

**Federal Geodetic Control Subcommittee
Vertical Reference System Work Group
Meeting Notes
September 2, 2010**

Attendance

NOAA/NGS Renee Shields, Ajit Singh, Christine Gallagher (for Tim Smith, NPS, Denver)

NGA: Jim Frederick, Tom Creel, Richard Salmon, Mark Sorum, Jim Clawson

NPS: Karl Brown

There was a conflict with another meeting using the same conference call number so this meeting was suspended until 11:00 a.m. Because of this the agenda was not strictly followed and not all topics were discussed.

Renee opened up by commenting that she is going to try, over the next 6 months, to re-evaluate the list of invited people, most of who never call in, and whittle down the invited list and change the topics for meeting discussion to more meaningful and active items than just the general info meetings that we have been doing.

Agenda:

1. *Review meeting notes from July*
 - a. *Do we need to create a team to be working on defining the new vertical datum? Is it too soon?*
 - b. *GPS receivers updated to EGM08? July mtg notes mention U.S. military uses using EGM84; do new receivers use EGM08? is there a way to upgrade legacy receivers? Do we need to write up something an instrumentation WG could work on?*
2. *Report on Status of Post Summit actions: proceedings, lessons/actions list*
 - a. *Meeting with NC and FEMA to plan pilot project*
3. *Topics for discussion:*
 - a. *Suggestions for future venues, activities, projects*
 - b. *Report on Stream gage updates: project between NOAA/USGS/USACE; also tri-office water level gage height updates to include tidal datums*
 - c. *Geodesy 101 Workshop for other agencies – suggestion from FGCS meeting in May. Look at when and where in their agency this can be done – Corbin training facility, webinar, on site at agencies – schedule with Erika*
 - d. *Possibility of NGS Liaison position with FEMA – i.e. re-establish position Ronnie vacated*
 - e. *Identify FGCS Standards/guidelines that should be reviewed in preparation for new Datums [at FGCS meeting Joe Evjen mentioned something in geodetic accuracy standards mentioning NAVD88 would be controlled by CORS?]*
4. *FGCS – do we have a secretariat? When will next meeting be? Did letters get sent out to agencies inviting participation, as was suggested at meeting in May?*

Dru Smith and others working on contributing projects like GRAV-D need to be present to have this discussion. Defining which geoid we use is part of the issue and there are conversations going on with Canada about this. But as with the definition of the NAVD 88 when that was being done, this may not be finalized till we are closer to having GRAV-D completed.

Jim Frederick mentioned that there are 2 parts to this discussion. One is about the US National Reference Frame (NAVD 88) and the other is the global reference frame (now EGM08). Mark Sorum and Jim Clawson are the vertical reference frame people at NGA and they look at the standards for the global reference frame that agency uses, and how to update their products and applications to that. Right now NGA has EGM96 built into their products. NGA needs to look at how to tie the 2 reference frames together. They understand the issues the cadastral users have for a local (US) reference frame, and looking at how to bring that to a geocentric reference frame can sometimes be at odds with NGA needs for a global reference frame.

Ajit commented that when NAVD 88 was done it was easier to be consistent with Canada because both were based on leveling. With the conversion to a gravity based system we need to coordinate more with Canada in how we do this. Also there is a discussion about how to handle the zero point for the geoid model, and whether that changes as sea level changes. Marc Veronneau and Joe Henton are the folks at NRCAN that NGS is talking to.

Renee commented that she feels NGS' conversion to the new datum will result in more consistency with the global model that NGA uses. Jim stated that NGA is converting their products to EGM08. Jim expects that, while there are no concrete plans for another version of EGM08 in the 2015, -18, -20 time frame, it's possible that would happen. NGA did have a discussion with Dru Smith about tying the national reference frame to global models so people are using the same standards. NGA is focusing on height above the ellipsoid, and using the geoid model to convert to orthometric height. There is concern that multiple reference frames in different countries are not to the same standard or on the same reference frame, and there needs to be some way to unifying them or related them to each other.

Renee believes that Dan Roman may know the global geoid models other countries are using, and then if we find out how they are tuning it to fit their local needs, we can develop the transformation parameters from that. Also, our plan is to develop a model that fits pole to equator, and latitudes spanning all US territories. Countries in that region are welcome to use our model or not. Canada plans to redefine their reference frame based on the gravity geoid model also, but is not doing the comprehensive gravity data collection that NGS is doing. We are working closely with them. NGA wants to know what they can do to facilitate some of these activities. NGS will provide lots of information to users, and continue dialogs with NGA and others to ensure we coordinate our activities and everyone has all the information they need to update their own products.

Discussion moved on to talk about how to handle legacy surveys that had been tied to control as old as NGVD29, how to bring those up to date to the new datum or even NAVD 88. Renee said NGS' recommendation is always to automate the original survey observations and re-adjust them with NAVD 88 control, rather than rely on transformations. But Renee also stated that NGS is hoping to have a reasonably good transformation tool so that users whose accuracy requirements

are not too strict can use that tool to convert their data to the new datum. NGS may have to evaluate existing infrastructure across the country and determine if there are areas where some densification needs to be done to facilitate a good transformation, whether the infrastructure needed is CORS or passive control. Also the vendors will have to be able to provide some kind of accuracy statement if the orthometric height depends on the geoid model, so they will need to have accuracies on the model they use. Renee described the NGS hybrid geoid model that uses GPS ellipsoid heights on leveled bench marks to relate the geoid model to the NAVD 88. The plan for the new datum is to remove this last step, stop at the gravity version of the geoid model, but use leveled height differences to validate local relative geoid height differences in the model. NGS met with North Carolina Geodetic Survey and FEMA to discuss a pilot project to look at how redefining the vertical datum is going to impact the North Carolina Floodplain mapping program, with the goal to evaluate what will change in the process to produce new maps.

Comment on meeting notes from July – item 3, “*An IAG Working Group is looking at unification of height systems around the world into the World Height System. That group agrees that the orthometric height system should be the GPS heights plus geoid model.*”

Renee wasn't sure if this item was from something Dru discussed in the last meeting or from NGS' workshop in Boulder last fall on maintaining the geoid model. Renee felt that even if NGS wasn't engaged in the group we should at least be aware of what kind of progress they are making. While our concern is the US reference frame, if we can achieve that and coordinate with folks working on a global reference frame, it would be a good thing. **Renee will try and get more information on this group and whether NGS is engaged now.**

Comment on item 4 from July meeting notes: “*The military uses EGM08 in its receivers. The issue they wrestle with is how to standardize the format and spacing of the grid data for the model.*” The GPS community is not using EGM08 yet. Some are using a low resolution EGM84 geoid model but there are others depending on the vendor. Renee mentioned an association of vendors that we have worked with. This might be the group to talk to about having a single global EGM. Question of whether there is documentation of why they have not yet gone to a single global model.

Question from NGA – is Renee the FGDC/FGCS representative from NGS. Renee explained the structure: FGCS is a subcommittee within FGDC; this work group is under the FGCS; there is supposed to be a Secretariat who facilitates sub-committee meetings and communications, but that position has been vacant for over a year and has yet to be filled. NGA is uncertain about where we are with defining the issues and actions that the work group or the FGCS should be addressing. Jim recommended we meet face to face to discuss how to coordinate NGS' strategy for the national reference frame with NGA's strategy to address these issues on an international scale. Jim asked Renee to draft up the objectives of the work group. Renee said she would send out the Charter, and agreed an action plan needs to be developed. **Note: links to the FGDC, FGCS, and Vertical Reference System Work Group Charter are provided at the end of this draft, and the Charter is confirmed as up to date.**

Because of missing an hour at the beginning of the meeting there was really no time to finish the other topics in the agenda.

Karl did raise the issue of the other items on the agenda, in particular the issue of the Secretariat and whether a fall meeting was going to happen. Renee said this was something NGS had to MAKE happen, and that she would push on this issue within NGS. **Note: Renee did inquire about this issue and Juliana said she had asked the divisions within NGS to either find a volunteer or provide their recommendations. She followed up with a reminder email within NGS. But to Renee's knowledge, as of October 4th, nothing has been done.** Karl also mentioned the web site, and who has historically been responsible for its upkeep. **Renee will speak with Joe Evjen about this.**

Next meeting: Due to a conflict on November 4, 2010, at 10-11:30 a.m. East coast time

(Renee is traveling)

The following alternate times are proposed:

- **November 4, 2010, some time in the afternoon, e.g. a 90 minute time slot starting at 1, 2, or 3 p.m.**
- **November 18, 10-11:30 a.m.**

Pertinent web links:

<http://www.fgdc.gov/>

<http://www.fgdc.gov/participation/working-groups-subcommittees/fgcs/>

<http://www.fgdc.gov/participation/working-groups-subcommittees/fgcs/vertical/charter>