

Monday, January 14 – Sessions (8:30 a.m. – 12:00 p.m.)

301 Mentoring our Future Surveyors

Amy Hopkins, PLS

With the average age of surveyors getting higher each year, we need to attract and retain young survey talent. Once we hire them, how do we hold onto them? Is your management staff scaring them off? Are we overlooking potential talent within our own firms? Is the generation gap too wide to bridge? Does your company offer a friendly work atmosphere for everyone? Maybe your management style needs to change.

This session is geared toward managers and party chiefs who interact directly with the future of our profession. Upper level managers will take away a new perspective on the development and mentoring of their employees at all levels of experience and licensure.

401 Modernization of the National Spatial Reference System

Dave Doyle

During the next several years' enhancements and additions to the network of Global Navigation Satellite Systems (GNSS) including: The U.S. NAVSTAR Global Positioning System, Russian GLONASS, European Union GALILEO and China's BeiDou will significantly improve the use of space-based positioning systems for surveying, mapping, charting, navigation and innumerable other applications. In order to meet the anticipated demands for an improved geospatial framework that these developments will require, the National Geodetic Survey (NGS) is implementing a plan for the modernization of the National Spatial Reference System (NSRS). Among the various topics outlined in this plan is the adoption of an entirely new geodetic reference frame with updated geometric (horizontal) and gravimetric (vertical) realizations that will replace the North American Datum of 1983 (NAD 83), the North American Vertical Datum of 1988 (NAVD 88) and the several island vertical datums. The new framework will be designed such that the geometric component (latitude, longitude, ellipsoid height) will be virtually identical to and aligned with the International Terrestrial Reference Frame (ITRF), while orthometric heights will be based exclusively on a nation-wide high accuracy (1-2 cm) gravimetric geoid model. This presentation highlights the rationale for these changes; the various elements that currently define the NSRS and the activities the NGS is engaged in to improve the capacity of and access to the NSRS.

501 ALTA/NSPS Standards

Gary Kent, PS

The Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys have been revised and the newest version became effective on February 23, 2016. The 2016 standards are the first revision to the 2011 standards which were the first completely rewritten, restructured and reorganized version of the standards since their origin in 1962.

This program will highlight the many changes in the 2016 Standards with a special emphasis on the most significant additions and modifications. The process of revision will also be explained.

In addition, the seminar will address uncertainties in boundary surveys, certification issues, dealing with lenders, the optional items of Table A and the Relative Positional Precision measurement standard.

Since the standards are a joint document of the American Land Title Association and the National Society of Professional Surveyors, the program also will provide for a clear understanding of the relationship between title insurance and Land Title Surveys, and how that dynamic relates to the ALTA/NSPS Standards.

601 The Boundary Commission

Michael F. Brinkash, PLS

John Smoker, PLS

David Widmer, PLS

The Boundary Commission: 1. Why? 2. Who appoints? 3. Composition of a Boundary Commission? 4. Duty of Boundary Commissioners? 5. Sources of Instructions? 6. Necessity of Public Hearings? 6. Professional Standards of Practice.

Source Records & Authority of Records: 1. Legislative Acts, 1a. Statute Reference Books, 2. Original Surveys, 2a. PA Archives, County Boundary Survey Maps, Township Connected Warrant Maps, Individual Warrant Surveys 3. County Courthouse, 3b. Deeds, 4. Maps, 4a. GIS, LIS, General Use Maps.

Boundary Retracement Considerations: 1. Slope Distances 1a. Survey Laws at the time of Survey, 1b. Modeling the terrain, 2. Angle Accuracies, 2a. Compass vs. Total Stations vs. GPS, 3. Geodetic Survey Considerations vs. Conventional Survey Methods, 4. Basis of Datum and Reasons Why?

Correlating Information, Record and Field: 1. Are the Survey Rules of Constructions applicable?

Requirements of Final Map and Report: 1. Authority for Source of Required Information. 1a. Specific items to be shown on plan.

Case Review: Retracement of the common boundary lines between the Counties of Lawrence and Butler.

701 FEMA Elevation Certification

Thomas F. Smith, PE, PLS

The goal of this seminar is to instruct the attendees to complete the FEMA Elevation Certificate. The instructions will include how to find the latest FEMA forms and the tools needed to complete the Certificate for Detailed study streams (AE Zones) and for approximate Flood Zone (A) streams. The presentation will discuss the field data needed to complete the forms, including the use of Google Earth and datum conversion using VERTCON software. A detailed example of an Elevation Certificate survey will be discussed.

Monday, January 14 – Sessions (8:30 – 10:00 a.m.)

101 Future of Pennsylvania State Plane Coordinates

Brian Naberezny, PLS, GISP

The anticipated modernization of the National Spatial Reference System in 2022, necessitates changes to the Pennsylvania Coordinate System Law. This opportunity allows us to examine our needs for state plane coordinates in Pennsylvania and develop a system to satisfy those needs. Feedback received over the past year will be discussed and some preliminary technical proposals will be discussed. This will be an opportunity to lend your voice to the conversation regarding shaping the future of state plane coordinates in Pennsylvania.

201 PA One Call

Jim Larkin

Designers, Project owners, Excavators, and Facility Owners all have specific responsibilities under the PA Underground Utility Line Protection Law. As the Law was signed new, by Governor Tom Wolf, on October 30, 2017, The PA Public Utility Commission (PUC) now enforces the Law. There are new responsibilities in addition to those carried forward for all the stakes holders performing excavation in PA. Jim will explain from a Designer and Project owners prospective the requirements for excavation work in Pennsylvania.

801 New Equipment Preview – Trimble SX-10 w/ Trimble TSC7

Kenneth Fronheiser, PLS

Chip Bernard

In this *New Equipment Preview*, we will take a look at the Trimble SX-10 and the Trimble TSC7. We will dive into both the hardware and software that makes this the total solution for the surveyor.

Monday, January 14 – Sessions (10:30 a.m. – 12:00 p.m.)

102 Intro to GNSS

Dimitrios Bolkas, PhD

Surveyors with little to no experience or knowledge in satellite positioning and who wish to understand how Global Navigation Satellite Systems (GNSSs) works are encouraged to attend this workshop. Some of the concepts that will be discussed include, how satellites can be used to obtain positioning information, the different coordinate systems

involved in GNSS, what are the GNSS error sources, why certain field procedures must be followed to obtain coordinates with desired quality, and things to watch when determining if a GNSS survey is the appropriate method for the application.

202 Maps in the Penn State University Library

Heather Ross

The Donald W. Hamer Center for Maps and Geospatial Information at Penn State University collects and manages print and digital maps and other geospatial information resources in support of Penn State research and teaching, and for use by residents of the commonwealth of Pennsylvania. It is home to the largest print map collection in Pennsylvania and is considered a top 15 collection in the country by volume. In this workshop, participants will learn how to search for print and digital maps in our collection by using a web-based cataloging system and digital collections platform, in addition to finding maps from other institutions. Of particular interest is the digital collection of Pennsylvania Sanborn fire insurance maps from the mid-1880s through mid-1900s for many Pennsylvania communities. Penn State manages the largest collection of Sanborn maps outside of the Library of Congress and has digitized the entire collection and made those out of copyright freely available online.

802 Equipment Adjustment on Robotic Total Station and Field Equipment

Christopher Guagliardo

In this session you will learn how to properly take care of equipment and do general maintenance of survey equipment.

Monday, January 14 – Sessions (1:30 – 5:00 p.m.)

402 Modernizing the National Datums and the State Plane Coordinate System in 2022

Dan Gillins

Jeff Jalbrzikowski

The National Geodetic Survey is modernizing the National Spatial Reference System, and new reference frames and a geopotential (vertical) datum are scheduled to be released in 2022. The modernization effort will lead to changes in the execution and georeferencing of future control surveys involving GNSS and leveling. In addition, a new State Plane Coordinate System is being designed. Web-based tools, including OPUS-Projects, have also been recently developed to enable surveyors to publish their static GNSS control surveys. Additional work is currently underway to further develop OPUS-Projects so that surveyors can submit Real-Time Kinematic GNSS vectors as well as leveling observations. OPUS-Projects will be a major tool for managing, processing, adjusting, and publishing control surveys.

502 Boundary Law Case Studies

Gary R. Kent, PS

Only two persons can truly resolve a disputed boundary or title problem. Those persons do not include attorneys, title companies or surveyors. And, in a sense, they do not even include judges and juries - at least not of their own volition.

This program explores the role that the professional surveyor can, and arguably should, take in helping property owners establish or maintain their common boundary in the location that they were perfectly satisfied with - at least until the surveyor showed up!

We will look at the role of the surveyor as related to boundaries, not only from a statutory/regulatory standpoint, but also as eloquently expressed by renowned Michigan Supreme Court Chief Justice Thomas Cooley in his seminal 1881 treatise "The Judicial Function of Surveyors."

As a part of this overview, we will review the dynamic that exists between matters of title and matters of survey, including a close look at title insurance.

Some cases from Pennsylvania will be used to study boundary law principles that illustrate the potential problems, to offer an alternative to what is often the standard approach by surveyors, and to answer some questions. Can the surveyor help property owners avoid the expense and angst of litigating boundaries? What can the surveyor do when there has been acquiescence to an accepted line by both owners?

602 Surveyor as an Expert

Bernard Telatovich, PE, Esq., M.Eng.

What you need to know in today's changing world in the practice of Forensic Surveying!

This workshop focuses on the aspects of practicing as a professional surveyor in litigation related matters. The surveyor is a "sleuth" by training, who is highly skilled to find, examine, and evaluate evidence in the real world. Use of these skills may play an important role in many types of litigation related matters. By understanding many legal concepts, including evidence and legal procedure, compounded with the technical expertise as a professional, a surveyor can play a key role in many differing types of cases in litigation. However, a surveyor must also be trained and skilled in other competencies, such as communication, to competently write reports for litigation and to competently testify as needed. The practice of Forensic Surveying can provide expanded opportunities for many surveyors to develop as professionals. This workshop is intended to expand on a surveyor's knowledge as it relates to Forensic Surveying, as well as address communication in the profession, which is the most important competency professionals must develop.

702 Computing a FEMA BFE for Zone A

Thomas F. Smith, PE, PLS

Compute a FEMA Base Flood Elevation (BFE) for a Zone A stream

A FEMA Zone A stream is one where no detailed study has been completed by FEMA; therefore, no Base Flood Elevations (The so-called 100-year flood elevation). This workshop will cover the use of FEMA maps with field surveyed cross-sections to determine the BFE using approximate methods. Detailed methods will also be covered to determine flood flows and BFE elevations with cross-section data. The FEMA eLOMA (electronic letter of map amendment) will be discussed, which allows the removal of structures or property mapped within the flood plain.

Presentation of several case studies to illustrate various types of projects.

803 Survey Math 1

Robert Miller

The content of this workshop is focused on reviewing basic surveying mathematics with surveying interns (i.e. rod person or beginning instrument person). Topics to be covered include, but are not limited to, basic geometry and manipulation of bearings and azimuths, basic trigonometry, coordinates, horizontal curves and vertical curves. Participants will need a calculator with trigonometry functions for this course, and should be very familiar with the use of the calculator prior to the workshop, particularly the conversion of degrees, minutes and seconds to decimal degrees or vice versa. Class size for this workshop will be limited to forty (40) attendees. A legal description provides the location and description of real estate in written words. The legal description is required for the transfer of real property. This presentation will examine the various ways that property can be described and provide methods by which these descriptions are created. Discussion regarding, reading, writing and interpreting legal descriptions and how this relates to retracement surveys will be included.

These courses are essential for those entering the surveying profession or those who want to further their ambitions and move up in their chosen career path.

Monday, January 14 – Sessions (1:30 – 3:00 p.m.)

103 CST Exam

Brent Birth

Overview of National Society of Professional Surveyors' "Certified Survey Technician" program and exam. Will review history, statistics, benefits, and sample exam questions to aid in the understanding of the program and preliminary preparation to take the exam.

203 Quality Assurance

Scott Reeser, PLS

This workshop will discuss how the topic of QA/QC. Frequently we throw these terms around interchangeably, but they really have separate meanings. These terms will be redefined and discussed with the attendees. Examples of how our work can be checked to insure either QA or QC is accomplished will be presented. This session is geared toward group discussion and intended to ignite the attendee's thought process so they can return to their daily operations with a new point of view.

302 PAMS – PennDot

Stephen Moore, PLS

Utilizing PennDOT's Photogrammetry Asset Management System (PAMS) to research existing photography, mapping, and survey control. PennDOT PAMS is a survey and mapping database archiving projects from the last 50 years. There are over 800,000 exposures, 10,000 projects, and 7,000 survey control marks to be researched and utilized for surveying and mapping projects. This session will provide information on PennDOT's Photogrammetry & Surveys Section, introduce the www.penndotpams.org website, and give instructions on how to search, sort, download, and request the data required. The session will have an interactive searching activity on the new mobile version of the website, and provide instruction for users to submit survey control recoveries and eventually add survey control to the database in a new crowd-sourcing initiative.

Monday, January 14 – Sessions (3:30 – 5:00 p.m.)

104 Fundamental of Surveying Exam Preparation

Brian Naberezny, PLS, GISP

Passing the Fundamentals of Surveying Exam is one of the first steps on the path to professional licensure. Exam qualifications, registration, and scheduling procedures will be reviewed. What to expect on exam day along with an overview of the exam will be discussed. Exam specifications along with reference and study materials will be reviewed in detail. Test taking strategies and tips will be presented. A few sample questions will be reviewed as a way to understand how questions are presented and how test taking strategies can be used to solve them.

204 Units of Measure

Scott Reeser, PLS

This session will take a look at various units of measure. While the focus of the session will be aimed at units encountered by a surveyor in the work, we will discuss other various units. Session discussion will include how units of measure have developed in various period of history.

303 Basic Principles of Photogrammetry

Francis W. Derby, PhD

Photogrammetry has been a part of the surveying technology for many years. It is the art and science of making maps from aerial photographs. Traditional photogrammetry typically involves analog photographs taken from manned aerial vehicles. The technology is becoming even more popular with the use of Unmanned Aerial Vehicles (UAVs) and digital photographs for mapping purposes. Whereas photogrammetric principles are common in both approaches, there are differences in the various stages, especially in flight planning, photo control points, and image storage and processing. In this workshop, the basic principles of photogrammetry including flight planning, photo scale, relief displacement, conversion of analog photos to digital imagery, interior and exterior orientations, image rectification versus geo-referencing, and creation of ortho-photographs. Where necessary, differences between the two approaches will be discussed.

Tuesday, January 15 – Sessions (8:30 a.m. – 12:00 p.m.)

105 Ethics for the Geomatics Professional

Scott Reeser, PLS

This session will discuss ethical considerations surveyors but also applies to engineers. Attendees will review published definitions of Professional Ethics, as well as cultivate a group definition. The Code of Ethics included within the Engineer,

Surveyor and Geologist Registration Law will be reviewed, as well as ethical codes from other surveying and engineering professional organizations. Discussion on the development of surveyor ethics will be discussed. This session is geared toward group participation, the presenter will encourage participation by all attendees in a manner that encourages thought and exchange of ideas.

205 Unmanned Aerial System – Mapping Best Practices

Bryan Baker

In 2014 the American Society of Photogrammetry and Remote Sensing (ASPRS), published mapping standards for collecting and processing digital aerial data.

While not specifically referring to Unmanned Aerial Systems (UAS) the standards can be applied to digital aerial data from a UAS.

This workshop will provide information on the best practices for collecting UAS data that can be processed to ASPRS Standards. From flight planning, to establishing ground control points (GCP's), to office processing and reporting, all phases of UAS Data Collection and Processing will be addressed.

305 Understanding the State Land Records of PA

Aaron McWilliams

The presentation will cover the patenting process, the documents created, and how to access the records. It will also touch on other sources at the Pennsylvania State Archives, such as land office maps, Board of Property records, and Commonwealth deeds. No prior experience with the state land records is required. The presentation is suitable for both new and experienced users of Pennsylvania's state land records.

403 UAS/UAV Flight of Office PixElement Photo Processing – Part 1

Jim Carlson

Steve Cummings

Benjamin Vander Jagt

Morning session: Flight to Office mapping UAS/UAV drones

UAS/UAV drones high end, low end, cost differences and accuracy issues

Need for a FAA Drone Pilot License Part 107 for flying any commercial UAS/UAV drone

Mission Planning software, FAA and weather permitting rules for UAS/UAV flights

Photo Capture (PixElement versus Pix4D) – Overview detailing the steps to import, set control

Discuss ground control, accuracy results both imagery i.e. Geo-Tiff and point cloud

Carlson Survey – Field-to-Finish virtual surveying using plan view on UAS/UAV Geo-TIFF imagery and Point Cloud P3D Topo

503 Mock Trial

Gary Kent, PS

The Harpers had Peyton Mann perform a survey to prepare for construction of a new house on their lakefront property. Sunshower Resort - owners of the property north of the Harpers - took exception to Mann's opinion and hired their own surveyor Tommy Bradley who disagreed with the Mann survey.

Litigation ensued and - although the surveyors met in order to attempt to resolve their differences - title problems, a lack of documentation of original surveys, and numerous historically conflicting surveys prevented a clear resolution to the conflict.

Two actual attorneys and a judge will participate, with the audience sitting in as jury, as the plaintiff and defendant, the two surveyors, and a title expert testify and we explore the chains of title, conflicting lines of possession, the related boundary law principles, and differing claims of title.

As an integral part of the trial, questions will be taken from the audience. In addition, the judge will discuss the process and procedures in such a case and the attorneys will offer guidance and suggestions to those who would testify as expert witnesses.

603 Civil 3D – Using Modern Survey Packages, Workflows and Applications with Civil 3D

John Cooke

Autodesk Civil 3D® is a very powerful – and popular – solution applicable in many Civil Engineering and Survey firms. Despite its power, Civil 3D's core survey functionality has not kept pace with developments by other vendors, including Leica, Trimble, Carlson and others. This class, drawn on real-world experience in a medium-size survey and engineering firm, focuses on two major areas: First, the class identifies core functionality within Civil 3D essential and common to survey and engineering applications, and looks at configuring that environment to work optimally. Secondly, the class identifies and focuses on better survey solutions in other products, including Leica and Carlson, and looks at the integration of these more modern solutions as replacements for the dated aspects of Civil 3D. The implementation strategy is to pull the best pieces from different, and sometimes competing, software products to develop the most efficient solution possible.

703 Stormwater Design - Part 1

Andrew Bennett

Tom Seybert

Stormwater Hydraulics. This workshop covers basic hydraulics for stormwater management design. The following topics are covered: flow rate, conservation of mass, continuity, basic energy methods, Manning's equation, channel flow analysis, channel sizing, gravity flow pipe sizing, hydraulic elements chart for pipe flow, orifice equation, weir equation and multiple stage outlet structure rating curves. Participants will need a calculator for calculations and a small straight edge for reading charts.

804 Survey Math 2

Robert Miller

Continuation of session 803...

Tuesday, January 15 – Sessions (1:30 – 5:00 p.m.)

106 Survey Practice (Technical and Business Aspects)

Donald H. Kamp, PLS, PP, CP

Today's Surveyors face many challenges as they try to effectively utilize technology, and manage the business aspects and liabilities of professional practice. This workshop will help you to understand how to effectively address these issues, increase your ability to grow and develop your skills and provide insights on ways to provide for growth and development your employees and your firm.

206 Factors that Affect the Accuracy of UAS Surveys

Dimitrios Bolkas, PhD

Images collected from unmanned aerial systems (UASs) offer the means to create point-clouds and elevation models of high resolution and accuracy. However, accuracy of derived models varies based on several parameters such as flying height, direct geo-referencing versus ground control points, camera settings during data-acquisition, type of camera and camera calibration, shadow areas, and scene complexity. Understanding how these factors affect errors in elevation models, as well as the spatial distribution of these errors, can be important in order to understand limitations of collected data. This workshop aims to investigate how these factors affect the accuracy of UAS surveys and provide best practices for field data acquisition.

306 Writing Legal Descriptions

Scott Reeser, PLS

This session is intended for both surveyors (in varied roles and responsibilities as well as those outside the profession that are involved with the preparation of legal descriptions. The content of the session is focused on legal descriptions

for real property and/or easements. The workshop will review parts of a legal description and how to assemble the information in each part. Different types of descriptions will also be discussed. Common mistakes and tips in preparing descriptions will be reviewed during the session. Time is allocated to the attendees having an opportunity to draft simple descriptions.

404 Office PixElement Photo Processing to Point Cloud and Geo-Tiff Imagery Output for PtCloud, Recap & P3D Topo Mapping

Jim Carlson

Steve Cummings

Benjamin Vander

Afternoon session: Office mapping and 3D visualization using point clouds and geo-tiff imagery from UAS/UAV drones

Carlson PtCloud – Field-to-Finish mapping virtual surveying directly working within the point cloud

Carlson P3D Topo – Combine both Geo-TIFF imagery and point cloud data into one GUI for mapping

Autodesk Recap – Point Cloud mapping in AutoCAD RCP/RCS (import quick scan using DPI-8 DotProduct hand scanner and output to Recap)

Virtual Survey using imagery and point cloud data displayed in AutoCAD, Intellicad and Autodesk OEM DWG platforms

504 Mock Trial

Gary Kent

Continuation of session 503...

604 Civil 3D – Terrain Modeling, Contouring and Analysis

John Cooke

This class examines the creation of Digital Terrain Models, or Surfaces, in Autodesk Civil 3D®, with an emphasis on producing highly-accurate models as efficiently as possible from survey data. Since the Civil 3D Surface is also the basis for contouring and analysis within the program, better surfaces yield better contouring and analysis as results.

The class reviews the data types for terrain modeling – point, breakline and contour data - and how their use is facilitated with survey data transferred into the drawing from field work. The class will examine how breakline data can be captured and included in the Civil 3D TIN. The course will examine various strategies for filtering point data for inclusion in the Civil 3D Surface, including Point Groups, Description Keys and other tools. Major topics also include the assessment of surface accuracy and surface editing, techniques for improving the quality of contouring, surface presentation and annotation styles, and the use of surfaces in analysis functions, such as slope and drainage assessment.

704 Stormwater Design 2 (Watersheds – Rainfall – CN)

Anthony Bennett

Tom Seybert

This workshop begins with the presentation of basic watershed characteristics as they relate to stormwater runoff calculations. Specific characteristics to be discussed include drainage area, watershed length, surface slope, hydrologic soil groups and land use/land cover. These topics will be followed by identifying rainfall data sources for Pennsylvania and nationally. The rainfall presentation will be followed by a presentation of the NRCS CN method for estimating surface runoff volumes. Participants will need a calculator for calculations and small straight edge for reading charts. Participants should be completely familiar with the topics covered in the Stormwater Review for Licensure Part 1 workshop before taking this workshop.

805 Survey Math 3

Robert Miller

Continuation of session 804...

Wednesday, January 16 – Sessions (8:15 – 11:45 a.m.)

107 A Review of the Pennsylvania Engineer, Land Surveyor and Geologist Registration Law

Scott Reeser, PLS

This workshop will take a 'walk' thru the current Pennsylvania Engineer, Land Surveyor and Geologist registration law. While the focus of the workshop will be to review the sections pertinent to Land Surveyors, related sections for Engineers and Geologists will be discussed. Additionally, where applicable parallels to other state's registration laws will be discussed as well as the NCEES model law. The presenter will encourage discussion on various topics within the current law. Participants should be prepared to discuss various aspects of the Registration Law and possibly identify areas of the law that could be strengthened to protect our profession.

207 Project Management and/or Contract

Thomas Skibinski

Session description coming soon...

307 Computations in State Plane Coordinates

Esra Tekdal

This workshop will cover the underlying theory of map projections. It will demonstrate how to take field observations of direction and distance and reduce them to a mapping/grid surface. It will also demonstrate how to layout a ground distance that is determined from SPCS/grid coordinates. The workshop will show how a single project factor can be used to perform these computations in the field automatically in your data collector as well as how to determine when one project factor is sufficient to achieve SPCS coordinates from field observations and layout ground observations such as a surface horizontal distance from grid coordinate computations. Finally, it will demonstrate how to compute SPCS coordinates when your control lies in more than one SPCS zone.

405 BIM: A New Market for Surveyors Part 1: Scan to BIM

Jim Carlson

Steve Cummings

Chris Donohue

Jonathan Sever

Keith Alcorn

A brief history on BIM implementation and what is BIM or Building Information Modeling and how it is evolving 3D Solid Modeling with Revit showing the stark difference between Autodesk drawings and Revit solid models composed 100% of a library of smart parametric with editable metadata, all as 3D solid objects and often from a library given to Autodesk Revit from the manufacturers for all indoor building systems. Scan to BIM with collision detection for structural and as-built compliance and for concrete floor and wall scanning for flatness, plumb and bulges.

506 Business Entities

N. Brian Caverly, Esq.

Salvatore Marsico

This workshop is for the surveyor who requires insight into the various types of business structures available to minimize potential personal liabilities and those of the firm.

605 Training Surveyors with Virtual Reality

Dimitrios Bolkas, PhD

Jeff Chiampi

Surveying engineering requires data collection with different techniques and instruments. Each project presents unique challenges, in terms of how to collect data in an efficient and timely manner, but also ensure that data accuracy satisfies project requirements. However, student training is often limited only on an area around the campus where each surveying program is situated. This reduces students' comprehension on how to use techniques and instruments in real applications; thus, making them unprepared for the job market. In addition, outdoor activities are weather dependent and cancelling such activities due to inclement weather is common, which disrupts the educational process. This reduces

the time students spend with surveying instruments; limiting their experience and skills with surveying practices and techniques. To address these unique challenges, we have developed surveying engineering laboratories in immersive virtual reality.

This workshop will present the creation and implementation of surveying engineering laboratories in virtual reality. We will discuss data collection using unmanned aerial systems and terrestrial laser scanners in order to create the virtual environment. We will present how laboratories are developed in virtual reality, including creation of relevant exercises, user control and interaction with surveying instruments and virtual environment. Finally, we will discuss the pedagogical contribution of virtual reality technology in surveying education.

705 Stormwater Design 3 – Travel Time-Hydrographs-Detention Storage

Andrew Bennett

Tom Seybert

This workshop begins with the presentation of travel time methods and the concept of watershed time of concentration. The NRCS average velocity methods will be presented to analyze sheet flow, swale flow and channel flow. This topic will be followed with a discussion of two hydrograph methods namely the NRCS tabular hydrograph method of TR-55 (1986) and the NRCS unit hydrograph method as developed through the computer program WIN TR-55 (2009). Pre-development and post development hydrographs will be investigated. Detention storage estimates to control post-development runoff will be presented using the NRCS TR-55 (1986) method and the CN difference method. Participants will need a calculator for calculations and small straight edge for reading charts. Participants should be completely familiar with the topics covered in the Stormwater Review for Licensure Part 2 workshop before taking this workshop.

806 Survey Math 4

Robert Miller

Continuation of session 805...

Wednesday, January 16 – Sessions (12:45 – 4:45 p.m.)

108 Suduko, Puzzles and Boundaries

Gregory Clark, PLS, PE

Crosswords, Sudoku's, Cryptoquotes, and Boundary Retracements; puzzle: a game or problem designed to test ingenuity or knowledge.

When attempting a crossword puzzle or Sudoku on the back page of a newspaper, clues are provided to get us started toward the end solution. Usually there can be only one inarguable solution as intended by the scrivener. When called upon to perform a boundary retracement, how can we know when we have collected and analyzed sufficient evidence, or clues, in order to be able to viably argue and defend our conclusions of location if need be? The scrivener, or original parties to a land boundary are usually not available to provide first-hand answers to the question of "intent."

These questions will be explored in this workshop by reviewing the Opinion and Court Order of Distefano vs. Moore No. 222 CD 2013 which consisted of an Action to Quiet Title related to a Boundary Line Error and an Action to Quiet Title related to Adverse Possession. Specifics from this case will be used to expand on: 1) the role of the retracement surveyor in determining land boundaries, 2) importance of collecting/analyzing sufficient evidence, 3) the need to be familiar with pertinent case law, 4) the value of effective communication between surveyor, client, and attorney.

208 Amazing Situations of Liability Traps that Caught a Surveyor

Mark Amirault

Laura Malloy

Vince Costello

This course will examine real situations where a surveyor found himself in situations where there was potential negligence, loss productivity, loss income, etc. During the session the attendees will learn about what caused the problem, how the problem was resolved, and how the problem could have been avoided. We will discuss insurance policies that will aid in the recovery, as well as lessons learned from these situations.

308 Post Davey Tree and Its Consequences

N. Brian Caverly, Esq.

Salvatore Marsico

The workshop is intended to review House Bill 1106 (2017) in light of the Appellate Court's analysis of the Southern Reographics case (Davey Tree). In Davey Tree the Appellate Court addressed the question of whether a Professional Surveying License is required to perform an "engineering land survey" in the context of the work performed by Davey Tree. The legislature's response to the Court's decision is HB 1106.

406 A New Market for Surveyors Part 2: PixElement Photo Processing

Keith Alcorn

Jim Carlson

Steve Cummings

Chris Donohue

Jonathan Sever

Scan to BIM (cont.), scan to map construction operations and for final as-built mapping on all BIM indoor structures and outdoor civil site.

Photo Capture geo-tiff imagery and point clouds output from UAS Drone, overhead crane cameras, 360 cameras and ground based photos.

Traditional survey gear to set control for BIM and Layout on building foundation, structural steel building lines using GNSS, robotic, conventional and digital levels along with Robotic Total Station Layout of BIM 3D Solid Objects for all building indoor and outdoor civil site.

507 Forensic Surveying

Bernie Telatovich

Session description coming soon...

606 State Plane Coordinates 2022

Charles Ghilani

NGS is proposing a different concept in state plane coordinate systems after the release of the 4-dimensional datum in 2022. Their proposal is to offer a SPCS that will involve a single parallel state plane coordinate zone(s) for PA that minimizes distortions by introducing a zone scale factor, which will conceptually bring the map surface at some elevation. This workshop will discuss the computational and the conceptual differences between the current system used in PA and the possible proposed system. In this discussion, the advantages and possible disadvantages of what is being proposed will be discussed. In the near future constituents in PA such as PennDOT, PSLs, and other players such as the GIS community will need to come to a consensus of the system that they desire to see in PA. Failure to do so will mean that NGS will design a 2-zone system, similar to SPCS 83 but w/ a single parallel.

706 Stormwater Design 4 – Rational Formula-Sedimentation Basin Sizing – Outlet Protection

Andrew Bennett

Thomas Seybert

The workshop addresses the Rational formula for peak flow estimates. Specifically, the elements of units, drainage area, land use, land cover, Rational C coefficient, time of concentration and rainfall intensity selection will be addressed. This topic will be followed by the sizing of sedimentation basins and outlet pipe protection design as prescribed by the Pennsylvania Department of Environmental Protection E&S manual. Participants will need a calculator for calculations and small straight edge for reading charts. Participants should be completely familiar with the topics covered in the Stormwater Review for Licensure Part 3 workshop before taking this workshop.

807 Survey Math 5

Robert Miller

Continuation of session 806...