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# Preparing for the Modernization of the NSRS: NGS Regional Activity

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NOAA's National Geodetic Survey*

# NOAA and the National Geodetic Survey

Our Nation's First Civilian Science Agency



*For more than 200 years, NGS and its predecessor agencies have collaborated with public and private organizations to establish reference stations at precisely determined locations.*

## NGS Mission



- Define, maintain, and **provide access** to the
- *National Spatial Reference System (NSRS)*
- “The NSRS is a consistent coordinate system that defines latitude, longitude, height, scale, gravity, orientation, and shoreline throughout the U.S.”



## What is NSRS Modernization?

- ***Improving the National Spatial Reference System***
- The National Geodetic Survey has been working over the last ten plus years to remove inaccuracies in the existing datums of the United States.
- By tracking the dynamic nature of the Earth, and giving users tools to account for it, NGS will provide a new National Spatial Reference System that is semi-dynamic.

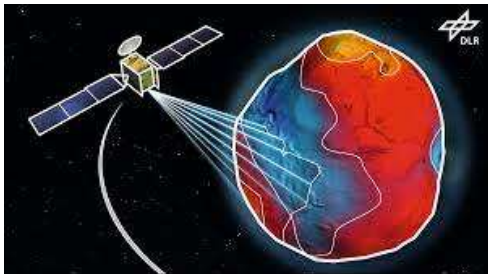
**“By fully embracing the benefits of GNSS as the positioning tool of today, and of the future, NGS will effectively link the replacements for NAD 83 and NAVD 88 through a geocentric reference frame and gravimetric geoid model”**

*-Dr. Dru Smith, Chief Geodesist, National Geodetic Survey, 2010*



## Setting a Geodetic Standard

- **For 200 years**, NGS and its predecessor agencies have collaborated with public and private organizations to establish reference stations at precisely determined locations.



More recently, NGS has fostered a network of **continuously operating reference stations (CORS)** where each CORS includes a highly accurate receiver that continuously collects radio signals broadcast by **Global Navigation Satellite System (GNSS) satellites** forming a network used to accurately position other points of interest.

# How You Can Prepare for the Modernization of the National Spatial Reference Frame



1. Transform your coordinates using NGS Coordinate and Transformation Tool (NCAT)
2. Record your metadata by knowing the datums and epochs of your geospatial files
3. Perform GPS on Bench Marks Operations.
4. Review State Plane Coordinate System of 2022 requirements
5. Prepare to update legislation, as needed

## NSRS Modernization : Regional Preparation

- New CORS Sub-Committees
- Braced Monument Workshops
- CORS Station Improvements
- GPS on Benchmarks
- OPUS Training
- Water Management
- Subsidence Monitoring
- Control Densification
- Partnership Work
- Foundation CORS



## Enhancing Geodetic Control to Improve Positioning Data and Imagery

- Bringing downed NOAA CORS Network sites back online – six sites currently
- Building new CORS stations with improved stability and monumentation – Shallow and Deep Braced Monuments
- Building a new Foundation CORS array at VLBA's in NM and AZ



NGS/City of Phoenix Braced Monument Workshop



Partnership Work!



NGS siting new GNSS array at Kitt Peak National Observatory, AZ



## Densification of Survey Control through Partnerships

- Positioning – improvements in both vertical and horizontal positioning
- Ground truthing – improve base station positions for LIDAR, aerial, drone, photogrammetric, altimetric data
- Datum consistency -throughout multiple data sets used for digital elevation modeling



## Foundation CORS/HASTE Project Reconnaissance 2022

Kitt Peak, AZ; Pietown, NM; Los Alamos, NM

at U.S. Space Geodetic Observatories with NGS/NRAO/NGA/NSF/ARL



## 2023 NGS/NPS Carlsbad Caverns National Park: Welcomes 'CAVE' to the NOAA CORS Network!



## 2023 National Forest Service/ NGS Partnership

- National Forest Service is working with NOAA's NGS to enhance CORS network coverage in remote Forest Service regions in NM and AZ
- Enhance Cell Coverage and Provide Accurate Positioning Data in Gap Areas



# USGS Great Salt Lake Hydrologic Survey: USGS/NOAA-NGS/UGRC Partnership

## **Project Plan:**

Improve Geodetic Control for USGS Lake Gauges at the Causeway and the Saltair Marina:

Utah Geospatial Resource Center (UGRC)  
Partners with the USGS



- In 2016 a breach in the causeway was created to allow exchange of water from south to north
- The USGS has established a gauging station at the breach that monitors lake water surface elevation and salinity
- It is critical to report highly accurate lake elevations using a meaningful datum that can be related to other lake gauges at the far south end of the lake (Saltair)

## The Regional Geodetic Advisor Program



- The Regional Geodetic Advisor is a federal employee of NOAA's National Geodetic Survey serving as a liaison between NGS and its public, academic, and private sector constituents who are managing the geodetic component of geospatial activities tied to the National Spatial Reference System (NSRS) in their region. Assistance in management of CORS stations in an advisor's region is an integral part of supporting the NSRS.

As always, we want to thank you for supporting the NSRS and encourage you to reach out to us so we can support you in preparing for Modernization!

<https://geodesy.noaa.gov>





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## About

I am currently a full time civil servant for the Department of Commerce, serving as the Southwest Regional Geodetic Advisor for NOAA's National Geodetic Survey (NGS). I am serving as a liaison between NGS and its public, academic, and private sector customers within my region (Arizona, New Mexico, and Utah), providing guidance and assistance on geospatial activities that are tied to the National Spatial Reference System. My current duty station is located at the USGS Science Center Campus in Flagstaff, AZ.

I have also had the great privilege to serve several other federal agencies in the geospatial community, working as a Geophysicist and Senior Scientist at NASA's Goddard Space Flight Center in Greenbelt, MD and as a Sea Level Specialist at the National Park Service Headquarters in Fort Collins, CO.