

Cooperative Charting Program
Geodetic Charting for D21
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Revisions:
Oct 31, 2018
Mar 30, 2019
Mar 7, 2020

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Overview

Geodetic marks are reference points established on the surface of the earth by state, local, and federal agencies. The geographic location of these reference points has been established with extreme accuracy, frequently to a fraction of an inch or so.

Geodetic marks are used as starting points for land surveying, map making, construction engineering, environmental measurements and geological studies.

Maintenance and preservation of these marks is important to all of the above users.

Our job is to locate the marks that are included in the National Geodetic Survey (NGS) database and report their condition together with any change in the directions needed to locate them.

All the requirements of the program are set out in the Geodetic SOP found on the Coop Charting website. However, this document covers in a more concise manner the procedures that are relevant to our District given the size of the District and the interests of the majority or our members. All the information is in the SOP for those wishing to go above and beyond our usual charting activities... and all are encouraged to go beyond these basics; we just don't want to discourage the beginners, minimalists, and less physically capable.

Preparing for the search

Look up the marks you want to search for using NGS's website, and make copies of the datasheets applicable to the marks you have chosen to search out. You will be taking a copy of each mark's data sheet to the field with you thus assisting you in locating the mark. The NGS website for locating marks and downloading their datasheets is www.ngs.noaa.gov/NGSDataExplorer/

There is also a private company website that is somewhat similar and for many is more user-friendly. It is found at <http://benchmarks.scaredycatfilms.com/index.php>

A cell phone app can also be used to single out marks for your search. *BenchMap* for Android phones is the most popular. If you can print from your cell phone, it's great. Otherwise it's only good for quick

reference (for instance when travelling). A paper copy is still best for taking notes on and keeping your phone available for other things.

Each mark has a Point ID of two letters followed by four numbers. If working from a computer, the data sheet should be printed out to take to the field. Before going to the field, sketch the location of each mark on its data sheet to save having to interpret the “how to find” instructions of the data sheet. A few minutes of studying the data sheet before leaving, will save lots of time in the field. You can even use blank space on the data sheet for recording the results of your search for the reports later. Then the data sheet and a photo will be the only paperwork you need for filling out the USPS report after the search.

Doing the Fieldwork

With a clipboard of datasheets in hand, head out and follow the instructions in the most recent station recovery notes to find the mark. A 100 ft tape measure is a necessity. You may have to dig for buried marks or clear brush or you may be fighting city traffic around public buildings or spending time on the phone getting permission to enter private land. The variety of locations is what makes the search fun.

With Google maps and apps such as *Benchmark*, you can sometimes walk right up to lost marks if they are in the category of Horizontal marks having an accurate Lat/Lon listed on the datasheet. If the location was only scaled for the data sheet, the handheld GPS may indicate locations inaccurate up to 300 feet.

Upon finding the mark, the condition of the mark should then be noted using the following definition:

G = GOOD...disk is in good condition, easily read, with no signs of having been moved ('disturbed'). Disk shows little or no mechanical damage and no serious erosion or corrosion damage.

P = POOR...disk shows evidence of having been disturbed or moved as determined from measurements or environment, or is severely damaged mechanically, scuffed, eroded or corroded.

N = NOT FOUND...disk is not found. If remnants of the station are found but the disk cannot be located, the station is classified as 'NOT FOUND' for NGS purposes. You can get by without finding remnants of the concrete mount if you have sufficient evidence that the mark is not there. You will have to definitively explain in the station recovery notes why you didn't find it... easier to just not report it! Maybe the next person will find it.

X = DESTROYED...disk is found and is physically removed from the concrete mounting. Disk should be returned to NGS. This situation is seldom encountered. The destroyed marks are removed from the database.

A “proof of find” digital photo should be taken from about 10 to 15 inches directly above the mark clearly showing the disk or rod cover. Take a couple of photos and pick the best one when back at home. If it is a disk or flip-lid cover, the stamped designator should be readable as much as possible. This photo file should be large enough to give a sharp image (at least 300 Kb) but not so large that it takes a long time to open (keep it less than 2 Mb). If you are not familiar with the settings for this, don't let it stop you from submitting – the reviewer will be able to deal with it! The photo must have the Latitude and Longitude and date imprinted on it. This will give the reviewer almost everything he needs to verify the find and report to NGS for the database update.

The easiest way to imprint this information is using a cell phone camera with an app that performs this function. The most popular are *Solocator* and *Camera Timestamp*. Adjust the settings on these apps to apply the Lat/Lon in Degrees– Minutes – Seconds. A handheld GPS or cell phone is accurate to a tenth of a second. Later, at home, transfer these photos to your computer for attaching (uploading) to the

report. Don't leave until you have a good photo - everything is present on this photo – the stamped designation, the date, and the lat/lon. The only other information needed for the report is the PID and the condition of the mark.



Typical photo using *Solocator* app



Typical photo with *Camera Timestamp* app

Reporting the Results

Once back home and on the computer, open the submittal form and fill out the information online. The report form can be found at <https://form.jotform.com/83633979028166>. Do not report anything to NGS yourself as USPS input. The information requested is straightforward. Including the Principle Observer (the submitter), others helping can be listed to earn credits for the marks reported on one form. Also, up to five marks can be included in one report. Be careful to enter the "Date of Recovery" as the actual date the mark was recovered or searched for... not the date of the report. All the marks on one report need to have been searched for in the same day. A new report is needed for other days.

List the condition of each mark, G, P, NF, or X (see above explanation). If the mark is not found, either don't report it if unsure, or write a description of why the mark cannot be found in which case you will get two credits but the reasons listed have to be sound and definitive.

Your "proof of find" digital photo will have to be uploaded to the report. It will prove that you actually found the mark on the date you have stated! If it is a disk or a flip-lid cover, the stamped designator should be readable. Use your phone's charging/download cable to transfer the photos to your computer for attaching to the report. The phone acts just like a jump drive plugged into the computer. Put them where you can find them on your computer. The digital photo file may be extremely large

since cell phone manufacturers like to impress. If you know how to reduce it's file size once on the computer, do so. Again it should be less than about 2 Mb.

Having the photo on your computer will also allow you to rename the file name from the camera's naming to the PID of the mark (example: AB1234.jpg).

If you would like to have a photo included in the NGS datasheet, use the elaborate naming convention below. The USPS close-up will not help the next searcher find the mark because it only shows the mark and not the surroundings. It would be a great help to future searchers if you took a photo from the road or from the direction you would probably approach the mark. If you choose to do this, use the naming convention below. Remember, this is just optional... don't let this extra work stop you from participating in the fun.

The format for file names is PID- DESIGNATION- TYPE- DATE.jpg

- **PID** is the NGS ID for the mark, e.g., AB1234. For new marks without PIDs, leave this blank and begin the file name with the designation.
- **DESIGNATION** is the official name for the mark, up to 25 characters.
- **TYPE** Use -1- for close-up, -2- for eye-level, and -3DIR- for horizontal photos, with DIR indicating the direction the photo is facing, e.g., 3ENE for east-northeastward-looking. NOTE: a direction is required for horizontal photos due to the current configuration of the NGSIDB
- **DATE** is the date photographed, in YYYYMMDD format.
- Use dashes "-" to separate the above fields. Spaces are not permitted in the file name. Use an underscore "_" in lieu of spaces within fields. These separators are required to minimize UNIX file handling problems.

You may include other photos that meet **TYPE** requirements but not more than one in each direction. There is a link on each datasheet that takes the user to the photos once NGS has added them. The lat/lon and date must be removed from the image with a photo editing software... or simply take another photo without using the GPS and time information app.

The use of the EXIF file for date and lat/lon in place of the actual imprinting (by phone app) on the image itself may suffice for the "proof of find" for the reviewer. This file is accessed by right clicking the image (after downloaded to the PC) and opening the "Properties" box. This requires a little more expertise and faith that your camera actually inserted the info since you can't view it on the camera in the field. This is a poor substitute for having the Date/Time actually printed on the photo.

In the "Recovery Notes" box you should add instructions to find the mark if anything in the existing NGS "Station Recovery Notes" has changed. This is not a place to write comments to the reviewer! Your notes will be included on the datasheet for all to see... make it short, accurate and carefully thought out.

After the last mark is included on the report, go to the end of the form and click on "Submit". The report number will appear and you can print a copy for your own records. A paper saving way of filing away your reports on a PC is to print to an .xps file. This MicroSoft .xps file will then be saved (you tell it where) and the file will appear the same as if the completed report were printed on paper. You can then print the .xps file in the future if you need it.

A USPS reviewer will check your report and either return it for corrections, or send it on to NGS for publication in the database, in which case you will be awarded credits in the USPS devised system of credit tracking. If returned to you for corrections, the email will be sent to the principle observer at the email address you provided at the beginning of the form. If it is accepted, the e-mail will inform you and also let you know how many credits were earned.

The reviewer sends the pertinent information to the NGS. A few weeks after your report has been approved, you can look once again at the datasheet online and see the information you submitted... congratulations.

Earning Credits

As with the Nautical Charting program, credits are given by the USPS National CoCh Committee to provide a “friendly” competition between individuals, squadrons and districts. Credits are determined solely from the online report made to USPS by the member. They are calculated according to the following list:

Landmarks (tower, cupola, antenna, steeple, etc.) if found intact - 0

Landmarks if missing (must include photo of area and adequate description of it’s demise) - 10

Mark "not found" when previously found (must include reason not found) – 2

Mark destroyed (must include photo of separated disk or concrete mount devoid of disk and circumstances of it’s demise) - 10

Geodetic Mark found good or poor - 10

Bonus for Mark found and not recovered in the past 5 years. – 4

Bonus for Mark found and not recovered in the past 25 years - 25

Bonus for Mark recovered when previously noted "not found" - 25 credits

A mark reported on by a USPS member cannot be reported on again for 2 years unless proven to have been destroyed or found after previously reported “not found”. Marks last recovered by other entities can be reported on after just one year. A mark may never be reported as “Not Found” again if the previous data sheet recovery was “Not Found” or “Destroyed”. Reports must be submitted within 30 days of the recovery date with the exception of marks recovered in the last half of December when the deadline is January 15th.

The totals for the calendar year are used for ranking individuals, squadrons and districts. Results are then made available soon after January 15 when all reports are in for the year and have been reviewed. Interim totals are usually posted on the website every few months. Remember, the program runs through the calendar year.

Awards

Honor roll for individuals, as in the Nautical program, is awarded for those in the top 20% regardless of any other factors. Honor roll status is achieved by squadrons and districts when the credits total more than a predetermined value which levels the playing field for various squadrons and districts. This value takes into account the latitude of your squadron or district (to offset winter months) and takes into account the membership numbers of squadron and districts (to offset a large contribution of a single individual).

The Honor Roll certificates will be distributed at the National Convention in the spring following the calendar year’s report submissions.