Course Description

Performance-based Navigation I
- Introduction to PBN, GNSS Theory and Area Navigation (RNAV)


General description

Performance-based Navigation I is a 5 day course that provides an overview of the history and evolution of the PBN concept, GNSS theory, Area Navigation (RNAV), RNP and airspace planning and design.

How you will benefit

You will benefit by learning about:

- History and evolution of the ICAO Performance-based Navigation (PBN) Concept
- ICAO Global Plan for CNS/ATM Systems
- Types of Area Navigation (RNAV) systems
- Fundamentals of GNSS theory and GNSS separation standards and benefits
- Fundamentals of RNAV and RNP procedure design
- Instrument Approach Procedures
- Standard Instrument Departures and Arrivals (SIDs, STARs)

Designed for:

- Air Traffic Controllers, managers and supervisors
- Air Navigation Service Provider managers and supervisors
- ATC Procedures and Airspace designers
- Aircraft operators and airline managers and personnel
- Aircraft Operations and Flight Planning managers and personnel
- Civil aviation authorities and regulators

Course Content

History and evolution of ICAO Navigation Specifications leading up to the PBN Concept
- The need for a Global Plan for implementation and harmonization of CNS/ATM systems around the world
- The ICAO Global CNS/ATM Plan and timeline
- FANS, CNS/ATM, RNP, RNP/RNAV etc.
- Relevant ICAO Specifications, in particular for Enroute, Terminal Area and Approach
- Regional differences and harmonization
- PBN in relation to existing and future airspace structures
Types of Area Navigation (RNAV) systems

- RNAV systems and the following individual navigation system technologies: DME/DME, IRU, INS, GNSS, GPS, SBAS, GBAS, Galileo etc.

Fundamentals of GNSS theory and GNSS separation standards and benefits

- The evolution of GNSS constellations and their augmentations systems (ABAS)
- Space-based and ground-based GNSS augmentations (SBAS, GBAS)
- GPS receiver and Receiver Autonomous Integrity Monitor (RAIM)
- GNSS interference and relevant NOTAMs
- GNSS approvals
- GNSS (RNAV) approaches
- Lateral and longitudinal GNSS (RNAV) separation standards and benefits
- Other RNAV (GNSS) procedures
- Overview of how to validate RNAV and RNP procedures

Fundamentals of RNAV and RNP procedure design

- Enroute and Terminal Manoeuvring Area (TMA) RNAV procedures
- Enroute Area Navigation, route spacing and the TLS
- Terminal Manoeuvring Area (TMA) Area Navigation
- Planning TMA Area Navigation Design and Implementation
- Different types of RNP and RNAV, and the regional variants

Instrument Approach Procedures

- Conventional and Area Navigation (RNAV) procedures and their influence on airspace design
- Procedure protection areas and their effect on airspace structure

Controlling aircraft using Standard Instrument Departures and Arrivals (SIDs, STARs)

- Modular approach to TMA area navigation implementation

Area Navigation Review

- In-depth discussion on PBN and in particular RNAV and RNP to summarize all topics covered.

- Exam
- Course evaluation
- Graduation ceremony
- Closing