

CN445 Special Topics for GNSS Antennas
ION GNSS 2007, September 25, 2007, 1:30 pm-5:00 pm, CEU: 3.0

Instructor: Dr. Rama Rao, Mitre Corporation

Prerequisite: Knowledge of mathematics, antennas, electromagnetics and GNSS will be useful. Additionally, knowledge from a GNSS antennas course (i.e., CN441 Fundamentals of Antenna for GNSS) will be useful. (Knowledge of vector calculus and Maxwell's Equations is not required.)

Intended Audience: Engineers, scientists, and managers interested in the design, development, implementation, and/or use of GNSS antennas in GPS, Galileo, Glonass and/or other satellite navigation systems. The course provides some special and advanced topics for GNSS antennas in particular GNSS applications. The course is considered a follow-on to CN441 Fundamentals of Antennas for GNSS.

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 present information on special and advanced topics related to GNSS for particular applications, which is important to many users. Antenna measurement effects and specialized antennas to maximize GNSS performance will be presented.

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

Antenna Effects on GNSS Observables:

- Phase Center vs look-angle, phase wrap-up, and measurement techniques
- Group delay and bandwidth effects

Ground Plane Effects

- Mitigating Methods (rolled edge, photonic band, resistivity tapered)
- Aircraft Fuselage Effects Investigations Using Scale Models;

Active GPS Antennas:

- G/T Ratio and measurement

Interference Issues for GPS Antennas

- Impact of Radiation from Interference Sources in the ARNS band

Special GNSS Antennas:

- Turnstile Antenna (Counselman),
- Spiral Antennas (NovAtel)
- Inverted and planar inverted F Antennas
- Multi-band GNSS Antennas
- Multi –System Antennas (combine GPS, PCS, Bluetooth, Wireless, etc)
- Very Compact Ceramic Antenna for Hand-sets, Automobiles, etc.

Adaptive Antenna Arrays:

- Multiple Element Antenna Arrays for Reducing Interference and Jamming,

- Brief introduction to Space Time Adaptive Processing and Space Frequency Adaptive Processing

Course Outcomes: At the completion of this course, the attendee should have a better understand of special and advanced considerations for GNSS antennas in particular applications to enable enhanced performance.