



INTRODUCTION TO AIR SPACE AND AIR TRAFFIC MANAGEMENT

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CONCEPTUAL FRAMEWORK

- ICAO Chicago Convention
- Standards and Recommended Practices
- Annexes 2, 11, 3, 10, 15
- Documents 4444



CONCEPTUAL FRAMEWORK

- Air Traffic Services
- Air Spaces: Different Airspaces
 - FIR
 - Advisory Air Space
 - ATS Routes
 - Control Area
 - Control Zone
 - TMA
 - ATZ
- Separation
- Time, space
 - Vertical,
 - Horizontal
 - Lateral



CONCEPTUAL FRAMEWORK

- Air Traffic Services Units
 - FIC
 - ACC
 - Approach Control Office
 - Aerodrome Control Tower
 - SMC



CONCEPTUAL FRAMEWORK

- Air Traffic Services
 - ATC Service
 - Alerting Service
 - FIS
- Types of Control
 - Procedural
 - Radar
 - Data



CONCEPTUAL FRAMEWORK

- CNS/ ATM
- Communication
 - HF
 - UHF
 - VHF
- Other Terminologies
- International Emergency Procedures
- Aviation Meteorological Services



Legal Framework for Air Space and Air Traffic Management: An Overview

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



Air Navigation

- Pilotage or Piloting
- Dead Reckoning
- Radio Navigation
- NAV Aids
- Global Positioning Systems
- Airspace/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



AERODROME DATA AND WARNING

- Key Terms in Aerodrome Standards and Warnings
- Meaning of Aerodrome Warnings
- ICAO Norms on Aerodrome data and warnings
- Criteria for Aerodrome Warnings



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?



AIR SPACE AND AIR TRAFFIC MANAGEMENT

- Introduction and Historical Evolution
 - The ATM System Functional structure
 - ATM Objectives
- Capacity and Safety of Air Traffic Management
 - Throughput and Efficiency
 - A Functional View of the Throughput and Safety
 - Levels of Flow Planning in the System
 - Levels of Plan Execution in the System



AIR SPACE AND AIR TRAFFIC MANAGEMENT

- A Functional View of the Current Concept, Throughput and Safety
- Flight and Flow Planning
- Separation Assurance and Technical Performance



AIR SPACE AND AIR TRAFFIC MANAGEMENT

➤ Dense Terminal Airspace

- Efficiency in Dense Terminal Airspace
- Safety in Dense Terminal Airspace
- Separation Assurance and CNS/ATM Technologies
- Efficiency in Low Density Airspace
- Transition from Low to High Density Airspace
- Extended Terminal Areas



AIR SPACE AND AIR TRAFFIC MANAGEMENT

➤ National Flow Management

- Planning for Operator Efficiency and Overload Protection
- Time Horizons and Coordination
- Information Flow
- Collaborative Decision Making



AIR SPACE AND AIR TRAFFIC MANAGEMENT

- Proposed CNS/ATM Technology Improvements
 - Airspace and Airways
 - Airports
 - Flight Service Stations



AIR SPACE AND AIR TRAFFIC MANAGEMENT

- Human Factors in Air Traffic Management Airspace and Airways
 - The Role of Human Factors In Enabling Change
 - Baseline Data of Human Roles
 - The Search For Greater Throughput And The Demands On The Human
 - Involvement Of Human Factors From Concept Development Through Final Design



AIR SPACE AND AIR TRAFFIC MANAGEMENT..

- Human Factors Support For Implementation, Education, And Training
- Designing To Support Human Performance Across The Entire Range Of System Operating Conditions
- Human Factors Issues Affecting Tactical Control
- Using Structure To Maximize Throughput
- Sharing Responsibility



AIR SPACE AND AIR TRAFFIC MANAGEMENT

- **Available and Emerging Technology**
 - System Performance
 - Air Navigation
 - Communication Systems
 - Surveillance Systems and Performance



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ **Meaning and Background**

- Historical Development
- Shortcomings of the Earlier System



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ **CNS Systems: An Overview**

- Objectives
- Brief Look at the Existing System
- Benefits of the New System
- Organizational and Financial Issues
- Assistance Requirements and Technical Cooperation



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

- **ICAO's Planning Structure for the CNS/ATM System**
 - Regional Planning Process
 - National Planning Process
 - CNS/ATM Partners and Tools
 - Relevant ICAO Policies on CNS/ATM
 - ICAO's Role and Responsibility



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ Global Planning Methodology

- Homogeneous ATM Areas and Major Traffic Flows
- Planning Methodology
- Operational Analysis



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ Communication Systems

- Air-Ground Communication
- Ground-Ground Communication
- Aeronautical Telecommunication Network (ATN)
- Future Trends
- Required Communication Performance (RCP)
- General Transition Issues



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ Navigation Systems

- Required Navigation Performance (RNP)
- Global Navigation Satellite System (GNSS)
- Avionics
- WGS-84 Coordinate System And Aeronautical Databases
- Evolutionary Introduction
- Systems To Support Approach, Landing And Departure Operations



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ Surveillance Systems

- Current Surveillance Systems
- Functional Description
- Technical Options Overview
- ATM Requirements For Surveillance
- Airborne Collision Avoidance System (ACAS)
- Required Surveillance Performance (RSP)
- Future Trends



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ **Meteorology**

- Meteorological Support To International Civil Aviation
- Meteorological Systems To Support Global CNS/ATM
- Meteorological Systems To Support The Transition To The New Global CNS/ATM Systems
- Planning And Implementation Of Meteorological Systems



COMMUNICATIONS, NAVIGATION, SURVEILLANCE/ AIR TRAFFIC MANAGEMENT (CNS/ATM)

➤ **Aeronautical Information Services**

- AIS and Map Support To International Civil Aviation
- AIS and Map Services To Support Global CNS/ATM Systems
- AIS/Map Systems & New Global CNS/ATM Systems



ICAO AND AIR SPACE AND AIR TRAFFIC MANAGEMENT

- **ICAO Institutional and Regulatory Framework**
 - Institutional Framework
 - Article 3 of the Convention
 - Assembly Resolutions
 - Existing Regulatory Framework



ICAO AND AIR SPACE AND AIR TRAFFIC MANAGEMENT

➤ **Civil and Military Inter-operability**

- Introduction
- Regulation And Standardization
- Operational And Technical Interoperability
- Strategic and/or Political Interoperability



ICAO AND AIR SPACE AND AIR TRAFFIC MANAGEMENT

➤ Air Space Organization and Management

- General Principles
- The Flexible Use of Airspace Concept
- FUA Principles
- Flexible and Adaptable Airspace Structures and Procedures
- Collaborative Decision-Making



ICAO AND AIR SPACE AND AIR TRAFFIC MANAGEMENT

- ATM Security and ATM in crisis situation
 - ATM Security
 - ATM In Crisis Situation



ICAO AND AIR SPACE AND AIR TRAFFIC MANAGEMENT

➤ State Aircraft Operations

- Introduction
- State Aircraft Roles
- State Non-Aviation Airspace Requirements
- State Aircraft Constraints
- Fully-Compliant Operations
- Partially-Compliant Operations



ICAO AND AIR SPACE AND AIR TRAFFIC MANAGEMENT

- Civil/Military Collaboration — A New Global Challenge
- Legal Issues Concerning Communication/Navigation and Surveillance Systems
 - Introduction
 - Fundamental Principles Of The GNSS Legal Framework
 - Other Legal Issues



AIR SPACE AND AIR TRAFFIC MANAGEMENT IN INDIA

- Introduction and Historical Evolution
 - An Overview of Air Transport Management in India
 - Airport as Growth Engine
 - Airport as Revenue Generator
 - Identified Challenges
 - Compacting Strategies



SPACE AND AIR TRAFFIC MANAGEMENT IN INDIA

➤ Institutional and Organizational Framework to regulate Air Space and Air Traffic Management in India

- Directorate General Of Civil Aviation
- Stakeholders Involved In Air Space And Air Traffic Management In India
- Role Of Airports Authority Of India In Air Space And Air Traffic Management



SPACE AND AIR TRAFFIC MANAGEMENT IN INDIA

- Role of Air Traffic Controllers in India
 - Meaning Of Air Traffic Control
 - Roles And Responsibilities Of Air Traffic Controllers
 - Categories of Air Traffic Controllers



SPACE AND AIR TRAFFIC MANAGEMENT IN INDIA

- The Future of Air Space and Air Traffic Management in India
 - Introduction
 - Satellite-Based Navigation System Is The Flagship Project
 - Flexible Use Of India's Airspace Will Deliver Significant Efficiencies
 - A National High Level Airspace Policy Board
 - Air Traffic Controllers Employed By Region
 - Growth Challenges Call For A New Governance Structure For The ANSP



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Thank You