

# National Geodetic Survey

## Director's Update to the HSRP

Juliana Blackwell, Director

February 28, 2023

HYDROGRAPHIC SERVICES REVIEW PANEL



# Highlights of NSRS Modernization

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

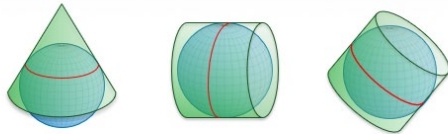
Over 1,000  
Attendees!

National Geodetic Survey Positioning America for the Future



## Changes Afoot After 2022

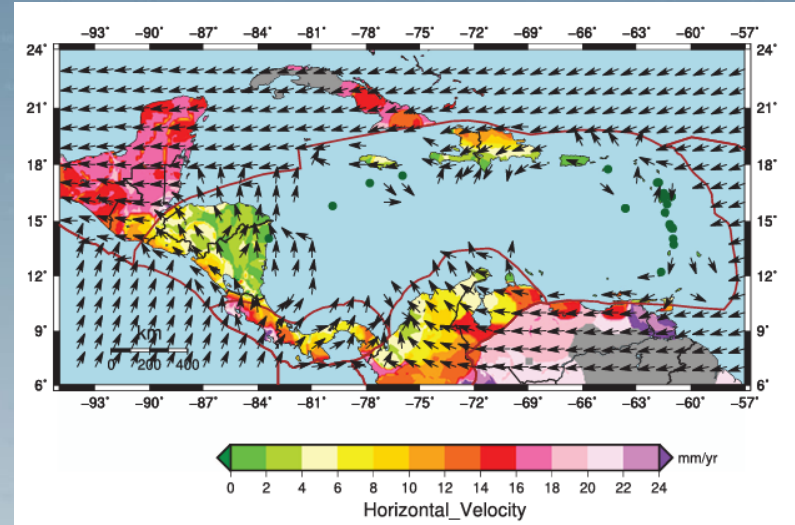
### State Plane and the Death of the U.S. Survey Foot



NGS Webinar Series  
November 10, 2022

Michael L. Dennis, PhD, PE, PLS  
SPCS2022 Project Manager

- **SPCS 2022** - Reviewed 806 zones submitted by 28 States, mostly LDP's
- **Retirement of US Survey Foot** - now complete, but won't take effect until the system is released



Source: [Expanding TRANS4D's Scope to Include 3D Crustal Velocity Estimates for a Neighborhood of the Caribbean Plate](#)

- **CATREF** - Caribbean Plate to get its own reference frame, separate from North American plate (NATREF)



# NSRS Modernization Timeline

**NOW:** Use OPUS-Projects 5 to mix static GNSS with RTK/RTN - Now moving to Production!

## **Early to Mid 2023:**

- Check out multi-GNSS with M-PAGES in OPUS-S
- Look for GDX to replace GVX
- The first (“alpha”) set of new coordinates on 100,000+ marks
- The release of the State Plane Coordinate System of 2022

## **End of 2023:**

- ITRF2020 coordinate functions on all NOAA CORS Network stations
- First (“alpha”) release of GEOID2022

**Mid 2024-Mid 2025:** One year roll-out of products, “domino style”, on the beta website

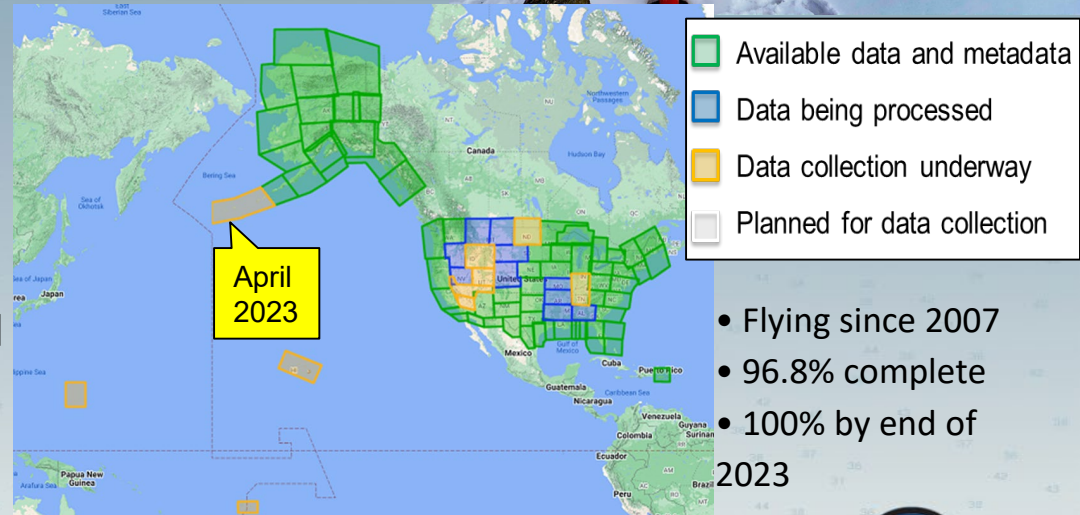
**Mid 2025:** Official announcement of the modernized NSRS

## Bipartisan Infrastructure Law Funding

***Provision 3 - Support coastal and inland flood and inundation mapping and forecasting, and next-generation water modeling activities***

**Foundation CORS** - Build out to measure Vertical Land Motion - integrate VLM measurement into inundation products

**GRAV-D** - Completion of measurements and processing to assure all modeling and mapping results are based on a shared reference frame.





# FY23 Topobathy Lidar Operations

Eastern side of the NWHI

topobathy\_tracking\_inhouse  
projects

- Planned
- Acquired
- Completed

BIL: Topobathy lidar data collection using aerial platform and processing of the data.

American Samoa

# Geospatial Modeling Grant

## NGS News

### A Grant Funding Opportunity is Now Available!

The National Geodetic Survey released a competitive funding opportunity under the Geospatial Modeling Grant. The Funding Opportunity is available for application through [Grants.gov](https://www.grants.gov/web/grants/view-opportunity.html?oppld=346302) - <https://www.grants.gov/web/grants/view-opportunity.html?oppld=346302>. Please review the "related documents" tab and download the full Notification of Funding Opportunity titled "NOAA-NOS-NGS-2023-2007815 NOFO Report.pdf." This document describes the application requirements.

### Description of Funding Opportunity

The primary objective of this funding opportunity is to modernize and improve the National Spatial Reference System (NSRS) and address emerging research problems in the field of geodesy. The secondary objective of this funding opportunity is to support a Geodesy Community of Practice in collaboration with federal and nonfederal stakeholders to address the nationwide deficiency of geodesists and improve the coordination and use of geospatial data. The program priorities under this grant program include;

1. Research and develop new methodologies for defining and applications for working with the NSRS;
2. Develop and evaluate tools, models, and guidelines to access, analyze, and manipulate geodetic data;
3. Enhance infrastructure of geodetic control, coastal remote sensing data, survey measurements, and other physical datasets that comprise the NSRS;
4. Support education, capacity building, and technology transfer for the future of geodesy;
5. Coordinate through partnerships with local, state, and regional users (e.g. state and local governments, universities, and/or the public sector).

**Notice of Federal Funding Opportunity:**  
\$4M available in FY23. Awards range from \$500k to \$2M over 2 to 5 years.



<https://www.grants.gov/web/grants/view-opportunity.html?oppld=346302>

# Coastal Imagery Viewer



Coastal Imagery Viewer

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Search Address



2015 Imagery

2016 Imagery

2017 Imagery

2018+ Imagery



- ☒ Mapbox Streets
- ☐ Mapbox Labels
- ☐ 2018 RGB Imagery
- ☐ 2019 RGB Imagery
- ☒ 2020 RGB Imagery
- ☒ 2022 RGB Imagery
- ☐ 2023 RGB Imagery

[https://geodesy.noaa.gov/storm\\_archive/coastal/viewer/index.html](https://geodesy.noaa.gov/storm_archive/coastal/viewer/index.html)



© Mapbox © OpenStreetMap Improve this map

HYDROGRAPHIC SERVICES REVIEW PANEL





**NOAA** NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL SYSTEMS DIVISION OF COMMERCE

## ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

Home | About VDatum | Download | Docs & Support | Contact Us

Regional Information  
\* Region : Puerto Rico and US Virgin Islands

Horizontal Information  
Source Target  
Reference Frame: NAD83(2011) NAD83(2011)  
Coor. System: Geographic (Longitude, Latitude) Geographic (Longitude, Latitude)  
Unit: meter (m) meter (m)  
Zone:

Vertical Information  
☒ Vertical Information  
Source Target  
Reference Frame: PRVO92 MLLW  
Unit: meter (m) meter (m)  
☒ Height ☐ Sounding ☒ Height ☐ Sounding  
☐ GEOTD model: GEOTD12B ☐ GEOTD model: GEOTD18

Point Conversion ASCII File Conversion

Input Output  
Latitude:  Transform Latitude:   
Longitude:  Reset Longitude:   
Height:  DMS Height:   
Drive to on map Reset Map  
☐ to DMS Vertical Uncertainty (+/-):  
☒ Valid Tidal area ☐ Non-Tidal area ☐ Non-Valid area  
☒ IGLD85 ☒ SVU area

Leaflet | Select a point by clicking on map.

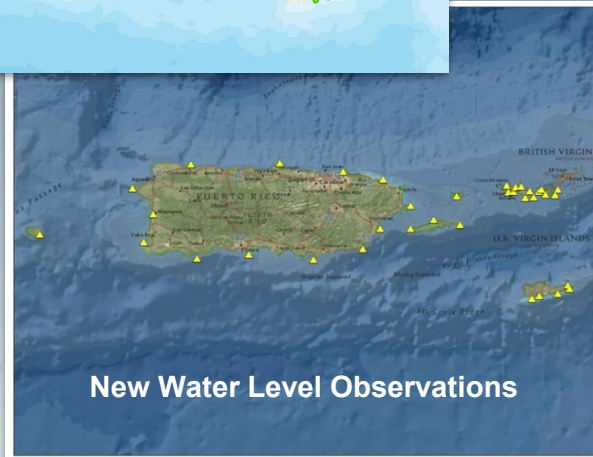
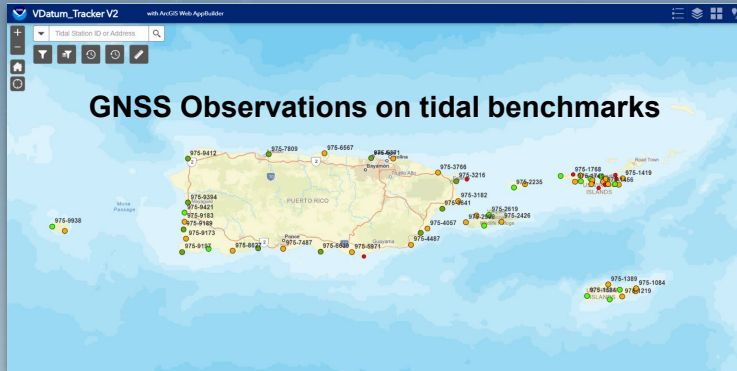
# VDatum

- **Version 4.5.1 Released, November 17, 2022**
  - Past Version Highlights:
    - 4.5: Integrated Columbia River Datum (CRD)
    - 4.4: West Coast Regional Model and Spatially Varying Uncertainty (SVU)
    - 4.3: Chesapeake and Delaware Regional Model and Spatially Varying Uncertainty (SVU)
- **Version 4.6 to be released later this year**
  - Includes Updated Puerto Rico/  
U.S. Virgin Islands Regional Model with SVU

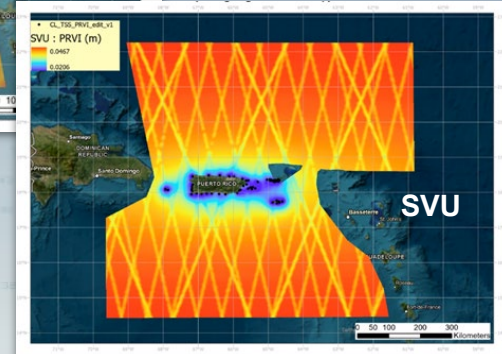
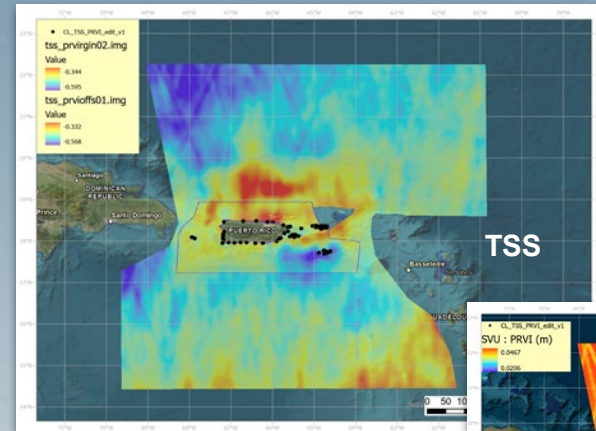


# VDatum - Caribbean Updates

## Foundational Observations



## Updated Tidal Datum and Topography of the Sea Surface (TSS) Fields and Spatially Varying Uncertainty (SVU)



# OPUS Projects 5, Real Time Data & GVX

Latest version to be released to Production [March 2023] supports:

- Campaign-style GPS survey control projects
- Real-time kinematic GNSS solutions
- New standardized vector exchange file format: GVX
- Survey network adjustments
- Submission of data to NGS for review and publication
- Exporting results to common geospatial file formats



NGS employee performing an  
RTN survey

User guide and online training videos coming soon

Promoted for crowdsourcing data collection on bench marks

# Geodesy Crisis - Geodetic Workforce Issues



The American Association for Geodetic Surveying

<https://aagsmo.org/the-geodesy-crisis/>

Home About Us Contact Us Donate Educational Videos News Membership Job Postings SaLIS  
Log In History of Geodetic Surveying

## The Geodesy Crisis

by AAGS | posted in: News | 0

Geodesy is the fundamental science of geospace. It supports and drives innovation in geospatial technology, the ~ \$ 1 trillion/year geospatial economy, and the geospatial systems of nearly all military platforms and activities. In the early 1990s the U.S. government, especially the Department of Defense (DOD), largely disinvested in academic research and education in geodesy. In contrast, the countries of the European Union that contributed the most to the development of geodesy in the preceding centuries have maintained healthy academic training and research programs, which is also the case in Japan, Canada, Australia and New Zealand. Furthermore, in the early 2000's, China began to make large and ever-growing investments in geodetic training and research. It now has more Ph.D. geodesists than the rest of the world combined. During this time period the greatest national collapse in geodetic capability occurred in the U.S., as its geodesists steadily retired, and most were not replaced. The Chinese military and defense industries now have access to hundreds of Ph.D. geodesists. Perhaps the most shocking example of the U.S. decline relative to China is that the number of Ph.D. geodesists in the entire DOD, including the National Geospatial-Intelligence Agency (NGA), is now approaching zero. The same is true of the U.S. defense industry. The U.S. is on the verge of being permanently eclipsed in geodesy and in the downstream geospatial technologies. This threatens our national security and poses major risks to an economy that is strongly tied to the geospatial revolution, on Earth and, eventually, in space.

10  
FEB 2022

Search

### Recent Posts

- ✍ Slate of candidates for the upcoming 2023 AAGS election of officers
- ✍ LSU Center for GeoInformatics is Hiring
- ✍ Lecturer or Teaching Assistant Professor – Geomatics
- ✍ FIG Foundation Student Grant

FGDC.GOV  
FEDERAL GEOGRAPHIC DATA COMMITTEE

### NATIONAL GEOSPATIAL ADVISORY COMMITTEE – RESOLUTION ON GEODESY

"The decline of geodetic academic programs in the United States and the resulting shortage of practicing geodesists threatens our international technological competitiveness in Earth and space science, affecting our economic health and security. The National Geospatial Advisory Committee (NGAC) supports the findings, which include challenges, threats, and opportunities, outlined in the "Geodesy Crisis" white paper<sup>1</sup> authored by Dr. Michael Bevis et al. and discussed with NGAC members.

The NGAC strongly recommends that these serious national challenges be addressed immediately through an ambitious program of educational support, research funding, and government agency action including:

- Address the challenges and opportunities for augmenting geodesy capabilities in support of the National Spatial Reference System and within relevant Federal Geographic Data Committee (FGDC) agencies.
- Promote understanding within FGDC agencies and across the geospatial community about how geodesy expertise advances socio-economic, environmental, ecological, intelligence, and military programs to advance national security and economic growth.
- Augment budgets to sponsor academic training and research work in geodesy and allied geospatial fields [the NGAC commends the National Geospatial-Intelligence Agency for providing its leadership and financial commitment to this effort].
- Act expeditiously."

(Adopted by the NGAC on December 7, 2022)

Leading voices in geodesy are sounding the alarm!

"America's loss of capacity and international competitiveness in geodesy, the economic and military implications, and some modes of corrective action"

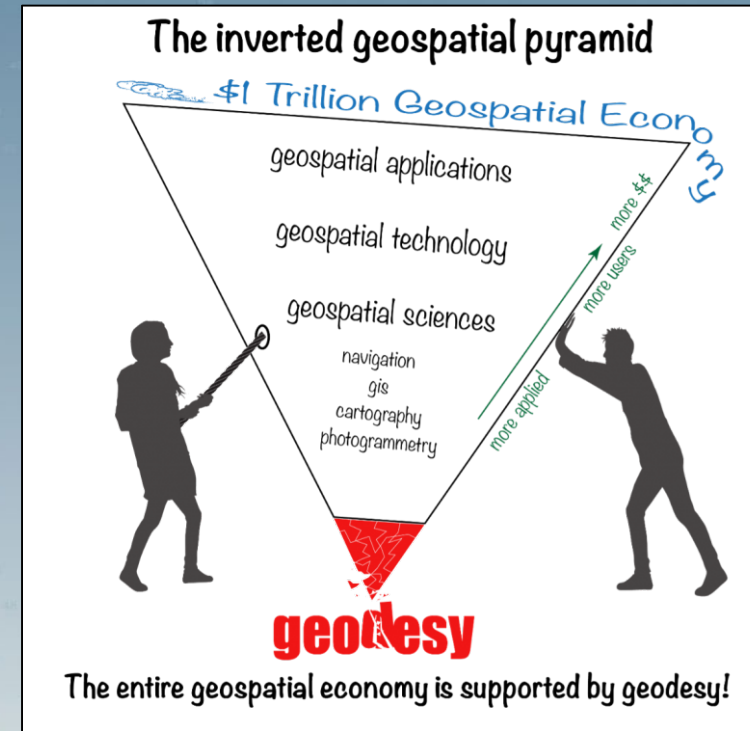
HYDROGRAPHIC SERVICES REVIEW PANEL





# How NGS is Addressing the Geodesy Crisis

- **Training:** Agency support for professional development and advanced education
- **Advocacy:** Raise awareness and communicate the risks and impacts
- **Collaboration:** Working with federal partners on Geodesy Community of Practice
- **Funding:** Engage non-federal stakeholders through grant opportunity focused on geodetic needs and building workforce



<https://www.gpsworld.com/the-inverted-geospatial-pyramid-shows-our-vulnerability/>



# International Highlights



## **United Nation Committee of Experts on Global Geospatial Information Management (UN-GGIM)**

- UN Global Geodetic Centre of Excellence (GGCE) opening March 29, 2023
- UN Subcommittee on Geodesy (SCoG) meeting
- Global Geodetic Reference Frame oversight and support by SCoG & GGCE



## **SIRGAS: the Geodetic Reference System for the Americas**

- Participation in meetings, activities, working groups
- Next meeting in Bogota, Colombia in 2024

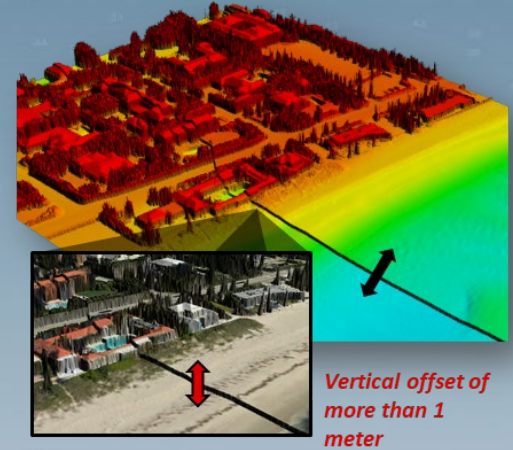


## **Caribbean Small Island Developing States (SIDS) Conference**

- UN SIDS Conference on February 21, pre-event for FIG 2023 (next slide)
- FIG previously hosted 3 Pacific SIDS meetings - supported Pacific Geospatial and Surveying Council (PGSC)

# Foundational Data and its use in planning for resilience

- NAPGD2022 will provide a consistent surface across the NW Hemisphere to align accurate heights, water levels, imagery, and other geospatial data critical for determination of hazards, risks, and management of impacts.
- Emergency response imagery provides actionable data to help first responders identify critical impacts and plan response actions.
- NOAA CORS Network and geoid model provide access to NSRS, even when all existing infrastructure has been damaged or wiped out



# Save the Date! NGS day at FIG 2023

NGS will present a full day's worth of content at the 2023 FIG Working Week in Orlando, FL on May 31, 2023

<https://fig.net/fig2023/>

<https://geodesy.noaa.gov/datums/newdatums/fig-2023.shtml>

The screenshot shows the NOAA National Geodetic Survey website. At the top is the NOAA logo and the text "National Geodetic Survey" with the tagline "Positioning America for the Future". Below this is a navigation bar with links: "NGS Home", "About NGS", "Data & Imagery", "Tools", "Surveys", "Science & Education", and a search bar. The main banner features the text "FIG WORKING WEEK 2023" in large orange letters, followed by "28 May - 1 June, 2023, Orlando, Florida, USA" in green. Below this is a green bar with the text "Protecting Our World, Conquering New Frontiers" and logos for NSPS and FIG. A blue bar below that says "Register for FIG Working Week 2023". The text below the blue bar states: "NOAA's National Geodetic Survey (NGS) provides the framework for all positioning activities in the Nation. The foundational elements of latitude, longitude, elevation, and shoreline information impact a wide range of important activities." Below this text are five icons with labels: "Process GPS Data (OPUS)", "NGS Data Explorer", "Looking for Bench Marks", "Conversion & Transformation (NCAT)", and "NOAA CORS Network". The "New Datums" icon, which shows a grid with a blue diamond, is highlighted with a red square. At the bottom, there are links for "Popular Links", "New Visitor", and a "Stay Informed: Subscribe" button with an envelope icon.

NOAA National Geodetic Survey  
Positioning America for the Future

NGS Home About NGS Data & Imagery Tools Surveys Science & Education Search

**FIG WORKING WEEK 2023**  
28 May - 1 June, 2023, Orlando, Florida, USA

NSPS FIG  
*Protecting Our World, Conquering New Frontiers*

Register for FIG Working Week 2023

NOAA's National Geodetic Survey (NGS) provides the framework for all positioning activities in the Nation. The foundational elements of latitude, longitude, elevation, and shoreline information impact a wide range of important activities.

Process GPS Data (OPUS) NGS Data Explorer Looking for Bench Marks Conversion & Transformation (NCAT) NOAA CORS Network

New Datums

Popular Links New Visitor Stay Informed: Subscribe

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## FIG 2023 Working Week



**FIG WORKING WEEK 2023**  
28 May - 1 June, 2023, Orlando, Florida, USA



*Protecting Our World, Conquering New Frontiers*

**Save the Date: NGS @ FIG - May 31, 2023**

NGS will be presenting a full-day's worth of content on NSRS Modernization during the **FIG Working Week 2023** meeting taking place at the end of May 2023 in Orlando, Florida. For the first time in over 20 years, this annual gathering of the **International Federation of Surveyors** will be taking place in the United States, hosted by the **National Society of Professional Surveyors** (NSPS).

The International Federation of Surveyors (FIG) is a United Nations and World Bank recognized non-governmental international professional organization. FIG was founded in 1878 and represents national associations of surveying, cadastre, valuation, national mapping professionals, geospatial experts and quantity surveyors working in both the public and private sectors, in the scientific, research and academic community, as well as from technology innovators and industry from more than 120 countries around the world.

We encourage you to attend the entire event and be sure to join us on the Wednesday after Memorial Day, May 31, 2023 for an NSRS Modernization update.

REGISTER