

**CN433 GNSS Receiver Signal Processing II - Future**  
**September 16, 2008, 8:30 am-12:00 pm, CEU: 3.0, prior to ION GNSS 2008**  
**Marriott Savannah Riverfront, Savannah, GA**

**Instructor:** Dr. Olivier Julien, Ecole Nationale de l'Aviation Civile (ENAC)

**Prerequisite:** Some knowledge of mathematics and computer science will be useful. Additionally, knowledge of basic GNSS signal processing and receiver functions will help (i.e., CN430 GNSS Signal Processing I).

**Intended Audience:** Engineers, scientists, and managers interested in the area of GNSS using GPS, Galileo, GLONASS, and/or other satellite navigation systems. The course provides information on GNSS receiver signal processing and architectures (acquisition and tracking) focusing on future civil GNSS signals, as well as expected performances.

**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 an excellent overview of future GNSS signal processing and the many aspects that affect GNSS receiver design and performance. The course starts with a reminder of future GNSS signal structures, and then addresses the important features to consider for future GNSS signals acquisition and tracking.

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

Review of civil GNSS signals

- Transmitted civil GNSS signals on L1/E1 and L5/E5 bands:
  - GPS: L1 C/A, L1C (TMBOC) and L5
  - Galileo: E1 OS (CBOC) and E5 (AltBOC)
- The correlation operation
  - Correlator output model,
  - GPS and Galileo main correlation functions,
  - Correlation losses

Acquisition of future GNSS signals

- Review of typical acquisition performance criteria
- Joint data/pilot acquisition detectors,
- Performance of MBOC signals acquisition and extension to other signals,
- Introduction to secondary code acquisition strategies

Phase tracking of future GNSS signals

- Phase tracking based on the pilot channel,
- Phase tracking performance

Code tracking of future GNSS signals

- Use of the pilot channel and secondary code for code tracking,

- Investigation of basic BOC tracking schemes (architecture, performance in thermal noise, tracking ambiguity problem),
- Tracking of BOC-based signals: MBOC/AltBOC (architecture, performance in thermal noise, tracking ambiguity problem)

**Course Outcomes:** At the completion of this course, the attendee should have a solid understanding of the fundamentals of GNSS signal processing, including future GNSS signals, necessary within GNSS receivers of the future. For further information on GNSS receiver and signal processing, CN434 GNSS Receiver is Signal Processing III is recommended.