Positioning America for the future

—by Ben Sherman, David Hall, and Ilse Genovese

States and communities reap $2.4 billion annually in potential benefits from the NOAA-managed National Spatial Reference System, reports an independent study conducted by a New Jersey-based economic consulting company. An additional $522 million in annual economic benefits could be generated by the implementation of a more precise vertical reference datum. It is estimated that close to half of these new benefits (about $240 million) would come from improved floodplain management alone.

"For more than 200 years, surveyors, mapping professionals, engineers and many others have used the NSRS as the foundation for establishing property boundaries, constructing buildings, roads, bridges, and levees, creating accurate maps and charts, and much more," said John H. Dunnigan, NOAA's assistant administrator for the National Ocean Service. "The nation is literally built on this framework."

Comprising more than 1.5 million static survey monuments and over 1,300 Continuously Operating Reference Stations (CORS) coordinated by the National Geodetic Survey, the NSRS provides positioning data with horizontal accuracy ranging from a few inches or less (for scientific, military, and engineering purposes) to a few yards. The centerpiece of the system is the NOAA CORS network of reference stations equipped with GPS receivers and transmitting precise positioning data via the Internet. According to Leveson Consulting, CORS alone provides about one-third ($758 million) of the estimated benefits accruing to the Nation from NSRS.

In the future, the combination of CORS and GRAV-D is poised to supplant passive markers currently used to determine elevations under the North American Vertical Datum (NAVD88). Redefining this datum with gravity data would enable even more precise determination of elevations for a host of activities benefitting the economy.

The GRAV-D initiative—Gravity for the Redefinition of the American Vertical Datum—is expected to help improve elevation measurement relative to the NSRS to under an inch, down from a range of 16 inches (for most of the Continental United States) to 6 feet (or more in Alaska).

"GRAV-D is the future foundation of all height-related activities in the United States," noted Juliana Blackwell, director of NOAA's National Geodetic Survey, during a Congressional briefing held by NOAA in the U.S. Capitol Visitor Center on June 15th.

Improving and modernizing the Nation's critical positioning infrastructure is a necessity, particularly felt in the coastal areas. "From where I come," said Windell Curole, General Manager of South Lafourche Levee District in Galliano, Louisiana, and invited speaker at the June 15 briefing, "the terra is not so firma. For us, elevation is the salvation to inundation."

A new, more precise vertical reference system will enhance positioning in flood-prone areas and so help improve floodplain mapping. It will provide the confidence necessary for dealing with the dynamics of our world—with crustal motion, with one foot per annum rising sea level, with the sinking of Louisiana's platform, with tsunami flooding in Alaska, with air routes in remote areas following a "moving map" on the ground.

Improving vertical data will positively impact public safety and go a long way to avoid human and economic loss during times of natural disaster.

The President's FY2010 budget request includes $4 million to begin collecting data to improve elevation information as a foundation for better commerce, economic efficiencies, and to better protect the public from coastal hazards and flooding. This funding, if approved, will support the development of GRAV-D. [www.ngs.noaa.gov].