25 S. 34th St.
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How to Verify your GNSS Receiver's Accuracy

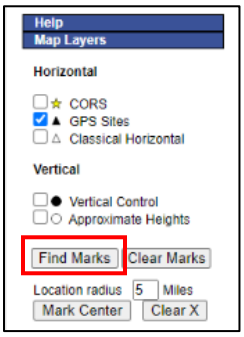
This workflow will provide an alternative method to section 8.3.2 (Base Station Self Check) and will verify the accuracy of both the receiver and the base station providing RTK corrections.

Step 1. Go to https://www.ngs.noaa.gov/

Step 2. Select **NGS Data Explorer.** This will open a map of NGS monuments throughout the US.

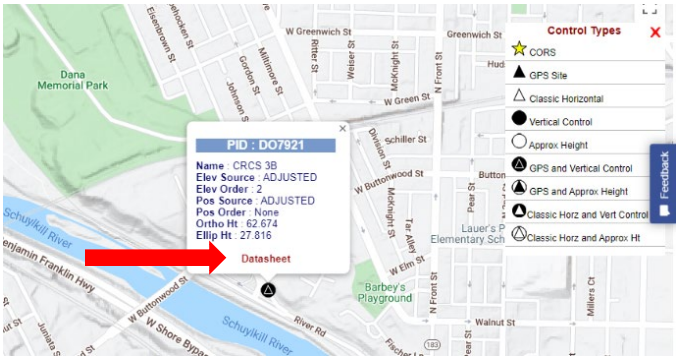
Step 3. On the left-hand side, enter your **City/Zip** code. Then select **GO**.

Step 4. De-select all horizontal and vertical layers except for **GPS Sites**. Then select **Find Marks.**

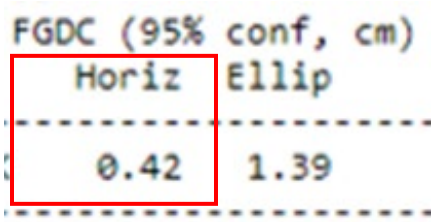


Step 5. Locate a **GPS Site** or a **GPS and Vertical Control** site. ▲ 

Step 6. Once you have found a site, select and click **Datasheet**.



Step 7. Look for the following to verify the accuracy of the NGS monument



If the horizontal value is less than 1, you know, with 95% confidence, that the monument's coordinates are less than 1cm in accuracy.

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The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.5.14
Starting Datasheet Retrieval...
1        National Geodetic Survey,   Retrieval Date = MAY 16, 2022
 DO7921 ***********************************************************************
 DO7921  DESIGNATION -  CRCS 3B
 DO7921  PID         -  DO7921
 DO7921  STATE/COUNTY-  PA/BERKS
 DO7921  COUNTRY     -  US
 DO7921  USGS QUAD   -  READING (2019)
 DO7921
 DO7921                        *CURRENT SURVEY CONTROL
 DO7921  ______________________________________________________________________
 DO7921* NAD 83(2011) POSITION- 40 20 20.61805(N) 075 56 24.57130(W)   ADJUSTED
 DO7921* NAD 83(2011) ELLIP HT-    27.816 (meters)        (06/04/13)   ADJUSTED
 DO7921* NAD 83(2011) EPOCH    -  2010.00
 DO7921* NAVD 88 ORTHO HEIGHT -    62.674 (meters)      205.62  (feet) ADJUSTED
 DO7921  ______________________________________________________________________
 DO7921  GEOID HEIGHT    -        -34.863 (meters)                    GEOID18
 DO7921  NAD 83(2011) X  -  1,182,716.154 (meters)                    COMP
 DO7921  NAD 83(2011) Y  - -4,722,597.307 (meters)                    COMP
 DO7921  NAD 83(2011) Z  -  4,106,772.283 (meters)                    COMP
 DO7921  LAPLACE CORR    -          0.50  (seconds)                   DEFLEC18
 DO7921  DYNAMIC HEIGHT  -         62.642 (meters)      205.52  (feet) COMP
 DO7921  MODELED GRAVITY -    980,114.0   (mgal)                      NAVD 88
 DO7921
 DO7921  VERT ORDER      -  SECOND    CLASS I
 DO7921
 DO7921  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 DO7921  Standards:
 DO7921         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 DO7921            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 DO7921  ------------------------------------------------------------------
 DO7921  NETWORK    0.42   1.39          0.18   0.16   0.71      0.02535326
 DO7921  ------------------------------------------------------------------
 DO7921  Click here for local accuracies and other accuracy information.
 DO7921
 DO7921
DO7921.The horizontal coordinates were established by GPS observations
DO7921.and adjusted by the WOOLPERT CONSULTANTS in June 2013.
DO7921
DO7921.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
DO7921.been affixed to the stable North American tectonic plate. See
DO7921.NA2011 for more information.
DO7921
DO7921.The horizontal coordinates are valid at the epoch date displayed above
DO7921.which is a decimal equivalence of Year/Month/Day.
DO7921
```

Step 8. Once a nearby monument with known high accuracy coordinates has been identified, go to that location with your Arrow Gold receiver.

Step 9. Open the Eos Tools Pro app and take a screenshot of the **Position** tab (from the **Status** page). You will need to reference the longitude and latitude values. When taking a screenshot of the position tab, make sure that your range pole is level.

Step 10. Go to the following link which will compute the distance between your two coordinates: https://geodesy.noaa.gov/cgi-bin/Inv_Fwd/inverse2.prl

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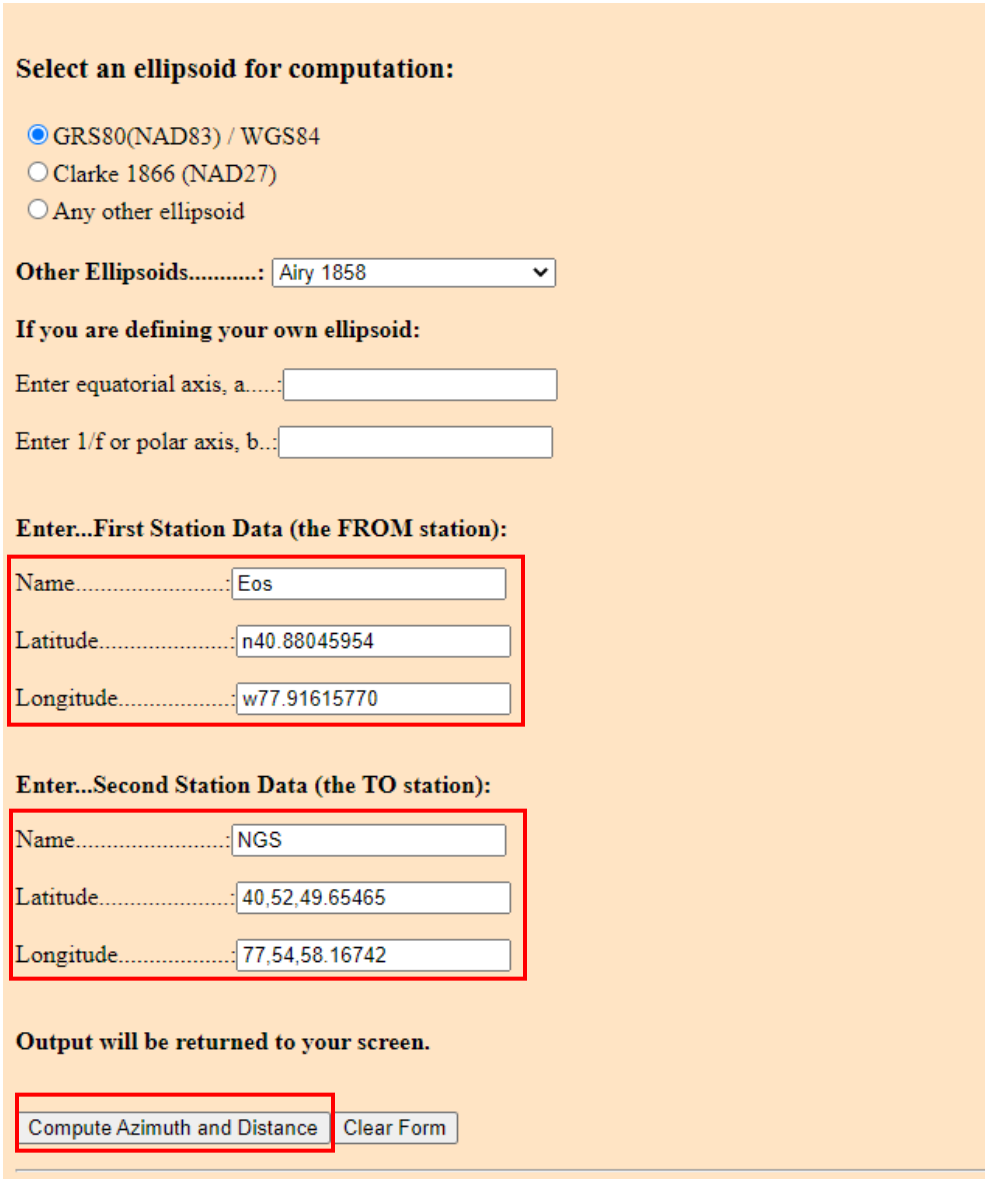
a. Enter your Eos coordinates in the **First Station Data**. For Latitude, you will need to enter an **n** followed by the latitude value from your screenshot taken in Eos Tools Pro. For Longitude, you will need to enter a **w** followed by the longitude value from your screenshot taken in Eos Tools Pro.
b. Enter the NGS coordinates from the data sheet for the mountpoint in the **Second Station Data.** Enter the DMS for the latitude and longitude. Separate the DMS values with a comma and do not enter a space after each.
c. Click **Compute Azimuth and Distance** once complete.



Step 11. You are now presented with an **Output from Inverse** calculation. Look for the **Ellipsoidal distance (S)** value. If this value is less than .03 meters (3 centimeters), then the accuracy of the receiver is correct. The ellipsoidal distance is the straight-line distance from one point to another.

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Output from INVERSE

```
Ellipsoid : GRS80 / WGS84  (NAD83)
Equatorial axis,     a   =    6378137.0000
Polar axis,          b   =    6356752.3141
Inverse flattening, 1/f  =  298.25722210088

First  Station : Eos
 ----------------
  LAT =  40 52 49.65434 North
  LON =  77 54 58.16772 West

Second Station : NGS
 ----------------
  LAT =  40 52 49.65465 North
  LON =  77 54 58.16742 West

Forward azimuth         FAZ =  36 39 11.1232 From North
Back azimuth            BAZ = 216 39 11.1233 From North
Ellipsoidal distance      S =         0.0118 m
```

NGS HOME PAGE