

## Montana Height Modernization Forum Report

Conducted October 17, 2006 8:30 AM to 4:30 PM at Montana Department of Transportation (MDT) headquarters conference room, Helena, Montana. Very well attended with 39 people representing a very broad spectrum of federal, state, county, city, vendor, and private firms.

**Agenda:** (start/stop times are approximate)

8:00 to 8:30 Attendee Sign In/Setup

8:30 to 8:45 Introductions/Opening Remarks – Loran Frazier, MDT; Dave Davis, MDT  
Loran Frazier, MDT Chief Engineer, welcomed attendees and addressed the needs for improved heights, not only by MDT but the state as a whole. Dave Davis, MDT Survey Section, also welcomed the group and the out of state participants.

8:45 to 9:05 State of Vertical Control in Montana - Curt Smith, NGS

Vertical control in Montana, and surrounding states, is questionable at best and the way we do business to update and maintain our vertical network has to be modernized.

9:05 to 9:20 National Height Modernization Program Overview – Zelda LeCoat, NGS

Zelda provided historical background of the Height Modernization initiative and an overview of the states currently involved in height modernization efforts.

9:20 to 10:30 Height Modernization for Montana - Renee Shields, NGS

Renee described in detail the Federal Grants process, how funds are appropriated, how funds are directed and used, etc. This is the process which Montana needs to embrace to achieve a height modernization program in the state.

10:30 to 10:50 Break – refreshments provided by MDT

10:50 to 11:40 Height Modernization; a State Perspective – Paul Hartzhiem, WIDOT

The Wisconsin Department of Transportation is in the middle of a very successful height modernization project which will ultimately cover Wisconsin. Paul describes their state plan and how it has evolved into an extremely comprehensive effort which will usher a modern approach to developing and maintaining heights in Wisconsin.

11:40 to 1:00 Lunch – on our own

1:00 to 1:50 Height Modernization Primer; GPS-derived Heights – Curt Smith, NGS

Leveled orthometric heights, GPS-derived ellipsoid heights, gravity and modeled geoid heights, how they're established and their relationships. How can we modernize our approach to establishing and maintaining accurate heights with the tools at our disposal with emphasis on conditions in Montana.

1:50 to 2:15 Panel Q&A; Identification of Discussion Topics – All

2:15 to 2:30 Break – refreshments provided by MDT

2:30 to 2:45 Focus Group Instructions - Renee Shields, NGS

2:45 to 3:45 Focus Group Discussions – Attendees

3:45 to 4:15 Focus Group Reports - Focus Groups

4:15 to 4:30 Wrap Up and Questions

These presentations with short author biographies are available on the NGS Internet site at: <http://www.ngs.noaa.gov/heightmod/events.shtml>. Click on “Montana” from the “Events” page.

There was great discussion generated relative to the need for an improved height process in Montana throughout the day. The Focus Group discussion and reports centered around the

following seven questions with group reports. The reports were created by each assigned group so there may be some duplication.

**1. What approach should Montana take to create the user network they need to support height modernization?**

- A. Gather together examples of what might have been prevented or mitigated with better/more height info.
  - 1. Floodplain mapping
  - 2. Being able to evaluate situation if more bench marks were available
- B. Put together a group of people such as DNRC, DOT, City, County, MARLS, University, etc.
- C. Outreach Program headed by NGS, University, AMFM
- D. Education of potential participants
- E. Survey of needs – identify and prioritize users
- F. Involvement of utilities, government agencies, vendors, private surveyors
- G. Political support
- H. Geographical and population density issues
- I. Who leads?
- J. Evaluate other’s process and effectiveness
  - This group today:
    - 1. Agree on who will lead the process
    - 2. Process: ID stakeholders/partners/supporters and their needs: surveyors, GIS, Agencies, utilities; present models from other states; agree on a strategy for implementation
    - 3. Implement: political support, fundraising, construction

**2. What should NOAA/NGS be doing to promote/support height mod?**

- A. Public education – identify who should be educated
- B. Administer and organize
- C. Distribute the data
- D. Quality control
- E. Training – especially hands on
- F. Education of industry
- G. Technical assistance and data management and standards
- H. R&D (GNSS)
- I. National CORS network?
- J. Help MT through grant process – liaison people to help states get started
- K. More communication, meetings – geared to consumers – website – coordination to see what other states are doing.

**3. How can the private sector become involved in promotion of height mod?**

- A. Lobby government officials encouraging the development of HM - Assist in development of a strategic plan – needs assessment
- B. Private sector can keep momentum moving in the next phase
- C. Monumentation by private sector – contracts

- D. Private offices operating the own base stations
- E. Does private sector mean just Surveying/ Engineer Community or other areas?

1. Who?

- Construction
- Agriculture
- Mining / Oil and Gas
- Surveying / Engineer. Firms
- Trucking and Rail
- Transportation and Airports

2. How?

- Letters of support
- Identify their needs and benefits
- Committee to create plan/ Help write
- Committee to review plan
- Bring plan to Congressional Delegation
- /user thru Congress/ Federal process

3. Implementation:

- Committee to prioritize projects
- Contract work to do
- Standards review/ protocols

**4. What are the educational challenges that go with establishing height mod in Montana?**

- A. Educate public of the impact of datum changes
- B. Awareness of datums; education for people using new datums
- C. Educate counties and cities on HM issues
- D. Public education to HM benefits
- E. Identify projects
- F. Connection between vertical and horizontal (i.e. HM helps horizontal)
- G. Specific example of Benefits and cost saving
- H. Define technical requirements
- I. Document benefits in term of dollars

**5. What if any expectations are there now for MDT to bring height mod to Montana? If not MDT, who? And who would develop the plan?**

- A. Need a statewide entity to manage.
- B. Regional representatives or committees
- C. Include MARLS
- D. MDT has contracting authority
- E. Representatives from MDT, regions and MARLS develop plans
- F. MDT is public entity
- G. More eyes and ears to keep system maintained
- H. Public agency can accept and redirect Federal Funds
- I. MARLS is supporting MDT to take the lead because they have the resources, contract admin., experience, etc.
- J. MLIAC supports MDT; if not MDT then possibly a University
- K. MDT would be a partner in developing the plan, with the group identified in Question 1.

L. MARLS representing private surveyors would know areas of need.

**6. How can MONTANA get a pilot program or survey to show the benefits of height mod?**

- A. Grad student could take on pilot project; gather data, etc.
- B. Dave says that MDT already has enough info for pilot project.
- C. Need – capabilities – political clout
- D. Why do we have to duplicate efforts – look at existing projects
- E. Water resources and wetlands management
- F. Irrigation
- G. Pilot the process of partnering, participating and funding
- H. Become part of a currently funded or soon to be funded project. Ex. Superfund sites

**7. What activities, issues, can be addressed by a height mod program?**

- A. Development –sewer, storm water, highway Planning
- B. Flood plain
- C. GIS spur better horizontal network and remonumentation of PLSS
- D. Some crop issues
- E. Fuels - Pipeline transmission
- F. Statewide control database - digital formats - lessen cost of terrain based mapping
- G. Flooding
- H. Horizontal Drilling (Oil and Gas Exploration / extraction)
- I. Coal, Liquefaction / water quality
- J. Aerial Photography control
- K. Energy Transmission
- L. Ground Water/ Right and studies Monitoring wells
  - 1. Quality (e.g. Nitrates)
- M. 911 Emergency response (Flood Hazard spills), Quarries
- N. Agriculture – Flood irrigation
  - 1. GIS –Mapping infrastructure
  - 2. Fertilizer
  - 3. Pesticides
  - 4. Seeding
- O. Irrigation projects
- P. Rural water systems \_development for fires
- Q. Transportation construction and rail
- R. Statewide densification
- S. Eliminate “local” datums
- T. Standardizing user data – ex. Floodplain maps
- U. Level elevations (ortho) on CORS stations
- V. Reduce cost for local entities for data acquisition
- W. Eliminate costly problems

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