COMMUNICATION-NAVIGATION SURVEILLANCE SYSTEM

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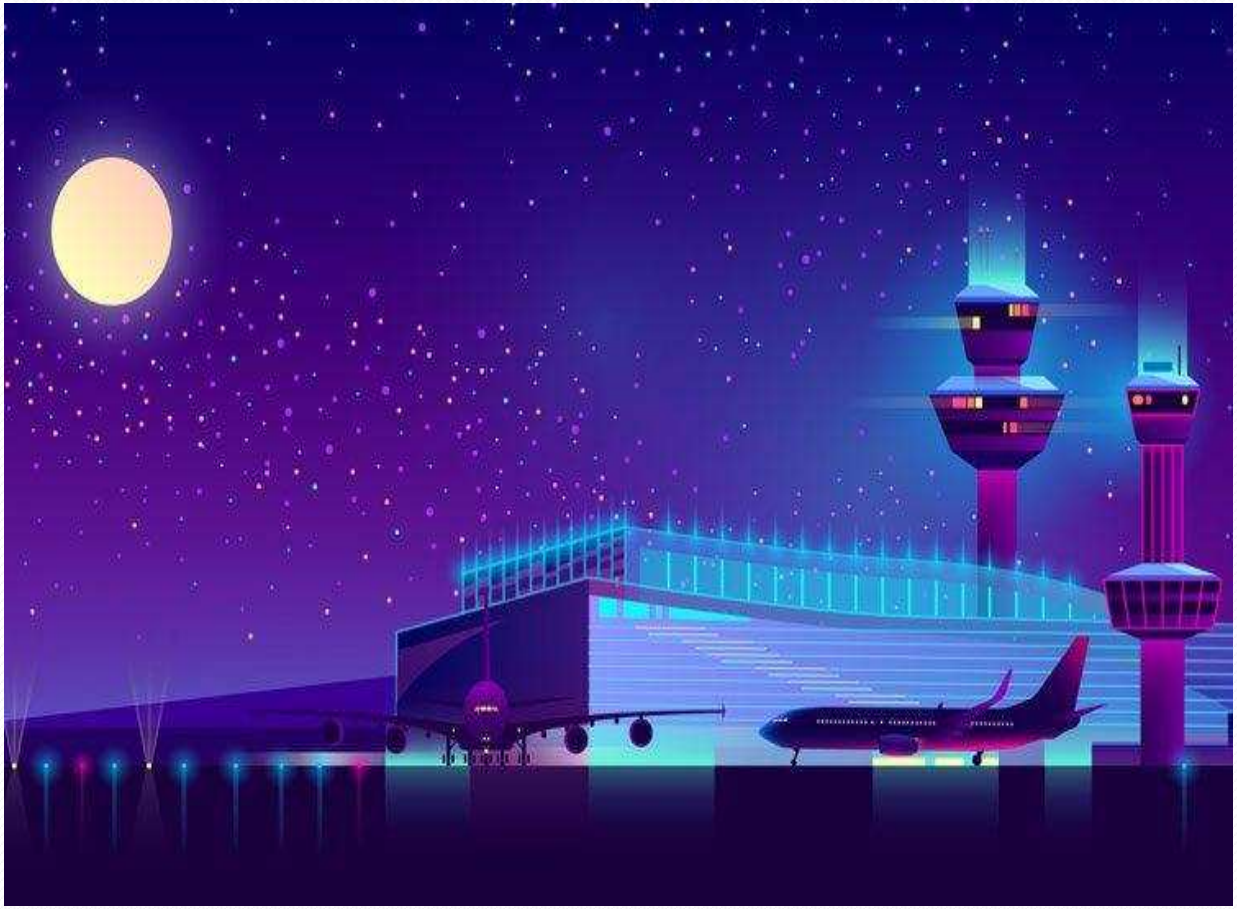
Communication Navigation Surveillance-Air Traffic Management-1

CNS/ATM System

- The Objectives of the CNS/ATM Systems?
- To enable aircraft operators to meet their planned times of departure and arrival and
- To foster implementation of a seamless, global air traffic management system
- adhere to their preferred flight profiles with minimum constraints and
- without compromising agreed levels of safety.



Why CNS/ATM?

- **An effective CNS/ATM is a globally coordinated system of air navigation services**
- **to cope with worldwide growth in air traffic demand while:**

  Improving upon the present levels of safety; regularity;
- **overall efficiency and capacity of airspace and airports**

Why CNS/ATM?

- **Improving operations allowing for capacity increase while minimizing fuel consumption and aircraft engine emissions;**
- **Increasing the availability of user-preferred flight schedules and profiles; and**
- **Minimizing differing equipment carriage requirements between regions.**

Growth of Air Transport

- **Air Transport is the fastest growing industry in the world**
- **ICAO determined that a thorough analysis and reassessment of the procedures and technologies that had so successfully served international civil aviation over many years was needed.**
- **In further recognizing that the systems and procedures, supporting civil aviation had reached their limits,**
- **In the early 1980s, ICAO established the Special Committee on Future Air Navigation Systems (FANS).**

FANS Committee

- The FANS Committee was tasked with
- Studying, identifying and assessing new technologies,
- Including the use of satellites, and making recommendations
- For the future development of air navigation for civil aviation over a period of the order of 25 years.

Out Come of FANS committee

- **The FANS Committee concluded that satellite technology offered a viable solution**
- **To overcome the shortcomings of conventional ground-based systems and**
- **To meet the future needs of the international civil aviation community.**

CNS/ATM

- **In September 1991, ICAO accepted the FANS concept, which became known as the Communications, Navigation, Surveillance Air Traffic Management (CNS/ATM) systems,**
- **It involves a complex and interrelated set of technologies, dependent largely on satellites. CNS/ATM is the vision developed by ICAO**
- **With the full cooperation of all sectors of the aviation community to accommodate the future needs of international air transport.**

Brief Outlook at CNS

- **Communication**
- **In CNS/ATM systems, the transmission of voice will, initially, continue to take place over existing very high frequency (VHF) channels;**
- **however, these same VHF channels will increasingly be used to transmit digital data.**
- **It aims to enhance coverage, accessibility, capability, integrity, security and performance of aeronautical communication systems in accordance with ATM requirements.**

Brief Outlook at CNS

- **Navigation:**
- **Improvements in navigation include the progressive introduction of area navigation (RNAV) capabilities along with the global navigation satellite system (GNSS).**
- **These systems provide for worldwide navigational coverage and are being used for worldwide en-route navigation and for non-precision approaches**

Brief outlook at CNS

- **Surveillance**
- **The major breakthrough, is implementation of Automatic Dependent Surveillance (ADS).**

  ADS allows aircraft to automatically transmit their position, and other data, such as heading, speed and other useful information contained in the flight management system (FMS),
- **via satellite or other communications links, to an air traffic control (ATC) unit where the position of the aircraft is displayed somewhat like that on a radar display.**

ATM Advantages

- Enhanced safety
- Increased system capacity; optimized use of airport capacity
- Reduced delays
- Reduced flight operating costs
- Reduced fuel consumption and emissions

ATM Advantages

- More efficient use of airspace; more flexibility; reduced separations
- More dynamic flight planning; better accommodation of optimum flight profiles
- Reduced controller workload/increased productivity

Benefits for the State

- States that provide and maintain extensive ground infrastructures,
- A reduction in the overall cost of operation and maintenance of facilities is expected as satellite technology is increasingly employed. They will also benefit from enhanced safety.
- CNS/ATM provides a timely opportunity for developing States to enhance their infrastructures to handle additional traffic with minimal investment.

Environmental Benefits

- As the aviation industry grows more and more rapidly, the impact of air traffic operations on the global atmosphere becomes increasingly important in addition to the local effects of noise and air quality
- it is expected that improvements in ATM could help reduce aviation fuel burn, and
- thereby reduce the levels of aircraft engine emissions.

Indirect Benefits

- There are also many indirect benefits, such as:
- Lower fares and rates;
- Passenger time savings;
- Transfer of high-technology skills;
- Productivity improvements and industry restructuring;
- Stimulation of related industries;
- Enhanced trade opportunities; and
- increased employment.

Organizational &Financial Issues

- **A major challenge in the implementation process of CNS/ATM systems relates to organizational and financial aspects.**
- **A characteristic of many CNS/ATM systems\ elements is the multinational dimension;**
- **Consequently, international cooperation will be required to a great extent throughout the implementation process and eventually in the future operational environment.**

Technical Cooperation

- **The Statement of ICAO Policy on CNS/ATM System Implementation and Operation includes, inter alia, a stipulation that ICAO shall play its central role in coordinating technical cooperation arrangements for CNS/ATM systems implementation.**
- **Assistance in the establishment of cooperative arrangements among States, under the auspices of ICAO, e.g. to address common equipment or training requirements, could also be provided.**

Regional Planning Process

- **The regional planning process is the principal engine of ICAO's planning and implementation work**
- **There is a global guidance and regional harmonization measures,**
- **converges with the approach constituted by States and aircraft operators and**
- **their proposals for implementation options.**

Regional Planning Process

- In its most basic form, the output from the regional planning process
- should be a listing of air navigation facilities and services, together with
- their achievable time frames, necessary for CNS/ATM systems implementation.

National Planning Process

- **ICAO has been addressing the planning strategy for CNS/ATM systems at the global and regional levels,**
- **leaving the responsibility for undertaking the task of structuring national plans to Contracting States.**
- **There is a need for integration and rationalization to ensure harmonization of national planning with planning at other levels.**

National Plan

- **A national plan is required to improve the overall efficiency and capacity of the State airspace infrastructure and**
- **to address the requirements arising out of the growth in both international and domestic air traffic.**
- **National planning, which is formulated by each State, should be in accordance with regional requirements and implementation guidelines.**

ANY Questions??

- **End of Part I**