

# N-GNSS: GLOBAL NAVIGATION SATELLITE SYSTEM

## OBJECTIVES.

This course explains GNSS systems comprising GPS, GLONASS, GALILEO and Beidou evolutions giving a general overview of signal processing in receiver, receiver performances (low-cost receiver vs. high-end receiver).

It also develops the signal structures and analyses system errors and augmentation.

## WHO SHOULD ATTEND.

This course will be directed to:

- **Engineering, Technical and/or Maintenance** professionals of an Air Navigation Service provider (ANSP) that are involved in the design, installation and/or operation of GNSS systems and their evolution.
- **CNS/ATM sector companies staff** requiring knowledge of GNSS systems providing services in Air Navigation as well as their evolution defined in ICAO, Eurocontrol, EUROCAE, ETSI, EASA,... So, industry would be able to analyse the evolution of current GNSS systems having a more global view in order to be able to generate better Offers bidding to Call For Tenders launched by ANSPs.

## KEY BENEFITS OF ATTENDING.

You will:

- **Learn** current status of the art about GNSS.
- **Understand** the principles managing the evolution of GNSS systems.
- **Know** the technical and operational specifications of GNSS systems.
- **Practise** the implementation of operational procedures based on GNSS.
- **Win** experience and know-how to generate better Offers to ANSPs CFTs.

## HIGHLIGHTS

Technical and operational course based on a wide experience deploying GNSS systems and services in Air Navigation.

Practical explanations based on current operational implementations.

Practical exercises to settle down theoretical concepts.

Ideal course for students with little, middle or high background on GNSS systems due to the customization performed by the Trainer.

Recommendable course for designers, implementers, developers and professionals within the aeronautical CNS/ATM sector.

## COURSE PRE-REQUISITES.

Basic knowledge about CNS/ATM systems.

## TABLE OF CONTENTS.

- 1) Terrestrial Navigation.
- 2) Introduction to GNSS.
- 3) GNSS Signal Structure.
- 4) Signal Processing in Receiver.
- 5) Data Formats, Coordinate Systems
- 6) GNSS Errors - Importance of Base Stations
- 7) Current Systems status.
  - GPS
  - GLONASS
  - Monitoring the Constellations
- 8) From GPS to GNSS.
- 9) Satellite Based Augmentation Systems.
  - Satellite Based Augmentation Systems – Principles
  - Implementations: EGNOS.
  - Implementations: USA's WAAS.
  - Implementations: Japan's MSAS.
  - Implementation: India's GAGAN.
- 10) PBN and Approach Classifications.
- 11) Ground Based Augmentation Systems.
- 12) GALILEO.
- 13) Other applications of GNSS