February 15, 2018

President Ron Nelms:

The American Association for Geodetic Surveying (AAGS) would like to make you aware that the National Geodetic Survey (NGS) is actively improving the accuracy of its hybrid geoid model and will replace GEOID12B with GEOID18 in early 2019. This new hybrid geoid model will improve the derivation of orthometric heights (elevations) referenced to the North American Vertical Datum of 1988 (NAVD 88) using Global Navigation Satellite System (GNSS) technology. The new model will also thereafter serve as the official means for obtaining NAVD 88 heights via GNSS.

NGS will use GNSS data collected on bench marks to create the new hybrid geoid model. Recent analyses have revealed areas in your state where additional GNSS data will either confirm or update the relationships between ellipsoid, orthometric, and geoid heights.

In addition to improving the geoid model, the collection and submission of GNSS data on bench marks will also enable NGS to develop more accurate models for transforming survey data referenced to NAVD 88 to data referenced to the future North American-Pacific Geopotential Datum of 2022 (NAPGD2022). Surveys starting in 2022 involving flood plain maps and so forth will require establishment of vertical control using GNSS; therefore, improving the accuracy of the geoid model is an important endeavor.

NGS has developed a prioritized list of bench marks. Data collected and submitted on these marks prior to August 31, 2018, will be used in the development of GEOID18. NGS will also continue to accept data on marks through 2020 for the development of the transformation models for 2022. New prioritized lists to support the transformation models will also be made available over the next few years as analysis of data requirements progresses.

AAGS has obtained a prioritized list of bench marks for your state from NGS (attached). This priority list is also shown in a useful, online tracking map at <https://geodesy.noaa.gov/GPSonBM/webmap/>.

This is an opportunity for your society to help all constituents in your state in need of orthometric heights. Your state society could organize an effort using your chapters to occupy as many of these bench marks as possible. The provided list contains all of the bench marks that NGS would like to have occupied with GNSS and then shared with them. Surveyors can increase the local accuracy of the geoid model in their area by collecting GNSS data on the identified marks, and this effort will thereby help improve the accuracy of future GNSS surveys for deriving orthometric heights referenced to the national datum in their area. It is also in your best interest to contribute data as it will improve future models for transforming vertical data in your state or local area to the future geopotential datum.

For the bench marks included in the prioritized list, NGS recommends contributing in two ways:

1. Attempt to locate the marks on the list and submit a mark recovery through [DS World](https://www.ngs.noaa.gov/PC_PROD/PARTNERS/DSWORLD/DSWorldV401.zip). Check this NGS page for [more information on mark recovery](https://www.ngs.noaa.gov/GPSonBM/Recover.shtml).
2. Collect 4 or more hours (more is better) of GNSS data on the mark following [NGS guidelines](https://www.ngs.noaa.gov/GPSonBM/Observe.shtml), submit the data to [OPUS](https://www.ngs.noaa.gov/OPUS/index.jsp) and select the option to Share. When sharing an OPUS solution, NGS will also request a brief description and photos of the mark for quality control. Two independent OPUS solutions for each mark are highly desirable for confirming results.

The list indicates how many observations NGS has received on each bench mark (see the “obs\_cnt” column). The aforementioned tracking map also shows the number of new, independent observations NGS is requesting for the marks. Please note that this tracking map will be updated as OPUS solutions are accepted by NGS, so we recommend checking it often.

It is also worth noting that marks on this list may be inaccessible, destroyed, or at sites that are unsuitable for collecting GNSS (e.g., trees, buildings, etc.). If this is the case, please locate and observe another nearby NAVD 88 bench mark, within ~10 km.

Attached is a map showing the potential changes between GEOID12B and the new hybrid geoid model. While data would be helpful on or near all of the marks on the list, you may consider focusing your data collection efforts by looking for areas in this map that show large changes in your region. For further information or to discuss options for collaborating with other regional partners, please consult with your [NGS Regional Geodetic Advisor](https://www.ngs.noaa.gov/ADVISORS/index.shtml) and/or [State Geodetic Coordinator](https://www.ngs.noaa.gov/ADVISORS/state-geodetic-coordinators.shtml). Questions to NGS may also be directed to ngs.GPSonBM@noaa.gov.

For additional information, Dave Zilkoski recently published an article on this topic for GPS World, which can be viewed at <http://gpsworld.com/ngs-2018-gps-on-bms-program-in-support-of-napgd2022-part-5/>.

Sincerely,

Daniel Gillins, Ph.D., P.L.S.

AAGS Director

