

réf. **WORKGNSS EXT**

Code OACI 179

ENAC - SINA

GNSS : Principles, Augmentation and Evolutions of EGNOS (1/2)**FORMATION EN ANGLAIS****DURÉE**

10 jours

PLACES OFFERTES

32

DATES ET LIEUX

No session in 2016, recast in progress.

CONDITIONS DE PARTICIPATION**CONTACT ADMINISTRATIF ENAC**

formationcontinue@enac.fr

Bulletin d'inscription obligatoire : voir en fin de catalogue

Objectifs

Will Global Navigation Satellite Systems (GNSS) ever become the 'sole means' of navigation service ? Can the current satellite systems be improved and what are the enhancements required to make the system acceptable for civil aviation use ? What is the view of civil aviation authorities on satellite navigation and their involvements on the Add-Value concerning their Navigation service domain ? The objective of this seminar is to provide answers to these questions .

The tutorial will analyse the civil aviation needs and requirements regarding navigation , and how GNSS with its augmentations, can fulfil them. The training provides an in-depth presentation of GNSS, including the planned modernization of GPS and GLONASS and the development of Galileo and Beidou. Based on the analysis of the current GNSS performance , on the presentation of the operational use and on requirements of civil aviation, it will clarify why GNSS cannot support by itself most of civil aviation phases of flight without augmentations. The different kinds of augmentations (ABAS, SBAS, GBAS) will then be reviewed in great details. A specific emphasis will be put on the European SBAS initiative, EGNOS. Its planned coverage extension towards the south of Europe and the main part of Africa will be discussed emphasizing its feasibility and expected performance.

Participants concernés

The course is designed for staff working in any area of CNS/ATM , to whom an overview of current and future development of the NAV/Atm system might be beneficial. It is aimed at people with a perception of the current Navigation domain , and wanting to take part in an in-depth analysis concerning the understanding of the way GNSS and its extension possibilities can support Navigation Service in Civil Aviation.

After completing the course, participants will have a comprehension of the basic GNSS principles, its limitations and its recent evolutions. They will also understand the different types of augmentation system used by civil aviation (SBAS,GBAS .. etc...).

The course participants will have an understanding of the operational and technical aspects of NAV application from GNSS. Specifically, trainees will master the meaning and principles associated with area navigation (RNAV) and the PBN concept. Additionally , participants will be able to explain the difference between RNAV and RNP Specifications, and to list the different stages of the PBN implementation processes and state which navigation applications support the different phases of flight.

Globally this training target engineers, involved in the planning of national "NAV" infrastructures of the local ANSP . This course is designed for operational, technical and managerial ATM staff interested in the developments of the field Navigation, more especially with a view toward implementation in their own environment of GNSS procedure Design. The course is also oriented for technical audience with a perception of the current Communication, Navigation and Surveillance domains, and intending to take part in an in-depth analysis of the techniques and strategies in CNS/ATM concept .

Contenu**1. GNSS : Concept and strategy**

Reminder on Nav aids and basic strategy in Navigation Services

- Basic descriptions and performances of Conventional Nav aids
- Notion of requirements and strategy view of Eurocontrol for Navigation

GPS System Description

- Basic principles. Pseudorange measurements.
- GPS : space , control and user segments . GPS Architecture.
- Time and coordinates reference system.
- Position computation.

GPS Architecture and Technique

RESPONSABLE(S) DU STAGE

Christophe MACABIAU [Systèmes Informatiques]

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- Signal structure : modulation and frequencies. GPS Navigation Message.
 - Propagation channel : ionosphere and troposphere propagation properties, interferences , multipath
 - Performances : UERE, DOP , Accuracy , Availability , Integrity , Continuity.
- Differential techniques : DGPS
- Principles of correction of common bias systematic error : code differential and phase differential techniques.
- Others Satellites Constellation for Navigation
- GLONASS , GALILEO , Beidou , Modernized GPS .

RESPONSABLE(S) DU STAGEChristophe MACABIAU [*Systèmes Informatiques*]