

**Summary of the August 10, 2015
Federal Geodetic Control Subcommittee Meeting**
1315 East-West Hwy, Silver Spring, Maryland 22031

Meeting Chair: Juliana Blackwell, Director of the National Geodetic Survey
Secretariat: Brian Shaw

FGCS Membership and Attendance

Department of Agriculture

US Forest Service – [Absent]
Farm Service Agency – David Davis

Department of Commerce

US Census Bureau – [Absent]
National Oceanic and Atmospheric Administration
National Geodetic Survey (NGS) – Juliana Blackwell, Tatiana Bowie, Neil Weston, Dru Smith,
Kendall Fancher, Dana Caccamise, Pam Fromhertz, Joe Evjen, Cece Mitchell, Brian Shaw

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

Department of Homeland Security

US Coast Guard - [Absent]
Federal Emergency Management Agency – Paul Rooney

Department of Defense

National Geospatial-Intelligence Agency – Nathan Ovans, Megan Miller
US Army Corps of Engineers - [Absent]
US Naval Observatory – [Absent]

Department of the Interior

Bureau of Indian Affairs – [Absent]
Bureau of Land Management – Robert Mandzi
Bureau of Ocean Energy, Management – Doug Vandegraft
Fish and Wildlife Service – Ken Elsner
National Park Service – Neil Winn
Office of Surface Mining, Reclamation, and Enforcement – [Absent]
US Bureau of Reclamation – [Absent]
US Geological Survey – Larry Hothem

Department of State

International Boundary Commission – JT Moore
International Boundary and Water Commission – Larry Kreiger

Department of Transportation

Federal Aviation Administration - [Absent]

Independent Agencies

National Aeronautics and Space Administration – [Absent]
Tennessee Valley Authority – [Absent]
Federal Communications Commission – [Absent]

Industry

Terrasurv – John Hamilton

Juliana Blackwell (Chair, NOAA/NGS)

Welcome and introductions

Juliana-

[Roll call led by Juliana Blackwell]

Actions

1. send out Geospatial Debriefing to FGCS Mailing list (Brian/done)
2. Send emails for FGDC Annual report (Brian/done)
3. Send out river crossing materials once finalized (Brian/waiting)
4. Send out poll for meeting dates in January (avoid other major conferences [ION]) (Brian/soon)

Agenda

NGS Activities: Juliana Blackwell

NGS Personnel changes:

Dru Smith, National Spatial Reference System Modernization Manager

Neil Weston, Chief Geodesist

Brett Howe, Acting Deputy Director

Vicki Childers, Observation and Analysis Division (OAD) Chief

Steve Hilla, Geosciences Research Division (GRD) Chief

Ross Mackay, Acting Geodetic Services Division (GSD) Chief

Theresa Damiani, Acting State Advisor Branch (SAB) Chief

Geospatial Summit Information

[Geospatial Summit Report now online](#)

Geospatial Summit presentations available online

<http://www.geodesy.noaa.gov/2015GeospatialSummit/>

Geospatial Summit Debrief Webinar (NGS Webinar Series), Thursday September 10, 2015

Registration: http://www.geodesy.noaa.gov/web/science_edu/webinar_series/Webinars.shtml

Juliana presented to the FGDC Coordination Group on Datum Modernization.

Larry Hothem: asked if there is going to be a way to monitor how agencies are preparing for the new datums? If not the FGDC Coordination Group would be a mechanism for monitoring agencies.

Neil Weston: mentions that NGS can make suggestions for the other agencies but they need to be the ones planning how to implement. NGS will continue making suggestions and best practices.

Larry Hothem: NGS should get the new datums preparation on the FGDC Coordinations Groups Agenda. Get FGDC sending letters to the Directors of all federal agencies so that they are aware of these new datums and how they will impact each agencies spatial data

NSRS Modernization Efforts: Dru Smith

Modernization of the National Spatial Reference System Goal 2 of the [NGS 10 Year Plan \(2013-2023\)](#)

Objective 1: "Replace NAD 83"

- This objective does not have an official name yet; will not be just about North America.
- There is an effort underway to work on tasks as projects; a lot more needs to be done now
- There is a new effort to update/replace PAGES, the GPS software application that is the guts of OPUS; critical effort being led by Steve Hilla
- Updating PAGES for multi-constellation processing capability (GNSS)
- Defining mathematical model connecting NSRS to IGS (geometric reference frames)
 - Larry Hothem (USGS): will this process involve COTS vendors (Geodetic Registry)
 - Dru Smith: All NGS transformations will be consolidated into one tool
 - Neil Weston: This model will first have to be scientifically sound and once the model is done we can provide guidance to COTS vendors
 - Dru Smith: NGS is updating New Datums web site to have a better tracking mechanism for the progress of the datum modernization efforts.

Objective 2: "Replace NAVD 88"

- GRAV-D is on schedule
- Components of GRAV-D
 - geoid monitoring projects (Currently GRACE for continental gravity monitoring)
 - if geoid is changing, heights are changing and need monitoring
 - GRACE satellite will be used for this
 - Episodic updates due to Earthquakes or other seismic events
 - Consolidating gravity data with Canada, currently both countries use different gravity data for geoid modeling.
 - IGLD project – Redefining IGLD 2020 set to be completed in 2025
 - Co-defining a new IGLD 85 and NAVD 88 is being led by Dan Roman

Objective 3: "Reinventing Bluebooking"

- NGS will continue to accept and share geodetic surveys
 - Will alter the current loading formats and software from old formats
- Rebuilding the NGS Database (NGSIDB), project led by Krishna Tadepalli
 - The current database was designed in the good old days of turning angles and EDM measurements before GPS. It does not currently account for velocities or include RTN surveys. It needs to be designed for storing continuous GNSS effectively.
- OPUS Projects is being updated to allow sharing of data; being led by Joe Evjen. This sharing of data is planned to be integrated with the OPUS Share DB; led by Mark Schenewerk. Partnering with USACE to make it a complete planning mechanism [Plan, Observe, Report]
- Production level entry into the NGSIDB was built w/o a lot of GPS in mind; need to go back to original receiver files to do an analysis of them; maybe some software is still around that can handle some of these older files.
 - Cece Mitchel: Currently NGS only loads GPS vectors into the NGSIDB. Ideally NGS wants to reprocess all original GPS observation files into the new DataBase.
 - Larry Hothem: Reach out to the IGS community to help with finding old format software
 - Dru Smith: This effort will allow NGS to relate coincident survey data that was done in the past across the nation that will provide longer baselines

Objective 4: "Repair the Toolkit"

- NAVD 86 to NAVD 2011 transformation
- Toolkit software currently has a command line interface that is being transformed to make it more user-friendly. Examples are listed in the 10 year plan of strategies.
- Better utilization of the NSRS
- Create a consistent set of transformation tools and easy to use
 - Larry Hothem: Commented on making it downloadable
 - Dru Smith: It will be available via web services as well as a downloadable JAR file
 - Neil Weston: Mentions the benefit of online is version consistency
 - Dru Smith: make sure people get output with the transformation tool version listed
 - Larry Hothem: Creating traceability of data when users perform transformations to help account for any inconsistencies

Objective 5: "Better Surveying"

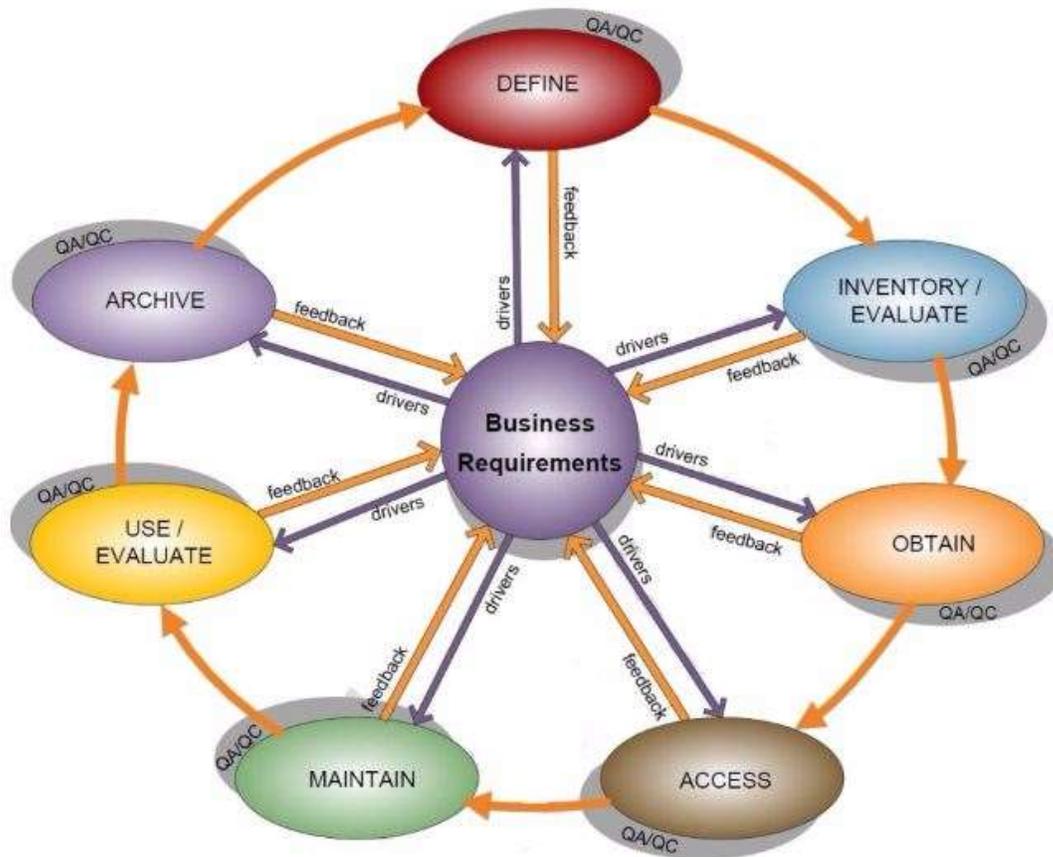
- Kendall Fancher is working on creating new procedures for surveying with the new reference frames (new datums)
 - Larry Hothem: Is NGS involved with the Global Height Program?
 - Neil Weston: Dan Roman is
 - Dru Smith: North America might not necessarily want the world value. Aerial gravity has provided the US with a better understanding of the gravimetric biases local to us.
 - Joe Evjen: There will be offsets from country to country. The week of 8/15/15 there will be a beta release of the new Experimental Geoid 2015
 - Dru Smith: NGS will be creating new experimental geoids every year converging to the new geopotential datum

Consolidating Survey Control into one location: Brian Shaw

- Presentation will be provided
- Montana has created a DB that houses PLSS corner data and other associated survey control data
- Brian brought this to the FGCS since it is a common problem that the many types of survey control (disks in the ground) at various accuracies are distributed across many agencies. The hope is creating a central location utilizing the FGDC NSDI Theme layers hosting and web services
- Showed a slide of the NSDI Framework Themes and Federal Leads
- Robert Mandzi: BLM is mandated to coordinate cadastral information
 - BLM is responsible for giving parcel location and coordinates
 - BLM has been trying to get accurate corner positions for PLSS grids to be compiled.
 - Many of the PLSS corners have positions that were scaled from USGS quads or from corners based on surveyors using chains in the days of the General Land Office
 - The combination of survey grade or hand held positions will improve the current positions
 - MT, ID and UT are all sharing stewardship of the PLSS corners DB
 - The US has 10 million corner positions
- Demo of of Multi-state Control Point data showing NGS, PLSS and Non PLSS
 - MT Cadastral Control Mapping Application - <http://ags.giscenter.isu.edu/flexviewers/mcpd/>
 - UT Cadastral Control - <http://gis.utah.gov/data/sgid-cadastre/>
- Larry Hothem: USGS monuments exist, but no longer used by USGS; all done entirely with GPS
- Brian Shaw: We all set marks in the ground; this DB would provide a means to consolidate all of them; need to discuss with Jerry Johnston of DOI to determine if this is viable
- Larry: The only role of NGS should be to provide guidance on this.

National Geospatial Data Archive Themes Update: Neil Weston

- Presentation will be provided
- Lifecycles for datasets



- Business process, framework themes and associated datasets
- FGDC National Spatial Data Infrastructure Data themes
 - Geodetic Control is a framework for all other themes
 - Project Managers
 - Airborne Gravity – Monica Youngman
 - CORS – Giovanni Sella
 - Geoid Models – Yan Wang
 - Passive Control – Krishna Tadepalli
- Questionnaire; 19 questions requested to be answered; due date Sep 30, 2015; questions are listed in the accompanying slides.
- For each dataset, there are 19 answers to these questions; quite detailed; in the end, result in a significant associated dataset.
- There is an associated website, contact Neil Weston for more information.

Workgroup Updates

Fixed Reference Stations Work Group – Neil Weston

- Just about up to 2000 CORS available at [UFCORS](#)
- NGS partners with 240 organizations including all levels of government, academic and private
 - Neil Winn: AK would benefit from more Canadian sites
 - Neil Weston: borders would be beneficial but not all Canadian sites. We do include an IGS site in western Canada that is good. Most Canadian sites are IGS sites and are used in OPUS, but the data is accessible via the IGS portal.
 - Pam Fromhertz: OPUS-RS still has some issues in remote areas
 - Neil Weston: since OPUS-RS is a small amount of data (15 min to 2 hr) it doesn't provide ideal geometric solutions and could be improved with longer observations
- OPUS to GNSS?
 - Neil Weston: Currently GLONASS orbits will degrade a solution but as the constellations mature they will be improved

Instruments Work Group - Kendall Fancher

- NGS is developing new procedures for River Crossings using high precision theodolites (total stations)

Methodologies Work Group – Joe Evjen

- Mentions the River Corssing as well
- Making a Geodetic Control attribute for photo identifiable control (DOA interested in this)
 - Larry Hothem: There is an International Standard for this.

Spectrum Work Group – Larry Hothem

- Presentation will be provided
- GPS Signals
 - There are now enough satellites up with L2C improving dual frequency signals
 - Will add L1C when GPS III is launched and has enough satellites up
 - Diagram on international signals
 - There is a need to make sure all of the different constellations signals are aligned
- DOT – GPS spectrum protection criteria
 - Adjacent Band Compatibility (ABC) – trying to operate free of harmful degradation from other transmissions.
 - Draft test plan out, will soon be a Federal Register Notice
 - Lists extensive GPS/GNSS receivers for use cases
 - There are threats to the GPS spectrum that will be broadcasting a signal that is 1000 billion times stronger than the GPS and Galileo L1
- Jammers – GPS Jammers, portable phone jammers
 - Currently all jammers are L1 only, benefit of dual frequency
- Wireless Broadband and Spectrum Sharing
 - FCC is close to achieving their goal and this could cause an issue of sharing the spectrum adjacent to GPS L1 and L5 if groups are not monitored and up the power of the signals in the adjacent bands.
- World Radio Communication Conference (WRC) 2015
 - IMT – big concern for GNSS and the GPS Directorate is monitoring all GPS bands and adjacent bands being proposed as candidates for band sharing with IMT

Open Discussion

Neil Winn: OPUS-Projects and sharing solutions in the future?

Joe Evjen: figuring out how to give additional metadata for adjusted solutions is being worked on.

Longer term NGS hopes to make OP publish to the NGS Database.

David Davis: Notes that for the Consolidated Survey Control adding an attribute for if the control mark is photo identifiable would be great.

Larry Hothem: There is a project in ISO for the preservation of original data and metadata. The issue stems from most data today is digital and storing data on media over a lifetime degrades and is not as durable as analog (paper). They are looking for case examples. Involving data archive people from Census and involves 20+ countries.

Dru Smith: 5% of our data CDs that have GPS data are dead. NGDC are the best archivists he knows

Larry Hothem: Not sure if anyone from NOAA is involved with this work but anyone from NOAA can serve as an alternate on this project.

Closing comments from Juliana

Next meeting will be in January

Notes Provided by Cece Mitchell and Brian Shaw