have areas of significant turbulence near them in the sloping tropopause above the core, in the jet stream front below the core, and on the low-pressure side of the core.



Factors causing air clear turbulence

- Jet stream
- Temperature gradient
- Vertical Temperature gradient
- Horizontal Temperature gradient
- Wind shear
- Vertical wind shear
- Horizontal wind shear
- Mountain waves
- Gravity wave wind shear

Can Turbulence Cause A Plane To Crash?

AIR NAVIGATION

- Pilotage or Piloting
- Dead Reckoning
- Radio Navigation
- NAV Aids
- Global Positioning Systems
- NAS/ATM System Development Process
- Human Centered Systems
- Analysis of the Future System Capacity, Safety and Efficiency
- System Technical Requirements
- Technology and Human Factors Analysis
- Transition Planning and Trade Off Analysis
- Constraints Analysis Model