Summary of the October 12, 2017

Federal Geodetic Control Subcommittee Meeting

1315 East-West Hwy, Silver Spring, Maryland 20910

Meeting Chair: Juliana Blackwell, Director, National Geodetic Survey

Secretariat: Brian Shaw, National Geodetic Survey

FGCS Membership and Attendance

Department of Agriculture

US Forest Service- [Absent]

Farm Service Agency – David Davis

Department of Commerce

US Census Bureau – Aaron Jenson

National Oceanic and Atmospheric Administration

National Geodetic Survey (NGS) – Juliana Blackwell, Brian Shaw, Dru Smith, Dan Roman, Bill Stone, Kendal Fancher, Pam Fromhertz, Michael Dennis, Rick Foote, Joe Evjen, Weibang Wang

Center for Operational Oceanographic Products and Services (CO-OPS) –

Michael Michalski

Department of Homeland Security

US Coast Guard- [Absent]

Federal Emergency Management Agency – [Absent]

Department of Defense

National Geospatial-Intelligence Agency –

US Army Corps of Engineers – Mark Huber, Jim Garster
US Naval Observatory – [Absent]

Department of the Interior

Bureau of Indian Affairs – [Absent]

Bureau of Land Management – [Absent]

Bureau of Ocean Energy, Management – [Absent]

Fish and Wildlife Service – [Absent]

National Park Service –Neil Winn, Karl Brown, Tim Smith

Office of Surface Mining, Reclamation, and Enforcement – [Absent]

US Bureau of Reclamation – [Absent]

US Geological Survey – Glenn Guempel, Charles Hickman

Department of State

International Boundary Commission – JT Moore

~~I~~*nternational Boundary and Water Commission* – Sheila Cain

Department of Transportation

Federal Aviation Administration – [Absent]

Independent Agencies

National Aeronautics and Space Administration – Ben Phillips

Tennessee Valley Authority – [Absent]

Federal Communications Commission – [Absent]

State

Caltrans – Scott Martin

NGS Activities – Juliana Blackwell

Dr Dan Roman is the new Chief Geodesist

Several new hires trying to maintain internal capacity

NGS successfully hosted the 2017 Geospatial Summit

NGS wants to keep making people aware of the new reference frames and geopotential datum coming in 2022.

NGS wants to get feedback and information from all our constituents on any challenges they foresee. NGS also wants to help make things easier to modernize geospatial data.

We will not have a 2018 Geospatial Summit but plan to have an Industry Day to collaborate specifically with vendors

NGS released the 2017 Experimental Geoid over the summer.

This geoid is to help users evaluate the changes that will come in the future geopotential datum but not recommended for production use.

https://beta.ngs.noaa.gov/GEOID/xGEOID17/

GRAV-D is on target and over 64% data collected

This year we had the ability to collect GRAV-D data using an optionally piloted aircraft collecting production data

GSVS17 occurred in Southern Colorado along US Hwy 160

Emergency Response imagery collection for Harvey, Irma, Maria and Nate

NGDA Geodetic Control theme strategic plan – Dan Roman

NGDA National Coordination

Dan has been collaborating with the FGDC helping get all the strategic plans developed for the 4 main geodetic control themes

All Geodetic Control Themes except the geoid have been added and have web services.

International Collaboration

Working with IAG (Commission 1 and 2) – ITRF/IHRF

UN-GGIM (UNGGRF, UN-GGIM Americas, SIRGAS)

FIG et al

ISO –TC 211

GLCC – IGLD

Working with all of these groups. Many of the future reference frames and the geopotential datum will be across international regions. What NGS is doing to modernize the reference system in the US will not just affect the US and NGS needs to collaborate with all the regional countries to make sure that what we produce is consistent with all the other regional reference frames and datums.

NSRS Modernization – Dru Smith

NGS has published the first blueprint document, the second should be out later this month, and the third will be early next year.

All of the TRF's now have official names. They are all global frames.

All the TRFs will rotate with the plate they are defined for. They will also have Intra Frame Velocity Models to help transition coordinate through different epics.

All the TRF models will be identical to IGS at one particular time and then adjust based on the different plates movements

Dru goes over several examples for how the TRF coordinates will look for different stations

(See slides)

Intra Frame Velocity Models –

These models will be used for each of the reference frames to help model change over time.

Questions:

Tim Smith – The NATRF2022 is going to be a held frame in time

Dru – It is not going to be held in time, coordinates will be held to particular epochs. The epochs will be adjusted at particular time intervals to be determined but possibly 5 or 10 years. OPUS will provide coordinates to the most recent epoch for NATRF 2022 (2020.0) for example since we are unsure what the chosen epoch will be.

The best coordinate for an observation will be for the time the survey. To move the coordinates back to an epoch or forward you are introducing uncertainty.

Tim – In the future if he submits an observation to OPUS it will provide the coordinate for the survey epoch and a coordinate for the most recent *ATRF 2022 epoch.

Dan Roman – There will be versioning of the IFVM as well so there will need to be good metadata for what version was used and all epochs.

Dru – Future products will spit out all of the metadata needed.

Tim Smith – Please try to make it as easy as possible. NPS users find it difficult to understand using datums and projections today so please consider that.

Dan – The aim is not to change things too much and NGS will try to make things more automated.

Tim Smith – What will be done about updating federal standards like for NAD 83?

Dru Smith – The FGCS is the voting body so the standard will not change until the FGCS votes to approve it.

Tim – What steps is NGS planning to do?

Juliana – Working through the FGCS and up to FGDC we need to communicate to people to accept and adopt it. To make it formal the FRN will be the way to make it official

Tim – The federal government is mandated to store and disseminate data in NAD 83 etc

Dru – The only mandates are OMB mandate for tying to geodetic control so he thinks we might already be

GEOID Slope Validation Survey 2017 – Brian Shaw

NGS conducted the GSVS17 in Southern Colorado along US Highway 160 from Durango to Walsenburg.

NGS conducted measurements on 223 survey monuments using four methodologies

GPS – Data was collected over two days with sessions of 24 and 16 hours on each mark.

Leveling – Procedures were followed to acquire 1st Order, Class II but due to bench mark ties it will be published as 2nd Order, Class 1 leveling.

Gravity – Absolute gravity and gravity gradients were collected on every mark. This is the only GSVS that NGS collected this data on every mark.

Deflection of the Vertical (DOV) – NGS is just wrapping up the DOV collection which is the final data that needs to be collected.

Latitude and Longitude Poll – Dru Smith

We sent out a poll to determine how people are storing latitude and longitude to evaluate this for choosing a good way to express it.

There are problems crossing the international dateline since from -179 to 179 can be difficult to represent mathematically. Either way there always has to be a difficult meridian chosen and Dru believes we should make the prime meridian the difficult one since the US has territory across the international date line.

NGS datasheets allow coordinates to be expressed in the Mariana's at 220 degrees west

Is there a need for standardization?

Data exchanges, integrated databases, overlapping products and services

Currently several agencies express latitude and longitude in different ways

Michael Dennis Comments:

The International Meridian Conference was a conference held in October 1884 in Washington, D.C., in the United States, to determine a prime meridian for international use. One of the resolutions of the 1884 conference was that the meridian longitude be counted in two directions up to 180 degrees, east longitude being plus and west longitude minus.

NAD83 Official Transformations – Dru Smith

After NGS developed NAD 83 and NADCON for transforming coordinates from NAD27 to NAD83 the FGCS voted to make NADCON the official transformation to go from NAD27 to NAD83

Dru mentions we put out an FRN and then never updated it as the various NAD83 realizations came around. He believes we should submit a new FRN specifying the transformations in NADCON 5 should be the official transformations.

Brian – Do we want to make it the software product or the transformation methodology that should be vetted as official?

Dru – he is not sure but believes that we should make it the grids and transformation methodologies are the way so that it can be incorporated in other software packages.

Neil – During the Geospatial Summit one of the software vendors talked about NGS vetting their transformations.

Dru – unsure how to really do that

Brian – I believe coming up with a standard test for vendors to check how they implement it against a list of correct results.

Dru – agrees but also not sure who validates the test.

Several people made comments that it should be on the vendor to validate their own results.

Michael – are the transformations completely reversible? That is, if you go one direction, can you get back exactly to where you started by using the output as input?

Juliana – mentions we should look into this and bring it up at industry day

Karl – Both the instrumentation and methodology group wrestled with validating software. We just don't have the people and means to certify that the vendors are producing the proper transformations. He believes creating the test file for vendors to validate their transformation implementations would be a good option.

Karl – NGS needs to provide good communication plans to deal with the NADCON transformations as well as for moving to the new Reference Frames to make things more clear than A-16.

A-16 is great, we do have a NAD83 mandate and NGS needs to develop a good communication plan for what NGS is developing (New reference frames and geopotential datum).

Workgroup Updates

Fixed Reference Stations Work Group – Dan Roman for Kevin Choi

1.IGLD Great Lake CORS station repair completed.

a. 6 stations (GDMA, CALU, OHMH, OHCD, BFNY, OSPA)

b. Updated to full GNSS receivers without changing antenna.

c. Hourly update with 1 sec interval data

d. Michigan DOT will take over the NGS-owned CORS stations in Michigan. Working on the paperwork with CO-OPS.

2. Foundation CORS planning.

a. Collective efforts to build and maintain a federally-owned GNSS network infrastructure.

b. Meeting with NASA HQ to discuss about collaboration with NASA's Space Geodetic Project. November 8 1-3 pm Location TBD

Instruments Work Group - Kendall Fancher

No updates

Methodologies Work Group – Joe Evjen

Should become more active in FY18.

OPUS Projects will be available to the public in beta for publishing data to the IDB

RTN – We are looking to allow more RTN/RTK data to get in to the IDB to help with GPS on Bench Marks.

Spectrum Work Group – Larry Hothem

Absent

Open Discussion

Michael Dennis – We will be seeking input on development of the State Plane Coordinate System for 2022. We will be working through the FGCS to get input and comments on the plan for the future.

Dru – He knows we have to get feedback from the states because they have to speak as a voice.

Michael – He is not sure the states have to approve but if anyone wants to make changes to the current system it has to come from the states. Michael wanted to put this out to the group so that it is on the radar since we only meet twice a year.

Dru – mentions that we will be coming out with a new SPCS and making sure that the states have a year to provide feedback on the system.

Dan – mentions that he isn't sure that the federal agencies might not be able to really influence the projections since it will be the states.

Karl – Wanted to express his gratitude for NGS staffing and running this subcommittee. Thanks for keeping everyone informed on the shape of the earth along with how it is moving and changing.