VIRTUAL RINEX & LOCALIZATION

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FRUSTRATED WITH LONG GNSS OBSERVATIONS?

Besides myself, who else is frustrated by long observation times to establish primary control?

Virtual Rinex may be your solution.

Lets look at a sample scenario.

You have a client that is intending to develop a large tract of land in Southeast Orange County.

You will be working as the primary Surveyor from the beginning of the project until completion of construction.

The site is comprised mostly of cow pastures and is an ideal candidate for GNSS RTK observations.

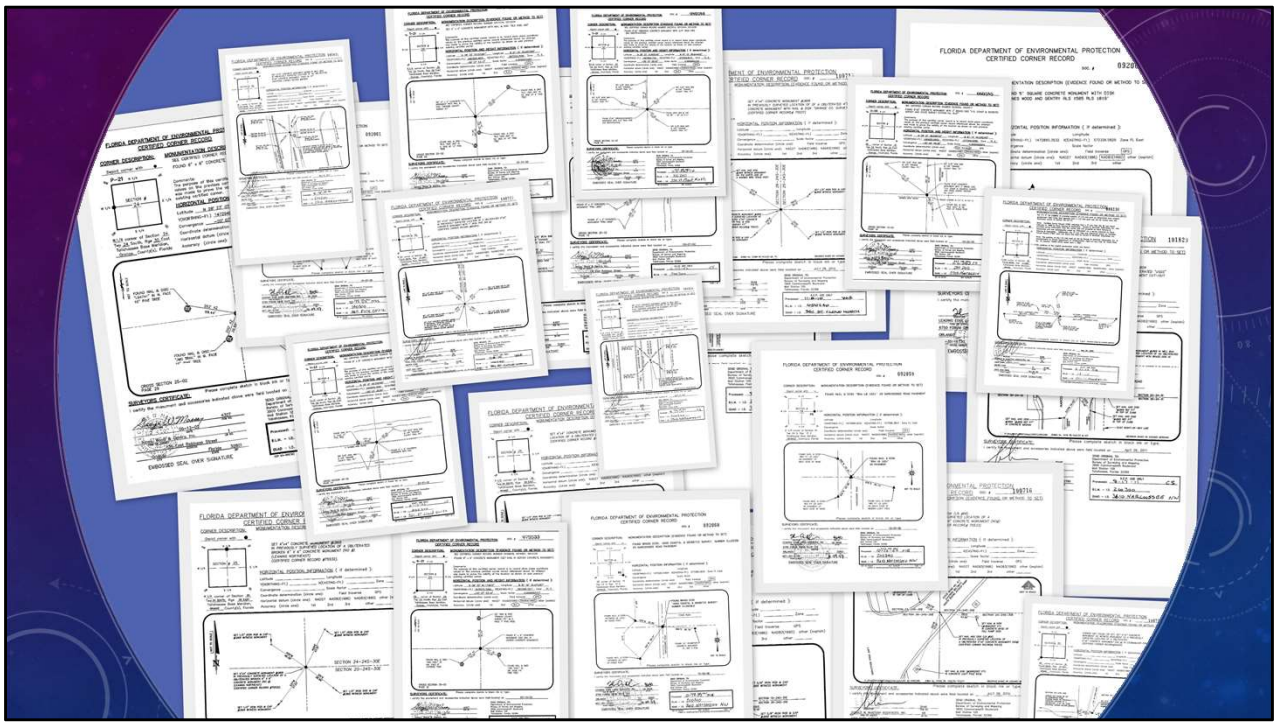
You research the project area for NGS control, Certified Corner Records, FPRN base stations, platting, Right-of-Way map, etc.

During the course of your planning you determine that the closest FPRN station is 14km away from the site.

With a 14 km baseline you determine that your static observation times should be 2 hours per occupation and with a set of redundant measurements, total observation time would be 4 hours per point.

In order to cut cost , you decide to use Virtual Rinex to establish the primary control and VRS-RTK to perform the boundary survey.

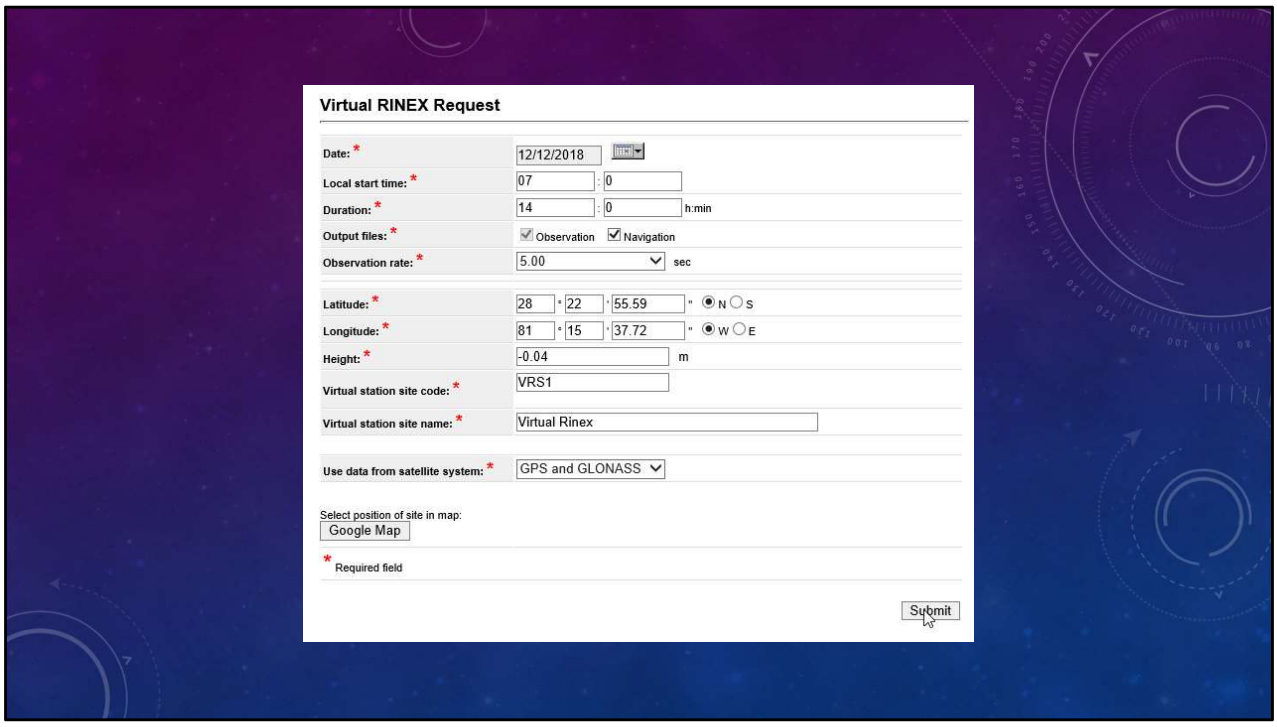
You go on to recover the NGS control and the section corners.


FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
CERTIFIED CORNER RECORD

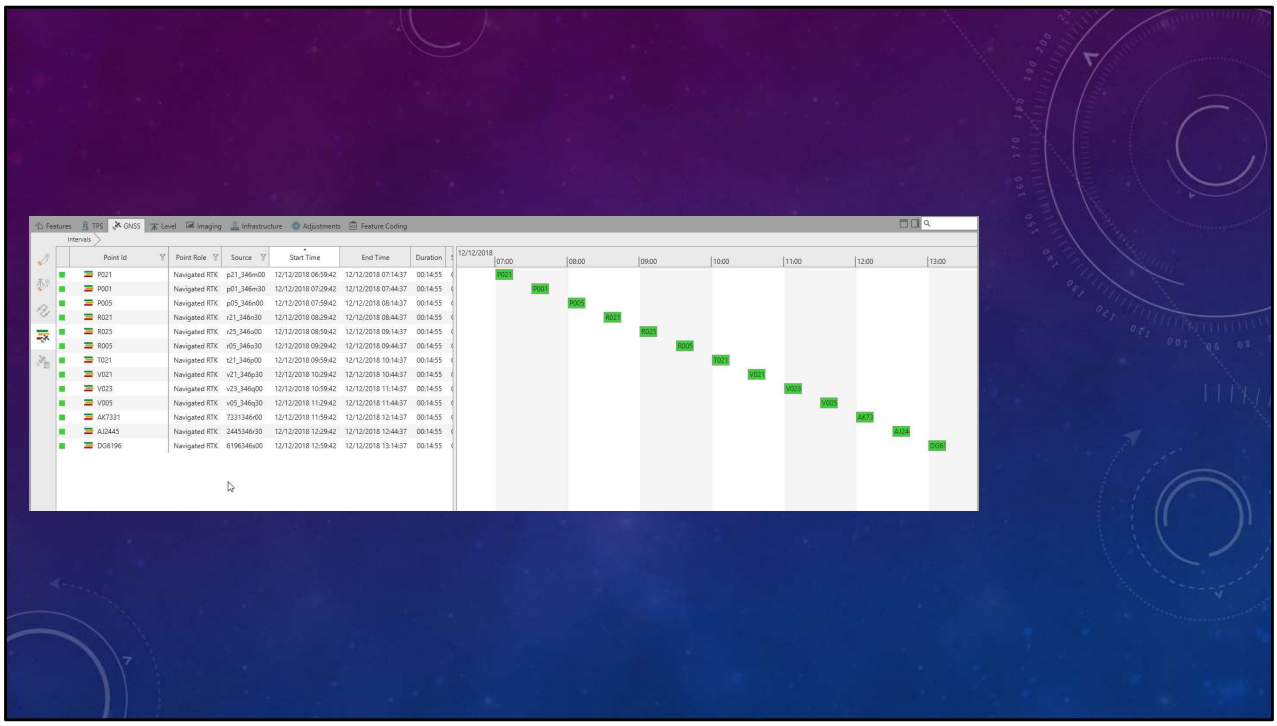

AJ2445
AK7331
75534
92062
92059
75533
75535
92060
75537
80584
23516
75538
75536
07211
DG6196
80585

You send field crews out to obtain 2 sets (separated by at least two hours) of 15 minute, 5 second epoch observations on each recovered point.

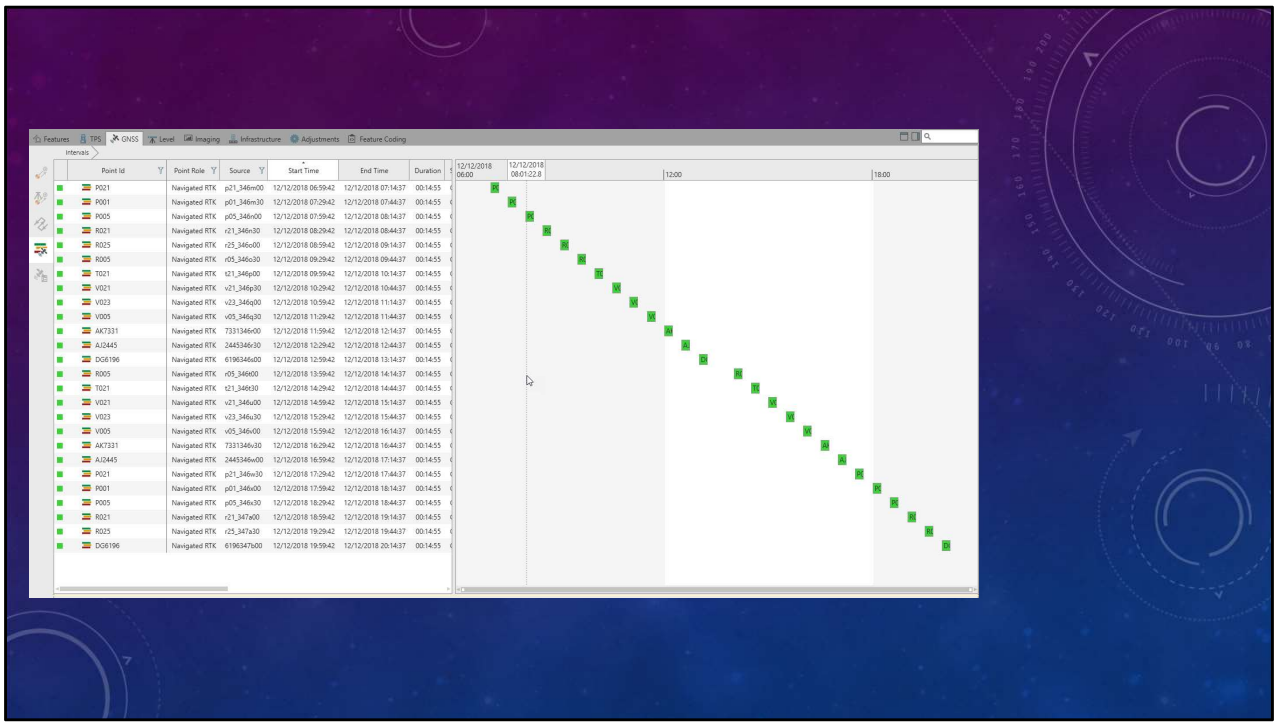
After the Field crews return all the data, you pick a location to act as your Virtual Reference Station.

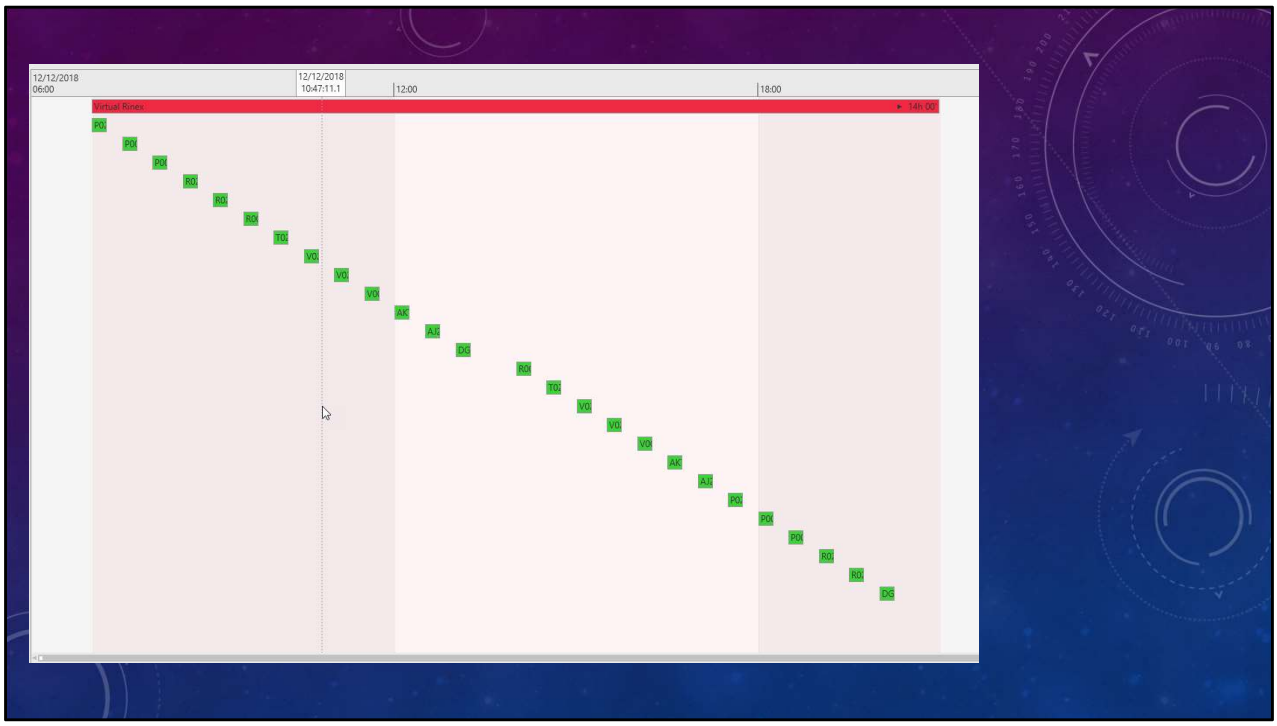


You log onto the FPRN webpage and request a Virtual Rinex file, that covers the entire field time, for the station.



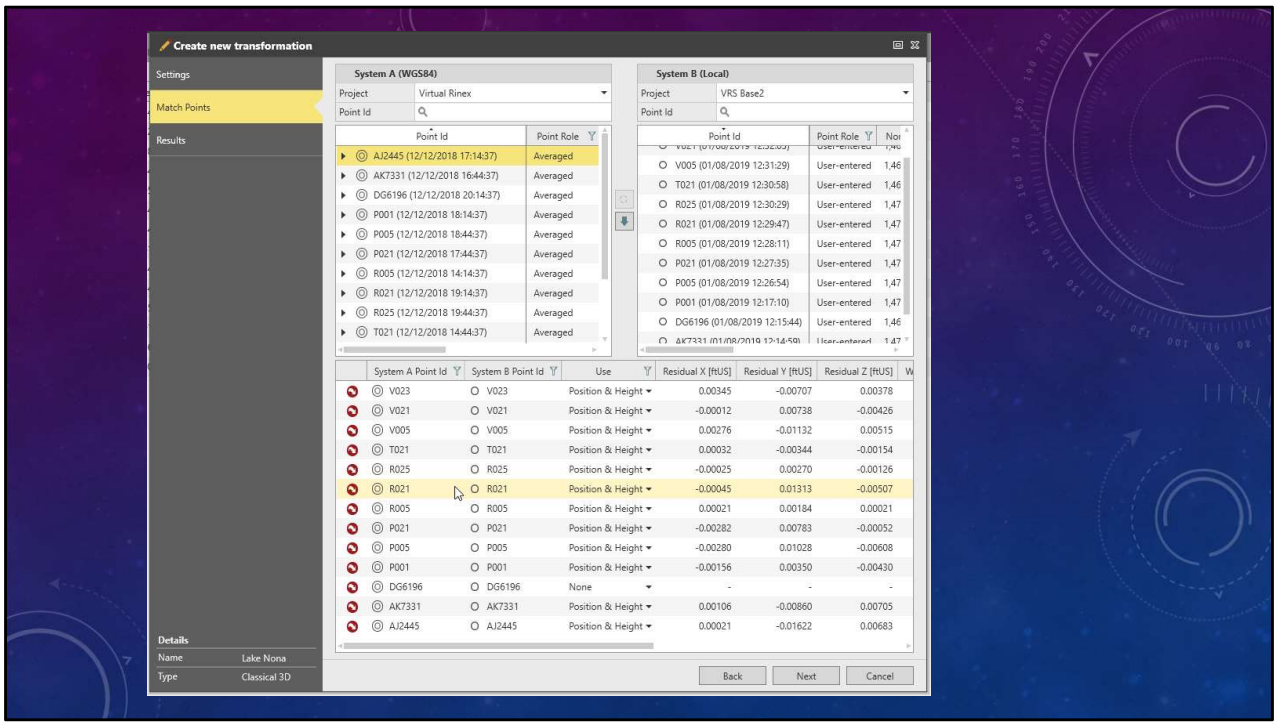
After receiving the VR file you proceed to import the field and refence data into your post processing software.


Features
TPS
GNSS
Level
Imaging
Infrastructure
Adjustments
Feature Coding
Intervals
Point Id
Point Role
Source
Start Time
End Time
Duration
12/12/2018 06:00
12/12/2018 08:01:22.8
12:00
18:00



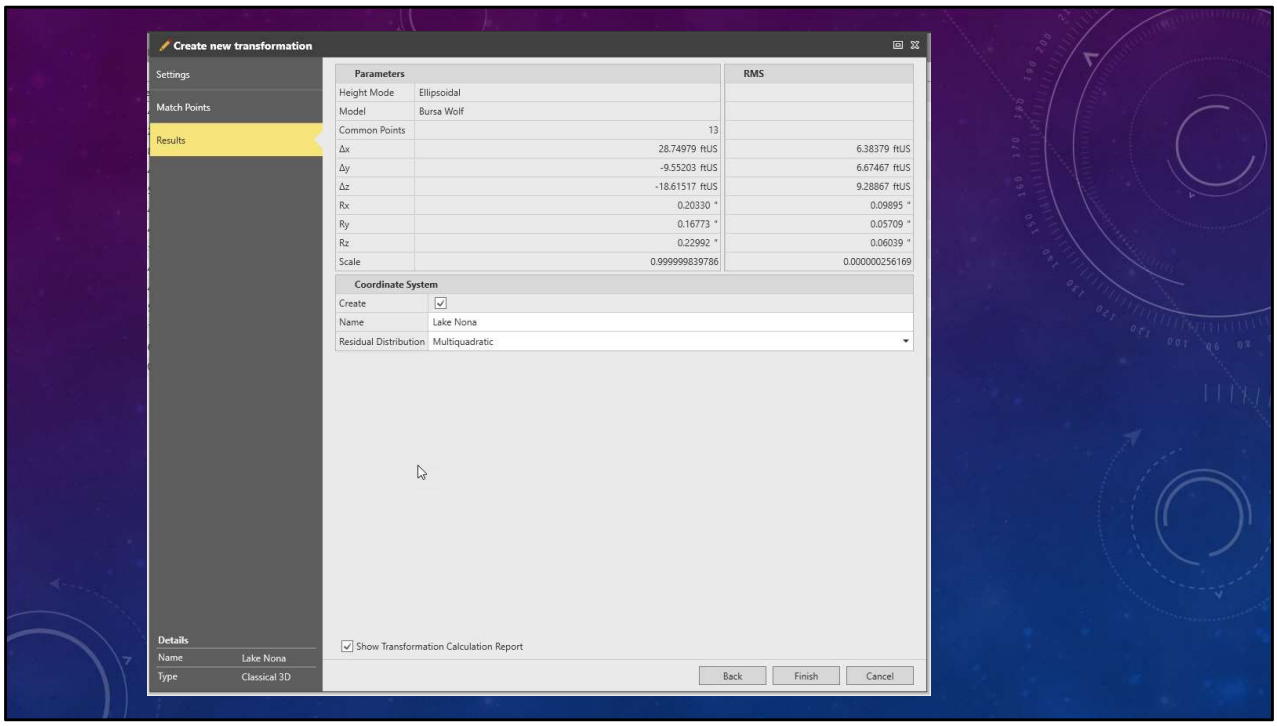
After processing your GNSS data. You create a separate coordinate file containing the published control for your project.

If the published datum for your control points (NGS, CCR's, etc.) is out of date, do not match, or not on the datum required by contract, you may choose to convert them to the desired datum prior to creating the new coordinate file.

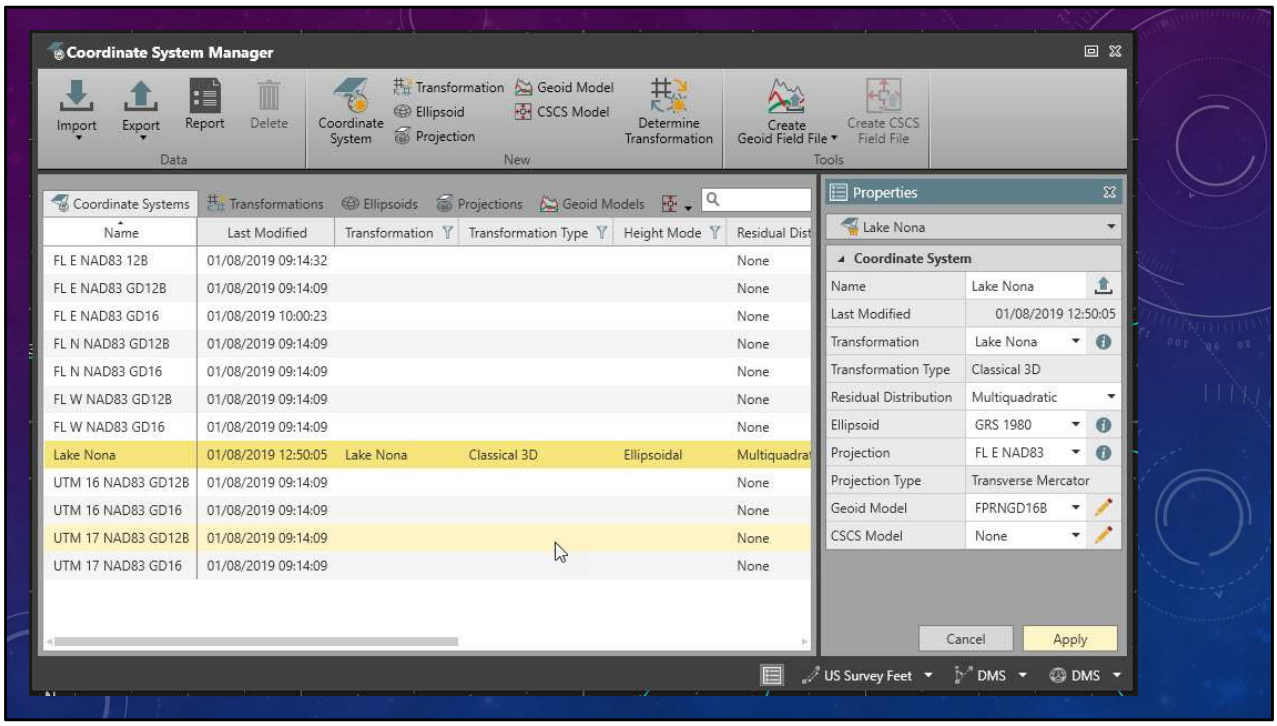


You begin to create a localization file (custom transformation) for the project site by matching the field observed points to the published value points.

Review the residuals for each point and discard any points that have a negative affect on the solution.



Finish creating your localization file (custom transformation).

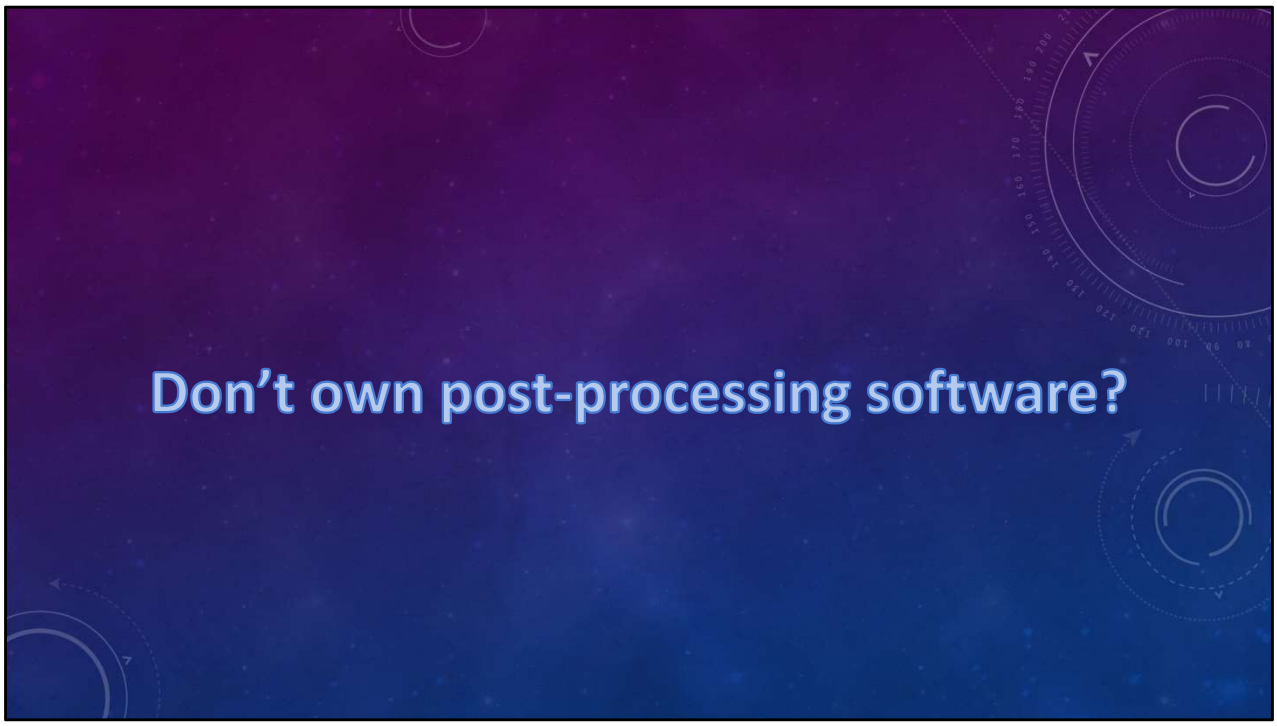


Apply your Localization file to your project.

Make sure to upload the file to your GNSS rovers and apply the transformation to any field file being used for the project.

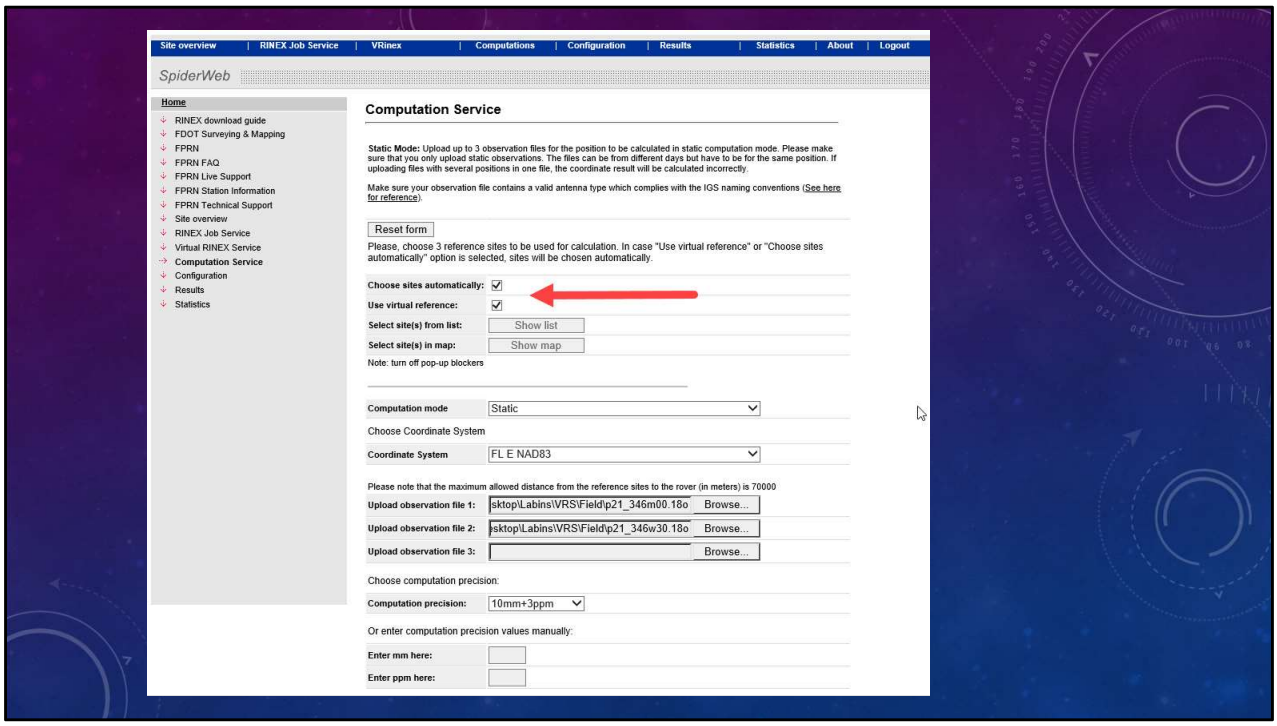
By applying the localization file to the your field files will cause the coordinates to be transformed, in real time, to the datum being used on the project.

No matter if it is NAD83 (CORS 96) or NAD83 (2011).



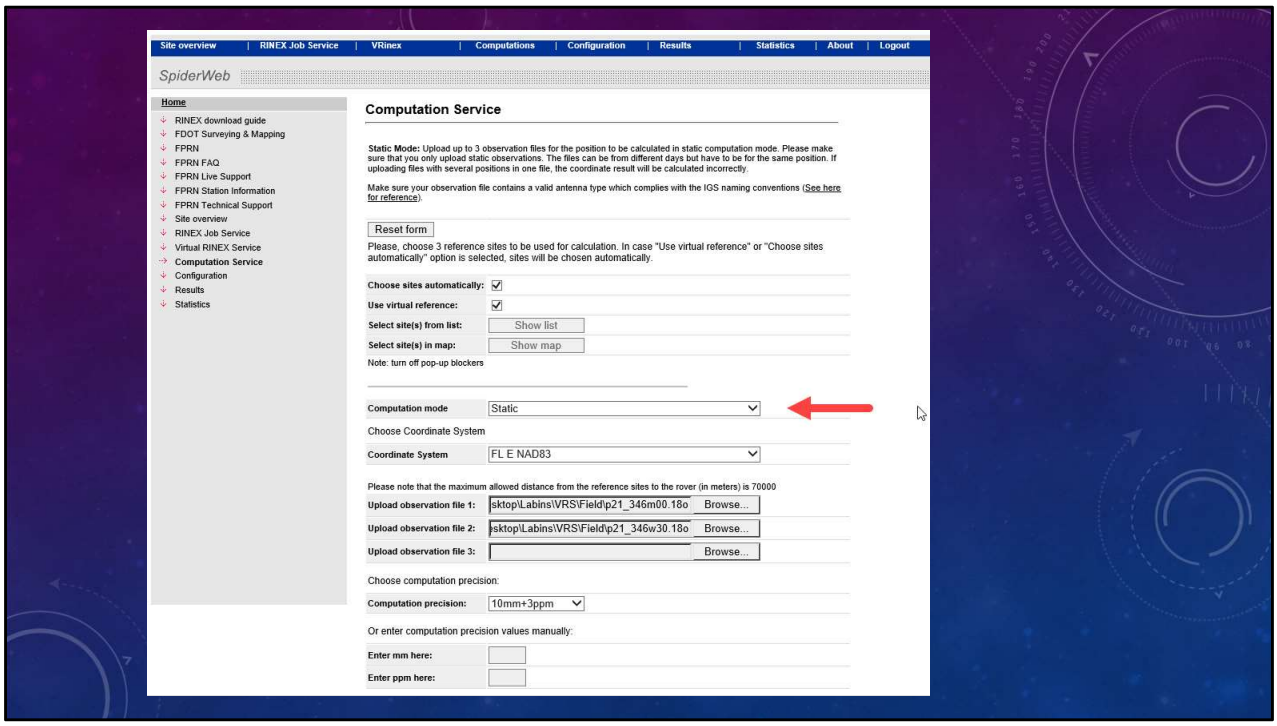
So, you don’t own a post-processing software?

Why not use the FPRN Computation Service.

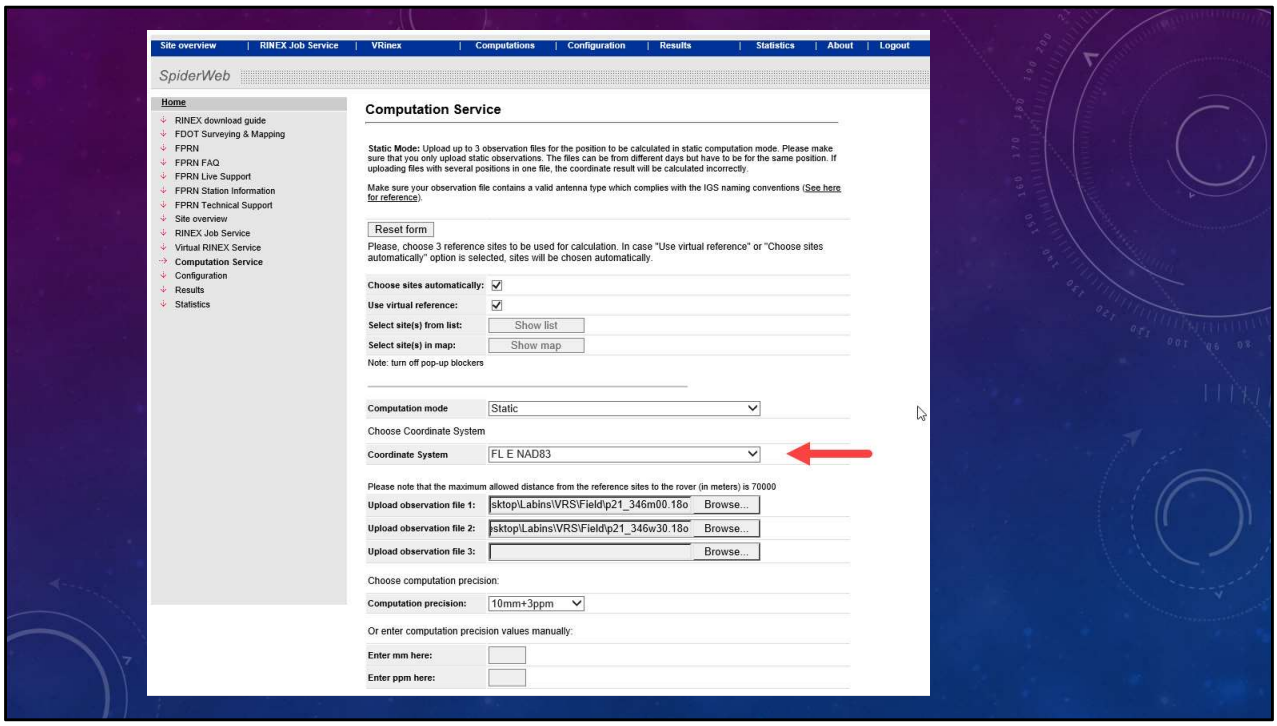


Login to the FPRN webpage and select Computation Service

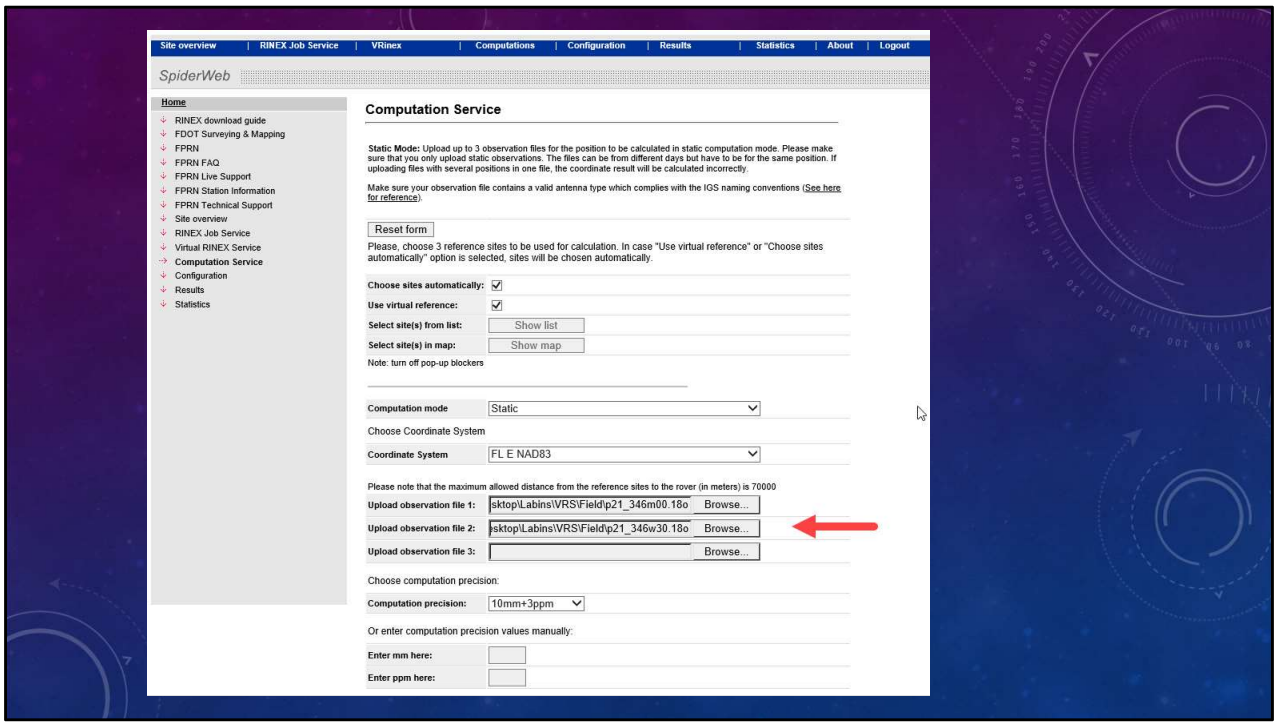
Let the program choose sites automatically and Use a Virtual Reference



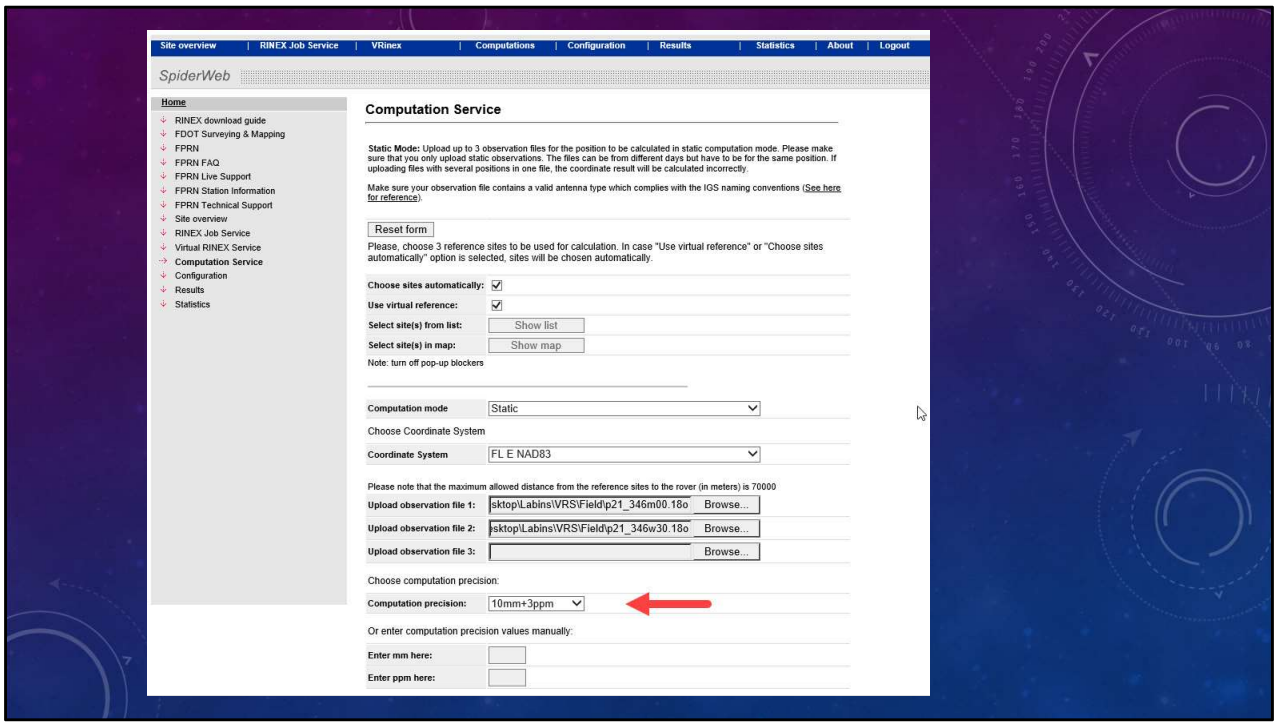
Select the Computation Mode



Select the Coordinate System

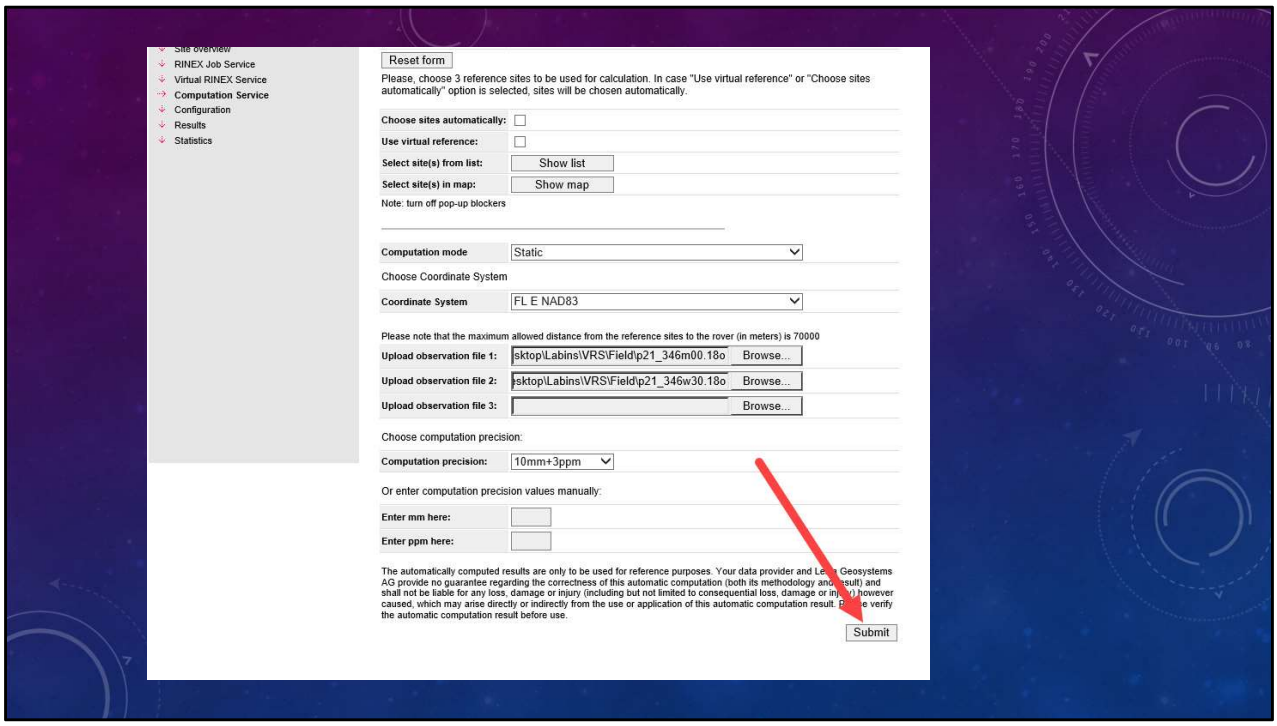


Upload up to 3 Rinex 2.11 files per point

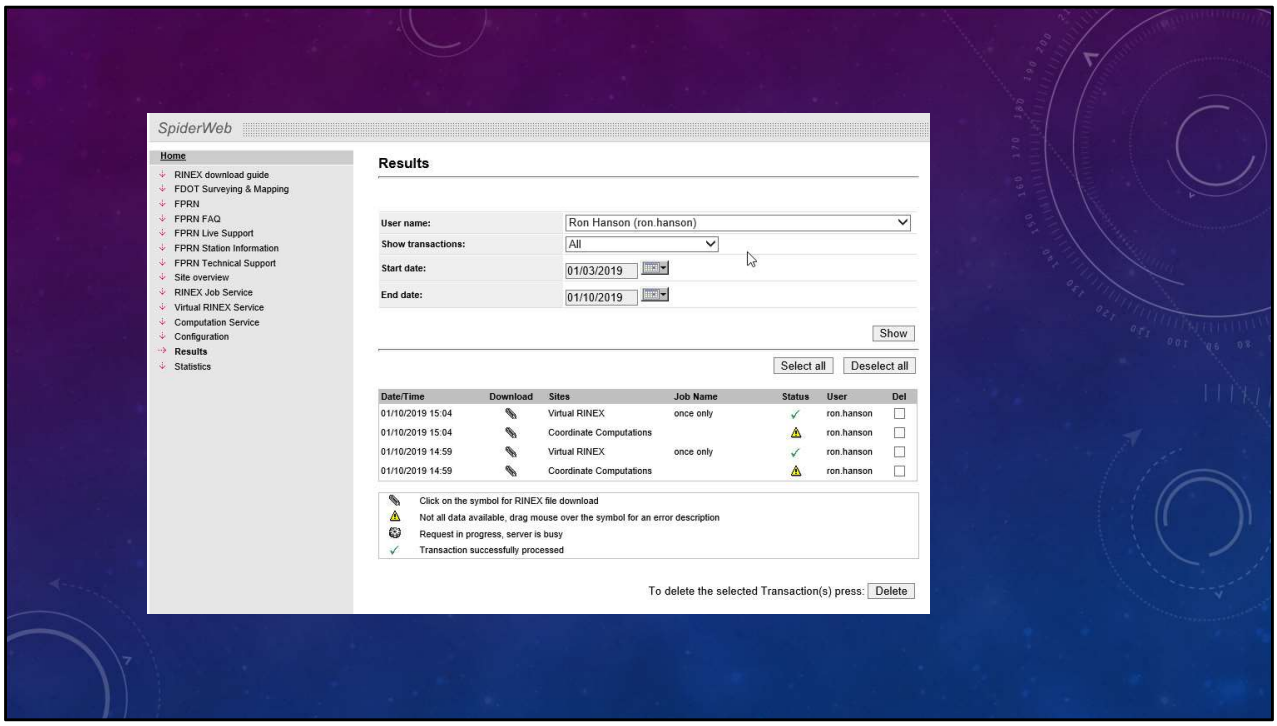


Select the computation precision or enter manually.

I suggest selecting 10mm +3ppm



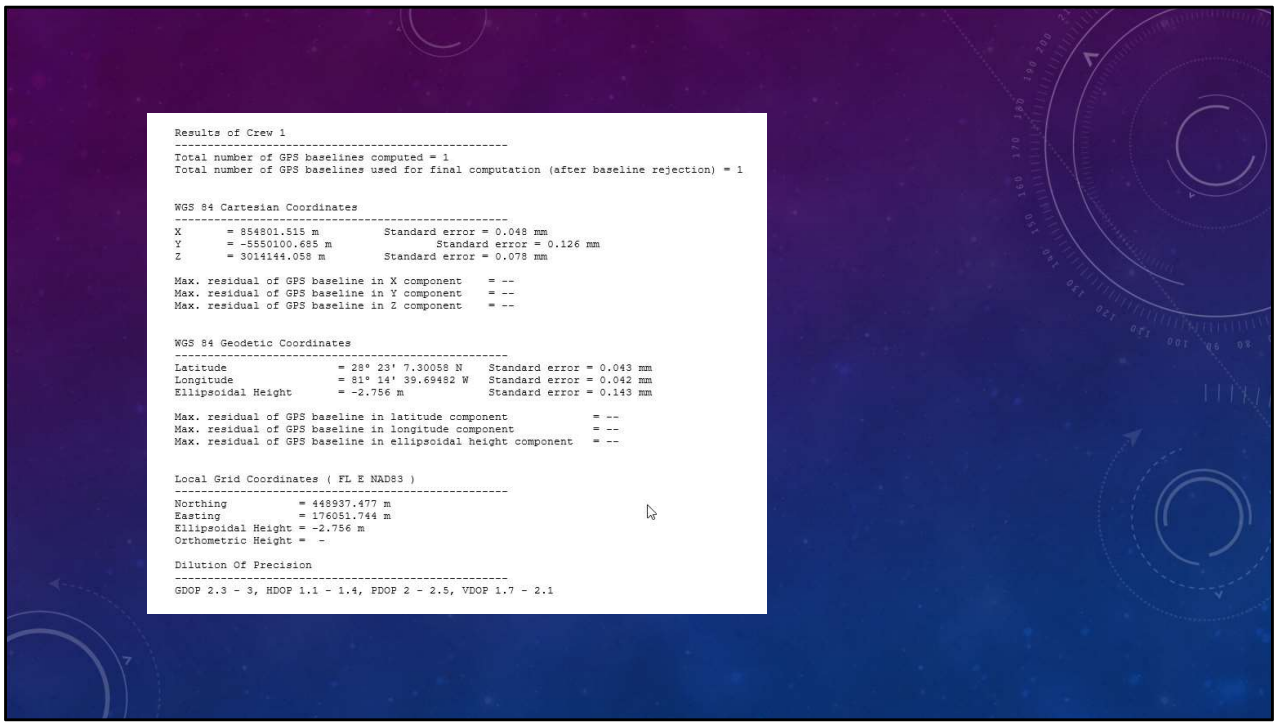
Finally, click on the submit button.



The program will generate a report containing the averaged WGS84 Cartesian, WGS84 Geodetic, and, in this case, the NAD83 (2011) Florida State Plane Coordinates (East Zone) coordinates.

The program will also create a Rinex file of the Virtual Rinex Station used to compute the Least Square adjusted coordinates supplied in the report.

You can use the Rinex file to import into a post processing software.



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Results of Crew 1
------------------------------------------------------
Total number of GPS baselines computed = 1
Total number of GPS baselines used for final computation (after baseline rejection) = 1


WGS 84 Cartesian Coordinates
------------------------------------------------------
X       = 854801.515 m          Standard error = 0.048 mm
Y       = -5550100.685 m                Standard error = 0.126 mm
Z       = 3014144.058 m         Standard error = 0.078 mm

Max. residual of GPS baseline in X component    = --
Max. residual of GPS baseline in Y component    = --
Max. residual of GPS baseline in Z component    = --


WGS 84 Geodetic Coordinates
------------------------------------------------------
Latitude                = 28° 23' 7.30058 N     Standard error = 0.043 mm
Longitude               = 81° 14' 39.69482 W    Standard error = 0.042 mm
Ellipsoidal Height      = -2.756 m              Standard error = 0.143 mm

Max. residual of GPS baseline in latitude component             = --
Max. residual of GPS baseline in longitude component            = --
Max. residual of GPS baseline in ellipsoidal height component   = --


Local Grid Coordinates ( FL E NAD83 )
------------------------------------------------------
Northing           = 448937.477 m
Easting            = 176051.744 m
Ellipsoidal Height = -2.756 m
Orthometric Height =  -

Dilution Of Precision
------------------------------------------------------
GDOP 2.3 - 3, HDOP 1.1 - 1.4, PDOP 2 - 2.5, VDOP 1.7 - 2.1
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Most of the modern Data Collectors will allow for the creation of a Localization file (custom transformation).

Just use the published coordinates as one of the files and the coordinates from the FPRN as the field observations and follow the steps previously outlined.

Questions ?


AJ2445
Mud Lake
Lake W
75534
92062
92059
AK7331
75533
75535
92060
Virtual Reference Site
75537
80584
23516
75538
07211
80585
75536