

**Responses to questions from July 25, 2019 webinar  
Blueprint for 2022, Part III: Working in the Modernized NSRS**



NOAA's National Geodetic Survey  
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Thank you to everyone who attended our webinar this summer. While we extended the length of the webinar to two hours in hope of addressing all questions from the audience during the event itself, some questions were still skipped or unaddressed due to the time constraint.

The questions and responses below are generally listed in the order that they were received, not by topic. More information on these topics can be found at <https://geodesy.noaa.gov>. We recommend you review our New Datums website, the recorded webinar, or within the Blueprint for 2022, Part III publication itself.

**1. Can I get some suggestions on what metadata to document a project?**

Each project owner has their own requirements for metadata. But if that data is going to be submitted to NGS for inclusion in the NSRS database, then metadata should include the following information with regard to geodetic control marks:

- Photographs
- Antenna heights and types used for each GNSS occupation

**2. What is the best method to conduct long-term monitoring projects for change-detection? We're interested in measuring erosion/deposition using GNSS at monthly and yearly time scales. Should we pick a single reference epoch for the entire project and always use the new NGS tool to transform all coordinates to that ref. Epoch?**

Change detection should be done in Final Discrete coordinates. Reducing to Reference Epochs will actual mask/hide change.

- 3. Can you give an example of GPS month for example if I occupy a point on July 25, 2019?**

NGS will provide a GPS month calculator to perform these calculations.

- 4. I mean how do we get the application for smartphone, I think the app. is for coordinate report...from power point page 42?**

[beta.ngs.noaa.gov/cgi-bin/recvy\\_entry\\_www.prl](https://beta.ngs.noaa.gov/cgi-bin/recvy_entry_www.prl)

- 5. You have an old survey done in 2018 (old State Plane, NAD83); you have a new survey done in 2025 (new system). What is the method used to compare coordinates?**

Transform the NAD 83(2011) epoch 2010.00 coordinates into NATRF2022 epoch 2020.00. Use NCAT and/or VDatum for this.

- 6. How will the 2022 datums align with the Canadian systems? Does NATRF2022 and NAPGD2022 match what the Canadian Geodetic Agency has decided to use? Will the new tools support converting between those?**

The Canadian government will continue to use their own version of NAD 83 and CGVD2013 until/unless they choose to change to the new system. Because NGS coordinates all decisions closely with our Canadian colleagues, if Canada \*does\* choose to change, they have existing buy-in to choose the new system of NATRF2022/NAPGD2022.

- 7. How the geopotential model be determined?**

The global geopotential model of 2022 (GM2022) will be created through an agreement between the National Geospatial Intelligence Agency (NGA) and NGS, as an expansion of the upcoming EGM2020 model, with the addition of the final two years of GRAV-D data.

- 8. Will there be a transition period of months/years, or a "cold turkey change on some determined date to the 2022 Datum coordinates with no more NAD83, NAVD88 coordinates published?**

There will be a transition period of currently indeterminate length.

**9. Will OPUS continue to also report ITRF coordinates in addition to NATRF2022 coordinates?**

OPUS will *\*always\** show ITRF first.

**10. What will happen to CORS coordinates with the Fixed Plate when a big earthquake happen?**

NGS is investigating new ways to process NOAA CORS Network (NCN) data on a daily basis for both persistent disagreement (between daily solutions and Final Running coordinates) and catastrophic events (immediate changes, like earthquakes). If we succeed, the new system will pull the CORSs which moved by some threshold amount out of OPUS, get new coordinate functions estimated quickly and get them back into OPUS within days.

**11. Will all the OPUS Shared Solutions be updated in 2022?**

Yes

**12. What is the name of the app for coordinate report? How do we get that?**

If you mean the “data delivery system,” it is not yet available.

**13. Could you please list the necessary metadata that should go on a survey project, such as Datum, Epoch, Time, Velocity, etc., which would feed NGS conversion apps?**

OPUS will determine many of these things from your RINEX files. You will need to provide photos of marks, antenna heights and antenna types for GNSS occupations.

**14. How will leveling be used with GNSS?**

See [Blueprint for 2002 Part 3, Working in a Modernized NSRS](#). Submitted leveling projects will need GNSS occupations on marks at 30 km spacing at the beginning, ending and (if project is > 6 months) in the middle of the leveling project.

**15. What are your thoughts about who would transition to the new datum, and when?**

Would? Hard to say. There are plenty of people using the 1920’s datums almost a century out of date by now. If they couldn’t/didn’t move to the 1980’s datums, it is hard to imagine what would motivate them to move to the 2022 system.

Should? Everyone.

When? As soon as resources allow you to do so.

**16. Additionally, who would use the ""dynamic"" epochs vs. reference epochs?**

That is a personal choice. If you are in the “change detection” business, then you will use Final Discrete coordinates. Reference Epochs will be used by those who need to express all of their coordinates at a single epoch, especially if their project spans many years (think, for example, of geodetic control for a highway construction project).

**17. Do you have a list of any organizations you know will immediately switch over (I'm thinking government would)? Any ideas about what their transition plan is?"**

Every agency is working toward transitioning at their own speed. USGS, FEMA, FAA and USACE all have begun to set up their own plans. It is impossible to know who will succeed and on what schedules.

**18. Is there going to be training for the new OPUS which uses GNSS, Leveling, Classic and Gravity?**

Probably. Decisions are always made based on the availability of resources.

**19. Will NSRS 5 yr. epoch coordinate values be available to download into survey software digitally for least squares adjustments**

NGS will make the information freely available.

**20. For a government body, like a state DOT, do they have to transform all the old survey data and coordinates (e.g. roads, bridges, etc.)? If yes, what is the best practice to do that?**

It would be best to do so as need and money allow. Best tool is NCAT or VDatum, but likely industry partners will incorporate the NCAT and VDatum engine and be able to transform larger datasets than the NGS website can support.

**21. How often will the coordinates in the NATRF2022 be updated? What is the recommendation for large survey projects that span the course of a year or more in regards to putting coordinates or Latitude/Longitude on plats?**

In the future, coordinates will be epoch-specific quantities, and thus are never “updated” unless a blunder occurred. \*New\* coordinates at \*new\* epochs may be published. This isn’t an “update” to the previous coordinate at the previous epoch.

New Final Discrete coordinates will only be created if a new survey is performed and the data turned in to NGS.

New Reference Epoch coordinates will be produced by NGS every 5 years from a combination of Final Discrete coordinates, IFVM2022 and the GeMS. For marks without new Final Discrete coordinates however, NGS anticipates that Reference Epoch coordinates on such marks will deteriorate in quality at each new 5 year reference epoch.

As for how to use latitude/longitude, the choice depends on the application.

**22. Is NGS creating a tool to transform an NAD83 coordinate to a coordinate in the new reference frame?"**

Yes. NCAT and VDatum will be expanded to support this.

**23. So, how does my Dumpy Level, my K & E Paragon Vernier open-faced transit, and my 100-foot Lufkin "hi-Way" heavy gauge steel drag tape fit in with all of this?**

Without GNSS, they don’t. With GNSS, they can be used in OPUS when it expands to work with leveling and classical surveying.

**24. Are the 15 minute target occupations going to work in coastal areas where the reference stations will not surround the mark?**

We won’t know until we build this. By definition, a target is something to shoot for, not a known quantity. The target of 15 minutes does not currently come with caveats like “except at the coast”.

**25. If I collect my data using RTK, will I need to re-project my previous data? I presume some of this information will be included or passed on to ESRI?**

This question is unclear. However NGS is working closely with ESRI on all aspects of modernization.

**26. OPUS Static in the Caribbean has large East coordinate residual when compare to TrimbleRTX online why?**

There are too many possible answers to this question. User error? Trimble error? Datum differences? Epoch differences?

**27. A new ellipsoid better than GRS-80 and WGS84 ellipsoids will be created?**

No. The modernized NSRS will use GRS-80.

**28. The Caribbean has not been modeled well with the EGM2008 geoid with  $\pm 0.5$  vertical differences against orthometric elevations, so how this will be solved?**

In Puerto Rico and U.S. Virgin Islands, GRAV-D will assist in generating a more accurate geoid. For the rest of the Caribbean, NGS is investigating future airborne gravity missions which could improve the geoid. But this won't be done before 2022.

**29. Will these changes matter for localized survey projects?**

NGS has no products or services which support so-called "localization". As such, it is difficult to know what localization software will do to the coordinates NGS provides to you in the modernized NSRS.

**30. Will old calibration type files have to be re-done for projects with a life that span thru the datum changeover?**

It is unclear what a "calibration type file" is. If this is another word for "localization", see above.