NOTES FROM ELEVATION FIT MEETING

At PSU, August 4, 2010

About 30 people in attendance.

Brandt Melick, FIT Lead:

Thanks to those in attendance, and those who participated in series of presentations over the previous day. Notes from all of those presentations will be posted on the Elevation FIT page.

This meeting is just the beginning of an important conversation about LiDAR and related issues including costs, standards, collaboration and cooperation, as well as common needs and applications.

Milt Hill, FIT Coordinator:

Thanks to Brandt for volunteering to be Elevation FIT Lead, and thanks to Emmor Nile for several years of hard work as previous Elevation FIT Lead.

Larry Sugarbaker, USGS: (did not catch Larry's title, National Coordinator of …?)

Will be speaking about where the National LiDAR Program is headed at USGS. First, must recognize the GIS and LiDAR innovations here in Oregon. USGS regards Oregon as one of the "leadership states", due in large part to efforts of people like Sheri Schneider and Cy Smith.

Brief history of topographic information at USGS. Begins with 1879 survey work. First DEM in 1975. Since then, rapid evolution of technology, makes possible the local production of high-quality maps, bringing about a shift in the federal role, no longer the sole map-maker. Currently a wide range in level of organization among the states. Oregon well ahead of most.

At USGS, topography supports wide variety of science missions. Exising NED, 10-meter (1/3 arc-second). Vertical error as much as 12 feet. Much of nation built on data acquired during 1960s and 1970s. At this point, only 15-20% is derived from LiDAR (1/9 arc-second), but more is currently in process. Some is available through CLICK, more will soon be.

USGS has received some stimulus funds, has invested some in LiDAR data acquisition. Specifications are now in Version 13, and V 14 is under development. Eight states have statewide LiDAR programs, 7 others (including Oregon) with non-statewide initiatives underway. Most, if not all, depend in some part on federal funding.

USGS is undertaking a National Assessment of LiDAR needs in part to better understand to what degree USGS needs to support these state programs. In turn, many of these states contribute data to CLICK, which has been underfunded, and a large backlog has developed but is being worked on.

Use of LiDAR at USGS extends across full spectrum of science missions, goes way beyond just having high-res topography. Have identified as many as 75 uses.

Concept of "elevation" is changing and evolving. Now includes third dimension, multiple types of surface features. The level of accuracy introduces new technical challenges, e.g., culverts and modeling water flow. Vendors also challenged to develop software tools.

National "drivers" of LiDAR include:

- NOAA and Shorelines
- NRCS and Farm Practices
- FEMA and Risk MAP
- USGS Carbon Cycle Studies

Plus a long list of other science applications, but these are the currently the big ones.

Why a National LiDAR Program? Number of critical applications; need for additional coverage; recently-acquired data inconsistent and difficult to integrate. Surveys suggest that elevation data is perhaps the most important type of data to users, certainly one of the most important.

USGS needs support from state and local as well as other federal agencies to achieve goal of having a national program. Development of program will involve examination of costs and benefits, congressional analysis, examination of alternative program scenarios. Costs of the assessment will be shared among several federal agencies.

Starting with some assumptions, the National Program will be or must be:

- Built on partnerships
- Use standards to maximize interoperability
- Be conducted in concert with federal and state programs
- Balance data requirements with costs and benefits
- Offer both on-demand data download and data services
- Use best available technologies
- Spawn new applications and new user communities

Five Elements of the National Assessment:

- Documentation of business needs and inventory of existing data
- Analysis of business needs
- Assessment of emerging technologies and related issues
- Analysis of technology infrastructure altenatives
- Development of Program Implementation Scenarios
  (e.g., ranging from more distributed to more centralized)

Begin assessment in FY10, complete assessment in FY12, begin implementation in FY13.

Near-term activities (FY10)

- Coordinate LiDAR planning through National Digital Elevation Program (http://www.ndep.gov/)
- Best Practices and standards to enhance ongoing collection
- Invest in expanded collection activities
- Initiate the National Assessment

Q & A: How can/will Oregon participate in the National Assessement? A: Pull together our business needs, inventory of existing data, description of acquisition programs.

Chris Wayne, Crater Lake National Park: "LiDAR at Crater Lake National Park 2010"
USGS Cascades Volcano Observatory and Federal Highway Admin. willing to fund LiDAR for 70% of the Park. Five other partners were found to fund the remaining 30%. Park has 2-meter bathymetry for the Lake, but only 10-m DEM for terrestrial topography. LiDAR will support a "seamless" hi-res topographic/bathymetric dataset. Potential applications include geology, veg mapping, fish habitat restoration, fire effects and recovery, water rights analyses. Challenges encountered: mechanism for transfer of funding to contracting agency, snow cover.

Chris Zeitner, City of Springfield: "Local Government Applications of LiDAR"
Four examples were illustrated:

1. New Hillshade and Slope models to replace 10-meter products. Compared to previous creation of slope information, dramatic savings in time and cost to produce, and more accurate.
2. Investigation of filling on specific site.
3. Hi-res cross-sections of waterways in Glenwood area, important stormwater conveyance and wetland issues.
4. Riparian corridor shading analysis, highest-hit grid provides input to DEQ shade model. Fast, automated, saves staff time and improves staff safety (property access).

Future uses likely to include impervious surface determination, urban forestry, land cover, others…

George McFadden, BLM: "BLM Use of LiDAR and Related Data"

Initial driver was vegetation analysis and stand management. Need high-res data, otherwise don't get actual treetops (misses the very top and creates underestimate), and need good penetration to ground in order to get accurate height information.

Panther Creek Watershed, a "LiDAR Laboratory". Several consecutive years of LiDAR data. Applications include landslide movement, soil carbon sequestration studies, stream/culvert sedimentation using CulSed model, cable cross-sections, mine cleanup, habitat studies, invasive species mapping in Nevada with hyperspectral data.

John English, DOGAMI: "Oregon LiDAR Consortium Specifications and Deliverables"

History of LiDAR technology, not all LiDAR is the same. In early years, contracting agencies had relatively poor technical understanding, trusted the vendor, hard to objectively assess data quality. In more recent years, emergence of accuracy standards, better understanding of the technology, academic publication and wider exposure. DOGAMI has worked hard on behalf of OLC to be an informed consumer.

OLC Goals:

- Large contiguous areas
- Anchored by interested parties
- Supplemental funding from additional partners
- Common benefit of shared acquisition

Federal, state, local, tribal, lots and lots of participants in the OLC

Review of OLC, Data Deliverables, Quality Assurance, Accuracy Assessment

Jake (?), US Army Corps of Engineers: LiDAR Acquisition along Columbia River

Full 8 pt/m^2 coverage of the entire River from mouth to source, 500-year floodplain buffered by about 1 km. Eventual goal is to make the point clouds and DEMS and other deliverables available in some manner, yet to be determined. Will be acquired at times of low tide and low flow, but not necessarily "lowest".

Brandt Melick, FIT Lead: Review of FIT composition and participation. Open to new participants. Current members in attendance each had an opportunity to make (very) brief comments, indicating the most important issues from their perspective:

- Asked for a show of hands regarding keeping elevation data publicly accessible (all raised hand) - consensus
- DOGAMI (John English standing in for Ian Madin): Accuracy and continuity of data
- USFS (Michael Golden): sharing of data, consistency
- BLM (Susan Nelson): could go with lower density on "east side" of state
- ODF (Emmor Nile): aviation hazards for low-flying aircraft, distribution of data to public users

- ASPRS (Doug Smith): standards, feature extraction
- OWRD (Bob Harmon): relation to NHD Framework, accuracy and consistency
- USGS (Sheri Schneider): partnerships and funding, expanding coverage statewide
- DAS-GEO (Cy Smith): standards that don't place limits on federal agencies' funding abilities
- PSU (David Percy): distribution, time-stamping
- FIT Lead (Brandt Melick): ability to share data, support for local needs, sustainability

Closing remarks from Larry Sugarbaker.