National Geodetic Survey

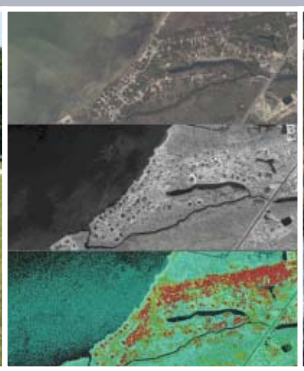
highlights

The National Geodetic Survey (NGS) develops and maintains a national coordinate system, which provides the foundation for transportation, navigation, land record systems, mapping and charting efforts, defense operations, adn a multitude of scientific and engineering applications.

Throughout fiscal year 2008, NGS continued critical development of products and services and the collection of positioning data to support maritime navigation, aviation safety, hurricane evacuation routes, climate change activities, ocean observing, and more.

First Test Flights Completed for the GRAV-D Program

In 2008, NGS began test flights of its recently acquired airborne gravimeter. Test flights occurred out of Montgomery, Alabama, and Kachemak Bay, Alaska, in support of the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) program. GRAV-D is an effort to use gravity data to redefine the vertical datum of the United States by 2017, if fully funded. NGS flew 100 hours in Alabama and over 400 hours in Alaska to determine optimum flight levels, spacing, and various procedures required to collect good airborne gravity data. Completion of GRAV-D will allow dramatically improved elevations through Global Positioning System (GPS) technology to an accuracy of approximately two centimeters (compared to as much as two meters today). This improvement will have profound implications for all activities relying on accurate heights.



Enhanced Online Positioning User Service Released

NGS released a new version of its popular Online Positioning User Service (OPUS) in February. OPUS-Rapid Static (OPUS-RS), designed in partnership with Ohio State University, saves time and money by providing solutions with as little as 15 minutes' worth of GPS data, as compared to standard OPUS, which requires at least two hours' worth of data. Since 2002, OPUS has transformed the way that GPS users across the country and world can obtain highly accurate, positioned coordinates. OPUS allows users, such as professional surveyors, to submit their GPS observations to NOAA, where the data are processed to determine corresponding three-dimensional positional coordinates.

NGS Begins International GNSS Service Effort

In 2008, NGS began a four-year term to lead an international effort to pinpoint the locations of more than 40 global positioning satellites in Earth's orbit, an effort vital to ensuring the accuracy of GPS data that millions worldwide rely upon every day for safe navigation and commerce. As Analysis Center Coordinator, NGS coordinates the work of other International Global Navigation Satellite System Service (IGS) analysis centers to develop high-precision orbit determination of GPS satellites. The IGS is a voluntary federation of more than 200 worldwide organizations that combine resources and continuous satellite-tracking data to generate precise products. For GPS receivers to provide accurate information, the precise location of positioning satellites as they orbit the Earth must first be determined.

Key Accomplishments in Ocean and Coastal Mapping

NGS supported NOAA's Integrated Ocean and Coastal Mapping (IOCM) initiative though several key accomplishments in three successful pilot projects in fiscal year 2008. For the North Carolina pilot project, NGS acquired nearly 23,000 high-resolution color and near-infrared aerial images and topographic Light Detection and Ranging (LIDAR) data. NGS also provided LIDAR data and aerial imagery as part of a New Hampshire IOCM pilot project. These data will be used by researchers from around the world to conduct research into high-resolution coastal surveying and mapping. Finally, NGS supported the National Ocean Service Hydropalooza project in Kachemak Bay, Alaska, by collecting high-resolution aerial imagery and LIDAR data for the project site. These data will provide accurate, up-to-date shoreline information, which will be used to update NOAA nautical charts for Kachemak Bay.

New Model for Horizontal Crustal Velocities

NGS released "version 3.0" of the Horizontal Time-Dependent Positioning (HTDP3.0) software. Users may now apply HTDP3.0 to predict how points on the Earth's surface have moved due to plate tectonics, earthquakes, and volcanic activity. Due to plate tectonics, points located in much of California, Oregon, Washington, and Alaska move approximately one inch per year relative to the eastern and central United States. Also, points in these and other regions may move several feet in a few seconds due to earthquakes. HTDP enables land surveyors, global information system (GIS) professionals, and others to cope with crustal motion by relating positional coordinates measured today with those measured in the past or with those to be measured in the future.

Work Begins On Sentinel Climate Change Monitoring Network

NGS, the Center for Operational Oceanographic Products and Services (CO-OPS), and the National Estuarine Research Reserve System (NERRS) are collaborating to establish and monitor coastal land elevations in relation to local sea level throughout the NERRS. The effort will improve understanding of climate variability and change and will enhance society's ability to plan and respond. The intent is to expand this program to all 27 Reserves. Data on coastal land elevations are critical to monitoring climate change and are an important component of the Integrated Ocean Observing System.