



APSG 43 SPRING MEETING

THE IMPACT OF AUTOMATION

ON THE GEODETIC WORKFLOW



APSG
THE ASSOCIATION OF
Petroleum Surveying & Geomatics

FRIDAY, MAY 8, 2020
VIRTUAL | ONLINE WEBINAR

AGENDA

VIRTUAL WEBINAR

8:30 - 8:45 AM CT

Welcome & Chair Updates

Chris Echols | *APSG Chair*

8:45 - 8:50 AM CT

Introduction To "The Impact of Automation On The Geodetic Workflow"

Stacey Lyle | *APSG Education Chair*

8:50 - 9:10 AM CT

Software Report Card: Does Not Work Well With Others

Kevin Tomanka | *Business Development Manager, OARS LLC*

9:10 - 9:30 AM CT

The Digital Crew Change

Ellen West Nodwell | *IntegraShare Dimensions, LLC*

John Conner | *CVV Consulting*

9:30 - 9:50 AM CT

Automated Infill Optimization For A Marine 3D Seismic Survey

Damian Hite | *Founder, ACTeQ*

Dave Ridyard | *Advisor, ACTeQ*

9:50 - 10:10 AM CT

Automated Data Processing Of C4G Continuously Operating Stations For Land Subsidence In Louisiana

Ahmed Abdalla | *Center for Geoinformatics (C4G), LSU*

10:10 - 10:20 AM CT

Intermission / Break

10:20 - 10:30 AM CT

APSG Education Foundation Updates & Scholarship Presentations

Ellen West Nodwell | *Chair, APSG Education Foundation*

10:30 - 10:50 AM CT

Voice Activated Automation Geospatial Data Modeler

William Lyle | *Student, Texas A&M Student*

10:50 - 11:10 AM CT

Photogrammetric Modeling Of Subterranean Features Through 3D Software Analysis

Jorge Sepulveda | *Student, Texas A&M Student*

11:10 - 11:30 AM CT

Working With Change: Staying Current When Standards Change

Kris Berglund | *Vice President of Sales, BlueMarble Geo*

11:30 - 11:50 AM CT

BIM Integrations For Operations

Mark Stevens | *Digital Innovations, Microsoft*

11:50 AM - 12:00 PM CT

Conclusion & Thanks

Chris Echols | *APSG Chair*

**8:30
AM**

Welcome & Chair Updates

Chris Echols. APSG Chair | chair@apsg.info

Our current Chair will welcome attendees to this online event, providing updates on membership within the Association of Petroleum Surveying and Geomatics (APSG) as well as any upcoming events.

**8:45
AM**

Introduction To "The Impact Of Automation On The Geodetic Workflow"

Stacey Lyle. APSG Education Chair | education@apsg.info

Our current Education Chair will provide an introduction to the theme of this meeting, laying the groundwork for the topics our presenters will cover throughout the morning and relating these innovations to our perspectives fields.

**8:50
AM**

Software Report Card: Does Not Work Well With Others

Kevin Tomanka. Business Development Manager, OARS LLC

This presentation will cover a few software tools that are currently in use for geophysical data and database integration. It will also cover an example of Deep Learning applied to image detection and point clouds from photos made from ROV video. These tools are powerful, but there are limitations that are preventing them from entering the mainstream - this will be discussed. Many of these limitations are man-made and could be avoided through standardization of products and across industries. However, the incentive to have a unique solution in order to stand out from competitors is still driving markets at this time. In order to change this, a culture shift will need to occur in order to get the sharing of at least some of the information collected in the field. Questions that arise are obviously who will lead this effort, and where and in what formats will the information be stored?

**9:10
AM**

The Digital Crew Change

Ellen West Nodwell. IntegraShare Dimensions, LLC

John Connor. CVV Consulting

Over the last five years - and beginning several years ahead of that - the concepts of using "big data" and "real-time" data in maps have launched and risen to be headlines in any GIS, geoscience, or IT discussion that you hear. In the world of surveying, the use of drones and increasingly sophisticated technology to acquire information has emerged as the attractive topic for many conferences, training seminars, and go-to technologies for operators to manage the oil field through all of its lifecycles, beginning at the green fields, continuing through the abandonment of fields. The fact is, the headline "digital oilfield" is out there. Decisions are made on data, as they have been increasing since the mid-1990's - but the data is not your grandfather's data. This talk explores the differences in your grandfather's data (or your father's data) or even the data from early in our own careers and today's data, which is undergoing a "digital crew change". It addresses the fact that in our industry, there is data that exists on maps that were hand-drawn early in the 20th century that is meaningful today, and since that time, more data that exists in old forms and formats can be harvested and combined with the "new data" to give a whole picture on which better decisions can be made than with just the "new generation" data. This requires a combination of people collaborating, using their best skills in geodesy, GIS, and spatial data management to do the harvesting and creation of databases that contain the historical picture that can be integrated with newer data for a variety of purposes.

9:30
AM

Automated Infill Optimization For A Marine 3D Seismic Survey

Damian Hite. Founder, ACTeQ
Dave Ridyrd. Advisor, ACTeQ

2D and 3D seismic surveys represent a major investment early in the hydrocarbon exploration cycle. Uncertainty in weather conditions and ocean currents create significant risk. In this paper, we use an example from East Canada to illustrate how an automated GIS workflow based on historical data, can be used to quantify and minimize these risks.

9:50
AM

Automated Data Processing Of C4G Continuously Operating Reference Stations For Land Subsidence In Louisiana

Ahmed Abdalla. Center for Geoinformatics (C4G), LSU

The GULFNET consists of more than 120 Continuously Operated Stations (CORS) that are run by the Center for Geoinformatics at Louisiana State University. The massive total number of daily Global Navigation Satellite Systems (GNSS) data files collected from these stations over time requires an automated technique for processing. The main tasks for processing the CORS archive is to study the land subsidence in Louisiana by means of Precise Point Positioning (PPP) using GIPSY-X software. The land subsidence affects the vertical control components for the height system in Louisiana and statewide. The National Height Modernization System is led by the US National Geodetic Survey (NGS) to improve the vertical component of the National Spatial Reference System (NSRS). NSRS combines 3D position of the point in addition to scale, gravity, and orientation and their variation with time. Hence, by the precise determination of land subsidence, the vertical component in Louisiana will be improved. Various and useful open source utilities will be addressed and used in handling large data sets such as used in this study. The automation procedure for the processing of GNSS data is based on data preparation and downloading parameters and orbit data that involved with ocean loading, troposphere, and ionosphere impact. For the sake of data preparation, conversion, and compression, a number of programs (e.g., `runkpr00`, `TEQC` and `Hatanaka`) are automated to obtain files in RINEX (Receiver Independent Exchange) format with GIPSY-X. The satellite parameters and orbit data are downloaded from their FTPs and websites and saved locally in the same manner. The last stage is to call GIPSY-X using the generated GIPSY tree file which utilizes the downloaded and converted data sets individually for daily PPP over a single station. We process 16-station data sets from January 2013 to June 2019 (2372 days). For more optimal performance, we put stations in jobs and use GNU Parallel to execute 4 jobs in parallel. The automation script is written using both Perl scripting under LINUX platform. The time-series (2372 days, 16 stations) have been processed in 5 days using a PC by means of automation and parallel computation. This means that about 317 daily files are processed in one hour when processing 4 stations simultaneously.

10:10
AM

Intermission / Break

A brief (10 minutes) break will be provided before presentations continue.

10:20
AM

APSG Education Foundation Updates & Scholarship Presentations

Ellen West Nodwell. Chair, APSG Education Foundation

Members of the Board governing APSG's sister organization - the APSG Education Foundation - will provide attendees updates on this group. This includes the scholarships and award programs it has developed for Texas A&M University students as well as recent recipients of these awards.

10:30
AM

Voice Activated Automation Geospatial Data Modeler

William Lyle. Student, Texas A&M

Using speech recognition software "Voice Activated Data" assists in creating and displaying information without the use of manual/physical interaction with the data. Flash-floods or other episodic events often require a temporal capture from real-time databases. A data manager can activate a geospatial data workflow by issuing a voice activated command from a "smart watch/phone" to capture specific datasets with argumentative parameters. This process executes a string of events that produces a shared graphical visualization on internally or externally with a hosted web service. This presentation will provide the workflow, tools, and results of a voice activated automation geospatial data modeler using USGS flood gage data as a case study.

10:50
AM

Photogrammetric Modeling Of Subterranean Features Through Three-Dimensional (3D) Software Analysis

Jorge Sepulveda. Student, Texas A&M

LiDAR is a popular and accurate method for mapping that can be utilized for three-dimensional (3D) model analysis. However, the equipment set-up and usage can become tedious, and ultimately impractical when applied to locations that are remote and confined in nature. In this investigation, 3D analysis was conducted within a cave system. With this, limitations of LiDAR technology in these conditions become prominent; mapping non-planar surfaces can cause a potential decrease of the quality of the point cloud data. In all, a LiDAR application would be an inefficient use of methodology to conduct this investigation. This prompted a need to set-up and conduct a photogrammetric based evaluation. With this, smartphone camera technology was used in conjunction with free-to-use software and 3D modeling applications. Through the use of photogrammetric concepts and structure from motion software, a 3D model of the cave can be generated. Long term, this model can also be utilized to document the impact and health of the cave system. For the methodology, the on-site portion of the investigation relies heavily on smartphone camera technology. The procedure draws parallels to drone paths; specifically, two flight-plans were developed to evaluate different perspectives within a 15-by-15 meter space in the cave. Within each flight path, the use of photo overlapping techniques established a denser and more fluid point cloud model. Once the data was processed, two different three-dimensional models of the cave were created. From those models, the point cloud data was extracted in order to merge the two separate models. Afterwards, the models underwent several format conversions in order to import it into the Unity game engine. The final results is an accurate 3D model of the cave that is viewable and playable in a simple video game platform.

11:10
AM

Working With Change: Staying Current When Standards Change

Kris Berglund. Vice President of Sales, BlueMarble Geo

The old saying, "Standards are great, there's so many to choose from" makes positioning work interesting, to say the least. Trends come and go, standards change, and those that stick around in an industry adapt or get made irrelevant by advances. Modern businesses with long histories have to be able to follow standards and make business rules, but then also react to changes in those standards, and smoothly transition to new standards as they emerge. Standardization is a perennial concern in the geodetics world as technologies from different sources are used in workflows and best practices change with modernization. This talk will cover changes we have encountered in recent geodetics history and discuss solutions for safeguarding against them both now and in the future.

11:30
AM

BIM Integrations For Operations

Mark Stevens. Digital Innovations, Microsoft

The use of hyperspectral sensors to help enhance the digital twin environment adds additional lifecycle features that enable more efficient condition monitoring. An overview of a coordinated Building Information Modeling (BIM) service supporting the digital lifecycle of 3D/2D model integrations will be discussed to support the HoloLens and the delivery of "model load packages", which allows the user to view the various models required to integrate with HoloLens features. Detailed asset views converted from static drawings enable a full 3D view of the individual components. The use of embedded sensor data is used to augment the BIM model which supports its use in Digital Twin projects.

11:50
AM

Conclusion & Thanks

Chris Echols. APSG Chair

Final remarks and questions.