

Agenda

Presented by Alan R. Dragoo

Development of State Plane Coordinate System

Who developed the State Plane Coordinate System
Why was the State Plane Coordinate System developed
How were the State Plane Coordinate Systems for the states designed

Development of Individual State Systems

Background for understanding projections
Understanding the Lambert Conformal Projection
Understanding the Transverse Mercator Projection
Analysis of State Plane Coordinate System distortions for various states

Use of Projections in State Systems

Using the reference ellipsoid to develop projections
Using the Lambert Conformal Projection

- Maryland
- Pennsylvania
- Corrections for Lambert Projections
 - Scale factor for distances
 - Elevation factor for distances
 - Understanding the effect of the geoid separation
 - Combined factor for distances
 - t-T Correction (arc to chord correction) for angles

Using the Transverse Mercator Projection

- Delaware
- Corrections for Transverse Mercator Projections
 - Scale factor for distances
 - Elevation factor for distances
 - Understanding the geoid
 - Understanding the effect of the geoid separation
 - Combined factor for distances
 - t-T Correction (arc to chord correction) for angles

State Plane Coordinates implications related to boundary surveying
Discussion of grid or ground data shown of plats and plans

Using the State Plane Coordinate System in the Field

Discussion of grid or ground distances in the field

Low Distortion Projections

What is good about them	What is bad about them
How they are designed	How you use them

Control Surveys

The techniques that can be used and the accuracies, advantages and disadvantages you can expect for the following:

GPS Static	OPUS Static
OPUS Rapid Static	Network RTK
Conventional Traverse	Conventional Leveling

How errors do and don't propagate in your survey measurements
How to properly use the previous techniques to minimize your errors
Learn how to get elevations that are twice as accurate from trig leveling
Standards and specifications
How atmospheric conditions can affect traverse and level data with refraction and what actions can be taken to correct this

Working with the State Plane Coordinate System
Richmond, VA - Tuesday, April 30, 2019



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Learning Objectives

You'll be able to:

Understand why and how the State Plane Coordinate System was developed.

Discuss the development of individual state systems.

Get tips on using Lambert Conformal Projections and Transverse Mercator Projections.

Discuss the use of grid or ground distances in the field.

Evaluate the good and bad of low distortion projections, how they are designed, and how you use them.

Learn about control surveys.



Working with the State Plane Coordinate System

Richmond, VA - Tuesday, April 30, 2019



Learn why the State Plane Coordinate System was developed and how it was designed

Understand individual state systems

Receive practical guidance on correcting projections in state systems

Discuss the use of the State Plane Coordinate System in the field

Receive tips on the use of low distortion projections

Learn about control surveys

Continuing Education Credits

Engineers & Land Surveyors

7.0 CE Hours/PDHs

Floodplain Managers

7.0 ASFPM CECs



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Alan R. Dragoo is a licensed surveyor in the State of Maryland who was employed for 27 years by the Washington Suburban Sanitary Commission (WSSC) in Laurel, Maryland. He was a geodetic project manager in charge of high-precision horizontal and vertical geodetic surveying projects using the global positioning system and classical methods in support of the WSSC Control Network, the Interagency GIS System and the deformation studies for three dams. Mr. Dragoo also worked for Trimble Navigation for eight years as a technical support representative in support of sales for the Northeast U.S. He also worked for Keystone Precision Instruments for eight years as the sales manager for land survey products for Delaware, Maryland and Virginia. He is currently employed by Maser Consulting at their Sterling, Virginia, office as their assistant Survey Department manager.

Mr. Dragoo worked with the National Geodetic Survey to survey the top of the Washington Monument. He was co-director for the completed survey on the top of the U.S. Capitol to determine its position and in the basement of the U.S. Capitol to locate the cornerstone set in 1792. He is a member and fellow of the National Society of Professional Surveyors; past president for the American Association for Geodetic Surveying (AAGS); past editor for the *Geodetic Surveyor*, a newsletter for AAGS; and National Society of Professional Surveyors director for the Maryland Society of Surveyors. Mr. Dragoo was MSS Surveyor of The Year for 1996 and Russell E. Lowman award recipient and Life Time Achievement award recipient in 2015. He was also director for the

spring 1996 ASPRS/ACSM Baltimore Convention and director for the spring 1998 ACSM Baltimore Convention.

Mr. Dragoo has authored and co-authored articles and papers for *Professional Surveyor* magazine; for *Surveying and Land Information System*, a journal for the American Congress on Surveying and Mapping; and for society newsletters in the United States and Canada. He has also presented numerous technical sessions and workshops on matters related to geodetic surveying, State Plane Coordinates, least squares, compatibility of GPS with conventional measurements, Trimble Business Center software, and the sources of errors in conventional surveying.

Here’s what past attendees had to say about the program and presenter Alan Dragoo:

- “Great program !!” – *Surveyor*
- “He’s an excellent speaker. He thoroughly knows subject area.” – *Professional Engineer*
- “Mr. Dragoo provided a unique perspective on the subject (e.g. theory and real world).” – *Land Surveyor*

Seminar Information

Hyatt Place Richmond/Arboretum
201 Arboretum Place
Richmond, VA 23236
(804) 560-1566

Tuition
\$289 for individual registration
\$269 for three or more registrations.
Each registration includes a 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.

Continuing Education Credit Information

This seminar is open to the public. It offers 7.0 hours of continuing education/PDHs to professional engineers in all states and 7.0 hours of continuing education/PDHs to professional land surveyors in most states, including Virginia. Educators and courses are not subject to preapproval in Virginia.

HalfMoon Education is an approved continuing education sponsor for professional land surveyors and engineers in Indiana (License No. CE21700059), Maryland, New York (NYSED Sponsor No. 35), North Carolina, and North Dakota. HalfMoon Education is also an approved education provider for Florida and New Jersey engineers (Approval No. 24GP00000700). This course is not approved for New Jersey land surveyors.

The Association of State Floodplain Managers has approved this course for 7.0 CECs.

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.

Additional Learning

Webinar Series

- Foundation Damage and Repair**
- **Structure Loads, Soil Mechanics, Bearing Capacity and Geo-Environmental Hazards**
Thurs., March 28, 2019, 11:00 AM -12:30 PM CDT
 - **Foundation-Wall Design and Construction**
Thurs., March 28, 2019, 1:00 -2:30 PM CDT
 - **Assessment of Foundation-Slab Damage & Repair Alternative**
Fri., March 29, 2019, 11:00 AM -12:30 PM CDT
 - **Assessment of Foundation-Retaining Wall Damage & Repair Alternatives**
Fri., March 29, 2019, 1:00 -2:30 PM CDT

For more information visit:
www.halfmoonseminars.org/webinars/

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

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Complete the entire form. Attach duplicates if necessary.		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.
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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.

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