

Implementing Geometric and Geophysical Datums for the United States in 2022

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SUMMARY

Use of GNSS-accessed geospatial data has proliferated not only within the surveying community but also into many related and dependent fields of work. These requirements approach the cm-level for coordinate determination with respect to both vertical and geodetic datums – often times with demands for real time or near real time coordinates. GNSS technology and tools have significantly improved in timeliness and accuracy of positioning in a geodetic or geometric datum. New data and processing techniques have also resulted in updated national geoids of increasing accuracy to serve as future vertical or geopotential datums. Such geoid models have been compared to external data sets such as tide gauges and astrogeodetic deflections of the vertical to provide calibration/validation with respect to real physical surfaces such as the ocean surface. This presentation will focus on some of the tasks and plans for developing, implementing and accessing these new datums by 2022 for the United States. The National Geodetic Survey has primary responsibility within the U.S. for developing and maintaining such datums, and has a stated goal of achieving cm-level accurate geometric coordinates and geophysical heights using only 15 minutes of GNSS data in combination with a gravimetric geoid model. To achieve these goals will require the near term definition of the requirements for both the reference frame and the necessary GNSS infrastructure. This process is well under way and tools are likewise being examined that will serve provide for such positional determination. Likewise the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) Project aids the determination of systematic errors in the existing two million gravity points held by NGS. Comparison the National Water Level Observation Network (NWLON) at tide gauges along the U.S Shoreline also aids in determining the fit of the geopotential datum to the real physical heights above the ocean. Comparisons are also planned along river datums such as the Columbia River Datum (CRD). The planning and implementation for these new datums will impact other U.S. agencies (such as FEMA and USACE) but also impacts local and emergency planning at the state and local levels – all of which impacts the surveying, GIS and other industries. Outreach must also begin now to make such a change within the next decade.