

Meeting Summary – 9:00 a.m. to 12:40 p.m.  
**NM Height Modernization Working Group**  
 – Meeting #3

November 2, 2007, Offices of Bohannon Huston  
 7500 Jefferson New Mexico State University – Las  
 Cruces, NM

Persons present:

Garry Nielsen, NM DOT - Co-chair  
 Earl F. Burkholder, NMSU - Co-chair  
 Bill Stone, NM Geodetic Advisor  
 Dr. Sonya Cooper, NMSU - ET&SE Dept Head  
 Kathy Rogers, Verde Realty  
 Scott Croshaw, Wilson & Company  
 Alan Benham, Bohannon Huston  
 Erle Wright NMAC Santa Fe County  
 Larry Brotman, NMGCAC

Appendices to this summary include:

1. Agenda for the Height Modernization Working Group #3
2. Summary Working Group Meeting #2 – August 31, 2007

Introductions were made by everyone and all were welcomed to the meeting. The meeting accommodations were excellent and gracious thanks were conveyed to Alan Benham and Bohannon Huston for the hospitality. Garry Nielsen moderated the meeting and Earl F. Burkholder agreed to keep notes.

Larry Brotman noted that the URL in Meeting Summary #2 should be [www.gac.state.nm.us](http://www.gac.state.nm.us). Records and information regarding the NM Height Modernization Working Group are posted there for everyone's benefit. No other revisions to Meeting Summary #2 were offered.

Under "reports" Burkholder noted that a summary of the Digital Precise Leveling Workshop was distributed along with the summary of meeting #2. Briefly, the leveling workshop was considered to be very successful. The ACSM/NMPS Student Chapter at NMSU sponsored the 2-day workshop at NMSU on September 28 & 29, 2007. Proceeds of the workshop will be used to help send NMSU students to the annual ACSM Student Team Competition coming up in Spokane, Washington, March 6, 2008. Instructors for the workshop were provided by the National Geodetic Survey (NGS) and the Texas Height Modernization Program out of Corpus Christi, Texas. Retired

NMSU Department Head, Professor James P. Reilly, also attended and contributed to the success of the workshop. Modern digital levels and associated instrumentation for the workshop were provided (loaned) by NGS, Texas Height Modernization program, NM DOT, and Surveyors Service Company of Albuquerque.

The Digital Precise Leveling Workshop at NMSU was a follow-up to the GPS Height Workshop given June 23, 2007, in El Paso, Texas, by the Texas Height Modernization Program. The 2-day September workshop included lecture, discussions, field work, working at a computer in the lab, and some data processing. The consensus of the Working Group (with input from those attending the September workshop) was that a follow-up "session II" workshop that included additional discussions and practice with NGS Blue Booking procedures would be very useful. It was also agreed that a repeat of the "session I" workshop in the Albuquerque area would also be very beneficial. Bill Stone (and others) will investigate the availability of NGS leveling experts to come to NM in April 2008 for the purpose of repeating session I and following up with session II on blue-booking.

Bill Stone then reported on attending the NM Floodplain Management Association (NMFMA) semi-annual meeting in Farmington on October 26, 2007. He presented an executive overview of height modernization at the meeting and shared some of the power point slides included in Kathy Rogers' presentation at the NGS Forum at Las Cruces in May 2007. There were about 65 persons attending the NMFMA meeting and the interaction was very good. Tom Loomis shared experiences from Arizona and gave enormous support to Mr. Stone's comments. Bill will attempt to get Height Modernization on the agenda for the NMFMA Annual Meeting in Las Cruces, NM in June, 2008. Bill Stone also noted he had just attended the ESRI Southwest Users Group (SWUG) meeting in Santa Fe. He was able to distribute NGS information on Height Modernization to SWUG.

There followed a general discussion of the role of FEMA, the U.S. CORPS of Engineers, and local organizations with regard to flood plain mapping, levees, maps, and community involvement. It seems Height Modernization is a fundamental part of the civil infrastructure that needs careful attention. It appears a lot of work needs to be done in New Mexico.

Mr. Stone also reported on the NGS Height Modernization Teleconference. It is somewhat catch-as-catch can. NGS Height Modernization Program Manager, Rene



Shields, was not able to participate in the September 2007 call but NGS Chief Geodesist, Dr. Smith, did present an overview of the impact of gravity on height modernization. Part of the distribution files following the telecon show the NOAA proposed "Regions" for a National Height Modernization Program. Under that scenario, New Mexico will be included with Texas and be part of the Height Modernization Program administered by the Texas Spatial Reference Center at the Conrad Blucher Institute of Science and Surveying at Corpus Christi, Texas. General discussion followed as to possible organizational scenarios.

Earl F. Burkholder and Sonya Cooper described the activities related to getting Height Modernization included in the NMSU 2009 Federal Initiative. In October 2006 a summary of Height Modernization was presented to a review panel of the NMSU Research Office and Height Modernization was subsequently included as a \$600,000 earmark for New Mexico in 2008. Earmark funding was not supported by Congress for 2008. Although earmarks funding has been used successfully in 10 different states for Height Modernization in the past 10 years, earmarks are not viewed as a reliable source for support. But, we were able to make an "up-date" presentation to the same NMSU review panel in October 2007 for possible funding in 2009 and we were told that Height Modernization will be included in the NMSU Federal Initiative for 2009. Follow-up work will be required to identify scope and components of an overall NM Height Modernization program. Burkholder and Cooper of the NMSU Department of Engineering Technology and Surveying Engineering (ET&SE) will pursue same.

Larry Brotman and Erle Wright lead an interesting discussion on organizational structure of state agencies and history of spatial data activities within New Mexico. It seems geospatial technologies have the attention of the Office of the Chief Information Officer and that progress is being made on several fronts. But, the challenge appears to be coordinating efforts and identifying interactions between agencies and disciplines. Several examples include the state parcel layer for cadastral parcels, the GIS data bases being built by the various counties, activities of the NM DOT, and activities of Earth Data Center at UNM. We need to identify ways to leverage existing support and including more users in an overall campaign to build support for Height Modernization from the bottom up. It was also suggested that we invite Dr. Gary Jeffress, Director of the Texas Height Modernization program to attend the next meeting of the NM Height Modernization Working

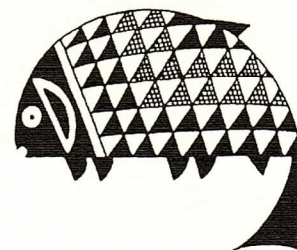
Group. Burkholder will follow-up with that and work with Garry Nielsen at DOT to begin several task-order efforts.

During the previous discussion Erle Wright also described the NM Association of Counties as being consumers of spatial data. Each of the 33 counties in NM is involved with land use planning as well as infrastructure development. As such, they may be helpful in finding ways to support federal funding for various projects related to Height Modernization. We also touched on topics such as the role of the NM Board of Licensing for Professional Engineers and Professional Surveyors as related to minimum standards, the Administrative Code for licensing both surveyors and engineers, policy statements, the NM Professional Surveyors contribution and use of a lobbyist, and the use of web sites for spreading the Height Modernization message. The NGS web site [www.ngs.noaa.gov/heightmod/](http://www.ngs.noaa.gov/heightmod/) already contains an enormous amount of excellent material.

Under new topics we briefly considered each item listed on the agenda and came back to the possible role of vendors in Height Modernization. It is apparent that each vendor has much to offer their customers in expertise, equipment, and support. The challenge is to find the right combination (balance) of sales pitch and technical support while recognizing the strengths of each vendor. It was suggested that we invite vendors to participate in the future in some appropriate manner. Garry Nielsen will talk with vendors to pursue ideas and arrange a possible meeting/session at which all can participate on a level playing field.

Under the "do now" category it was agreed we need to pursue mark recovery and identify what benchmarks still exist, what benchmarks already have good GPS values on them and to identify those areas needed new/additional marks established. Garry Nielsen passed around a map made by DOT that shows some of the work the DOT has done to date. It appears to be an excellent start. Feedback from counties should also be solicited to aid in identifying current status of existing control and areas where additional control is needed.

Finally, we tentatively decided to meet again on January 11, 2008, in Socorro, NM. Burkholder will contact Dr. Jeffress to see if he might be able to attend. Bill Stone will see about getting NGS expertise here for the follow-up leveling workshops in April, 2008,





Larry Brotman will collect/provide additional information on activities of the statewide parcel Working Group and the Geospatial Advisory Committee (GAC), Burkholder and Cooper will work on possible organization and funding sources, Alan Benham will investigate making a presentation to the American Consulting Engineers Council (ACEC), Kathy Rogers will provide additional information on the "new city" project of the Verde Realty group in Southern New Mexico, and Erle Wright will gather information on the Municipal League.

Meeting adjourned at 12:40 p.m.

Respectfully submitted – Earl F. Burkholder, PS, PE

#### Appendix 1 - Agenda

##### Height Modernization Working Group Meeting #3

- Date: November 2, 2007  
 Place: Bohannon Huston, Inc.  
 7500 Jefferson St., NE  
 Albuquerque, New Mexico 87109-4335  
 Time: 9:00 a.m. to 12 noonish  
 Contact: Alan Benham, PE, PS (505) 798-7899  
 or mobile (505) 228-8661
- I. Welcome and Introductions
  - II. Record (minutes) of previous meeting – August 31, 2007
  - III. Reports:
    - A. Digital Leveling Workshop  
 Burkholder/Croshaw/Benham
    - B. Presentation to NM Floodplain Management Association  
 Stone
    - C. Monthly NGS Height Modernization Teleconference  
 Stone
    - D. NMSU Legislative Initiative  
 Burkholder/Cooper
    - E. Opportunities for interaction with NM Association of Counties  
 Wright
    - F. Web posting of Working Group Activities  
 Nielsen
  - IV. Possible new discussion items:
    - A. Role of vendors in Height Modernization
    - B. How does Height Modernization interface with GPS Real-Time Networks?

- C. Explore possibilities of leveraging current interest for funding from multiple sources – state/federal/local/private
- D. Where to from here?
- E. Make-up of Working Group
- F. Other?
- V. Next meeting – Time and place
- VI. Adjourn

#### Appendix 2

Meeting Summary – 1:30 to 4:15 p.m.

##### NM Height Modernization Working Group – Meeting #2

August 31, 2007, Shaw Conference Room, Goddard Hall

New Mexico State University – Las Cruces, NM

Revised November 3, 2007 to show correct link to NM Geospatial Advisory Committee

#### Persons present:

Garry Nielsen, NM DOT - Co-chair  
 Earl F. Burkholder, NMSU - Co-chair  
 Bill Stone, NM Geodetic Advisor  
 Dr. Sonya Cooper, NMSU - ET&SE Dept Head  
 Dave Cooper, President NMPS  
 Dr. Kurt Wurm, NMSU ET& SE Dept.  
 Kathy Rogers, Verde Realty  
 Scott Croshaw, Wilson & Company  
 Alan Benham, Bohannon Huston  
 Steve Beyerlein, BLM State Office

#### Appendices to this summary include:

3. Agenda for the meeting
4. Report from Erle Wright, Santa Fe County
5. List of possible Height Modernization activities
6. Notice of Precise Digital Leveling Workshop at NMSU Sept 28/29, 2007

Bill Stone gave us a number of brochures describing NGS, Height Modernization, and NOAA activities (NGS is a part of NOAA). The NGS web site is also quite informative.

Following welcome and introductions, Garry Nielsen moderated the meeting. Earl F. Burkholder took notes and will write a (this) meeting report.

No revisions were offered for the (minutes) Summary of Working Group Meeting #1. It was noted that information about activities of the Height Modernization Working



Group are posted on the NM Geospatial Advisory Committee (GAC) web site courtesy of GAC Chair, Larry Brotman. Interested persons are invited to visit the web site, register for login, and find the link to "New Mexico Height Modernization Workgroup." [www.gac.state.nm.us](http://www.gac.state.nm.us)

Under "reports" Burkholder noted that discussions of Height Modernization have been part of the New Mexico Professional Surveyors (NMPS) Annual Program in each of the past 2 years, that periodic reports are made to the NMPS Board of Directors (the most recent being August 10, 2007), and that NMPS President, David Cooper, is present as part of the Height Modernization Working Group.

Burkholder also noted that NMSU Dept Head, Dr. Sonya Cooper, is attending the meeting and very interested in learning more about what Height Modernization will really involve and how NMSU can contribute to overall program success.

Finally, he called attention to the Digital Leveling Workshop to be held at NMSU and presented the report received from Erle Wright who could not attend today's meeting. A separate attachment as noted above describes each item.

Garry Nielsen summarized the precise leveling that NM DOT is doing and described the precise leveling workshop held in Colorado in October 2006. As moderator he also interjected numerous items relating to DOT throughout the meeting.

Bill Stone summarized the history of Height Modernization and gave an excellent overview of challenges associated with funding. Congressional earmarks have been successfully used by a number of states in the past but earmarks came under "disfavor" in the current budget cycle where federal funding occurs under "continuing resolutions" and does not contain funds for "earmarked" projects. The NGS is investigating a National Height Modernization effort in which funding would not come under the earmark umbrella. A national program would be conducted on a "regional" basis with New Mexico being grouped with Texas, Oklahoma, and Kansas under the Height Modernization program already operating out of Corpus Christi, Texas. That program is administered by the Conrad Blucher Institute for Surveying & Science under the leadership of Dr. Gary Jeffress.

During the discussion Dr. Wurm asked if formal certification will be required as a part of non-federal participation in Height Modernization. He related the question to the state requirement for NM licensed surveyors to meet the Minimum Standards for establishing survey control. Bill

discussed the NGS "blue-booking" process and described current NGS guidelines for performing geodetic surveys. It appears this area deserves careful consideration by various stakeholders – NGS, NMPS, NM DOT, & NM Board of Licensure.

Bill also noted the importance of broad local support of Height Modernization to the federal congressional delegation. As a federal agency, NGS and federal employees are prohibited from lobbying but the NGS is willing to assist in assuring consistency in the message delivered to the legislative process. There was also a short discussion about the potential for state level support and utilizing matching funds in support of an overall effort. The NM DOT mandate is more specific (narrow) while NMSU as an educational institution has more latitude in developing collaborative efforts. NM DOT is better positioned to accomplish specific tasks immediately while NMSU will need a clear vision and some time to develop appropriate resources (training materials, curriculum, distance education) in support of our Land Grant mission in which the entire state is our campus.

According to Bill, NGS Chief Geodesist, Dru Smith, is developing a 1-2 page summary outlining the importance of gravity and its role in developing a better geoid model. Bill also mentioned the Flood Plain Managers' Annual Meeting in Farmington, October 17-19, 2007, and the SouthWest Users Group meeting in Santa Fe, Oct 30 to Nov 1, 2007.

Garry described DOT involvement in the NGS Geodetic Advisor program, deployment of continuously operating reference stations (CORS) for DOT uses, the importance of automating the "blue-booking" processing, anticipation of the on-line user positioning service (OPUS) database service from NGS, and the immediate need for an inventory of existing 1<sup>st</sup> and 2<sup>nd</sup> order control points throughout the state. There is an immediate need for 1<sup>st</sup> order leveling to the existing CORS installations and a long-term need for gravity observations throughout New Mexico.

Dr. Cooper then outlined the overall educational mission of NMSU as realized through extension, research, and service and noted that NMSU has a venue for workshops, courses, training, summer courses, field schools and the like. But we need to look at many activities and do a careful job of establishing priorities.

Dr. Wurm described some of his activities in working with the NM Taxa-





tion and Revenue Department in modernizing the cadastral parcel database. While that effort focused on horizontal rather than vertical, there are some obvious parallels of approach and ultimate benefits.

The discussion portion of the agenda was quite fruitful but did not follow item by item.

Dr. Cooper re-iterated that we need more discussion of "what does NM want?" Everyone seemed to agree that establishing priorities is something we need to do. Kathy Rogers noted the importance of reliable control in new subdivisions and Garry commented on the value of the presentation Kathy made at the May Forum on the Hatch flood of 2006. Flood plain maps are critical and based upon reliable benchmark elevations.

Burkholder noted that a number of states have established spatial data reference centers (Washington, California, Louisiana, Texas) or, as in the case of New Mexico, the Physical Science Laboratory (PSL) at NMSU in working with the NMSU Geography Department proposed a "Center for Excellence in Geospatial Science" to be established using earmarked funds in 2007 (the funding never materialized).

Garry drew an organizational diagram on the whiteboard to show how the NM Geospatial Advisory Committee reports to the Office of the Chief Information Officer (Roy Soto) and has a number of Working Groups coming under the GAC umbrella – one being the Height Modernization Working Group. Concurrently the DOT organizational chart shows Rhonda Faught as being the Cabinet Level Secretary and (his boss) Robert Ashmore, DOT Chief Information Officer.

Other items included DOT's need for information on costs for establishing both horizontal and vertical geodetic control points and the need for a Guidebook (standards and specifications) on establishing geodetic control for DOT projects/applications.

The next meeting of the Height Modernization Working Group will be in late October or early November in Albuquerque. Wilson & Company and Bohannon Huston both offer meeting facilities/accommodations. Kathy Rogers is to identify particular events and propose a specific date – Friday November 2, 2007, is a possibility.

Meeting adjourned at 4:15 p.m.

Respectfully submitted – Earl F. Burkholder, PS, PE

Meeting Summary – 9:00 a.m. to 12:28 p.m.  
**NM Height Modernization Working Group – Meeting #4**

January 11, 2008, Tripp Room, Skeen Library  
 New Mexico Tech – Socorro, NM

**Persons present:**

Earl F. Burkholder, NMSU - Co-chair  
 Bill Stone, NM Geodetic Advisor  
 Dr. Sonya Cooper, NMSU - ET&SE Dept Head  
 Dave Love, NM Tech Bureau of Geology  
 Glen Thurow, Land Links Albuquerque, NM  
 Larry Brotman, NM Tax & Revenue  
 Dr. Gary Jeffress, Director – Blucher Institute of Surveying & Science at Texas A&M University, Corpus Christi, Texas

The proposed agenda for the meeting is attached as an Appendix to this summary.

In the absence of Co-Chair Garry Nielsen, Earl F. Burkholder moderated the meeting. Introductions were made all around. The facilities and hospitality were excellent. Burkholder promised to express our sincere thanks to Dr. Bowman, Chair of the NM Tech Department of Earth & Environmental Science for making the arrangements.

There being no corrections or changes made to the Minutes of Working Group Meeting #3, they were approved as published. With thanks to Larry Brotman, minutes of all previous Working Group Meetings are accessible on-line at [www.gac.state.nm.us](http://www.gac.state.nm.us).

Bill Stone reported that Curt Smith, NGS leveling expert, would be available for a digital leveling workshop tentatively planned for Albuquerque in April, 2008. Day one will be a repeat of the digital leveling workshop held in Las Cruces on September 28 & 29, 2007, and Day Two would focus on office procedures and Blue-Booking. NMPS (along with the Student Chapter at NMSU) will be invited to share in sponsoring the workshop (and in sharing in the proceeds).

Larry Brotman described activities of the NM Parcel Working Group related to fire suppression and associated resource allocation. He also described the difference between digital formats, paper-based media, warehousing spatial data, and partnering with local agencies. He noted that, for the most part, Tax & Revenue is not interested in elevations so much as horizontal boundaries and attributes. Glen Thurow briefly discussed his activities of working with federal agencies, digitizing 7.5 minute maps,



and eventual addition of height to the GCDB. It was noted in either case that horizontal is a natural by-product of a height modernization effort and, when using modern 3-D positioning technology, horizontal comes with vertical. Larry also noted the Parcel Working Group had recently conducted a very productive web-cast meeting which brought persons together from various locations while remaining at their desks.

Dr. Cooper announced that NMSU had recently been successful in obtaining a grant for the Geography Department, the Physical Science Laboratory, and the Engineering Technology & Surveying Engineering (ET&SE) Department from the National Geo-Spatial Intelligence Agency (NGA) for establishment of a "Geospatial Center of Excellence" for the purpose of enhancing the workforce capability of the agency. The primary benefit for ET&SU will probably be softcopy photogrammetry workstations for the photogrammetry lab. Dr. Frank is working to refine scope and develop a budget. The Geography Department is budgeted to hire additional faculty under the grant. Dr. Jeffress noted that the NGS National Height Modernization Program desires to partner with local "spatial reference centers" and described the process by which the Texas Spatial Reference Center was established. It takes a lot of work, coordination, vision, and support from various sources for it to become a reality.

Bill Stone reported on a meeting held December 17, 2007, convened by Garry Nielsen and held at NMDOT in Santa Fe, at which a number of vendors participated in a discussion of the vendor role in Height Modernization. The meeting was held with the idea of keeping lines of communication open for all parties.

Burkholder and Stone reported briefly on the NGS teleconference call on January 10, 2008, in which Height Modernization many persons (callers exceeded the number of telephone lines available) from all over the United States participated in a 90 minute discussion on a wide range of topics. The first topic was Height Modernization Program Development and the process by which HM grants are developed, evaluated and funded – see below. Other incidental discussion included outreach, events, software development, and standards & specifications. The call

ended with an invited presentation by Charles Geoghegan from the NGS Instrument Facility in Corbin, Virginia on transferring NAVD88 heights to Continuously Operating Reference Stations (CORS). Another conference call is scheduled for the second Tuesday in February.

Next, Dr. Gary Jeffress, lead a broad-ranging discussion of steps needed to establish a Height Modernization program in New Mexico. He is the Director of the Blucher Institute of Surveying & Science at Texas A&M in Corpus Christi and Principal Investigator for the current year cycle for Height Modernization Program in Texas. They have invited the New Mexico State University to submit a joint Height Modernization Program proposal to NGS and the letter of intent has already been submitted. The full proposal is due February 11, 2008. He provided background on the history of Height Modernization and how it started about 10 years ago in California. Since then approximately 10 states have participated and height modernization has been largely funded with congressional earmarks. In 2006, the earmarks for Height Modernization amounted to about \$10M. Congress failed to pass a budget in December 2006 and the federal government operated using "continuing resolutions" sans earmarks. NGS had to scramble to develop a line item in their budget for a National Height Modernization program that will function without earmark funding. The Broad Agency Announcement inviting proposals for the current year states that \$9.5M has been allocated for Height Modernization – nationwide. Dr. Jeffress noted the importance of developing productive relationships with persons in the congressional/legislative process.





Action items are for NMSU to work with Dr. Jeffress and Texas A&M to develop and submit a full proposal if invited to do so by NGS on January 18th. (Follow-up note - in a subsequent communication from NGS, the total funding is now about \$5M and we are invited to submit.)

No time or place was decided for the next Working Group meeting. Stay tuned.  
Meeting adjourned at 12:28 p.m.

Respectfully submitted – Earl F. Burkholder, PS, PE

### Appendix 1 - Proposed Agenda Height Modernization Working Group Meeting #4

Date: January 11, 2008  
Place: Tripp Room, Second Floor, Skeen Library  
New Mexico Tech  
Socorro, New Mexico 87801  
Time: 9:00 a.m. to 12 noonish (maybe a bit beyond)  
Contact: Robert S. Bowman, Chair  
– Earth & Environmental Science (505) 835-5992 (he reserved the room in his name for us)

- I. Welcome and Introductions  
Nielsen
- II. Acknowledge contribution/participation of hosts – NMT/Bowman  
Burkholder
- III. Approve minutes of November 2, 2007 meeting  
Nielsen
- IV. Brief Reports:
  - A. Workshops in Spring -  
Stone
    1. Repeat I (Digital Leveling) in Albuquerque
    2. Add II (Blue-booking) in Albuquerque
  - B. Activities of statewide Parcel Working Group  
Brotman
  - C. Leverage and funding (Dr. Jeffress attending today)  
Burkholder/Cooper

- D. Presentation for Consulting Engineering Council  
Benham
- E. Information on “new city” project by Verde  
(future program?)  
Rogers
- F. Role of vendors in Height Modernization – report of meeting  
Nielsen
- G. NGS Height Modernization Monthly Teleconference calls  
Stone
- V. Interaction with New Mexico Association of Counties  
Wright
- VI. Featured Guest – Dr. Gary Jeffress, Director – Texas Height Modernization
  - A. Background – big picture environment for Height Modernization
  - B. Status – What is current situation with regard to organization & funding?
  - C. Prospects for future – what could/should we be doing in NM?
    1. Short term
    2. Long term
  - D. Recommendations:
  - E. Discussion - all
- VII. List and review action items:  
Burkholder
- VIII. Next meeting – Time and place  
Nielsen
- IX. Adjourn

