

# **AIR SPACE AND AIR TRAFFIC MANAGEMENT**

Group Captain P Aanand Naidu(Retd)

# 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 Current Concept, 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
    - 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
- General Transition Issues

# 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
- General Transition Issues

# 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 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



# 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