

# Agenda

*Presented by David R. Doyle*

## Fundamentals of Geodetic Datums

### Horizontal datums

- Geodetic surfaces – ellipsoid and geoid
- Positioning elements of the National Spatial Reference System (NSRS)
- Classical horizontal positioning – triangulation and traverse
- U.S. national horizontal datums – NAD 27 and NAD 83

### Development of satellite positioning systems

- Foundation of space-based positioning up to GPS/GNSS
- GPS impact on integrity of NAD 83
- Relationship of NAD 83 and WGS 84
- Horizontal datum transformations – NADCON, Molodensky

### Vertical datums

- Vertical datums definitions – geodetic and tidal
- U.S. national vertical datums – NGVD 29 and NAVD 88
- Issues with GPS/GNSS-derived heights
- Vertical datum transformations - VERTCON

## New Geodetic Datums for the United States 2022

### Rational for replacing current geodetic datums

- Problems with NAD 83 and NAVD 88
- Introduction to International Terrestrial Reference Frame
- Adoption of ITRF14 into NSRS

### National geodetic survey plans for new national datums

- New geometric/geopotential datum definitions
- Gravity for the Redefinition of the American Vertical Datum (GRAV-D)
- Computing approximate horizontal and vertical positional differences
- Importance of positional metadata

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## Geodetic Datums: Fundamentals and New Developments

Fairfax, VA - Thursday, January 30, 2020



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## Learning Objectives

### You'll be able to:

**Examine** the foundational attributes that define horizontal and vertical geodetic datums.

**Realize** the accessibility of datums through passive and active control stations.

**Review** the positional reliability of geoid models and datum transformations.

**Study** the rational for the decision by the National Geodetic Survey to replace existing Horizontal and Vertical Datums.

**Understand** the approximate 3-dimensional positional changes to existing datums.



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### Continuing Education Credits

**Professional Engineers**  
7.0 PDHs

**Geologists**  
Non-Credit Continuing Ed.



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# Faculty

**David R. Doyle** *Base 9 Geodetic Consulting Services, in Silver Spring, MD*

Mr. Doyle has been involved in geodetic surveying since 1967. He joined the National Geodetic Survey in 1972 and functioned in numerous positions dealing with national adjustments, datum transformation and outreach to the surveying and geospatial community. Mr. Doyle held the position of chief geodetic surveyor for 12 years prior to his retirement in 2013. He now owns Base 9 Geodetic Services which provides consultation to public and private agencies and companies as well as teaching seminars on the fundamentals of geodesy and the National Spatial Reference System. Mr. Doyle is a past president of the American Association for Geodetic Surveying, and he is an active member of the DC, Maryland and Virginia professional surveyors’ associations. He has published more than 30 technical articles on geodesy and was honored as the recipient of the AAGS 2018 Joseph Dracup Lifetime Achievement award in addition to numerous other service awards from state and national surveying associations.

# Seminar Information

|                                                                                                  |                                                                             |                                                                                   |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Hilton Garden Inn Fairfax</b><br>3950 Fair Ridge Drive<br>Fairfax, VA 22033<br>(703) 385-7774 | Registration<br>8:00 - 8:30 am<br><br>Morning Session<br>8:30 am - 12:30 pm | Lunch (On your own)<br>12:30 - 1:30 pm<br><br>Afternoon Session<br>1:30 - 5:00 pm |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|

**Tuition**  
**\$289** for individual registration  
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**Included with your registration:**  
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**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

**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

**Seismic Design of Buildings**

- **Part I**  
Wed., Dec. 18, 2019, 11:00 AM - 3:30 PM CST
- **Part II**  
Thurs., Dec. 19, 2019, 11:00 AM - 3:30 PM CST

For more information and other online learning opportunities visit:  
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This course offers a non-credit continuing education opportunity to Virginia geologists. It may qualify for continuing education credit in other states. Refer to specific state rules to determine eligibility.

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.

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# Registration

## Geodetic Datums: Fundamentals and New Developments

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

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