CN 480 Fundamentals of Kalman Filtering for GPS/INS Integration I
September 16, 2008, 8:30 am-12:00 pm, CEU: 3.0, prior to ION GNSS 2008
Marriott Savannah Riverfront, Savannah, GA

Instructor: Dr. Mohinder S. Grewal, Professor of Electrical and Computer Engineering, California State University, Fullerton, CA.

Prerequisites: Knowledge of mathematics, GPS and INS basics will be helpful. Knowledge gained through experience or courses CN405/406 Fundamentals of GNSS II & II, and CN460/461 Introduction to Strapdown INS I & II will be helpful.

Included Audience: This course is for engineers, scientists and managers. It will cover the basics of Kalman filtering for GPS/INS integration.

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 emphasizes the fundamentals of Kalman filtering needed for application to GPS/INS integration. Main topics include:

Course Content: The main topics to be covered in the course are

- What is Navigation
- Discrete Kalman Filter
- Continuous Kalman Filter
- Relationship Between Discrete and Continuous Process Noise
- Example (One State)
- Example (6 States)
- Measurements as Scalars
- Problems and Solutions
- Nonlinear Kalman Filters
- Examples
- Sigma Point (Unscented) Kalman Filter
- Square Root Filtering
- Examples with UDUT
- Prefiltering

Course Outcomes: At the completion of the course, attendees should understand the fundamentals of Kalman filtering and GPS/INS integration. For additional knowledge on the integration of strapdown inertial navigation systems and GPS, CN482 Fundamentals of Kalman Filtering for GPS/INS Integration II is recommended.