GPS on bench mark (BM) webinar, March 5, 2015

Follow-up questions/answers

A. General webinar questions

What is the web address for the recordings?

Will the power point presentations be available for download?

How many people were in the audience?

How do we get proof of attendance for P.D.H.?

B. General GPS on bench mark (BM) questions / all panelists

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If a GPS on bench mark was used in Geoid 12A, would it be beneficial to re-observe and share it?

Would it be beneficial to observe a BM more than one time?

Will there be any published official upgrades or new geoids between Geoid 12A and year 2020?

Are handheld coordinates actually useful for updating the database? I was under the impression that they wouldn't be.

Should volunteers concentrate on the recovery of marks not recovered in at least 30 years?

Does NGS review the BMs and elevations projects done by FEMA/ A lot of the work is sub 4th order?

I have markers at the university at which I work. Can I set-up on one of those and send the data in? I do have datasheets for the markers.

Is there any areas in southern New Hampshire you would like to see more observations?

It looks like the network is slim in the NW of Washington state, what is the plan and time line for this geographic region?

I've found USGS in NE OK and receive level line sheets from them in Rolla. Are their BM's available thru NGS as well? Many have not been found in many years.

C. General online tools questions (all panelists)

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Can I search for control by Project ID?

Will online tools work on a smart phone?

Can you print the map showing the Bench mark locations?

Where is the photo editing on the NGS web page?

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Are the data sets compatible with QGIS?

It appears that you have this as a map service (ArcGIS Online?) Do you plan to publish this for users?

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If one determines a position on a 3rd order BM with 4 hour of observation, will the solution upgrade the BM to a 2nd order? Especially if it also is tied into a 2nd order BM?

G. DSWorld / Malcolm Archer-Shee

What is DS World? Is it a program we need to download? Is it for Pro surveyors or for hobby GPS folks? Is it more than an image editing application?

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No difference, they are merely different paths to the same database.

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Comment: When submitting a recovery, it would really be nice to have a preview screen of what the recovery submission will look like prior to submitting. I would like this as one final check for any submission errors. Once the data is submitted, there is no way to correct simple errors.

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DSWorld has an option to update coordinates via OPUS-Share. How would this be handled on a mark with known horizontal coordinates?

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Where do I find the dialog box "Photograph Data"? What if you do not have Google Earth Pro?

A. General webinar questions

1. What is the web address for the recordings?
   a. find recordings at geodesy.noaa.gov/corbin/online_learning.shtml

2. Will the power point presentations be available for download?
   a. These will be posted in the NGS Presentation Library:
      http://www.ngs.noaa.gov/web/science_edu/presentations_library/

3. How many people were in the audience?
   a. 435; thanks for the great turnout!

4. How do we get proof of attendance for P.D.H.?
   a. A fillable PDF certificate has been sent via email to attendees.

B. General GPS on bench mark (BM) questions / all panelists

1. Is there an ideal or maximum distance between BM's with GPS?
   a. The "ideal" distance between GPS'ed bench marks is 30 km; areas with sparser ties suffer lower accuracy. Consider that each valid GPS on BM tie helps "knit" the two geopotential surfaces (NAVD88 and gravimetric) together.

Shorter distances are also welcomed, they provide a tighter knit, they help us identify and remove invalid ties, and so they are useful in areas where GPS heights (from NGS geoid models) are suspect or critical.

2. If a GPS on bench mark was used in Geoid 12A, would it be beneficial to re-observe and share it?
3. Would it be beneficial to observe a BM more than one time?
    a. Beneficial only if the new ellipsoid height is different, and better, than that used in 12/12A/12B models, e.g., in subsidence areas, or if the original GPS solution was old or invalid. However NGS is working on an Adopt a Bench Mark campaign for people that can provide extended observations annually or bi-annually in areas experiencing land motion. More information will be available soon.

4. Will there be any published official upgrades or new geoids between Geoid 12A and year 2020?
    a. Very soon, GEOID12B will be released, to correct a problem with 12/12A data in western Puerto Rico. In all other areas, 12B will be identical to GEOID12A.

       Longer term, we expect yes, we will release an update to GEOID12/12A/12B prior to the new vertical datum in 2022 using the data collected during this campaign. NGS has released updates in 1999, 2003, 2006, 2009, and 2012, but no new release date is targeted yet; it depends on resource availability and a determination of whether sufficient data have been collected to significantly improve the 2012/12A/12B models.

5. Are handheld coordinates actually useful for updating the database? I was under the impression that they wouldn't be.
    a. True, handheld GPS will not create a GPS on BM. Only a survey-grade GPS ellipsoid height will improve geoid models and surrounding GPS heights.

       However, YES, handheld coordinates (and photos, notes, etc.) will improve the mark descriptions and make them easier for surveyors to assess and recover.

6. Should volunteers concentrate on the recovery of marks not recovered in at least 30 years?
    a. Not necessarily. First priority is location, followed by mark quality and description quality, both of which degrade with age.
        i. LOCATION: marks farthest from existing GPSBMs are preferred.
        ii. QUALITY: we favor 1st- or 2nd-order BMs with good (A, B, C) stability, as these hold the most valid NAVD88 heights.

iii. DESCRIPTION: marks which don't have photos, handheld coordinates, or a recent recovery note will benefit most, and may be the hardest, and therefore most interesting, to find.

7. Does NGS review the BMs and elevations projects done by FEMA/ A lot of the work is sub 4th order?
   a. NGS reviews only those surveys which are bluebooked, and shared via NGS survey mark datasheets or are shared via OPUS. Bluebooking requires 2nd-order or better leveling, so 4th-order work would not be reviewed by us.

8. I have markers at the university at which I work. Can I set-up on one of those and send the data in? I do have datasheets for the markers.
   a. To use GPS to create a GPSBM, you need to start with a BM. So, YES, if your survey mark is published by NGS as ⬤ Vertical Control, and has an NGS datasheet with mm-accuracy ORTHO HEIGHT like this:
   `AB1234* `<u>`NAVD 88`</u>` ORTHO HEIGHT -     1.022 (meters)        3.35  (feet) ADJUSTED`

9. Is there any areas in southern New Hampshire you would like to see more observations?
   a. Use our [AGOL Web Map](#) to see areas of greatest need; look for BMs farthest from existing GPSBMs.

10. It looks like the network is slim in the NW of Washington state, what is the plan and time line for this geographic region?
    a. Contact your local [National Society of Professional Surveyors](#) chapter or your nearest [NGS geodetic advisor](#) to learn about projects being planned in your local area.

11. I've found USGS in NE OK and receive level line sheets from them in Rolla. Are their BM's available thru NGS as well? Many have not been found in many years.
    a. Some are, some are not. Please [look for the NGS datasheets](#) to see if they are published by us, these are the only BMs we use for GPS on BM ties.

C. General online tools questions (all panelists)

1. What is NGS "IDB"?
   a. NGSIDB is the *National Geodetic Survey "Integrated DataBase",* that provides datasheets for survey marks published in the National Spatial Reference System.

2. Can I search for control by Project ID?
   a. Not via the data explorer, currently, but YES, you can retrieve datasheets by Project at http://www.ngs.noaa.gov/cgi-bin/ds_proj.prl
   You can also use DSWorld's '*Plot>Marks>Published>By Project*'.

3. Will online tools work on a smart phone?
   a. Yes, they are not optimized for mobile devices, but they should work.

4. Can you print the map showing the Bench mark locations?
   a. You can capture print screens for most of the applications (e.g., copy, paste-and-crop in Paint). The ArcGIS Online Web Map does have a print option.

5. Where is the photo editing on the NGS web page?
   a. The photo editing is available in the downloadable program DSWorld's '*Edit>Photos*' menu. Photos are not yet accepted via the web mark recovery form. No editing is required for OPUS.

6. How do you go about submitting newly constructed bench marks to the network?
   a. To be included in NGS database, new mark leveling must be bluebooked, and submitted to NGS as a complete project. Begin at the project proposal web page: http://www.ngs.noaa.gov/CORS-Proxy/project_tracking/surveyproposal . GPS data may also be submitted this way, or shared via OPUS.

D. NGS Data Explorer/ Brian Ward

1. Do you want to set up under a high power transmission line?
   a. It isn't ideal, but power lines are acceptable if you have no better options in your area. We have sporadic reports of GPS signal loss beneath such wires, which lowers survey accuracy.

E. ArcGIS online / Brian Shaw

1. What is the benefit of using the ArcGISs map vs. the Data Explorer
   a. Our AGOL Web Map focuses on campaign-eligible bench marks only, but it provides more functionality: driving directions, measurement tools GPSBM priority symbols.

b. [The NGS Data Explorer](#) is refreshed monthly, displays more types of NGS control, and also offers the Streetview tool 🚶 that we demonstrated.

2. Is there a collector site I can connect to using the ArcGIS Online Collector app so that I can connect to your database with my smartphone when away from the internet connection?
    a. Good idea, but not at this time; we are hoping to work on this. Hopefully we can have that to populate another editable AGOL Feature Layer.

3. Is non-CONUS in that map package as well?
    a. Yes, I forgot to cover the bookmarks during the presentation. There is data for all US states and territories. There are distance and accuracy grids for CONUS, AK, Puerto Rico and the Virgin Islands, American Samoa, Guam and the Commonwealth of the Marianas.

4. In the map package, how can you tell which points are the ones (27,000) used for GEOID12A?
    a. I will update the map package once I have the GPS on BM used in 12/12A/12B.

5. On what platform does the 100mb package work?
    a. I exported it in windows using ArcGIS 10.2. I believe it should work with any installation of ArcGIS. If not please let me brian.shaw@noaa.gov know and I can work on fixing that.

6. Are the data sets compatible with QGIS?
    a. They are in an ArcGIS Map Package; I can email a zip of the shape files and rasters that should work with QGIS.

7. It appears that you have this as a map service (ArcGIS Online?) Do you plan to publish this for users?
    a. This was our [AGOL Web Map](#). We plan to publish the feature layers from ArcGIS Server, thanks to our sister office the Office of Coastal Survey (OCS) who is hosting these web services.

F. OPUS / Joe Evjen

1. Comment: FYI, the antenna Joe showed it TRM57971.00+NONE not TRM57971.00+SCIT. There's a typo on his slide.
   a. Good catch, but no typo. The last four characters of any antenna model name (NONE, SCIT, SNOW, etc.) refer to an optional radome covering. It is important to choose the correct antenna+radome combination, as the radome does impact the GPS measurements, but the underlying antenna and it's ARP/NRP will be identical for any radome. I would have shown the appropriate (TRM57971.00 **NONE**) image, but NGS didn't have one available.

2. What counts as "Survey Grade" GPS, for example does a Trimble ProXH receiver with a Juno count? I believe it is mapping grade, or is there a difference?
3. Would a Centimeter Edition Trimble 7X with the antenna on a tripod with a tribach qualify as Survey grade for Opus?
   a. if your receiver stores a dual-frequency static GPS data file, and OPUS can reformat and process it, it counts/qualifies. See also http://www.ngs.noaa.gov/OPUS/about.jsp#uploading

4. Does it have to be 4 hours of observation time?
   a. for now, yes. OPUS accuracy increases with duration, and 4 hours is the current minimum. This MAY decrease in future, if evidence supports it.

5. Do we need to wait for the precise ephemeris to be calculated before we submit to OPUS Share?
   a. No. It may be wise in extremely remote areas, such as Pacific atolls, but in any case, OPUS shared data are eventually reprocessed using precise ephemeris.

6. After you share our OPUS solution with NGS can you see others solutions for the point one measured?
   a. Adding new solutions is welcomed. For now, multiple solutions per mark are displayed as a stack, we plan to improve this in future to provide a single composite of all solutions.

7. Can you submit multiple observations to the share option using ZIP files
   a. That should not work, unfortunately, but we should try it! The description process is currently tied to upload, but you can access it later with the edit screen.

8. How do you sign up to be a "recovering agency"?
    a. for OPUS, you enter your agency info as you share your first solution.
    b. for DSWorld, you can use one of these agency codes as appropriate:
        i. LOCSUR - Local Surveyor
        ii. LOCENG - Local Engineer
        iii. GEOCAC - Geocaching
        iv. INDIV - Individual Contributor

        You can also check the contrib.dat file in your C:\NGS-Apps\DSWorld\ directory. If you are planning on bluebooking a GPS or Leveling project you can request an agency code using DSWorld. Click 'Request of New Agency' from the main menu.

    c. for mark recovery or bluebook, if your agency is not on latest contributors' list and you would like to be assigned a specific agency code, please contact Deb.Brown at noaa.gov to make the appropriate arrangements.

9. If GPS'ing new benchmarks, are there recommendations for the number of times a mark should be surveyed?   For instance 3 surveys of 4 hours and average the elevation? I assume you cannot trust one lone occupation.
    a. Just to clarify, "new" means new GPS on an existing BM? OPUS can add the GPS part, but doesn't create a BM in the traditional sense.
    One lone solution gives us the most benefit, though yes, these are historically considered NOCHECK. For the effort involved, we prefer one solution each on three different marks, instead of three-on-one. However, adding new solutions atop existing marks is also encouraged, as it enhances the accuracy and stability assessments.

10. When OPUS-Projects results are shareable will the results benefit the hybrid geoid model like normal OPUS-Shared solutions?
    a. Yes, they certainly should.

11. If one determines a position on a 3rd order BM with 4 hour of observation, will the solution upgrade the BM to a 2nd order? Especially if it also is tied into a 2nd order BM?
    a. No, GPS cannot improve leveling order; only another leveling survey of higher order can do that. GPS will improve the position, but not the NAVD88 order; it will improve heights for older horizontal marks which have only scaled heights.

G. DSWorld / Malcolm Archer-Shee

1. What is DS World? Is it a program we need to download? Is it for Pro surveyors or for hobby GPS folks? Is it more than an image editing application?
   a. DSWorld is a Windows PC application that interacts with the NGS database and Google Earth. It is designed for anyone who wants geodetic data, including Geocachers, Land Surveyors, Engineers and GIS professionals. It may be downloaded at http://www.ngs.noaa.gov/PC_PROD/PARTNERS/

2. What is the difference between submitting a recovery report on the NGS website and using DSWorld?
   a. No difference, they are merely different paths to the same database.
      i. The NGS mark recovery form is a quick way to upload condition and recovery text only
      ii. DSWorld requires downloading software, but allows you to add photos, stamping, disk type, setting, logo, more precise Lat/Lon, and GPS suitability.

3. Comment: The location field appears "greyed out" which usually indicates it is a read only field.
   a. The Lat/Lon boxes are greyed out only when the mark has an 'Adjusted' position. Otherwise the lat lon may be edited prior to submittal. In the case of most bench marks, a SCALED position will appear, accurate only to the nearest second. If you have a position determined by a inexpensive hand held device, you should enter the position to the nearest 0.1 seconds. If you have performed a traverse to the point or have a positions determined by GIS or Survey grade GPS receivers, you enter your position to the nearest 0.01 seconds. If the mark was previously positioned to the nearest 0.1 seconds, you can enter a better position if you have one.

4. Comment: When submitting a recovery, it would really be nice to have a preview screen of what the recovery submission will look like prior to submitting. I would like this as one final check for any submission errors. Once the data is submitted, there is no way to correct simple errors.
   a. Thanks for the suggestion. If you have made an error on the recovery report you sent through DSWorld, you can send me an email indicating the date and time sent and what the recovery report should indicate. Please send the email to: Malcolm.Archer-Shee@noaa.gov

5. Comment: the DSWorld Help file is actually helpful (not always the case).
   a. Thanks! Suggestions on improvements to DSWorld and its help file are strongly encouraged. Send an email to Malcolm.Archer-Shee@noaa.gov

6. DSWorld has an option to update coordinates via OPUS-Share. How would this be handled on a mark with known horizontal coordinates?
   a. The '*Upload>OPUSDB Data*' menu item takes one to the OPUS web page. Sharing data on a mark with published GPS coordinates won't immediately change the official datasheet, but the solution is shared for other uses.

7. If the Latitude and Longitude are populated in DSWorld, when the user enters the PID… and the record is scaled, but we now know a real GPS location, can we overwrite the location?
   a. Yes. Enter the position to the nearest 0.1 seconds for inexpensive GPS receivers and 0.01 seconds for survey or GIS grade GPS receivers.

8. Is DSWorld stripping out the EXIF geo Location data from the images?
   a. Not all images contain EXIF information. In addition, some older image editors destroy EXIF information when an image is edited. The date is available with the current version of DSWorld, and the position, date, and direction of a photo will be available with a future version of DSWorld.

9. Where do I find the dialog box "Photograph Data"? What if you do not have Google Earth Pro?
   a. Data for a mark is displayed as part of the photo editing process in DSWorld. Click '*Edit>Photos*' from the main menu.

   You do not need Google Earth Pro for this tool, but just in case you had not heard, Google Earth Pro is now free and can be downloaded from Google.