

Agenda

Presented by Dr. Thomas H. Meyer

Development of Global Navigation Satellite System (GNSS) Surveying

What motivated the development of GNSS?
What were the early efforts and what came of them?
Terms and nomenclature
System architecture
Today's GNSSs: GPS, Galileo, GLONASS, Compass, regional systems
Example applications

GNSS Positioning

Orbits
Ranging with timing code and carrier phase

Timing Codes and Carrier Phase Details

Bands
What is a timing code?
C/A code, P code
Timing codes, time determination
Pseudoranges
Navigation message
The carrier phase observable and the integer ambiguity problem

Geodesy and GNSS

Reference systems, reference frames, datums
VLBI, SLR, GPS
Tectonics, time-dependent positioning

Error Budget and Differencing

System errors
Geometric errors
Environmental errors
Dilutions of precision, ephemeris quality
Error mitigation
DGPS
Phase differencing

Observation Protocols

Redundancy
Tying to control

Introduction to GNSS Surveying
Springfield, MA - Friday, January 17, 2020

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Learning Objectives

You'll be able to:

Understand today's global navigation satellite systems (GNSS) for surveying, including GPS, Gallileo, GLONASS, Compass and regional systems.

Learn the basics of GNSS positioning.

Explore timing codes and carrier phase details.

Review the relationship between geodesy and GNSS

Handle system errors, geometric errors and environmental errors.

Discuss observation protocols for GNSS surveying.



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Introduction to GNSS Surveying

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Review the development of Global Navigation Satellite System (GNSS) surveying

Learn about GNSS positioning and orbits

Explore timing codes and carrier phase details

Examine the relationship between geodesy and GNSS

Discuss error budgets and differencing

Continuing Education Credits


**Professional Engineers
& Land Surveyors**

6.5 Continuing Education Hours



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Faculty



Dr. Thomas H. Meyer *University of Connecticut*

Dr. Meyer is a professor in the Department of Natural Resources and the Environment at UConn’s College of Agriculture, Health and Natural Resources (CAHNR). He is a member of the American Society of Civil Engineers and the American Society for Photogrammetry and Remote Sensing, and he is a fellow and current president (2019) and past president (2016) of the American Association for Geodetic Surveying. Dr. Meyer is a past president (2006-2007) of the Geomatics Society of New England (previously known as the New England Section ACSM) and a member of the editorial boards of the *Journal of Surveying Engineering* and *Surveying and Land Information Science*. Dr. Meyer earned his Ph.D. degree from Texas A&M University (College Station, 1998) where he was a research associate in the Mapping Sciences Laboratory. He was named a UConn Teaching Fellow (2015), and he has taught geomatics courses at the graduate and undergraduate levels in geodesy, geographic information science, digital terrain modeling, spatial statistics and global navigation satellite system surveying. Dr. Meyer has authored an undergraduate-level geodesy textbook and numerous peer-reviewed papers about surveying and mapping and he teaches professional education seminars for surveyors throughout New England and the United States.

Here’s what past attendees had to say about the program and presenter Dr. Thomas H. Meyer:

“All topics incredibly, equally useful.” – *Land Surveyor*

“Excellent material, especially for practical application of the science.” – *Civil Engineer*

“Superb seminar! Highly knowledgeable, humorous and very interesting!” – *Land Surveyor*

Seminar Information

Sheraton Springfield Monarch Place Hotel	Registration	Lunch (On your own)
One Monarch Place	8:00 - 8:30 am	12:00 - 1:00 pm
Springfield, MA 01144	Morning Session	Afternoon Session
(413) 781-1010	8:30 - 12:00 pm	1:00 - 4:30 pm

Tuition

\$289 for individual registration

\$269 for three or more registrations.

Included with your registration: *Complimentary continental breakfast and printed seminar manual.*

Receive a reduced tuition rate of \$101 by registering to be our on-site coordinator for the day. For availability and job description, please visit www.halfmoonseminars.org.

How to Register

- Visit us online at www.halfmoonseminars.org
- Mail-in or fax the attached form to 715-835-6066
- Call customer service at 715-835-5900

Cancellations: Cancel at least 48 hours before the start of the seminar, and receive a full tuition refund, minus a \$39 service charge for each registrant. Cancellations within 48 hours will receive a credit toward another seminar or the self-study package. You may also send another person to take your place.

Additional Learning

Webinar Series

National Electrical Code:

Onsite Power Generation and Distribution

- **Part I**
Wed., Dec. 4, 2019, 11:00 AM - 2:15 PM CST
- **Part II**
Thurs., Dec. 5, 2019, 11:00 AM - 2:15 PM CST

Floodplain Mapping and Regulation

- **Floods, Floodplains and Introduction to Floodplain Management**
Wed., Dec. 4, 2019, 11:00 AM - 12:30 PM CST
- **Flood Maps and Flood Zones**
Wed., Dec. 4, 2019, 1:00 - 2:30 PM CST
- **Elevations in the National Flood Insurance Program (NFIP) and Floodplain Regulation**
Thurs., Dec. 5, 2019, 11:00 AM - 12:30 PM CST
- **Practical Floodplain Management**
Thurs., Dec. 5, 2019, 1:00 - 2:30 PM CST

For more information and other online learning opportunities visit: www.halfmoonseminars.org/webinars/

Retaining Walls and Slope Stabilization

- **Retaining Wall Basics**
Tues., Dec. 10, 2019, 11:00 AM - 12:00 PM CST
- **Geosynthetics and Retaining Walls**
Tues., Dec. 10, 2019, 12:30 - 3:00 PM CST
- **Slope Stability and Geosynthetics**
Wed., Dec. 11, 2019, 11:00 AM - 12:30 PM CST
- **Slope and Retaining Wall Failures, Fixes and Prevention**
Wed., Dec. 11, 2019 , 1:00 - 3:00 PM CST

International Green Construction Code

- **Introduction to the International Green Construction Code (IgCC)**
Wed., Dec. 11, 2019, 11:00 AM - 12:30 PM CST
- **IgCC Chapters 4-5: Site Development and Material Use**
Wed., Dec. 11, 2019, 1:00 - 2:30 PM CST
- **IgCC Chapters 6-9: Energy, Water, Environmental Quality and Building Commissioning**
Thurs., Dec. 12, 2019, 11:00 AM - 12:30 PM CST
- **IgCC Chapters 10-11: Existing Buildings**
Thurs., Dec. 12, 2019, 1:00 - 2:30 PM CST

Continuing Education Credit Information

This seminar is open to the public and offers a 6.5 continuing education opportunity to Massachusetts professional engineers and land surveyors. Continuing education is not presently mandatory for license maintenance in Massachusetts.

Professional engineers and land surveyors seeking continuing education credit in other states will be able to claim the hours earned at this seminar, in most cases. Refer to specific state rules to determine eligibility.

HalfMoon Education is an approved continuing education sponsor for engineers in Florida, Indiana (License No. CE21700059), Maryland, New Jersey (Approval No. 24GP00000700), North Carolina, and North Dakota. HalfMoon Education is deemed an approved continuing education sponsor for New York engineers and land surveyors.

HalfMoon Education is an approved continuing education sponsor for professional land surveyors licensed in Indiana, Maryland, North Carolina, and North Dakota.

Attendance will be monitored and attendance certificates will be available after the seminar for most individuals who complete the entire event. Attendance certificates not available at the seminar will be mailed to participants within fifteen business days.

Can’t Attend? Order the Manual and Audio from the Live Seminar as a Self-Study Package!

Audio recordings of this seminar are available for purchase starting at \$269. See registration panel for more information and please refer to specific state licensing rules or certification requirements to determine if this learning method is eligible for continuing education credit.

Registration

Introduction to GNSS Surveying

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How to Register

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Complete the entire form. Attach duplicates if necessary.

Registrant Information

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City: _____ State: _____ Zip: _____

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Additional Registrants:

Name: _____

Occupation: _____

Email: _____

Phone: _____

Name: _____

Occupation: _____

Email: _____

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Email address is required for credit card receipt, program changes, and notification of upcoming seminars and products. Your email will not be sold or transferred.

()  I need special accommodations. Please contact me.

Tuition

() **I will be attending the live seminar.** Single Registrant - **\$289.00**. Three or more registrants from the same company registering at the same time - **\$269.00** each.

() **I am not attending.** Please send me the self-study package:

☐ Downloadable MP3 Audio/PDF Manual for **\$269.00**.

☐ CD/Manual Package for **\$289.00**. ☐ USB/Manual Package **\$289.00**.
(Please allow four weeks from seminar date for delivery)

Checks: Make payable to HalfMoon Education Inc.

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