

## Summary of the 24 July 2014 Federal Geodetic Control Subcommittee Meeting

**Meeting Chair:** Juliana Blackwell, Director of the National Geodetic Survey

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### **FGCS Membership and Attendance**

Department of Agriculture

**US Forest Service – [Absent]**

*Farm Service Agency* – David Davis, Zach Adkins, Brian Vanderbilt

Department of Commerce

*US Census Bureau* – Frederick Malkus

*National Geodetic Survey* – Juliana Blackwell, Tatiana Bowie, David Conner, Rick Foote, Jeremy McHugh, Giovanni Sella, Jon Sellars, Dru Smith, Tom Soler, Bill Stone, Neil Weston

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

Department of Homeland Security

*US Coast Guard* – LT Hermie Mendoza, Gene Schlechte

*Federal Emergency Management Agency* – Paul Rooney

Department of Defense

*National Geospatial-Intelligence Agency* – Nathan Ovans, Dan Mullaney

**US Army Corps of Engineers - [Absent]**

**US Naval Observatory – [Absent]**

Department of the Interior

**Bureau of Indian Affairs – [Absent]**

*Bureau of Land Management* – Mike Londe

**Bureau of Ocean Energy, Management – [Absent]**

**Fish and Wildlife Service – [Absent]**

*National Park Service* – Tim Smith, Karl Brown, Neil Winn, Joel Cusik

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

**US Bureau of Reclamation – [Absent]**

*US Geological Survey* – Larry Hothem, Glenn Guempel, Charlie Hickman

Department of State

**International Boundary Commission – [Absent]**

*International Boundary and Water Commission* – Wayne Belzer, Larry Krieger

Department of Transportation

*Federal Aviation Administration* - Terry Rhea

Independent Agencies

**National Aeronautics and Space Administration – [Absent]**

**Tennessee Valley Authority – [Absent]**

**Federal Communications Commission – [Absent]**

## **Juliana Blackwell (Chair, NGS) – Welcome, introductions**

Welcome and thanks for joining us. This meeting is not only a chance for us to brief you on our activities in NGS, but also a chance for you all to tell us what is going on in your agencies and identify issues for us to work on collaboratively with respect to geodetic data activities.

## **Neil Weston - Geodetic Control Theme - geoplatform demo**

[Neil demonstrated the Geodetic Control Theme content available on the geoplatform here: <http://www.geoplatform.gov/a16geocontrol-home> ]

Glen Guempel - Is this site built from a template?

Neil Weston - Yes, but we can make some changes.

Glen Guempel- We are still required to update Data.gov separately.

Larry Hothem- Can Mexico and Canada use this site?

Neil Weston- They can certainly access the information on the site freely.

Juliana Blackwell- We have worked to get the content on the site, but feel free to let me or Neil, or Jeremy know if it needs any changes.

Joe Evjen - If an agency wanted to put up a dataset here, for example EGM08, can they do that though you, Neil?

Neil Weston - Possibly. We could certainly try to put up anything meaningful and relevant to the theme as long as it has good metadata.

Juliana Blackwell - FYI, The elevation theme is co-led by the USGS and NOAA.

## **David Davis - Photo-identifiable control points**

[David presented his slides]

Joe Evjen - Are most of these points set by states and counties?

David Davis - Yes. Those groups do use the points a lot.

Joe Evjen - If those users wanted accurate NAIP (National Agriculture Imagery Program) imagery, then there should be an incentive for those users to want to provide more of these points so that the imagery would be more useful to them.

David Davis - Why are so many control points be located in non photo-identifiable locations?

Larry Hothem - I have been involved in establishing coordinates on photo-identifiable features. I

believe that people who use these for aerial triangulation, agree that the best photo-identifiable control points are on or near flagged features for a specific temporary project. Then, they remove the flagging when the aerial photography mission is done.

Joe Evjen- NGS does not set them next to a curb, for example, because we have a very low tolerance for movement of marks.

Jon Sellars - CORS stations could be made to be photo-identifiable. They are often at corners of buildings.

David Davis - I have seen some of those CORS locations, but even those are not in ideal locations.

Bill Stone - Typically we are digging or drilling holes for marks that require enough room for the digging or drilling. That is part of the issue.

Mark Eckl - We are currently making monuments now with a ring around the top about 1 meter in diameter. For example, in Iowa right now, we have set some marks of this type. Maybe in OPUS, the photo-identifiable points could be tracked.

Joe Evjen- What is your tolerance for false positives, ie, points that we think might be of use to you? We are loathe to add more fields to the database for attributes like this that don't stay constant (photo-identifiably degrades with time).

David Davis - If you have possible points for us to use, I would be happy to try to use them.

David Davis- I learned from NGS that there are just not that many passive marks being established anymore. Is that true?

Juliana Blackwell - For NGS, yes. This year we happened to set a number for a special project, but, in general, we are not doing a lot of mark-setting like we used to.

Juliana Blackwell - Do you have any points provided to you on or around Airports?

David Davis - Yes we have that type of data. We think we have asked everyone we can think of for points.

Juliana Blackwell - The airport GIS program at the FAA may be a good resource if you have not worked with them.

David Conner - What is the difference between public vs private points?

David Davis - We don't provide our database to contractors and it is not shared widely with Federal agencies. In NC, for example, the points were shared with us with the stipulation that we don't share them with anyone else.

Michael Michalski - We regularly set marks and I can put you in touch with the group that can provide metadata etc.

David Davis - Thanks Michael. Please send me an email about that.

David Davis - What about adding some fields of flags to a database like OPUS to indicate if points are photo-identifiable?

Joe Evjen - In OPUS-DB, there is a special application code that could potentially be used for this purpose. You could also plot all ~750k of your marks in grey and overlay them to see which align with spots of interest to you throughout the US.

Neil Weston - We can do a little more research about what other groups outside of NGS do this.

Joe Evjen - I think that the local and state groups who use these kind of marks the most, and that you will have the best luck with route. It might be good to prioritize the states, counties, or local areas that are in need of these points.

Nathan Ovans - In Michigan, I know that we had a number of data sources at the universities in Michigan. I am from Michigan and have some experience there.

Joe Evjen - I took a note to see if we can add a photo-identifiable flag in the database.

Jon Sellars - If they fly over Virginia, I have some ideas that may be able to help David. David and I have exchanged emails already.

Terry Rhea - the FAA's Airports GIS program is making improvements to the way we share data, so there may be some additional benefits there for David. So, keep in touch with FAA on that.

Joe Evjen- It is a good time to have this problem, because the cost to position points to ~30cm with RTK is very low now.

Juliana Blackwell - Thanks David. The meeting notes will help David capture the ideas mentioned here.

### **Larry Hothem - ISO registry of Geodetic Codes and Parameters: Status, future milestones, and demo**

This will be an introduction. I won't be able to demo the ISO registry because it is still undergoing testing.

[Larry presented his slides]

Neil Weston- The intent is to capture all the different realizations of reference frames. The United Nations is interested in implementing one common global reference frame for all nations.

Larry Hothem- It could be implemented through ISO.

Neil Weston - Will the time / epoch part be included soon? Once we do that, the registry will be more widely accepted.

Larry Hothem - We are discussing implementing it into the registry, but we need first to revise ISO/IS 19111 on Spatial Referencing by Coordinates to include time-dependent changes in coordinate transformations or dynamic reference frames.

Joe Evjen - Is the registry free to view?

Larry Hothem - It should be publicly available to review by November.

Larry Hothem - If we implement the initial Registry for public viewing in November, using a live link to the Registry I think that we can plan to discuss at our next FGCS meeting in January.

Juliana Blackwell - Thanks Larry. We are a little ahead of schedule. Let's take a break now until 2:55pm.

## **Break**

### **Giovanni Sella - CORS update**

Giovanni Sella - I am going to keep this brief because I want to leave time for questions and I am not sure what aspects of CORS people are most interested in.

[Giovanni presented his slides]

Neil Winn- In an ideal world, I would love to be able to install our own CORS whenever and wherever. You had mentioned some co-location with tide gauges that might make our potential sites more attractive to include in the CORS network.

Giovanni Sella - We have a bit of flexibility in how we implement the 70km spacing rule. Within NOAA, we have had missions come up that have been exceptions, but those exceptions are mostly in coastal areas.

Neil Winn - Why do we have the 70km minimum distance?

Giovanni Sella – NGS reviewed in 2012 its products and services and the resources that is has available for CORS and recognized that the number of CORS exceed those requirements in many areas. It decided that the 70km was a reasonable distance to ensure redundancy to support its products and services. NGS recognized that this would not necessarily match the needs of agencies establishing sites, but CORS serve as a backbone for many products and services so maintain their coordinates to the highest level is essential. The accuracy of the coordinates is dependent not only on the quality of the equipment managed and supported by the contribution agency, but also ensuring that all metadata records are maintained and this is an extremely personnel intensive task. Given current resources not having a minimum distance requirement was unsustainable while maintaining quality requirements

Neil Winn - Would having a station that tracks GLONASS make that station more attractive for inclusion in the CORS network?

Giovanni Sella – Possibly. The current network is ~50/50 GPS vs GPS+GLONASS.

Neil Winn - When we can't be part of CORS, what should we do if we actually want to monitor geodetic changes?

Giovanni Sella - There are number of universities that might want to work with you. You could also establish your own post-processing tasks, or use one of the NGS-OPUS flavors.

Tim Smith- What kind of reactions do you get from people when you terminate an existing CORS station?

Giovanni Sella - Generally, the reaction has been an understanding was mutual. We have only terminated a current station when we had monumentation problems or equipment quality decreases. In some cases, they were able to rebuild stations to meet our criteria. I want to clarify that the 70km minimum distance rule is not applied retroactively, it is just for stations since we established that minimum distance rule (Jan 6 2013).).

Tim Smith - Have you considered using any kind of hierarchy for CORS network inclusion so that, for example, a federal-run CORS would override a request to build a CORS station from a state, local, or private agency?

Giovanni Sella - No we have not faced a simultaneous submission at the same site.

Tim Smith - I was concerned that I needed to have our stations on CORS so that we can use OPUS.

Giovanni Sella - If someone can demonstrate real benefits to adding a station to the network, we have some leeway in the 70km spacing. That said, we have excluded a lot of stations due to the 70km minimum distance rule.

Joel Cusik- Is it possible to incorporate stations from western Canada into the CORS network to improve the geometry of our work in Alaska?

Giovanni Sella - We have included a number of Canadian sites in the CORS network through our Canadian sister agency, NRCAN.

Joel Cusik - Whitehorse, Fort Nelson and some other sites are of interest to us.

Giovanni Sella - The ones around the Great Lakes are related to water level sites. We brought some legacy Canadian stations into our CORS network. We have NAD83 (2011) positions for all of the Canadian CORS sites.

Joel Cusik - What about the Plate Boundary Observatory sites and the possible end of funding for those sites?

Giovanni Sella - We have discussed the potential end of NSF funding for PBO with the leadership of the PBO. There are possibilities for people to adopt some of those stations.

Tim Smith - Who can we contact at UNAVCO to discuss this?

Giovanni Sella – You should contact Meghan Miller <[meghan@unavco.org](mailto:meghan@unavco.org)> President, and Glen Mattioli <[mattioli@unavco.org](mailto:mattioli@unavco.org)> Director of Geodetic Infrastructure.

Larry Hothem- One of the problems that projects like PBO have, is that the funding reviewers don't appreciate the need for a long-term observations.

Juliana Blackwell - Let's see if we can have a presentation from UNAVCO. It may not necessarily be part of an official FGCS event or meeting, but FGCS community would be welcome to participate.

Joel Cusik - Without these stations, especially in Alaska, we would be left with essentially no CORS.

Juliana Blackwell - There are other groups related to Alaska that are concerned with this, such as those involved with the Alaska Statewide Digital Mapping Initiative and the Alaska Geospatial Council.

Larry Hothem- The hazards monitoring program of the USGS would definitely be impacted by the ending of observations at PBO sites. I will discuss this matter with David Applegate, Associate Director for Natural Hazards, USGS.

Neil Weston- Juliana and I have attended a number of events at which UNAVCO spoke about this. I think they are being very proactive with starting the discussion about what to do now in anticipation of a loss of funding for the PBO sites.

Tim Smith- Is it possible to include the US Coast Guard in these discussions?

Giovanni Sella - There has only been a study where they collected comments on impacts if NDGPS sites went away. A decision has not been made to eliminate NDGPS. In fact, the US Coast Guard is upgrading equipment at some stations.

### **Joe Evjen - New datums communication plan**

[Joe presented his slides]

Joe Evjen – How would describe each of your agency's awareness of NGS's plans for these new datums?

Joel Cusik- I think people are blissfully ignorant. Maybe 1-2 people in each agency are aware. I recommend to keep coming out to the field to tell the public about it.

Tim Smith - We need the vendors to update their software to incorporate these datum changes.

Larry Hothem - This underscores the importance of the ISO Registry for Geodetic Codes and Parameters (RGCP).

Joel Cusik - Someone from NGS should be connected to the EPSG, the European Petroleum Survey Group.

[Joe showed the Web page for the NGS experimental Geoid <http://beta.ngs.noaa.gov/GEOID/xGEOID14/> and the first minute or two of a new video that NGS has linked to from our Home page [https://www.youtube.com/playlist?list=PLsyDI\\_aqUTdFY6eKURmiCBBk-mP4R10Dx](https://www.youtube.com/playlist?list=PLsyDI_aqUTdFY6eKURmiCBBk-mP4R10Dx) ]

Joe Evjen - We understand that the information presented in the videos is just a primer. There is a lot more work that needs to be done within agencies.

## **Work Group Updates followed by Open discussion / opportunity to propose new Work Group activities**

### ***Fixed Reference Stations - Neil Weston:***

There are three main areas covered by this work group:

- prevention of redundancy
- ensuring use of the the latest realizations of datums
- creation of robust metadata

Ongoing activities: Guidelines. The CORS guidelines were updated last year. With datatypes, RTCM and RINEX are very popular. Real Time Networks are still evolving and growing in number. We want to encourage standardization. We have done several webinars related to Real Time Networks and plan to do more.

***Instruments - Kendall Fancher (could not participate in today's meeting, but provided this statement ahead of time):*** NGS is developing new river/valley crossing procedures which will allow for use of optical total station surveying instruments, vs. the highly specialized Zeiss crossing equipment previously required for this purpose. The procedures will be field tested over the next several months.

Also, the Establishment of Calibration Baselines document has recently been updated.

### ***Methodology - Joe Evjen:***

NGS has updated a number of documents:

- NGS Guidelines for Real Time GNSS Networks
- FGDC-STD-014.4-2008 - Geographic information Framework Data Content Standard - Part 4: Geodetic Control
- User Guidelines for Single Base Real Time GNSS Positioning

NGS is updating a number of others:

- FGDC-STD-007.1-1998 - Geospatial Positioning Accuracy Standards - Part 1: Reporting Methodology

- FGDC-STD-007.2-1998 - Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks
- FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy
- FGDC-STD-007.4-2002 - Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction, and Facility Management

### ***Spectrum - Larry Hothem***

NTIA has released the Fourth Interim Progress Report on the Ten-Year Plan and Timetable <http://www.ntia.doc.gov/report/2014/fourth-interim-progress-report-ten-year-plan-and-timetable> . It is all part of the president's plan to identify and make available 500 MHz of federal and non-federal spectrum by 2020 for expanded wireless broadband use. NTIA is encouraging shared use of spectrum. An example of a possible case of spectrum sharing was the LightSquared proposal to operate in a band adjacent to the GPS L1 signal. LightSquared is still an issue. We all should be closely monitoring proposed shared use of spectrum and looking for ways to avoid interference affecting the GPS signals.

Juliana Blackwell - There was an email from Karen Van Dyke the Director of the DOT's PNT office. The action was to do a GPS use case template so they can assess the compatibility of other applications with GPS.

Larry Hothem - Glen Guempel is involved in that too. It is very important that our spectrum managers are aware of all the uses of spectrum that we all have. Some federal users of currently assigned spectrum are being asked to vacate the spectrum. Funds are available to cover new equipment costs for users required to move to new assigned spectrum.

Juliana Blackwell - Jeremy will send out that PNT email I mentioned to the FGCS community just to be sure that you all see it. If any kinds of actions come up again regarding the cataloging or documenting of GPS use, please do take that seriously.

***Vertical Reference Systems - Mark Eckl (could not participate in this part of today's meeting, but provided this statement ahead of time):*** There are no updates from the vertical reference system work group. All activity regarding this subject has been focused on the new vertical datum.

Juliana Blackwell - Now I open it up to hear what ideas you may have. A lot of the topics that come up are not something that are best presented at a full FGCS meeting. Rather, many topics are best handled by subsets or Work Groups. Thoughts or comments? Ideas for things you would like to see further developed?

Paul Rooney - I find this meeting very useful because it is at a high level and it gives me a great overview.

Juliana Blackwell- Anyone else? Even if something does not fit neatly under one of the existing work groups, we can still try to discuss it and work on it. Of course, you can always contact the chairs of work groups or send anything to Jeremy.

## **Closing remarks**

Juliana Blackwell - Thank you for your participation today! We appreciate your input and feedback. Our next meeting will be in January. Please send any ideas for the next meeting to the secretariat.