

NSRS Modernization

What it means to me

What's Changing?

3 things



Datum Change

- NAD 83
- NAVD 88



State Plane Coordinates (SPCS)

- All States



US Foot deprecation

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

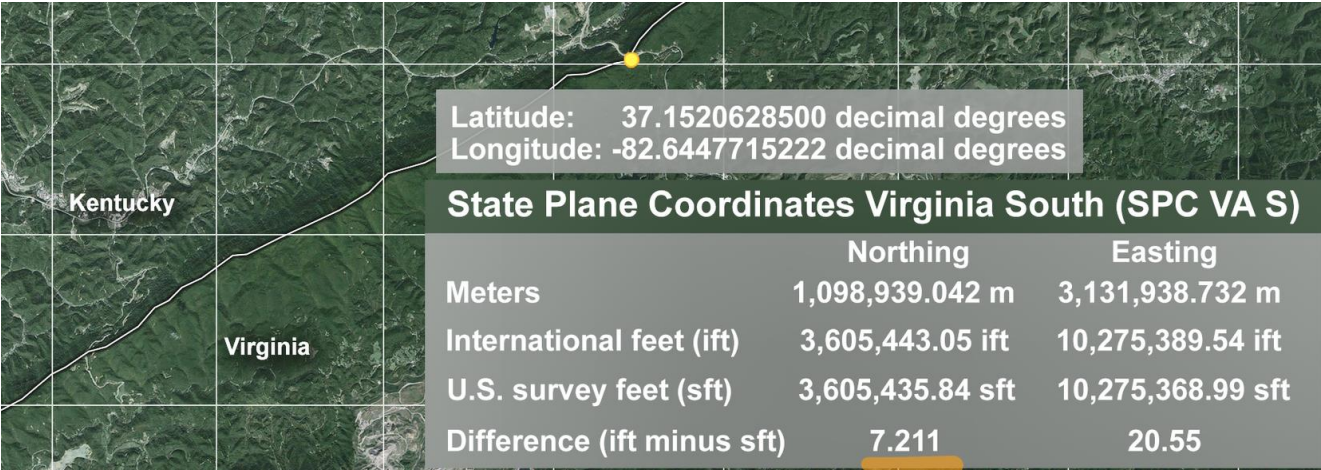
When is your foot not a foot?

US foot

= 0.30480060960.... meter

International foot

= 0.3048 meter



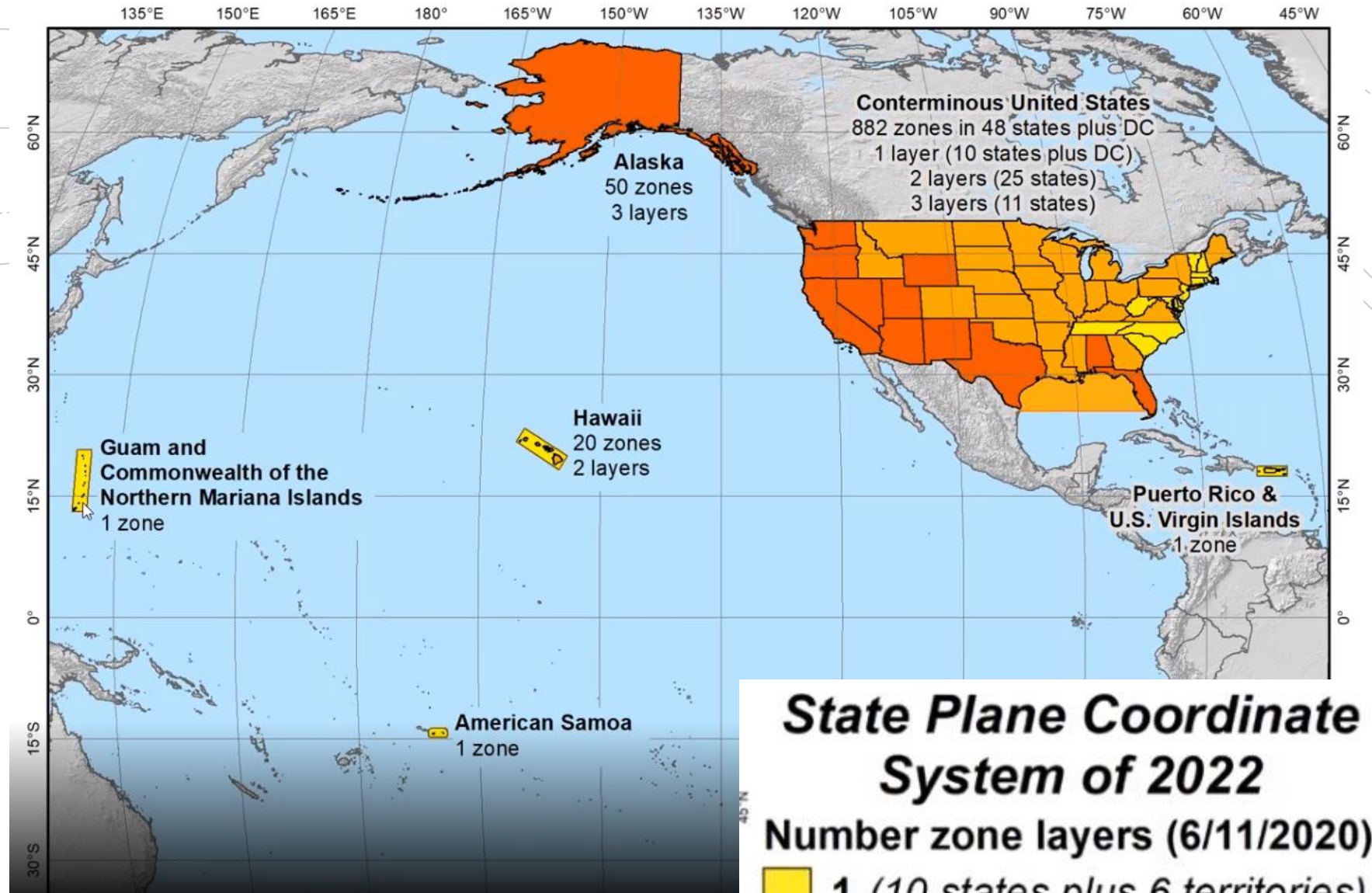
This NGS example shows a Difference of 7.211 in Northing and 20.55 in Easting which puts this point in two different states

516.9KM from Graham NC to Annapolis MD
US Ft = 1695862.8
Int Ft = 1695866.1
Difference = 3.391 feet

4/23/2021

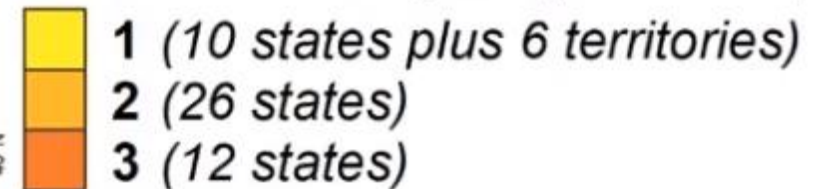
State Plane Coordinate System of 2022 (955 zones in 56 states and territories)

Zone Layers



State Plane Coordinate System of 2022

Number zone layers (6/11/2020)

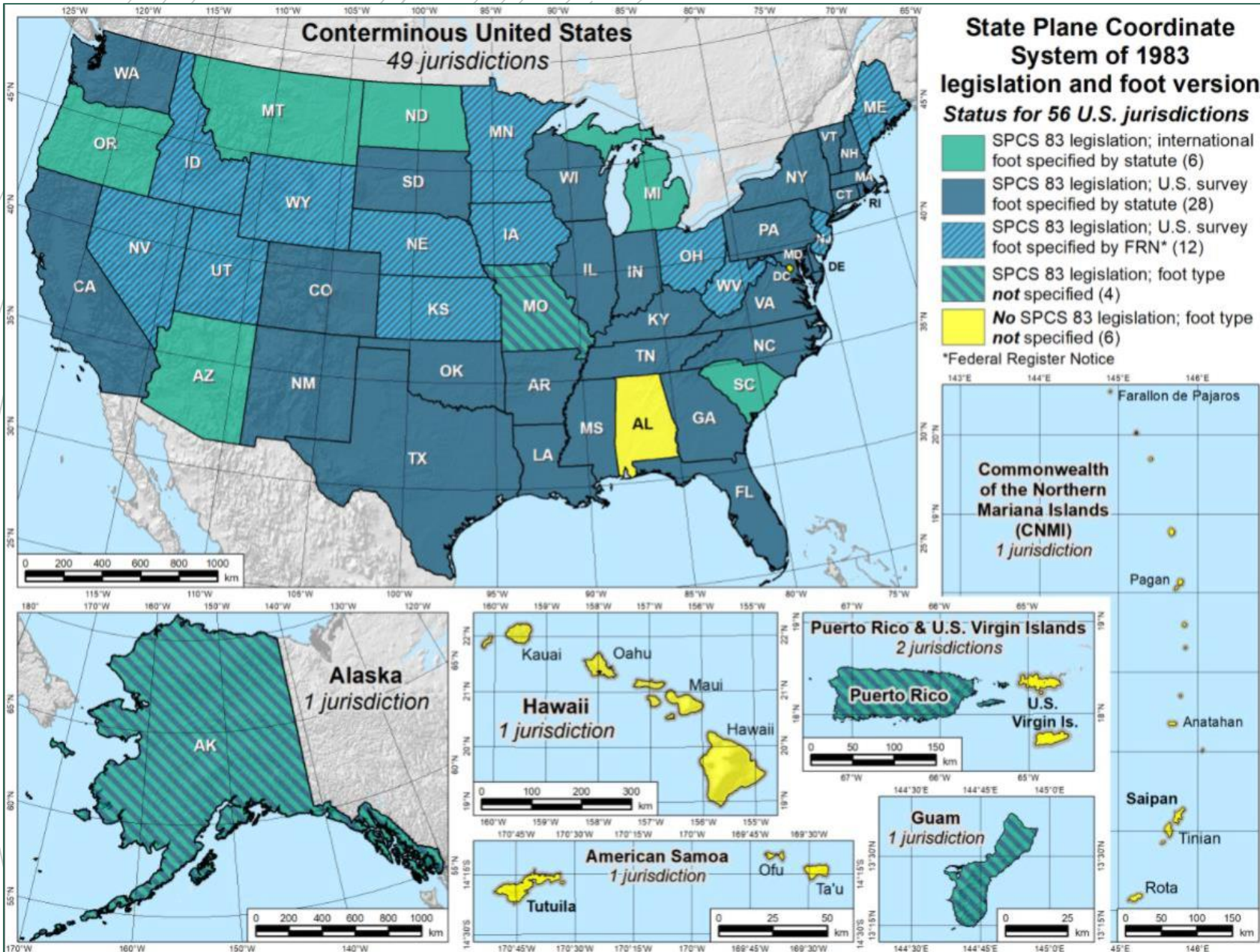


SPCS end of
2021

- Machine readable definitions
 - (e.g., WKT2)
- SPCS2022 report
- Modify NGS algorithms
 - (e.g., 1 – parallel Lambert)
- Check NGS algorithms
 - (refine after 2021...?)

U.S. Survey foot and State Legislation

- NIST is responsible for units of measure.
- SPCS2022 parameter definitions METRIC
 - Output coordinates in feet = international feet
 - Can use name “foot” or “international foot”
 - 1 foot = 0.3048 meter(exact)
- US survey foot deprecated after Dec 31, 2022
 - will not be used for SPCS2022
 - But legacy applications supported (e.g., SPCS 83)
- NSRS legislation with international foot
 - Two done: Kentucky and Washington



Legislation of State Plane Coordinate System

Datum Changes

Some examples are based on the “thought experiments” used in Blueprint 3

Replacing NAD 83

The Old:

NAD 83(2011)

NAD 83(PA11)

NAD 83(MA11)

The New:

The North American Terrestrial Reference Frame of 2022
(NATRF2022)

The Caribbean Terrestrial Reference Frame of 2022
(CATRF2022)

The Pacific Terrestrial Reference Frame of 2022
(PATRF2022)

The Mariana Terrestrial Reference Frame of 2022
(MATRF2022)



Replacing NAVD 88

The Old:

NAVD 88

PRVD 02

VIVD09

ASVD02

NMVD03

GUVD04

IGLD 85

IGSN71

GEOID12B

DEFLEC12B

Orthometric
Heights

Normal
Orthometric
Heights

Dynamic
Heights

Gravity

Geoid
Undulations

Deflections of
the Vertical

The New:

The North American-Pacific **Geopotential Datum** of 2022 (NAPGD2022)

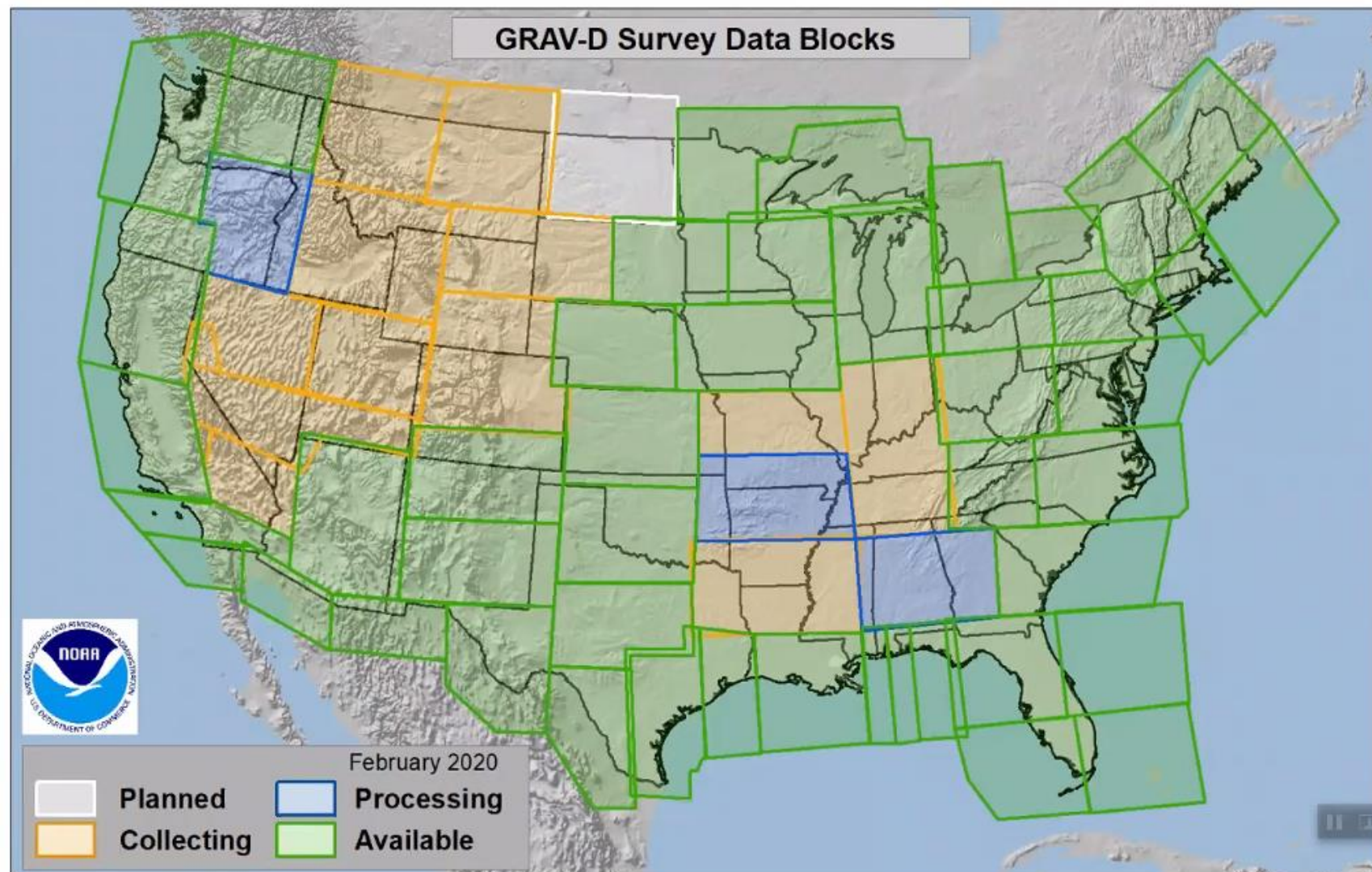
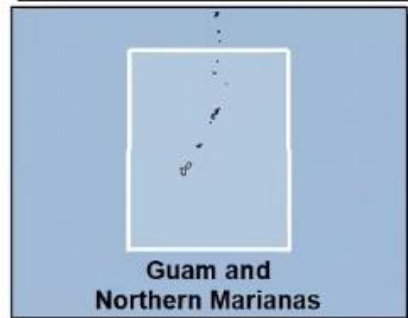
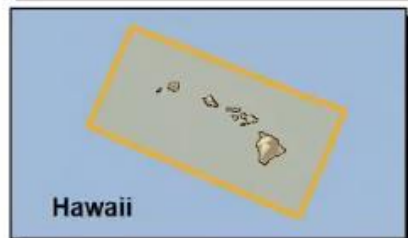
Will include:

- GEOID2022
- DEFLEC2022
- GRAV2022
- DEM2022
- More

Gravity for the Redefinition of the American Vertical Datum

GRAV-D

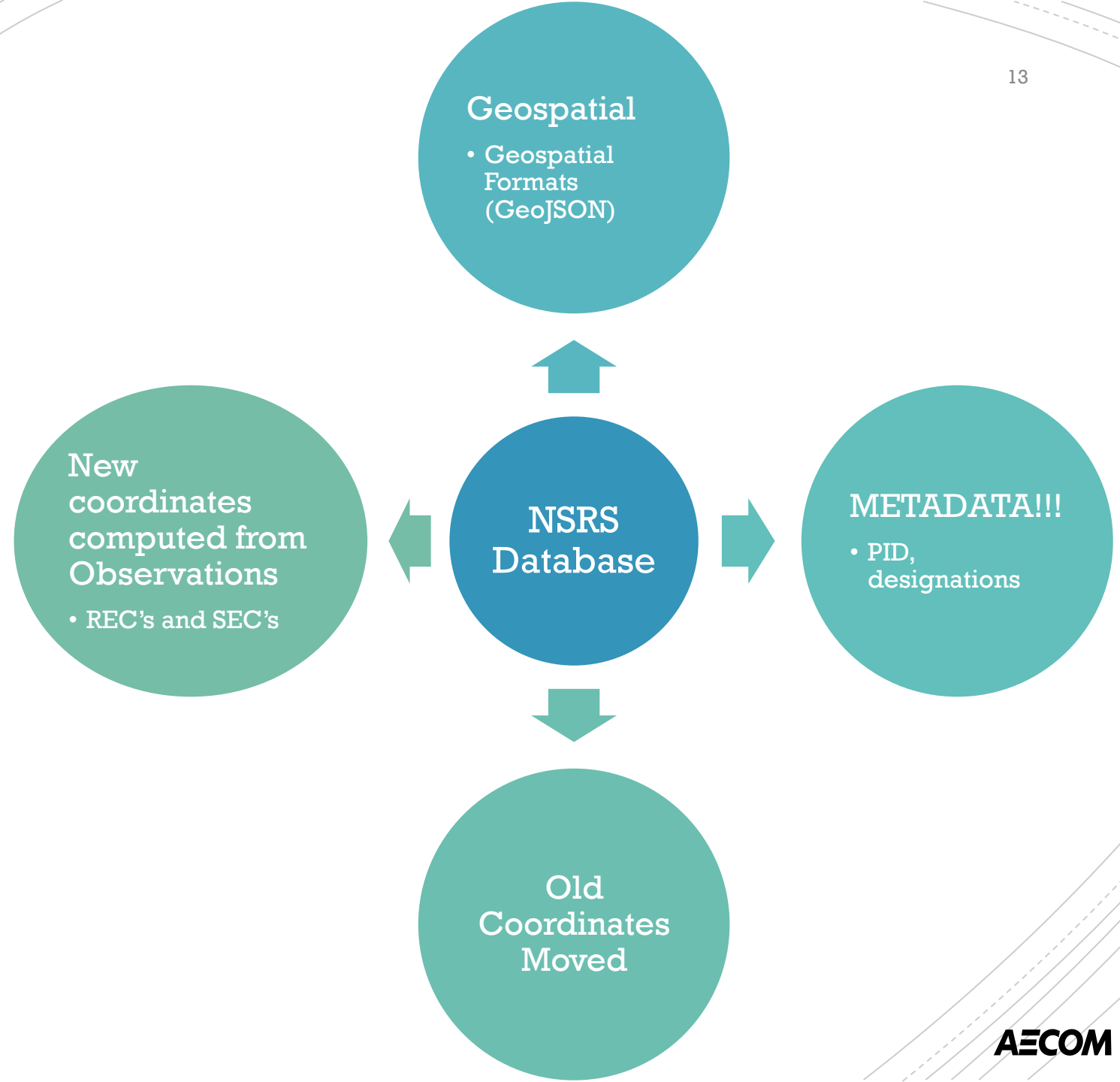
85.3% Complete (3/30/2021)



NSRS Modernization ... not just new datums

- Replacing NAD 83 → Blueprint for Modernized NSRS, Part 1
 - Replacing NAVD 88 → Blueprint for Modernized NSRS, Part 2
 - Re-inventing Bluebooking
 - Improving the Geodetic Toolkit
 - Better Surveying Methodologies
- Blueprint for Modernized NSRS, Part 3
- How NGS will provide the frames/datum in the future
 - How YOU can use the frames/datum

NSRS database replaces the NGS IDB



- Floodplain Mapping Program
 - Digital Flood Insurance Rate Maps (DFIRMs)
 - Elevation certificates
 - Gage Networks
- Bathymetry/ Underwater Geospatial collection
- Sea Level Rise
- Transportation projects
- Land Records Management System
- NC CORS/Real Time Network (RTN)
- Precision Farming applications
- GIS clearinghouse
- LiDAR (3DEP) and aerial imagery programs
- GIS programs (state and local governments)
- Programs /projects with a geospatial component

Potential Areas of Impacts

Types of Impacts

Collection/processing

Conversion

Outreach/Training

Collection/ Processing

Floodplain Mapping Program

- Elevation certificates
- Gage Networks

Transportation projects

Bathymetry/ Underwater

NC CORS/Real Time Network (RTN)

Precision Farming applications

LiDAR (3DEP) and aerial imagery programs

Geospatial collections

Conversion

Floodplain Mapping Program

- Digital Flood Insurance Rate Maps (DFIRMs)
- Terrain and Modeling

Bathymetry/ Underwater Geospatial collection

- Historical Comparisons

Transportation projects

- Tying into existing projects
- Passive control for Multi- year projects

Land Records Management System

- Use of Lat/Long for Pin numbers

GIS clearinghouse

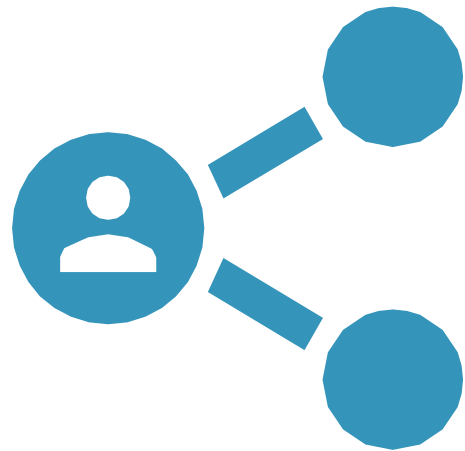
- Understanding what you are using

GIS programs (state and local governments)

- Conversions and Manipulation**

Programs /projects with a geospatial component

- Tie ins
- Infrastructure Monitoring



Outreach

ALL OF THEM!

Shift

- **When?**
 - **Why?**
 - **How much?**
 - **Who?**
- Once, at rollout
 - Correcting systematic errors in the current datums
 - Decimeters-to-meters of one-time immediate coordinate changes
 - Will affect everyone

Drift

- Impact will grow as time goes on
- Embracing the dynamic planet upon which we live
- Centimeters of persistent annual coordinate changes (plus potential meter-level jumps from earthquakes)
- Can mostly be ignored or mitigated through NGS's creation of plate-fixed frames and reference epoch coordinates

Tianjin passes under the Talmadge Bridge, Georgia (Steve Bisson, 2015)



Mean Sea Level

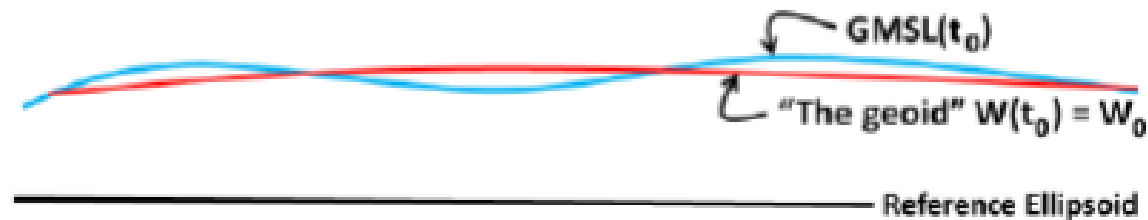
Importance of Vertical Datums to
Coastal Engineering

Sea Level and The Geoid

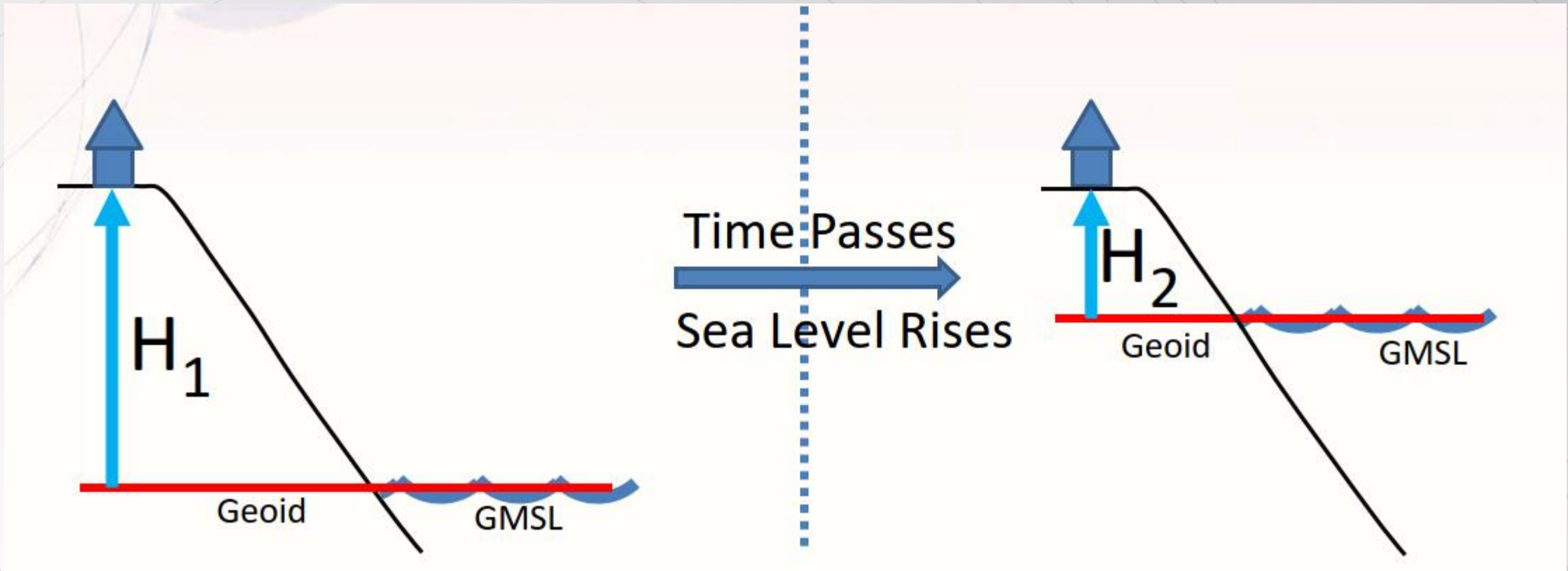
Standing definition of geoid:

The equipotential surface of the Earth's Gravity Field which best fits, in a least squares sense, global mean sea level.

$$T = t_0$$

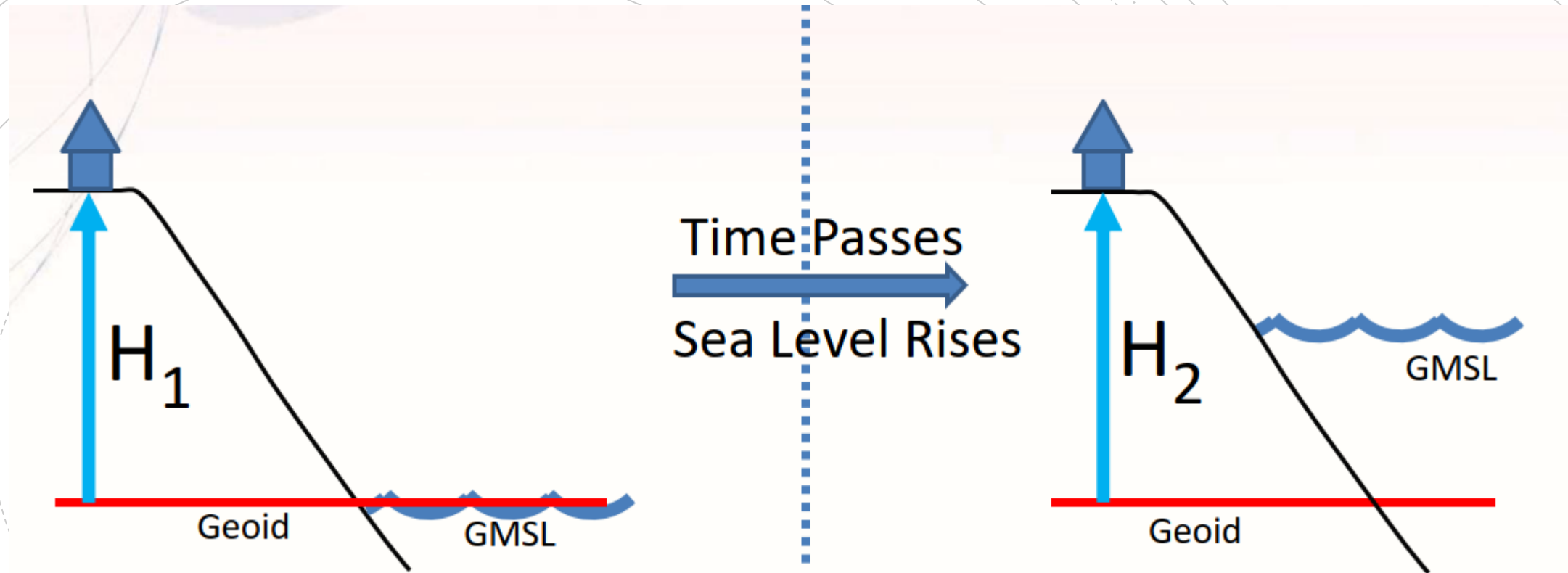


Scenario 1: Geoid Definition remains tied to GMSL



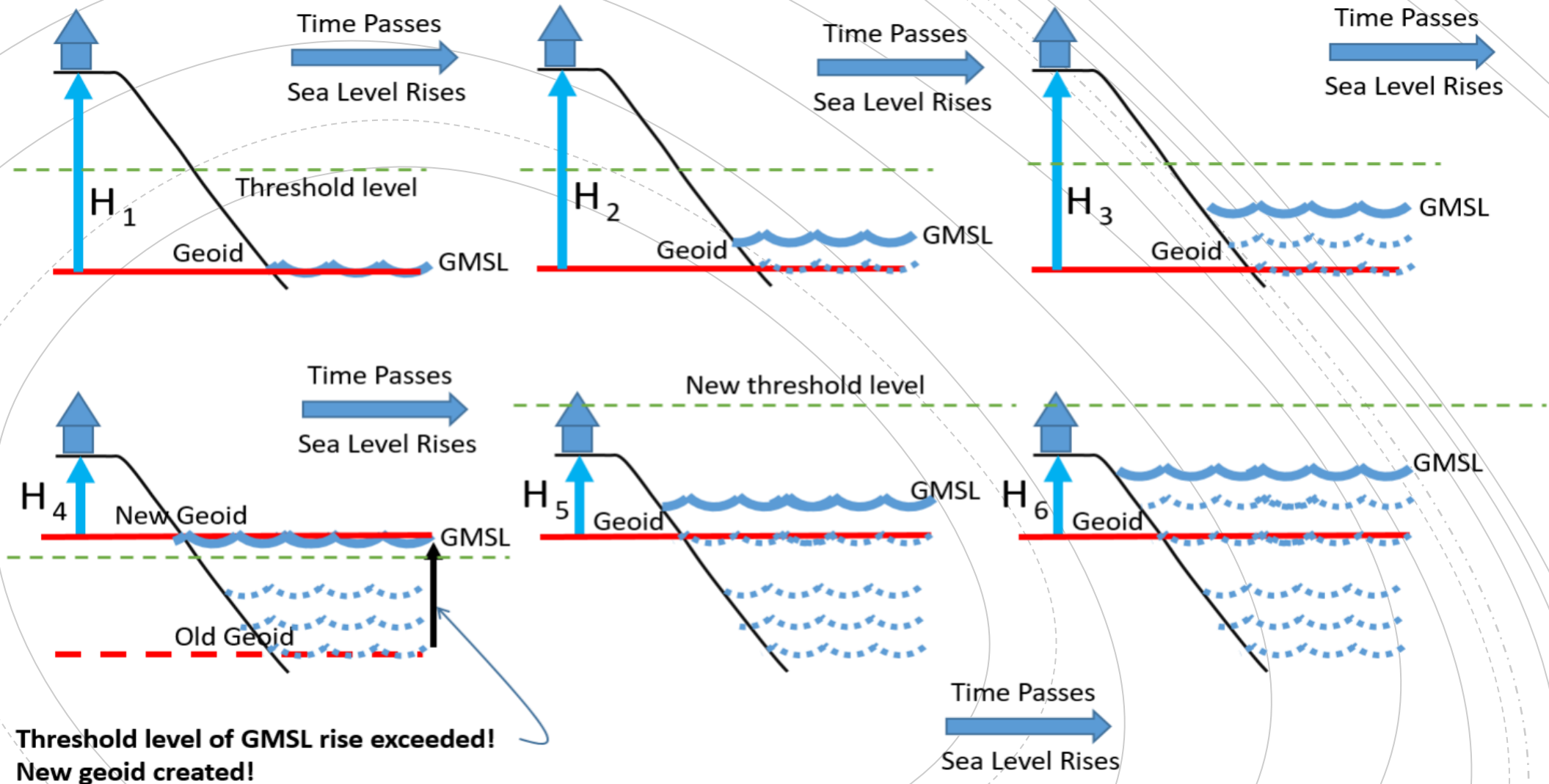
As Global Mean Sea Level rises, orthometric height gets smaller

Scenario 2: Geoid Definition Decoupled from GMSL



As Global Mean Sea Level rises, orthometric height remains Constant

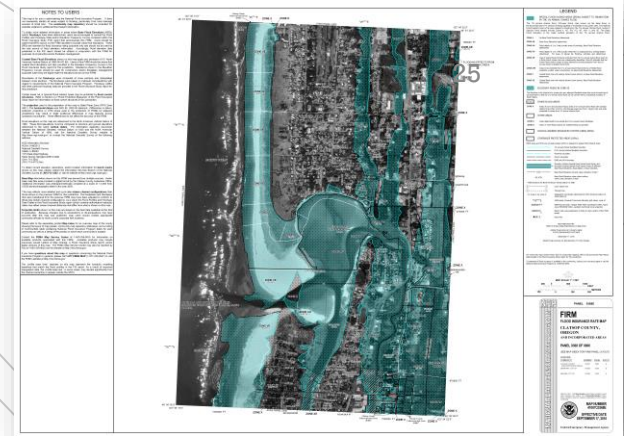
The Threshold Compromise: Choosing a new geoid as GMSL changes



4/23/2021

Floodplain Mapping

Some examples are based on the “thought experiments” used in Blueprint 3



Conversion

FEMA- Floodplain Mapping Program- Dfirms

Guidance for Flood Risk
Analysis and Mapping

Vertical Datum Conversion

May 2014



When will FEMA incorporate the new Datum?

This is still to be Determined.



FEMA currently requires use of the NSRS in the NFIP
wherever practicable

Data in state preferred coordinates



FEMA has done this before

**there is guidance on
Datum Conversion.**

**Documentation adjusted
as datum are finalized.**

Collection- Impacts

Elevation
Certificates

Survey

Terrain and
Models

FIS and
FIRMS

4/23/2021

ELEVATION CERTIFICATE

Important: Follow the instructions on pages 1-9.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE	
A1. Building Owner's Name		Policy Number:	
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Company NAIC Number:	
City	State	ZIP Code	
A3. Property Description (Lot and Block Number, etc.)			
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)			
A5. Latitude/Longitude: Lat _____ Long _____		Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983	
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.			
A7. Building Diagram Number _____			
A8. For a building with a crawlspace or enclosure(s):			
a) Square footage of crawlspace or enclosure(s) _____ sq ft			
b) Number of permanent flood openings in crawlspace or enclosure(s) _____			
c) Total net area of flood openings in A8.b _____ sq ft			
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No			
A9. For a building with an attached garage:			
a) Square footage of attached garage _____ sq ft			
b) Number of permanent flood openings in attached garage _____			
c) Total net area of flood openings in A9.b _____ sq ft			
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No			
SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION			
B1. NFIP Community Name & Community Number		B2. County Name	B3. State
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date
B8. Flood Zone(s)		B9. Base Flood Elevation(s) (Zone AD, use Base Flood Depth)	
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9: <input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____			
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____			
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA			

Collection

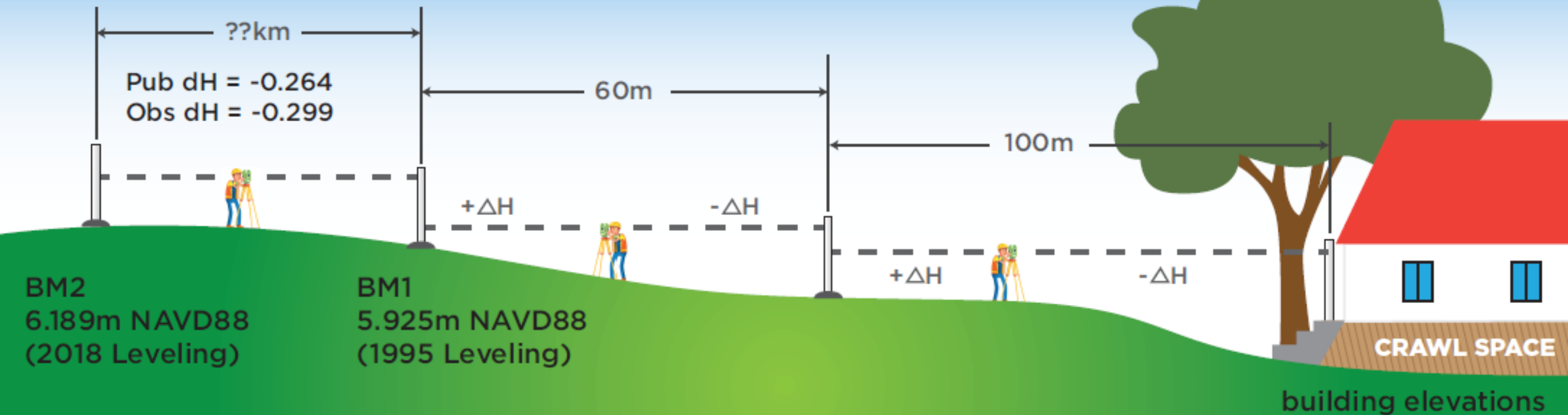
Elevation
Certificates

- EC's already allow for multiple datums so there shouldn't be much change
- "... provide the vertical datum for the benchmark elevation. All elevations for the certificate, including the elevations for Items C2.a-h, must use the same datum on which the BFE is based. Show the conversion from the field survey datum used if it differs from the datum used for the BFE entered in Item B9 and indicate the conversion software used. Show the datum conversion, if applicable, in the Comments area of Section D."



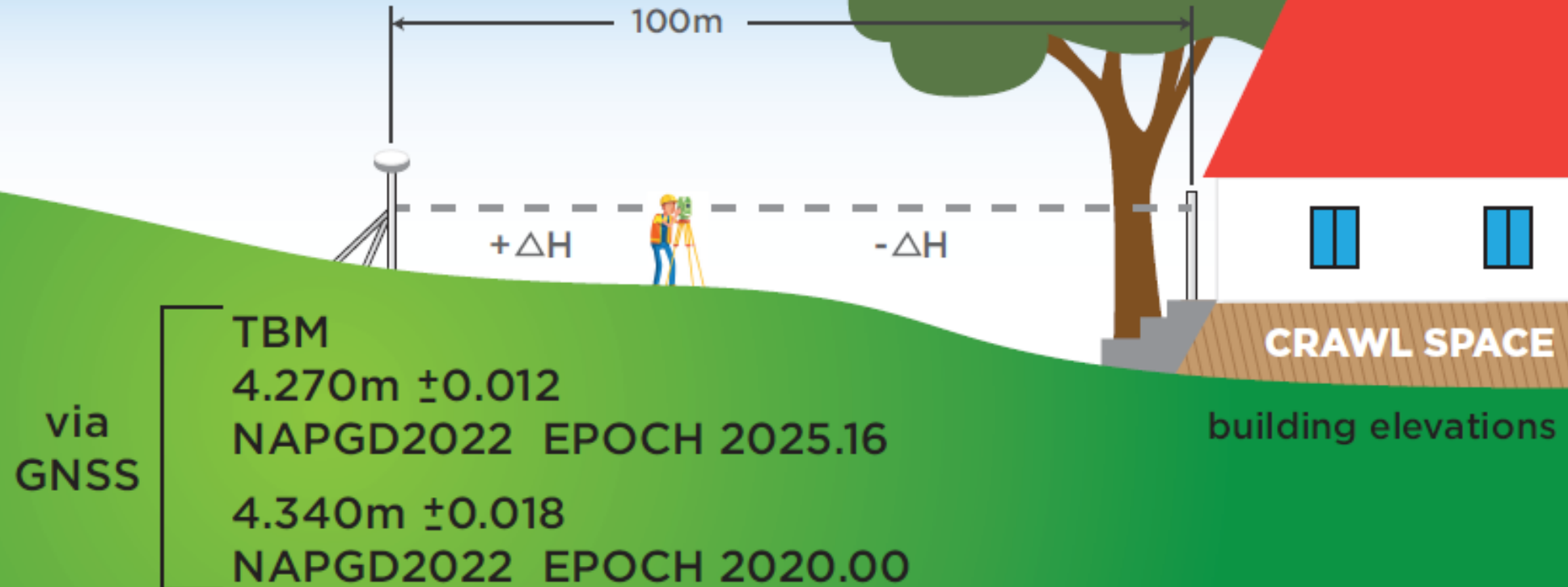
Added Convenience in NFIP Workflows

TIE TO PASSIVE CONTROL



Added Convenience in NFIP Workflows

TIE TO ACTIVE CONTROL



NFIP CRS Coordinator's Manual

442.c. Benchmark maintenance (BMM)

The maximum credit for this element is 27 points.

BMM1 credits a program that maintains benchmarks so surveyors can find them and can depend on them to be accurate. BMM2 credits a program that maintains a network of stations that support GPS surveying.

Benchmarks: Accurate benchmarks are critical to surveyors when they are completing Elevation Certificates or performing land surveys before a new structure is built. If the benchmarks are not accurate, structures can be built too low, or perhaps even in the wrong location.

The National Spatial Reference System (NSRS) is maintained by the National Geodetic Survey (NGS) in the U.S. Department of Commerce. It is a compendium of vertical and horizontal benchmarks for the country. This element provides credit if the community has a sufficient number and density of benchmarks to meet the NSRS prerequisites. If the community does not, it is encouraged to either survey new ones or submit the data necessary to add qualifying existing benchmarks to the national system.

Any surveyor can create a NSRS benchmark. Surveyors must follow the guidelines of the NGS for the type of monument set and the accuracy of the survey that establishes the monument. After review by the NGS, these benchmarks are added to the NSRS data base, which is available to surveyors and the public at <http://geodesy.noaa.gov/>.

GPS support: The NGS manages a network of Continuously Operating Reference Stations (CORS) that provide Global Navigation Satellite System data in support of three-dimensional positioning and geophysical applications throughout the United States.

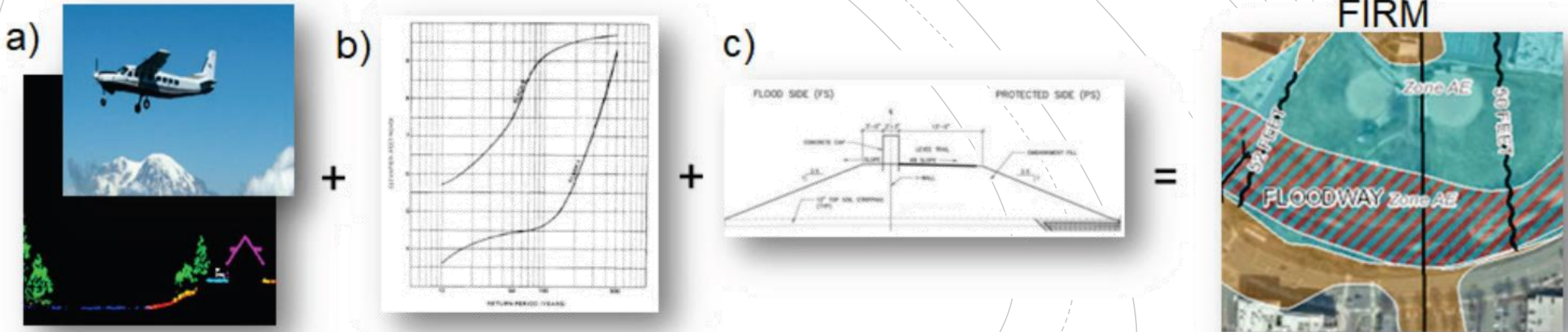
Surveyors, GIS users, engineers, scientists, and others who collect GPS data can use CORS data to improve the precision of their positions. CORS-enhanced, post-processed coordinates are accurate to within a few centimeters relative to NSRS coordinates, both horizontally and vertically.

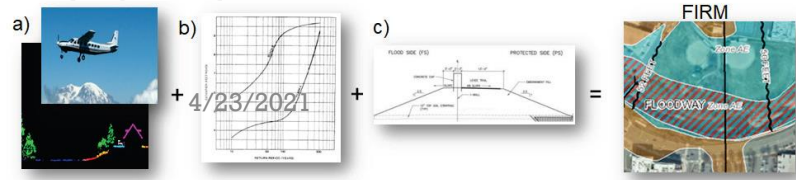
The CORS sites are independently owned and operated. Each agency shares its data with the NGS, and the NGS in turn analyzes and distributes the data free of charge. As of August 2015, the CORS network contained almost 2,000 stations, contributed by over 200 different organizations, and the network continues to expand.

GPS support: The NGS manages a network of Continuously Operating Reference Stations (CORS) that provide Global Navigation Satellite System data in support of three-dimensional positioning and geophysical applications throughout the United States.

Conversion- Impacts

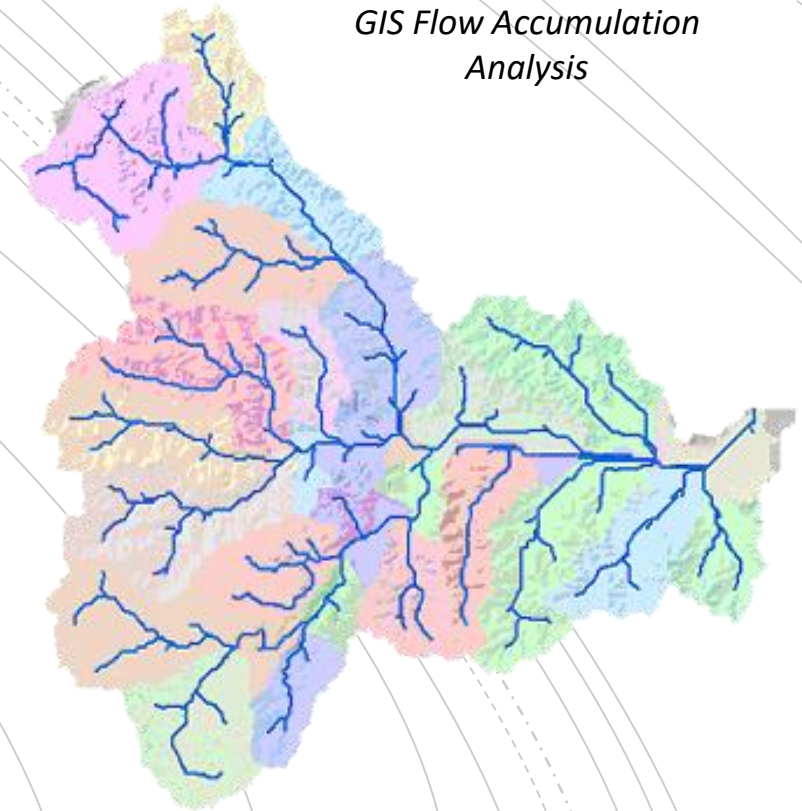
- a) Digital elevation models
- b) Hydraulic obstruction heights (toe, crest or deck on structures)
- c) Stream cross section surveys for hydrograph calculations





FIRM production:

- Discovery phase leverages best available existing data
- Flood hydraulic modeling
- Hazard zone mapping



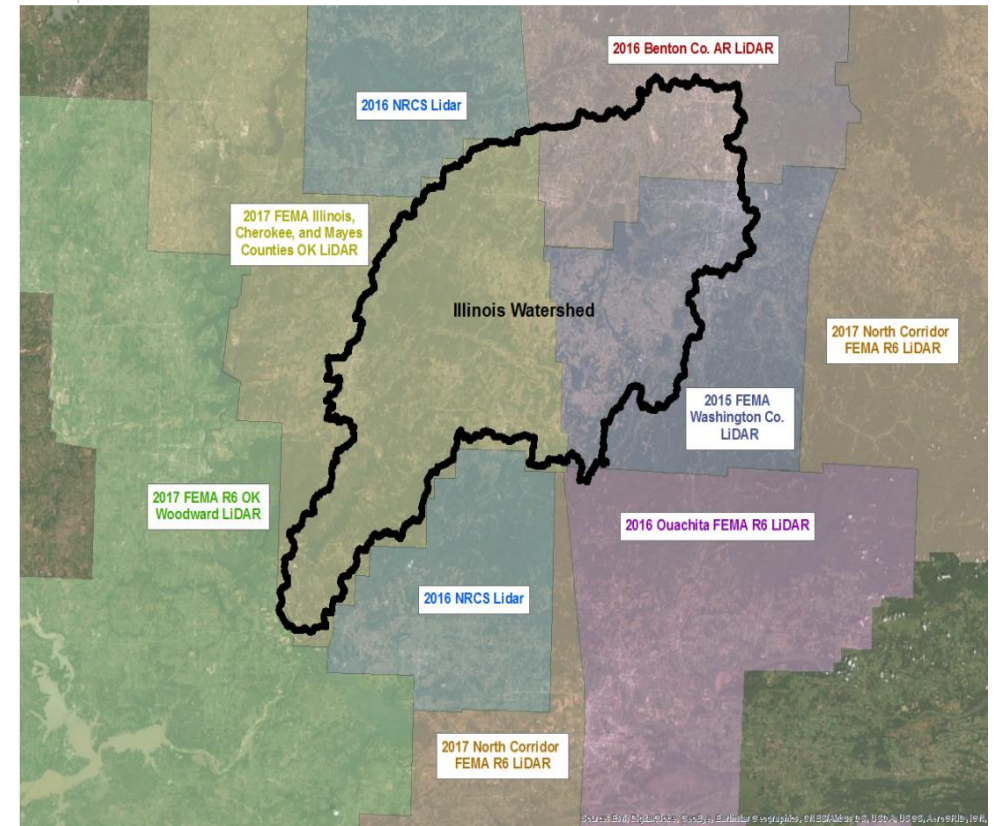
Data Disparities- Terrain and Models

FEMA Submittals Must show:

All data sources

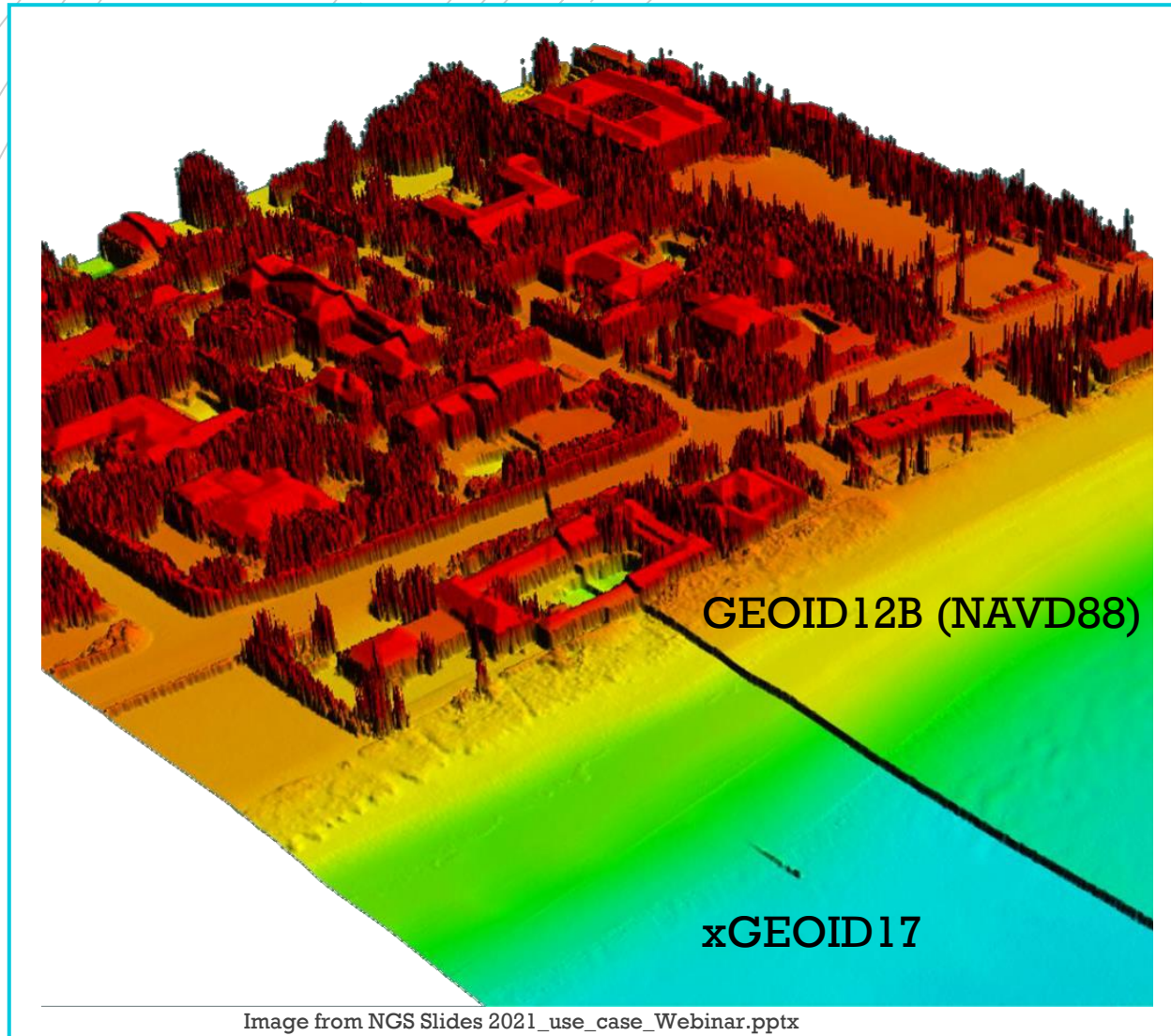
Prioritization of Data

Quality control of data

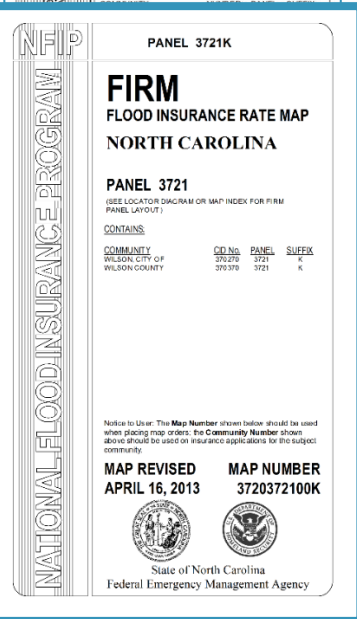
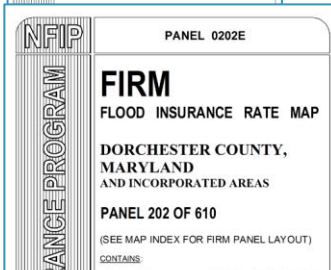
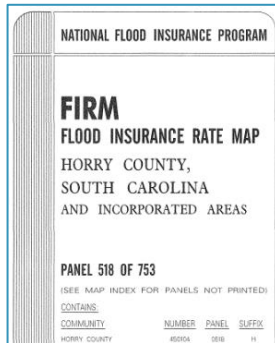


NSRS Modernization: Vertical Challenge

- Local Datum/NGVD 29 → NAVD 88
 - Originally inhibited by non-digital data and limited transformation tools;
 - incomplete due to NAVD 88 extent/access exceptions
- Creation of FIS and FIRMS happens on a cyclical basis. This allows for the gradual adoption of modernized NSRS
 - As maps are updated the new projections will be adopted.



Vertical offset of >1 m (Pacific NW)



NOTE: The coordinate system used for the production of this Flood Insurance Rate Map (FIRM) is Universal Transverse Mercator (UTM), North American Datum of 1927 (NAD27), Clarke 1866 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Universal Transverse Mercator projection, NAD27. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

ATTENTION: Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 18N. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

DATUM INFORMATION

The **projection** used in the preparation of this map was the North Carolina State Plane (FIPSZONE 3200). The **horizontal datum** was the North American Datum of 1983, GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

North Carolina Geodetic Survey
121 West Jones Street
Raleigh, NC 27601
(919) 733-3836
<http://www.ncgs.state.nc.us>

County Average Vertical Datum Offset Table	
County	Vertical Datum Offset (ft)
WILSON	-1.05
Example: NAVD 88 = NGVD 29 + (-1.05)	

Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Culvert, Flume, Penstock or Aqueduct

Road or Railroad Bridge

Footbridge

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid ticks, zone 17

2500-foot grid values: North Carolina State Plane coordinate system (FIPSZONE 3200, State Plane NAD 83 feet)

North Carolina Geodetic Survey bench mark (for more information visit <http://www.ncgs.state.nc.us>)

National Geodetic Survey bench mark (for more information visit <http://www.ngs.noaa.gov>)

NGS-58 GPS 2-5 cm Vertical Control Marks or Contractor-Established NCFMP Bench Marks (for more information visit <http://www.ncgs.state.nc.us>)

River Mile

FEMA- Next Steps

- Update policies, standards, guidance, related documents
 - SIDs 41 and 118
 - Elevation Certificate Form and Instructions
 - Guidance for Flood Risk Analysis and Mapping, Metadata
 - Guidance for Flood Risk Analysis and Mapping, Projections and Coordinate Systems
 - Guidance for Flood Risk Analysis and Mapping, Vertical Datum Conversion
- Build datum conversion/transition into scopes of work for studies



FEMA- Next Steps

Develop outreach messaging for the public

- Documents will differ
- Public needs to know what the change means for them

Plan for NSRS Modernization

- Make sure you know this is coming.
- Develop training for partners
 - NGS- go to first!
 - ASPRS
 - ASFPM



National Geodetic Survey
Positioning America for the Future

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

Webinar Series
Overview
Upcoming Webinars
Recorded Webinars
User Forums and Q&A Sessions
Frequently Asked Questions (FAQ)

Contact information
Email us
Subscribe for webinar notifications

Upcoming Webinars

Special Edition Webinar

MAY 4-5 2021
1-5 pm EST

2021 Geospatial Summit
Speakers will be listed on the [Summit Agenda](#)

The 2021 Geospatial Summit will provide updated information about the planned modernization of the National Spatial Reference System (NSRS).

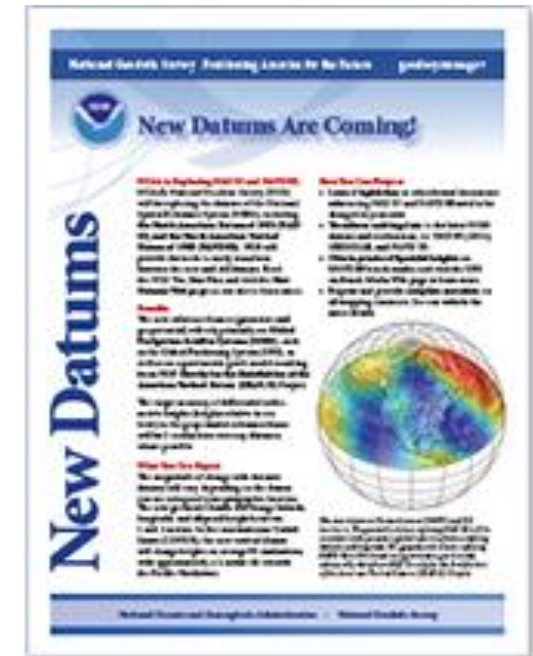
REGISTER

NOTE: This is a two-day event, and attendees are strongly encouraged to attend both days.

[>> Learn more about this virtual event.](#)

Website Owner: National Geodetic Survey / Last modified by NGS.InfoCenter Apr 14 2021

NOS Home • NGS Employees • Privacy Policy • Disclaimer • USA.gov • Ready.gov • Site Map • Contact Webmaster



- NSRS modernization benefits inundation mapping
- After initial shift, expect **minimal changes to workflows** in NFIP of today
- Continue **outreach and education** about changes to come
- Rolling **coordination** with FEMA on NSRS use in NFIP guidance
- Provide **technical assistance** to flood mapping partners:
 - Beta testing of tools
 - Data-driven case studies
 - Development of methodologies that embrace time-dependency

Summary and Next Steps- NGS

Long Term Projects

Collection- Passive Control

Why is Modernized NSRS Important to Passive Control?

- World is dynamic place
- Modernized NSRS will connect time-dependent positioning and passive control
- ▶
- Critical when passive control is used to build new infrastructure



Survey Data

CONVENTIONAL

- Total Station

LEVELING

- Differential Leveling

GNSS

- Static
- RTK
- RTN

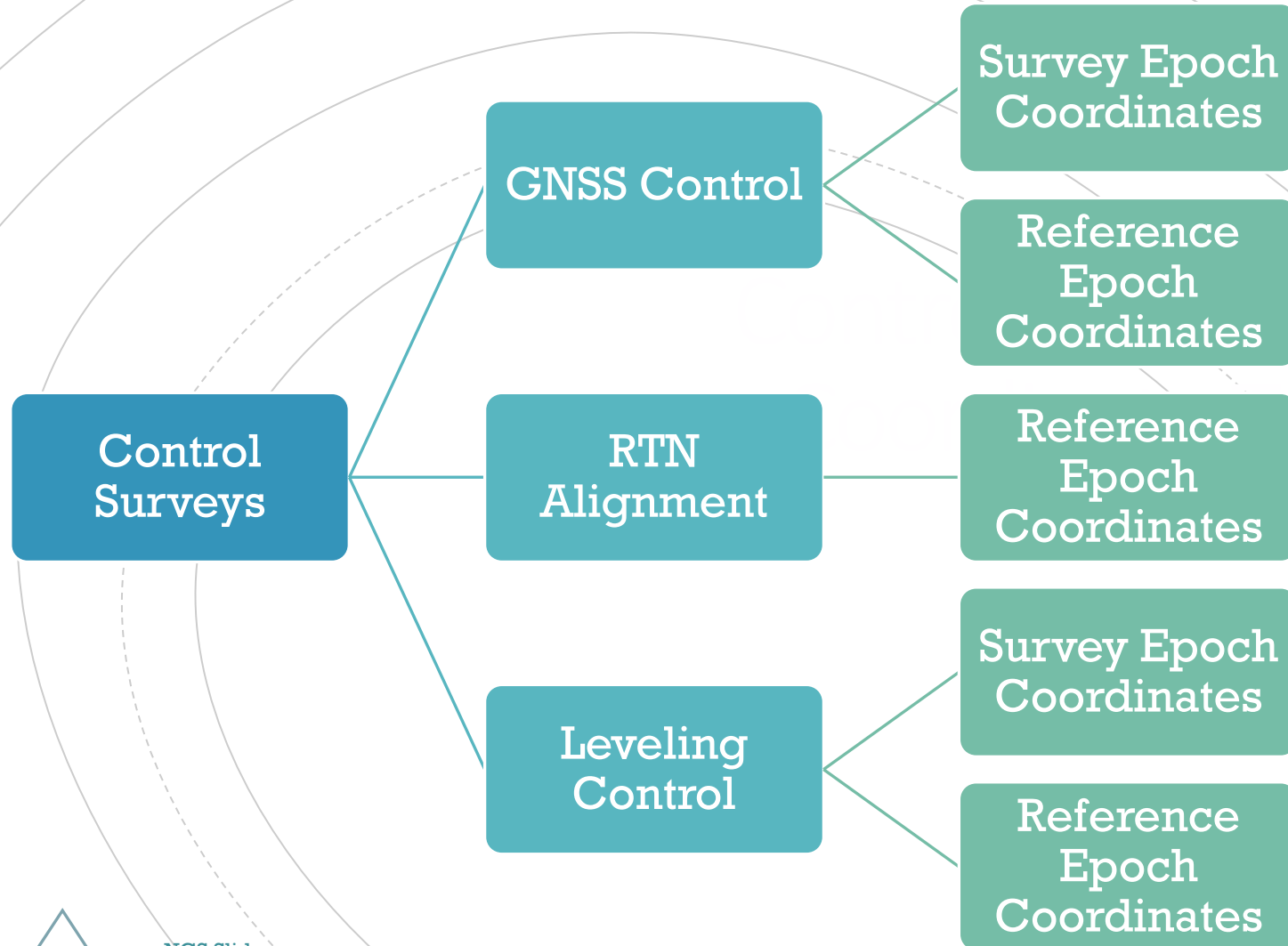
OTHER

- Terrestrial Laser Scanning
- Mobile LiDAR
- Aerial LiDAR/Photogrammetry

CONTROL



Control Surveys and Coordinate Types



Update RTN base station coordinates every 5 or 10 years
Ensure that RTN base stations are aligned with RECs





Long Term Transportation Project

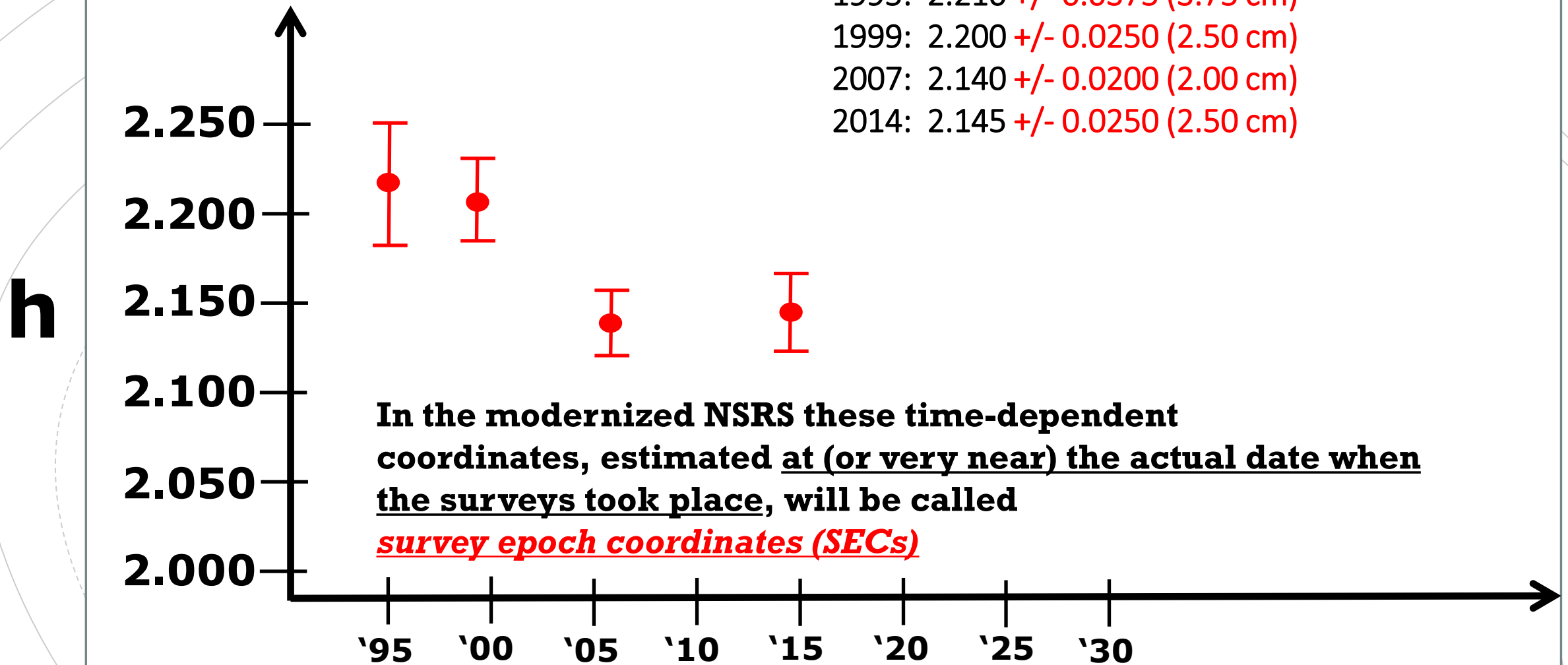
All measurements have error. Shown here are the same Values of “h”, but with their error estimates.

1995: 2.210 +/- 0.0375 (3.75 cm)

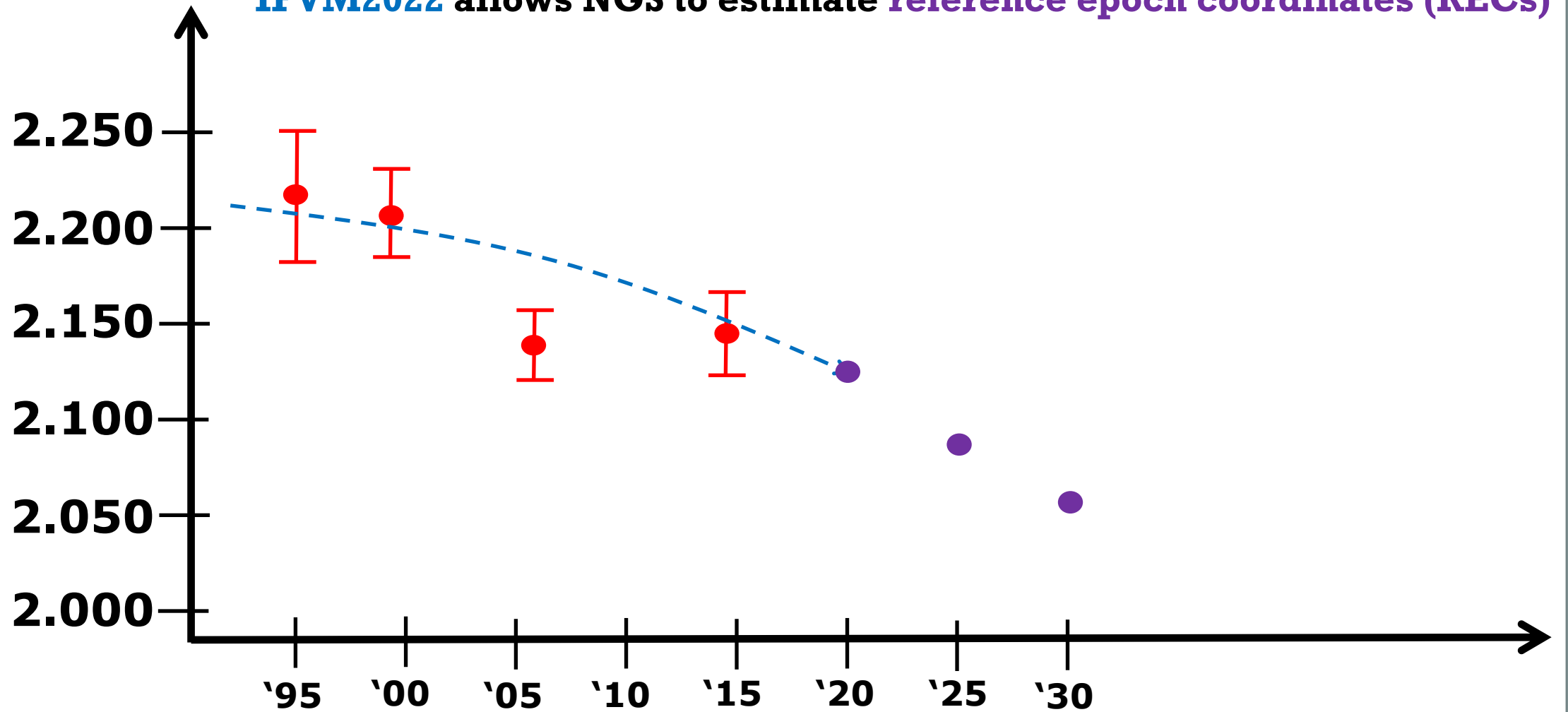
1999: 2.200 +/- 0.0250 (2.50 cm)

2007: 2.140 +/- 0.0200 (2.00 cm)

2014: 2.145 +/- 0.0250 (2.50 cm)



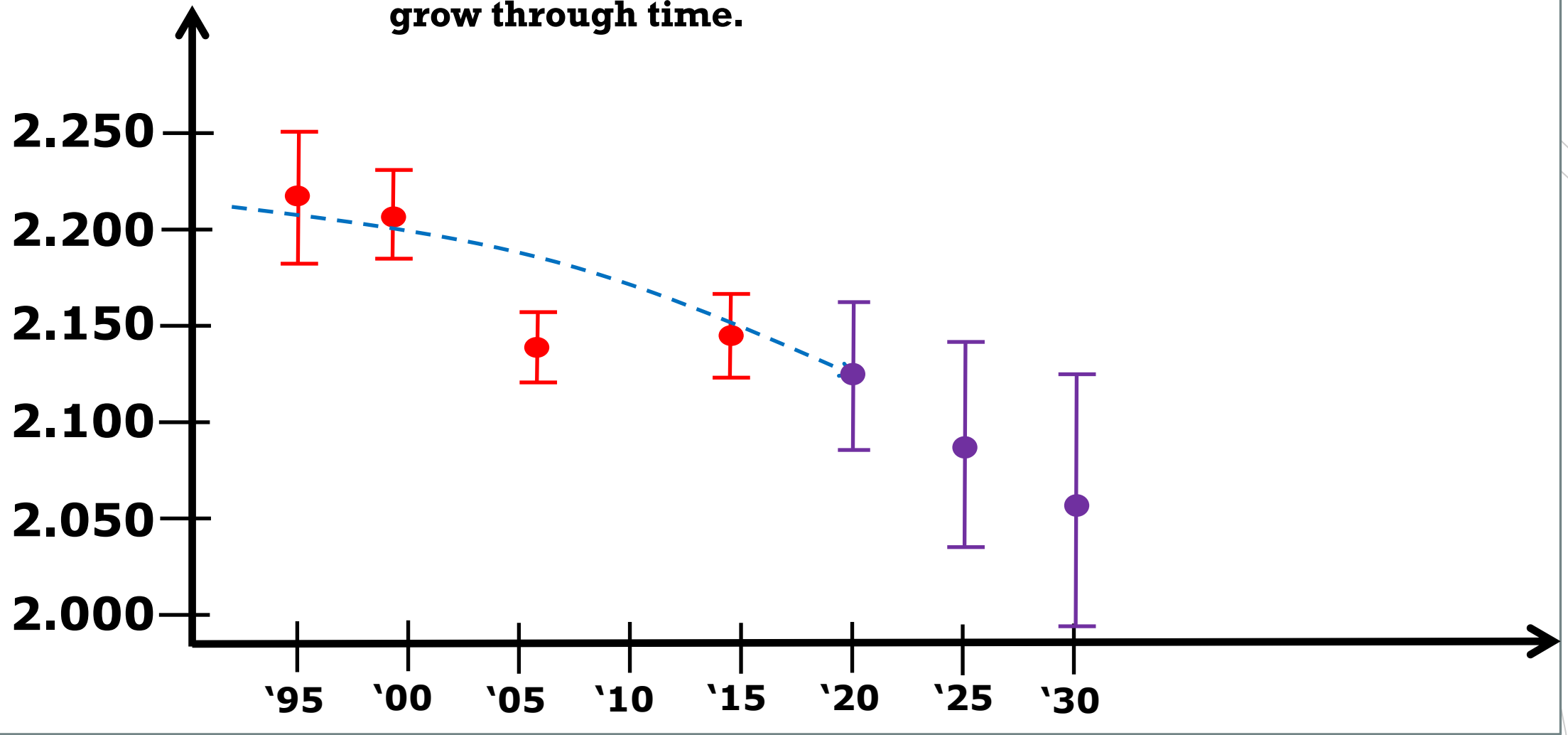
Combining the same observations that were used to create **SECs** with **IFVM2022** allows NGS to estimate **reference epoch coordinates (RECs)**



h

time

In the absence of new survey data, error estimates will grow through time.



Metadata Example

- Latitude, longitude, and ellipsoid heights: North American Terrestrial Reference Frame of 2022 (NATRF2022)
- Orthometric heights: North American-Pacific Geopotential Datum of 2022 (NAPGD2022)
- Epoch: 2020.0000
- Linear unit: International foot, ift (1 foot = 0.3048 meter)
- Projected coordinate system: State Plane Coordinate System of 2022 (SPCS2022), Kentucky North Central zone (KY NC, 211007)

Best ways to determine coordinates in the Modernized NSRS

Listed in decreasing order of Accuracy, Cost, and Complexity

Resurvey:

- Return to the field and collect new observations, relying on geodetic control that has coordinates in the new datum.

OPUS

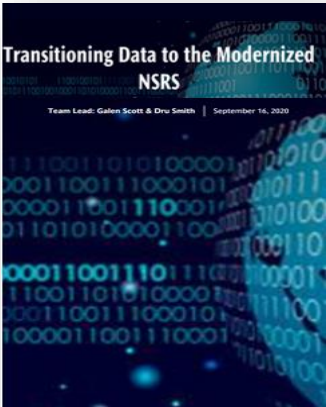
Readjust:

- Using existing observations, re-compute new coordinates based on geodetic control that has been defined in the new datum.

NCAT

Transform:

- Take finished products that have coordinates in the old datum and use transformation software to estimate coordinates in the new datum.



Best ways to determine coordinates in the Modernized NSRS

Listed in decreasing order of Accuracy, Cost, and Complexity

Resurvey:

- Useful for municipalities looking to migrate a local datum into the NSRS
- ongoing project control in areas experiencing lots of vertical motion

OPUS

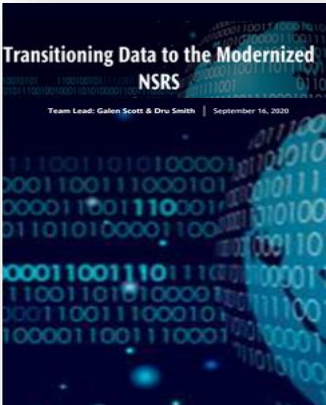
Readjust:

- Most appropriate for updating existing project control in stable regions

NCAT

Transform:

- Best for updates to legacy mapping data.
- Note - Not all data will need to be transformed as soon as the Modernized NSRS is released



NGS will provide:

NGS

NGS Slides
2021_use_case_
Webinar.pptx

The source code, defining datasets, and robust documentation for NCAT and VDATUM so they can be incorporated into non-NGS software

Downloadable versions of NCAT & VDatum so they can be run locally

Sample input and output datasets so that users may test other transformation software against NGS' definitive transformations

Uncertainty estimates for transformations

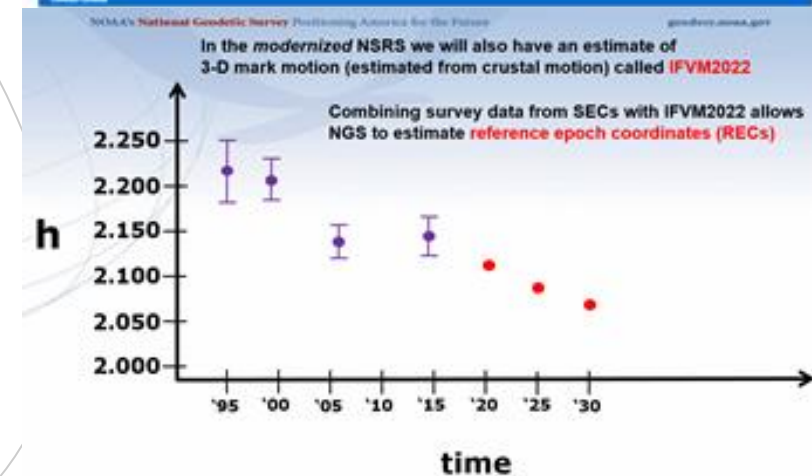
Note: Superseded historic transformation software will continue to be available on the NGS website, however they will not be updated.

GPS on Bench Marks for the Modernized NSRS

GPS on Bench Marks is not only about building the Transformation

GPSonBM Campaign Goals:

- Data for NAVD 88 – NAPGD2022 Transformation Tools
- 2020.0 Reference Epoch Coordinates (REC's)
- Build time series of observations in areas of motion



Preparation

Educate

Get Educated

- NGS website- <https://geodesy.noaa.gov/datums/newdatums/index.shtml>
- NIST- www.nist.gov/pml/us-surveyfoot

Review

Review State or locally specific impacts.

- Pin Numbers
- Flood mapping
- Data Conversion

Real Use Cases

Work through Use Cases with NGS

Provide Survey through the end of the year to help with Datum Update

Data Preparation

Newest Realizations:	NAD 83(2011) epoch 2010.00 USGG12 (gravimetric geoid) / GEOID12B (hybrid geoid)
Obtain	Obtain precise ellipsoid heights on NAVD 88 bench marks. <ul style="list-style-type: none">• (OPUS-DB, contact NGS Geodetic Advisor)• Improves hybrid geoid models and provides “hard points” in new vertical datum.• Follow new NGS Guidelines when released.
Understand	Understand the accuracy of VERTCON in your area.
Passive to GNSS	Move away from passive marks to GNSS. Utilize CORS, OPUS, Real-time Networks.
METADATA	Require/provide complete metadata for all mapping contracts. How were the positions/heights derived? Document it!



Training Preparation

Read the **Blueprint Documents**

Recorded webinars from NSRS Modernization Manager

Subscribe to **NGS news**

<https://www.ngs.noaa.gov/INFO/subscribe.shtml>

Check out the New Datums web page:

<https://www.ngs.noaa.gov/datums/newdatums/>

Reach out to NGS for support as needed

<https://www.ngs.noaa.gov/ADVISORS/>



Preparation could include

Organizing an advisory committee associated with your location, consider reps from:

- Universities
- Private industry
- State surveying agencies
- Professional societies

Providing 2022 datum information to constituents via:

- Workshops
- Speaking engagements
 - Goal is User friendly communications with people who are unfamiliar with Geodesy

Request feedback from:

- Surveyors
- Engineers
- Property Mappers
- Geospatial Organizations



Transition Tools / Outreach Needs

57

State/Local governments work with NGS leadership to participate at the state Land Surveying and GIS conferences seeking input concerning the 2022 datums impacts

Ensure the Surveying, Mapping, and GIS communities are included in the decision-making process by establishing ad hoc groups:

- To document and address issues with the new datums

Include representatives from:

- NGS leadership
- State surveying agencies
- Professional societies
- Academia
- Private industry
- GIS professionals



Advantages

Improved height information will be available in:

Areas lacking NAVD 88 benchmarks

Areas of crustal movement

Improved geoid and gravity especially
in our coastal and mountainous areas



Takes into consideration Sea Level Rise



NGS actively engaging State & Local surveying and mapping communities



Challenges

The 2022 datums transition will be an unfunded mandate for:

Most state and local agencies

The private sector



The 2022 Vertical Datum's 2cm accuracy

major improvement in areas without vertical control,

will not meet some high precision (sub-cm) vertical control requirements (e.g. coastal work in North Carolina).

NGS does not plan to improve the accuracy of the geoid beyond 2 cm.



Due to budget and personnel constraints, NGS will focus:

More on the scientific community's issues

Less on State/Local agency's issues



References

- https://www.ngs.noaa.gov/web/science_edu/presentations_library/
- SPCC- <https://geodesy.noaa.gov/SPCS/policy.shtml>
- https://geodesy.noaa.gov/web/science_edu/webinar_series/state-plane-2022-shape-things.shtml
- New Datums- <https://geodesy.noaa.gov/datums/newdatums/index.shtml>
- <https://geodesy.noaa.gov/datums/newdatums/policy.shtml>
- US Survey Foot to International Foot- National Institute of Standards and Technology (NIST)
www.nist.gov/pml/us-surveyfoot

QUESTIONS????