

New Datums New Coordinates New Heights



Chesapeake College
Wye Mills
June 12, 2026



Dave Doyle
Base 9 Geodetic Consulting Services
NGS, Chief Geodetic Surveyor (Retired)
base9geodesy@gmail.com
301-704-9578

Can You Answer These Questions?

- 1) What, if any, are the most significant problems with both NAD 83 and NAVD 88?
- 2) What are the names for the new horizontal and vertical datums for 2026?
- 3) What is the approximate positional difference between NAD 83(2011) and the ITRF2020?
- 4) What organization is responsible for the ITRF?
- 5) What 4 geodetic measurement techniques are used to define the ITRF?
- 6) How fast and in what direction per year is your area moving as part of the North American tectonic plate?
- 7) Which NGS tools can you use to estimate horizontal and vertical differences for 2026?



Problems with NAD 83 and NAVD 88

NAD 83 is not as geocentric as it could be (approx. 1.5 m for CONUS). Surveyors don't see this – Yet

NAD 83 is not well defined with positional velocities

NAVD 88 is realized by passive control (bench marks) most of which have not been leveled in 30-50 years.

NAVD 88 does not easily account for local vertical velocities (subsidence / uplift)

- ❖ Post glacial isostatic readjustment (Forebulge collapse) Cordilleran & Laurentide Ice Sheets
- ❖ Subsurface fluid/hydrocarbon extraction
- ❖ Sediment loading - Compaction
- ❖ Sea level change

New Datum Names

NAD 83 becomes:

North American Terrestrial Reference Frame (NATRF2022)

Caribbean Terrestrial Reference Frame (CTRF2022)

Mariana Terrestrial Reference Frame (MTRF2022)

Pacific Terrestrial Reference Frame (PTRF2022)

Realized by CORS defined in ITRF2020 at Epoch 2020.00

NAVD 88 (and U.S. Island Datums) becomes:

North American-Pacific Geopotential Datum of 2022 (NAPGD2022)

Realized by GEOID2022

Also new National Tidal Datum Epoch 2002-2020

Current release target 2029

<https://tidesandcurrents.noaa.gov/datum-updates/ntde/>

CO-OPS Datums Team – tide.predictions@noaa.gov



International Gold Standard

International Earth Rotation and Reference System Service (IERS)



Established 1987
Office in Paris, France

Produces the International Terrestrial Reference System
And
International Terrestrial Reference Frame

First ITRF – 1988
Current ITRF – 2020

IERS Four Geodetic Services



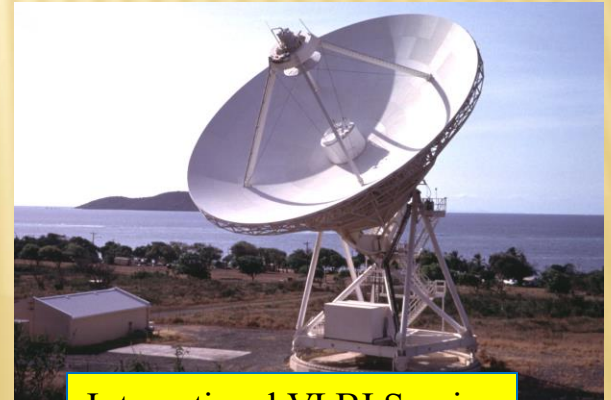
International GNSS Service



International DORIS Service



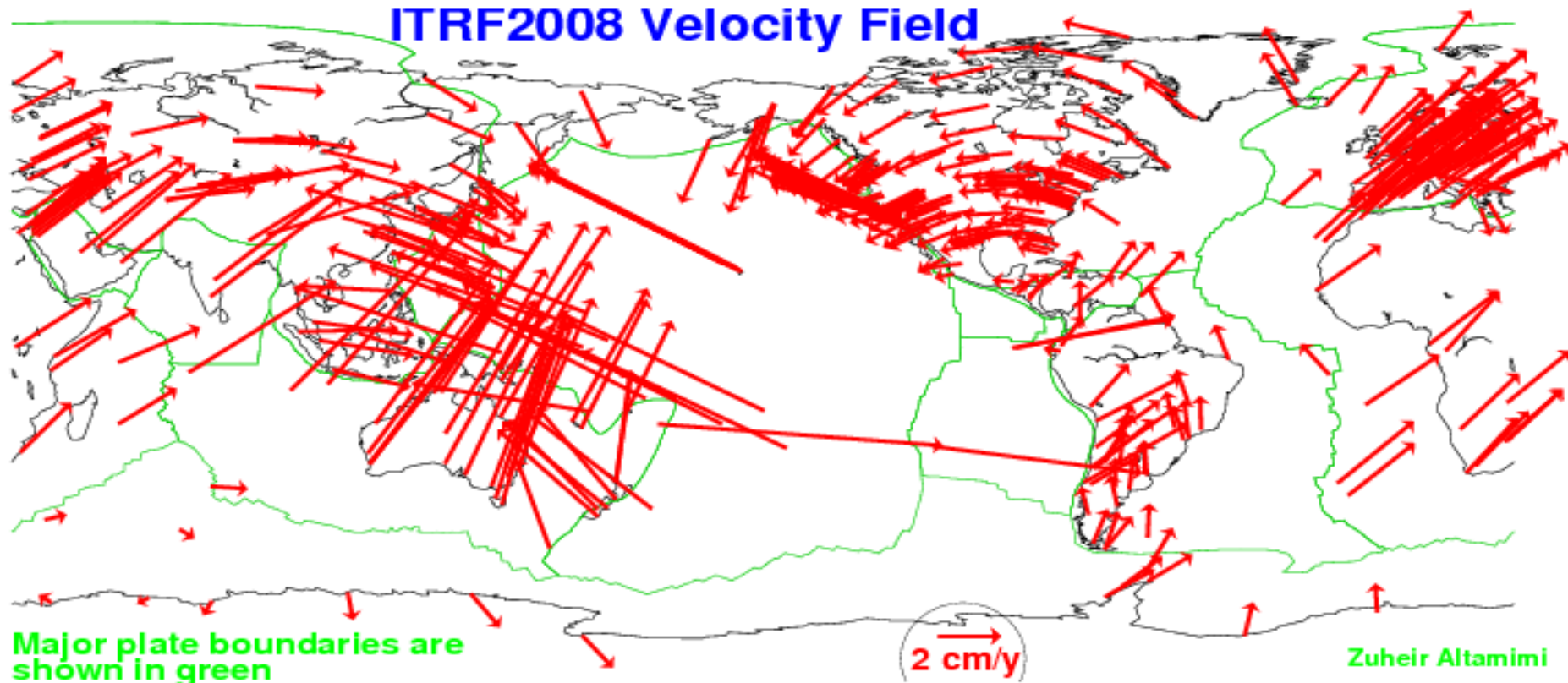
International Laser Ranging Service



International VLBI Service

Plate Tectonic Velocities

ITRF2008 Velocity Field



Horn Point nr. Cambridge (HNPT) CORS

HORN POINT ENVIRO (HNPT), MARYLAND

Antenna Reference Point(ARP) : HORN POINT ENVIRO CORS ARP

PID = AI3494

ITRF2020 POSITION (EPOCH 2020.0)

Computed in Dec 2025 using data through gpwsk 2190.

X = 1196626.103 m	latitude = 38 35 19.74136 N
Y = -4846358.496 m	longitude = 076 07 49.35447 W
Z = 3956723.134 m	ellipsoid height = -28.003 m

ITRF2020 VELOCITY

Computed in Dec 2025 using data through gpwsk 2190.

VX = -0.0129 m/yr	northward = 0.0055 m/yr
VY = 0.0021 m/yr	eastward = -0.0120 m/yr
VZ = 0.0029 m/yr	upward = -0.0022 m/yr

NAD_83 (2011) POSITION (EPOCH 2010.0)

Transformed from ITRF2020 (epoch 2020.0) position in Dec 2025.

X = 1196626.987 m	latitude = 38 35 19.70944 N
Y = -4846359.976 m	longitude = 076 07 49.33366 W
Z = 3956723.190 m	ellipsoid height = -26.679 m

NAD_83 (2011) VELOCITY

Transformed from ITRF2020 velocity in Dec 2025.

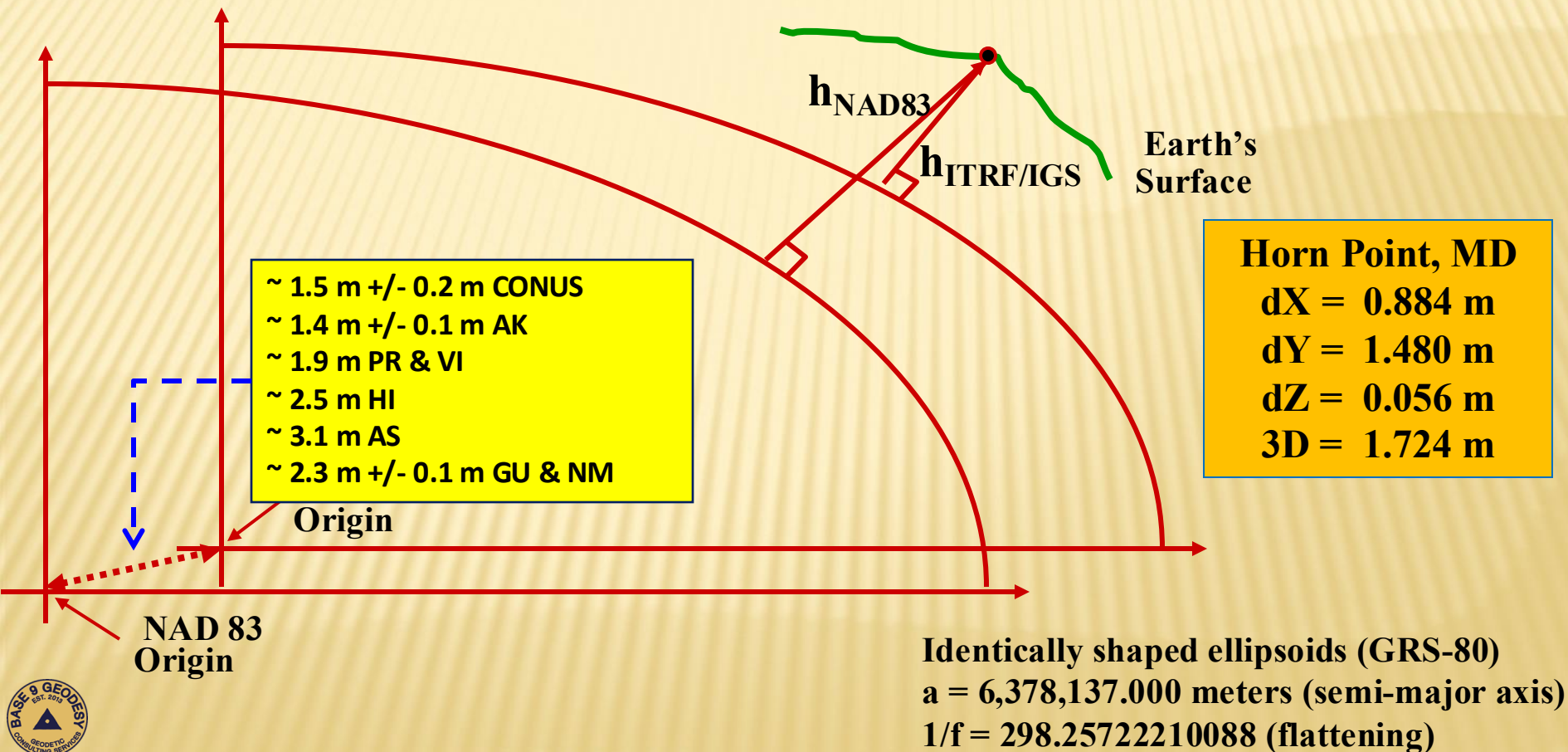
VX = 0.0035 m/yr	northward = 0.0003 m/yr
VY = 0.0033 m/yr	eastward = 0.0042 m/yr
VZ = -0.0015 m/yr	upward = -0.0028 m/yr

ITRF2020-NAD 83(2011)

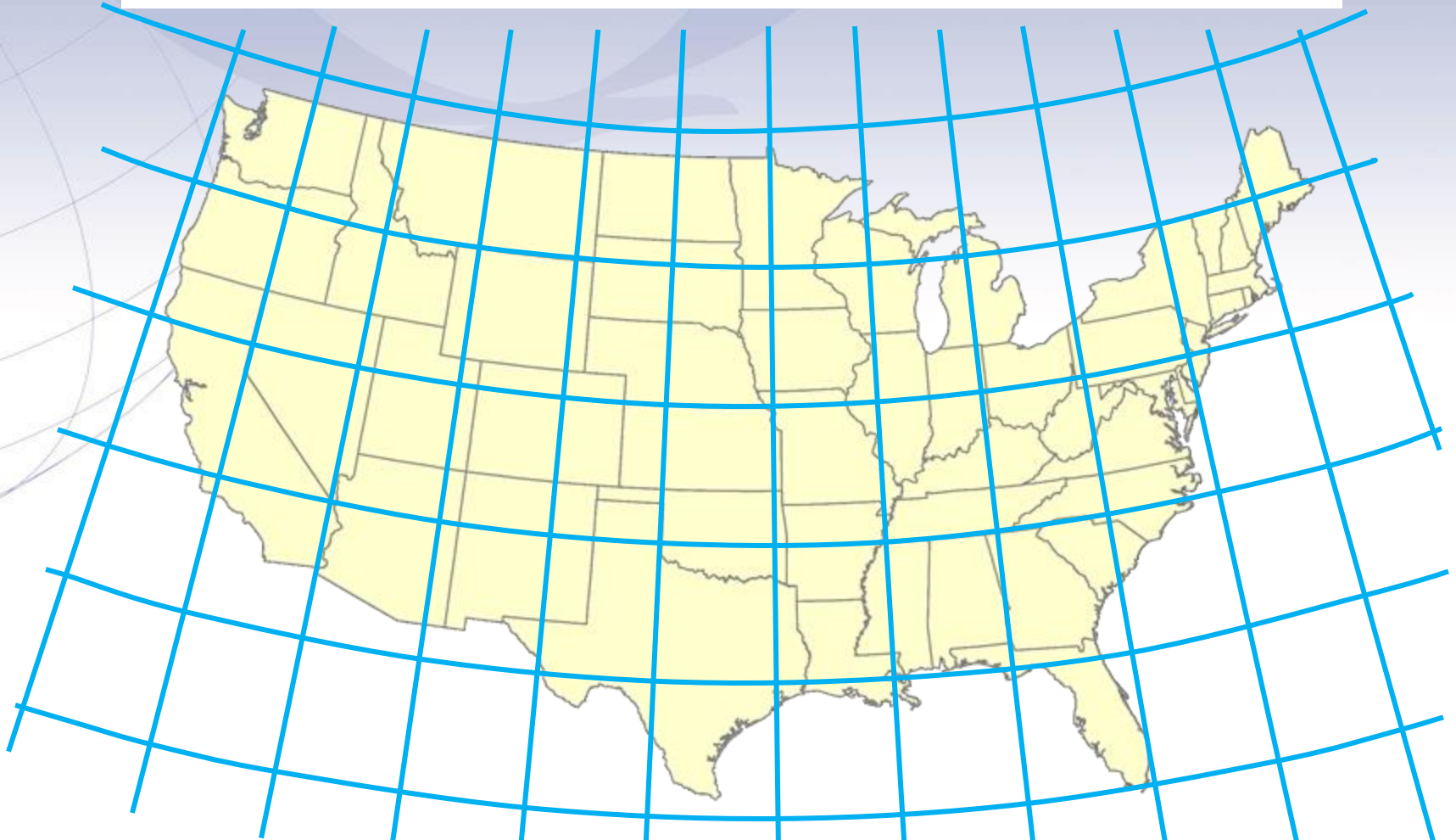
$\Delta H_{\text{Horiz}} = 1.106 \text{ m} / 3.63 \text{ ft}$

$\Delta E_{\text{Ht}} = 1.324 \text{ m} / 4.34 \text{ ft}$

Simplified Concept of NAD 83(2011) vs. ITRF 2020

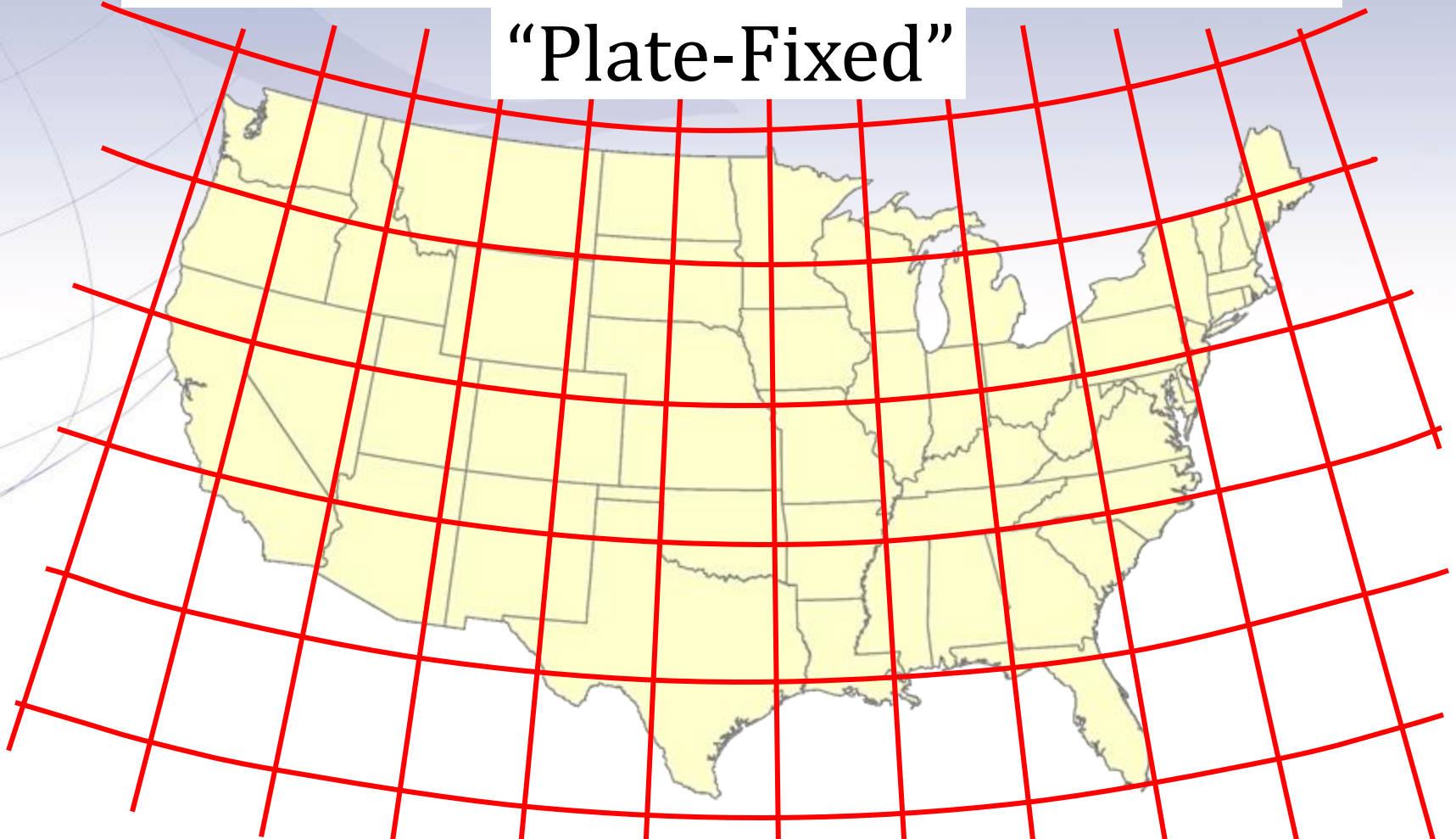


ITRF – constant frame, rotating plate

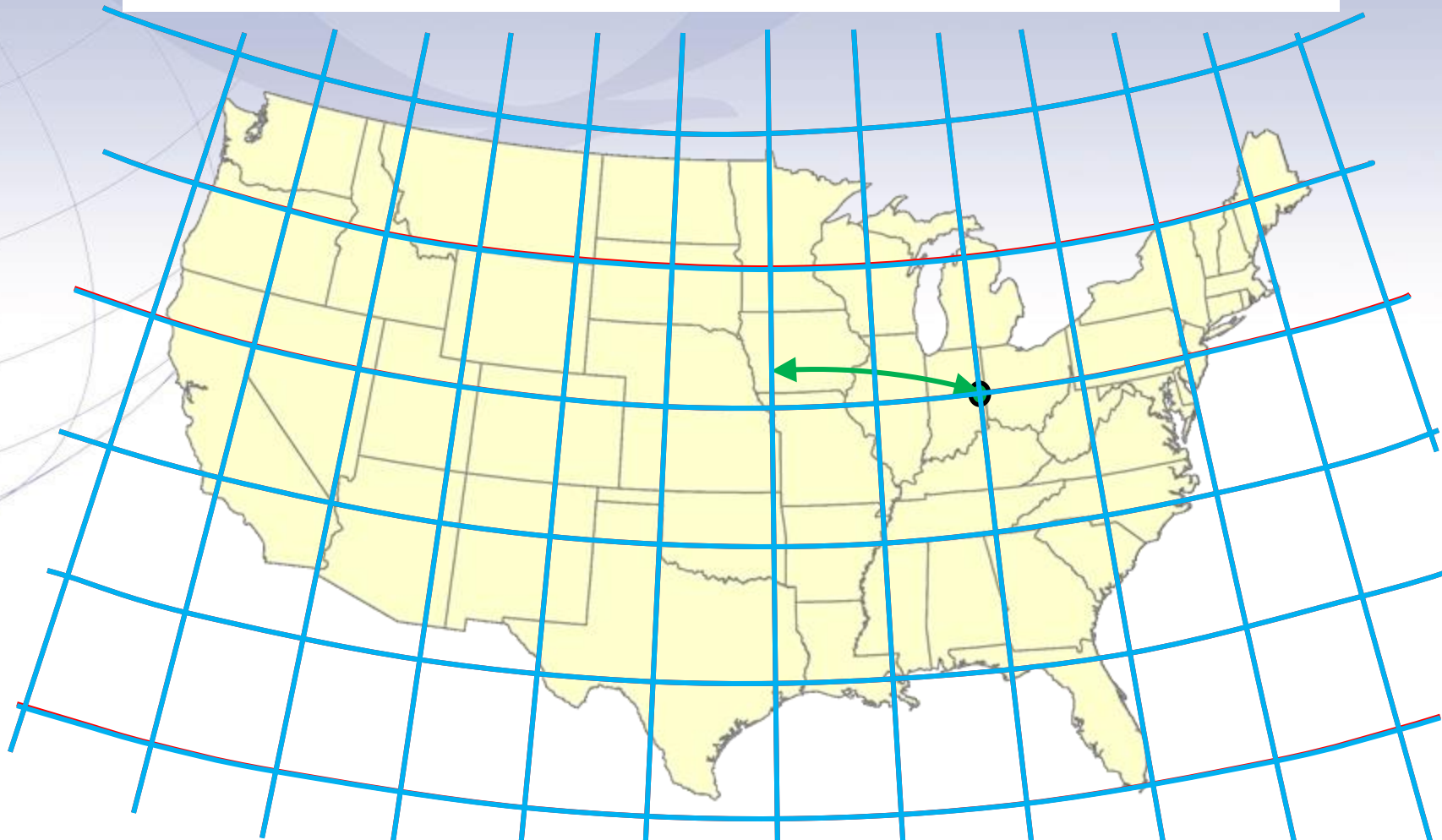


NATRF – rotating frame, constant with plate

“Plate-Fixed”



ITRF or **NATRF** – your choice, just use **EPP**



Transition to the Future – GRAV-D

Gravity for the Redefinition of the American Vertical Datum

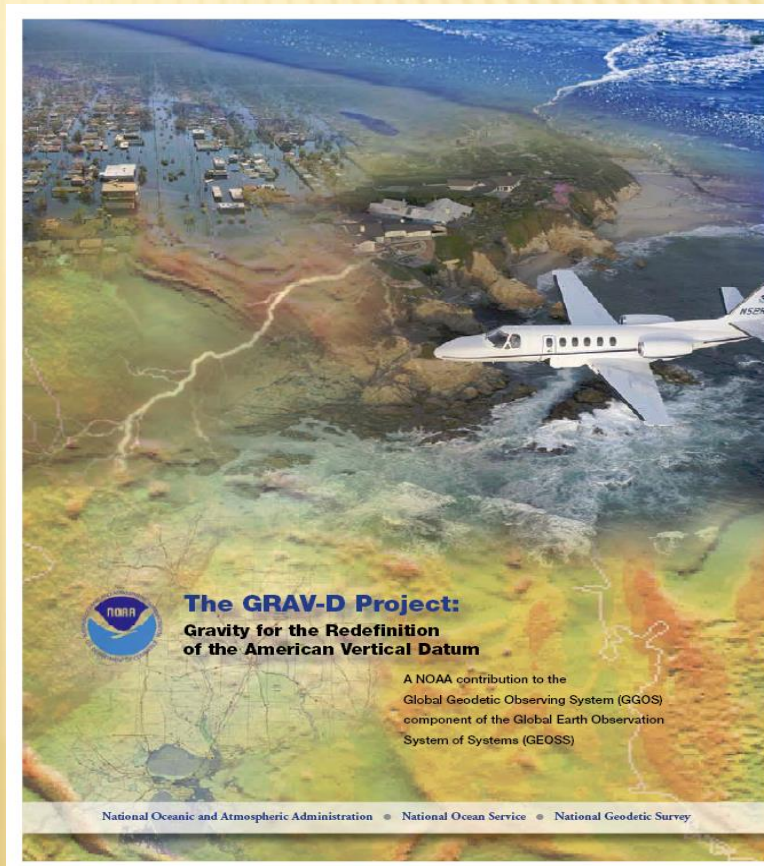
Official NGS policy as of Nov 14, 2007

Airborne Gravity Snapshot

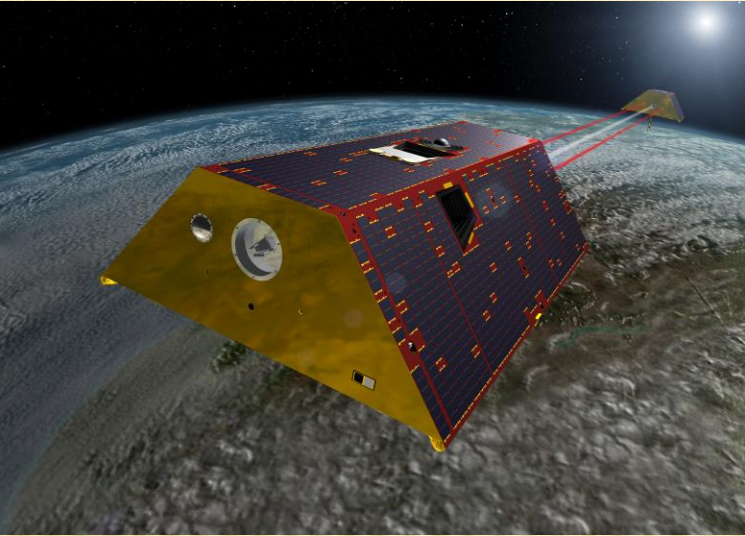
Absolute Gravity Tracking

Re-define the Vertical Datum of the USA by 2025

100% Complete as of September 2023



Space-Base Gravity Observations



Gravity Recovery And Climate Experiment (GRACE)

137 mi apart/310 miles high

Launched – March 2002

Mission End – October 2017

GRACE-FO (Follow On) launched May 2018

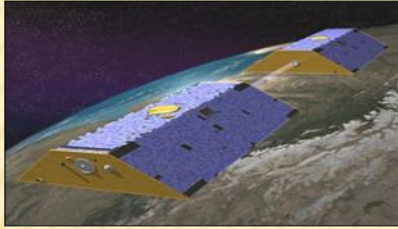
Gravity field and steady state Ocean Circulation Explorer (GOCE)

Launched – March 2009

Re-entry November 2013



Building a Gravity Field



GRACE/GOCE/Satellite Altimetry

Long Wavelengths
(≥ 250 km)

+



Airborne Measurement

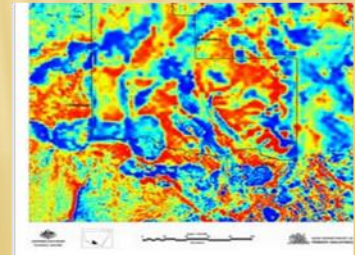
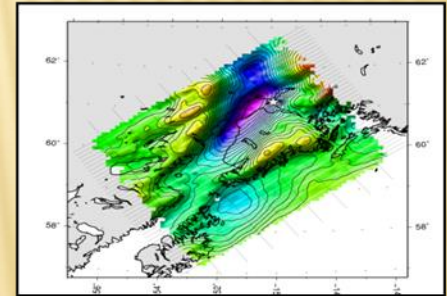
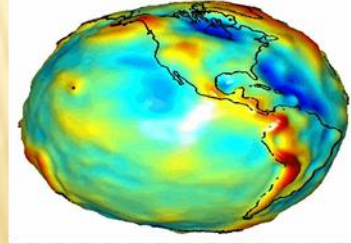
Intermediate Wavelengths
(500 km to 20 km)

+



Surface Measurement and
Predicted Gravity from Topography

Short Wavelengths
(< 100 km)



Datum Transformations

You **CANNOT improve the accuracy of coordinates/heights by performing a datum transformation**

If possible, ALWAYS recompute using original observations

If you use any datum transformation utility, make sure you know the source and uncertainty it may provide

NAD 83 History in MD

1983 – **NAD 83 (1986)** – All classical triangulation adjusted as part of new national geodetic horizontal datum. Approx 266,436 classical triangulation and traverse stations, including some Transit Doppler and VLBI. Required 12 years to complete. Subsequent GPS observations indicated NAD 83 suffered from approximately 1 m nation-wide distortion.

1991 – **NAD 83 (1991)** – NGS observes the Maryland High Accuracy Reference Network (HARN). All classical triangulation adjusted to fit HARN.

2000 – Maryland observed by NGS and MDSHA as part of the Federal & Cooperative Base Networks (FBN/CBN). Previous HARN positions consistent at .05 m/.16 ft level no need to readjust.

2007 – **NAD 83 (2007)** – All passive GPS control adjusted to fit update CORS network positions – 67,000+ stations

2011 – **NAD 83 (2011)** – All passive GPS control adjusted to fit update CORS network positions – 80,000+ stations



Datum Transformations – NCAT

<https://geodesy.noaa.gov/NCAT/>



NGS Coordinate Conversion and Transformation Tool (NCAT)

National Geodetic Survey

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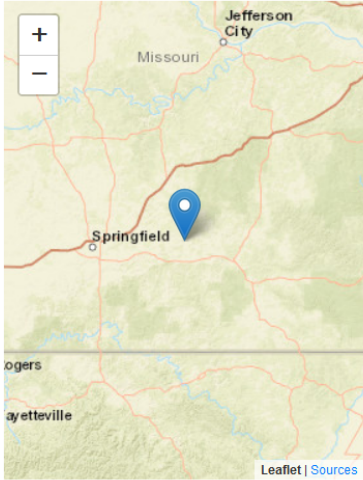
Single Point Conversion | Multipoint Conversion | Web services | Downloads | Tutorial & FAQs | About NCAT

Convert/Transform from:

☒ Horizontal ☐ Horizontal+height ☐ XYZ

Select the type of horizontal coordinate:

☒ Geodetic lat-long ☐ SPC ☐ UTM ☐ USNG



Leaflet | Sources

Enter lat-lon in decimal degrees

Lat

Lon

or degrees-minutes-seconds

Lat

Lon

or drag map marker to a location of interest

Input reference frame (historically called 'horizontal datum')

Don't see a reference frame in the list? [Click here to learn more.](#)

SPC zone

Output reference frame (historically called 'horizontal datum')

- NAD83(2011)
- NAD83(NSRS2007)
- NAD83(FBN)
- NAD83(HARN)
- NAD83(1986)
- NAD27
- USSD

Submit

Click blue bar(s) to expand/collapse



Vertical Datum Transformations

NAVD 88 to/from NAPGD 2022

Available with NGS NCAT utility

Transformation uncertainty likely to be relatively good in areas with considerable GPS on BM observation, regrettably not as good in many areas due to lack of GPS on BMs observed in those states and submitted to NGS

My estimates – Where GPS on BMs have been observed $\approx .02-.04\text{m}/.1-.13\text{ft}$
Other areas $\approx .05-.08\text{m}/.2-.3\text{ ft}$ maybe more!

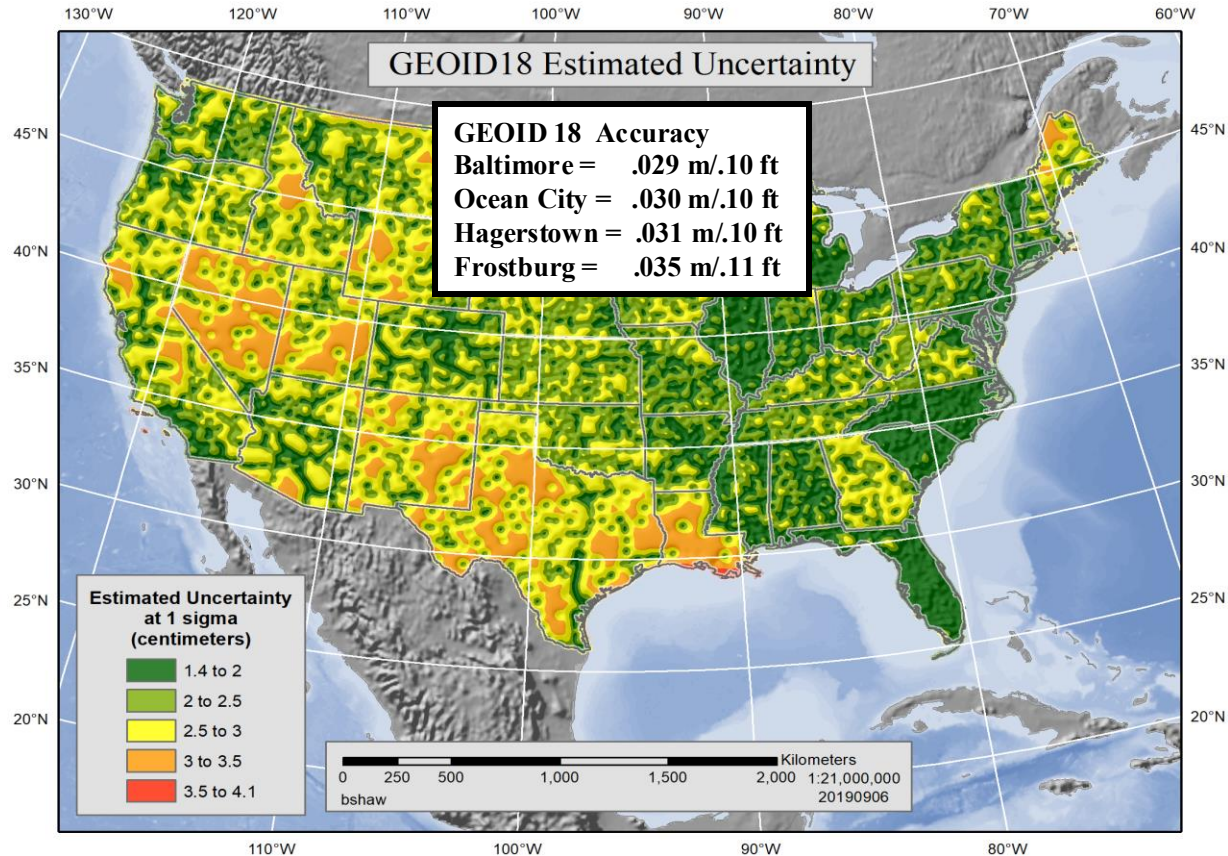
See – NGS GPS on BMs

<https://geodesy.noaa.gov/GPSonBM/>



GEOID 18 Accuracy – Be Mindful of Accuracy

<https://geodesy.noaa.gov/GEOID/GEOID18/>



U.S. Survey Foot Is Gone!

Deprecation of the United States (U.S.) Survey Foot as of January 1, 2023

National Institute of Standards and Technology (NIST)

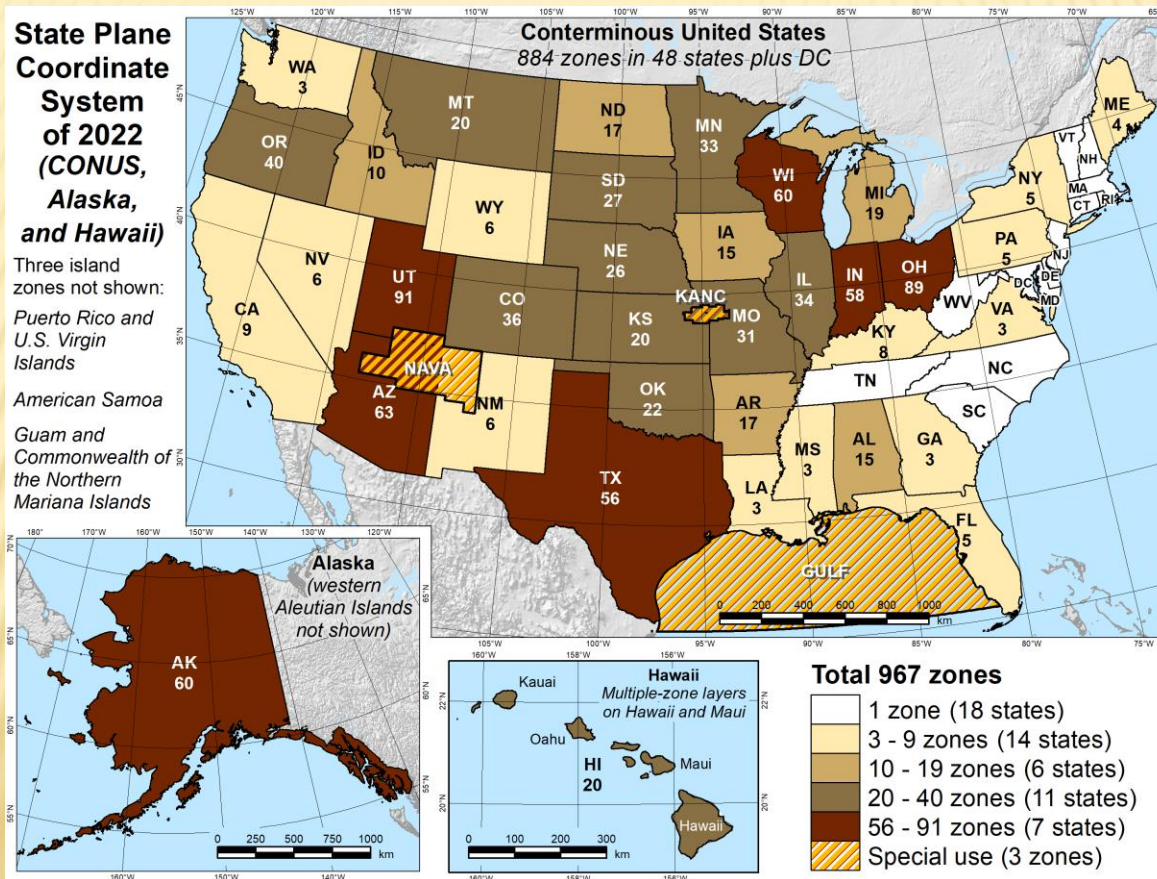
Federal Register Notice

Vol. 85, No. 193, October 5, 2020, pg 62698

<https://www.govinfo.gov/content/pkg/FR-2020-10-05/pdf/2020-21902.pdf>



NATRF 2022 State Plane Coordinates



Compute Predicted NAPGD2022 Positions

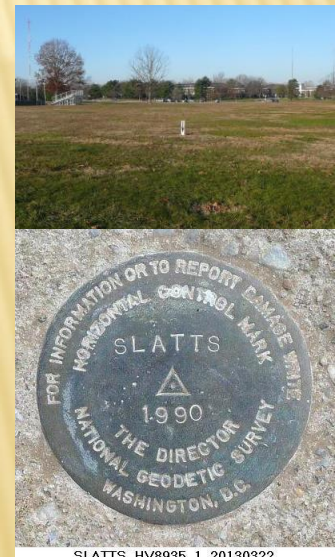
This presentation uses data for station SLATTS (HV8935) nr. Wye Mills

Step 1 – From Datasheet get NAD 83 (2011) Latitude, Longitude, Ellipsoid Height

Step 2 – Run NGS utility **HTDP** - <https://geodesy.noaa.gov/TOOLS/Htdp/Htdp.shtml>

- Select option 4 “Transform positions between reference frames and/or dates”
- Select how you wish to specify positions: “Individual points entered interactively”
- Specify the reference frame for the input values: “NAD_83(2011/CORS96/2007) North America plate fixed”
- Specify the reference frame for the output values (scroll down): “ITRF20 or IGS20”
- Specify the reference date of the input position(s) and output position(s): enter “2010.00”; enter “2020.00”
- Select the type of coordinate to be entered: “Latitude, Longitude, Height”
- Select how the required velocity (relative to the input frame) is to be entered: “Use the velocity predicted by this program (ignore the input boxes below)”

Click



SLATTS, HV8935, 1, 20130322

Compute *Predicted* NAPGD2022 Position



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HTDP – Horizontal Time-Dependent Positioning

HTDP is a utility for transforming positional coordinates across time and between spatial reference frames.

*** HTDP should NOT be used to transform between NAD 83 realizations (2011, NSRS2007, HARN, etc.). It will not give correct results. To transform between NAD 83 realizations, use the **NGS Coordinate Conversion and Transformation Tool (NCAT)** instead. ***

Interactive Computations (using HTDP version 3.5.0):

1. Estimate horizontal displacements between two dates.
2. Estimate horizontal velocities.
3. Transform observations to a specified reference frame and/or date. (Note)
4. Transform positions between reference frames and/or dates. (Note)
5. Transform velocities between reference frames.

More Info:

- View [User Guide \[pdf\]](#) and [Revision Log \[pdf\]](#)
- Download a **zipped archive** of the HTDP PC executable, User Guide, Revision Log, sample data files, Fortran-90 source code, and tectonic plate shapefile.
- **Relevant publications**
- You may access the source code on [github](#) and customize it for your needs.

*** Notes regarding transformations involving WGS 84 (see the **HTDP User Guide** for more details) ***

- **WGS 84 is a product of the National Geospatial-Intelligence Agency** and is not part of the National Spatial Reference System. Because NGS is not the authoritative source, WGS 84 transformations performed by HTDP should be considered approximate and used with caution.
- Original WGS 84 (Transit) is no longer treated as equivalent to NAD 83. Therefore transformations involving WGS 84 (Transit) will give results that differ from those obtained in versions of HTDP prior to 3.4.0.



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EST. 2014
GEODETIC
CONSULTING SERVICES

Compute *Predicted* NAPGD2022 Position



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[Estimate horizontal displacements between two dates](#)

[Update positions and/or observations to a specified date](#)

[Transform positions between reference frames and/or dates](#)

[Transform velocities between reference frames](#)

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Transforming Positions Between Reference Frames

HTDP uses 14-parameter transformations, exclusively, to transform positional coordinates between spatial reference frames. Thus, HTDP addresses only the coordinate differences associated with differences in the origin, orientation, and scale between reference frames and/or differences in the rate of change of these features with respect to time.

As a result, HTDP is not intended to perform rigorous transformations between the various realizations of NAD_83.

Coordinate transformations between the various realizations of NAD_83 can instead be performed using the tools NADCON (for 2-D transformations) and GEOCON/GEOCON11 (for 3-D transformations).

Select how you wish to specify positions:

- [Individual points entered interactively](#)
- [*80* records in a specified Blue book file. \[Explain\]](#)
- [Multiple points contained in a file in Lat-Lon-Ht format. \[Explain\]](#)
- [Multiple points contained in a file in X-Y-Z format. \[Explain\]](#)

Documentation & Downloads

- [PC Software Information](#)
- [User's Guide](#)
- [Revision Log](#)
- [Download Zip File](#)
- [Relevant publications](#)



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Compute ITRF2020/NATRF2022 Position

Horizontal Time-Dependent Positioning

TRANSFORMING POSITIONS BETWEEN REFERENCE FRAMES

Specify the reference frame for the input values:

NAD_83(2011/CORS96/2007) North America plate fixed
NAD_83(PA11/PACP00) Pacific plate fixed
NAD_83(MA11/MARP00) Mariana plate fixed
WGS84 original (Transit)
WGS84(G730) ITRF91 used

Specify the reference frame for the output values:

ITRF2000 or IGS00/IGb00
ITRF2005 or IGS05
ITRF2008 or IGS08/IGb08
ITRF2014 or IGS14/IGb14
ITRF2020 or IGS20

Dates may be entered either in the month-day-year format or in the decimal-year format.

For the month-day-year format, the month is a number between 1 and 12 and a four-character year is required. The month, day, and year may be separated by spaces or by commas.

Valid examples are:

5,4,1998 for May 4, 1998

5 4 1998 for May 4, 1998

For the decimal-year format, enter yyyy.xxx where yyyy denotes the year and xxx denotes the fraction of the year.

Valid examples are:

2010.0 for January 1, 2010

1979.359 for May 12, 1979

1991.35 for May 8, 1991

No decimal point is needed for beginning of year (e.g., can use 2010 instead of 2010.0).

The fractional year is obtained by subtracting one from the day-of-year and then dividing the result by 365 (or 366 if it is a leap year).

Thus, the fractional year corresponds to UTC midnight at the beginning of the day.

HTDP models are not valid for dates before the 1906 San Francisco earthquake.

☐ month-day-year ☒ decimal year

Specify the reference date of the input position(s): 2010.00

Specify the reference date of the output position(s): 2020.00

Compute ITRF2020/NATRF2022 Position

Input the site's position either in terms of latitude, longitude, and ellipsoidal height or in terms of geocentric Cartesian coordinates $-X,Y,Z$ - but not both. For latitude (positive north) and longitude (positive west), use the form degrees, minutes, and seconds and use either commas or spaces to separate the individual values. The field for seconds must include a decimal point. To denote negative values, use negative degrees, minutes, and seconds.

Valid examples for latitude are:

37,34,35.67

37 34 35.67

-37 -34 -35.67 denotes a point in the southern hemisphere.

Values for ellipsoidal height or for X, Y, and Z must be specified in meters and must be entered with a decimal point (but without commas).

Select the type of coordinates to be entered:

☒ Latitude, Longitude, Height ☐ Global X, Y, Z

Latitude or X:

Longitude or Y:

Height or Z:

Station Name (optional):

Select how the required velocity (relative to the input frame) is to be entered:

☒ Use the velocity predicted by this program (ignore the input boxes below)

☐ Specify the velocity in terms of north-east-up components (use the input boxes below)

☐ Specify the velocity in terms of global X-Y-Z components (use the input boxes below)

North or X (mm/yr):

East or Y (mm/yr):

Up or Z (mm/yr):

Compute ITRF2020/NATRF2022 Position

HTDP Output

HTDP OUTPUT, VERSION 3.6.0

TRANSFORMING POSITIONS FROM NAD_83(2011/CORS96/2007) (EPOCH = 01-01-2010 (2010.0000))
TO ITRF2020 or IGS20/IGb20 (EPOCH = 01-01-2020 (2020.0000))

LATITUDE	38 57 4.25987 N	38 57 4.29156 N	-1.24 mm/yr	north
LONGITUDE	76 04 44.59128 W	76 04 44.61328 W	1.80 mm/yr	east
ELLIP. HT.	-17.373	-18.668 m	-0.90 mm/yr	up
X	1194908.580	1194907.675 m	1.77 mm/yr	
Y	-4820842.926	-4820841.480 m	0.36 mm/yr	
Z	3988092.994	3988092.940 m	-1.53 mm/yr	



[NGS HOME PAGE](#)

Compute NATRF2022 State Plane Coordinates

Open BETA NCAT - <https://beta.ngs.noaa.gov/NCAT/>

Input Position Requirement

- Select Convert/Transform From: “Horizontal+height”
- Enter Coordinate from previous HTDP computation – remember to select “W” for Longitude if entering value without the “minus” sign!
- Enter Ellipsoid Height and units from previous HTDP computation
- Note: BETA version has input and output reference frames locked at NATRF2022 (Epoch 2020.00) – this is OK as this is just for estimating purposes. The final live version of NCAT will allow the user to make whichever datum and coordinate system selections they want
- Select the SPC zone from the (very) long list of zones if the default is not what you want.

Click 

Output – NATRF2022 Epoch 2020.00 Latitude and Longitude, State Plane and UTM coordinates
All NATRF2022 SPCs defined in Meters and International Feet only



Compute NATRF2022 State Plane Coordinates



BETA PRODUCTS ▾

NGS Coordinate Conversion and Transformation Tool (NCAT)

Single Point Conversion

Multipoint Conversion

Web services

Downloads

Tutorial & FAQs

About NCAT

Last Updated: Jul 01 2025

Convert/Transform from:

☐ Horizontal

☒ Horizontal+height

☐ XYZ (Cartesian geocentric)

Select the type of horizontal coordinate:

☒ Geodetic lat-long

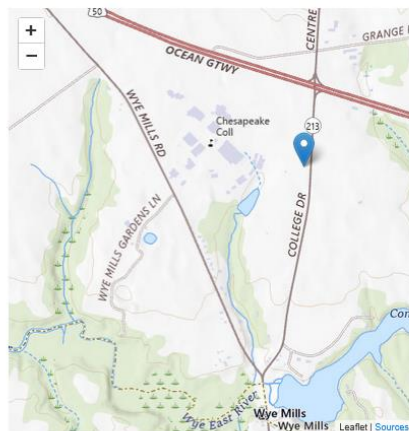
☐ SPC (State Plane)

☐ UTM

☐ USNG

Select a height

☒ Ellipsoidal



Enter lat-lon in decimal degrees

Lat

Lon

or degrees-minutes-seconds

Lat

Lon

or drag map marker to a location of interest

Ellipsoid Height

Units of height

Input reference frame
(historically called 'horizontal datum')

Output reference frame
(historically called 'horizontal datum')

Don't see a reference frame in the list? Click [here](#) to learn more.

SPC zone

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 USNG). If NAD 83 ellipsoid heights are used, the linear distortion and combined factor will differ from SPCS2022 values by a small amount, within ± 0.3 parts per million (ppm). To reduce these differences, NAD83 epoch 2010.0 coordinates can first be transformed to ITRF2020 epoch 2020.0 using the [Horizontal Time-Dependent Positioning \(HTDP\)](#) tool.

Submit



Compute NATRF2022 State Plane Coordinates

Converted Coordinate

Reference Frame: NATRF2022

Lat-Lon-Height		SPC		UTM/USNG		XYZ	
Latitude	N38° 57' 04.29156" N385704.29156 38.9511921000	Zone	MD- 240001 (Statewide)	Zone	18	X	1,194,907.675 m
Longitude	E283° 55' 15.38672" W0760444.61328 -76.0790592444	Northing	240,235.928 m 788,175.618 ft	Northing	4,311,913.896 m	Y	-4,820,841.479 m
Ellipsoid Height (m)	-18.668	Easting	879,929.741 m 2,886,908.599 ft	Easting	406,497.036 m	Z	3,988,092.940 m
		Scale factor	0.999981554	Scale factor	0.999707654		
		Combined factor	0.999984483	Combined factor	0.999710582		
		Distortion	-15.517 ppm	Distortion	-289.418 ppm		
		Convergence	+00° 34' 39.69"	Convergence	-00° 40' 42.27"		
				USNG	18SVJ0649711913		

You may change the default UTM zone. The change is processed interactively once a lat-long is converted; DO NOT click the Submit button.

Compute Predicted NAPGD2022 Orthometric Heights

Step 1 – Open the **BETA** utility **NAPDG2020** <https://beta.ngs.noaa.gov/NAPGD2022/>

Step 2 – Select “Interactive Online Map”

Step 3 – Select “GEOID2022”, Should be the default

Step 4 – On the map scroll to the approximate general area of your control

Step 5 – The tool is clumsy(!) Carefully scroll into the general area of your interest then open one of the Basemaps,  I generally use “Human Geography” then scroll as close as possible to your specific area.

Step 6 – Left click on your chosen point, and you will get the GEOID2022 height

Step 7 – To get the approximate NAPGD2022 orthometric height add the geoid height to the previously computed NATRF2022 ellipsoid height (be mindful of the signs +/-)

Step 8 – Select “Interactive Online Map,” this time select “NAPGS2022 Difference” and relocate your point again, left click and you will get the predicted orthometric difference which should match your computation from STEP 7 by a couple of cm with the color codes on the right.



Compute Predicted NAPGD2022 Orthometric Heights

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NAPGD2022 Home

Map Gallery

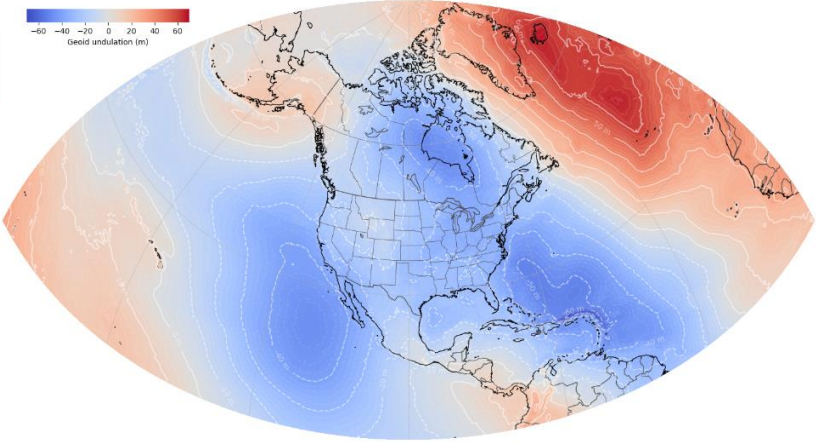
Data Download

Interactive Online Map

Developer Guide

Change Log

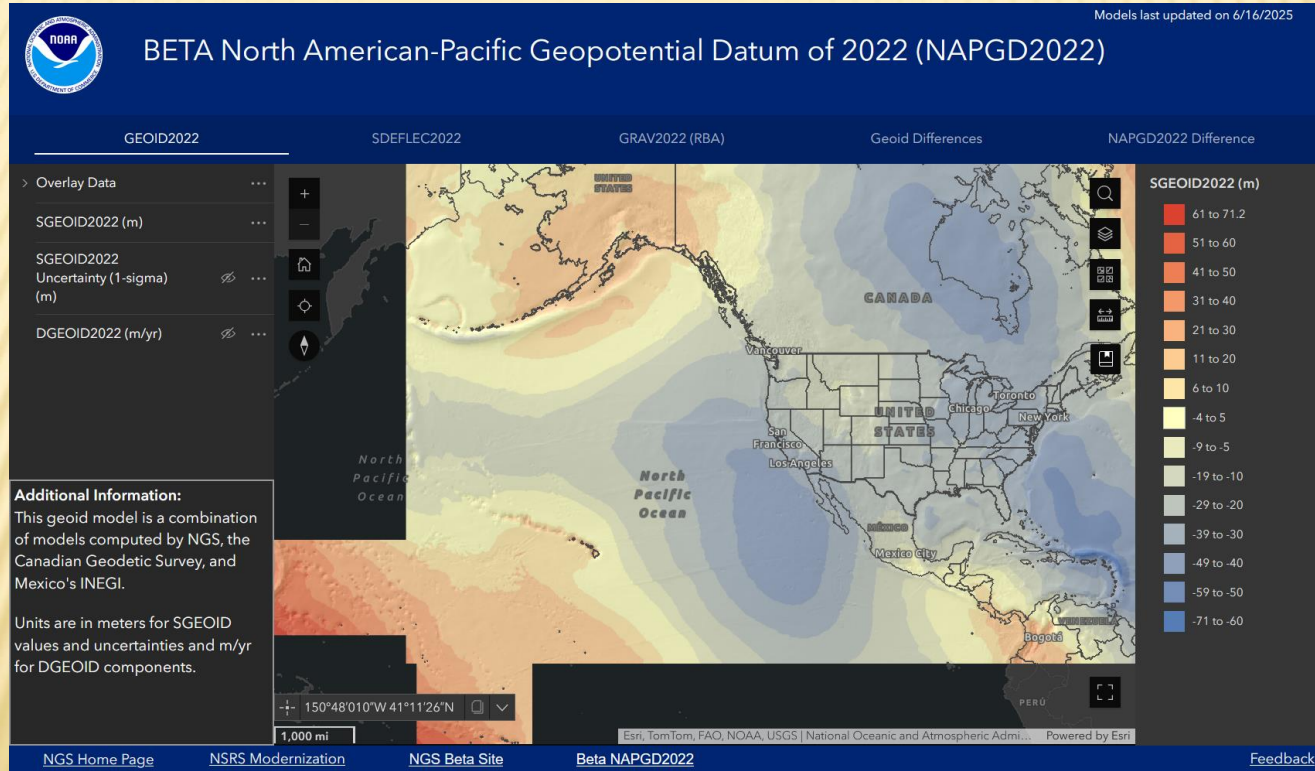
NAPGD2022



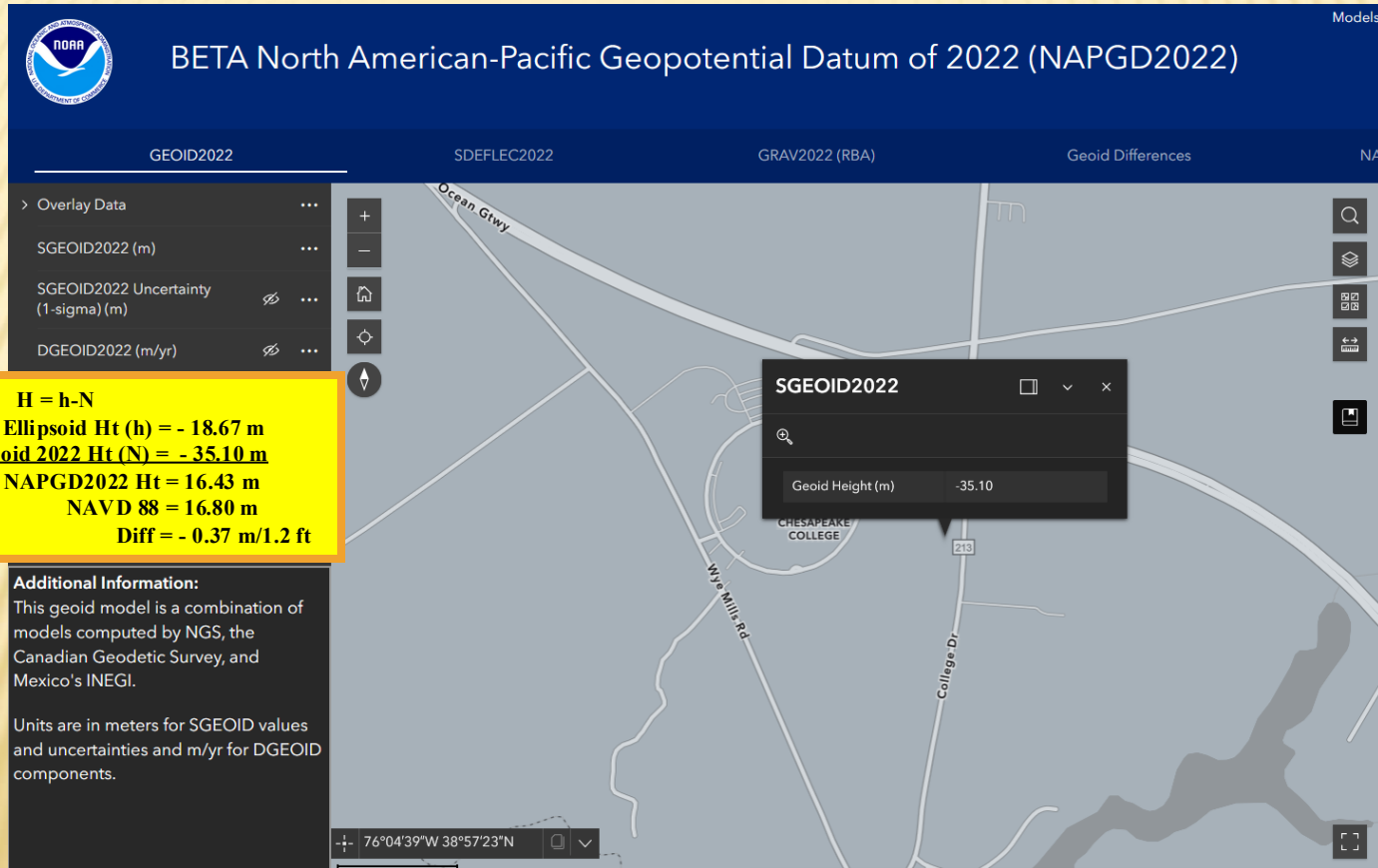
Geoid undulation (m)

Color scale: -60 to 60 meters

Compute Predicted NAPGD2022 Orthometric Heights



Compute Predicted NAPGD2022 Orthometric Heights



Compute Predicted NAPGD2022 Orthometric Heights



Predicted Position & Height Changes in 2026

Near Wye Mills

Computed for SLATTS (HV8935)

Horizontal $\approx$ 1.112 m (3.65 ft) Latitude & Longitude

Horizontal $\approx$ 1.112 m (3.65 ft) UTM Zone 18

Horizontal $\approx$ 1,350,890.32 Int ft SPC MD S-W Zone

Ellipsoid Height $\approx$ - 1.295 m (- 4.25 ft)

Orthometric Height $\approx$ - 0.37 m (- 1.2 ft)

Computed with Beta NAPGD2022 & Beta SPCS2022

Comparison Current to Future Grid Distance

Near Wye Mills

SLATTS (HV8935)

Horiz. Dist. x SPC Combined Factor

1000 Horiz. Feet

NAD 83 (2011) MD SPC Grid Distance = 999.951 ft

NATRF 2022 MD SPC Grid Distance = 999.984 ft



Estimates of NAPGD2022 to Local Mean Sea Level in 2029

<https://www.tidesandcurrents.noaa.gov/>

Baltimore (8574680)
857 4680 TIDAL BASIC (JV0578)

1983 – 2001 Local Mean Sea Level = 9.275 m (30.43 ft)

2002 – 2020 Local Mean Sea Level $\approx$ 9.212 m (30.22 ft) – Predicated from local SL trends (+0.0033 m/yr x 19)

NAVD 88 = 9.268 m (30.41 ft) to LMSL = +0.007 m (0.02 ft)
NAPGD2022 $\approx$ 8.880 m (29.13 ft) to LMSL = +0.332 m (1.09 ft)

Cambridge (8571892)
857 1892 D (AC6854)

1983 – 2001 Local Mean Sea Level = 2.285 m (7.50 ft)

2002 – 2020 Local Mean Sea Level $\approx$ 2.181 m (7.16 ft) – Predicated from local SL trends (+0.0040 m/yr x 19)

NAVD 88 = 2.257 m (7.40 ft) to LMSL = +0.028 m (0.09 ft)
NAPGD2022 $\approx$ 1.934 m (6.34 ft) to LMSL = +0.247 m (0.81 ft)



Metadata

**Coordinates and heights without appropriate metadata
have the same reliability as a boundary line in Google
Earth**

Just A Wild A Guess**

Metadata

Data About Data

Datums, Realizations and Epochs

NAD 27, NAD 83(1986), NAD 83 (1991), NAD83 (1998),
NAD 83 (2007), NAD 83 (2011), NATRF 2022 +Epoch

NGVD29, NAVD88, NAPGD 2022 +Epoch

NTDE 1941-1959, NTDE 1960-1978, NTDE 1983-2001, NTDE 2002-2020

Units

Meters, U.S. Survey Feet, International Feet

Accuracy

0.03 m, 0.1 ft

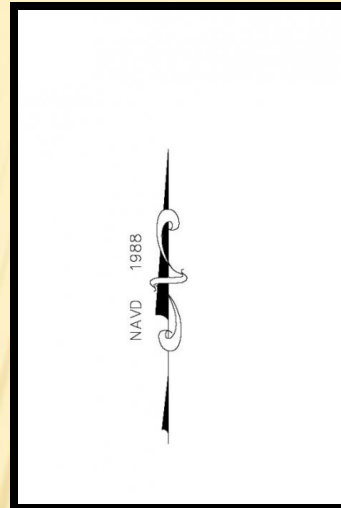
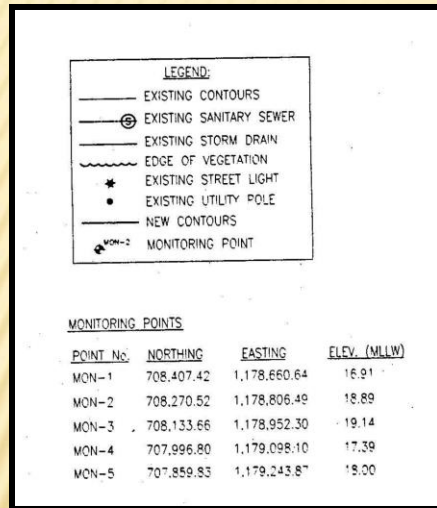
1 sigma (68%), 2 sigma (95%)

How good is it really??

The number of digits to the right of the decimal have nothing to do with accuracy



Examples of Bad Metadata



SUPREME COURT OF THE UNITED STATES

No. 5 Orig.

UNITED STATES OF AMERICA, PLAINTIFF v.
STATE OF CALIFORNIA

ON BILL OF COMPLAINT

[December 15, 2014]

Location of the Fixed Offshore Boundary Between the
United States and California that is Parallel to the
Coastline of Mainland California.

NAD 83/WGS 84

UTM ZONE 11 (meters)
x-coordinate y-coordinate

BEGINNING AT	482577.890	3599275.555
BY ARC CENTERED AT	488133.576	3599216.475
TO	482623.800	3599931.673
BY STRAIGHT LINE TO	482614.890	3599955.433
BY ARC CENTERED AT	487607.655	3602392.938

BENCHMARK:

TOP OF CONCRETE BOUND
EL=73.68 GPS DATUM

National Map Accuracy Standard
1:50,000 = 83 ft/25.4 m

Questions for Your Vendors

Are your current GNSS units GPS L5 capable?

How long will they maintain both NAD 83 (2011) and NATRF 2022 in their RTNs?

Will their datum transformations be identical with those provided by NGS?

Will their datum transformations show the positional integrity?

If so, will it be at 68% (1 sigma) or 95% (2 sigma) level?

Watch These Webinars

“Welcome to the Alpha Zone: A Preview of State Plane 2022”

**[https://geodesy.noaa.gov/web/science_edu/webinar_series/videos/
welcome-to-alpha-zone-spcs.mp4](https://geodesy.noaa.gov/web/science_edu/webinar_series/videos/welcome-to-alpha-zone-spcs.mp4)**

“NSRS Modernization - Big Steps Forward and What Comes Next”

**[https://geodesy.noaa.gov/web/science_edu/webinar_series/videos/
nsrs-mod-big-steps.mp4](https://geodesy.noaa.gov/web/science_edu/webinar_series/videos/nsrs-mod-big-steps.mp4)**

“National Tidal Datum Epoch”

<https://tidesandcurrents.noaa.gov/education/tech-assist/training/self-guided-training/>



What can you do to get ready for New Positions?

Understand the impact of changing positions and heights for your community, company or agency

TALK TO YOUR VENDORS!

Watch for upcoming NGS status reports/webinars

<https://geodesy.noaa.gov/INFO/subscribe.shtml>

NGS Regional Geodetic Advisors

Charlie Geoghegan – charles.geoghegan@noaa.gov

<https://geodesy.noaa.gov/ADVISORS/index.shtml>



“GOOD COORDINATION BEGINS WITH GOOD COORDINATES”

Gunther Greulich
MA PLS #11012



Maryland Society
of **Surveyors**



GEOGRAPHY WITHOUT GEODESY IS A FELONY