

**CN425 GNSS Signals and Systems with emphasis on Galileo
ION GNSS 2006, September 24, 2007, 8:30 am-12:00 pm, CEU: 3.0**

Instructor: Dr. Tony Pratt, Orbstar Consultants

Prerequisite: Some knowledge of mathematics and computer science will be useful.

Intended Audience: Engineers, scientists, and managers interested in the area of GNSS for GPS, Galileo, Glonass, and other satellite navigation systems. Emphasis will be on signals and systems used in GNSS and in particular Galileo. The course provides a solid foundation for navigation signal formats and their characteristics.

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 of GNSS Signal formats and emphasizes the new signal and services for Galileo. Details on GNSS signal formats, spreading codes, and their characteristics are provided.

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

GNSS System Overview:

- Necessary & Desirable GNSS signal characteristics
- GNSS Frequency Bands: Present, future, ITU regulations
- Galileo signals and relationship to GPS signals

Galileo Signals and Services:

- Galileo service:
 - Open Services (OS)
 - Commercial Services (CS)
 - Safety of Life (SOL)
 - Public Regulated Services (PRS)
 - Search and Rescue (SAR)

Galileo/GPS Signaling Waveforms:

- GNSS Spreading symbol waveforms (BPSK, Binary Offset Carrier (BOC), AltBOC, Linear Offset Carrier (LOC), DoubleBOC, Multiplexed BOC (MBOC), non-binary (i.e., tertiary)
- GNSS Spreading codes for Galileo and GPS in L1, L2, L5/E5, E6 bands
- Auto & Cross Correlation properties for GNSS Signals
- Power Spectral Densities (PSD) for GNSS Signals
- GNSS satellite signal multiplexing: orthogonal, interplex, and Coherent Adaptive Sub-carrier Modulations (CASM)

Course Outcomes: At the completion of this course, the attendee should have a solid understanding of the fundamentals of navigation signals and their characteristics used in GNSS.

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