



TUC 19 Agenda

Monday May 6th, 2019

REGISTRATION AND CONTINENTAL BREAKFAST

7:00 AM - 8:00 AM – *Courtyard and Hall of Fame*

Registration will be open in the Auditorium until 9:00. After that it will be available in the Rotunda for the rest of the day.

OPENING REMARKS

8:00 AM - 8:50AM – *Auditorium*

TECHNICAL TRACK A - INTRODUCTION TO MICROSTATION CONNECT AND TOPODOT 64 BIT **New Content**

9:00 AM - 10:05 AM – *LAB 216*

Learn about the changes made in TopoDOT for MicroStation CONNECT (64 bit version). You will be able to locate tools and menus in the ribbon, activate TopoAerial, set up the symbology manager and see the latest tools updates on TopoDOT 64 bit. You will also learn how to activate the task bar, V8i style, as a preference over the ribbon. This class will also review Accudraw and ACS manipulation. The instructor will also demonstrate solid modeling tools and meshing tools (not DTM tools) for multiple purposes. This session is essential for participants new to MicroStation CONNECT.

TECHNICAL TRACK B - INTRODUCTION TO MICROSTATION V8I AND TOPODOT 32 BIT

9:00 AM - 10:05 AM – *LAB 218*

Learn to set up a MicroStation seed file with units, levels, toolbars, key in commands and workspace windows to start the TopoDOT workflow. It will highlight the importance of the Auxiliary Coordinate System (ACS) to establish a drawing plane; will discuss its placement and modification tools. This class will also cover how to use Accudraw, converting 2D shapes into 3D elements and how to modify 3D elements. You will also be introduced to setting up the symbology manager. This session is important for all MicroStation users.

TECHNICAL TRACK C - INTRODUCTION TO MICROSTATION AND TOPODOT FOR BEGINNERS

9:00 AM - 10:05 AM – *LAB 217*

This class will follow up on the online basics class for participants new to MicroStation. It will cover the most important tools from MicroStation to use in TopoDOT. Learn how to set up a MicroStation seed file with units, levels, toolbars, key in commands and workspace windows to start the TopoDOT workflow. It will highlight the importance of the Auxiliary Coordinate System (ACS) to establish a drawing plane; will discuss its placement and modification tools. This session is essential for participants new to MicroStation. Please be sure to register for the online session prior to the conference. More details on the event website.

BREAK FOR ALL TRACKS

10:05 AM - 10:20 AM – *Rotunda*

TECHNICAL TRACK A - MOBILE DATA MANAGEMENT – 100 MINUTES New Content 2 GENERAL CEC COURSE # 9353**10:20 AM - 12:00 PM – LAB 218**

Learn to manage mobile data using LAS data file format. This session will include how to use TopoAerial to identify the project site on an aerial image, parse flight-lines into tiles along a path, load calibrated images and use the “Visual Inspection” tool. This class is essential for anyone managing and/or using pointcloud data in TopoDOT; therefore this class can be attended by processors and project managers alike.

TECHNICAL TRACK B - STATIC DATA MANAGEMENT – 100 MINUTES New Content 2 GENERAL CEC COURSE # 9353**10:20 AM - 12:00 PM – LAB 216**

Learn to manage static data using the Terrestrial Static E57 format. E57 format as a standard format available to most LiDAR systems. The management of data using E57 is similar to other formats such as RSP, so this class is suitable for anyone using static data. This session will include how to convert E57 to DOT format, How to use loading filters, how to use TopoAerial to identify the project site on an aerial image, loading calibrated images and mapping single scan position. This class is essential for anyone managing and/or using pointcloud data in TopoDOT; therefore this class can be attended by processors and project managers alike.

TECHNICAL TRACK C - DATA MANAGEMENT FOR BEGINNERS**10:20 AM - 12:00 PM – LAB 217**

Learn the basic tools to load pointcloud and other resources for data processing that has been organized for this purpose. This session will include how to use TopoAerial to identify the project site on an aerial image, loading calibrated images and load scan positions. This session is essential for any participants new to TopoDOT that are not managing data. Managers should take sessions in this same time block on A or B tracks.

LUNCH**12:00 PM - 1:00 PM – Dining Room****TECHNICAL TRACK A - MOBILE DATA VISUALIZATION AND MANIPULATION New Content****1:00 PM - 1:50 PM – LAB 218**

Learn to apply multiple display modes available in TopoDOT and its uses for static feature extraction including the new hybrid modes. This class will introduce the Random Noise Filter for data isolation. Moreover, multiple data manipulation techniques will also be explored such as: cropping, hiding and navigating data. There will be an emphasis on creating cross sections and its use in running TopoDOT automatic and semi-automatic tools. This class will also discuss how to create elements on the pointcloud data using a drawing plane or using snapping functions. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK B - STATIC DATA VISUALIZATION AND MANIPULATION New Content**1:00 PM - 1:50 PM – LAB 216**

Learn to apply multiple display modes available in TopoDOT and its uses for static feature extraction including the new hybrid modes. This class will introduce the Random Noise Filter for data isolation. Moreover, multiple data manipulation techniques will also be explored such as: cropping, hiding and navigating data. There will be an emphasis on creating cross sections and its use in running TopoDOT automatic and semi-automatic tools. This class will also discuss how to create elements on the pointcloud data using a drawing plane or using snapping functions. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C - DRONE DATA MANAGEMENT AND VISUALIZATION New Content**1:00 PM - 2:00 PM – LAB 217**

Learn to manage imagery pointcloud data from UAV or drone systems using LAS data file format. This session will include how to use Pix4D images to identify the project site on an aerial image, map files and load data. This class will also take a quick look on data quality qualification data based on the technology limitations by looking at density, randomness (noise) as well as break-line definition. Moreover, you will learn how to manipulate the data display mode options for feature extraction including converting color to intensity-like display to use the intensity extraction tools and more. Multiple data manipulation techniques will be explored such as: cropping, hiding and navigating data. There will be an emphasis on creating cross sections and its use in running TopoDOT automatic and semi-automatic tools. This class will also discuss how to create elements on the pointcloud data using a drawing plane or using snapping functions. This class is suitable for all participants new to TopoDOT.

MANAGEMENT TRACK - THE TOPODOT PROCESS SOLUTION**1:00 PM - 2:00 PM – Room 209***Presented by: Ted Knaak, President, TopoDOT.*

We kick off the Management program by looking at the big picture. The TopoDOT process offers a comprehensive solution to challenges of LiDAR data. We'll review process categories of data management, quality assessment, model extraction and feature analysis. This session will provide an overview of the TopoDOT process for first time attendees as well as a glimpse of exciting new developments introduced at TUC 19.

TECHNICAL TRACK A - MOBILE DATA OPTIMIZATION & CLASSIFICATION**1:50 PM - 2:40 PM – LAB 218**

Learn to manipulate data for maximum efficiency for feature extraction by optimizing tiled data and then classifying it. This class will introduce where and when these options are appropriate. This class is valuable for anyone managing and/or using pointcloud data in TopoDOT; therefore this class can be attended by processors and project managers alike.

TECHNICAL TRACK B - STATIC DATA OPTIMIZATION & CLASSIFICATION**1:50 PM - 2:40 PM – LAB 216**

Learn to manipulate data for maximum efficiency for feature extraction by optimizing scan positions and classifying data. This class will introduce where and when these options are appropriate. This class is valuable for anyone managing and/or using pointcloud data in TopoDOT; therefore this class can be attended by processors and project managers alike.

TECHNICAL TRACK C - LEAST SQUARE FIT**2:00 PM - 2:50 PM – LAB 217**

Learn to use the "Least Square Fitting" tool to translate and/or rotate objects or pointclouds using 3 or more adjustment points. This class will focus on applications where this tool is appropriate such as Design Build and Design to Site applications.

MANAGEMENT TRACK - COMPREHENSIVE DATA MANAGEMENT SOLUTION: TOPOCLOUD®

2:00 PM - 2:50 PM – Room 209

Presented by: Ted Knaak, President

Data management and administration is a critical component of the TopoDOT® process. In this session we review the TopoCloud® administrator solution currently available with TopoDOT® including many new developments. We'll demonstrate the TopoCloud® standard of "one minute data access" from any processor with no limitations on project size or the number of projects. We'll review the new TechNote #1034

BREAK FOR A & B

2:40 PM - 2:55 PM – Rotunda

BREAK FOR C & MANAGEMENT

2:50 PM - 3:05 PM – Rotunda

TECHNICAL TRACK A - MOBILE DATA ASSESSMENT – 80 MINUTES New Content 2 GENERAL CEC COURSE # 9355

2:55 PM - 4:10 PM – LAB 218

Learn to qualify mobile data using technote #1021 "Establishing Requirements, Extracting Metrics and Evaluating Quality of LiDAR Data" as a guide to identify data discrepancies using TopoDOT data analysis tools. This comparison will help the participant understand why is important to check for such discrepancies and what to do if they exist. This class will discuss the TopoDOT tools to evaluate data alignment, density, randomness as well as image alignment to the data. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK B - STATIC DATA ASSESSMENT – 80 MINUTES

2 GENERAL CEC COURSE # 9355

2:55 PM - 4:10 PM – LAB 216

Learn to qualify static data using technote #1021 "Establishing Requirements, Extracting Metrics and Evaluating Quality of LiDAR Data" as a guide to identify data discrepancies using TopoDOT data analysis tools. This comparison will help the participant understand why is important to check for such discrepancies and what to do if they exist. This class will discuss the TopoDOT tools to evaluate data alignment, density, randomness as well as image alignment to the data. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C - TOPOGRAPHY PROJECTION New Content

3:05 PM - 3:40 PM – LAB 217

Learn to re-project line-work using "Topography Projection" tool using the trajectory information or imagery information of mobile projects. This class will demonstrate how to use this tool to move line-work to a new pointcloud location while maintaining quality control. This class is also available Thursday at 1:30 PM on Track C.

MANAGEMENT TRACK – QUALITY ANALYSIS, METADATA AND PROVENANCE

3:05 PM – 4:05 PM – Room 209

Presented by: Ted Knaak, President, TopoDOT.

Day two of TUC 19 starts with a look at data quality. A quick review of the principles documented in TechNote #1019: Placement requirements, extracting metrics and evaluating quality of LiDAR data will be given. Then new automated TopoDOT® quality tools will be reviewed. At this point we'll introduce new raster style image formats that are stored as metadata to capture and communicate data quality. We'll take a look at the correct assessment process applied to data fused different platforms and different quality specifications.

TECHNICAL TRACK C – DPEG CREATION AND USE ON ESRI

3:40 PM - 4:10 PM – LAB 217

Learn to create DPEGs from pointcloud and images using TopoDOT. See a demonstration of the use the exported DPEG's in ESRI's ArcGIS Pro to navigate projects, make measurements and update information.

TECHNICAL TRACK A - TOPOCLOUD USER INTERFACE FOR MOBILE DATA

4:10 PM - 5:00 PM – LAB 218

Learn to use the TopoCloud application for project overview and data exchange. This class will show the TopoCloud user workflow to visualize, download, map and load project files. There will be an emphasis on data organization using Technote 1034 "Project Data Organization Requirements for Optimized Performance and Cloud Storage" to an optimize storage performance. The instructor will also quickly demonstrate TopoCloud Pro web version with DPEG capability.

TECHNICAL TRACK B - TOPOCLOUD USER INTERFACE FOR STATIC DATA

4:10 PM - 5:00 PM – LAB 216

Learn to use the TopoCloud application for project overview and data exchange. This class will show the TopoCloud user workflow to visualize, download, map and load project files. There will be an emphasis on data organization using Technote 1034 "Project Data Organization Requirements for Optimized Performance and Cloud Storage" to an optimize storage performance. The instructor will also quickly demonstrate TopoCloud Pro web version with DPEG capability.

TECHNICAL TRACK C - TOPOCLOUD ADMINISTRATOR New Content

4:10 PM - 5:00 PM – LAB 217

Learn to use the TopoCloud application for project overview and data exchange from the admin prospective. Learn to use the admin tools to upload, label, tag and manage tiled data. Attendees will be able see the user interface to visualize, download, map and load project files. There will be an emphasis on data organization using Technote 1034 "Project Data Organization Requirements for Optimized Performance and Cloud Storage" to an optimize storage performance. The instructor will also quickly demonstrate TopoCloud Pro web version with DPEG capability.

WELCOME RECEPTION

5:00 PM - 7:00 PM – Courtyard

Luau time! Enjoy an evening of entertainment and networking as the conference begins. Drinks and hors d'oeuvres will be served at the campus courtyard.

| Time | Monday, May 06, 2019 | | | |
|---------------------|---|---|--|--|
| | Technical Track - Data Management and Assessment | | | Management Track |
| | Track A Lab 218 | Track B Lab 216 | Track C - Monitoring Lab 217 | Room 209 |
| 7:00 am - 8:00 am | Registration / Continental Breakfast | | | |
| 8:00 am - 9:00 am | Opening Remarks | | | |
| 9:00 am - 10:00 am | Introduction to MicroStation CONNECT and TopoDOT 64 bit | Introduction to MicroStation V8i and TopoDOT 32 bit | Introduction to MicroStation and TopoDOT for Beginners | |
| 10:00 am - 11:00 am | Break | | | |
| 11:00 am - 12:00 pm | Mobile Data Management CEC | Static Data Management CEC | Data Management for Beginners (not managers) | |
| 12:00 pm - 1:00 pm | Lunch | | | |
| 1:00 pm - 2:00 pm | Mobile Data Visualization and Manipulation | Static Data Visualization and Manipulation | Drone Data Management and Visualization | The TopoDOT Process Solution |
| 2:00 pm - 3:00 pm | Mobile Data Optimization & Classification | Static Data Optimization & Classification | Least Squares Fit | Comprehensive Data Management Solution: TopoCloud® |
| | Break | | | |
| 3:00 pm - 4:00 pm | Mobile Data Assessment - CEC | Static Data Assessment - CEC | Topography Projection | Moving Beyond the Linear Project Model: TopoCloud Pro® |
| | | | DPEG Creation and Use on ESRI | |
| 4:00 pm - 5:00 pm | TopoCloud | TopoCloud | TopoCloud Admin | |
| 5:00 pm - 7:00 pm | Welcome Reception | | | |

Tuesday May 7th, 2019

REGISTRATION AND BREAKFAST

7:00 AM - 8:00 AM – Auditorium / Dining Room

Registration will be open in the Auditorium until 9:00 AM. After that it will be available in the Rotunda for the rest of the day.

TECHNICAL TRACK A - BREAK-LINE DRAPE **New Content**

8:00 AM - 9:05 AM – LAB 218

Learn about recent updates to the “Drape Element to Data” and “Extraction by Intensity” tools. Discover how to change settings and tool options through multiple extraction examples. Other associated tools such as the “Smart B-spline” tool, “Fence Along Element” and “Quick-line” will be discussed, as well as advanced extraction techniques for guard rail, painted stripes on curvy roads, slope and ditch lines. This class is suitable for participants somewhat familiar with the tools discussed in this class.

TECHNICAL TRACK B - BREAK-LINE DRAPE **New Content**

8:00 AM - 9:05 AM – LAB 216

Learn to draw and drape elements on pointcloud data as a basic form of linear feature extraction. This class will showcase the “Drape Element to Data” tool to extract semi flat or one side flat break-lines such as edge of shoulder, sidewalk line, concrete edges, etc. It will also be used to extract soft or “natural” breaks such as top of slope, toe of slope and bottom of ditch. Further tool functions will be explored by extracting building outlines, fences and walls. Moreover, this class will discuss the “Extraction by Intensity” tool to extract paint stripes and guard rails. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C- VOLUME CALCULATION **New Content**

8:00 AM - 9:15 AM – LAB 217

Learn data manipulation and surface creation for volume calculation techniques in MicroStation CONNECT/TopoDOT 64 bit with the new “Volume Calculation” tool. Stock piles and berm volume calculation examples will be demonstrated in the new 3 step process. This class is suitable for all participants new to TopoDOT.

MANAGEMENT TRACK – THE LATEST INNOVATIONS IN TOPODOT® EXTRACTION

8:15 AM – 9:15 AM – Room 209

Presented by: Ted Knaak, President, TopoDOT.

This session takes a look at the latest in Extraction and Analysis tools development. Cognizance of these new capabilities are important at the Management level to understand and “assure” that your extraction teams are operating at peak efficiency. Often extraction team stick by tried and true techniques when new developments in say break line extraction have increased productivity by 400-500%. We will discuss a new online training program designed to increase the productivity of the processing team while causing a little disruption to on-going operations as possible.

BREAK A & B

9:05 AM - 9:20 AM – Rotunda

BREAK C & MANAGEMENT

9:15 AM - 9:30 AM – Rotunda

TECHNICAL TRACK A - BREAK-LINE EXTRACTION - 100 MINUTES New Content 3 GENERAL CEC COURSE # 9354

9:20 AM - 11:00 AM – LAB 218

Learn to use advanced settings and about the recent updates for the “Break-Line Extraction” tool including the “Auto Fit” option and “Look Ahead” option. This class will also go through the more automatic option using the “Template Extraction” Toolbox and shape template creation. Discover how to change settings and use tool options in several different extraction examples and when to use the appropriate tool based on data signature and site complexity. Advanced extraction techniques for urban curb extraction and highway barriers will be demonstrated. This class is suitable for participants somewhat familiar with the tools discussed in this class. *To collect CEC credits must take Break-line Editing class.

TECHNICAL TRACK B - BREAK-LINE EXTRACTION - 100 MINUTES New Content 3 GENERAL CEC COURSE # 9354

9:20 AM - 11:00 AM – LAB 216

Learn to use the “Break-Line Extraction” tool to extract common break-lines found in topographies such as curbs, barriers retaining walls, etc. This tool’s versatility will be discussed in multiple settings with its corresponding appropriate settings. A comparison using the template matching tools for automatic break-line extraction will be demonstrated as well as advice on how, where and when to use which tool. This class is suitable for all participants new to TopoDOT. *To collect CEC credits must take Break-line Editing class.

TECHNICAL TRACK C - 3D INDOOR MODELING

9:30 AM - 10:55 AM – LAB 217

Learn 3D modeling of indoor features such as walls, columns, stairs, etc. using a combination of cross section tools and 3D modeling tools. Use the “Quick-line” tool to easily create outlines for walls, the “Step Extraction” tool to create staircases and the “Pipe Extraction” tool set for multiple pipe shapes and conduit extraction. Place building features using cell tools.

MANAGEMENT TRACK – THE LATEST INNOVATIONS IN TOPODOT® ANALYSIS

9:40 AM – 10:40 PM – Room 209

Presented by: Ted Knaak, President, TopoDOT.

Analysis tools within the TopoDOT® tool suite are designed to identify, interpret and document the analysis of features for a specific common objective. These tools typically feature high levels of automation with little to no feature extraction or modeling requirements. Of most importance to Management professionals is their use expands business development opportunities. Analysis categories include Clearance, Design Verification, Monitoring, Collision and Simulation.

TECHNOLOGY PRESENTATIONS

11:00 AM - 12:00 AM – Auditorium

LUNCH & SYSTEM DEMONSTRATIONS

12:00 PM - 1:30 PM – Courtyard

TECHNICAL TRACK A - BREAK-LINE EDITING - 60 MINUTES

1:30 PM - 2:30 PM – LAB 218

Learn advanced and updated techniques for break-line modification using the TopoDOT “Break-Line Modification” menu tools to edit lines for a complete, uniform and smooth break-line extraction. Use the “Template Extraction at X-section” tool to introduce new nodes, create bullnose arches, smooth “hand formed” sections with the “smart b-spline” tools, join segments together and close break-lines, use the “Quick Adjust” tool to adjust break-lines horizontally and use “Delete Abnormalities” on template break-line results. This class is suitable for participants somewhat familiar with the break-line tools.

TECHNICAL TRACK B - BREAK-LINE EDITING - 60 MINUTES

1:30 PM - 2:30 PM – LAB 216

Learn to use the TopoDOT “Break-Line Modification” menu tools to edit lines for a complete, uniform and smooth break-line extraction. How to create bullnose arches, smooth “hand formed” sections, create new nodes, join segments together, use the quick adjust tool and close break-lines will be discussed. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C - SUBSTATION EXTRACTION

1:30 PM - 2:20 PM – LAB 217

Learn extraction of substation common features from pointcloud data and imagery including 3D elements, powerlines, ground features and clearances.

MANAGEMENT TRACK - MOVING BEYOND THE LINEAR PROJECT MODEL: TOPOCLOUD PRO®

1:30 PM - 2:30 PM – Room 209

Presented by: Ted Knaak, President, TopoDOT.

The majority of projects are still fundamentally a linear process comprised of Acquire->Extract->Deliver. Multiple simultaneous use of the data across operations is still rarely the case. In this session we examine the role of TopoCloud Pro® in establishing communication among geospatial specialists and “all” downstream operations within and outside of a company or agency. The TopoCloud Pro® website seamlessly communicates the availability and inherent value of project data to the world and allows the world to communicate its specific needs to the geospatial specialist administering the project data. Thus TopoCloud Pro® effectively integrates the world into a single low cost, high performance process.

BREAK C

2:20 PM - 2:35 AM – Rotunda

BREAK A, B & MANAGEMENT

2:30 PM - 2:45 PM – Rotunda

TECHNICAL TRACK C - POWERLINE CORRIDOR EXTRACTION New Content

2:35 PM - 3:50 PM – LAB 217

Learn semi-automatic and manual extraction of powerlines, towers, attachment points and clearances. Automatic classification of features and encroachment areas. Improved encroaching areas labeling tool as well as the automatic tower search and extraction tool will be introduced.

MANAGEMENT TRACK – EFFECTIVELY MARKETING PROCESS DISRUPTION

2:35 PM - 3:35 PM – Room 209

Presented by: Elaine Ball, CEO, Elaine Ball Marketing

Marketing equipment that fits into an established process is one thing, marketing and selling a product requiring an entirely new process is quite another. Elaine will discuss the challenges associated with marketing and selling a product requiring a complete reorganization and retraining of existing operations. Elaine will share how she uses social media and other medium as a means for to promote the adoption of not just TopoDOT® but the corresponding process across the transportation and civil infrastructure markets. In addition, Elaine Ball will introduce her company’s “Get Kids into Survey” initiative and discuss ways in which the TopoDOT® community can support that effort.

TECHNICAL TRACK A - SMART CELL

2:45 PM - 4:00 PM – LAB 218

Learn about the recent updates to the TopoDOT “Smart Cell” tools to create and place semi automatically common features in urban sites such as ramps, driveways, inlets, etc. Learn how to create the smart cell and place it. New ADA ramps features include dynamic measurements and labels. This class is suitable for participants somewhat familiar with the tools discussed in this class.

TECHNICAL TRACK B – SMART CELL

2:45 PM - 4:00 PM – LAB 216

Learn to use the TopoDOT “Smart Cell” menu tools to create and place semi automatically common features in urban sites such as ramps, driveways, inlets, etc. Learn how to create the smart cell and place it. See the latest updates to this tool, especially for ADA ramps. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C – UTILITY POLE EXTRACTION **New Class**

3:50 PM PM - 4:30 PM – LAB 217

Learn to use the new Utility Pole Extraction tool to easily identify, measure and label poles.

TECHNICAL TRACK A - ROAD EXTRACTION

4:00 PM - 4:30 PM – LAB 218

Learn to use advanced settings and the recent updates for the “Road Extraction” tool such as the boundary option. Discover how to change settings and use tool options in several different extraction examples and check the process quality using meshing techniques. Advanced extraction techniques for road surface, grade analysis, and slope grade and crown/peak point will be demonstrated. This class is suitable for participants somewhat familiar with the tools discussed in this class.

TECHNICAL TRACK B - ROAD EXTRACTION

4:00 PM - 4:30 PM – LAB 216

Learn how to extract road surface points using the “Road Extraction” tool. This class will demonstrate multiple extraction results from basic surface model to detailed surface model. Grade analysis and crown extraction will also be discussed. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK A - GROUND EXTRACTION

4:30 PM - 5:00 PM – LAB 218

Learn to use advanced settings for the “Elevation Grid” and “Elevation Along Path” tools. Discover how to change settings and use tool options in several different extraction examples. Advanced extraction techniques for rocky surfaces, slopes, heavy vegetation and low density will be demonstrated. The participant will learn about labeling ground points and editing points. This class is suitable for participants somewhat familiar with the tools discussed in this class.

TECHNICAL TRACK B - GROUND EXTRACTION

4:30 PM - 5:00 PM – LAB 216

Learn how to extract points from multiple types of surfaces to integrate in a Digital Terrain Model (DTM). The class will explore the different tools and settings available to best represent soft surfaces such as areas with vegetation, dirt, grass, etc. and hard surfaces such as paved areas or concrete pads. Multiple modes of extraction such as by grid, by path and by key points will be demonstrated as well as quality assessment of the results will be discussed. The participant will learn about labeling ground points, creating individual construction and permanent points and editing points. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C – NEW IN TOPODOT

4:30 PM -5:00 PM – LAB 217

Meet the TopoDOT developers and learn about the latest software advances. See upcoming TopoDOT tool projects and ask any questions of the development team. This same presentation is also given on the other tracks at other times.

| Time | Tuesday, May 07, 2019 | | | |
|---------------------|------------------------------|-----------------------------|-------------------------------|---|
| | Technical Track - Processing | | | Management Track |
| | Track A | Track B | Track C | Room 209 |
| | Lab 218 | Lab 216 | Lab 217 | |
| 7:00 am - 8:00 am | Registration / Breakfast | | | |
| 8:00 am - 9:00 am | Break-line Drape | Break-line Drape | Volume Calculation | Quality Analysis, Metadata and Provenance |
| 9:00 am - 10:00 am | Break | | Indoor 3D Modeling | |
| | Break-line Extraction - CEC | Break-line Extraction - CEC | | Break |
| 10:00 am - 11:00 am | | | | The Latest Innovations in TopoDOT® Extraction |
| 11:00 am - 12:00 pm | Technology Presentations | | | |
| 12:00 pm - 1:00 pm | Lunch & System Demonstration | | | |
| 1:00 pm - 2:00 pm | Break-line Editing- CEC | Break-line Editing- CEC | Substation Extraction | The Latest Innovations in TopoDOT® Analysis |
| 2:00 pm - 3:00 pm | | | Break | |
| 3:00 pm - 4:00 pm | Smart Cell | Smart Cell | Powerline Corridor Extraction | Effectively Marketing Process Disruption |
| | | | | |
| 4:00 pm - 5:00 pm | Road Extraction | Road Extraction | Utility pole Extraction | |
| | Ground Extraction | Ground Extraction | New in TopoDOT | |

Wednesday May 8th, 2019

REGISTRATION / BREAKFAST

7:00 AM - 8:00 AM – Rotunda / Dining Room

Registration will be open in the Rotunda all day.

KEYNOTE – NCDOT MOBILE LiDAR: APPLICATIONS AND QUALITY CONTROL

8:00 AM - 9:00 PM – Auditorium

*Presented by: Brian N. Flippin, PE, PLS, Terrestrial LiDAR Surveys Engineer - Location & Surveys Unit
NC Transportation*

NCDOT Location & Surveys Unit has been utilizing mobile terrestrial LiDAR since approximately 2010. This presentation will highlight some of the varied applications of the technology related to highway surveys and mapping for the Department. There will also be a discussion of how some early missteps led to our current QA/QC process and a better deliverable.

TECHNICAL TRACK A - ASSET EXTRACTION - 50 MINUTES

2 GENERAL CEC COURSE # 8945

9:05 AM - 9:55 AM – LAB 218

Learn to use the “Auto Asset Identification” tool to locate and label 3D features automatically and the “Asset Identification” tool for flat features as well as 3D features not located by the automatic tool. Advanced tools’ options and new settings will be explored such as look up table to train the tool to automatically identify cell, adjust height function and aligning cells to a centerline. The “Survey Point” tool will be also discussed to place single elevations with Labels. This class is suitable for participants somewhat familiar with the tools discussed in this class. *To collect CEC credits must take GIS Inventory class

TECHNICAL TRACK B - ASSET EXTRACTION - 50 MINUTES

2 GENERAL CEC COURSE # 8945

9:05 AM - 9:55 AM – LAB 216

Learn to use the “Auto Asset Identification” tool to locate and label 3D features automatically and the “Asset Identification” tool for flat features as well as 3D features not located by the automatic tool. The tools’ options and settings will be explored to extract information such as diameter, height, ground elevation, etc. The “Survey Point” tool will be also discussed to place single elevations with labels. This class is suitable for all participants new to TopoDOT. *To collect CEC credits must take GIS Inventory class

TECHNICAL TRACK C – WALL AND OTHER SURFACE MONITORING - 100 MINUTES

2 GENERAL CEC COURSE # 8951

9:05 AM - 10:45 AM – LAB 217

Learn to run analysis and export reports on retaining wall lateral deflection and settlement analysis using the “Wall Monitoring” tool. The latest updates for this tool will be demonstrated. Run multiple surfaces analysis using the “Plane Deviation” tool and “Floor Flatness” for visual and numerical evaluation of deviation from a plane. This class will emphasize how to prepare the data for analysis, how to read the results and will demonstrate some examples using the tools to detect deflection and general deformation on walls and floors.

MANAGEMENT TRACK – TOPODOT® APPLIED OUTSIDE OF TRANSPORTATION CORRIDORS

9:05 AM - 10:05 AM – Room 209

Presented by: Principal Scanning Surveyor at Balfour Beatty Major Projects UK

While the majority of TopoDOT® applications involve road and rail corridors, TopoDOT® performs extremely well in structural modeling and analysis applications. Mr. Nick Salmons, friend and longtime TopoDOT® user from across the pond, will present examples of TopoDOT® application to large industrial structures, tunnels, bridges, and more.

TECHNICAL TRACK A - GIS INVENTORY - 50 MINUTES

9:55 AM - 10:45 AM – LAB 218

Learn to create the attribute scheme to tag assets such as signs, poles, valves, etc. for asset inventory. Learn to edit element tags and export feature list. *To collect CEC credits must take Asset Extraction class.

TECHNICAL TRACK B - GIS INVENTORY - 50 MINUTES

9:55 AM - 10:45 AM – LAB 216

Learn to create the attribute scheme to tag assets such as signs, poles, valves, etc. for asset inventory. Learn to edit element tags and export feature list. *To collect CEC credits must take Asset Extraction class.

BREAK FOR ALL

10:45 AM - 11:00 AM – Rotunda

TECHNICAL TRACK A – DRAWING LINE-WORK FINALIZATION

11:00 AM - 12:00 PM – LAB 218

Learn to edit and finalize topographic drawings. This class will cover merging simultaneous drawings, using the “Drape Element to Intersection” to line up break lines, cleaning points along lines, use of “Visual Inspection” tool to check for missing elements. The instructor will also demonstrate how to use MicroStation tools to delete duplicates, match properties and compress files. This class is suitable for all participants new to TopoDOT and Project Managers.

TECHNICAL TRACK B – DRAWING LINE-WORK FINALIZATION

11:00 AM - 12:00 PM – LAB 216

Learn to edit and finalize topographic drawings. This class will cover merging simultaneous drawings, using the “Drape Element to Intersection” to line up break lines, cleaning points along lines and the use of “Visual Inspection” tool to check for missing elements. This class is suitable for all participants new to TopoDOT and Project Managers as well.

TECHNICAL TRACK C – SPEED ADVISORY

11:00 AM - 11:45 AM – LAB 217

Learn to run the “Speed Advisory” analysis tool to identify appropriate vehicle speed based on road curvature, slope and more. Create a visual and numerical report. This class is suitable for all participants new to TopoDOT.

MANAGEMENT TRACK – THE TOPODOT® PROCESS PROGRAM OPTIMIZES YOUR TEAM’S PERFORMANCE AND ROI

11:00 AM - 12:00 PM – Room 209

Presented by: Ted Knaak, President, TopoDOT.

TopoDOT® is not simply a software application, it is a process. The combined acquisition of point cloud project data feeding the TopoDOT® process is a disruptive departure from traditional survey workflows. The nature and characteristics of acquired data have changed. Personnel have been reorganized from the field to

the office. The demands of data storage and administration throughout the process challenge IT infrastructure. The successful implementation and execution of this process demands on-going supervision and accountability to assure the process is optimized for performance and ROI. Team TopoDOT® has implemented the new TopoDOT® Process Program. TPP is an intensive training program designed to develop the abilities of those persons responsible for coordinating and executing their team's execution of TopoDOT® process.

LUNCH

12:00 PM - 1:00 PM – Dining Room

CASE STUDY – TOPODOT EXTRACTION ON HIGH DENSITY AERIAL LIDAR SURVEYS

Presented by: Matthew LaLuzerne, PSM Vice President / Regional Operations Director & Trevor Tyson, Project Manager, GPI

1:00 PM – 1:45 PM – Auditorium

Enhanced sensor technology and strengthened aerial acquisition techniques allows for increased point density for aerial LiDAR projects. This presentation will use a large interstate transportation project to highlight techniques for extracting roadway features derived from aerial LiDAR using TopoDOT software. This demonstration will identify the methodologies traditionally used in mobile and static LiDAR and how they can be applied to airborne data. Other ancillary project benefits include high resolution colorized point cloud, ortho backdrops and accuracy verification.

CASE STUDY – FUSING UAS AND MOBILE LIDAR: THE SR417 CORRIDOR SURVEY

1:45 PM - 2:30 PM – Auditorium

Presented by: Michael Ehrhart, PSM, Maser Consulting, P.A. & Paul DiGiacobbe, FE, Principal Associate and Director, Maser Consulting, P.A

When approached to survey a critical section of SR 417 for the Central Florida Expressway Authority, Maser Consulting decided to attempt an industry first process: to collect mobile and UAS LiDAR with common control points and produce a tightly fused, high density, high precision point cloud as the basis for the corridor survey. This session will show how Maser conducted their field work, processed their data, developed deliverables and shared their solution with stakeholders.

CASE STUDY – DEFINING UNIQUE SOLUTIONS FOR AGE OLD PROBLEMS

2:30 PM – 3:15 PM – Auditorium

Presented by: Scott Osterhoudt, Mobile LiDAR Manager at ESP Associates, Inc.

Surveying a failing ninety plus year-old bridge using bathymetric, static, vehicle and boat mounted mobile LiDAR. Combining these tools facilitated a safer work zone, accelerated schedule, reduced fees, and highly accurate deliverables.

BREAK FOR ALL

3:15 PM - 3:30 PM – Rotunda

TECHNICAL TRACK A - AUTOMATIC PAINT MARKING EXTRACTION New Class

3:30 PM - 4:30 PM – LAB 218

Learn to automatically extract painted signs from LiDAR using the new “Paint Marking Extraction” tool. Easily extract painted signs such as arrows, speed restrictions and text (school, stop, etc.). Identify how to set the identification parameters and how to match them with the corresponding cell description. Identify when to use each of the 3 extraction methods for different levels of complexity and efficiency.

TECHNICAL TRACK B – NEW IN TOPODOT

3:30 PM - 4:00 PM – LAB 216

Meet the TopoDOT developers and learn about the latest software advances. See upcoming TopoDOT tool projects and ask any questions of the development team. This same presentation is also given on the other tracks at different times during Thursday.

TECHNICAL TRACK C - CLEARANCES AND CLASH DETECTION

3:30 PM - 4:30 AM – LAB 217

Learn to use the 3D classification tools to do an encroachment and clash detection analysis. Use the “Classify by Envelope along Path” tool to identify encroachment along a path for a specific profile. Use the “Classify by Rail Along Path” tool to find encroachment areas for a rail cart using the cord method. Use the “Classify by Vehicle Simulation” tool for clash detection using the sweep method. Learn to use clustering to label encroachment areas. This class will also advise how to prepare and export the results.

MANAGEMENT TRACK – TECHNICAL AND MARKET DIRECTION FORUM

3:30 PM - 4:30 PM – Room 209

Subsequent to the sponsor case study presentations, the last Management session will be conducted as a forum. An opportunity will be afforded for sponsors to answer questions and share further details about their specific case studies. A general discussion will then address the challenges and potential solutions for further integration of the geospatial, design, engineering, construction and infrastructure clients into a more coherent and organized process designed to exploit the value of point cloud technology, at minimum cost and technical risk.

TECHNICAL TRACK B - AUTOMATIC PAINT MARKING EXTRACTION New Class

4:00 PM - 5:00 PM – LAB 216

Learn to automatically extract painted signs from LiDAR using the new “Paint Marking Extraction” tool. Easily extract painted signs such as arrows, speed restrictions and text (school, stop, etc.). Identify how to set the identification parameters and how to match them with the corresponding cell description. Identify when to use each of the 3 extraction methods for different levels of complexity and efficiency. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK A – NEW IN TOPODOT

4:30 PM - 5:00 PM – LAB 218

Meet the TopoDOT developers and learn about the latest software advances. See upcoming TopoDOT tool projects and ask any questions of the development team. This same presentation is also given on the other tracks at other times.

TECHNICAL TRACK C – EXTRACTION OF FEATURE OUTLINES

4:30 PM - 5:00 PM – LAB 217

Learn multiple classification and isolation techniques to separate data features. Outline such features using clustering tools. Applicable to encroachment and tree canopy identification as well as any classification process for isolated data visual representation.

GOLF SOCIAL

8:00 PM - 11:00 PM – Top Golf

Enjoy an evening of entertainment and networking at Top Golf

| Time | Wednesday, May 08, 2019 | | | |
|---------------------|---|------------------------------------|---|--|
| | Technical Track - Processing | | | Management Track |
| | Track A | Track B | Track C | Room 209 |
| | Lab 218 | Lab 216 | Lab 217 | |
| 7:00 am - 8:00 am | Breakfast | | | |
| 8:00 am - 9:00 am | Key Note | | | |
| 9:00 am - 10:00 am | Asset Extraction - CEC | Asset Extraction - CEC | Wall and Other Surface Monitoring - CEC | TopoDOT® Applied Outside of Transportation Corridors |
| 10:00 am - 11:00 am | GIS Inventory- CEC | GIS Inventory- CEC | | |
| | Break | | | |
| 11:00 am - 12:00 pm | Drawing Line-Work Finalization | Drawing Line-Work Finalization | Speed Advisory | The TopoDOT® Process Program Optimizes Your Team's Performance and ROI |
| 12:00 pm - 1:00 pm | Lunch | | | |
| 1:00 pm - 2:00 pm | Case Study: TopoDOT Extraction on High Density Aerial LiDAR Surveys by GPI | | | |
| 2:00 pm - 3:00 pm | Case Study: Fusing UAS and Mobile LiDAR: The SR417 Corridor Survey by Maser | | | |
| | Case Study: Defining Unique Solutions for Age Old Problems by ESP | | | |
| | Break | | | |
| 3:00 pm - 4:00 pm | Automatic Paint Marking Extraction | New in TopoDOT | Clearances and Clash Detection | Technical and Market Direction Forum |
| 4:00 pm - 5:00 pm | | Automatic Paint Marking Extraction | | |
| | New in TopoDOT | | Extraction of Feature Outlines | |
| 8:00 pm - 11:00 pm | Golf Social | | | |

Thursday May 9th, 2019

BREAKFAST

7:00 AM - 8:00 AM – Dining Room

The Info Desk will be open in the Rotunda all day.

TECHNICAL TRACK A – LINE-WORK ASSESSMENT New Class

8:00 AM - 9:00 AM – LAB 218

Learn about line-work assessment tools in TopoDOT in this class. Tools such as the “Path Deviation” tool to check individual lines and the “Mesh Assessment Overview” to check surface quality will be demonstrated in this class as well as other checking techniques.

TECHNICAL TRACK B – LINE-WORK ASSESSMENT New Class

8:00 AM - 9:00 AM – LAB 216

Learn about line-work assessment tools in TopoDOT in this class. Tools such as the “Path Deviation” tool to check individual lines and the “Mesh Assessment Overview” to check surface quality will be demonstrated in this class as well as other checking techniques.

TECHNICAL TRACK C - TUNNEL EXTRACTION

8:00 AM - 9:00 AM – LAB 217

Learn to extract tunnel profiles semi-automatically using the “Tunnel Extraction” tool for excavated or rounded tunnels. A further example on how to use this tool inside a manhole will be discussed. Use the “Break-line Extraction” tool to semi-automatically extract tunnel profiles of tunnels with a rectangular cross section. Create mesh from surface profiles.

TECHNICAL TRACK A - FEATURE EXPORT

9:00 AM - 10:00 AM – LAB 218

In this session the “Export” toolbox will be discussed. The participant will learn to export all extracted features in a text format as well as all tagged features in both text and shape format. Customization of the exported data editing with “Element Tag Editor” tool will also be discussed. Symbology Manager features export and Sheet Extraction tool will be demonstrated to create a 2D print out version of the pointcloud at a specific cross section. Lastly learn to create a pointcloud raster image with the “Overview Image” tool.

TECHNICAL TRACK B - FEATURE EXPORT

9:00 AM - 10:00 AM – LAB 216

In this session the “Export” toolbox will be discussed. The participant will learn to export all extracted features in a text format as well as all tagged features in both text and shape format. Customization of the exported data editing with “Element Tag Editor” tool will also be discussed. Symbology Manager features export and Sheet Extraction tool will be demonstrated to create a 2D print out version of the pointcloud at a specific cross section. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C - SURFACE MODELING WITH DRONE DATA

9:00 AM - 10:00 AM – LAB 217

Learn how to extract terrain points from imagery based point-clouds. This class will explore how to use the drone data classification and editing tools to optimize ground extraction and qualify results. This class is suitable for all participants new to TopoDOT.

BREAK FOR ALL TRACKS

10:00 AM - 10:15 AM – Rotunda

TECHNICAL TRACK A – RAIL New Content

10:15 AM - 11:45 AM – LAB 218

Learn the basic automatic extraction of rail using the “Template Extraction by Direction” tool and clean up results with the “Rail Center Line Extraction” tool. Extraction assessment methods using rail gauge. Use the extracted lines with semi-automatic extraction of rail profile, centerline and 3D model of rail using the “Rail Extraction” tool for additional extraction control.. Extraction of rail line posts (towers) and powerlines will be demonstrated as well. See all the latest updates to this workflow. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK B - BRIDGE - 100 MINUTES

2 GENERAL CEC COURSE # 8946

10:15 AM - 11:55 AM – LAB 216

Learn basic extraction of bridge elements such as vertical and horizontal clearances, I-beam, super-elevation, columns and abutment 2D and 3D extraction and more. Beam creation using the new “Beams” tool. Introduction of the new “Vertical Clearances” tool as well as extraction of horizontal clearances will be reviewed. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C - ROAD PAVEMENT CONDITION ANALYSIS

10:15 AM - 11:45 AM – LAB 217

Learn the use of the “Road Condition” tools to create a condition analysis of road distress (road wear) and to generate a PCI index report using the ASTM 6433 standards. This class will demonstrate how to prepare the data for the analysis, create bounding lines, run the analysis tool, interpret the results and export a report. Create an optimized mesh using results. Tool updates and latest additions will be demonstrated.

LUNCH

12:00 PM - 1:00 PM – Dining Room

TECHNICAL TRACK A - BRIDGE - 100 MINUTES

2 GENERAL CEC COURSE # 8946

1:00 PM - 2:40 PM – LAB 218

Learn basic 2D and 3D extraction of bridge elements such as I-beam, super elevation, columns, abutment and more. New I-beam creating techniques will be demonstrated. Introduction of the new “Vertical Clearances” tool. Extraction of horizontal clearances will be reviewed.

TECHNICAL TRACK B – RAIL New Content

1:00 PM - 2:30 PM – LAB 216

Learn the basic automatic extraction of rail using the “Template Extraction by Direction” tool and clean up results with the “Rail Center Line Extraction” tool. Extraction assessment methods using rail gauge. Use the extracted lines with semi-automatic extraction of rail profile, centerline and 3D model of rail using the “Rail Extraction” tool for additional extraction control.. Extraction of rail line posts (towers) and powerlines will be demonstrated as well. See all the latest updates to this workflow. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C – GRADE ANALYSIS

1:00 PM - 1:35 PM – LAB 217

Learn to extract and analyze any surface grade with TopoDOT. Run a report on surfaces such as sidewalks, parking lots and more for slope changes identification. This class is suitable for all participants new to TopoDOT.

TECHNICAL TRACK C - TOPOGRAPHY PROJECTION New Content

1:35 PM - 2:15 PM – LAB 217

Learn to re-project line-work using “Topography Projection” tool using known points on a construction line. This class will demonstrate the use of this tool to adjust line-work to an adjusted pointcloud. This class is also available Monday at 3:05 PM on Track C.

BREAK FOR C

2:15 PM - 2:30 PM – Rotunda

TECHNICAL TRACK C - POINT-CLOUD ANIMATION AND VIDEO EDITING

2:30 PM - 5:00 PM – LAB 217

Learn techniques for optimal fly-through creation of point-cloud data in MicroStation. Use fly through tools to position camera and create path. Record fly through and capture screen images. See a demonstration of how to merge and edit visuals using Microsoft Movie Maker.

BREAK FOR B

2:30 PM - 2:45 PM – Rotunda

TECHNICAL TRACK B – BEGINNER PROJECT WORKFLOW

2:45 PM - 3:45 PM – LAB 216

This session is a review basic project set up, data loading and linear extraction for new users.

BREAK FOR A

2:40 PM - 2:55 PM – Rotunda

TECHNICAL TRACK A – MOBILE DATA WORKSHOP

2:55 PM - 5:00 PM – LAB 218

This session is a review of the entire road training program with emphasis on completing a section of a sample scanned highway corridor using mobile data and images.

TECHNICAL TRACK B – STATIC DATA WORKSHOP

3:45 PM - 5:00 PM – LAB 216

This session is a review basic road training program with emphasis on completing a section of a sample urban corridor using static (terrestrial) LiDAR data and images.

| Time | Thursday, May 09, 2019 | | |
|---------------------|------------------------------|---------------------------|--|
| | Technical Track - Processing | | |
| | Track A | Track B | Track C - Monitoring |
| | Lab 218 | Lab 216 | Lab 217 |
| 7:00 am - 8:00 am | Breakfast | | |
| 8:00 am - 9:00 am | Line-Work Assessment | Line-Work Assessment | Tunnel Extraction |
| 9:00 am - 10:00 am | Feature Export | Feature Export | Surface Modeling with Drone Data |
| 10:00 am - 11:00 am | Break | | |
| 11:00 am - 12:00 pm | Rail | Bridge - CEC | Road Pavement Condition Analysis |
| 12:00 pm - 1:00 pm | Lunch | | |
| 1:00 pm - 2:00 pm | Bridge - CEC | Rail | Grade Analysis |
| 2:00 pm - 3:00 pm | | | Topography Projection |
| 3:00 pm - 4:00 pm | Mobile Data Workshop | Beginner Project Workflow | Pointcloud Animation and Video Editing |
| 4:00 pm - 5:00 pm | | Static Data Workshop | |