Oregon GPS User Group Workshop: NGS OPUS and HTDP

Date: Friday, October 16, 2009

Time: 8:30 am to 4:00 pm

Location: Linn County (Fairgrounds) Expo Center:
http://www.lcfairexpo.com/Maps%20and%20Directions.htm
3700 Knox Butte Rd
Albany, OR 97322

Workshop Topics:

National Geodetic Survey:
- Online Positioning User Service (OPUS)
- Horizontal Time Dependent Positioning (HTDP)software

Abstract: This workshop features Joe Evjen and Chris Pearson of the National Geodetic Survey (NGS) explaining the use, intricacies and future enhancements of the NGS Online Positioning User Service (OPUS) and the NGS Horizontal Time Dependent Positioning (HTDP) software. If you are a user or potential user of OPUS, this workshop will provide crucial information to you so you can use OPUS effectively and within good survey practices, avoiding critical mistakes that can affect the accuracy of your GPS positions.

If you have questions or concerns about the use of OPUS, then this workshop is for you.

OPUS is an on-line processing service offered by NGS that allows you to e-mail GPS observation files on a point to NGS. Then OPUS software computes the position for your site referenced to several NGS CORS stations. The resulting position is mailed back to the user within minutes; however, most surveyors want to know what is going on in the background with OPUS. This is your chance to find out and talk directly with NGS about your questions.

HTDP software allows users to predict horizontal displacements and/or velocities at locations throughout the United States and its territories. This software also enables users to update geodetic coordinates and/or observations from one date to another. HTDP is used internally by the NGS OPUS processing, so even if you don't use the HTDP software yourself, it is important to understand how OPUS uses HTDP.

Speakers:

Christopher Pearson - NGS Advisor for Illinois

Chris Pearson lives in Springfield, where he works with the Illinois Department of Transportation to maintain and improve geodetic control in Illinois. He was instrumental in establishing Illinois's height Mod program. He gives numerous short courses and guest presentations in Illinois and surrounding states. He is also responsible for maintaining the model of crustal deformation, and HTDP that the NGS uses to correct coordinates and survey data for tectonic motion in the western US. Chris has a PhD from the University of Otago in New Zealand where his PhD concerned the measurement of crustal deformation on the New Zealand plate boundary.

Joe Evjen - NGS Supervisory Geodesist - Silver Springs, MD

Joe began his NOAA career aboard hydrographic survey ships MT MITCHELL and RUDE following graduation (honors) in 1990 from the University of Florida's surveying and mapping program. More recently, Joe helped manage nationwide high-accuracy GPS survey projects and now focuses on improving NGS products and guidelines

as chief of the National Geodetic Survey's Standards and Applications branch. Joe also participated in the development of the OPUS website and publishing function.

Cost: **$50.00** if registration received **by October 7.**
$65.00 if registration received **after October 7 and at the door**.

Bonus: A delicious catered lunch is included in your registration fee.

How to Register:

1. Download the workshop registration form:

http://ogug.net/Oregon%20GPS%20Users%20Group%20Workshop%20Flyer2.pdf

2. Fill out the form and mail with your check (payable to the ***Oregon GPS Users Group***) to the OGUG address on the form.

3. Now, that is easy. See you at the workshop.

Workshop Outline:

Morning Session

9:00 OPUS History and Development
Speaker: Joe Evjen, NGS

1. Why did the NGS create OPUS and offer it to the public?
2. Is OPUS being fully used as intended?
3. What are some of the pitfalls when using OPUS to control small projects?
4. How should QA checking be performed using OPUS.
5. When should OPUS-S or RS not be used?
6. Will OPUS incorporate GNSS (non GPS) satellites into future solutions?
7. Review recent changes and any proposed changes to OPUS processing rules.
8. Review measuring antenna heights to the ARP and relative and absolute calibrations.
9. Review current datum, adjustments, and epochs including ITRF, latest WGS84 updates, and NAD83 adjustments up through NSRS 2007.
10. Explain how ionospheric and tropospheric distortions affect OPUS solutions and how are they accounted for in processing through Pages and RSGPS.

10:15 Break

10:30 HTDP and the OPUS Connection
Speaker: Chris Pearson, NGS

1. How often is the HTDP national CORS velocity model updated?
2. Are the UNAVCO PBO west coast CORS velocities part of the current model and included in NSRS2007?
3. Are OPUS versions updated to correspond with HTDP updates?
4. What percentage of input horizontal velocity data is estimated or interpolated vs. measured?
5. Would it be appropriate to have a menu choice of HTDP versions when using OPUS particularly for different regions of the country?
6. Was HTDP used to update CORS positions for the NSRS 2007 adjustment? Why was there such a shift in west coast CORS positions as reflected in the picture below?
7. What are the plans for a vertical time displacement program?
8. Consider discussing a review of vertical datum in US: NGVD 29 and its adjustments in Oregon, and NAVD88. Will Gra D require a new vertical datum?
9. Review Geoid03 and what is a hybrid model? How will the GravD (pure gravimetric) model be different and implemented in processing software and OPUS?

NOON: Lunch (catered lunch included in registration fee)

Afternoon Session

1:00 Interpreting OPUS-S and RS Results
Speaker: Joe Evjen, NGS

1. Detail the OPUS standard and long form reporting.
2. What are the key factors to consider in reviewing the output long form?
3. How is the NGSIDB using OPUS (one time positions) contributing to the clarity of NSRS 2007?
4. What is the functional difference between the RSGPS program and PAGES.
5. Explain the RSGPS network and rover modes. Explain how OPUS-RS (GIS) processing works?
6. Explain in detail how to use PAGES to do our own least squares solution in place of the OPUS average position solution?

2:15 Break

2:30 OPUS Project, OPUS Datasheet, Database, GIS, and Future Plans
Speaker: Joe Evjen, NGS

1. Would the NGS consider a ?National Survey? in 2010 to update FBN and CBN station positions throughout the nation and combine them with CORS positions for a new NSRS 2010 or 2011? Seems like this would provide consistent ~30k spacing for 'measured' position and velocity determinations when compared with previous measured data and provide for a true near simultaneous 'measured' NSRS adjustment?

2. Are OPUS positions destined to be the datasheet preferred solutions over blue booked data for FBN and CBN observations? Is there a plan form to blue book measured data for OPUS ?preferred? solutions for the IDB?

3. What are the future plans for OPUS Datasheets? Will they replace the current PID Datasheet making it superseded?

4. What is the 'big picture'? How CORS, OPUS (all flavors), Height Mod, GravD campaign, new geoid models, real-time networks, all fit together for the future of surveying, positioning and geodesy.

5. Explain how OPUS GIS 'single frequency' and what data requirements will be necessary.

6. What is the future for existing monumented passive bench marks given the increased understanding of subsidence and uplift? How will GravD be correlated with current NAVD88 NGS bench marks?

7. What is the NGS current view for the future of geodetic positioning?

Note: The Oregon GPS Users Group is a 501(3)(c) non-profit corporation organized to promote the use and understanding of the Global Positioning System (GPS) for surveying, mapping, and geographic information systems; to provide a forum for the exchange of information among members and the general public; to advance local, State, and Federal GPS strategies and legislation; and to promote the understanding and establishment of standards and guidelines. For membership information see our website at www.ogug.net