

**CN434 Future GNSS Signals Tracking II: Advanced Tracking and Architectures**  
**ION GNSS 2007, September 25, 2007, 1:30 pm-5:00 pm, CEU: 3.0**

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

**Prerequisite:** Some knowledge of mathematics and computer science will be useful. Additionally, knowledge of future GNSS signal processing and receiver functions will help. CN433 Future GNSS Signal Processing I or equivalent knowledge is recommended but not required.

**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 future GNSS signal processing, including advanced signal tracking and architectures within a GNSS receiver.

**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 performance. The course starts with requirements, addresses advanced GNSS receiver architectures for future signals, and concludes with receiver performance characterizations in the presence of thermal noise, but also multipath and interference.

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

Reminder on transmitted civil GNSS signal model and budget link:

- GPS L1 C/A, GPS L5, GALILEO E1 OS (BOC and MBOC), GALILEO E5 (E5a/E5b)

Propagation channel model:

- Detailed budget link for GPS L1, L5 and GALILEO E1, E5a/E5b
- Multipath model
- Detailed interference threats in L1 and E5 bands

Advanced Signal Tracking Architecture:

- Advanced receiver architecture for dedicated civil signals (BOC, MBOC, AltBOC, joint data/pilot channels, etc.)

Multipath effects:

- Review of traditional code and carrier multipath envelopes for GPS L1 C/A
- Advanced multipath mitigation techniques for code and carrier tracking on GPS L5 and GALILEO E5, GALILEO E1

Interference effects:

- Wide band interference effect on GPS L1, GALILEO E1
- C/W interference effect and mitigation on GPS L1, GALILEO E1
- Pulsed interference effect and mitigation on GPS L5, GALILEO E5a/E5b

**Course Outcomes:** At the completion of this course, the attendee should have a solid understanding of the fundamentals of GNSS signal processing, including advanced tracking and performance aspects of future GNSS signals. Further knowledge can be gain by taking CN434 Future GNSS Signal Processing II: Advanced Tracking and Architectures.