



**NATIONAL
GEODETIC
SURVEY**

NSRS Modernization: 2022 Datums

Presented by

Charlie Geoghegan, *NGS Mid-Atlantic
Regional Geodetic Advisor*

NGS's Mission

Define, maintain and provide access to the National Spatial Reference System (NSRS) to meet our nation's **economic, social, and environmental needs.**



NSRS Modernization Delay

- Operational, workforce retention and other issues have delayed NSRS Modernization
- Resources have been diverted from tool-building to, **first and foremost**, the assurance of quality data.
- Work on additional tools will continue in the out-years

<https://geodesy.noaa.gov/datums/newdatums/FAQNewDatums.shtml>



Focused Efforts

- NAPGD2022
 - North American-Pacific Geopotential Datum of 2022
 - **Geoid2022**, Deflect2022, Grav2022, GM2022
- NATRF2022 (CATRF2022, MATRF2022, & PATRF2022)
 - North America Terrestrial Reference Frame of 2022
- SPCS2022
 - State Plane Coordinate System of 2022



<https://beta.ngs.noaa.gov/index.html>



Tools NGS Will Provide

- NCAT (SPCS2022)
 - NGS Coordinate Conversion and Transformation Tool
- DDS
 - Data Delivery System
- Station and Mark Pages
 - CORS page and passive marks page
- NCAT (update)
- OPUS Products
 - Online Positioning Users Service

Rollout Timeline

- NGS will roll out components of the modernized NSRS over time (2025 - 2026)
- While the modernized NSRS is being rolled out and tested, the current NSRS will remain the official NSRS of the United States.
- Once enough **testing by stakeholders** is done, and all modernized NSRS components seem stable and correct, the Federal Geodetic Control Subcommittee (FGCS) will be asked to vote to approve the modernized NSRS and new datums (likely in mid 2026).

More NSRS Mod Info

- Track our progress
 - <https://geodesy.noaa.gov/datum/s/newdatums/TrackOurProgress.shtml>



- FAQs
 - <https://geodesy.noaa.gov/datum/s/newdatums/FAQNewDatums.shtml>

NSRS Modernization Resources

- [1. North American-Pacific Geopotential Datum of 2022 \(NAPGD2022\)](#)
- [2. Terrestrial Reference Frames of 2022 for North America \(NATRF2022\), Pacific \(PATRF2022\), Caribbean \(CATRF2022\), and Mariana \(MATRF2022\) plates](#)
- [3. State Plane Coordinate System of 2022 \(SPCS2022\)](#)
- [4. NGS Coordinate Conversion and Transformation Tool \(NCAT\)](#)
- [5. The Data Delivery System](#)
- [6. Geodetic Station and Marks pages](#)
- [7. NGS Coordinate Conversion and Transformation Tool \(NCAT\)](#)
- [8. OPUS products](#)



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NAPGD2022

<https://beta.ngs.noaa.gov/NAPGD2022/>

This suite of models allows people to derive accurate height information, especially from GPS. It will serve as the reference surface for height measurements in the future.



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BETA



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[Home](#) > NAPGD2022

NAPGD2022 Home

Map Gallery

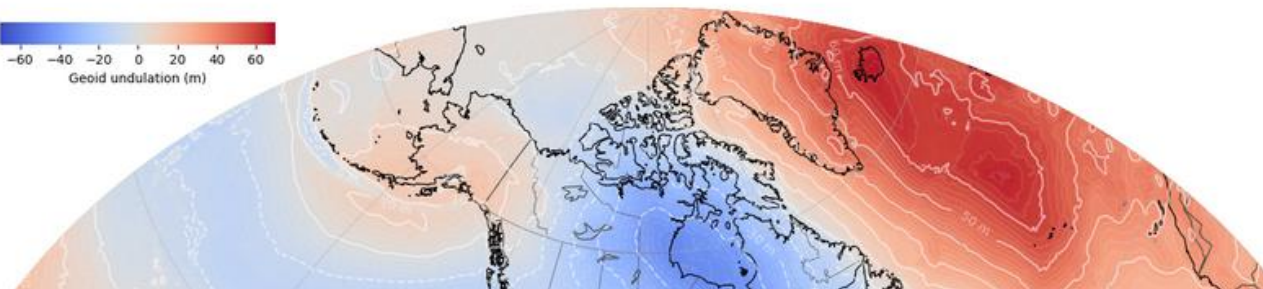
Data Download

Interactive Online Map

Developer Guide

Change Log

NAPGD2022





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NATRF2022

<https://beta.ngs.noaa.gov/NATRF2022/>

These frames will serve as the future reference for all measurements of latitude, longitude, and ellipsoid height in the United States. They are defined by transformation from international models using Euler Pole Parameters that were found for each tectonic plate.



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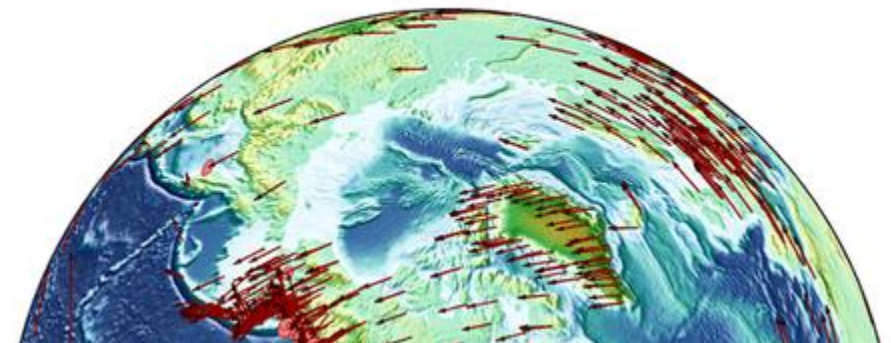
BETA

BETA PRODUCTS ▾

[Home](#) > NATRF2022, PATRF2022, CATRF2022, and MATRF2022

NATRF2022, PATRF2022, CATRF2022, and MATRF2022

Four new terrestrial reference frames will replace the North American Datum of 1983 (NAD 83). They will serve as a foundational component of the modernized





SPCS2022 (basis for NC Coordinate System)

<https://beta.ngs.noaa.gov/SPCS/>

- This system of map projections is how most surveyors will use and reference the NSRS. Also most statewide Geographic Information System (GIS) managers will want to adopt new statewide zones.



SPCS Home

Zone Information

Distortion Maps

Online Interactive Maps

Beta NCAT

Learn More

State Plane Coordinate System of 2022 (SPCS2022)

SPCS2022 is the third generation of the State Plane Coordinate System. The first version was created in the 1930s (SPCS 27) and the second in the 1980s (SPCS 83) as part of providing access to the horizontal datums current at the time of their creation. SPCS2022 will be referenced to the four 2022 Terrestrial Reference Frames that will be released as part of NGS [National Spatial Reference System \(NSRS\) Modernization](#). General information about SPCS, including its existing and previous versions, is available on the [SPCS website](#).

The maps below show that SPCS2022 will have up to three zone layers in each state, and the number of zones will vary

— **INITIAL VERSION RELEASED TO BETA** — This software tool is being rolled out in a limited capacity for SPCS2022, allowing for accurate “transformations” between different coordinate systems. (Later beta versions will include the ability to transform between reference frames and vertical datums, not just for SPCS2022.)



BETA PRODUCTS ▾

NGS Coordinate Conversion and Transformation Tool (NCAT)

Single Point Conversion

Multipoint Conversion

Web services

Downloads

Tutorial & FAQs

About NCAT

Convert/Transform from:

☒ Horizontal

☐ Horizontal+height

☐ XYZ (Cartesian geocentric)

Select the type of horizontal coordinate:

☒ Geodetic lat-long

☐ SPC (State Plane)

☐ UTM

☐ USNG



Enter lat-lon in decimal degrees

Lat

37.2509000000

Lon

-92.5104000000

or degrees-minutes-seconds

This beta version of NCAT supports beta State Plane Coordinate System of 2022 (SPCS2022) but not transformations between reference frames or geopotential datums. NAD 83 latitude and longitude can be used as input, but the output coordinates will differ horizontally from actual SPCS2022 by up to a few meters, depending on location (likewise for UTM and

Data Delivery System (DDS)

- — **PENDING FOR BETA RELEASE** — The Data Delivery System landing page will provide an updated version of the “NGS Map” and “Looking for Bench Marks” pages. This new landing page will allow you to access modernized informational pages about geodetic stations and geodetic marks.

Geodetic Stations and Marks Page

- — **PENDING FOR BETA RELEASE** — Geodetic station pages will offer an updated version of the current NOAA CORS Network (NCN) station pages. Geodetic mark pages will be updated datasheets, replacing the current ASCII text file version of datasheets. The updated coordinates (reference epoch coordinates) for marks and updated CORS coordinate functions (CCFs) for CORSs in the modernized NSRS will be available through these pages.

NGS Coordinate Conversion and Transformation Tool (NCAT)

- — **PENDING FOR BETA RELEASE** — NCAT will be updated through multiple versions, currently with state plane coordinates, then later adding support for various geopotential calculations including ellipsoid/orthometric height conversion as well as NADCON (geometric) and VERTCON (orthometric) transformations from the current NSRS to the modernized NSRS.

OPUS Products

- — **PENDING FOR BETA RELEASE** — OPUS-Static will function similarly to today's tool, but it will operate with the modernized NSRS, including the support of multi-GNSS data. Additionally, the popular function of “sharing” your solution with others (colloquially called “OPUS-Share”) will be retained, but with appropriate caveats that the shared solution should not be used as geodetic control. These shared solutions will be available through the geodetic mark pages of the DDS.