

CNS / ATM

- Introduction to CNS / Atm:

- * **Back Ground.**
- * **Short Comings of Conventional Systems.**
- * **Current Navigation Capability.**
- * **A Brief Look at CNS / Atm.**
- * **Global Planning and Regional Planning Process.**
- * **ICAO Policies on CNS / Atm.**

- Cns System -- Communication:

- * **Introduction.**
- * **Telecommunications in ATC.**
- * **Essential tools for controller**
 - **Radar display**
 - **Radio**
 - **Telephone**
- * **AIR – Ground Communication:**
- * **ATC Communications**
- * **Operational Requirements**
- * **HF – Voice Communication**
- * **VHF – Voice Communication**
- * **UHF – Voice Communication**
- * **Satellite Voice Communication**
- * **Data Communication to Replace Voice Communication.**

*** Ground / Ground Voice Communications:**

*** Types of links (Radio, Telephone)**

*** Availability**

*** Signaling.**

*** Ground / Ground Data Communications**

*** Used for many purpose.**

*** Flight data transmission**

*** AFTN, OLDI.**

*** ATFM.**

*** AIS.**

*** Communication emerging Technologies:**

*** Data – Link needed by ATC.**

*** Data – Link needed by Airlines.**

*** ICAO initiative for Telecommunications**

*** The Connected mode.**

*** A cars Data – Link.**

*** AMSS**

*** VHF Digital link (VDL Mode 2)**

*** Mode – S (secondary surveillance Radar)**

*** Mode – S Data Link**

*** Other Air – Ground data Links.**

- Cns System – Navigation:

- * Aeronautical Navigation Overview.**
- * ICAO & Aeronautical Organization**
- * Navigation Overview**
- * Navigation Parameters**
- * Navigation Systems.**
- * Airspaces**
- * Phases of Fly.**
- * En – Route Requirements**
- * RNP.**
- * ICAO Requirements Approach & landing.**
- * Conventional Ground Based NAV. Systems.**
- * En – Route:**
 - * OMEGA.**
 - * LORAN - C.**
 - * VOR.**
 - * NDB.**
 - * DME.**
 - * ILS.**
 - * MLS.**
- * Technical Overview of Systems.**
- * GNSS:**
 - * The GNSS Concept.**
 - * Operational Requirements for Navigation**
 - * GPS – How it works?**
 - * Satellite Ranging**
 - * Measuring Distance from a satellite**

- * **Perfect timing**
- * **Effects of Atmosphere and Ionosphere.**
- * **Differential GPS.**
- * **GPS Benefits.**
- * **Status of GLONASS**
- * **SBAS**
- * **GBAS**
- * **New GNSS elements and future trends.**
- * **EGNOS architecture**
- * **EGNOS Planning**
- * **GALILEO – Services**
- * **GALILEO – Planning**
- * **G. R. A. S.**
- * **A/C multi – mode Receiver.**
- * **WAAS**
- * **LAAS**
- * **On Board Increments (RAIM, AAIM Function)**
- * **Users Receivers**
- * **RVSM.**

3- RNP Criteria:

- * **Defining RNP Air Space.**
- * **Applying RNP in an Air Space.**
- * **Relation of R N P to Separation Minima.**
- * **Rnp Types : (1 , 4 , 12 . 6 , 20) .**

*** Air Space Requirements.**

*** RNP Route:**

*** Fixed R N P Route.**

*** Contingency R N P Route.**

*** Random R N P Route.**

*** RNP Co - Ordinate System.**

*** Atc Procedures in R N P Air Space:**

*** Normal Procedures.**

*** Special Procedures.**

*** Procedures for Transit between Different Types of R N P Air Space.**

*** Rnp Concept for Approach, Landing and Departure Operations.**

*** RNP Operations:**

*** Atc for RNP Air Space.**

*** Atc For Parallel Offset.**

*** Flight Plan Requirement.**

*** Procedures in Event of Equipment Failure.**