OREGON GNSS USERS GROUP
MEETING MINUTES

Date: January 20, 2023

Location: Salem Convention Center—Salem, Oregon

Board Members Present: Ken Hoffine, Chair (outgoing)
Samantha Tanner, Chair (incoming)
Alycia Lenzen, Chair Elect (incoming)
Eric Zimmerman, Treasurer
Chris Munson, Secretary

Called to Order: 1:00 pm
Adjourned: 4:25 pm
Contact Hours: 3.0 hours

Business Meeting (1:00-1:10)

- Introduction by Ken Hoffine, Chair.
- Treasurer's Report by Eric Zimmerman: $10,529 in funds at the beginning of 2022, $1550 in dues paid, $1518 in outgoing expenses (primarily June 2022 meeting expenses) and $10,561 currently in bank account.
- Secretary's Report by Chris Munson: 303 contacts in OGUG's email list and 57 paid members for 2023 as of the meeting. Chris thanked Ken Hoffine, Samantha Tanner and Eric Zimmerman for their service on the Board for 2022.
- Elections: Alycia Lenzen was nominated for the position of Chair Elect for 2023 by Chris Munson and the nomination was seconded by John Minor. Alycia was elected by unanimous vote of the members present. Samantha Tanner, Chair Elect for 2022, moves into the position of Chair for 2023 per OGUG bylaws. No one ran for the positions of Treasurer or Secretary, and Eric Zimmerman and Chris Munson will continue in those positions for 2023.

Phaseout of 3G Cellular Networks and its Effect on Real Time GNSS Networks, by Jarrett Price of Frontier Precision (1:10-1:30)

- Jarrett gave his personal background.
- Overview of presentation:
    - Requirements for real-time GNSS survey.
    - Evolution of mobile broadband technology.
    - Phaseout of 3G cellular networks.
- Requirements of a real-time GNSS survey:
    - GNSS/NTRIP capable receiver.
    - NTRIP capable controller.
    - Internet service.
- Evolution of mobile broadband technology: 1G to 5G.

    - 2G had up to a 50 mile range, but slow speeds. 5G has only a range of 1,000 feet for its very highest speeds.
- Phaseout of 3G services per FCC:
    - AT&T began phaseout February 2022.
    - Verizon to end have ended its phaseout by December 2022.
    - T-Mobile has various phaseouts depending on the system (T-Mobile, now merged with Sprint, has two separate cellular technologies).
- Older data collectors/controllers and GNSS units with 3G internal modems on their chipsets will no longer work once your cellular carrier's 3G phaseout has occurred in your area. You can still use an external device such as a hotspot from your cell phone or a dedicated device such as a Verizon Jetpack MiFi as long as it uses 4G or newer technology.
- "What If" discussion:
    - Use a hotspot on your phone or an external portable Wi-Fi device if you were previously relying on a 3G internal modem.
    - Check compatibility before heading out into the field when using any new device. Certain cellular carries will deny your device's access if it is deemed not supported, and sometimes this denial is delayed, with a device that appears to work later being denied without warning.

Improving Maritime Safety using Real-Time GNSS Networks, by Jon Dasler of David Evans and Associates (1:30-2:10)

- Published inland navigation charts are low resolution, and there are potential conflicts with deep draft ships with respect to bridge clearance.
- DEA is using multibeam sonar, GPS and inertial navigation systems to remap.
- Examples of this remapping were shown, including the Houston ship channel and a 250-mile segment of the Mississippi River.
- Datasets not only used for navigation, but also for modelling, training & development, and research & development.
- Resulting data is used in piloting software.
- The drydock in Portland is one of the few in the Pacific capable of working on cruise ships. This led to the charting of the Lewis & Clark Bridge at Longview, Washington.
- An example of measuring air draft of a cruise ship in Fort Lauderdale was given, using GPS, salinity measurements, tides, and hand measurements.
- DEA uses the Oregon Real-time GNSS Network (ORGN) in conjunction with NOAA tide stations to track air draft of ships in real time.
- Q&A session.

Break (2:10-2:25)

Overview and Discussion of Current and Pertinent GNSS Research, by Chase Simpson of Oregon State University (2:25-3:20)

- OPUS-S and OPUS-RS solutions by Gillins et al (2019).
    - Longer observations equals better results.
    - OPUS-RS better than OPUS-S at 2 hours of observation time.
    - No significant improvements in OPUS-S after 4-5 hours.

- Single base versus network RTK by Allahyari et al (2018).
    - For single base solutions, no real improvement in horizontal accuracy for GPS-only versus GPS+GLONASS. Some improvement was observed in vertical accuracy using GPS+GLONASS over GPS-only.
    - New NGS draft guidelines for RTK control recommend 300 second occupations based on this research.
- Hybrid GNSS Survey Networks by Weaver et al (2018) and Gillins et al (2019).
- RTN Accuracies from the ORGN by Simpson et al (2021).
    - Three repeat observations gives high accuracies, no real improvement in additional observations.
    - Three hours between observations recommend by NGS draft guidelines and this paper.
- Developing a Network Processing & Adjustment Workflow (January 2022-June 2024), funded by the Oregon Department of Transportation (ODOT) and a work in progress.
- Automated workflow for monitoring RTN stations.
    - Uses OPUS Projects.
    - Outputs a daily report and a time series plot for comparison.
- Implementation of real-time surface monitoring for active landslides.
- Atmospheric disturbance classification and estimation using novel sensors and sensor data fusion. Funded by DARPA (February 2021-April 2023).
- Adapting GNSS reflectometry for coastal monitoring (tides). Funded by NOAA (October 2021-September 2024).

ODOT Online Geodetic Control Database, by Chris Pucci of the Oregon Department of Transportation (3:20-3:55)

- Inspired by WashDOT, NGS and Wisconsin.
- Example of beta web interface:
    - Can add other layers besides control using other GIS features, possibly including mobile lidar data from ODOT.
- Intended that information can be added in an automated process, then QA/QC checked by a real person.
- Timeline:
    - 9-12 months for first online tools.
    - Around 2 years for a complete working system.
- Chris made a call for “what am I missing” to the audience for suggestions to improve the database project.

Oregon Real time GNSS Network Changes in 2022, by Eric Zimmerman of the Oregon Department of Transportation (3:55-4:25)

- Station upgrades were made in 2019-2021 in concert with Central Washington University for the Shake Alert program.
- Several station upgrades were made to full GNSS capability or GPS+GLONASS capability.
- All ODOT stations are now at least GPS+GLONASS capable. Most PBO stations are as well, with the exception of Medicine Mountain, which is still GPS only.
- ODOT recently partnered with Idaho, adding 3 Idaho stations to the ORGN.
- FAQ’s.

- Overview of what ODOT sees in the Spider software.
- Example of a Spider rover log.

Adjourned at 4:25 pm

Minutes APPROVED by board majority (Tanner 2/3/2023, Lenzen 2/3/2023, Zimmerman 2/4/2023, Munson 2/20/2023)

Respectfully submitted,

Chris Munson, Secretary
Oregon GNSS Users Group