CN430 GNSS Signal Processing I
September 15, 2008, 6:45 pm-9:30 pm, CEU: 2.5, prior to ION GNSS 2008
Marriott Savannah Riverfront, Savannah, GA

Instructor: Dr. Christophe Macabiau, ENAC (Ecole Nationale de I'Aviation Civile)

Prerequisite: Some knowledge of mathematics, computer science and GNSS will be useful. The GNSS course sequences with emphasis on GPS (i.e, CN405 & CN406) or with emphasis on Galileo (CN425 & CN426) are recommended.

Intended Audience: Engineers, scientists, and managers interested in the area of satellite navigation using GPS, Galileo, Glonass, and/or other satellite navigation systems. The course provides the fundamentals of GNSS signal processing functions that are necessary 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 basic presentation of GNSS receiver design. The course starts with requirements on signal structure and propagation channel effects, then addresses the receiver signal processing techniques required for acquisition and tracking.

Course Content: The main topics to be covered by this course are:
Receiver Requirements for Design:

- Transmitted GPS L1 signal model
- Propagation channel model
    - Main receiver signal processing blocks: antenna, RF front-end, local oscillator, signal processing
    - Budget link for GPS L1
    - General multipath and interference model
    - General model for signal output by ADC
- Application constraints : market, cost, environment, standards Basic GPS L1 C/A Signal Processing Architecture:
- Correlator
    - Definition and general structure
    - Signal characteristics at correlator output: signal, noise, multipath, interference
- Basic Signal Acquisition for GPS L1 C/A in presence of noise:
    - Acquisition detectors
    - Acquisition strategy
    - Acquisition performance
- Basic Signal Tracking for GPS L1 C/A in presence of noise
    - Carrier tracking loops for GPS L1 C/A: PLL, FLL

- Code tracking loop for GPS L1 C/A

Course Outcomes: At the completion of this course, the attendee should have a solid understand the fundamentals of GNSS signal processing necessary within a GNSS receiver. For further information on GNSS receiver and signal processing, CN433 GNSS Receiver and Signal Processing II, and CN434 GNSS Receiver and Signal Processing III are recommended.