

CN409 Precise Timekeeping and GNSS
September 15, 2008, 6:45 pm-9:30 pm, CEU: 3.0, prior to ION GNSS 2008
Marriott Savannah Riverfront, Savannah, GA

Instructor: Dr. Demetrios Matsakis, U.S. Naval Observatory

Prerequisite: Some knowledge of mathematics and electrical engineering or physics will be useful.

Intended Audience: Engineers, scientists, and managers interested in the area of precise timekeeping and its implementation radionavigation systems.. The course is more advanced than a simple user's course, but not too detailed for the beginner to time keeping.

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 modern timekeeping art, with emphasis on radionavigation. The fundamentals of timekeeping including GPS, UTC, and time transfer will be presented. Timekeeping using radionavigation systems, including chip scale atomic clocks for user equipment will be discussed.

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

- Basics of Timekeeping
 - Fundamentals
 - Statistics
 - Timescale creation
 - Generation of Coordinated Universal Time (UTC)
 - Clock Steering
 - Generation of GPS Time
 - Time Transfer
- Radionavigation
 - GPS as a user and provider of precise time
 - Galileo and interoperability
 - Glonass
 - eLoran
- Parade of Clocks
 - From Stonehenge to Optical combs
 - Predictions for future

Course Outcomes: At the completion of this course, the attendee should have the ability to understand the fundamentals and capabilities of precise timekeeping and its implementation with radionavigation systems including GNSS and eLoran.