HEIGHT MODERNIZATION

EASTERN STATES REGIONAL WEBINAR MEETING

Silver Spring, MD

March 4, 2014

Final Report

CONTENTS

Executive Summary

The National Geodetic Survey's National Height Modernization Program (NHMP) organized a webinar that was intended to focus on issues and challenges from the Eastern States Region. Over 140 people registered, and more than 80 people attended most of the 4 hour webinar. The webinar had broad participation across sectors, geography, and many participants expressed an interest in starting a eastern regional coordinated effort or community of practice. The presentations from NGS updated stakeholders on the history of the NHMP, the work being completed to transition to a new vertical datum in 2022, and information about products and tools that are available (or nearly available) for the public to use. Guest speakers from other agencies highlighted state specific challenges, examples how to collaborate with other states, and how to other federal agency efforts. The feedback was generally positive, with the exception of some minor audio issues. Overall, the meeting was successful, and future meetings could be planned in a similar manner to reach a broad audience without significant travel costs.

Background and Goals

Since many Eastern States are not currently active Height Modernization (or Height Mod) "partners," the objective of the webinar was to give context and background to participants that have a varying level of familiarity with Height Mod. Additionally, we wanted to share information from two very active states in the region: North Carolina and South Carolina.

Agenda and presentations

A brief summary of the presentations is included below, and the presentation materials, if available, are included in the appendices.

Table 1: Session 1 Presentation Summary

Organization(s)	**Presenter(s)**	**Summary**
National Geodetic Survey & North Carolina Geodetic Survey	Juliana Blackwell and Gary Thompson	Juliana and Gary both welcomed everyone to the meeting.
National Geodetic Survey	Christine Gallagher	Christine gave an overview of Height Modernization. It developed as GPS was improving to help establish accurate heights, included past congressionally directed funding of some states, and today is expanding its scope to help prepare for and transition to the new vertical datum.

ORGANIZATION(S)	PRESENTER(S)	SUMMARY
North Carolina Geodetic Survey	Gary Thompson	Gary gave an overview of how the North Carolina Geodetic Survey works to establish and maintain the official survey base in North Carolina. NC is planning on refreshing its high resolution lidar by 2017, along with acquiring statewide ortho-imagery by 2015. Gary also gave an overview of Height Mod projects by county, the NC CORS Network, the GNSS Real Time Network, and the Flood Risk Information System.
South Carolina Geodetic Survey	Matt Wellslager	Matt gave an overview of Height Modernization efforts from the South Carolina Geodetic Survey. SC manages Height Mod Projects, a County Boundary Program, a Real-Time network, and Ortho-photo collection. SC has completed Height Mod surveys for 80% of the counties in the state, plans to make ties to historical tide gages and barrier islands, continue to leverage the RTN and create a database for geodetic control.
National Geodetic Survey	Michael Dennis	Michael introduced the Height Mod Program and Height Mod surveys. He also discussed the "bluebooking" process for submitting data to NGS for publication, and an ongoing effort to update the NGS-58 and NGS-59 guidelines. Finally, he outlined a nationwide height Mod vertical adjustment and previewed some beta GIS tools.
National Geodetic Survey	Joe Evjen	Joe gave a brief introduction and overview to both OPUS and OPUS Projects, which is still in beta. OPUS, together with GEOID 12A, provides a tool to compute orthometric heights, and we are still exploring the difference between heights published in the NGS integrated database and OPUS solutions on the same marks.
National Geodetic Survey	Dru Smith	Dru further described the steps NGS must take to transition to a new vertical datum in 2022, and he shared the progress NGS has made to this point. Additionally, he encouraged continued collection of GPS on Bench Marks, completion of "mini" geoid slope validation surveys, coordination with the GRAV-D team, and joining the NGS workforce. Dru also gave updates on the progress of GRAV-D, the Geoid Slope Validation Survey of 2011, and the plans for future geoid models.
National Geodetic Survey	Neil Weston	Neil gave an overview of the CORS program at NGS, first discussing the current network itself, its applications, and its numerous products or activities. Neil provided additional detail regarding the difference between absolute and relative antenna calibrations as well as NGS GPS orbit products. Finally, Neil discussed the CORS selection criteria (e.g. 70 km spacing), the program's evolving business model, and other program statistics.
U.S. Geological Survey	Jim Kolva	Jim introduced the challenge that many USGS streamgages have a datum referenced to NGVD29 rather than NAVD88. Approximately 17,000 sites need to have some analysis and conversion, and NGS Height Mod partners have assisted in this effort during their GPS campaigns.

NEXT STEPS

1. Work with Geodetic Advisors and partners to engage participants who expressed an interest in organizing a Eastern Regional Team.

2. Use Lessons Learned from webinar when planning future regional webinars.

ACKNOWLEDGMENTS

Thank you to everyone participated, especially:

Meeting Planners and Support
Gary Thompson, North Carolina Geodetic Survey Chief
Erika Little, NGS Training Coordinator
Scott Lokken, NGS North Carolina Geodetic Advisor
Dan Martin, NGS Vermont Geodetic Advisor
Aida Polite, NGS Observations and Analysis Division

Guest Presenters
Gary Thompson, North Carolina Geodetic Survey Chief
Matt Wellslager, South Carolina Geodetic Survey Chief
Jim Kolva, USGS Office of Surface Water data program liaison

Sincerely,
Christine Gallagher, Height Modernization Program Analyst

APPENDICES

APPENDIX A: ATTENDEES SUMMARY

State Abbreviation	Attended
AK	3
AL	1
AR	3
CA	2
CO	2
CT	4
FL	6
IL	1
KS	2
KY	1
LA	3
MA	4
MD	7
ME	1
MI	3
MN	5
MS	2
NC	4
NE	1
NH	4
NJ	5
NV	3
NY	7
OH	3
OR	2
PA	6
SC	3
TX	2
UT	1
VA	6
VT	3
WA	1
WI	2
WV	2
(blank)	7
Total	112

Region	Attended
AK	3
Central	6
Great Lakes	14
Gulf Coast	14
North Atlantic	41
Southeast	16
West	11
(blank)	7
Total	112

Organization sector	Attended
private	47
public	58
university	5
(blank)	2
Total	112

Public sector, detail	Attended
federal	11
local	14
NGS	18
state	15
Total	58

APPENDIX B: AGENDA

National Height Modernization Partner Meeting

Tuesday, March 4, 2014
1 pm to 5 pm Eastern Time
Teleconference only

Agenda

1:00-1:10 **Introductory Remarks**
Juliana Blackwell, Director, NGS
Gary Thompson, Chief, North Carolina Geodetic Survey

1:10-1:30 **Overview of Height Modernization**
Christine Gallagher, Program Analyst, NGS
- History of Height Modernization
- Height Modernization as we prepare for a new vertical datum

1:30-2:10 **Height Modernization is Eastern States**
- North Carolina: *Gary Thompson, Chief, North Carolina Geodetic Survey*
- South Carolina: *Matt Wellslager, South Carolina Geodetic Survey*

2:10-2:50 **"Height Mod" Surveys**
Michael Dennis, Geodesist, NGS
- Overview of survey planning (NGS 58 and NGS 59)
- Bluebooking and Adjust
- Where we are going (testing to update NGS 58 and NGS 59)
- GIS tools

2:50-3:00 break

3:00-3:30 **Tools to help complete "Height Mod" Surveys**
Joe Evjen, Geodesist, NGS
- OPUS
- OPUS Projects

3:30-4:00 **Planning for the next vertical datum**
Dru Smith, Chief Geodesist, NGS
- Major steps to the new vertical datum and progress to date
- Future help from the public
- Implementation Plan to Replace NAVD 88
- GRAV-D data and product releases
- Geoid models

4:00-4:30 **Continuously Operating Reference Stations (CORS)**
Neil Weston, Deputy Director, NGS
- Program overview / status
- Program policies, e.g. "70 km rule"

4:30-4:45 **Height Modernization and United States Geological Survey (USGS)**
Jim Kolva, Office of Surface Water data program liaison, USGS

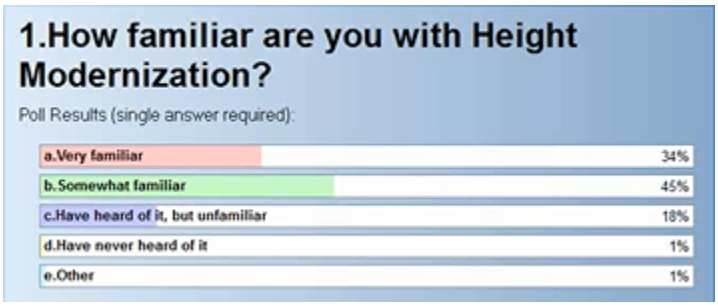
- Applications to stream gages and USGS hydrologists
- Coordination with US Army Corp and others

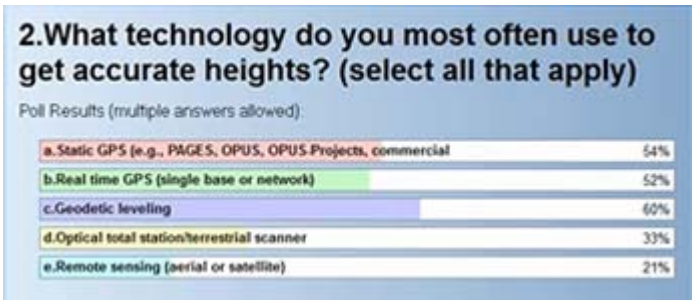
4:45-5:00 **Wrap-up and closing**

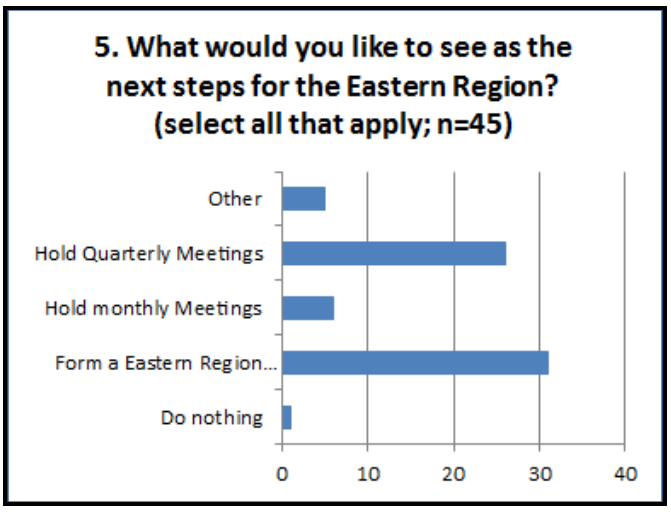
APPENDIX C: PRESENTATIONS

Presentations, when available, were posted to the following web page:
http://www.ngs.noaa.gov/corbin/class_description/HM_EasternRegion.shtml

APPENDIX D: LIVE POLL QUESTIONS/ANSWERS






5. What would you like to see as the next steps for the Eastern Region? (select all that apply; n=45)
Other
Hold Quarterly Meetings
Hold monthly Meetings
Form a Eastern Region...
Do nothing
0
10
20
30
40


6.How would you rate your satisfaction with this webinar?
Poll Results (single answer required)
a.Very satisfied 86%
b.Somewhat satisfied 14%
c.Neither satisfied nor dissatisfied 0%
d.Dissatisfied 0%
e.Very dissatisfied 0%

APPENDIX E: LIVE QUESTIONS/ANSWERS FROM AUDIENCE

SUBJECTS

SUBJECTS

I. North Carolina Height Modernization
II. South Carolina Height Modernization
III. NGS Data Explorer
IV. Online Positioning User Service (OPUS)
V. GPS on Bench Marks
VI. Gravity for the Redefinition of the American Vertical Datum (GRAV-D)
VII. Continuously Operating Reference Stations (CORS)
VIII. Stream gages
IX. Miscellaneous questions

I. NORTH CAROLINA HEIGHT MODERNIZATION

1. Gary, where are you currently getting your absolute gravity values? Do you expect you will need more absolute sites established?
   NC worked with NGS by providing funding to establish absolute gravity stations in a subsidence area. A few additional stations were established when GRAVD began work in NC, and we plan to buy our own equipment in the future.

II. SOUTH CAROLINA HEIGHT MODERNIZATION

1. Matt, have you considered using OPUS Projects to process your data so that you can create B and G files for blue booking?
   A challenge at this time in SC is the station spacing of CORS network, and it has not been pursued at this point.

III. NGS DATA EXPLORER

1. Will the NGS Data Explorer replace DSWorld?
   Data Explorer will continue to evolve and improve. DSWorld, a user-contributed software, is currently still maintained by its creator. At this time, they will both remain available.

2. Will the Data Explorer be available as an app for Android and such devices?
   It is possible, but it is not likely to occur in the next year.

IV. Online Positioning User Service (OPUS)

1. Most of us have hundreds of static sessions. Why is OPUS projects manager training so limited?
   We understand there is high demand, but we believe the program is complex enough to require in-person training at this point. We are continuing to offer in-person training across the country as frequently as possible, and we are exploring remote training options. A nearly final comprehensive manual will also assist in this training process.

2. Does the blue booked data from OPUS Projects get placed into the NSRS?
   OPUS Projects currently produces a B and G file, which in turn can be submitted through the bluebooking process. There is no automatic submission through OPUS Projects at this time.

3. Is the 'Draft' Opus Project Technical Guide available for non NGS personnel review?
   Public copies have been distributed for review, so contact NGS if you would like to review the document before it is formally finalized and published.

V. GPS on Bench Marks

1. If we have GPS on Bench Marks, where / how do we get it to NGS? Are there a specific class/type of benchmark you would prefer be observed?
   Visit the GPS on Bench Marks page for more specifics. First order and higher stability are preferred. You can submit your observations via OPUS share.

2. Is OPUS-Share acceptable to Dru Smith or does GNSS on bench marks need to be blue booked?
   Sharing via OPUS is acceptable for GPS on bench marks. If anyone choses to bluebook data, then that may be valuable, too.

3. Would there be a benefit to promote folks observing on these surface water sites during National Surveyors Week?
   Yes, because the observations may ultimately help update the gage.

4. Will you mention the efforts of National Surveyors Week?
   NGS encourages anyone with survey-grade Global Positioning System (GPS) receivers to join the 2014 GPS on Bench Marks Campaign, a National Surveyors Week (March 16-22) event to raise awareness about professional surveying while improving the National Spatial Reference System (NSRS). Visit this webpage to learn more: http://www.ngs.noaa.gov/heightmod/GPSonBM.shtml

5. What spacing is desired for GPS on Bench Marks to support geoid modelling?
   When densifying the data using OPUS-Share - the goal would be 30-60 km spacing to help support geoid modeling.

VI. Gravity for the Redefinition of the American Vertical Datum (GRAV-D)

1. How is the GRAV-D data accessed at present?
   Published data is available on the GRAV-D webpage: http://www.ngs.noaa.gov/GRAV-D/data_products.shtml

2. Will new hybrid geoid models be developed with the new gravity data? If so, how often?
   At this time we are planning to first create experimental gravimetric geoids with the airborne gravity data, possibly as frequently as annually. Decisions about the next hybrid model will be made at a later date.

VII. CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS)

1. Mr. Weston has there been any movement on the acceptance of replacement National CORS that are closer than the 70 km rule? i.e., a current National CORS station is destroyed, and a replacement station is built but other stations are located closer than 70 km.
   Every station submitted will be considered, and we will evaluate the type of receiver, antennae, the facility in it will be housed, potential multi-path. There is not a unilateral decision; rather, the team evaluates every site case-by-case. If you have a specific case you would like to have considered, you can work with the CORS team directly.

2. Why are there CORS in Canada?
   CORS are in numerous countries around the world outside of the United States, including in Canada.

3. Is there any kind of list of legacy stations with 'iffy' stability that may be better not to include when selecting CORS?
   If you are using OPUS tools, then there is some quality control built in. If you are going to use the data yourself, you should use User Friendly CORS (UF CORS) because it also does some quality control. Any CORS that have a problem for 2-3 will be identified in the CORS newsletter.

VIII. STREAM GAGES

1. When ties/observations have been made on gauge stations where is the info submitted?
   Contact the Data Chief at the local USGS Water Science Center, and if you have difficulty identifying that person, you can contact Jim Kolva directly.

2. How can we find stream gauges?
   Contact your local USGS Water Science Center in each state.

3. Does USGS have a google earth kmz file showing the location of gauges across the country?
   Not at this time.

IX. MISCELLANEOUS QUESTIONS

1. Is it possible to get copies of the presentations so I could use some of the graphics and information in my teaching?
   Yes, powerpoints and videos will be posted online.

2. Can you explain the scale on the estimated height changes on the NAVD88 to new vertical datum map?
   From 0.1 m change to -1.3 m change.

3. What was the name of the South Carolina Height Mod test you briefly referred to? Where can I find additional information on the project?

   It is a component of a project intended to help update guidelines NGS 58 and NGS 59. As the project progresses, updates and information will be made available on the Height Mod web pages or at the Height Mod monthly coordination meeting.