

**CN461 Introduction to Strapdown Inertial Navigation Systems II**  
**September 21, 2009, 1:30 pm-5:00 pm, CEU: 3.0**  
**GNSS Solutions® Tutorials prior to ION GNSS 2009, September 21-22, 2009**  
**Marriott Savannah Riverfront, Savannah, GA**

**Instructor:** Dr. Kevin E. Dutton, Honeywell International

**Prerequisite:** Some knowledge of mathematics and physics will be useful.

**Intended Audience:** Engineers, scientists, and managers interested in the area of strapdown inertial navigation systems (INS). This course is a follow-on to CN460 Introduction to Strapdown INS I, and concentrates on inertial sensors.

**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 strapdown inertial navigation sensors – the types of sensors and their errors and their behavior. The course also discusses sensor and system specifications

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

- Strapdown inertial navigation error equations and performance
- Alignment techniques
  - gyro-compass alignment
  - in-flight alignment
  - at-sea alignment
  - transfer alignment
- Inertial sensors
  - gyroscopes
  - accelerometers
- Sensor errors and error models
  - Gauss-Markov random process
  - bias
  - scale factor
  - misalignment
  - non-orthogonality
  - size effects
- Sensor calibration techniques
- Sensor specifications
- Inertial navigation system performance and specifications

**Course Outcomes:** At the completion of the course, the student should understand the mathematics behind strapdown inertial navigation systems, how to initialize the free inertial navigation solution, how to read sensor and system specification sheets, and how to select a sensor system for the necessary application. For additional knowledge on applications of strapdown inertial navigation systems, CN462 Applications of Strapdown Inertial Navigation Systems is recommended.