

CN426 Future GNSS Signals and Systems with emphasis on Galileo II
September 20, 2010, 1:30 pm-5:00 pm, CEU: 3.0
GNSS Solutions® Tutorials prior to ION GNSS 2010, September 20-21, 2010
Oregon Convention Center, Portland, Oregon, USA

Instructor: Dr. Tony Pratt, Orbstar Consultants

Prerequisite: Some knowledge of mathematics and computer science will be useful and knowledge of GNSS signals and systems (i.e., CN425 GNSS Signal & Systems with emphasis on Galileo I).

Intended Audience: Engineers, scientists, and managers interested in the area of GNSS using GPS, Galileo, Glonass, and/or other satellite navigation system. Emphasis will be on performance of GNSS signals used in GNSS with particular emphasis Galileo and new GNSS signal formats. The course provides a solid foundation for navigation signal formats, characteristics, and performance. This course is a continuation of the topics covered in CN425 GNSS Signals and Systems with emphasis on Galileo I.

Notes Provided: Slides presented will be professionally spiral bound, with clear plastic cover, including color to add clarity where needed.

Reference List: A reference list will be provided as part of the note package for completeness and to allow the interested attendee to obtain additional information.

Course Overview: This course provides a solid foundation for the performance of GNSS signal formats and emphasizes the new signal and services for Galileo. Details on GNSS signal spreading codes and their performance in noise, multipath, and interference are provided. Additionally, the performances of the Galileo signals are characterized with respect to the GPS signal formats.

Course Content: The main topics to be covered by this course are:

Basics of Satellite Measurements

- Code and Carrier Tracking
 - New layers of complexity?
- Pseudo-range (and the various definitions) and tri-lateration
 - Simple location solutions
 - Measurement ambiguity – a problem solved using new signals?
- Measurement and solution accuracy
 - User range error
 - Cramer-Rao Lower bound
 - Signal and noise levels

Noise and Interference Levels for GNSS Signals:

- Interference definitions for GNSS spreading codes
 - Inter & Intra interference between Galileo & GPS
 - Spectral Separation Coefficients (SSC) with lists for SSC values

- Multipath consideration for Galileo & GPS signals
 - Historic and modern mitigation techniques
 - Gabor bandwidth

Course Outcomes: At the completion of this course, the attendee should have a solid understanding of the fundamentals of navigation signals, their characteristics, and performance used in GNSS. For further information on the performance of GNSS signal performance and signal processing, CN433/CN434 Receiver and Signal Processing for Future GNSS Signals I&II are recommended.