

North Carolina Geodetic Survey (NCGS): Positioning NC today and for the future!



State Mapping Advisory Committee October 13, 2021

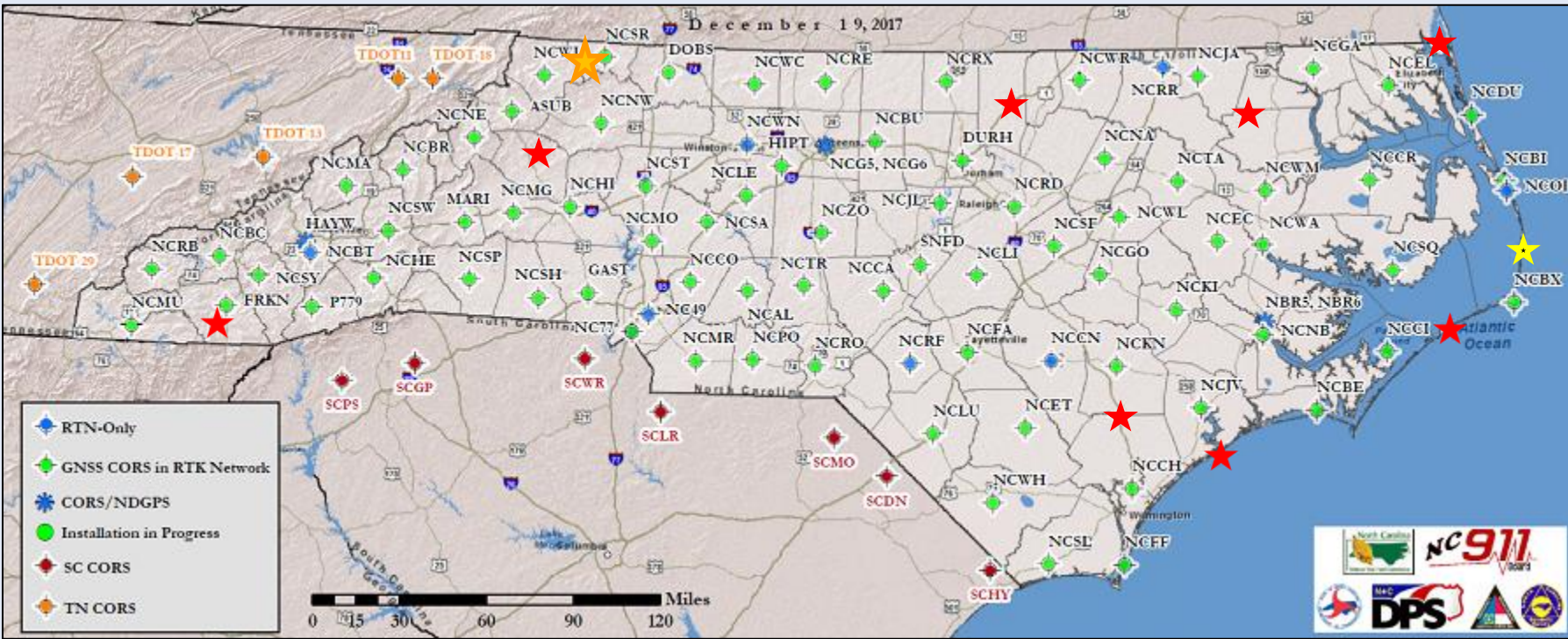
Geodetic Control



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North Carolina (NC) Continuously Operating Reference Station (CORS) Network

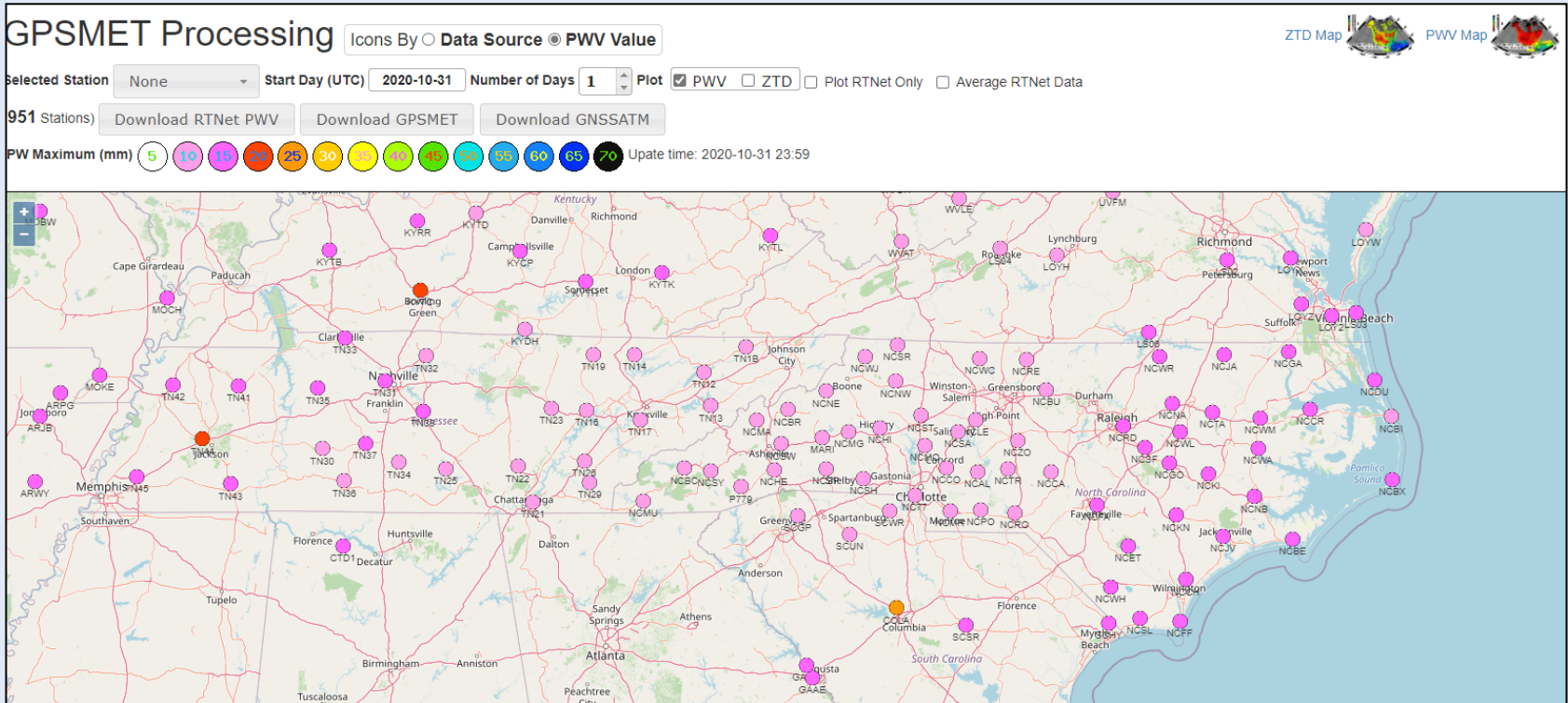


Future CORS location = ★
 CORS installed = ★
 Earthquake CORS = ★

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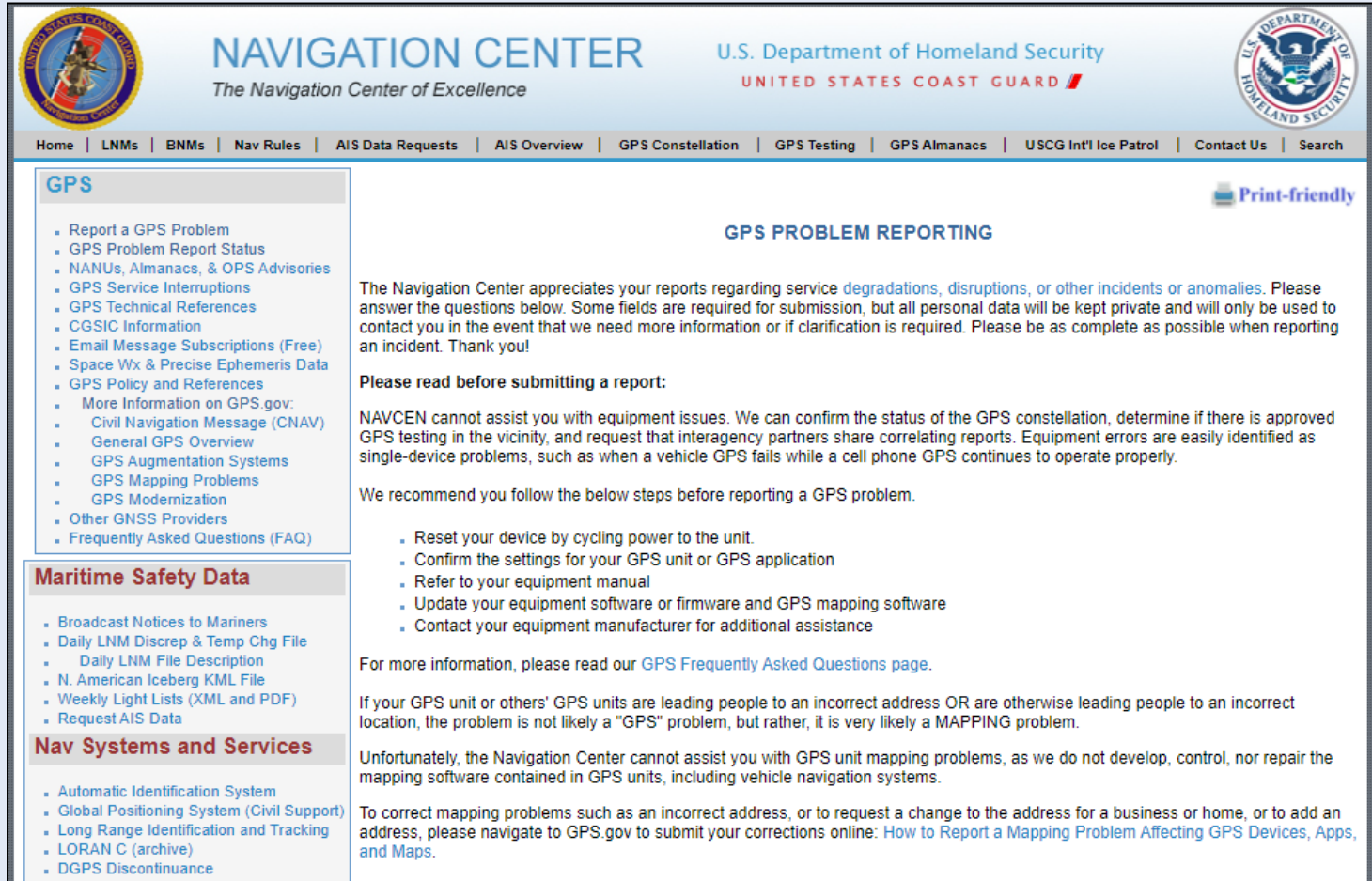
NC CORS Network Supports Weather Forecasting



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Global Positioning System (GPS) Problem Reporting



The screenshot shows the Navigation Center website's "GPS PROBLEM REPORTING" page. The page header includes the Navigation Center logo, the U.S. Department of Homeland Security logo, and the United States Coast Guard logo. A navigation menu is located below the header, and a "Print-friendly" icon is on the right. The main content area is titled "GPS PROBLEM REPORTING" and contains the following text:

The Navigation Center appreciates your reports regarding service degradations, disruptions, or other incidents or anomalies. Please answer the questions below. Some fields are required for submission, but all personal data will be kept private and will only be used to contact you in the event that we need more information or if clarification is required. Please be as complete as possible when reporting an incident. Thank you!

Please read before submitting a report:

NAVCEN cannot assist you with equipment issues. We can confirm the status of the GPS constellation, determine if there is approved GPS testing in the vicinity, and request that interagency partners share correlating reports. Equipment errors are easily identified as single-device problems, such as when a vehicle GPS fails while a cell phone GPS continues to operate properly.

We recommend you follow the below steps before reporting a GPS problem.

- Reset your device by cycling power to the unit.
- Confirm the settings for your GPS unit or GPS application
- Refer to your equipment manual
- Update your equipment software or firmware and GPS mapping software
- Contact your equipment manufacturer for additional assistance

For more information, please read our [GPS Frequently Asked Questions](#) page.

If your GPS unit or others' GPS units are leading people to an incorrect address OR are otherwise leading people to an incorrect location, the problem is not likely a "GPS" problem, but rather, it is very likely a MAPPING problem.

Unfortunately, the Navigation Center cannot assist you with GPS unit mapping problems, as we do not develop, control, nor repair the mapping software contained in GPS units, including vehicle navigation systems.

To correct mapping problems such as an incorrect address, or to request a change to the address for a business or home, or to add an address, please navigate to [GPS.gov](#) to submit your corrections online: [How to Report a Mapping Problem Affecting GPS Devices, Apps, and Maps](#).

The left sidebar contains a "GPS" menu with links to report a problem, check status, and other resources. Below it are sections for "Maritime Safety Data" and "Nav Systems and Services".



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OPUS-Projects 5.0

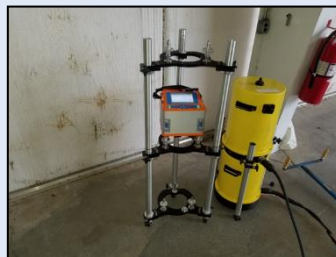
- Inclusion of previously processed GNSS vectors
 - Single-base Real Time Kinematic (RTK) vectors
 - Network RTK vectors
 - Vectors processed in other software

The screenshot shows a NOAA bulletin with the following content:

- NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION** (UNITED STATES DEPARTMENT OF COMMERCE)
- NGS Releases BETA OPUS Projects 5.0 — Now accepting RTK data**
NOAA's National Ocean Service sent this bulletin at 09/16/2021 11:24 AM EDT
- National Geodetic Survey**
- Test New Features in BETA OPUS Projects 5.0**
- Users can now upload GNSS vectors into OPUS projects, including vectors derived from either a single-base real-time kinematic (RTK) setup or from a real-time network (RTN), for evaluation, quality assessment, and inclusion in a GNSS survey network for least squares adjustment. Use the new GNSS Vector Exchange (GVX) file format to transfer data from various manufacturer hardware to OPUS Projects 5.0.
- Getting started:**
 - Use sample data that are available online and in the GVX file format.
 - Talk to your vendor about converting your own GNSS vector data to the GVX file format.
- Learn More about OPUS Projects 5.0**
For an overview of the new features check out the recent NGS webinar from May 20, 2021.
- OPUS-Projects for RTK/RTN Vectors**
NGS is developing OPUS-Projects so that GNSS vectors, including those from real-time kinematic (RTK) surveys, can be uploaded to a survey network for least-squares adjustment and submittal to NGS for publication. This has required developing a standardized GNSS vector exchange format known as GVX.
- *Technical Content Rating: Advanced - Prior knowledge of this topic is suggested.
- NGS Welcomes Your Feedback**
NGS continually works to improve our services and releases beta versions of new or improved products for external testing and feedback. Please look for the new Feedback icon that appears on the right side of our OPUS pages. Click the icon to answer a short survey with your feedback, which will be used to make future improvements to OPUS. Or try uploading and working with GVX files in Beta OPUS Projects 5.0 and email your feedback to ngs.feedback@noaa.gov.
- Send feedback on Beta OPUS Projects 5.0 at any time, by emailing ngs.feedback@noaa.gov.
- NOAA's National Geodetic Survey geodesy.noaa.gov
- Stay Connected with NOAA's National Ocean Service [Manage Subscriptions](#)

Gravity Data Collection

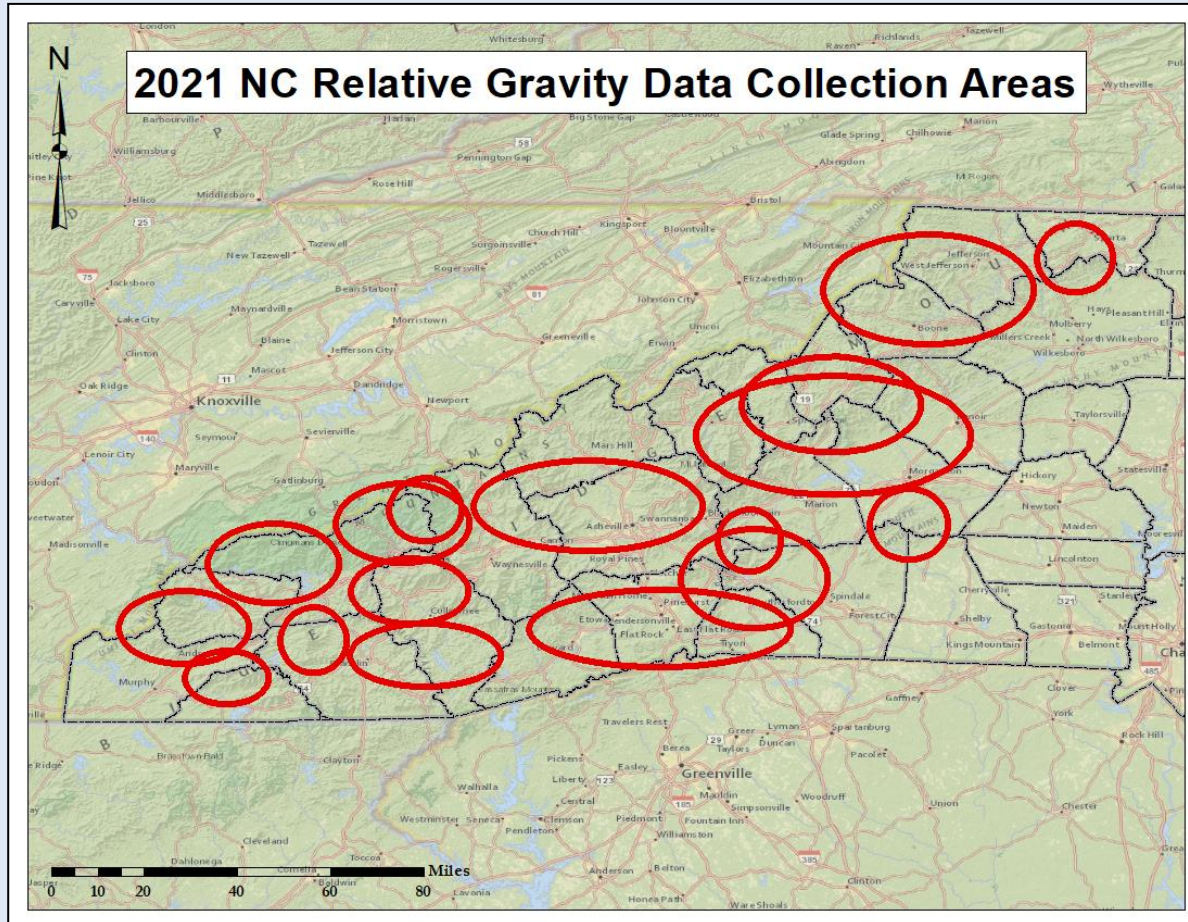
- New gravity marks established (relative and absolute)
 - Partnered with NGS to establish eleven (11) new absolute gravity stations in western North Carolina (NC)
 - Observations completed in western NC on 11/14/19
 - Obtained two (2) relative gravity meters on loan (January – December 2021) from the National Geodetic Survey



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Gravity Data Collection

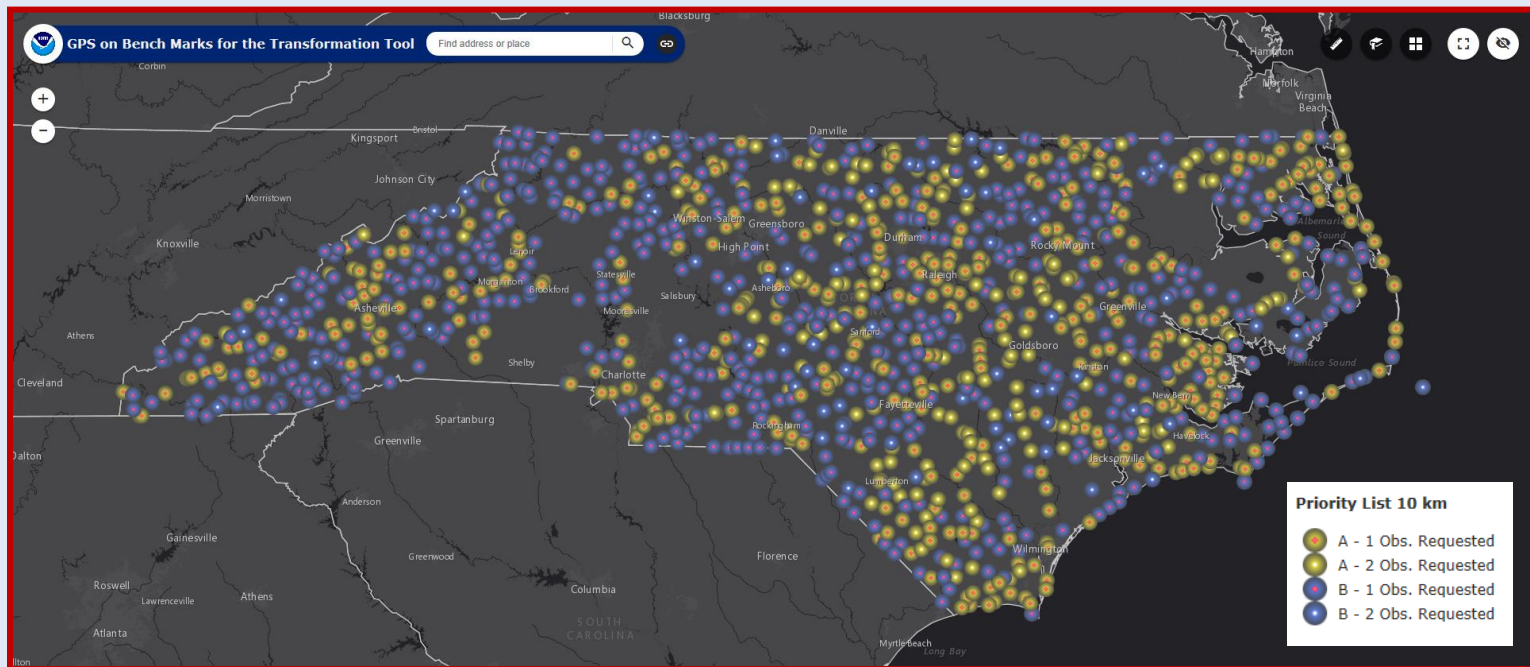


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National Geodetic Survey GPS on Bench Marks 2020/2021

- 2020
 - NGS has prepared a list of geodetic monuments that we review for possible GNSS data collection

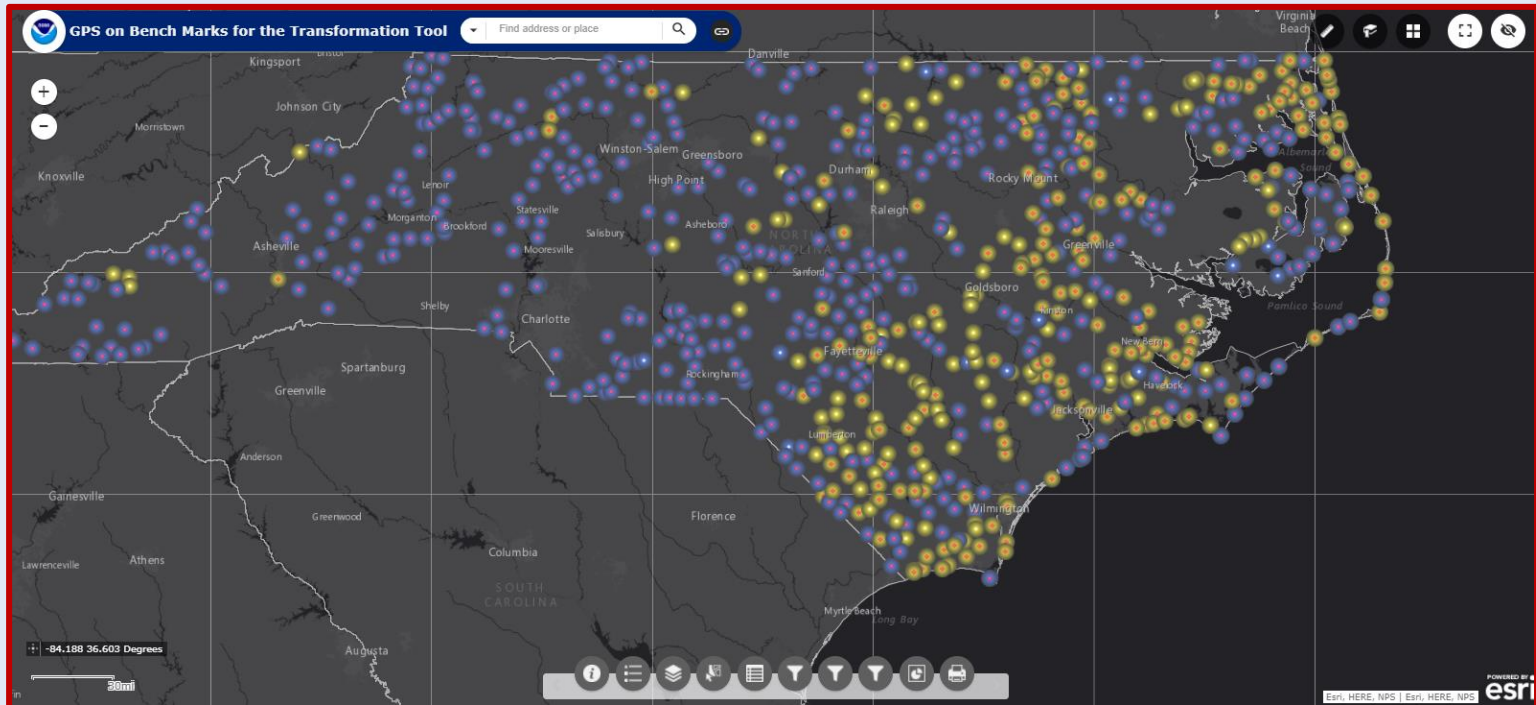


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National Geodetic Survey GPS on Bench Marks 2020/2021

- 2021 (status as of 8/13/2021)

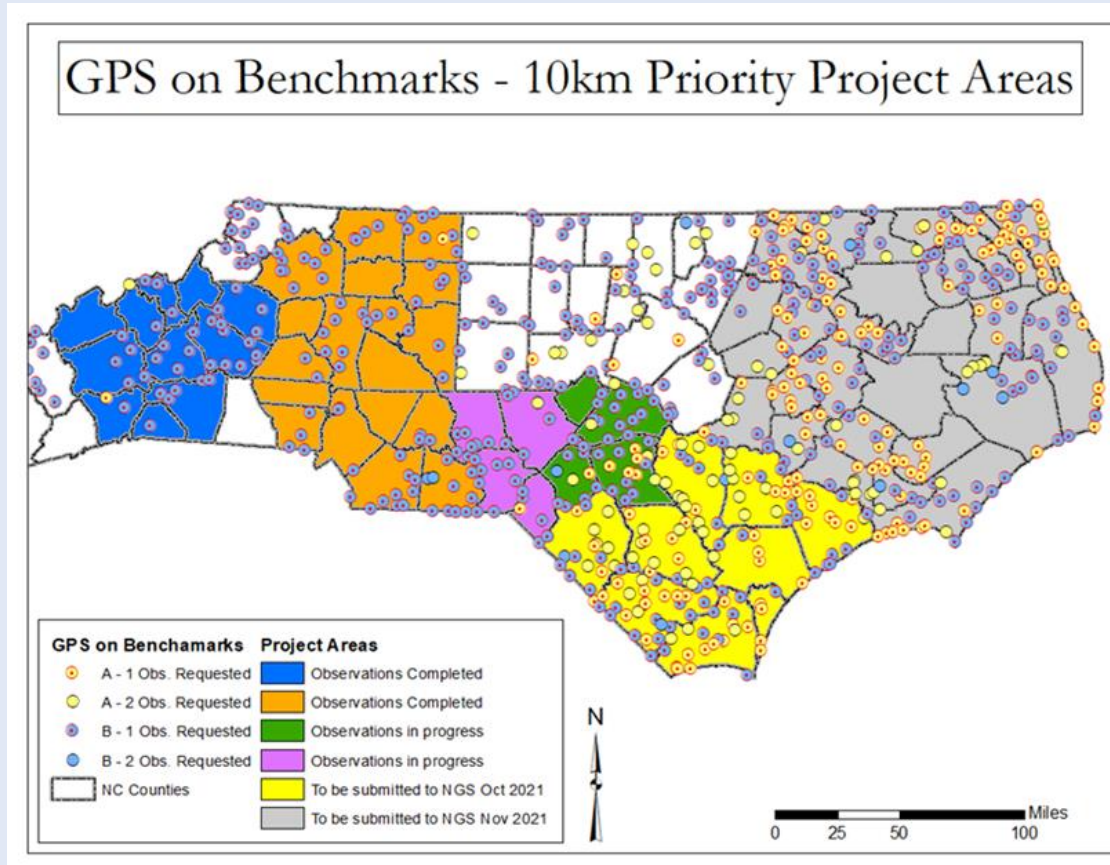


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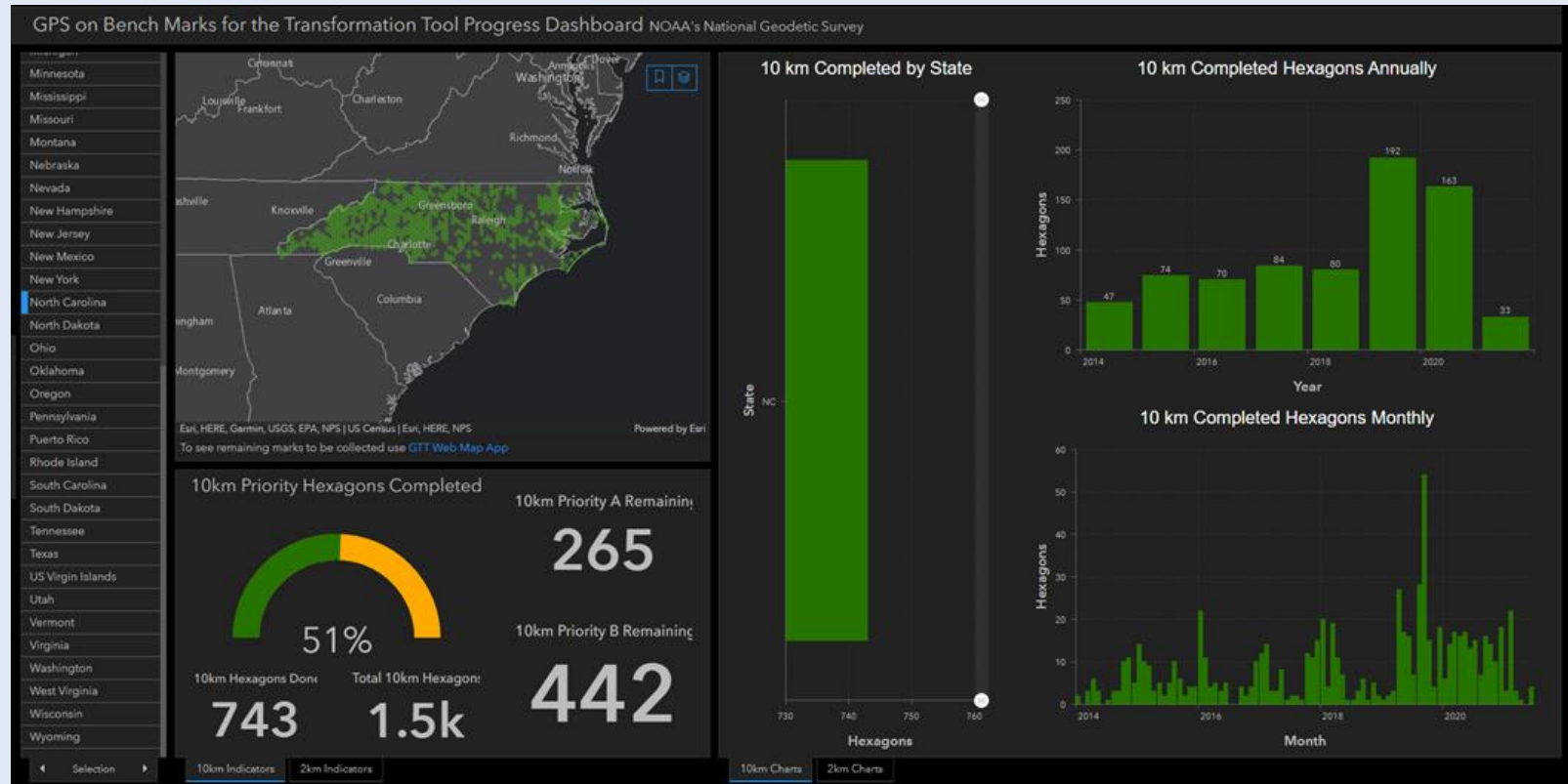


National Geodetic Survey GPS on Bench Marks 2020/2021

- Projects in progress



North Carolina's Progress Dashboard



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New Datums Are Coming!

New Datums

NOAA is Replacing NAD 83 and NAVD 88.

NOAA's National Geodetic Survey (NGS) will be replacing the datums of the National Spatial Reference System (NSRS), including the **North American Datum of 1983 (NAD 83)** and the **North American Vertical Datum of 1988 (NAVD 88)**. NGS will provide the tools to easily transform between the new and old datums. Read the NGS Ten-Year Plan and visit the **New Datums Web page** on our site to learn more.

Benefits

The new reference frames (geometric and geopotential) will rely primarily on **Global Navigation Satellite Systems (GNSS)**, such as the Global Positioning System (GPS), as well as on a gravimetric geoid model resulting from NGS' **Gravity for the Redefinition of the American Vertical Datum (GRAV-D)** Project.

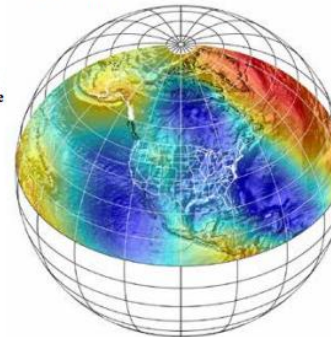
The target accuracy of differential orthometric heights (heights relative to sea level) in the geopotential reference frame will be 2 centimeters over any distance, where possible.

What You Can Expect

The magnitude of change with the new datums will vary depending on the datum you are using and your geographic location. The new geometric datum will change latitude, longitude, and ellipsoid height between 1 and 4 meters. In the conterminous United States (CONUS), the new vertical datum will change heights on average 50 centimeters, with approximately a 1-meter tilt towards the Pacific Northwest.

How You Can Prepare

- Learn if **legislation** or other formal documents referencing NAD 83 and NAVD 88 need to be changed in your state.
- **Transform existing data** to the latest NSRS datums and realizations; i.e. NAD 83 (2011), GEOID18, and NAVD 88.
- **Obtain precise ellipsoidal heights** on NAVD 88 bench marks, and visit the GPS on Bench Marks Web page to learn more.
- Require and provide **complete metadata** on all mapping contracts. See our website for more details.



The new datums will extend across CONUS and U.S. territories. The terrestrial reference frames replacing NAD 83 will be consistent with geocentric global reference frames defining latitude and longitude. The geopotential datum replacing NAVD 88 will be based on a gravimetric geoid model, enhanced by data from NGS' Gravity for the Redefinition of the American Vertical Datum (GRAV-D) Project.



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