

The New



a web Odyssey



Well with and introduction like that I better have a very good presentation.

(CLICK)

# Contents

- Registration
- Real-Time Products
- Downloading Rinex 3 files
- Downloading Rinex 2 files
- Creating and downloading Virtual Rinex files
- Using the Computation Service
- Other Services
- Direction of the FPRN

Here are the items I hope to discuss before the end of our time together.

(CLICK)

# Registration

First lets go over the registration steps for the FPRN.

Start by navigating to our home page

(CLICK)

<https://www.fdot.gov/geospatial/fprn.shtm>

The FPRN Home page can be located here:

<https://www.fdot.gov/geospatial/fprn.shtm>

(CLICK)

**FDOT** Florida Department of TRANSPORTATION

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Surveying & Mapping

Surveying & Mapping Office Programs & Services / FPRN

**Florida Permanent Reference Network (FPRN)**

Welcome to the FPRN

Together with our Cooperative Agencies the FPRN network consists of nearly 100 Continuously Operating Reference Stations (CORS) located throughout Florida. We work closely with the National Geodetic Survey's National CORS network. Each CORS site provides Global Positioning System (GPS) carrier phase and code range measurements in support of 3-dimensional positioning activities throughout Florida and surrounding states.

**Maps**

- Dynamic Map
  - Station status for all FPRN sites (updates every 15 minutes)
  - Google Earth Overlay
  - File of all FPRN stations with links to data sheets (1kmz, 14.6 KB)
  - Florida Custom Geoid Package
  - bin, gcm, .gpf and .gpf Geoid files for data collectors (zip file, 30 mb)

**Services**

- RINEX
  - Create new Rinex Download or
  - Manage existing Rinex gds
- Computation Service
  - Submit data for computation
  - FPRN Station Outstations & Superseded Control
  - Individual Station Information for position at AOP

**Registration**

- Registration Steps
  - New User Registration
  - Maintain Existing Users Profile
  - Forgot/Reset Password
  - Email Notifications
  - Receive email notifications of FPRN maintenance and other events.

**Customer Service**

- FPRN Products
  - Listing of Current FPRN Real-Time Products
- FPRN FAQ
  - Frequently Asked Questions
  - Live Support Option
  - Live Support Options
- FPRN News
  - Newsletter/Archive
- FPRN Training
  - Presentations and notes from classes

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Begin by reviewing the Registration Steps

Please review **ALL** pages in the instructions paying particular attention to the required Demographic Groups

(CLICK)

DEMOGRAPHIC GROUP NAME	DEFINITION
Academic	Colleges and Universities
Agriculture	Agriculture (Farms, Golf Course, etc)
City	City Government Agencies and Departments
Construction	Construction related Companies
County	County Government Agencies and Departments
Federal	Federal Government Agencies and Departments
Mapping	Mapping Organizations (Engineering, GIS & Surveying Companies)
Mining	Mining Operations
Private	Private accounts (for personal use by individuals)
State	State Government Agencies and Departments
Utilities	Utility Companies
Vehicles	Vehicular Navigation (autonomous vehicles)
Vendors	Mapping Equipment Vendors

The Demographic Groups allow us to gather usage data for reporting purposes.

(CLICK)

The screenshot shows the FDOT website's Surveying & Mapping section for the Florida Permanent Reference Network (FPRN). The page includes a navigation menu, a search bar, and a main content area with several sections: Maps, Services, Registration, and Customer Service. A red arrow points to the 'New User Registration' link under the 'Registration Steps' sub-section.

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Surveying & Mapping

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### Florida Permanent Reference Network (FPRN)

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- Dynamic Map  
Station status for all FPRN sites (updates every 15 minutes)
- Google Earth Overlay  
File of all FPRN stations with links to data sheets (kmz, 14.6 KB)
- Florida Custom Geoid Package  
bin, \_gem, \_ggf and \_gsf Geoid files for data collectors (zip file, 30 mb)

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- RINEX  
Create new Rinex Download or Manage existing Rinex jobs
- Computation Service  
Submit data for computation  
FPRN Station Datasheets & Superseded Control  
Individual Station Information for position at ARP

**Registration**

- Registration Steps
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  - Maintain Existing Users Profile
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  - Email Notifications  
Receive email notifications of FPRN maintenance and other events.

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Newsletter/Archive  
FPRN Training  
Presentations and notes from classes

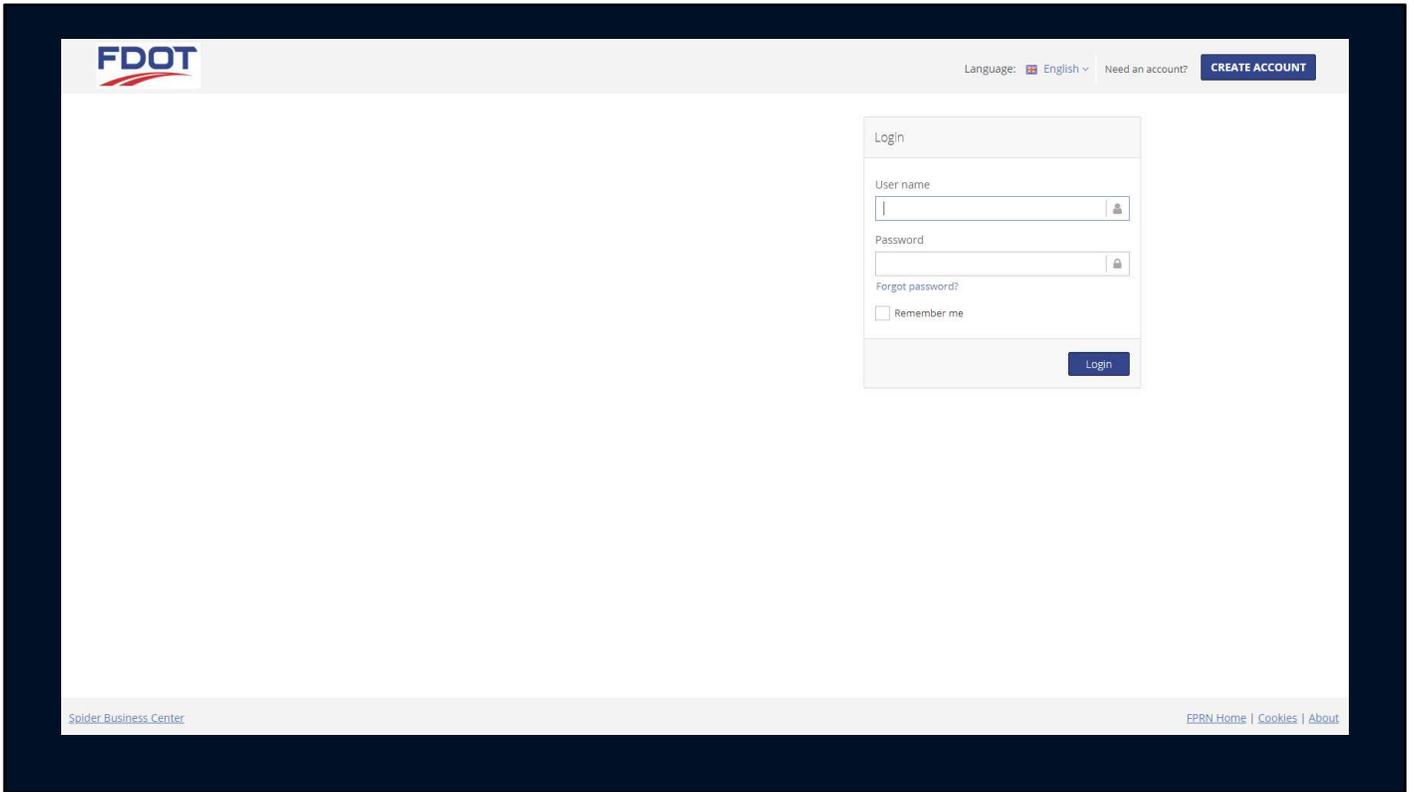
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Safety. Mobility. Reliability.

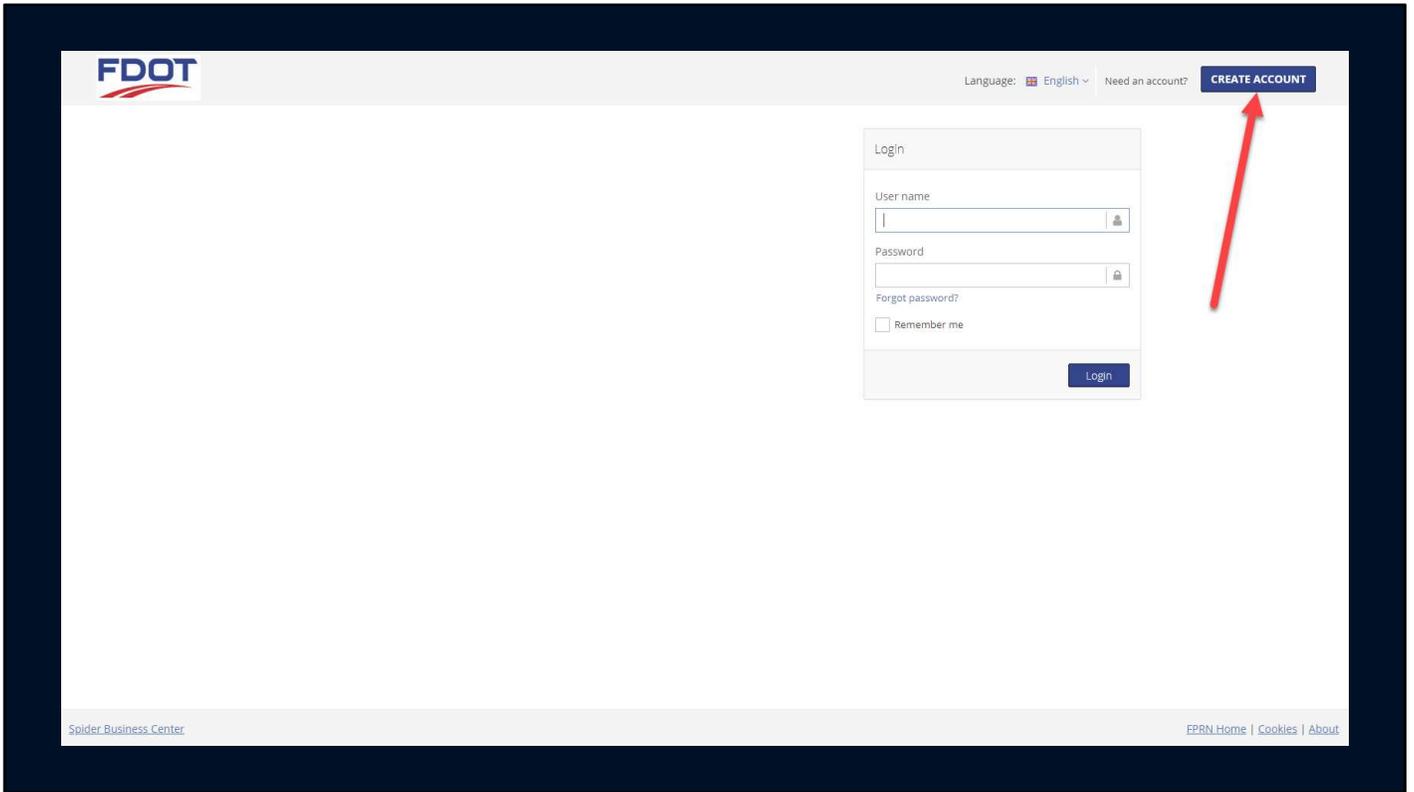
Next let's click on the New User Registration link

(CLICK)



This will take you the User Portal Login Page

(CLICK)



Click on the Create Account button

(CLICK)

Once on the new user registration page you should begin by picking a user name and password.

As a note, if you are creating multiple account, each rover requires its own account, you can use the same password but you will need a unique user name.

(CLICK)

The image shows a screenshot of the FDOT Sign Up form. The form is divided into three main sections: Credentials, Personal Information, and Additional Information. The Credentials section includes fields for User name\* (with a sample value 'Sample') and Password\* (with a masked value '\*\*\*\*\*'). The Personal Information section includes fields for First name\*, Last name\*, Email\*, Language (set to English), and Mobile phone\*. The Additional Information section includes a Group\* field and a CAPTCHA image with the text 'tov7eJ'. Red arrows point to the Company\* field, the Email\* field, and the Mobile phone\* field. The form also includes a 'Show' checkbox for the password field, a 'Read Privacy Notice' link, and a 'Sign Up' button.

Fill out the rest of the required information.

Make sure your email is spelled correctly because it is used in following steps of the registration process

Remembering to associated your company to one of the Demographic Groups.

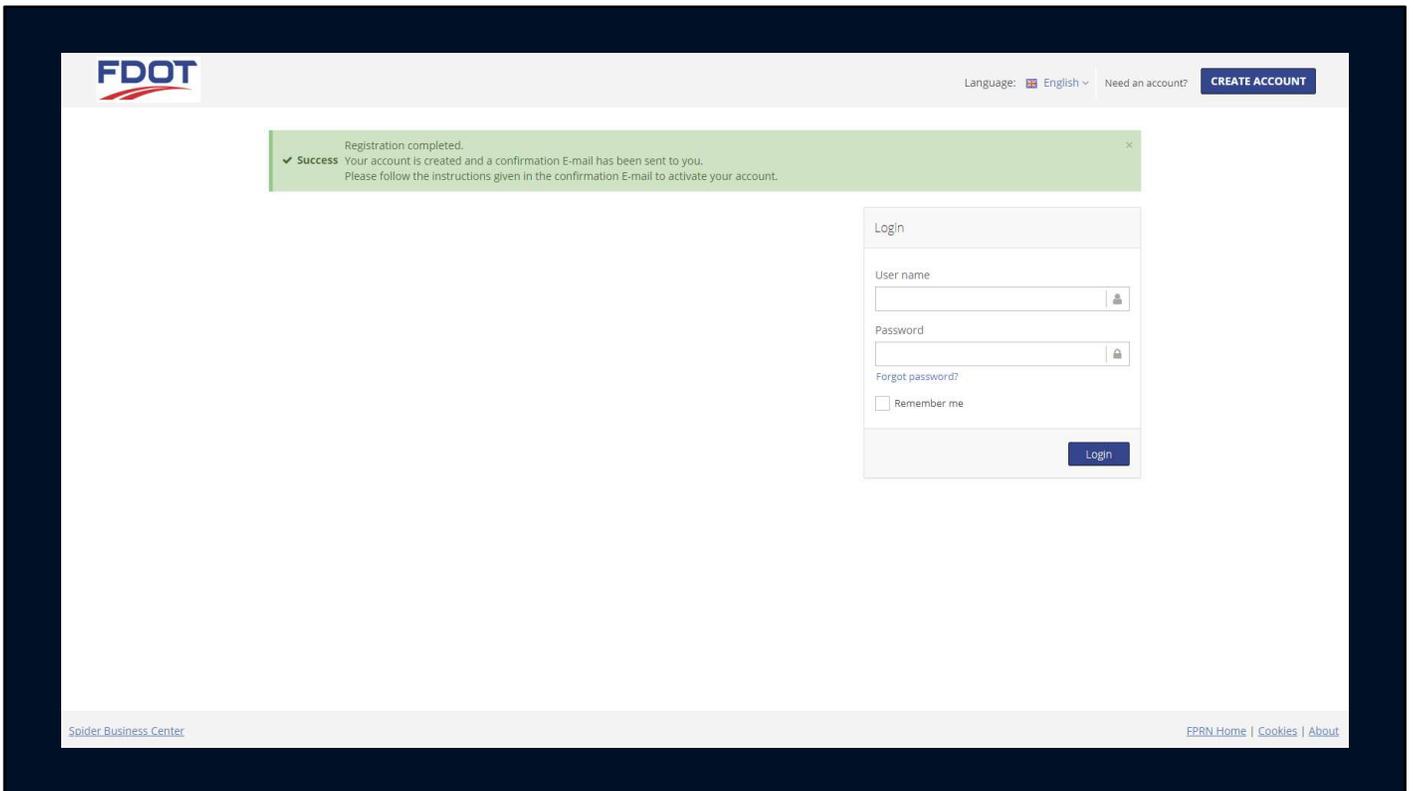
Also, the mobile phone should be for the operator of the equipment. From time to time if we notice problems with your Rover login, time permitting, we will call to try and resolve the issue.

(CLICK)

The image shows a screenshot of the FDOT Sign Up form. The form is titled "Sign Up" and is divided into several sections: "Credentials", "Personal Information", "Additional Information", and a CAPTCHA section. The "Credentials" section includes fields for "User name\*" (containing "Sample") and "Password\*" (containing "\*\*\*\*\*"). The "Personal Information" section includes fields for "First name\*" (containing "Ron"), "Company\*" (containing "FDOT"), "Last name\*" (containing "Hanson"), "E-mail\*" (containing "ronald.hanson@dot.state.fl.us"), "Language" (a dropdown menu set to "English"), and "Mobile phone\*" (containing "850-510-8556"). The "Additional Information" section includes fields for "Group\*" and "State\*". Below these is a CAPTCHA section with an image of the text "tov7ej" and a text input field containing "tov7ej". A red arrow points to the "Sign Up" button at the bottom right of the form. The FDOT logo is in the top left corner, and the text "Language: English" and "Already registered? Login" is in the top right corner. The footer contains "Stellar Business Center" on the left and "FDOT Home | Cookies | About" on the right.

Finally, click the Sign Up button

(CLICK)



You will be brought back to the User Portal Login Page.

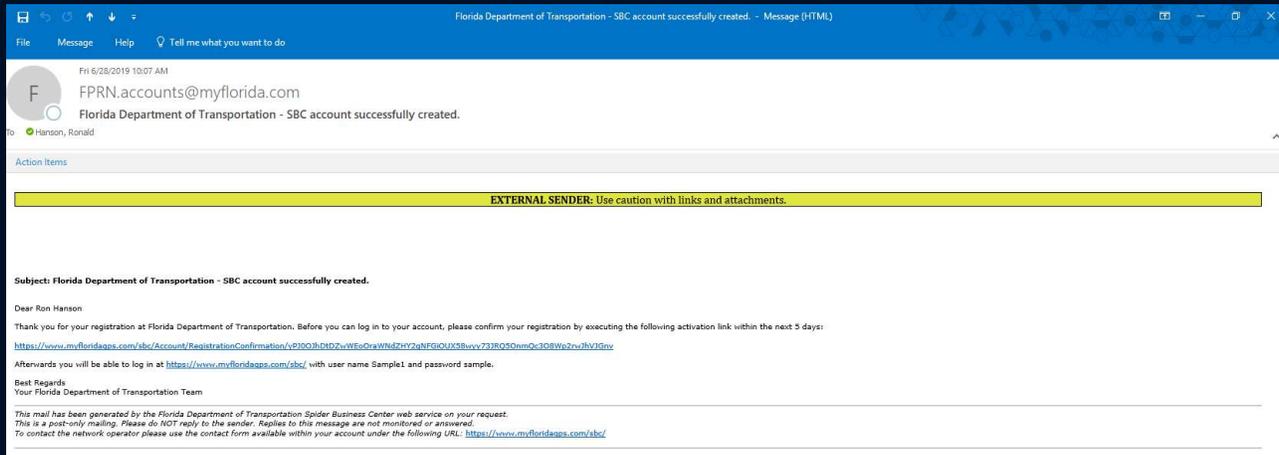
You should get the following message

“Registration Completed

Your account is created and a confirmation E-mail has been sent to you.

Please follow the instructions given in the confirmation E-mail to activate your account.”

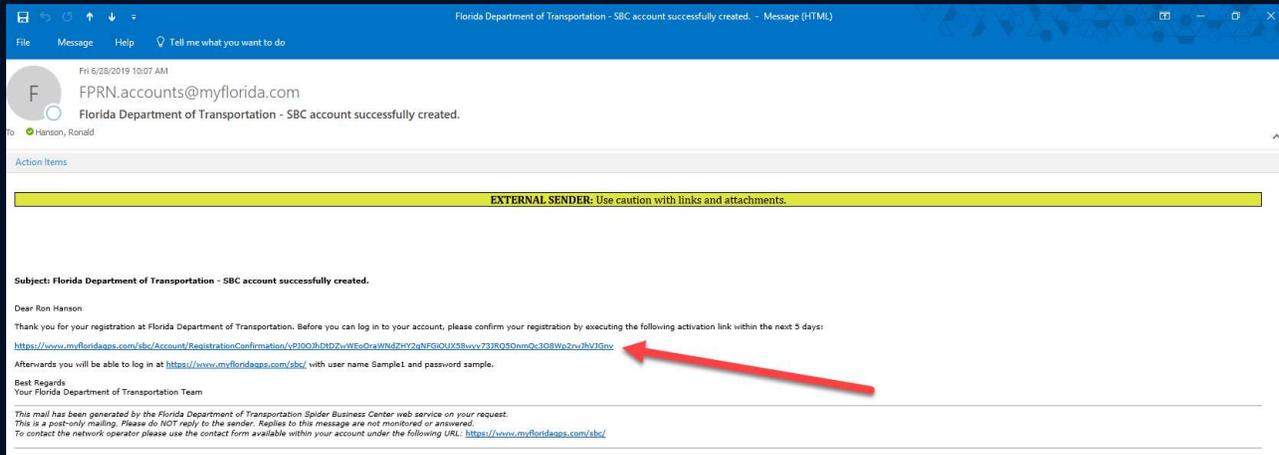
(CLICK)



Navigate to your E-mail

You should notice an E-mail from FPRN.accounts@myflorida.com that looks something like this

(CLICK)

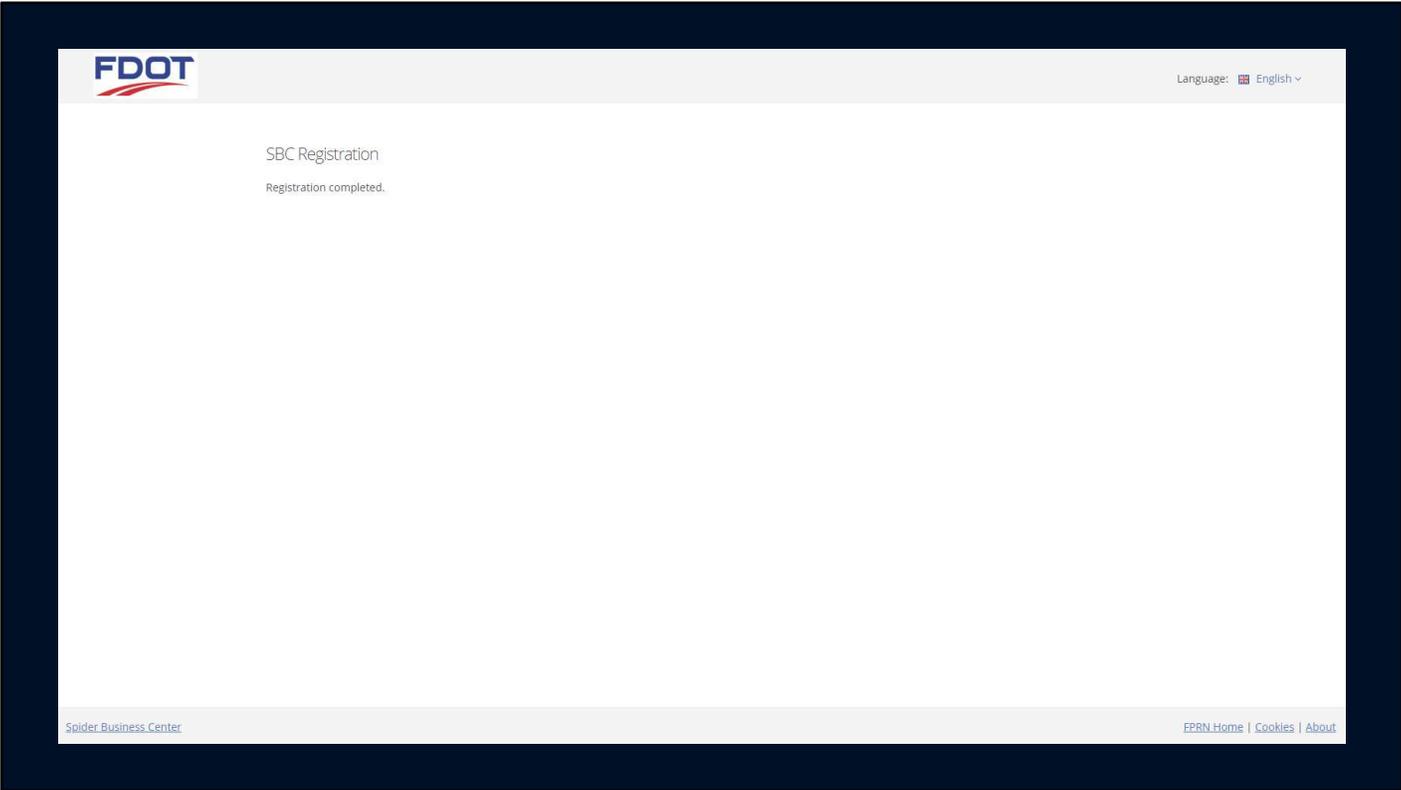


Navigate to your E-mail

You should notice an E-mail from FPRN.accounts@myflorida.com that looks something like this.

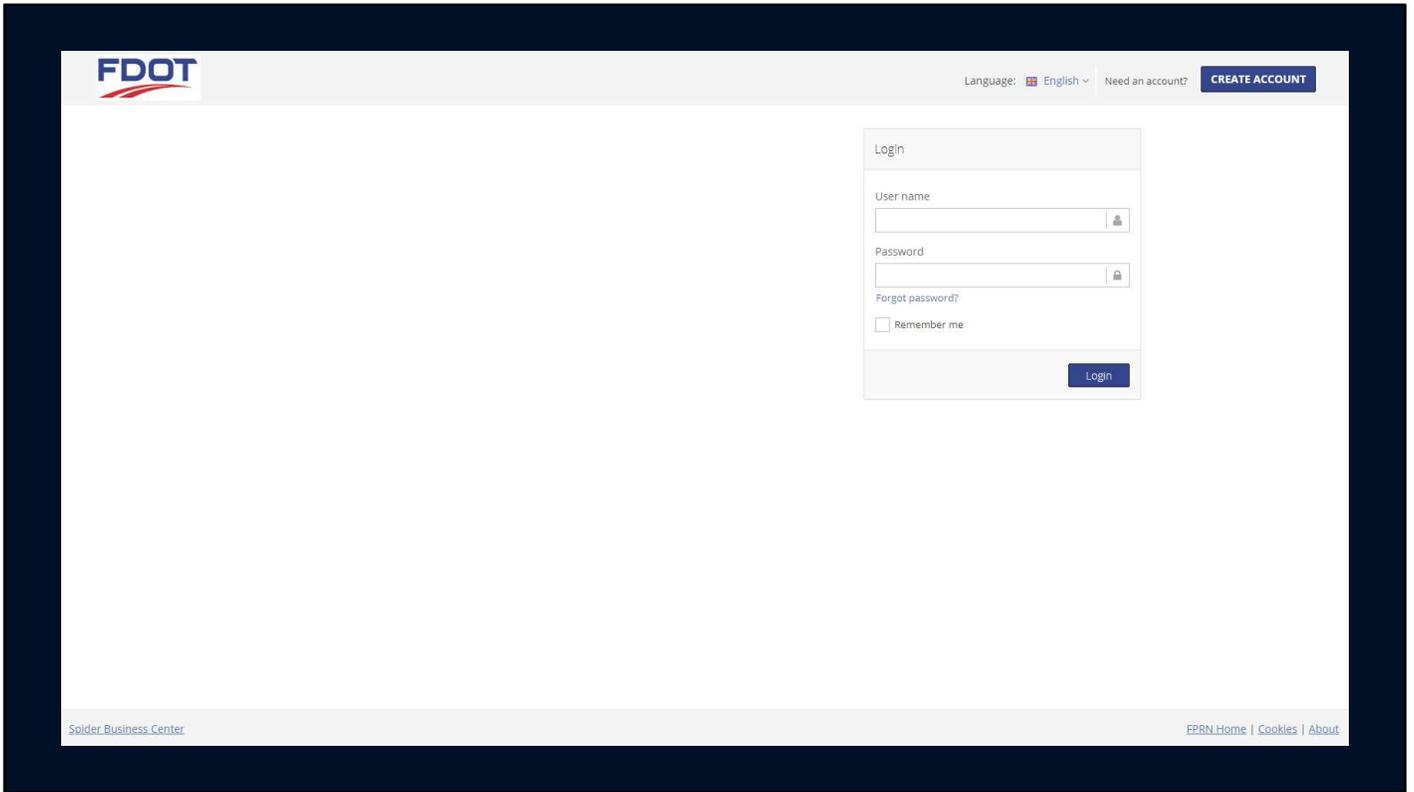
Click on the link in the E-mail to verify your account with the FPRN.

(CLICK)



You will be sent to a web page that says your registration is complete.

(CLICK)

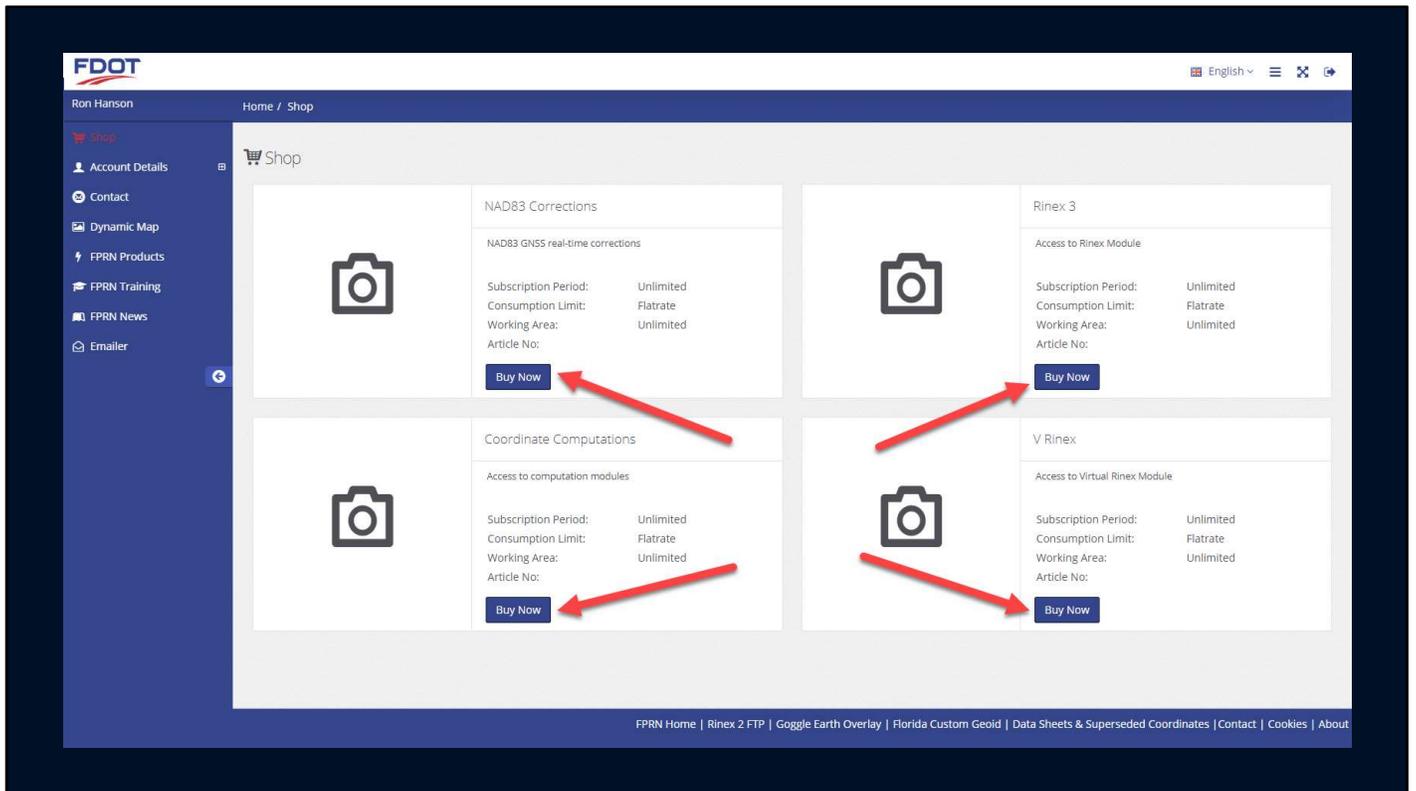


Navigate back to the Customer Portal

<https://www.myfloridagps.com/sbc>

Login using your new Username and Password

(CLICK)



Go “shopping” to pick the services you wish to use with this account.

(CLICK)

If the account will be strictly used in the field you may want to limit the account to just NAD 83 Corrections

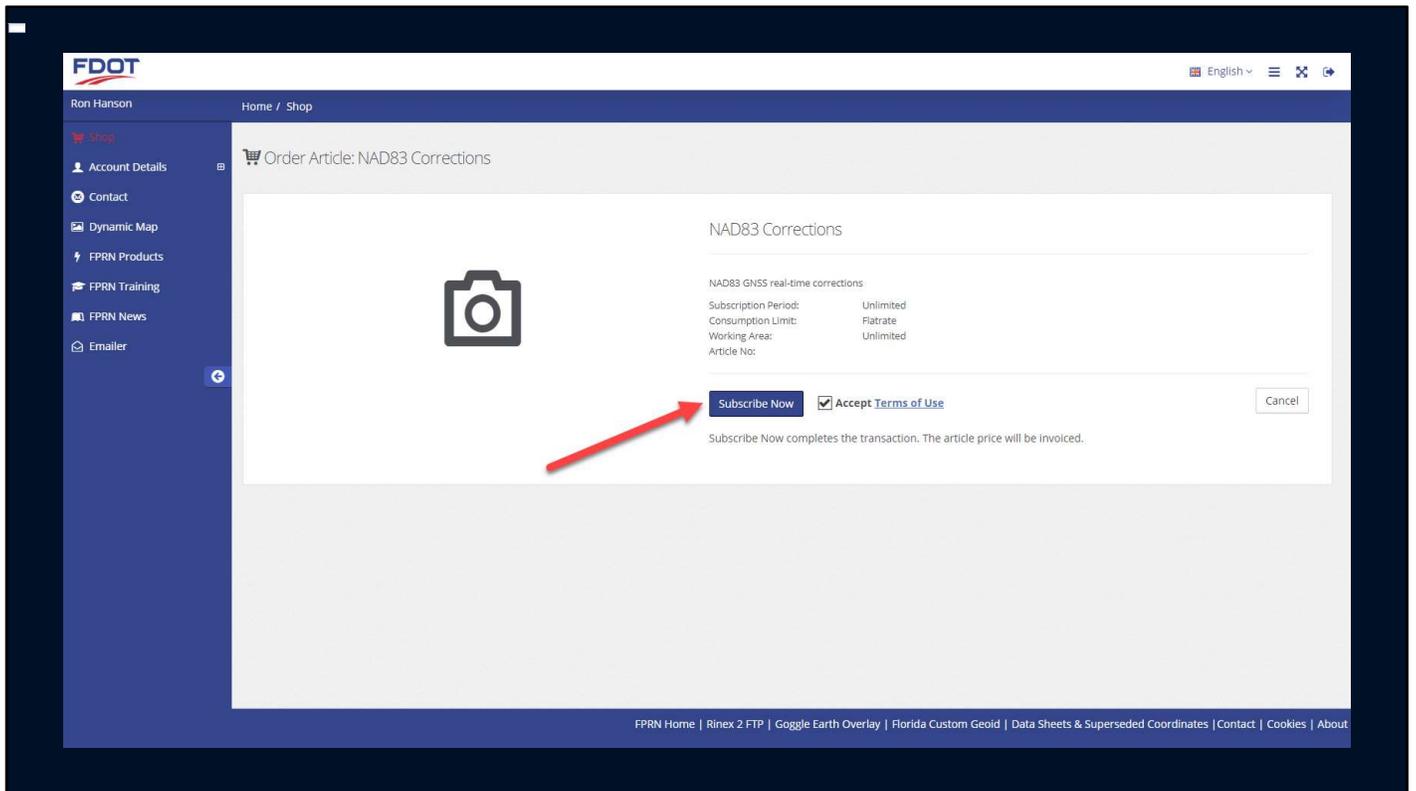
(CLICK)

If an Office account you could pick Rinex 3, Coordinate Computations, & V Rinex.

(CLICK)

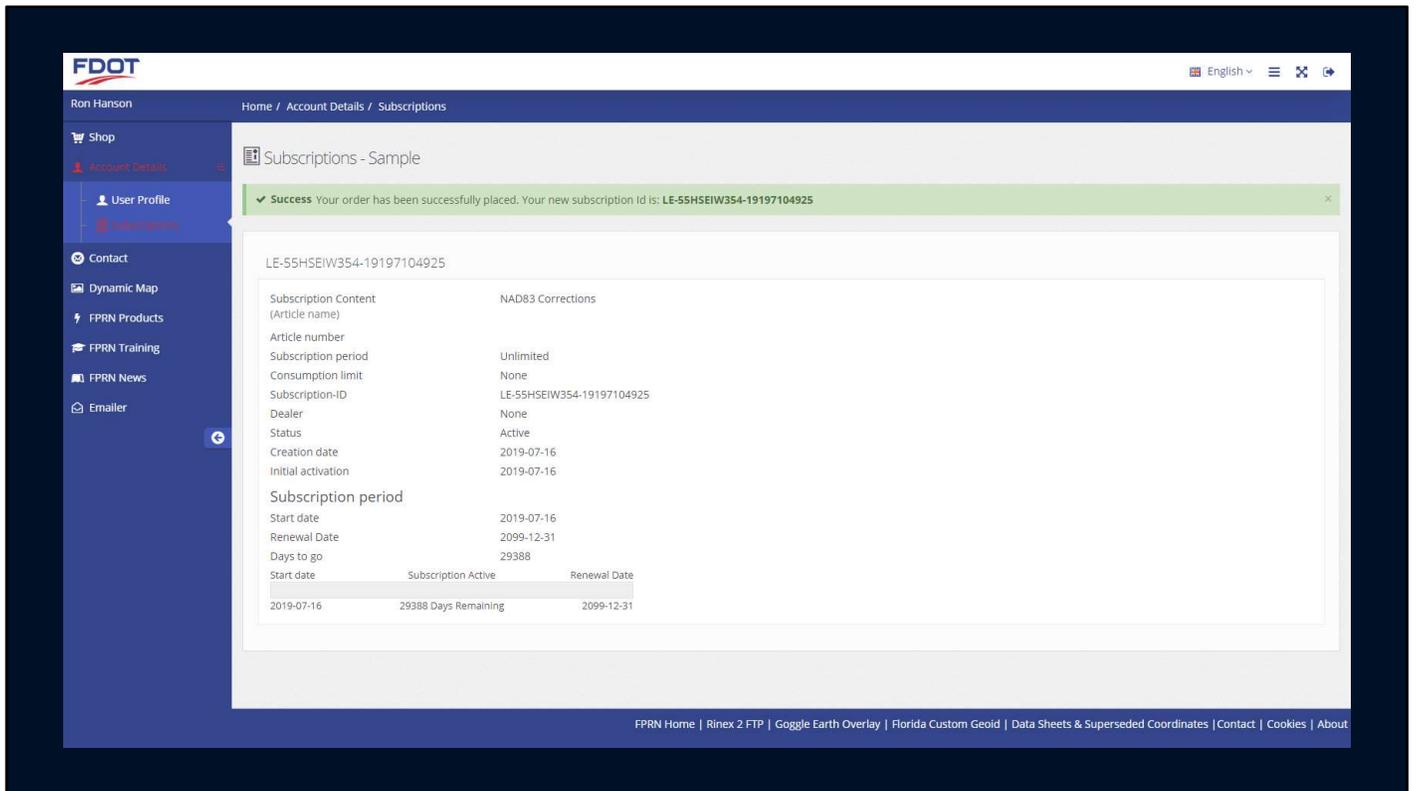
Or, you can pick everything

(CLICK)



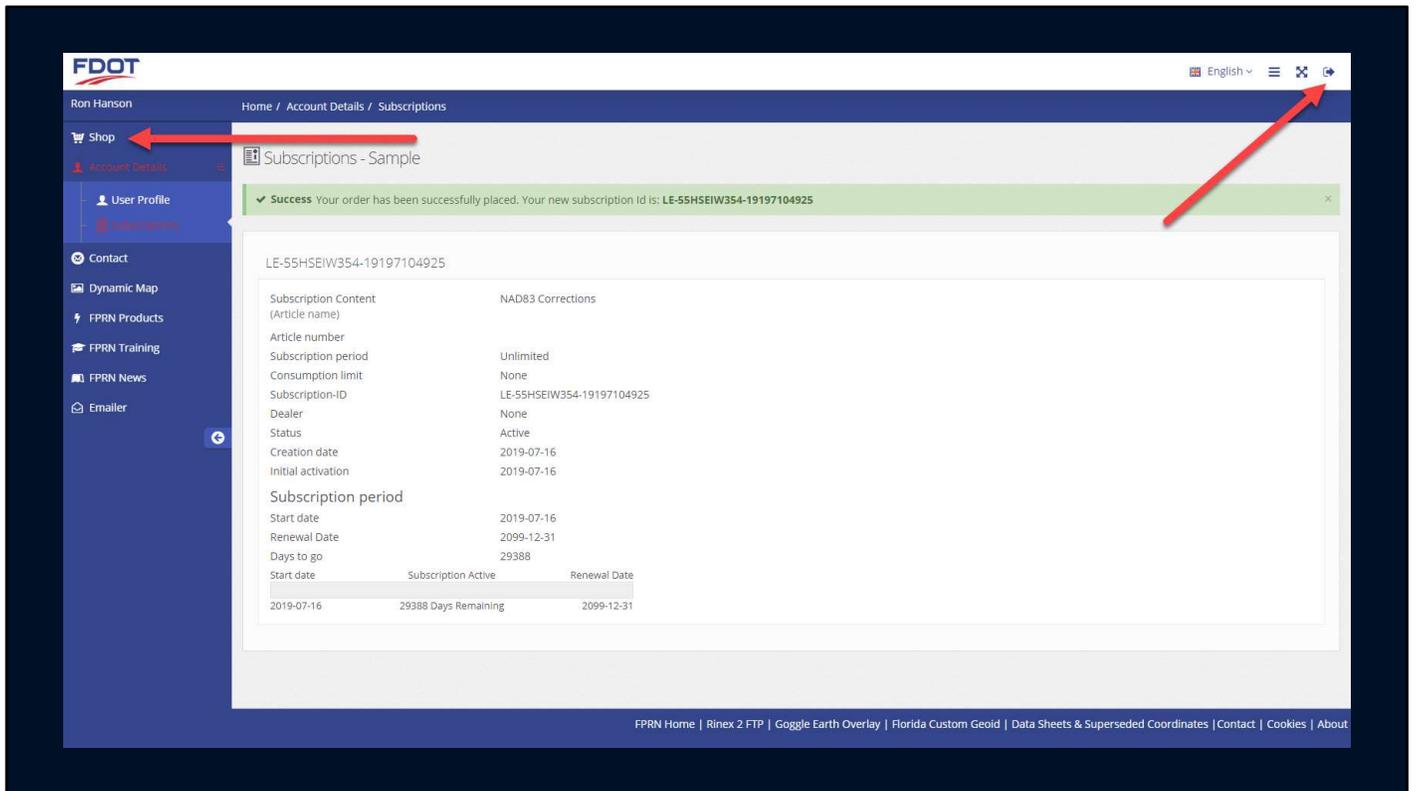
You will have to accept the Terms of Use and “Subscribe now” for each product you wish to use.

(CLICK)



You will see the subscription information for each product on the next page

(CLICK)



Log out

Or

Continue Shopping

(CLICK)

# Real-Time Products

Once you have completed “shopping” and logged out, your account will now be complete.

(CLICK)

The FPRN offers numerous Real-Time Products in each of Four different languages

(CLICK)

40.121.5.206

**North American Datum 83 (NAD83)  
Single Baseline (Automatic Nearest Station)**

**Port 10000**

(Requires NMEA string to be broadcast at least every 30 seconds)

Language	Region
RTCM2	RTCM2_Near
CRM / CRM+	CRMP_Near
RTCM3	RTCM3_Near
RTCM3 MSM4	MSM4_Near

The IP address for all Real-time transmissions from the FPRN is 40.121.5.206

The most popular product is Automatic Nearest.

This product transmits single baseline corrections from the closest FPRN station.

In order for the software to determine the closest station it requires your location. This information is transmitted via the NMEA string. Because of mobile work products the system requires the NMEA string to be updated at least every 30 seconds.

All of the Automatic Nearest products are offered on port 10000

(CLICK)

**40.121.5.206**

**North American Datum 83 (NAD83)**

**Single Baseline**

**RTCM 2.3**

<b>Port</b>	<b>Region</b>
23000	Statewide
23100	District 1
23200	District 2
23300	District 3
23400	District 4
23500	District 5
23600	District 6
23700	District 7

The RTCM2.3 language is broadcast on the following ports for single baseline solutions

(CLICK)

40.121.5.206  
North American Datum 83 (NAD83)  
Single Baseline  
**CMR / CMR+**

Port	Region
25000	Statewide
25100	District 1
25200	District 2
25300	District 3
25400	District 4
25500	District 5
25600	District 6
25700	District 7

The CMR / CMR+ language is broadcast on the following ports for single baseline solutions

(CLICK)

40.121.5.206  
North American Datum 83 (NAD83)  
Single Baseline  
**RTCM 3.1**

Port	Region
31000	Statewide
31100	District 1
31200	District 2
31300	District 3
31400	District 4
31500	District 5
31600	District 6
31700	District 7

The RTCM 3.1 language is broadcast on the following ports for single baseline solutions

(CLICK)

40.121.5.206  
North American Datum 83 (NAD83)  
Single Baseline

**RTCM 3.1 MSM4**

Port	Region
40000	Statewide
40100	District 1
40200	District 2
40300	District 3
40400	District 4
40500	District 5
40600	District 6
40700	District 7

The RTCM 3.1 MSM4 language is broadcast on the following ports for single baseline solutions

(CLICK)

40.121.5.206

North American Datum 83 (NAD83)

Network Solutions

**Port 10000**

(Requires NMEA string to be broadcast at least every 30 seconds)

Language	Product	Description
RTCM 2.3	RTCM2_FKP	RTCM 2.3 Flächen Korrektur Parameter (Network Solution)
	RTCM2_IMAX	RTCM 2.3 Individualized Master Auxiliary Concept (Network Solution)
	RTCM2_VRS	RTCM 2.3 Virtual Reference Station (Network Solution)
CMR / CMR+	CMRP_IMAX	CMR / CMR + Individualized Master Auxiliary Concept (Network Solution)
	CMRP_VRS	CMR / CMR + Virtual Reference Station (Network Solution)
RTCM 3.1	RTCM3_IMAX	RTCM 3.1 Individualized Master Auxiliary Concept (Network Solution)
	RTCM3_MAX	RTCM 3.1 Master Auxiliary Concept (Network Solution)
	RTCM3_VRS	RTCM 3.1 Virtual Reference Station (Network Solution)
RTCM 3.3 MSM4	MSM4_IMAX	RTCM 3.3 MSM4 Individualized Master Auxiliary Concept (Network Solution)
	MSM4_VRS	RTCM 3.3 MSM4 Virtual Reference Station (Network Solution)

All network solutions (including Automatic Nearest) (discussed earlier) are broadcast on port 10000

In order for the software to determine the stations required to develop your network it requires your location. This information is transmitted via the NMEA string. Because of mobile work products the system requires the NMEA string to be updated at least every 30 seconds.

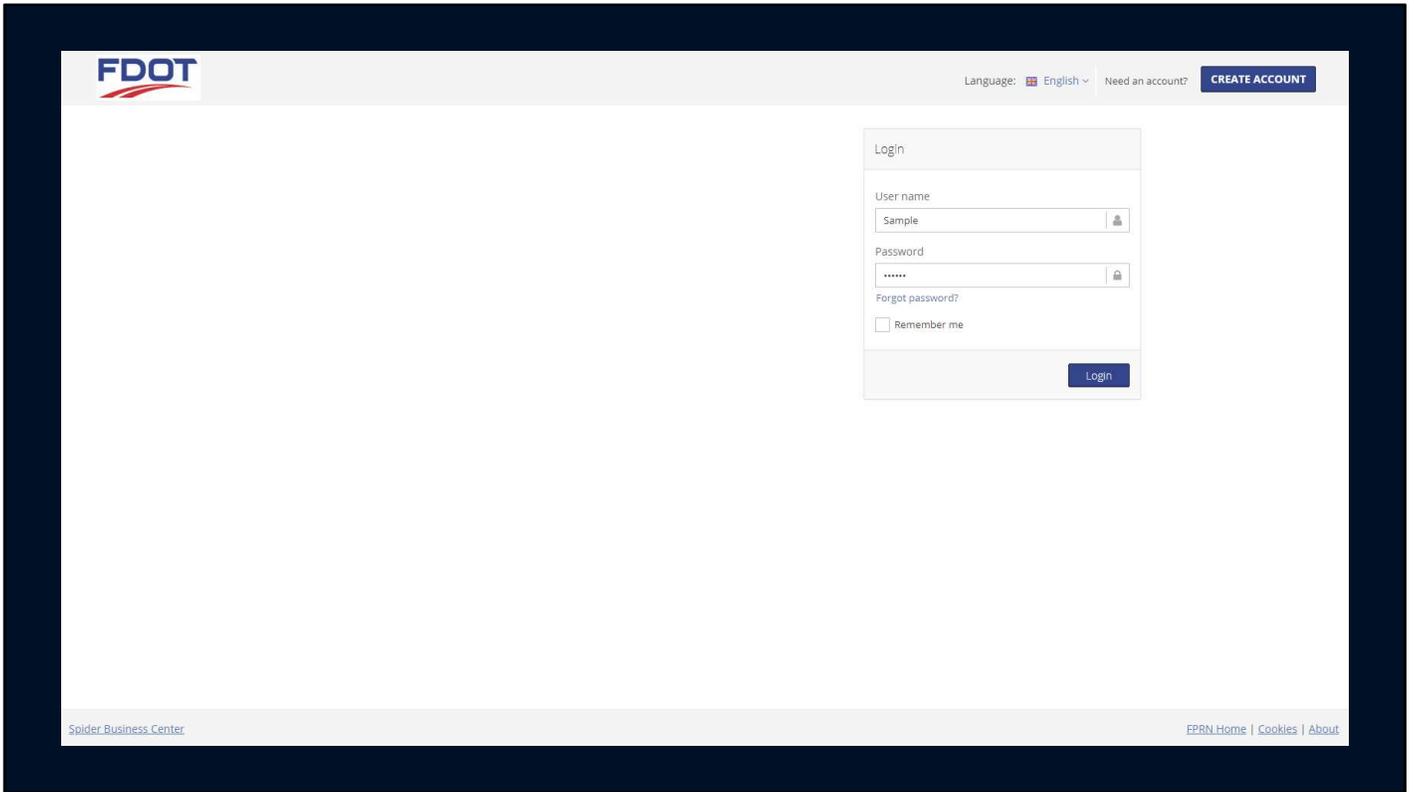
(CLICK)

# Rinex 3 Files

Let's talk about downloading Rinex 3 data

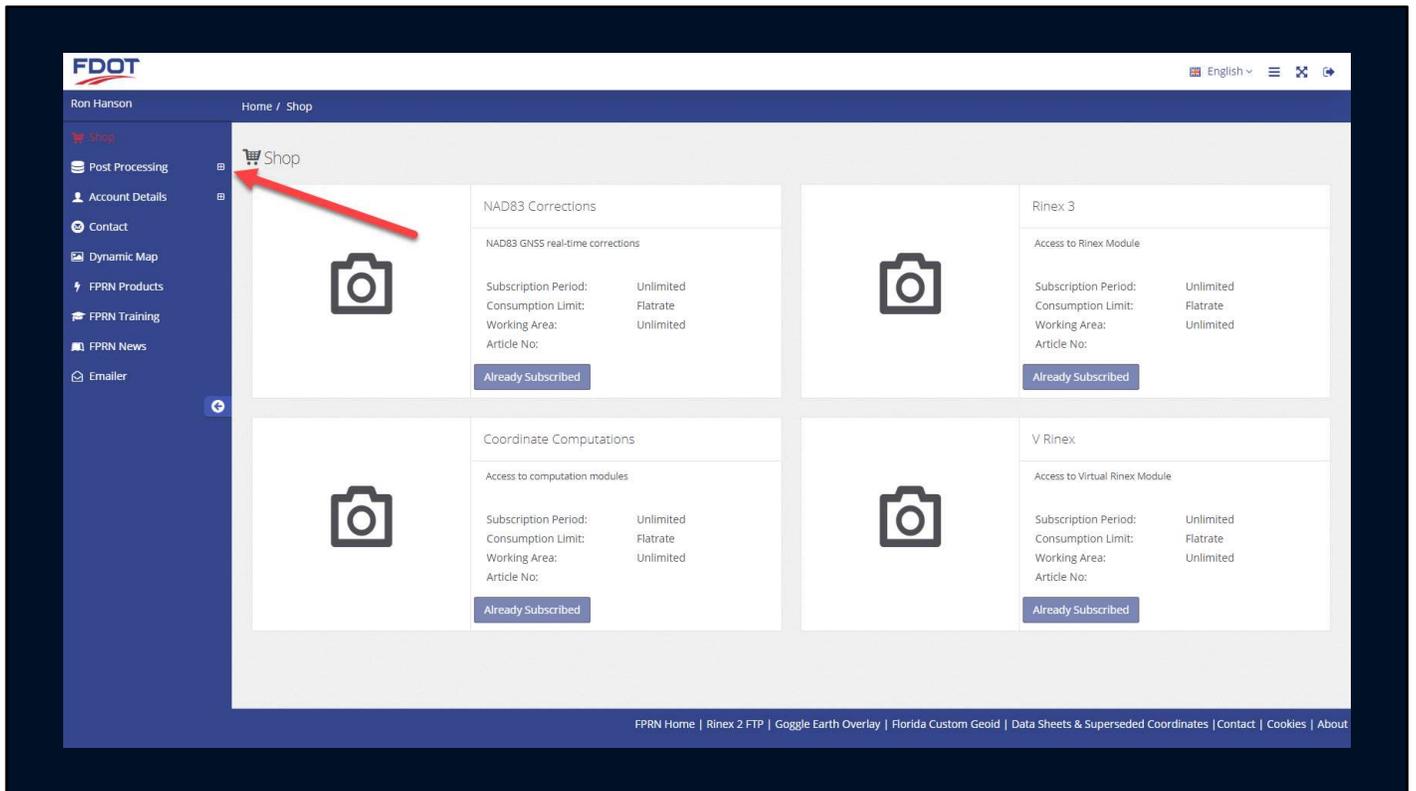
Navigate to the Customer Portal

(CLICK)



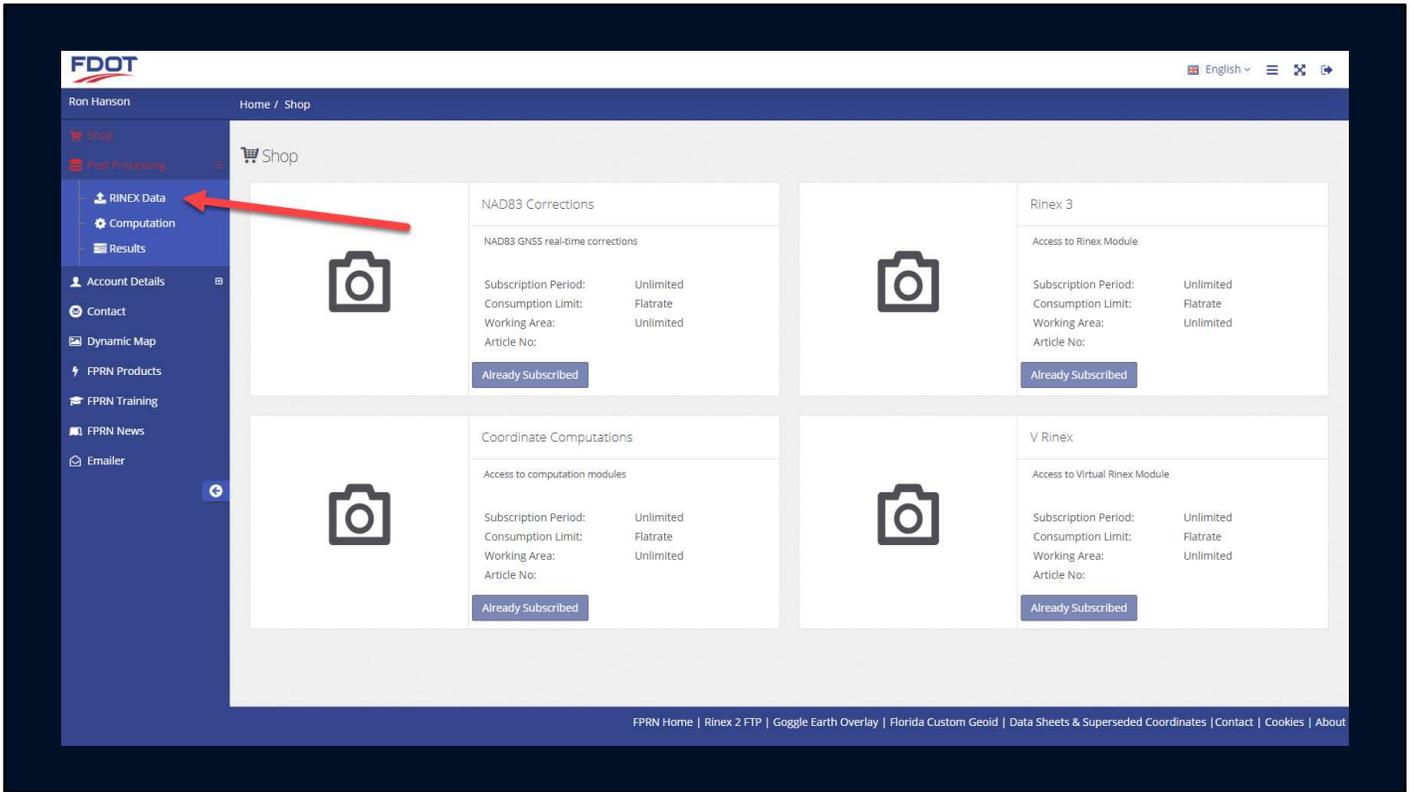
Login using your User Name and Password

(CLICK)



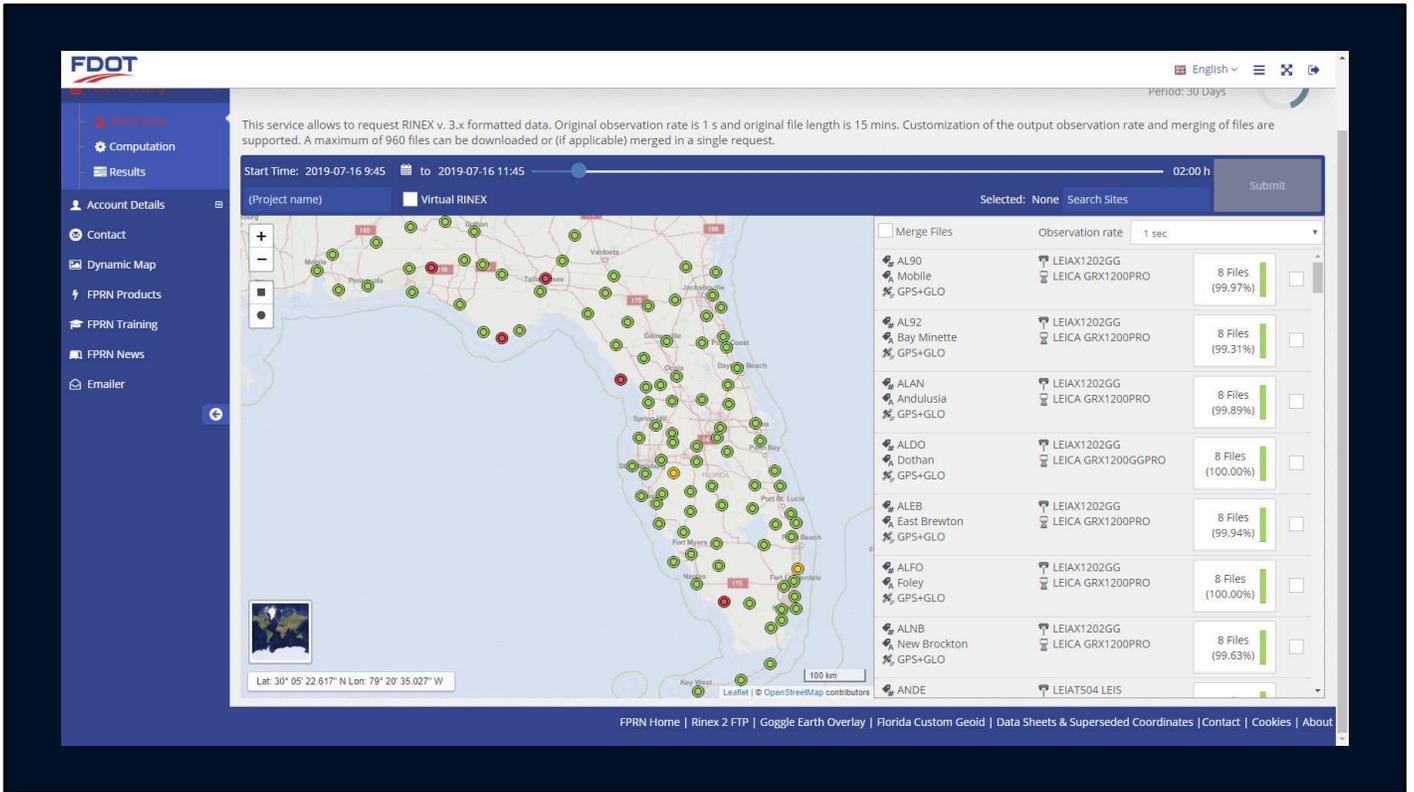
Select Post Processing from the left hand menu

(CLICK)



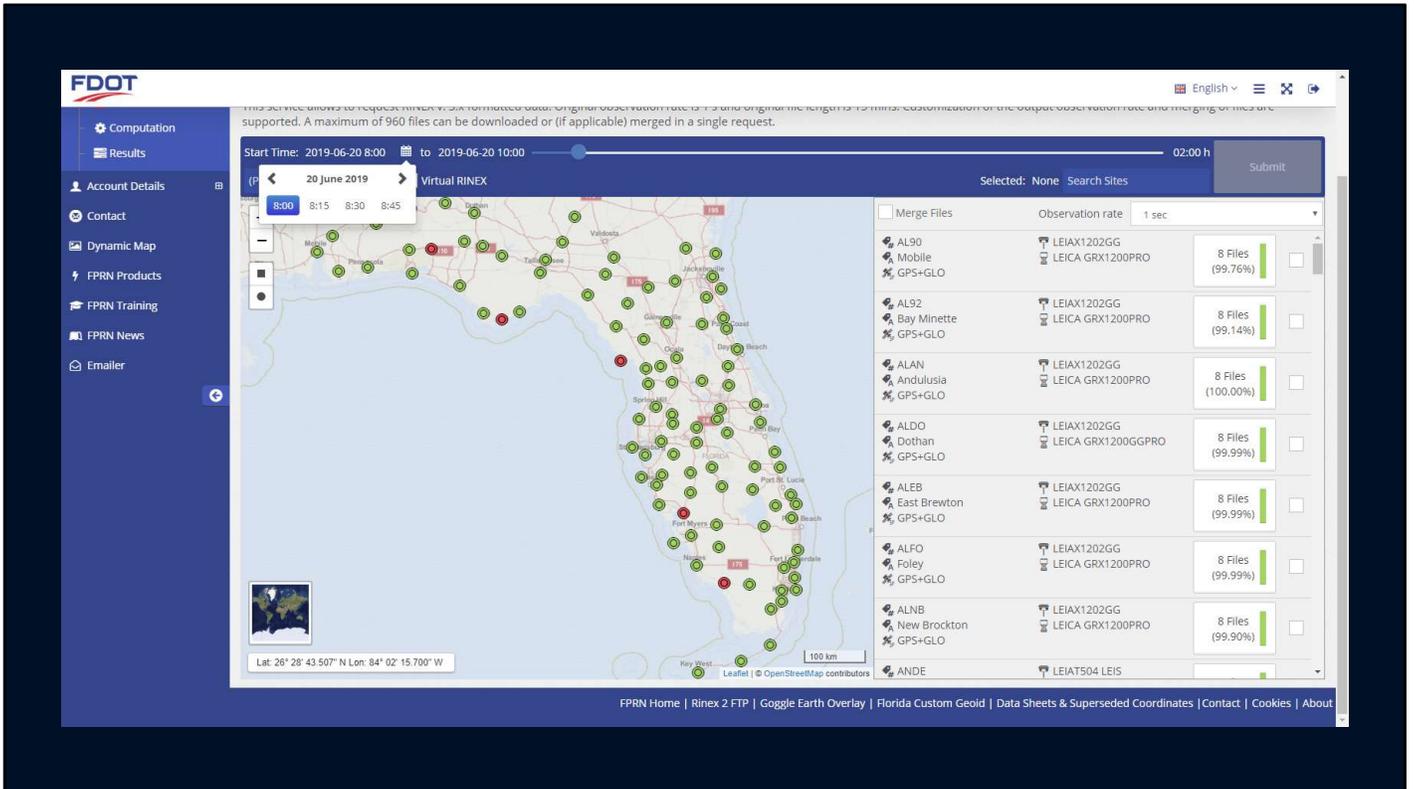
Select Rinex Data

(CLICK)



The Rinex 3 application will load

(CLICK)



Start by clicking on the Calendar icon

(CLICK)

Select the beginning date

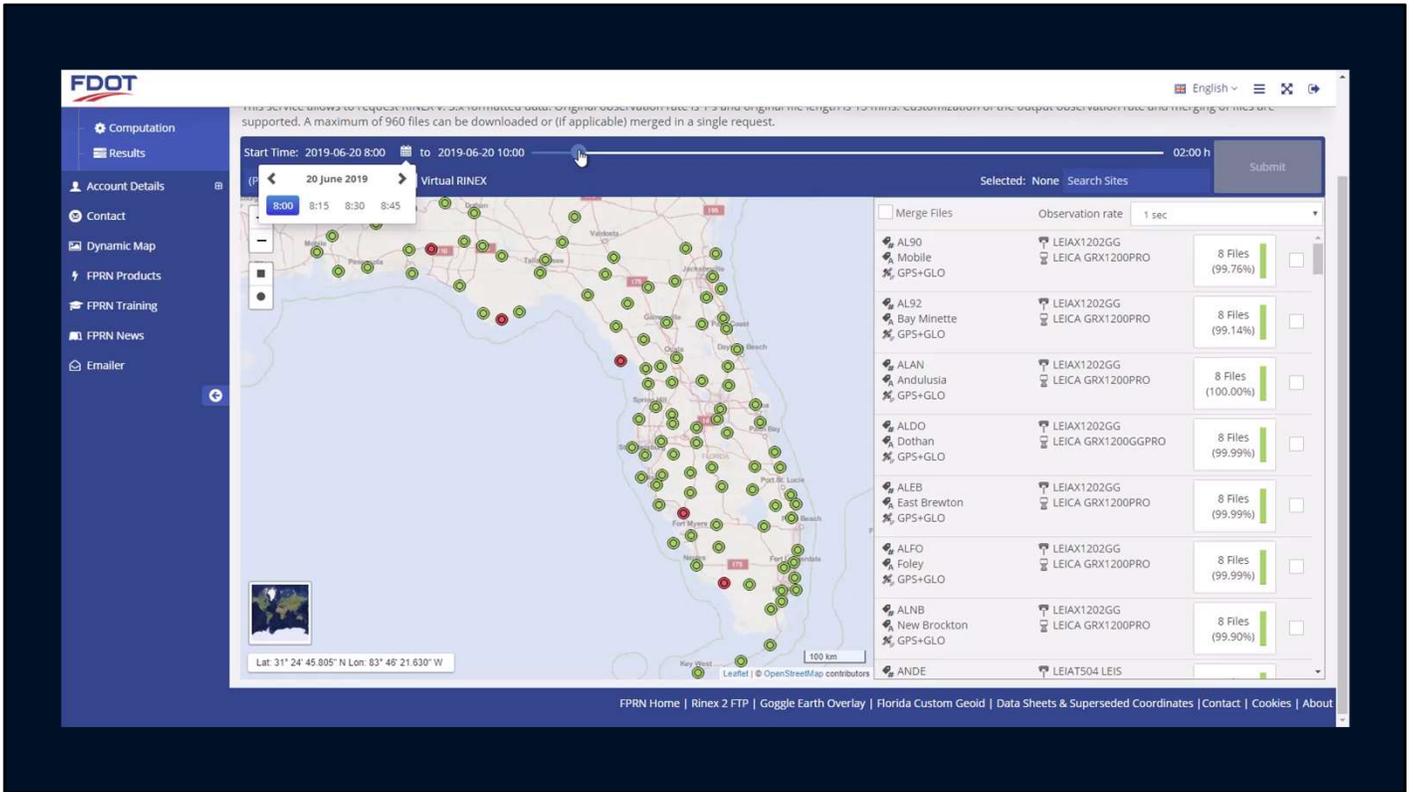
(CLICK)

Select the beginning hour

(Click)

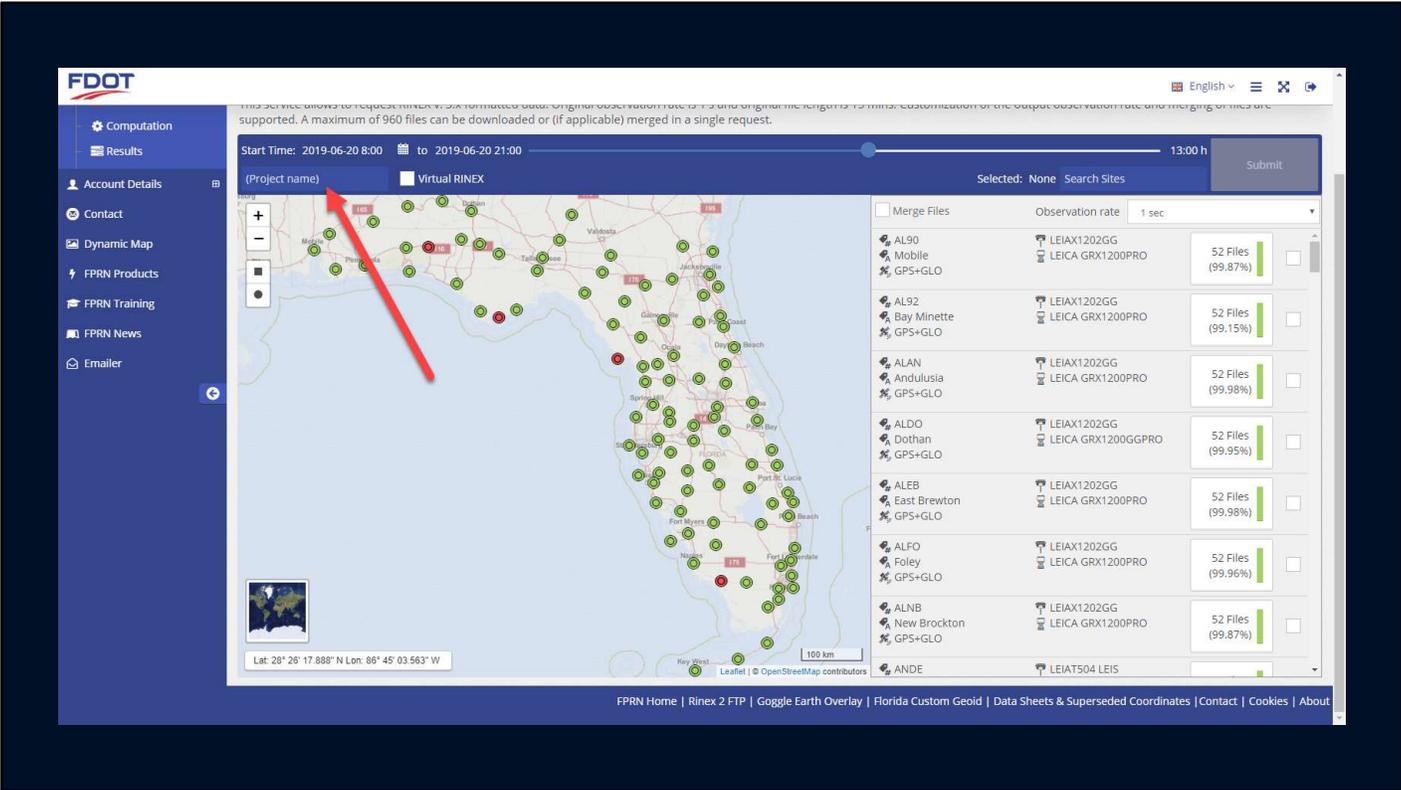
Select the closest starting minute

(CLICK)



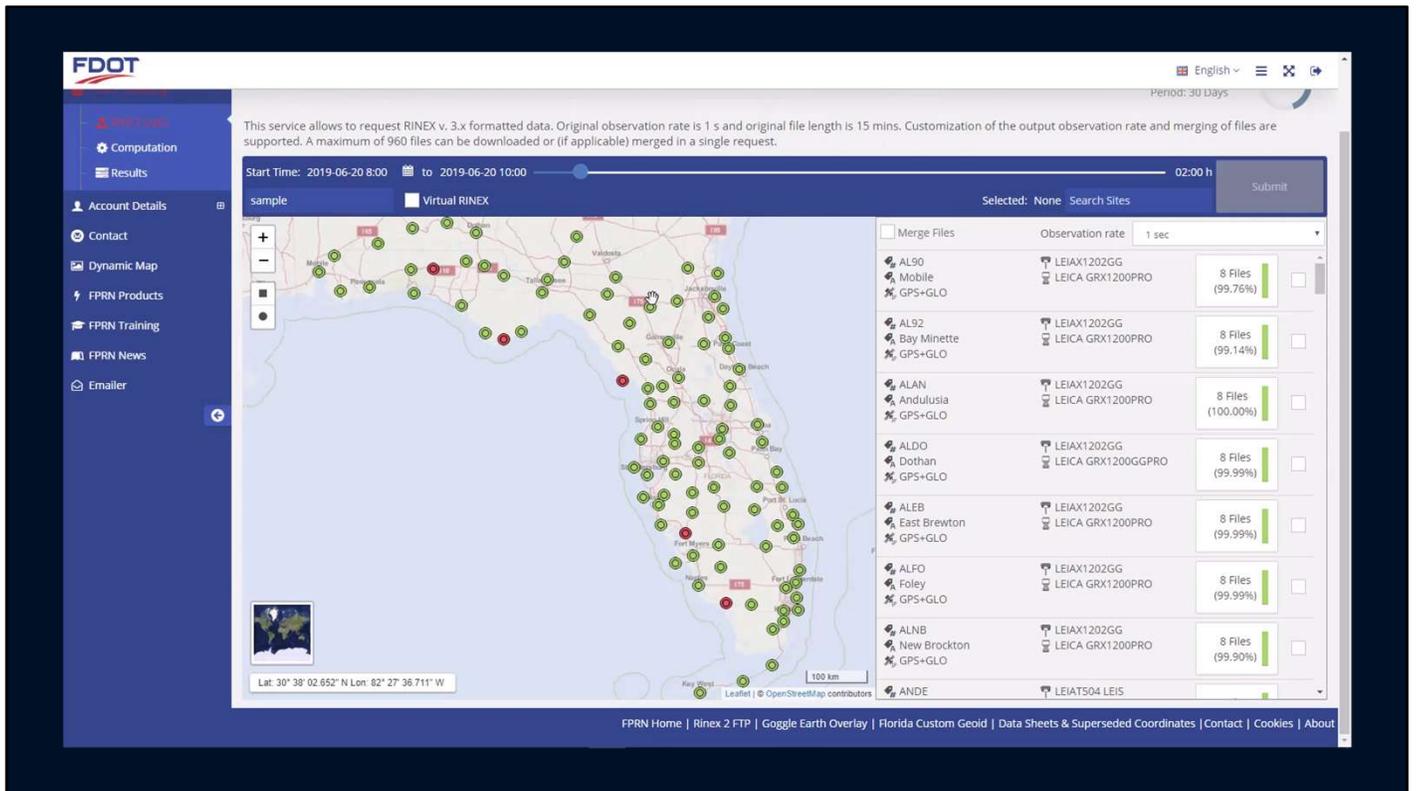
Slide the bar for the duration of the file needed

(CLICK)



Assign a Project Name

(CLICK)



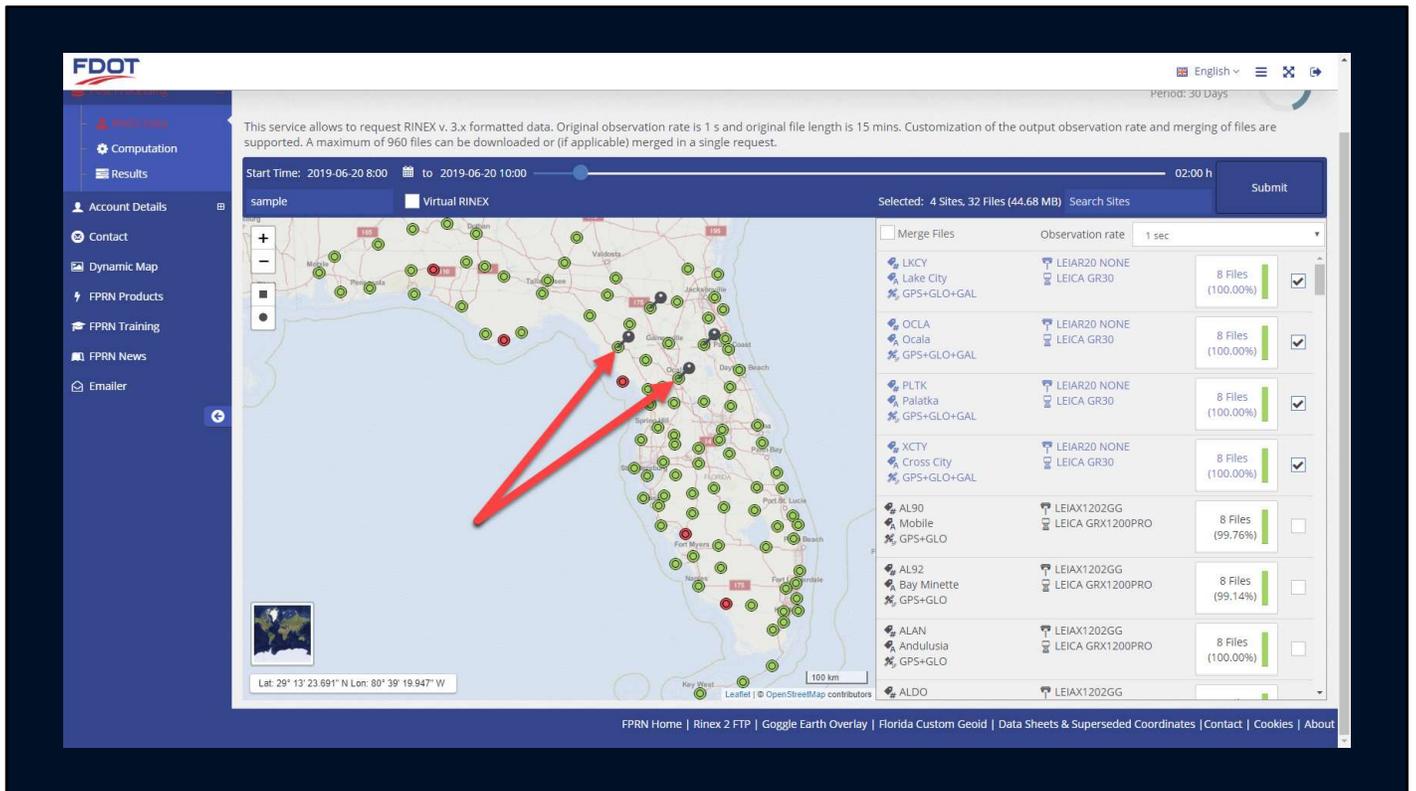
Pick the site or sites you need either on the map or on the list at the right.

Sites with 100% available data are shown in green

Sites with partial data are shown in yellow

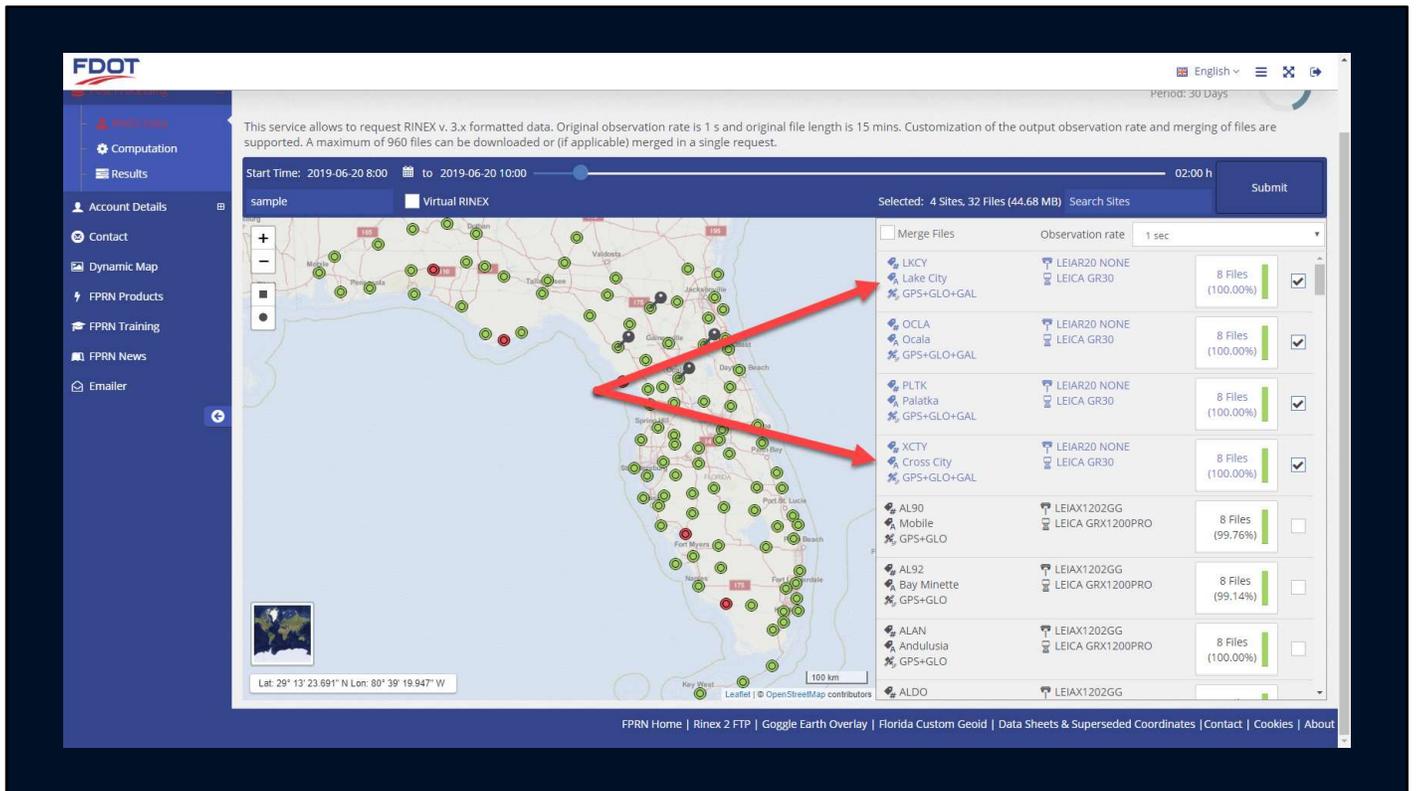
Sites with no data are shown in red

(CLICK)



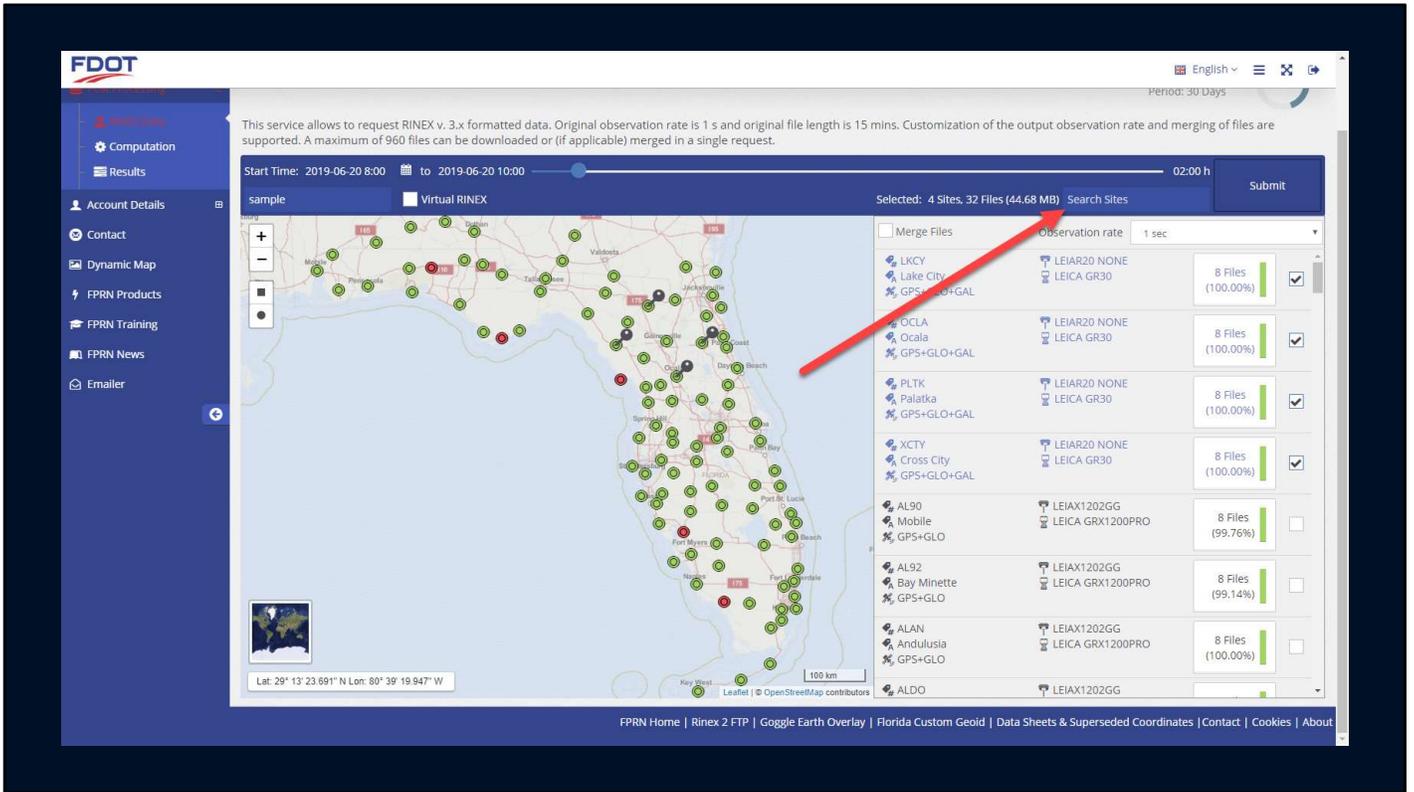
The sites you pick are shown with "push pin"

(CLICK)



They are also automatically moved to the top of the list and shown in alphabetical order.

(CLICK)



You can also search the sites

(CLICK)

This service allows to request RINEX v. 3.x formatted data. Original observation rate is 1 s and original file length is 15 mins. Customization of the output observation rate and merging of files are supported. A maximum of 960 files can be downloaded or (if applicable) merged in a single request.

Start Time: 2019-06-20 8:00 to 2019-06-20 10:00 02:00 h

sample Virtual RINEX Selected: 4 Sites, 32 Files (44.68 MB) Search Sites Submit

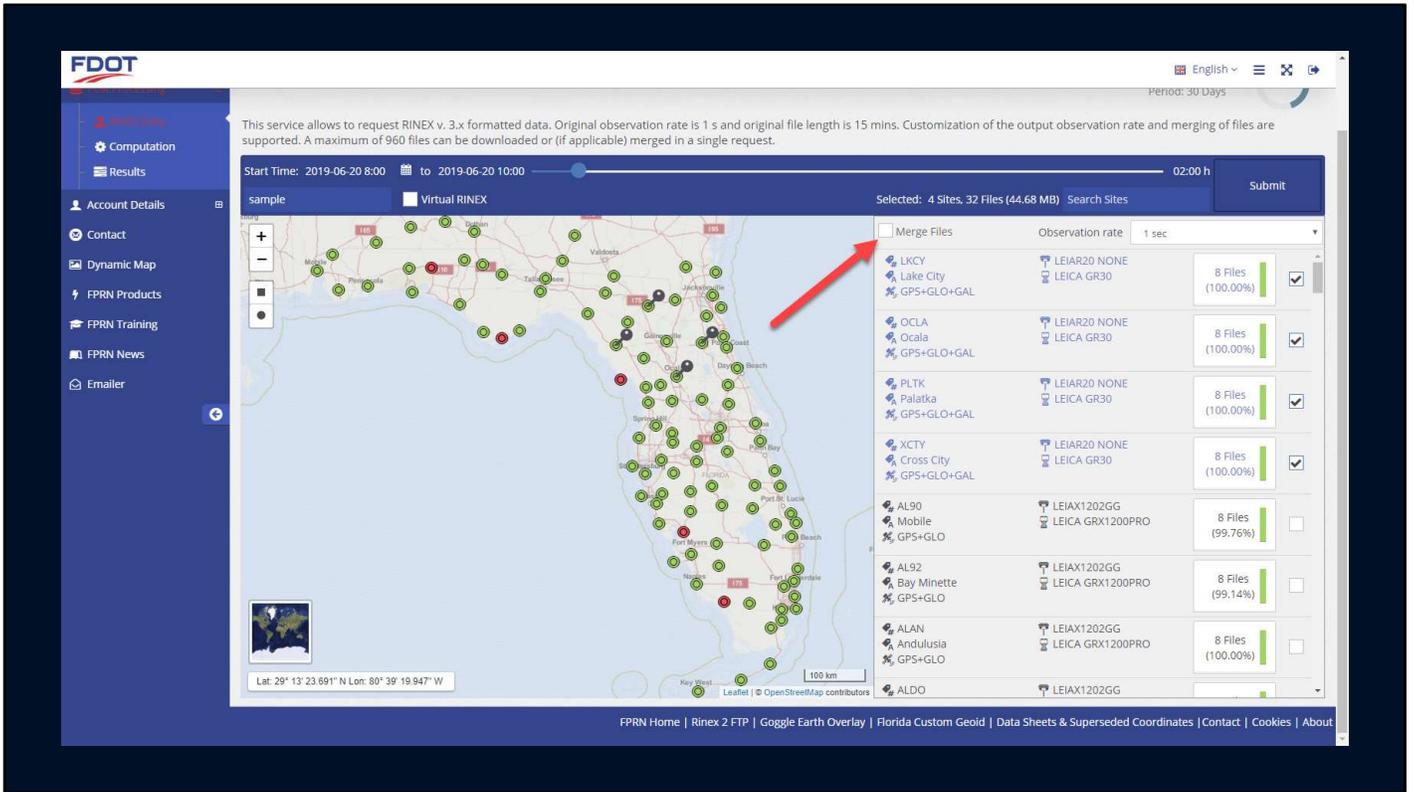
Site	Equipment	Files	Progress	Check
LKCY Lake City GPS+GLO+GAL	LEIAS1202GG LEICA GR30	8 Files (100.00%)	<div style="width: 100%;"></div>	<input checked="" type="checkbox"/>
OCLE Orlando GPS+GLO+GAL	LEIAR20 NONE LEICA GR30	8 Files (100.00%)	<div style="width: 100%;"></div>	<input checked="" type="checkbox"/>
PLTK Palatka GPS+GLO+GAL	LEIAR20 NONE LEICA GR30	8 Files (100.00%)	<div style="width: 100%;"></div>	<input checked="" type="checkbox"/>
XCTY Cross City GPS+GLO+GAL	LEIAR20 NONE LEICA GR30	8 Files (100.00%)	<div style="width: 100%;"></div>	<input checked="" type="checkbox"/>
AL90 Mobile GPS+GLO	LEIAX1202GG LEICA GRX1200PRO	8 Files (99.76%)	<div style="width: 99.76%;"></div>	<input type="checkbox"/>
AL92 Bay Minette GPS+GLO	LEIAX1202GG LEICA GRX1200PRO	8 Files (99.14%)	<div style="width: 99.14%;"></div>	<input type="checkbox"/>
ALAN Andulusia GPS+GLO	LEIAX1202GG LEICA GRX1200PRO	8 Files (100.00%)	<div style="width: 100%;"></div>	<input type="checkbox"/>
ALDO	LEIAX1202GG			

Observation rate: 1 sec

Lat: 29° 13' 23.691" N Lon: 80° 39' 19.947" W

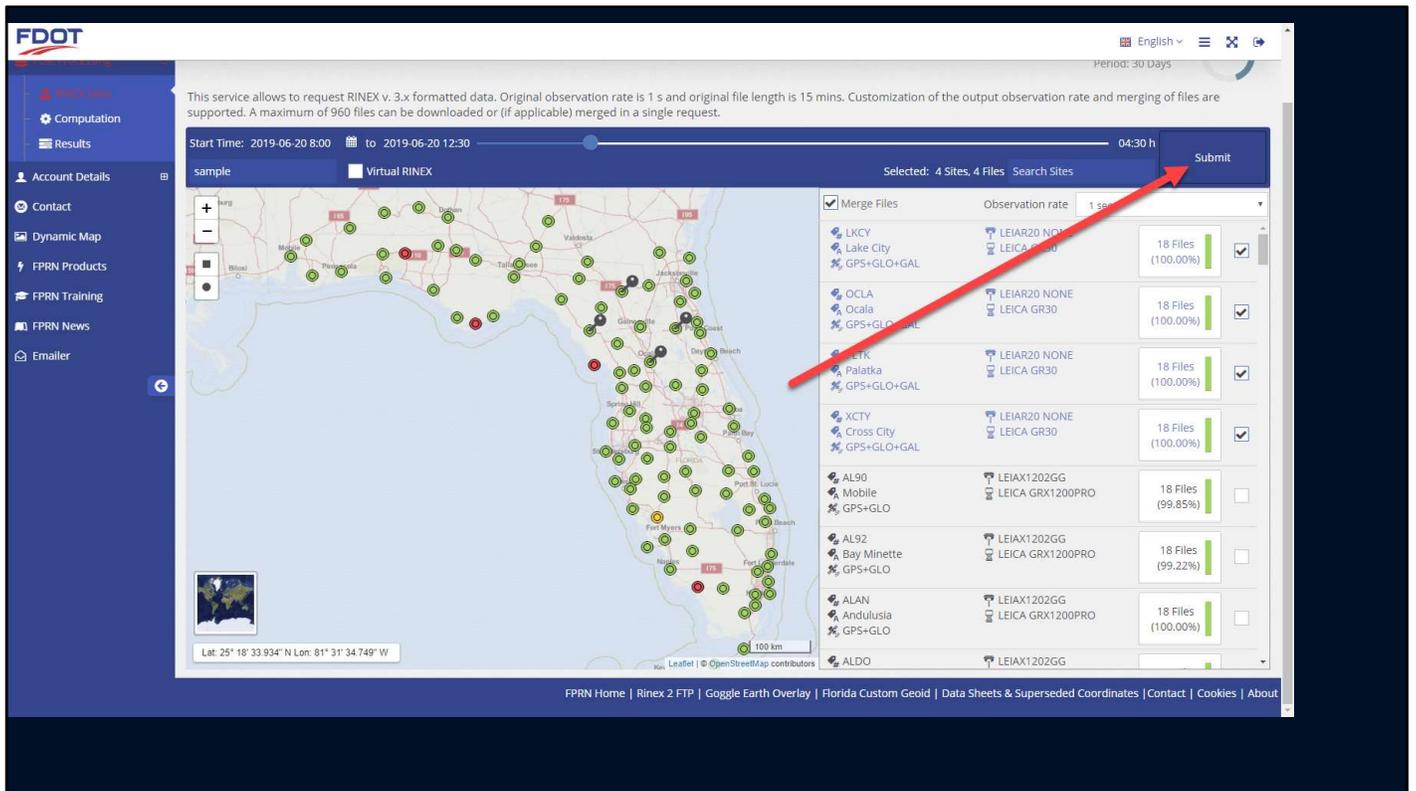
FP RN Home | Rinex 2 FTP | Google Earth Overlay | Florida Custom Geoid | Data Sheets & Superseded Coordinates | Contact | Cookies | About

Once you have finished selecting the sites needed, you can pick the epoch interval  
(CLICK)



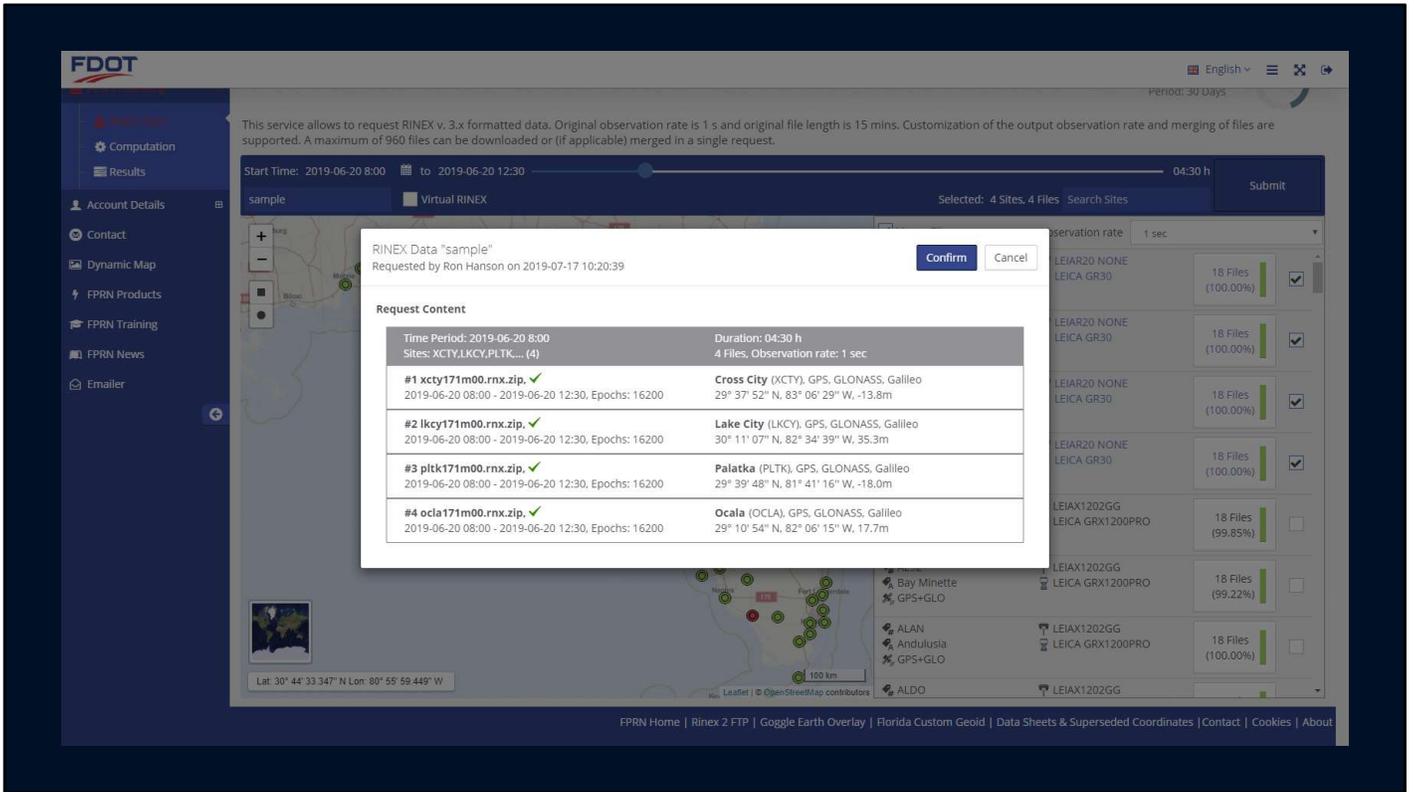
And whether or not to merge the site files into one each.

(CLICK)



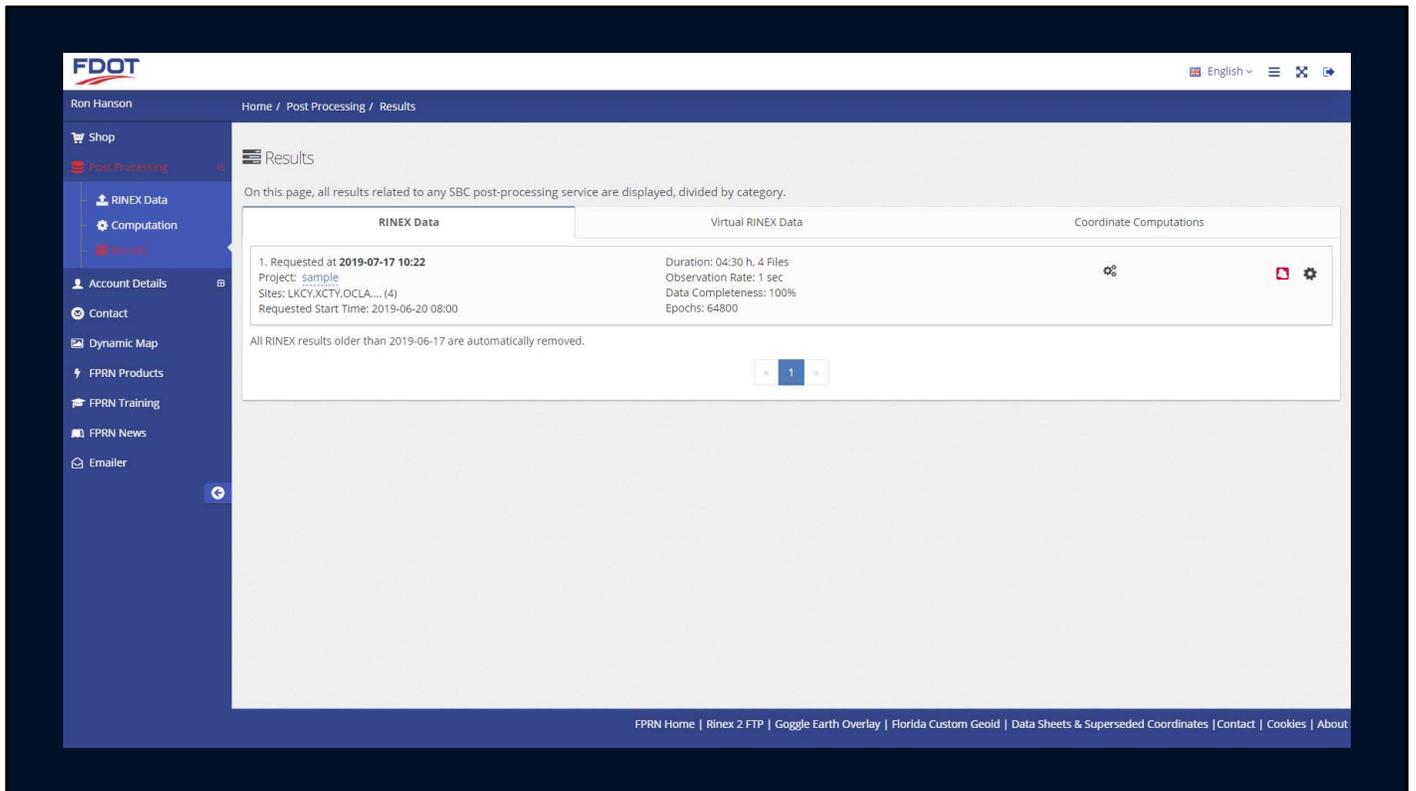
Click on the Submit button to start processing your request

(CLICK)



A confirmation screen will appear, click the confirm button to continue.

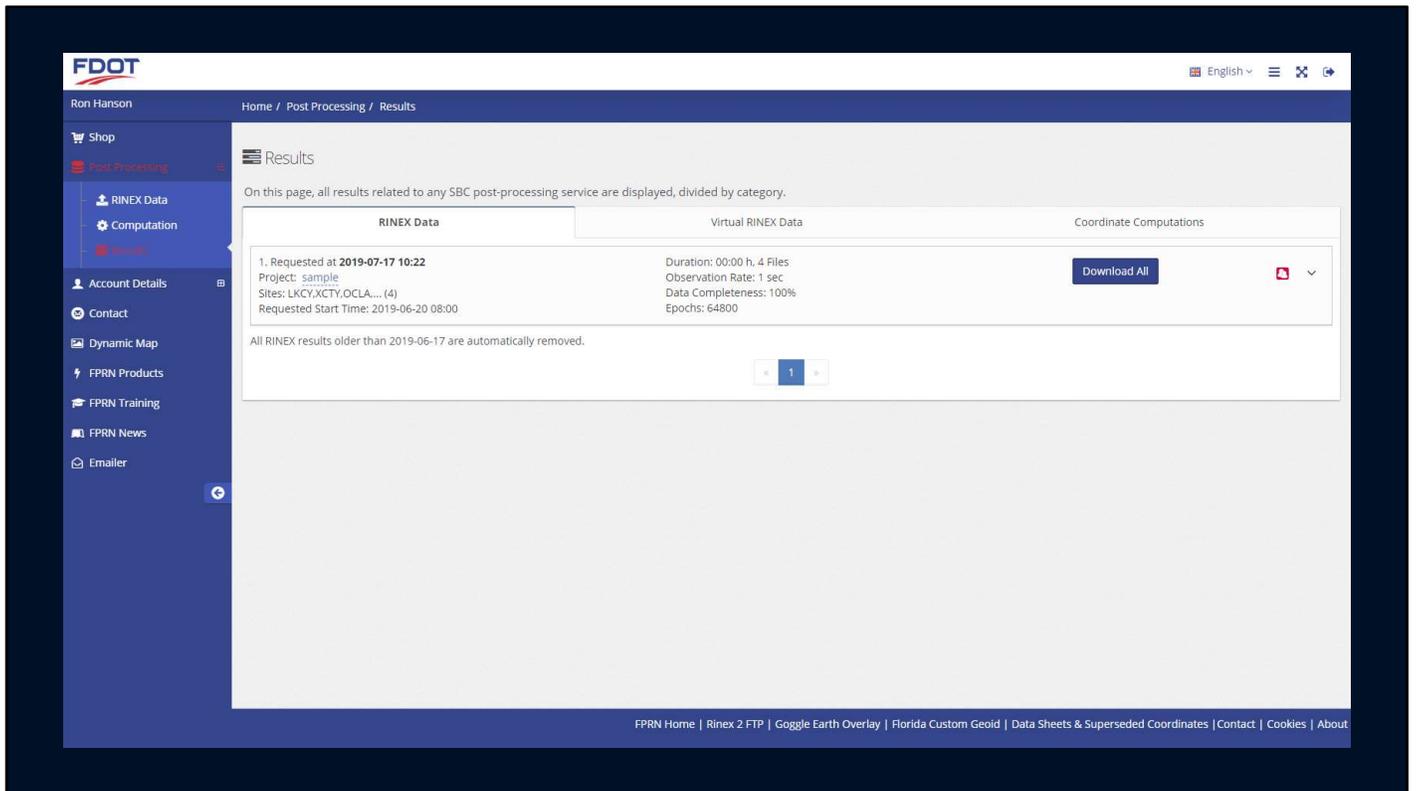
(CLICK)



You will be redirected to the results page

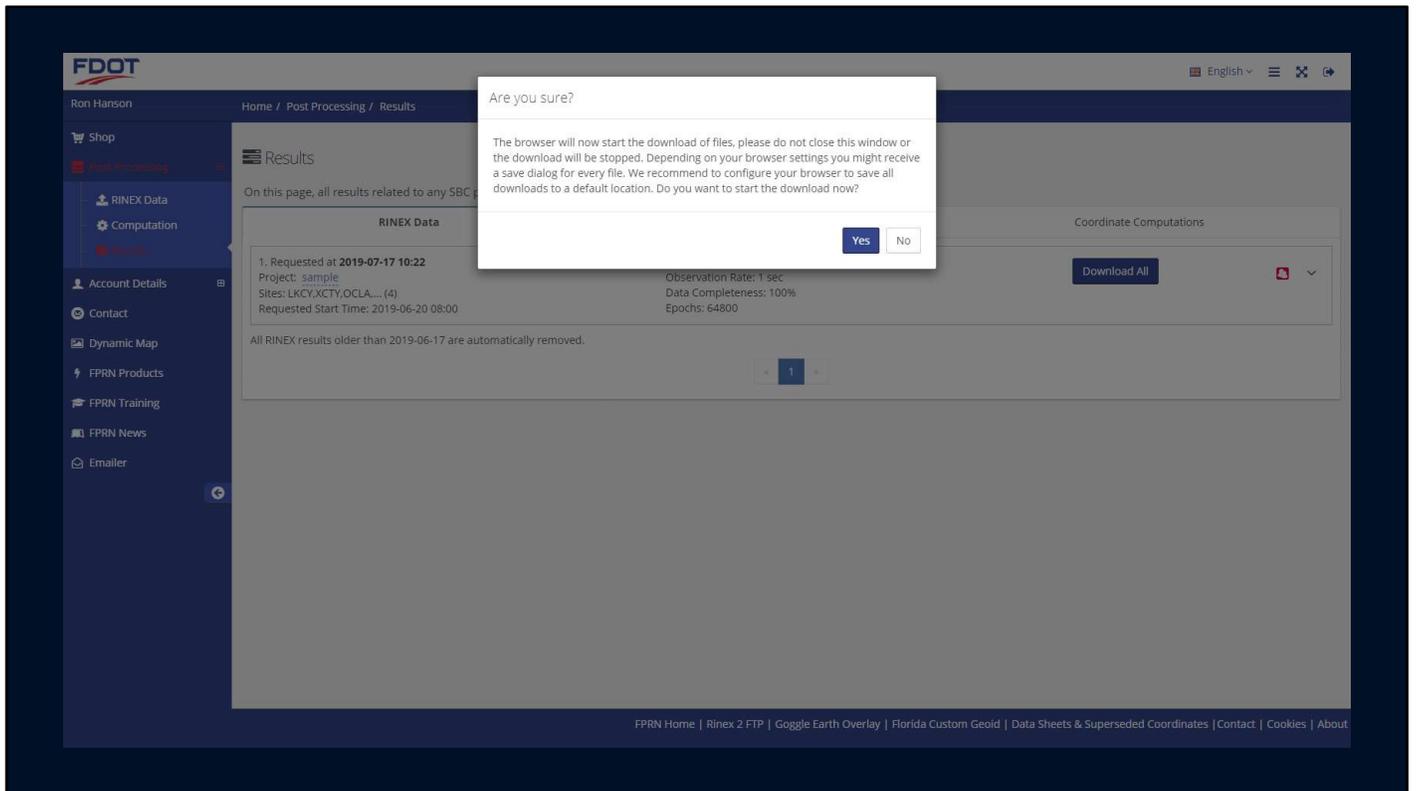
The results page shows any request you have made in the last 30 days, whether it be Rinex, Virtual Rinex or Computations

(CLICK)



Once the request has been finalized, the download all button will appear.

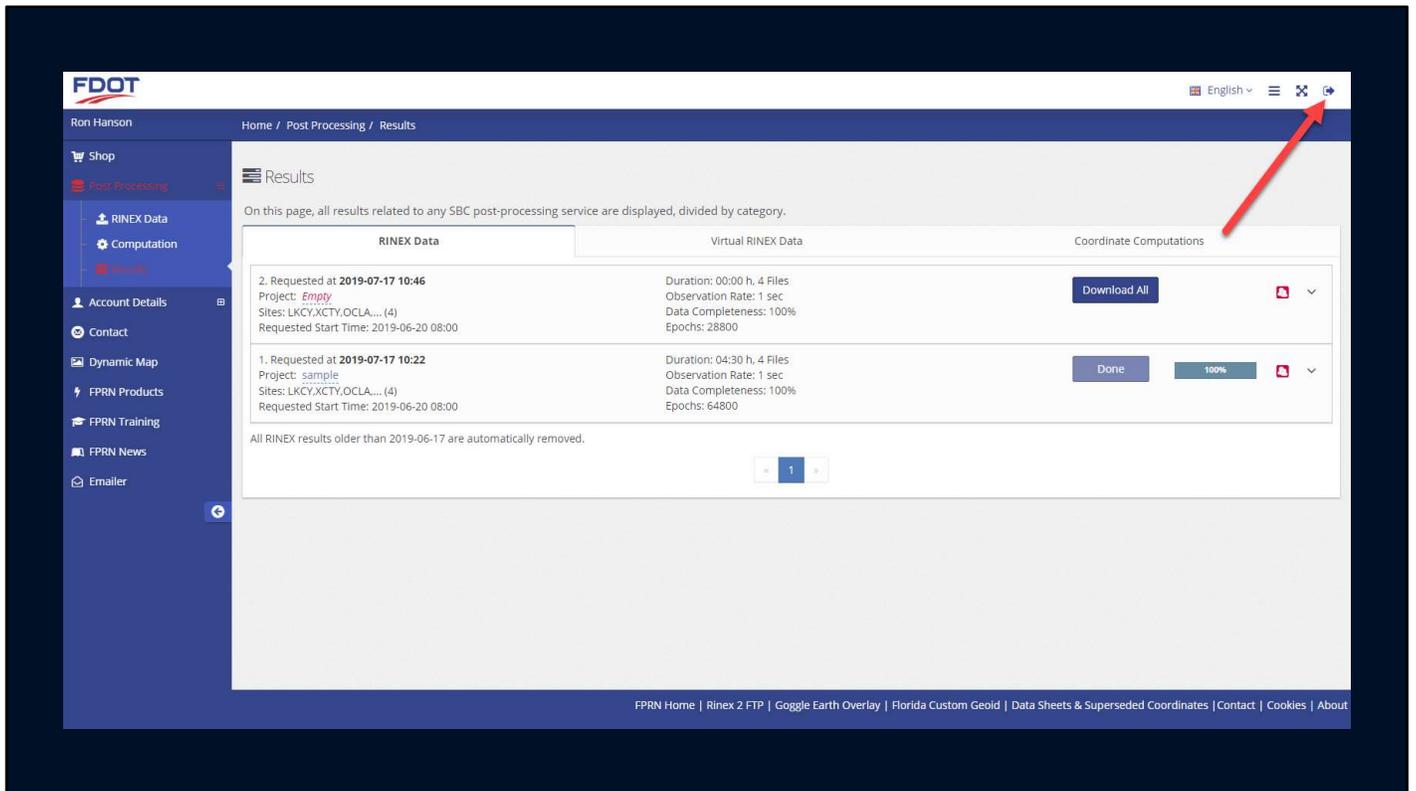
(CLICK)



Clicking will cause the confirmation window to appear, click yes to continue.

The files will be downloaded to your default download directory established in your browser.

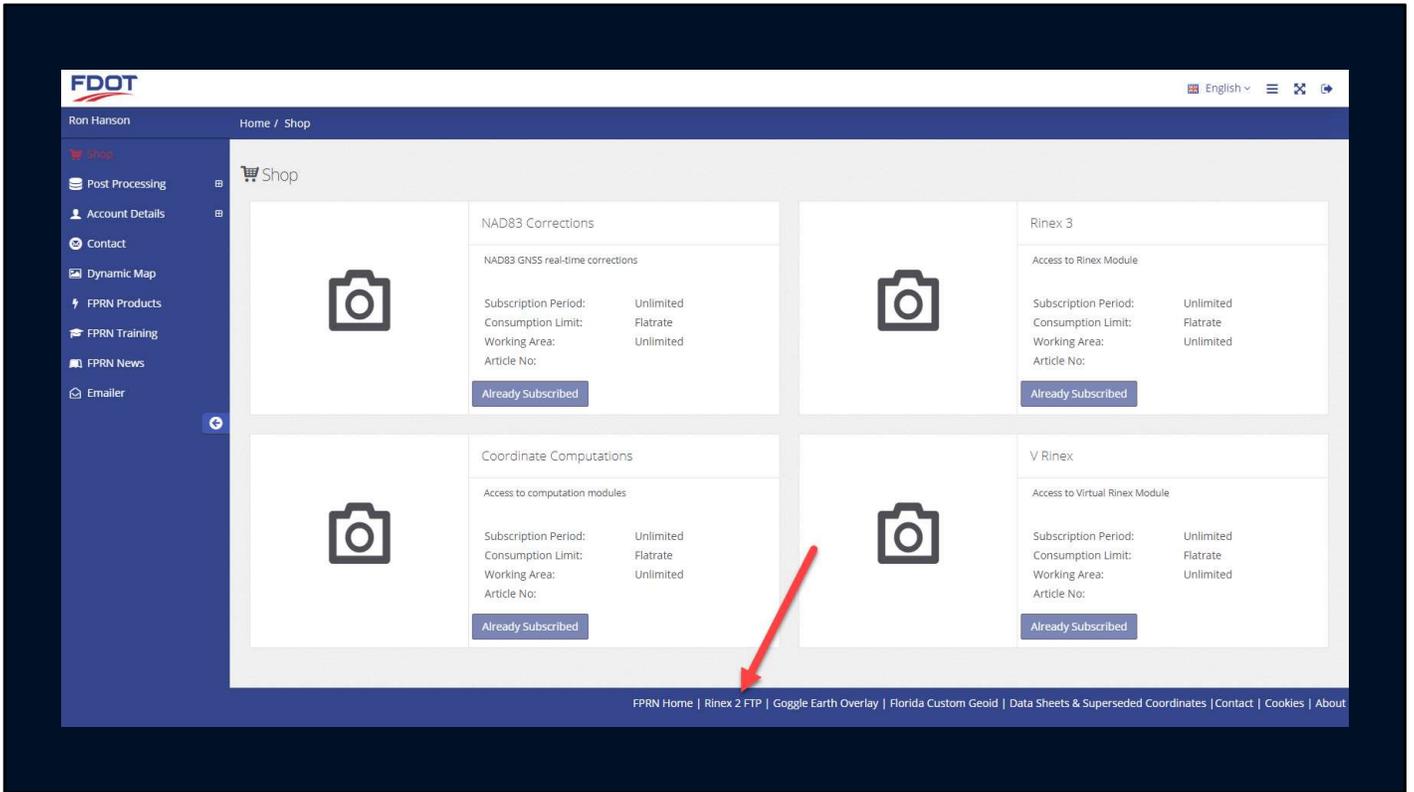
(CLICK)



Once download has completed, you can log off the site if you choose.

(CLICK)

# Rinex 2 Files



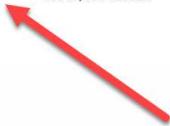
Starting on the Customer Portal Home screen, click on the Rinex 2 FTP link on the bottom of the screen.

(CLICK)

## Index of /Rinex2/

[parent directory]

Name	Size	Date Modified
01/		4/11/19, 11:27:00 AM
24/		4/11/19, 11:27:00 AM



Select either 1 hour file or 24 hour file

1 Hour files are 1 second epochs

24 Hour files are 30 second epochs

(CLICK)

## Index of /Rinex2/01/

[parent directory]

Name	Size	Date Modified
AL90/		3/19/19, 2:37:00 AM
AL92/		3/19/19, 2:37:00 AM
ALAN/		3/19/19, 2:37:00 AM
ALDO/		3/19/19, 2:37:00 AM
ALEB/		6/28/19, 5:27:00 AM
ALFO/		6/28/19, 5:27:00 AM
ALNB/		6/28/19, 5:27:00 AM
ANDE/		6/28/19, 5:27:00 AM
AVON/		7/3/19, 2:12:00 AM
BART/		7/3/19, 2:12:00 AM
BKVL/		3/19/19, 2:38:00 AM
BOCA/		6/28/19, 5:27:00 AM
BRTW/		3/19/19, 2:38:00 AM
CRNR/		6/28/19, 5:27:00 AM
CRST/		6/28/19, 5:27:00 AM
DFNK/		3/19/19, 2:38:00 AM
DLND/		6/28/19, 5:27:00 AM
DSTN/		3/19/19, 2:38:00 AM
DUNN/		6/28/19, 5:27:00 AM
FL23/		6/28/19, 5:27:00 AM
FL75/		6/28/19, 5:27:00 AM
FLA1/		7/3/19, 2:12:00 AM
FLBF/		6/28/19, 5:27:00 AM
FLBN/		6/28/19, 5:27:00 AM
FLBR/		6/28/19, 5:27:00 AM
FLBY/		6/28/19, 5:27:00 AM
FLCB/		6/28/19, 5:27:00 AM
FLCC/		6/28/19, 5:27:00 AM
FLCK/		6/28/19, 5:27:00 AM
FLD6/		6/28/19, 5:27:00 AM
FLD7/		6/28/19, 5:27:00 AM
FLDC/		6/28/19, 5:27:00 AM
FLEM/		6/28/19, 5:27:00 AM
FLEU/		6/28/19, 5:27:00 AM
FLFB/		3/19/19, 2:38:00 AM
FLFD/		6/28/19, 5:27:00 AM
FLFR/		6/28/19, 5:27:00 AM
FLGR/		6/28/19, 5:27:00 AM
FLHG/		7/3/19, 2:12:00 AM

Select the station desired

(CLICK)

## Index of /Rinex2/01/DLND/

 [parent directory]

Name	Size	Date Modified
 2019		6/30/19, 5:03:00 PM



Select year

(CLICK)

## Index of /Rinex2/01/DLND/2019/

[parent directory]

Name	Size	Date Modified
01/		7/3/19, 2:13:00 AM
02/		2/27/19, 9:16:00 PM
03/		3/30/19, 5:03:00 PM
04/		4/29/19, 5:03:00 PM
05/		5/30/19, 5:02:00 PM
06/		6/29/19, 5:03:00 PM
07/		7/17/19, 5:04:00 PM

Select month

(CLICK)

## Index of /Rinex2/01/DLND/2019/06/

[parent directory]

Name	Size	Date Modified
01/		6/1/19, 4:08:00 PM
02/		6/2/19, 4:06:00 PM
03/		6/3/19, 4:07:00 PM
04/		6/4/19, 4:04:00 PM
05/		6/5/19, 4:06:00 PM
06/		6/6/19, 4:08:00 PM
07/		6/7/19, 4:07:00 PM
08/		6/8/19, 4:06:00 PM
09/		6/9/19, 4:04:00 PM
10/		6/10/19, 4:06:00 PM
11/		6/11/19, 4:06:00 PM
12/		6/12/19, 4:04:00 PM
13/		6/13/19, 4:05:00 PM
14/		6/14/19, 4:06:00 PM
15/		6/15/19, 4:06:00 PM
16/		6/16/19, 4:06:00 PM
17/		6/17/19, 4:06:00 PM
18/		6/18/19, 4:07:00 PM
19/		6/19/19, 4:06:00 PM
20/		6/20/19, 4:07:00 PM
21/		6/21/19, 4:06:00 PM
22/		6/22/19, 4:10:00 PM
23/		6/23/19, 4:08:00 PM
24/		6/24/19, 4:08:00 PM
25/		6/25/19, 4:08:00 PM
26/		6/26/19, 4:09:00 PM
27/		6/27/19, 4:10:00 PM
28/		6/28/19, 4:08:00 PM
29/		6/29/19, 4:09:00 PM
30/		6/30/19, 4:08:00 PM

Select day

(CLICK)

## Index of /Rinex2/01/DLND/2019/06/20/

[parent directory]

Name	Size	Date Modified
<input type="checkbox"/> dlnd171a.rnx.zip	2.0 MB	6/19/19, 5:02:00 PM
<input type="checkbox"/> dlnd171b.rnx.zip	2.3 MB	6/19/19, 6:02:00 PM
<input type="checkbox"/> dlnd171c.rnx.zip	2.3 MB	6/19/19, 7:02:00 PM
<input type="checkbox"/> dlnd171d.rnx.zip	2.7 MB	6/19/19, 8:02:00 PM
<input type="checkbox"/> dlnd171e.rnx.zip	3.1 MB	6/19/19, 9:03:00 PM
<input type="checkbox"/> dlnd171f.rnx.zip	3.0 MB	6/19/19, 10:02:00 PM
<input type="checkbox"/> dlnd171g.rnx.zip	2.9 MB	6/19/19, 11:02:00 PM
<input type="checkbox"/> dlnd171h.rnx.zip	2.7 MB	6/20/19, 12:02:00 AM
<input type="checkbox"/> dlnd171i.rnx.zip	2.8 MB	6/20/19, 1:03:00 AM
<input type="checkbox"/> dlnd171j.rnx.zip	32.3 kB	6/20/19, 1:08:00 AM
<input type="checkbox"/> dlnd171j01.rnx.zip	18.7 kB	6/20/19, 1:08:00 AM
<input type="checkbox"/> dlnd171j04.rnx.zip	2.3 MB	6/20/19, 2:02:00 AM
<input type="checkbox"/> dlnd171k.rnx.zip	2.8 MB	6/20/19, 3:02:00 AM
<input type="checkbox"/> dlnd171l.rnx.zip	3.0 MB	6/20/19, 4:03:00 AM
<input type="checkbox"/> dlnd171m.rnx.zip	3.0 MB	6/20/19, 5:03:00 AM
<input type="checkbox"/> dlnd171n.rnx.zip	3.1 MB	6/20/19, 6:03:00 AM
<input type="checkbox"/> dlnd171o.rnx.zip	3.0 MB	6/20/19, 7:03:00 AM
<input type="checkbox"/> dlnd171p.rnx.zip	2.7 MB	6/20/19, 8:03:00 AM
<input type="checkbox"/> dlnd171q.rnx.zip	3.0 MB	6/20/19, 9:03:00 AM
<input type="checkbox"/> dlnd171r.rnx.zip	2.9 MB	6/20/19, 10:03:00 AM
<input type="checkbox"/> dlnd171s.rnx.zip	2.8 MB	6/20/19, 11:02:00 AM
<input type="checkbox"/> dlnd171t.rnx.zip	2.9 MB	6/20/19, 12:03:00 PM
<input type="checkbox"/> dlnd171u.rnx.zip	2.9 MB	6/20/19, 1:03:00 PM
<input type="checkbox"/> dlnd171v.rnx.zip	2.6 MB	6/20/19, 2:02:00 PM
<input type="checkbox"/> dlnd171w.rnx.zip	2.5 MB	6/20/19, 3:02:00 PM
<input type="checkbox"/> dlnd171x.rnx.zip	2.2 MB	6/20/19, 4:07:00 PM

Select file

Remembering that there is a time shift

(CLICK)

## Index of /Rinex2/01/DLND/2019/06/20/

[parent directory]

Name	Size	Date Modified
 dlnd171a.rnx.zip	2.0 MB	6/19/19, 5:02:00 PM
 dlnd171b.rnx.zip	2.3 MB	6/19/19, 6:02:00 PM
 dlnd171c.rnx.zip	2.5 MB	6/19/19, 7:02:00 PM
 dlnd171d.rnx.zip	2.7 MB	6/19/19, 8:02:00 PM
 dlnd171e.rnx.zip	3.1 MB	6/19/19, 9:03:00 PM
 dlnd171f.rnx.zip	3.0 MB	6/19/19, 10:02:00 PM
 dlnd171g.rnx.zip	2.9 MB	6/19/19, 11:02:00 PM
 dlnd171h.rnx.zip	2.7 MB	6/20/19, 12:02:00 AM
 dlnd171i.rnx.zip	2.8 MB	6/20/19, 1:03:00 AM
 dlnd171j.rnx.zip	32.3 kB	6/20/19, 1:08:00 AM
 dlnd171j01.rnx.zip	18.7 kB	6/20/19, 1:08:00 AM
 dlnd171j04.rnx.zip	2.3 MB	6/20/19, 2:02:00 AM
 dlnd171k.rnx.zip	2.8 MB	6/20/19, 3:02:00 AM
 dlnd171l.rnx.zip	3.0 MB	6/20/19, 4:03:00 AM
 dlnd171m.rnx.zip	3.0 MB	6/20/19, 5:03:00 AM
 dlnd171n.rnx.zip	3.1 MB	6/20/19, 6:03:00 AM
 dlnd171o.rnx.zip	3.0 MB	6/20/19, 7:03:00 AM
 dlnd171p.rnx.zip	2.7 MB	6/20/19, 8:03:00 AM
 dlnd171q.rnx.zip	3.0 MB	6/20/19, 9:02:00 AM
 dlnd171r.rnx.zip	2.9 MB	6/20/19, 10:03:00 AM
 dlnd171s.rnx.zip	2.8 MB	6/20/19, 11:02:00 AM
 dlnd171t.rnx.zip	2.9 MB	6/20/19, 12:03:00 PM
 dlnd171u.rnx.zip	2.9 MB	6/20/19, 1:03:00 PM
 dlnd171v.rnx.zip	2.6 MB	6/20/19, 2:02:00 PM
 dlnd171w.rnx.zip	2.5 MB	6/20/19, 3:02:00 PM
 dlnd171x.rnx.zip	2.2 MB	6/20/19, 4:07:00 PM

 dlnd171h.rnx.zip

Show all X

The file will automatically download to your default directory

Repeat as necessary

(CLICK)

10 Minute Break

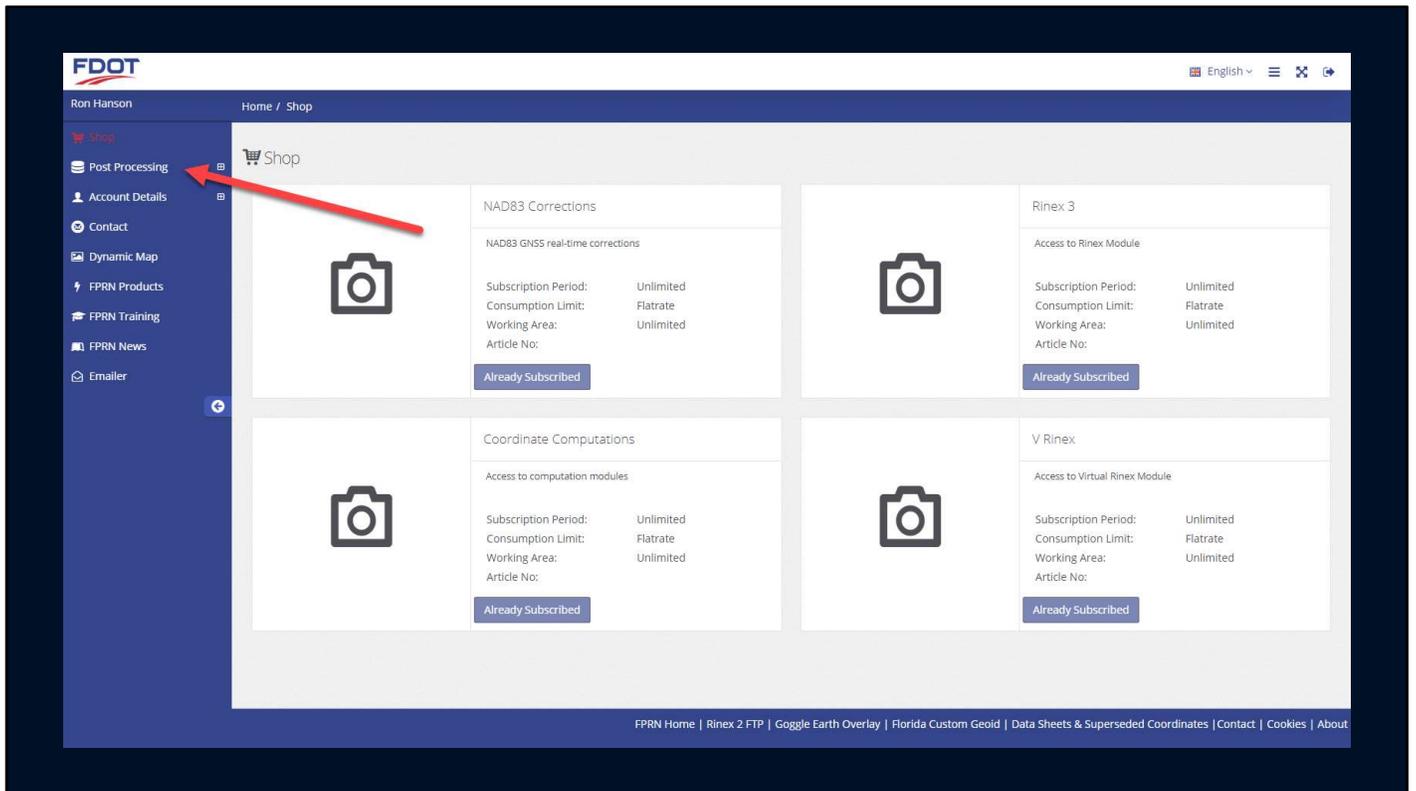


# Virtual Rinex

Now let talk about Virtual Rinex

Virtual Rinex allows you to create a network adjusted Rinex file

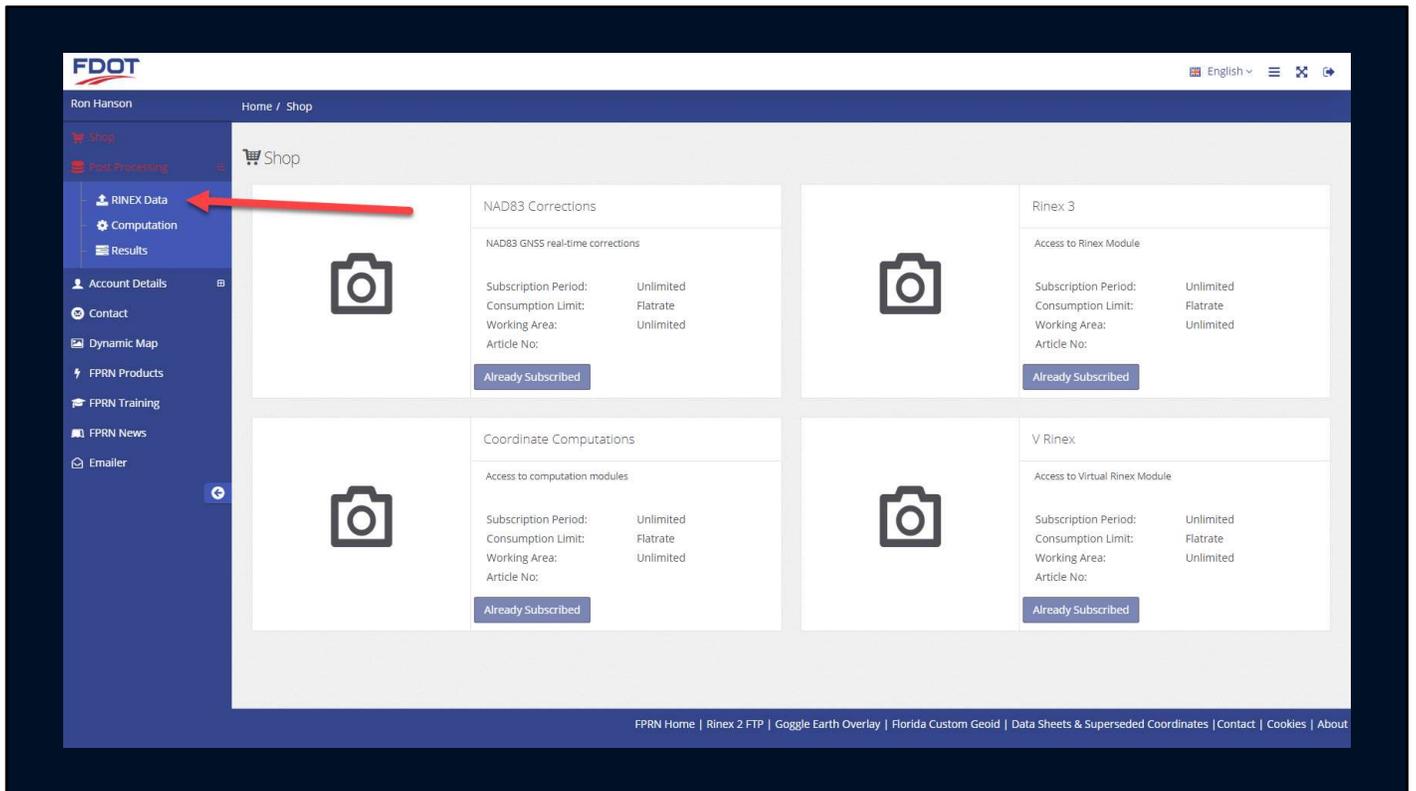
(CLICK)



Starting at the Customer Portal home screen

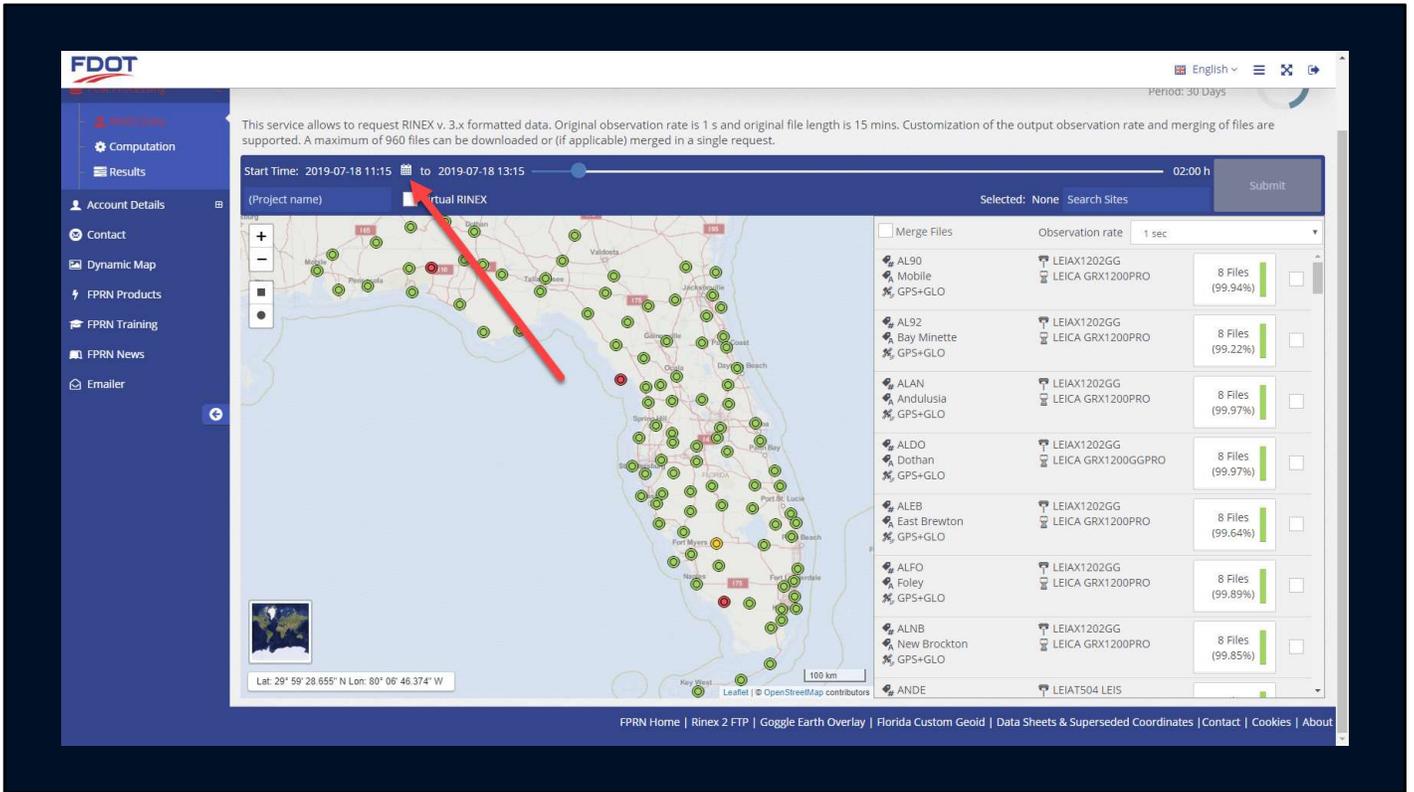
Click on Post Processing

(CLICK)



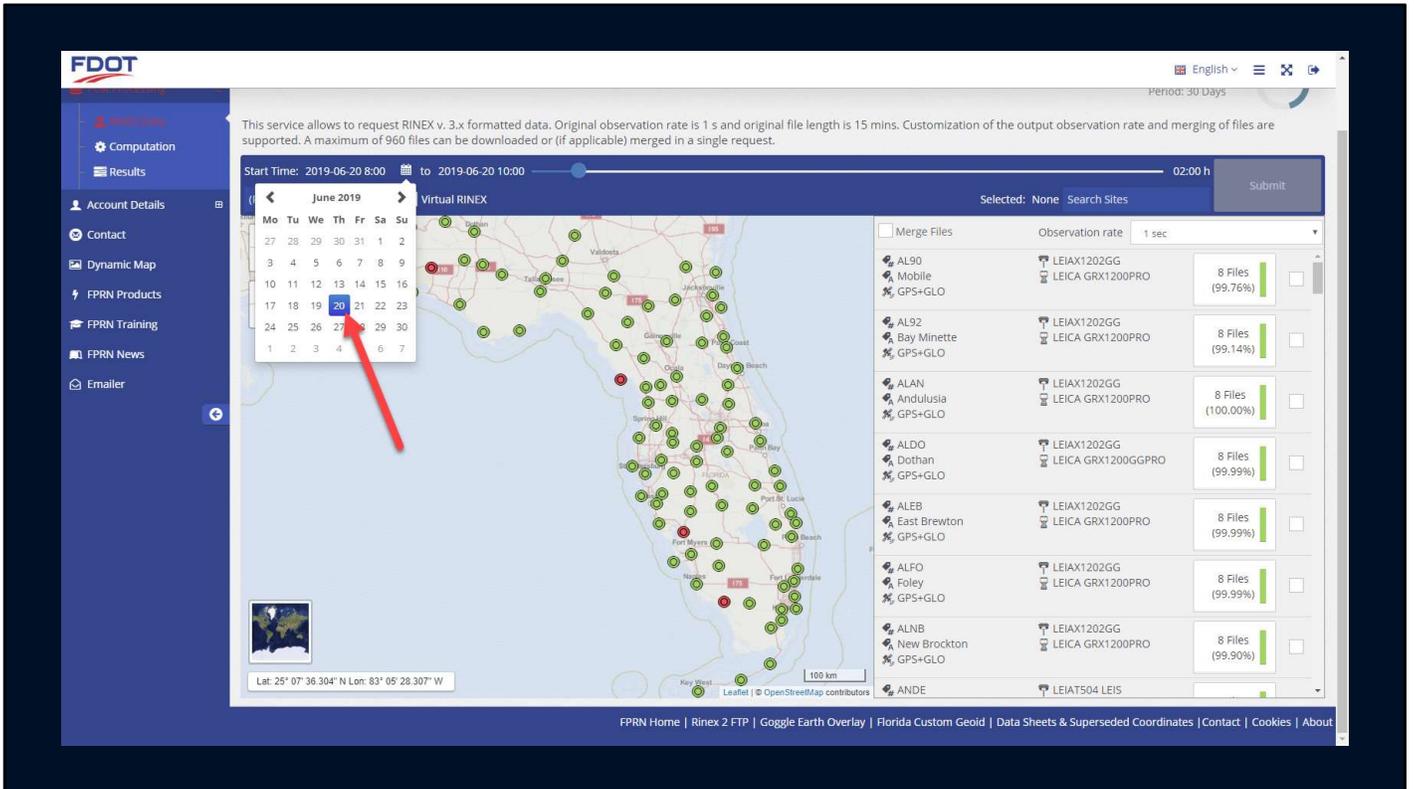
Click on RINEX Data

(CLICK)



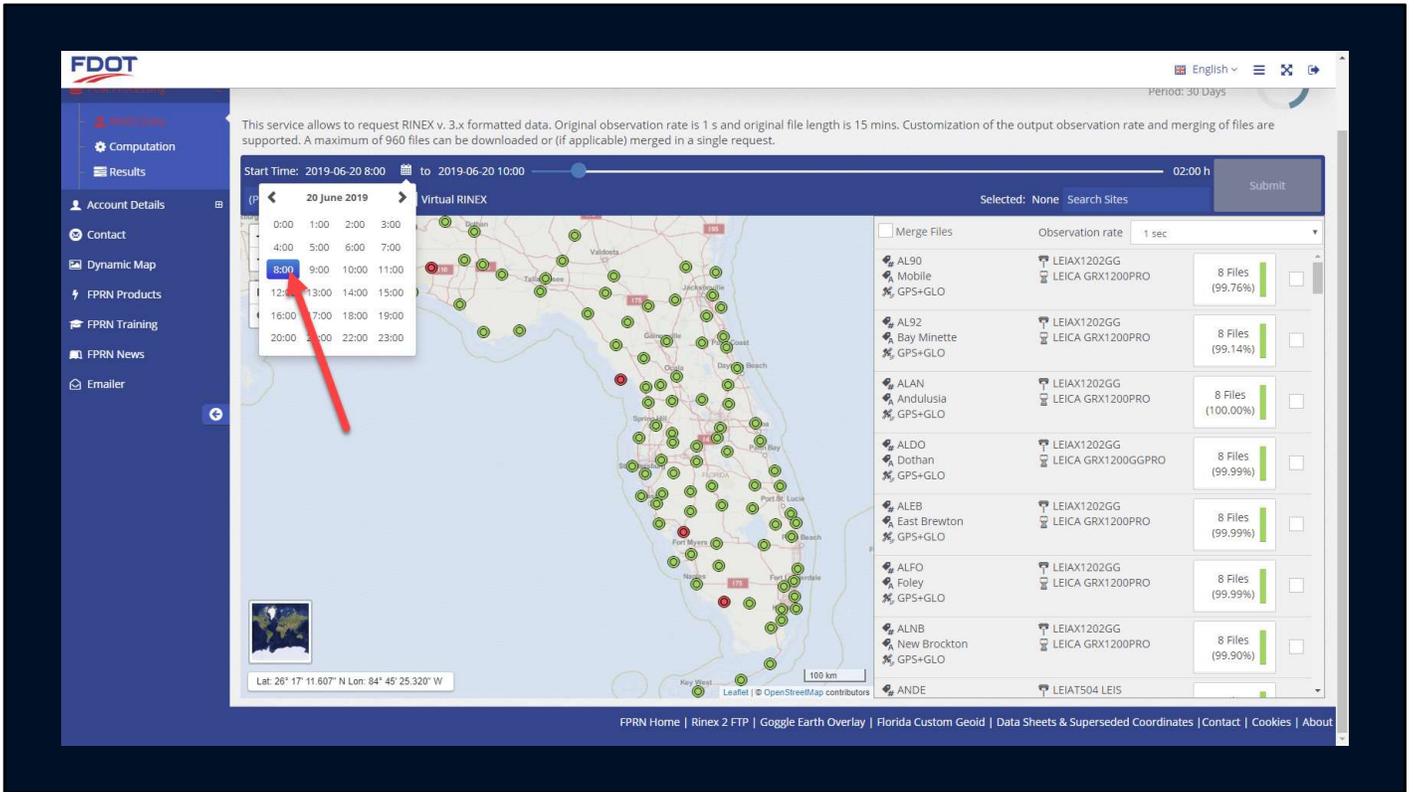
Click on the calendar icon to begin selecting your date

(CLICK)



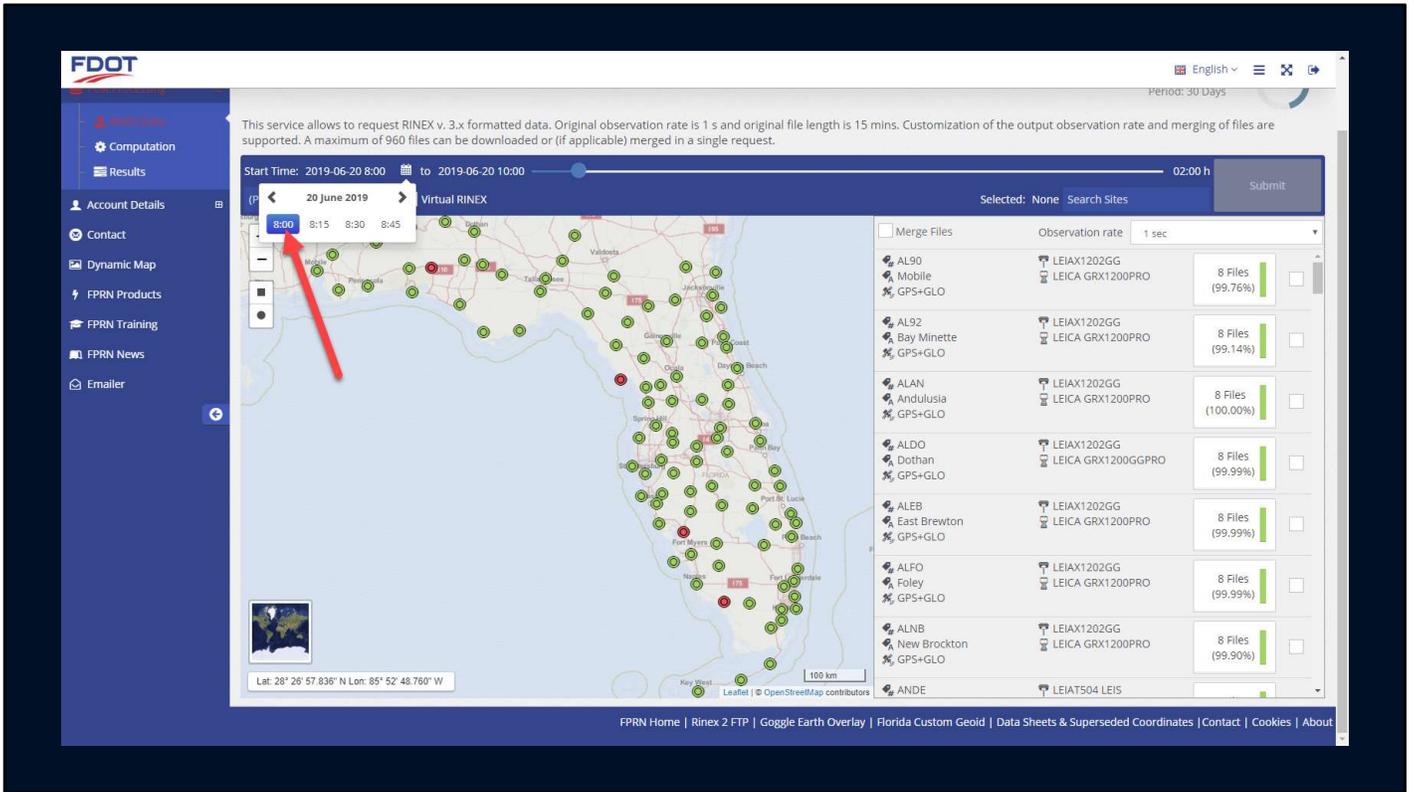
Select the day

(CLICK)



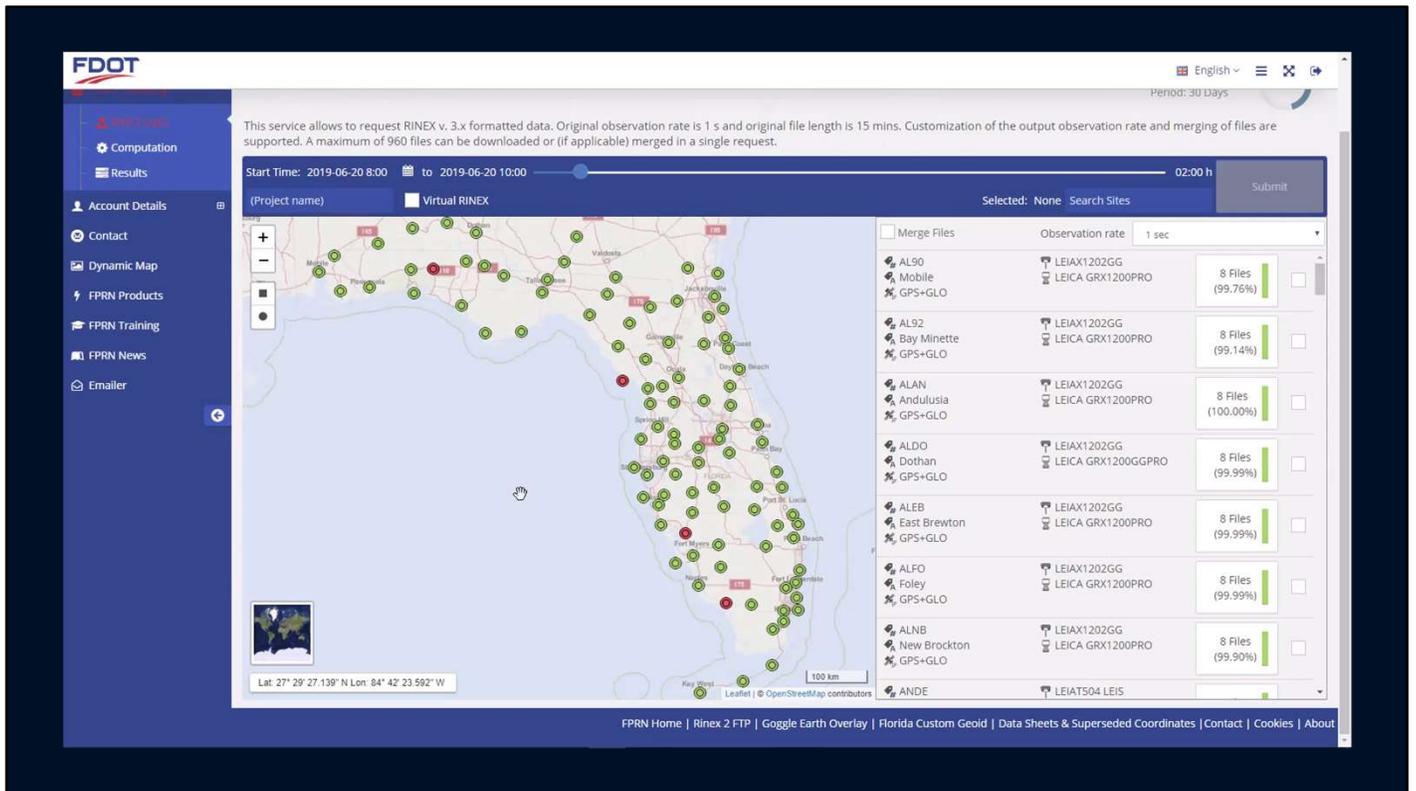
The starting hour

(CLICK)



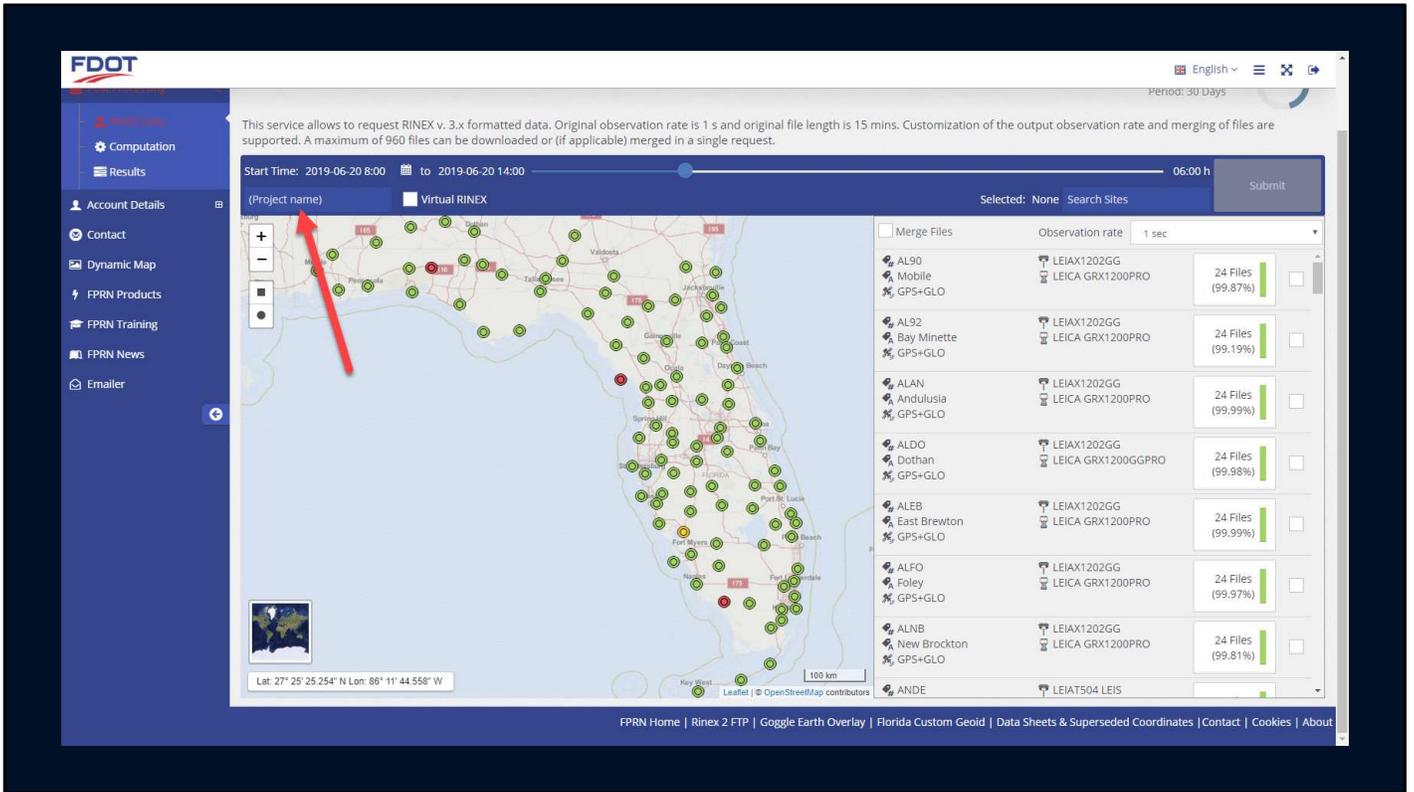
And starting minute

(CLICK)



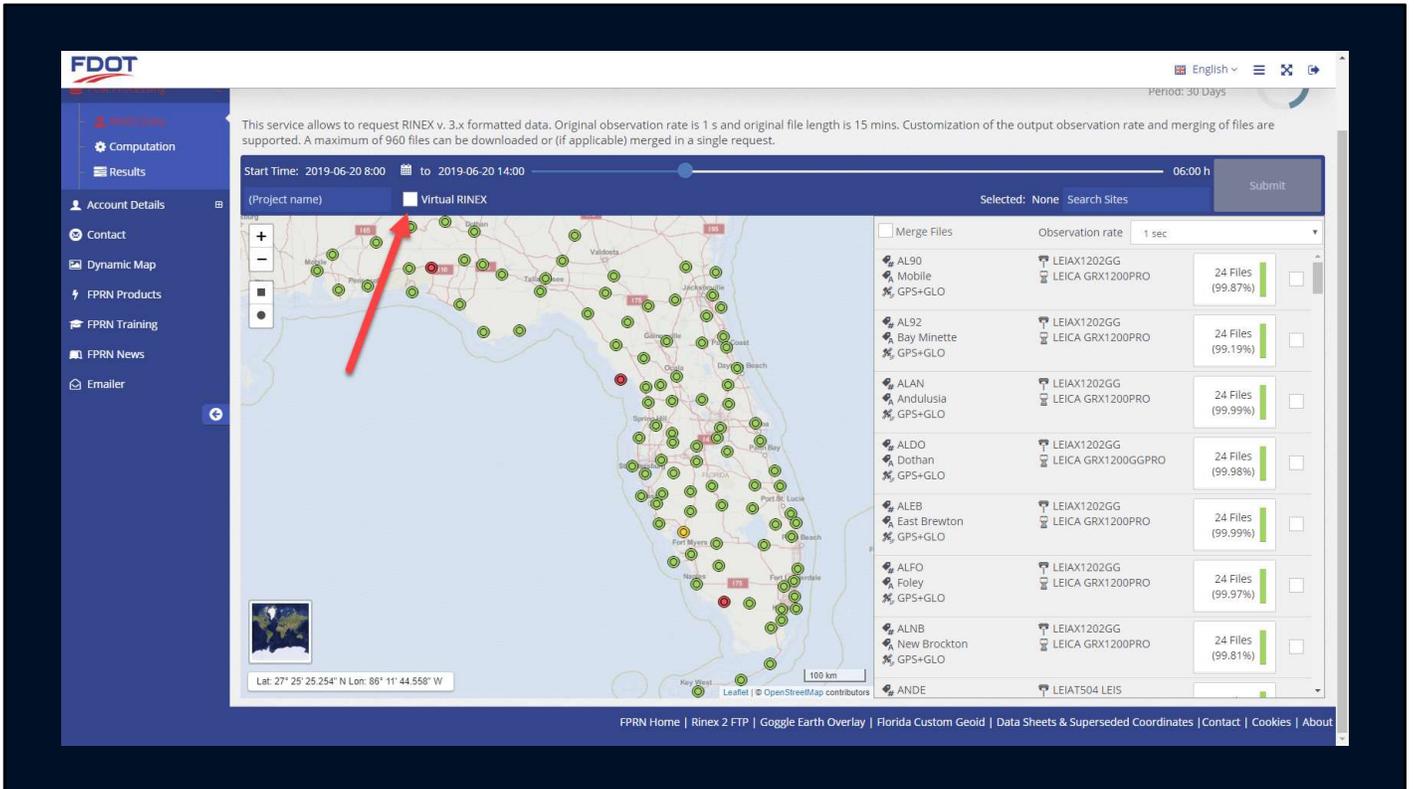
Slide the duration bar back and forth to pick the length of your file

(CLICK)



Enter a Project Name

(CLICK)



Select the Virtual RINEX checkbox

(CLICK)

FDOT

RINEX Data

English

DATA AVAILABILITY 70.43%

Period: 30 Days

06:00 h

Submit

Start Time: 2019-06-20 8:00 to 2019-06-20 14:00

(Project name)  Virtual RINEX

RINEX marker name  
(Virtual RINEX)

RINEX marker number  
(VRNX)

Latitude  
28° 01' 10.623" N

Longitude  
084° 04' 14.082" W

Ellipsoidal height  
(Automatic)

Observation rate  
1 sec

Lat: 27° 02' 42.544" N Lon: 86° 12' 29.990" W

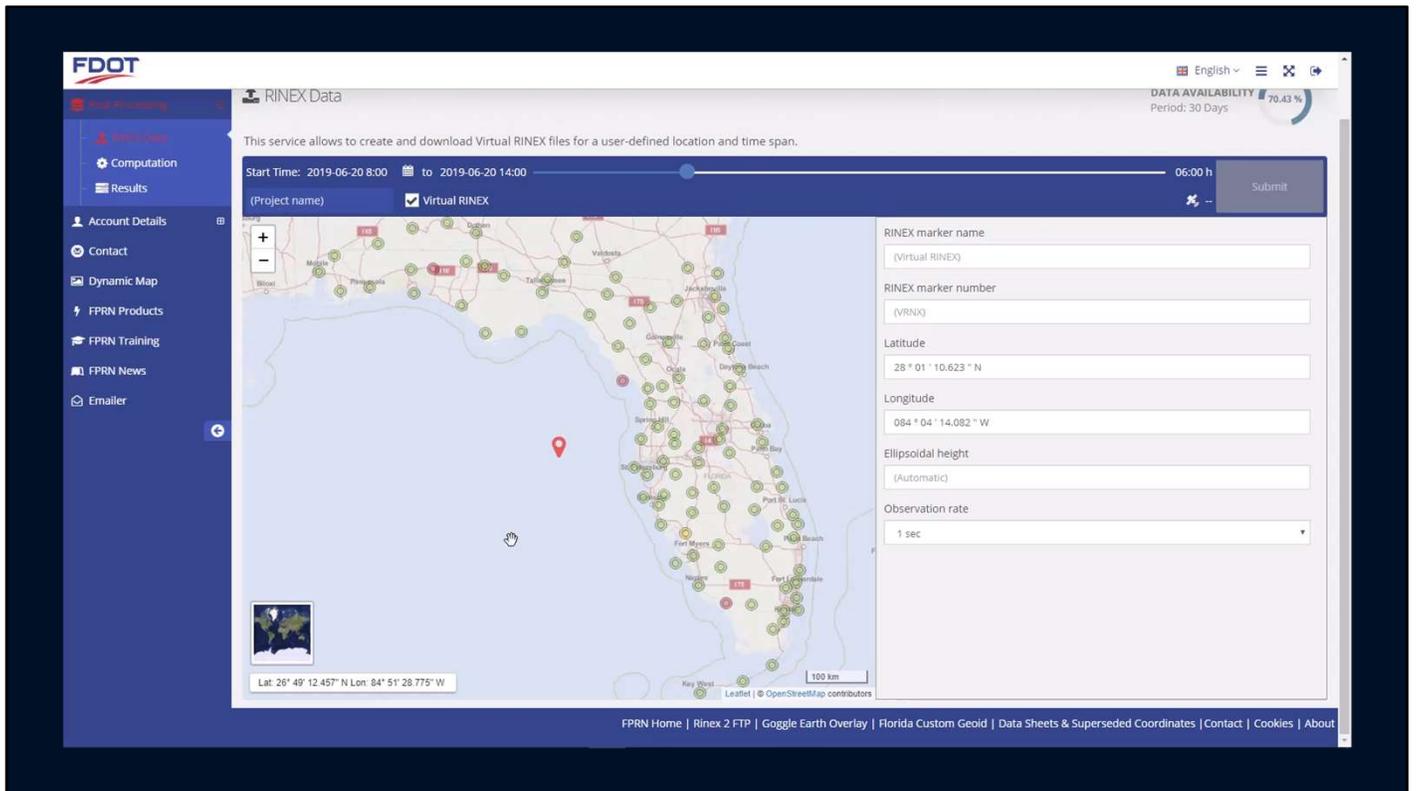
100 km

Leaflet | © OpenStreetMap contributors

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A location pin will appear on the map

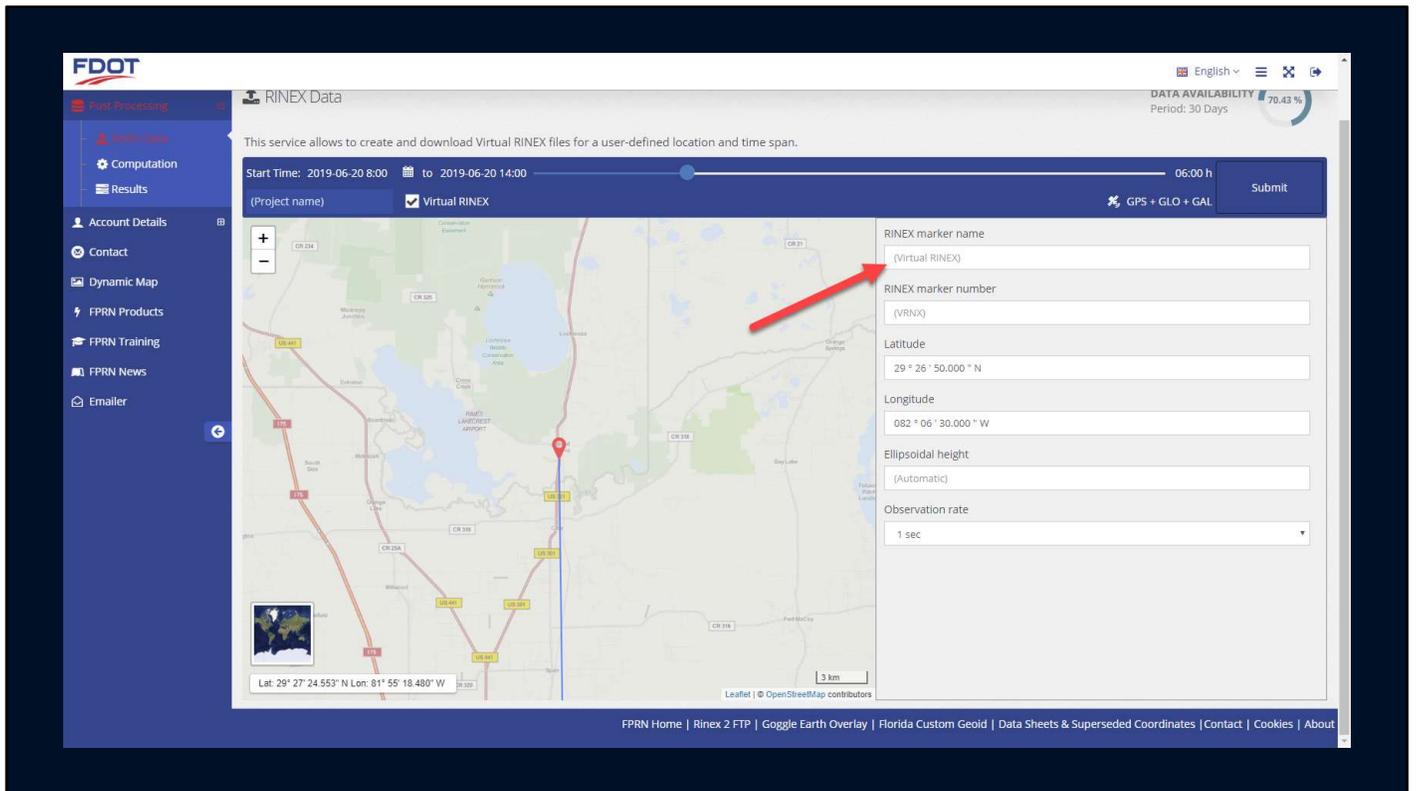
(CLICK)



You can drag the pin around and using your mouse wheel zoom in and out to finalize your position.

Also, you can type the latitude and longitude location in the are on the right of the screen.

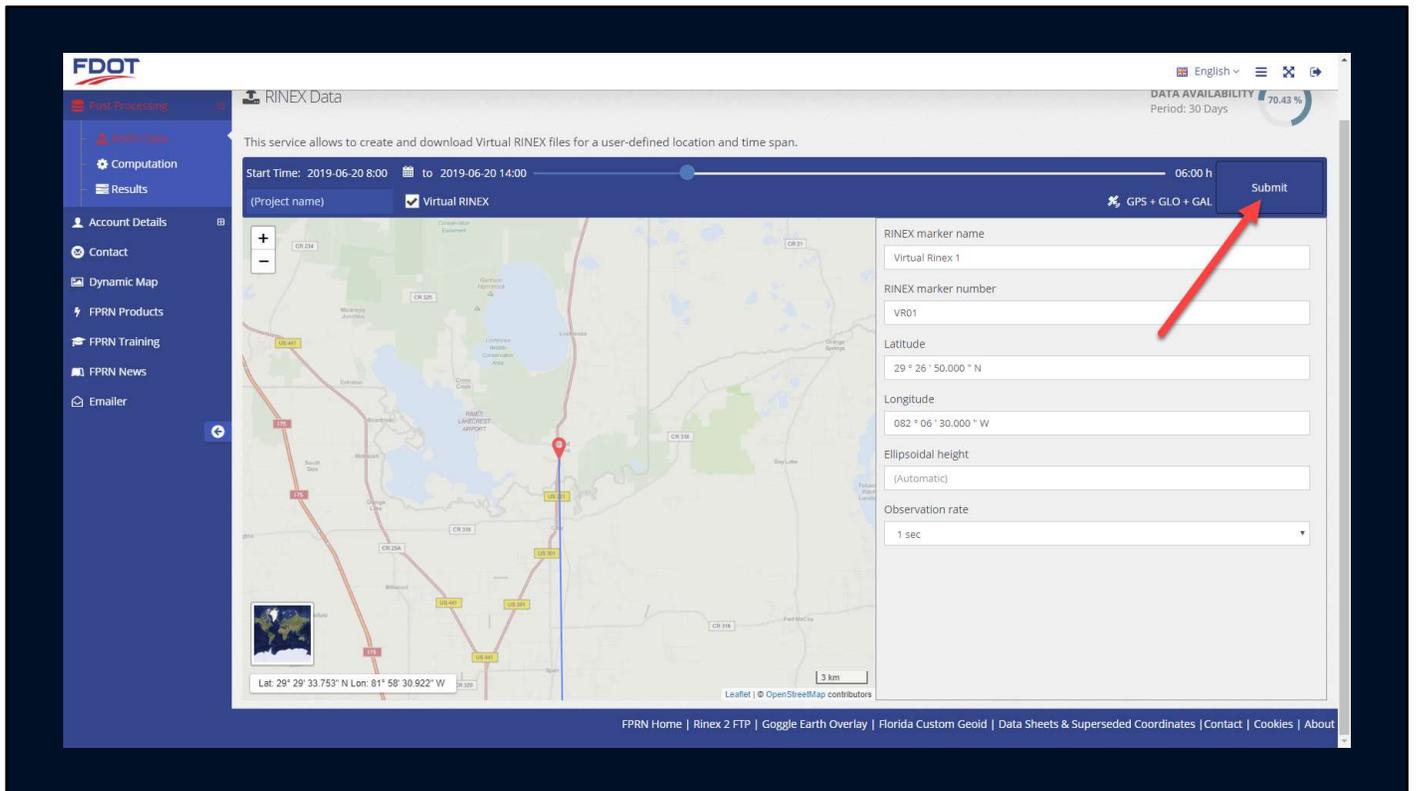
(CLICK)



Assign a marker name

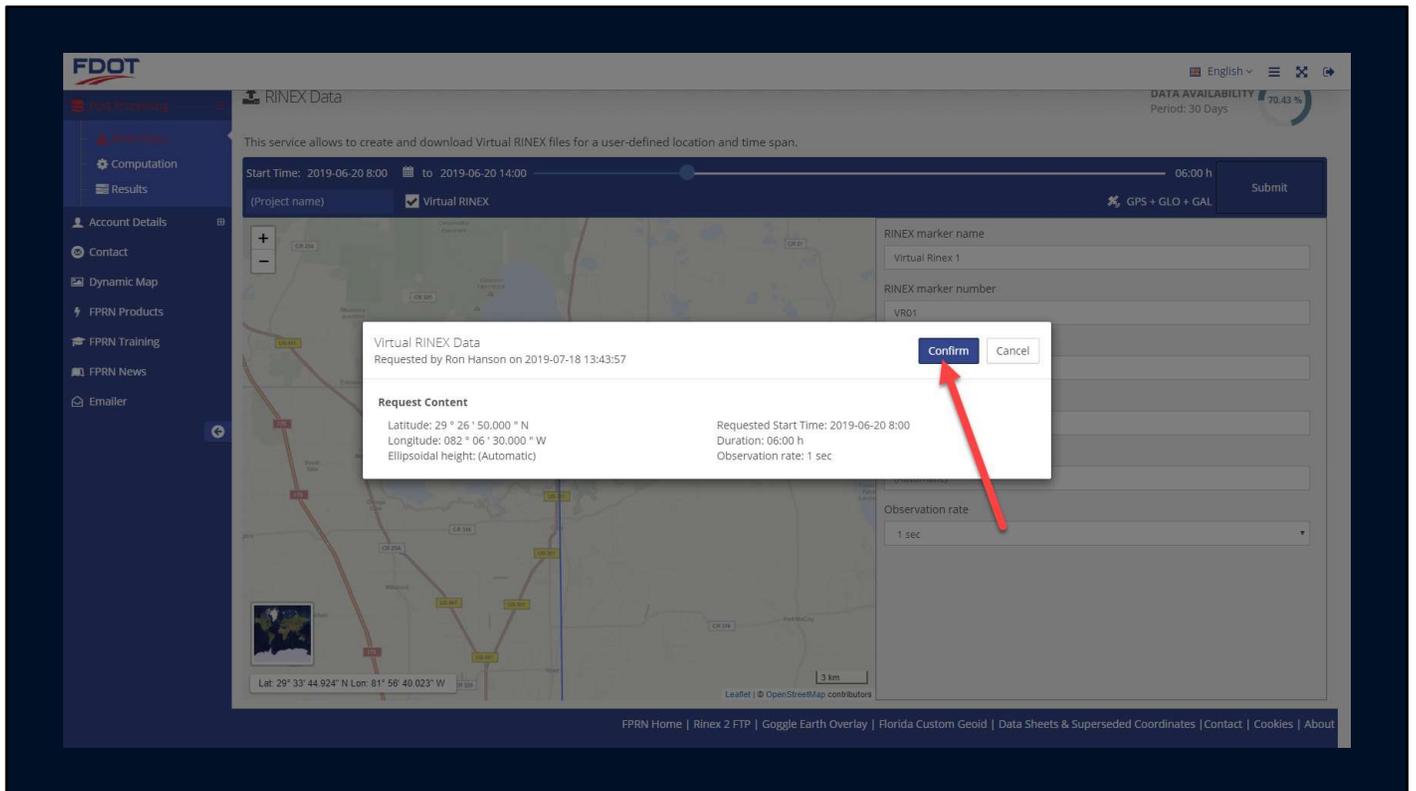
(CLICK)

And a marker number  
(CLICK)



Once satisfied with the location and name click the submit button

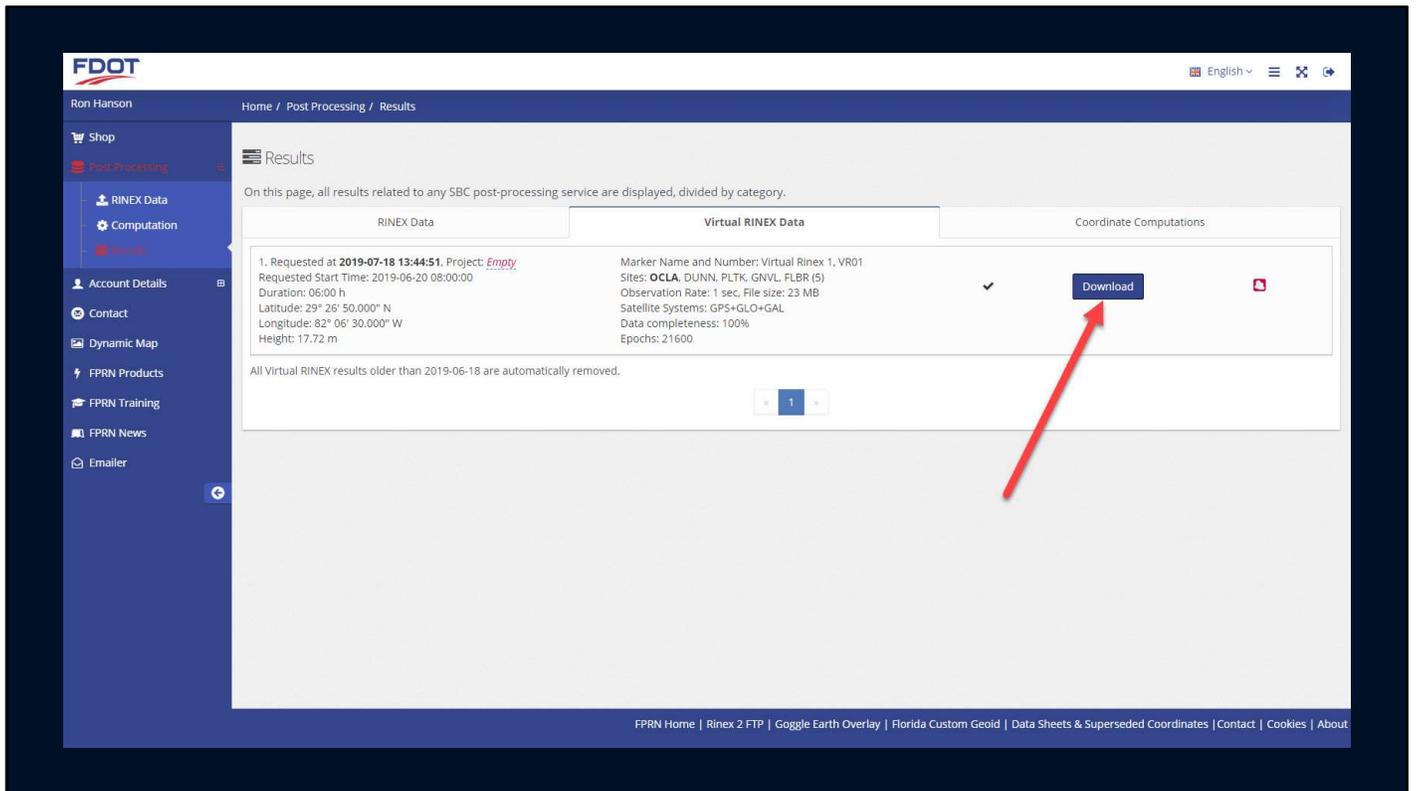
(CLICK)



A confirmation window will appear

Click confirm to continue

(CLICK)

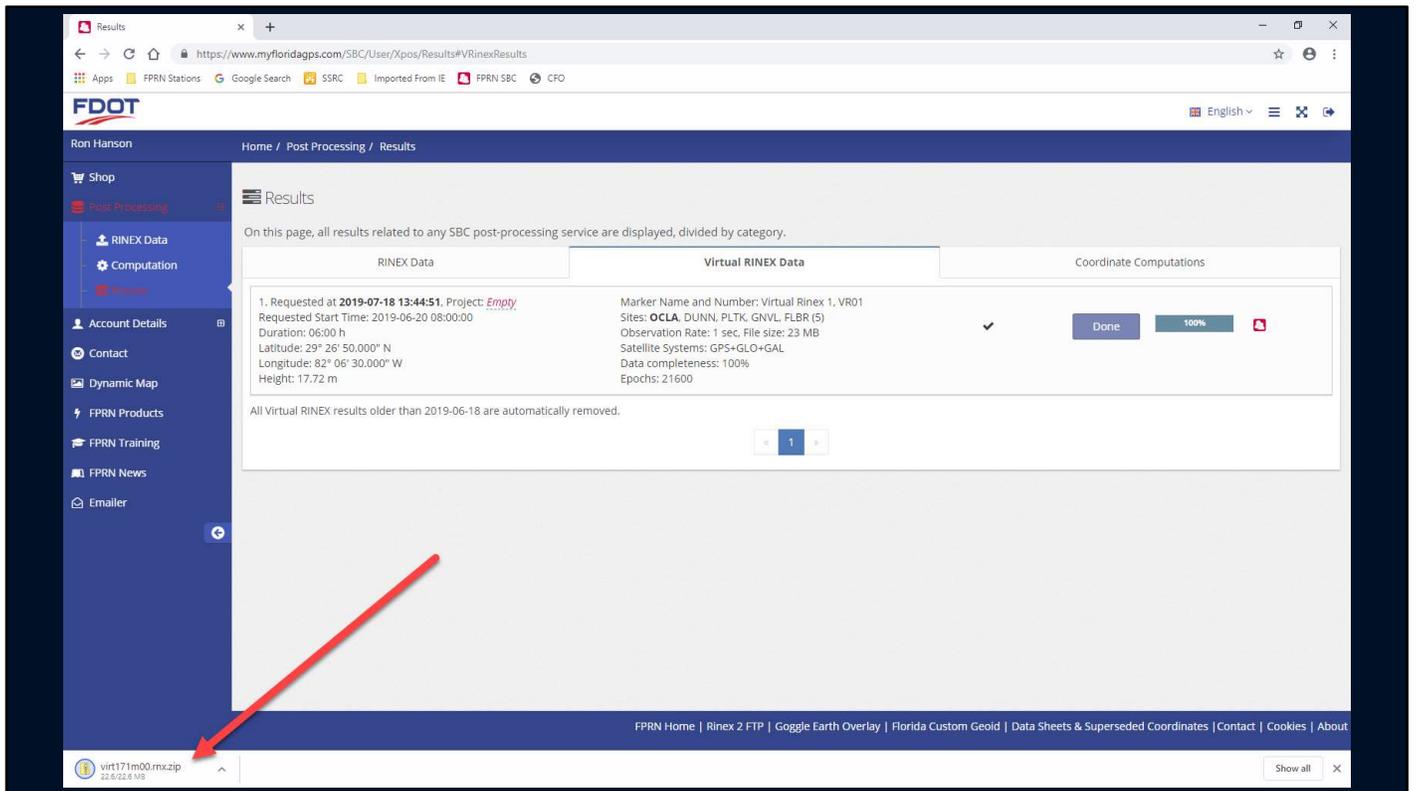


You will be taken to the results page.

When the processing of your file is complete the download button will appear.

Click the download button to receive your file

(CLICK)

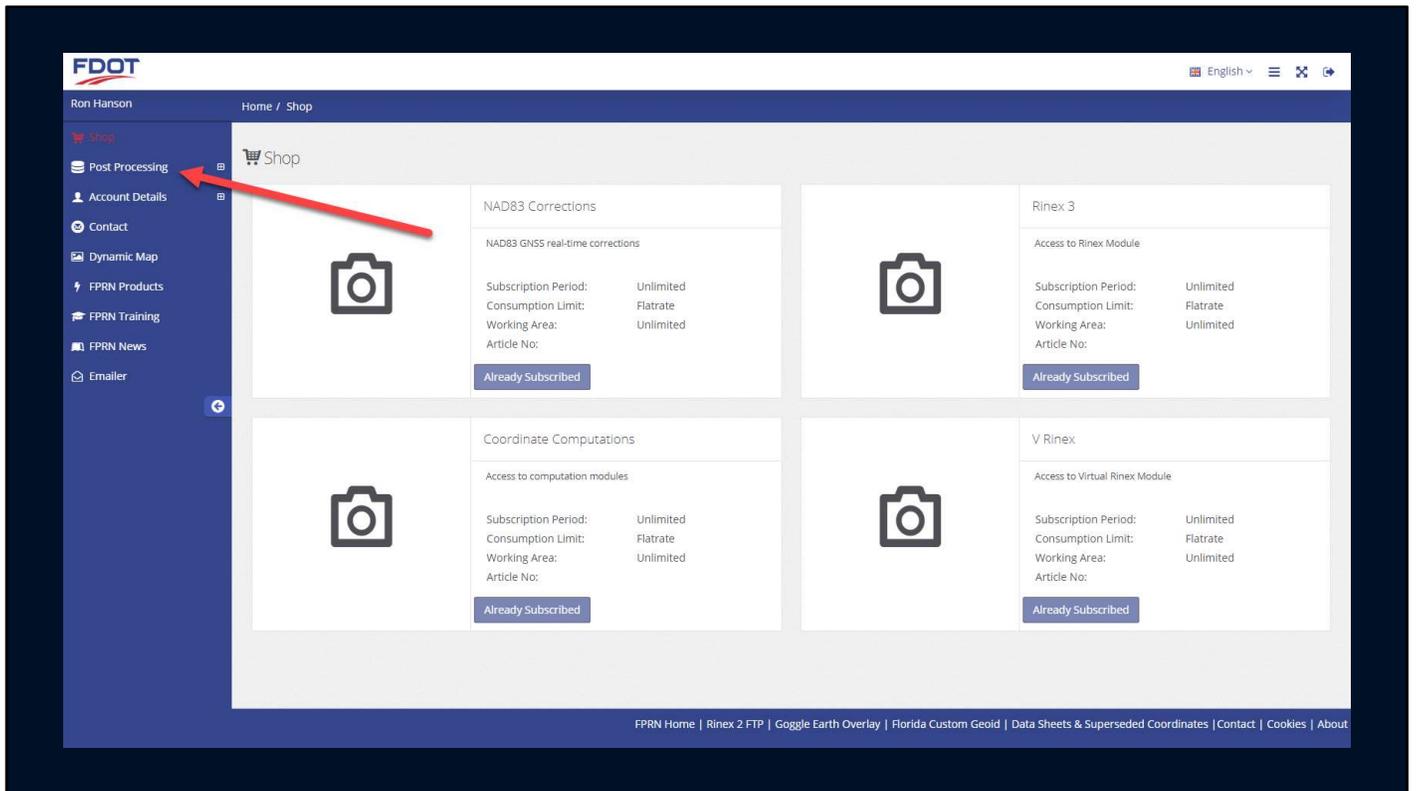


Once the download process starts you will see your file name in the download area  
(CLICK)

# Computation Service

The computation Service is our next topic

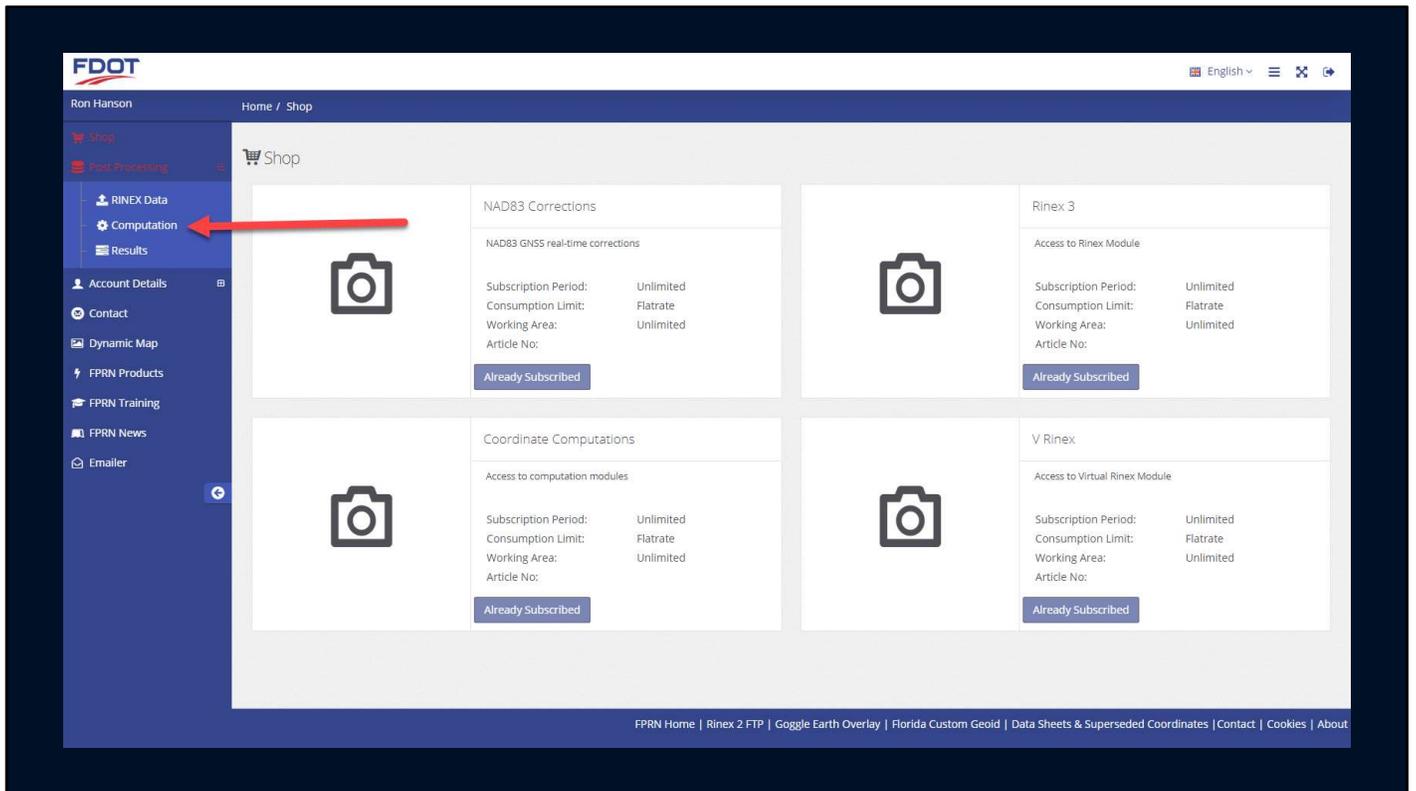
(CLICK)



Once again, starting at the Customer Portal Home screen

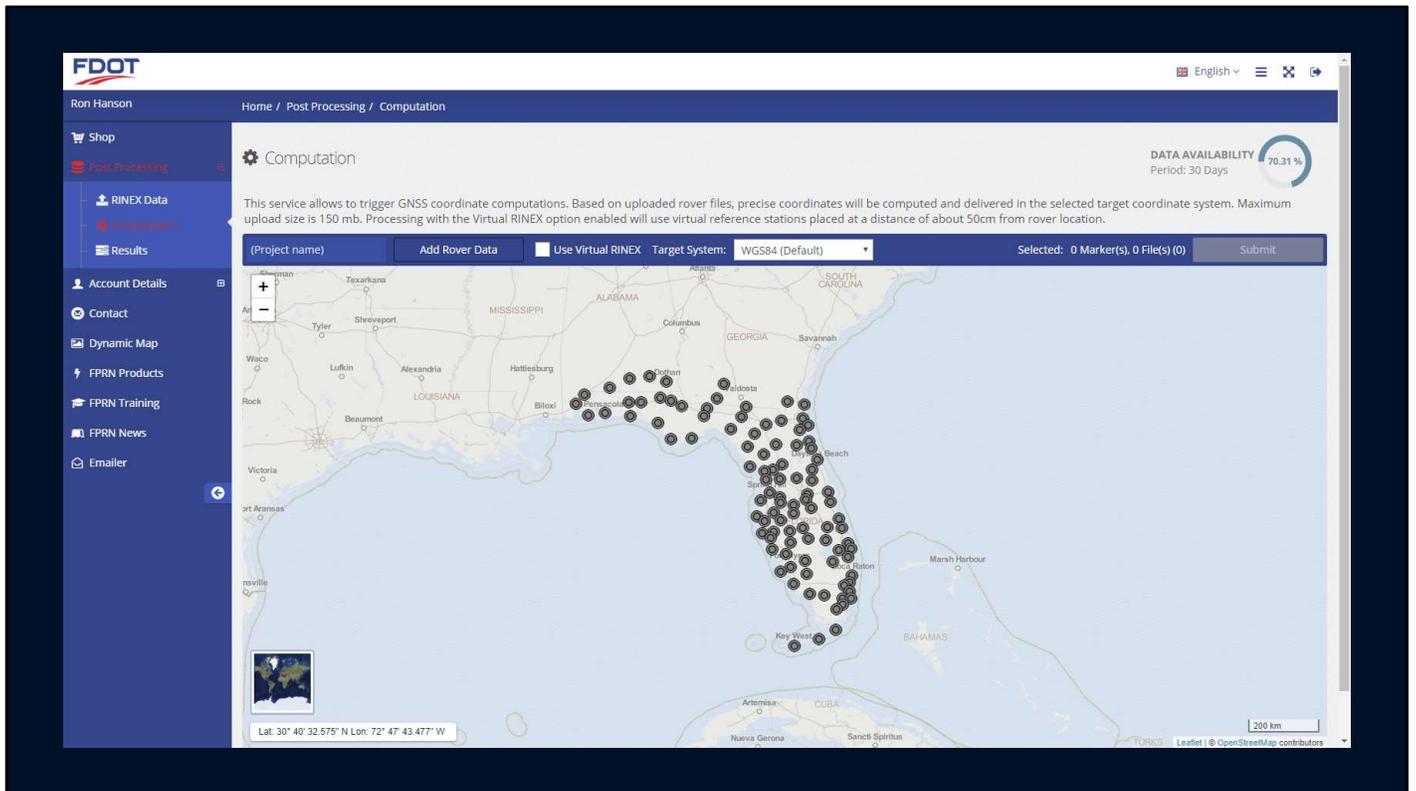
Click on Post Processing in the left menu bar

(CLICK)



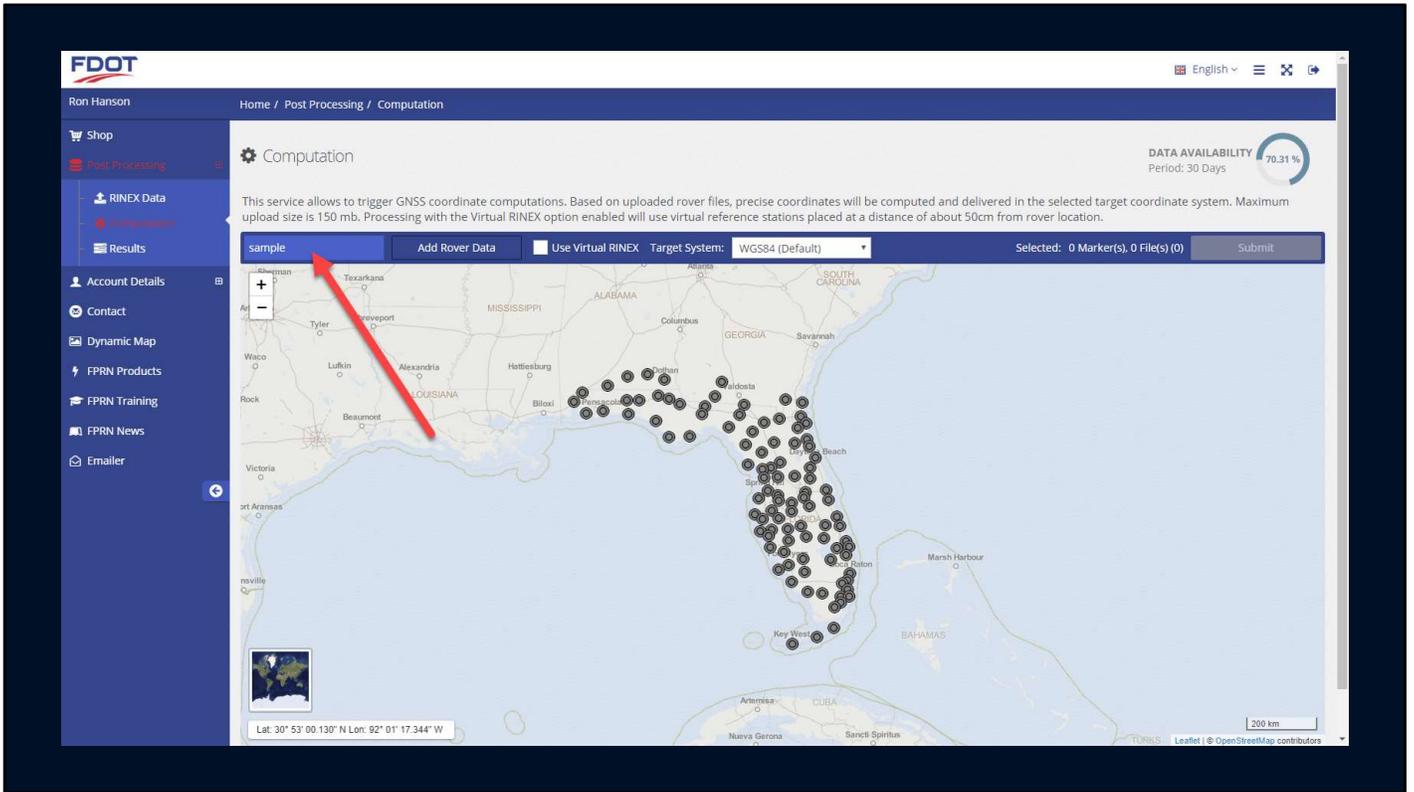
Click on Computation

(CLICK)



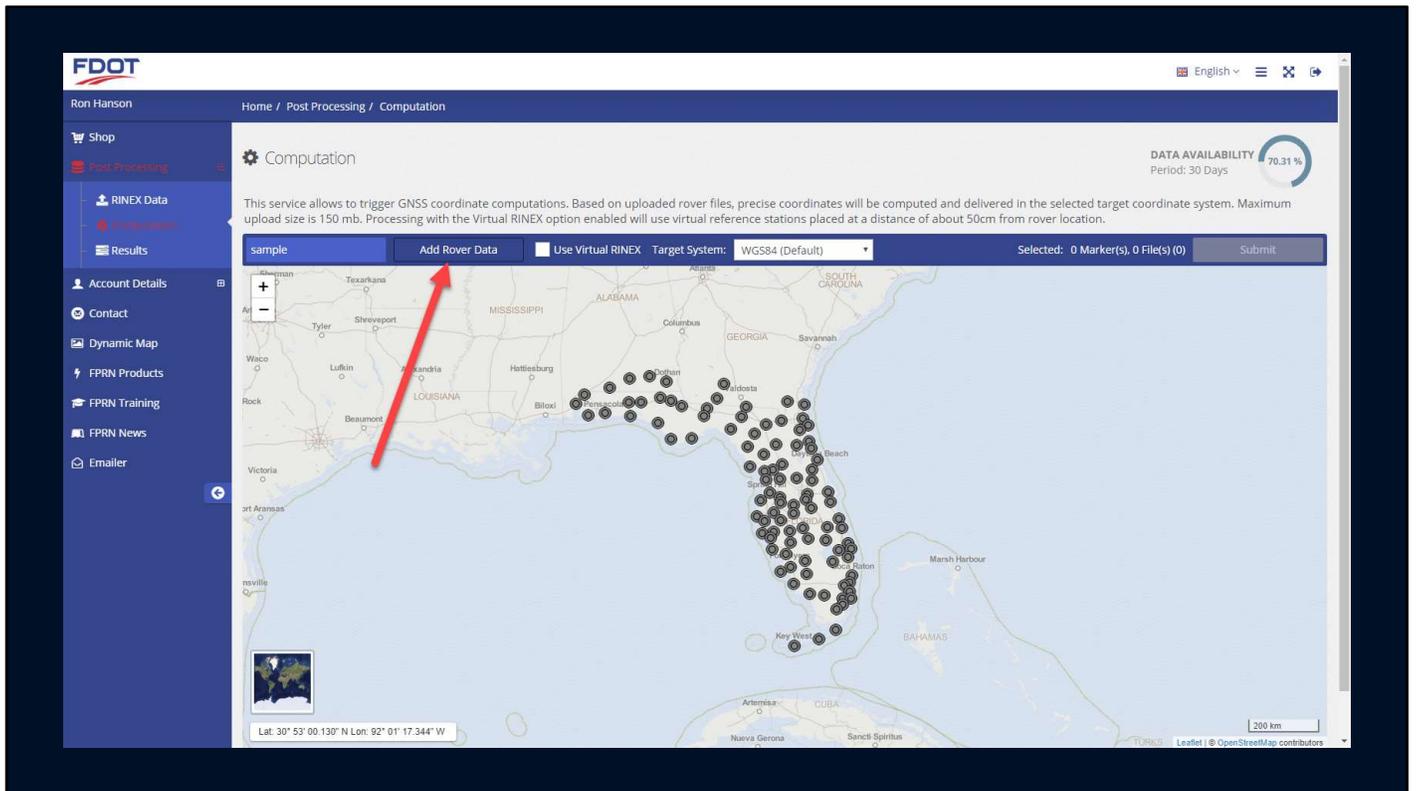
The Computation application will open

(CLICK)



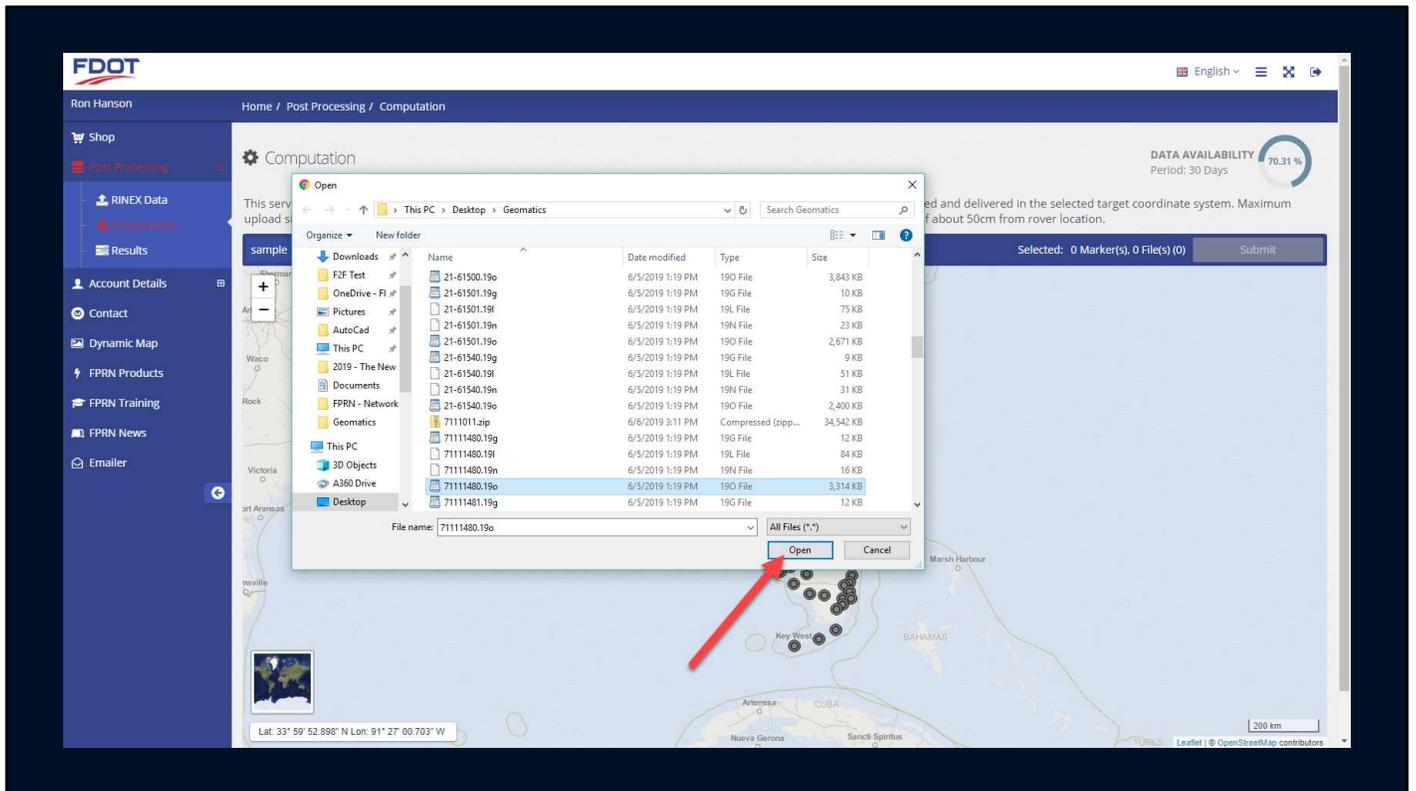
Start off by giving the project a name

(CLICK)



Next, click on the Add Rover Data button to begin selecting observation file(s)

(CLICK)



An explorer window will appear allowing you to browse to your data.

Select the file or files you wish to use and click the open button.

(CLICK)

The screenshot shows the FDOT Computation interface. On the left is a navigation menu with options like Shop, Post Processing, RINEX Data, Results, Account Details, Contact, Dynamic Map, FPRN Products, FPRN Training, FPRN News, and Emailer. The main area features a map of the Southeastern United States with a red circle highlighting a region in Georgia and Florida. To the right of the map is a data table with the following content:

sample	Add Rover Data	Use Virtual RINEX	Target System: WGS84 (Default)	Selected: 2 Marker(s), 2 File(s) (3.76 MB)	Submit
71111480.190	3.24 MB	✓		7111011H1 - 7111011H1	
<ul style="list-style-type: none"> <li>Static</li> <li>LEIGS15 NONE</li> <li>LEICA GS15</li> <li>2019-05-28 13:42:20 (GPS)</li> <li>2019-05-28 09:42:02 (Local)</li> </ul>					
POB-10B.180	538.19 kb	!		Not enough reference site with data for processing found.	
<ul style="list-style-type: none"> <li>Static</li> <li>LEIGS15 NONE</li> <li>LEICA GS15</li> <li>2018-12-19 20:06:00 (GPS)</li> <li>2018-12-19 15:05:42 (Local)</li> </ul>					

At this point the system will validate your data.

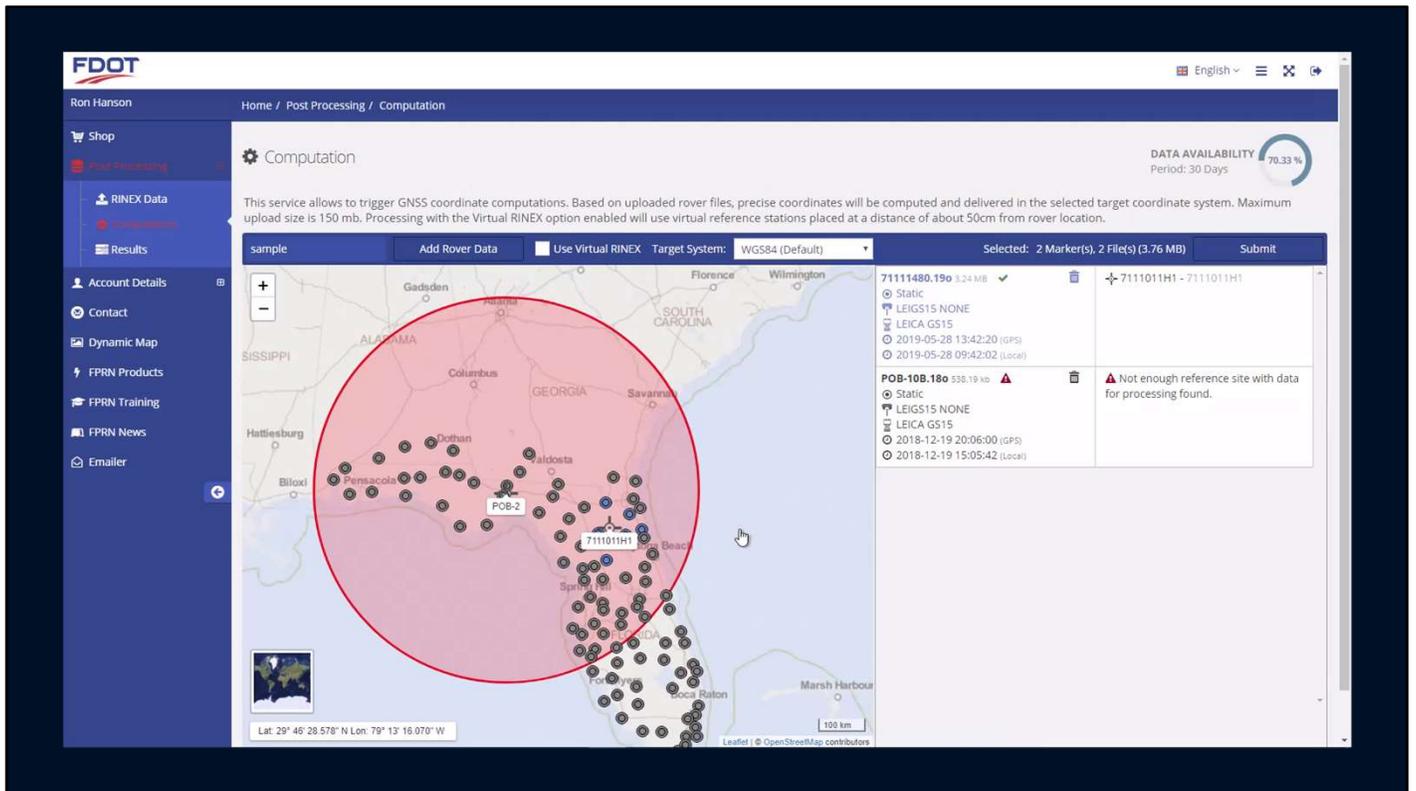
(CLICK)

If your data is good it will be indicated by a green checkmark

(CLICK)

If there is a problem a yellow or red exclamation will be shown

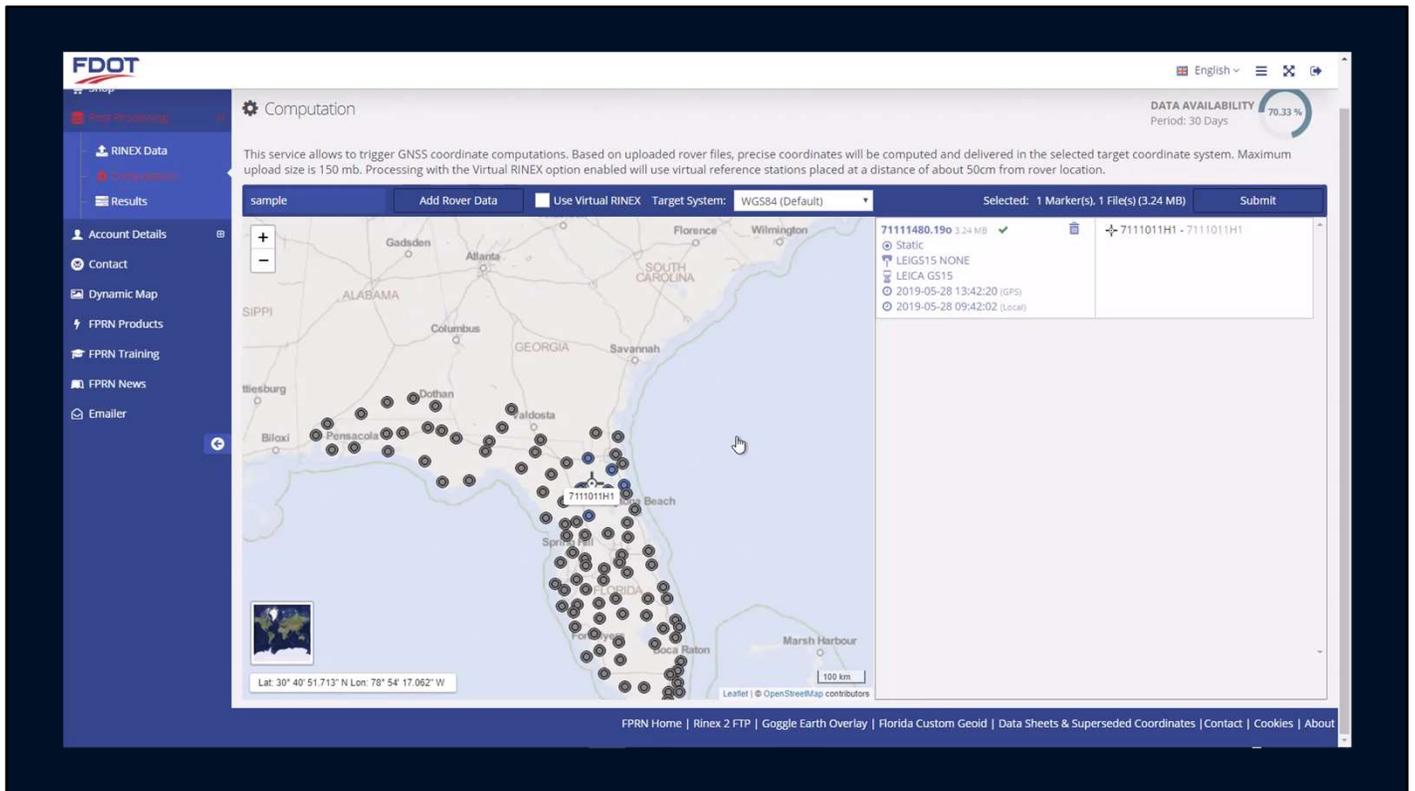
(CLICK)



You can remove data from the project by simply clicking on the appropriate trashcan

(CLICK)

(CLICK)



(CLICK)

In the Computation Application you can pan & zoom around the map just like in the Rinex 3 Data application

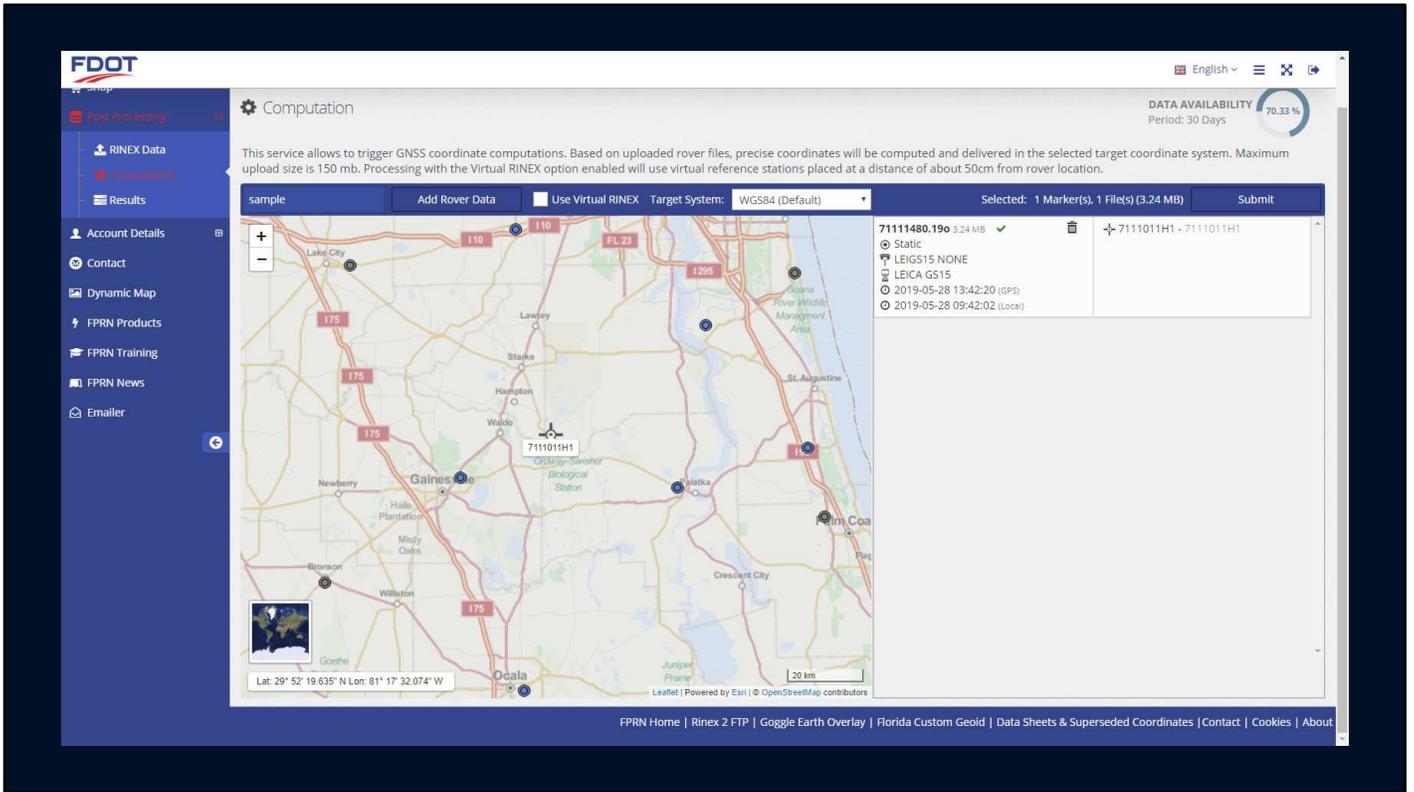
You can also switch between map and satellite view.

You can also see information about your data file submitted.

Such as the data type, Antenna type, and start time in local and GMT.

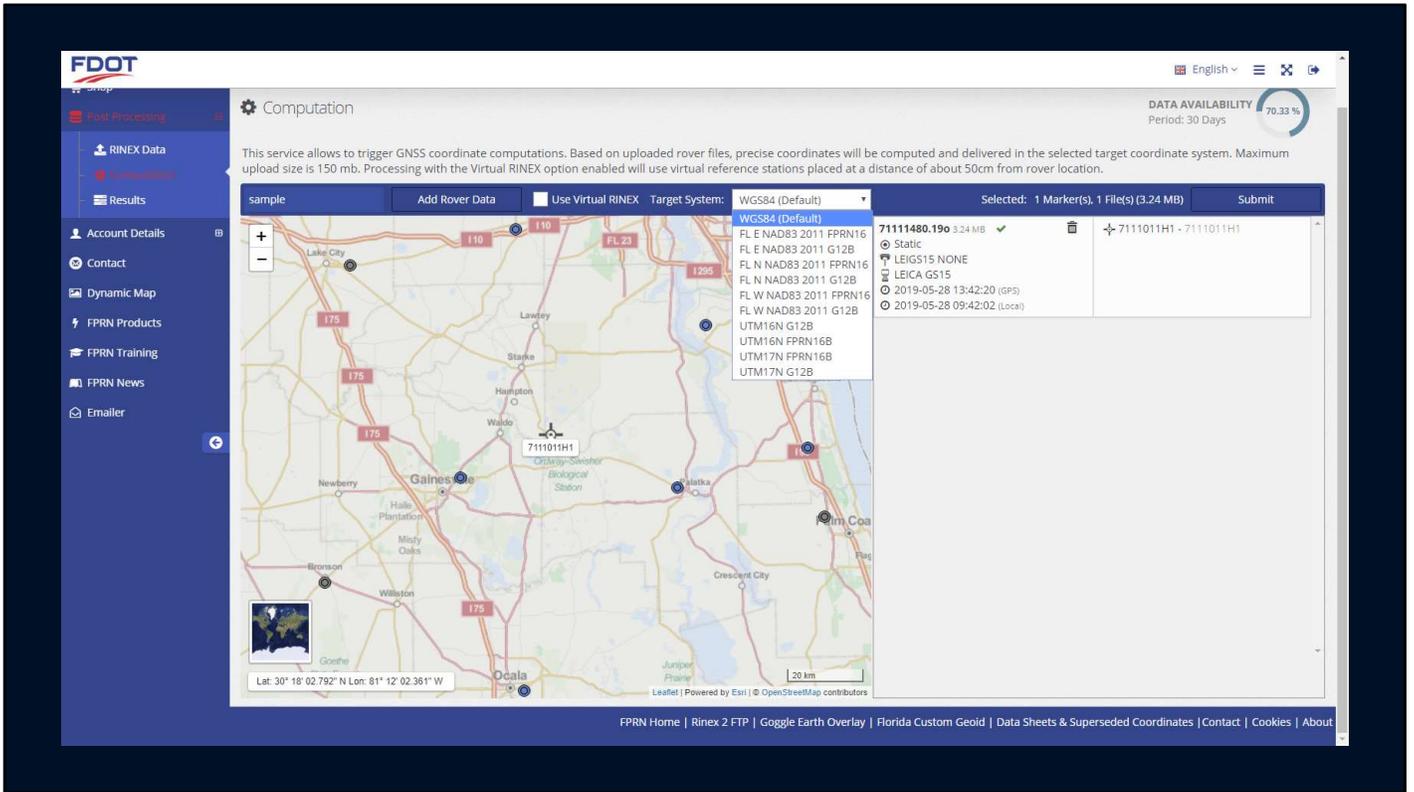
The point name is displayed in the far right area

(CLICK)



From here you should pick your output Coordinate datum

(CLICK)



You can see that there are several options available including State Plane, UTM, and WGS84.

We also offer elevations using Geoid 12B and the Florida Custom Geoid (FPRN16)

(CLICK)

FDOT

Post-Processing

RINEX Data

Computation

Results

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FPRN Training

FPRN News

Emailer

Computation

This service allows to trigger GNSS coordinate computations. Based on uploaded rover files, precise coordinates will be computed and delivered in the selected target coordinate system. Maximum upload size is 150 mb. Processing with the Virtual RINEX option enabled will use virtual reference stations placed at a distance of about 50cm from rover location.

sample Add Rover Data Use Virtual RINEX Target System: WGS84 (Default)

Selected: 1 Marker(s), 1 File(s) (3.24 MB) Submit

WGS84 (Default)  
 FL E NAD83 2011 FPRN16  
 FL E NAD83 2011 G12B  
 FL N NAD83 2011 FPRN16  
 FL N NAD83 2011 G12B  
 FL W NAD83 2011 FPRN16  
 FL W NAD83 2011 G12B  
 UTM16N G12B  
 UTM16N FPRN16B  
 UTM17N FPRN16B  
 UTM17N G12B

71111480.190 3.24 MB  
 Static  
 LEIGS15 NONE  
 LEICA GS15  
 2019-05-28 13:42:20 (GPS)  
 2019-05-28 09:42:02 (Local)

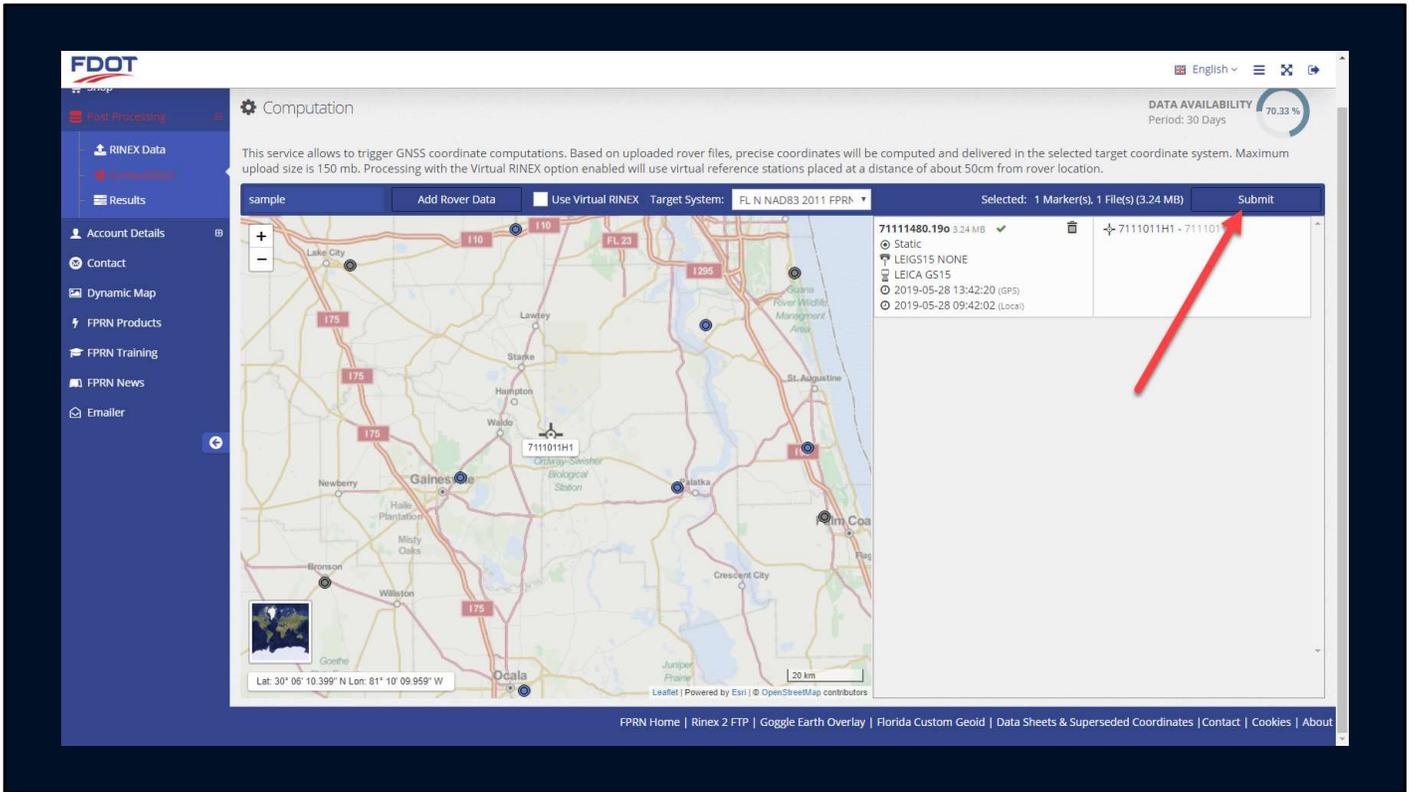
Lat: 30° 18' 02.792" N Lon: 81° 12' 09.855" W

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For the purpose of this presentation I'll use Florida North NAD 83 2011 epoch 2010 and The Florida Custom Geoid FPRN16.

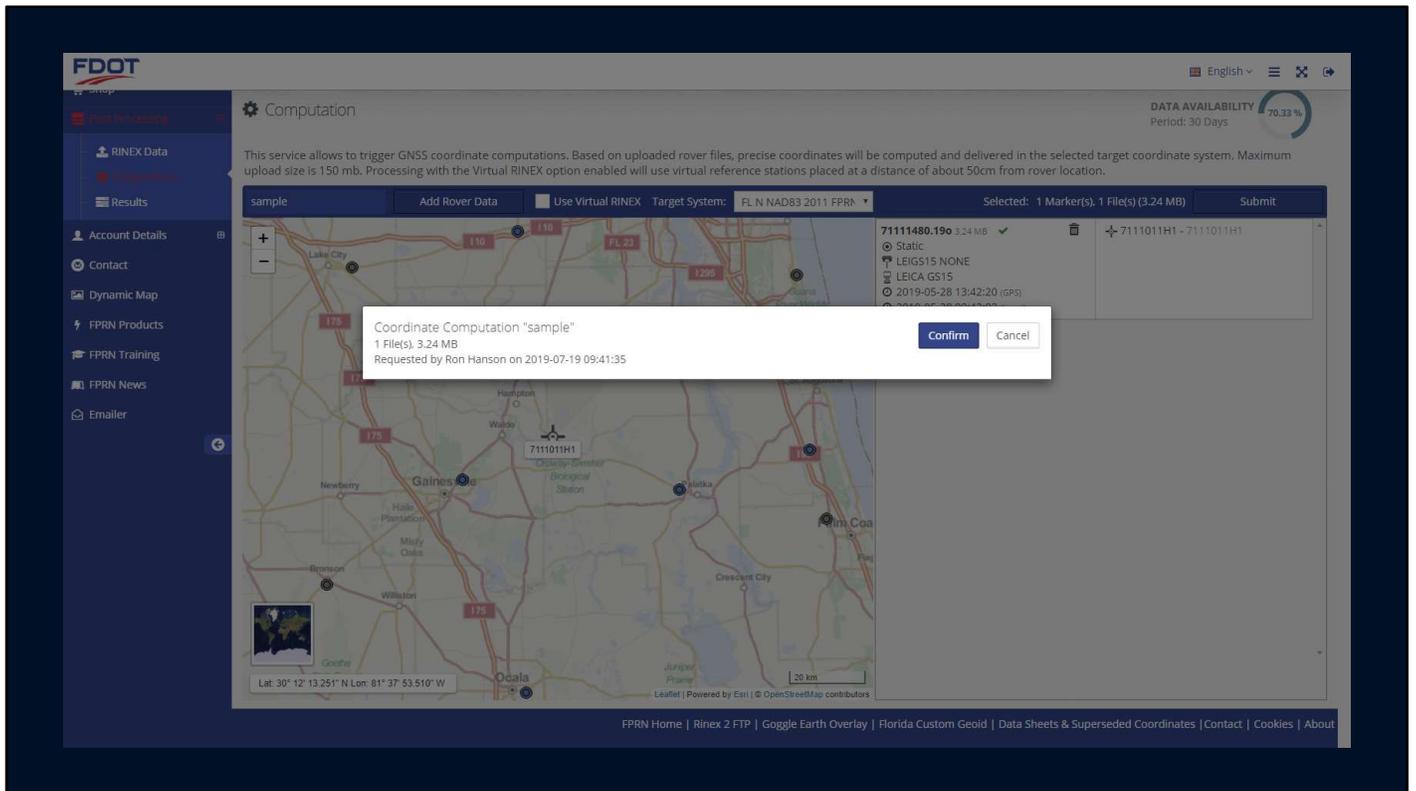
All coordinates are output in meters so you will have to do any unit conversions yourself.

(CLICK)



Once you are finished submitting data and have picked your output coordinate system, click the Submit button.

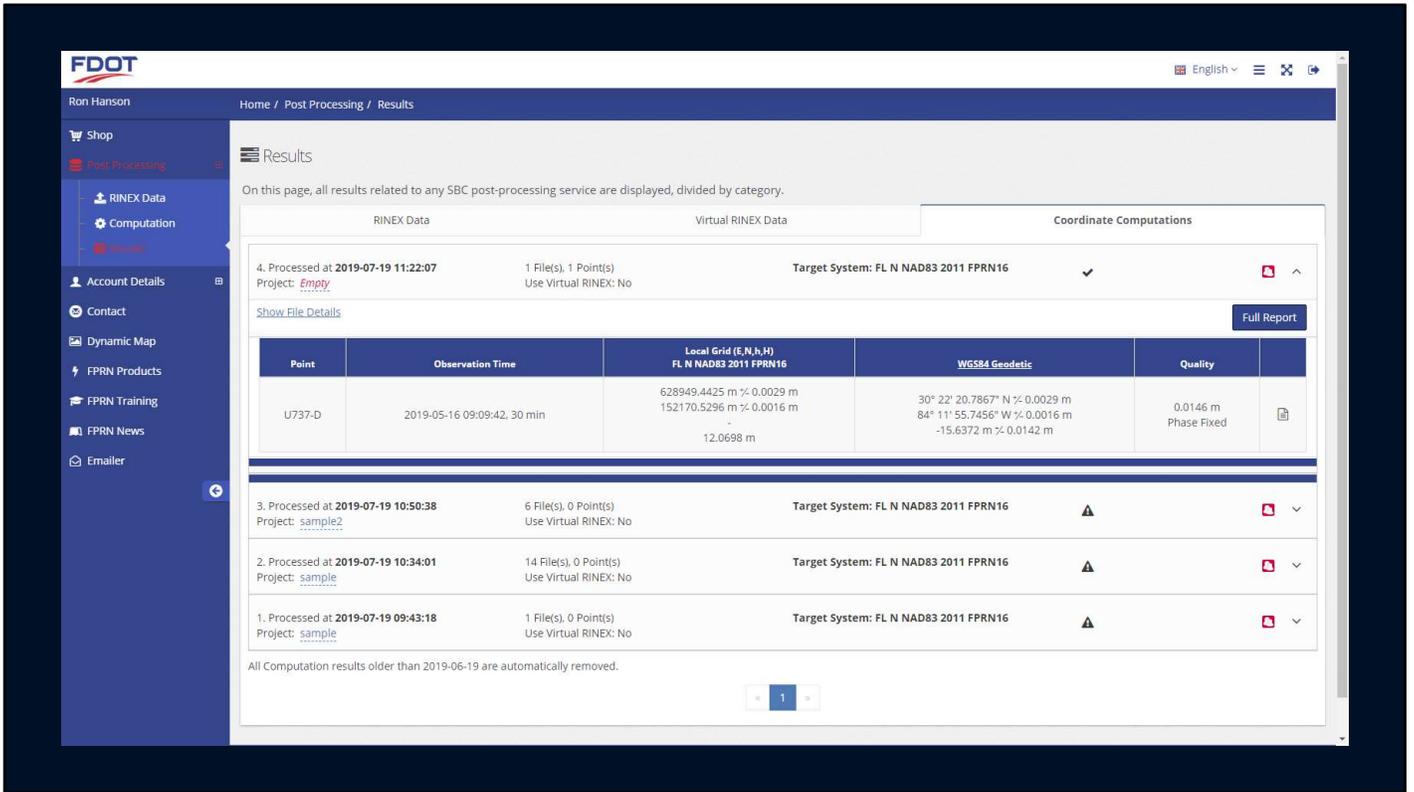
(CLICK)



A confirmation screen will appear.

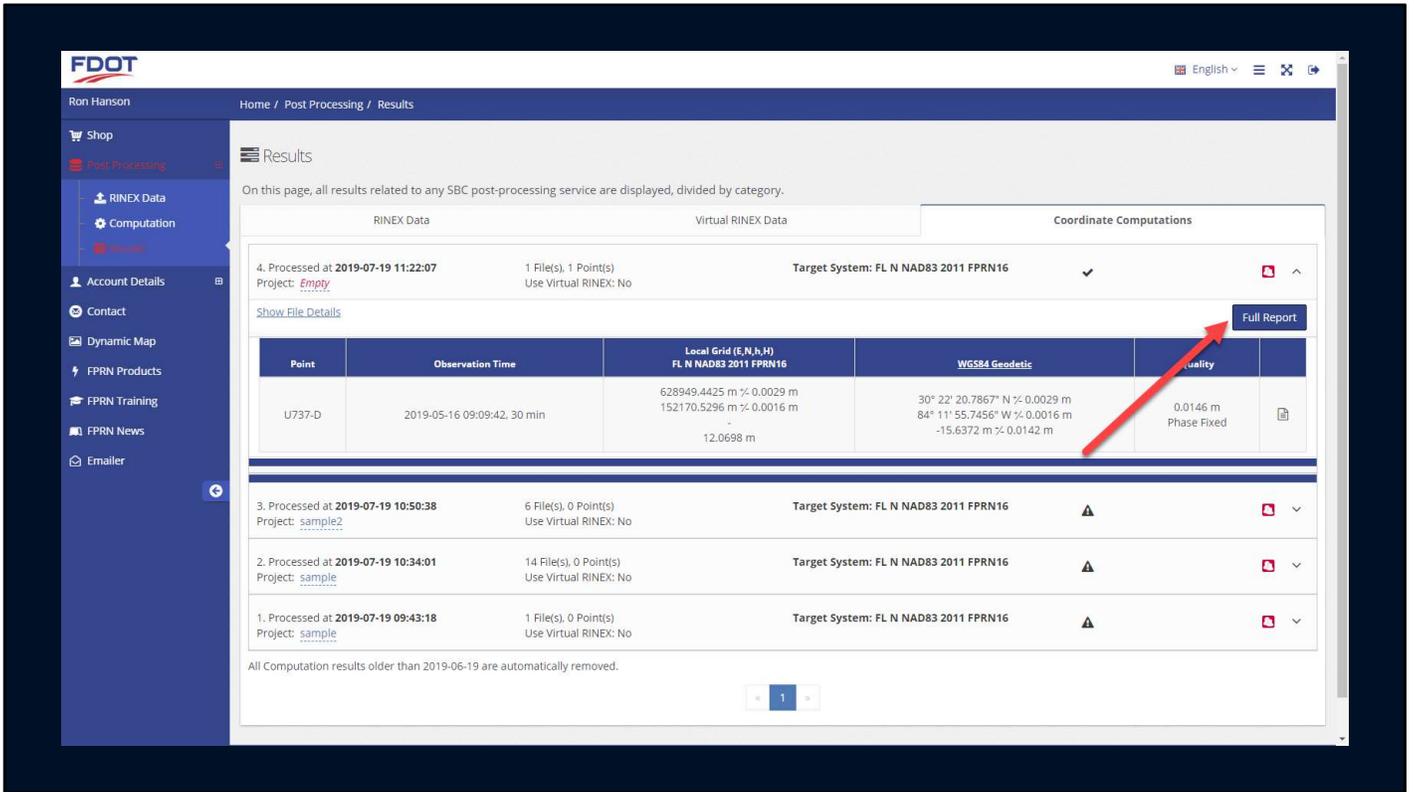
Click confirm to continue.

(CLICK)



You will be taken to the results page.

(CLICK)



When the computation is complete you will see information about your project.

Click on the Full Report button to see project details

(CLICK)

GNSS Processing Report Summary

Point Results

U737-D



## GNSS Processing Report - Summary

---

### Request Details

**General**

Processed at: 2019-07-19 11:22:07  
SBC version: 7.3.0.207

**User Details**

User name: Sample  
Name: Ron Hanson  
Company: FDOT  
E-Mail: ronald.hanson@dot.state.fl.us

---

### Point Results

Point-ID	Solution Type	Occupations / Baselines	WGS84 Latitude	WGS84 Longitude	WGS84 Ellip. Height [m]	SD Latitude	SD Longitude	SD Height
U737-D	Phase Fixed	1/6	30° 22' 20.7867" N	84° 11' 55.7456" W	-15.6372 m	0.0029 m	0.0016 m	0.0142 m

Point-ID	Solution Type	Occupations / Baselines	WGS84 Cartesian X	WGS84 Cartesian Y	WGS84 Cartesian Z	SD X	SD Y	SD Z
U737-D	Phase Fixed	1/6	556678.9060 m	-5479277.6199 m	3206054.1917 m	0.0020 m	0.0123 m	0.0076 m

**Target Coordinate System**

Name: FL N NAD83 2011 FPRN16  
 Ellipsoid: GRS 1980  
 Projection Type: LambertTwo  
 Geoid Model: FPRNGD16B  
 CPCS Model: -

Point-ID	Coordinate System	Northing	Easting	Ellip. Height Ortho. Height	SD Easting	SD Northing	SD Height
U737-D	FL N NAD83 2011 FPRN16	152170.5296 m	628949.4425 m	- 12.0698 m	0.0029 m	0.0016 m	0.0142 m

**U737-D - 2019-05-16 09:09:42**

---

### Point Occupation Results

The Full Report in come up in a separate window.

On the report page you can see the point occupation results which are a weighted average from each of the baselines (up to 6) per point submitted.

The individual baseline results for each of the baselines used is also shown.

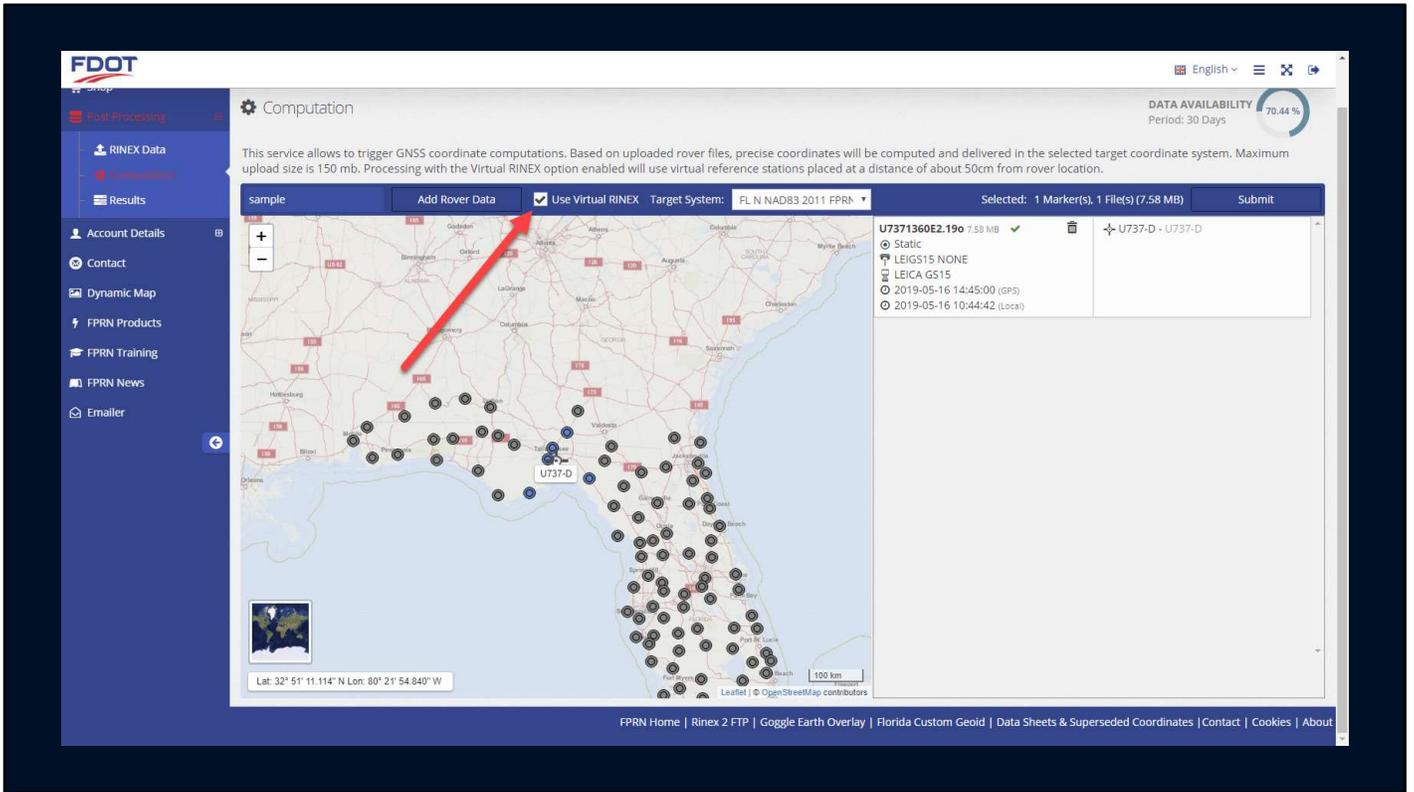
The report can be printed or saved to your local computer.

(CLICK)

# Computation Service Using VRS

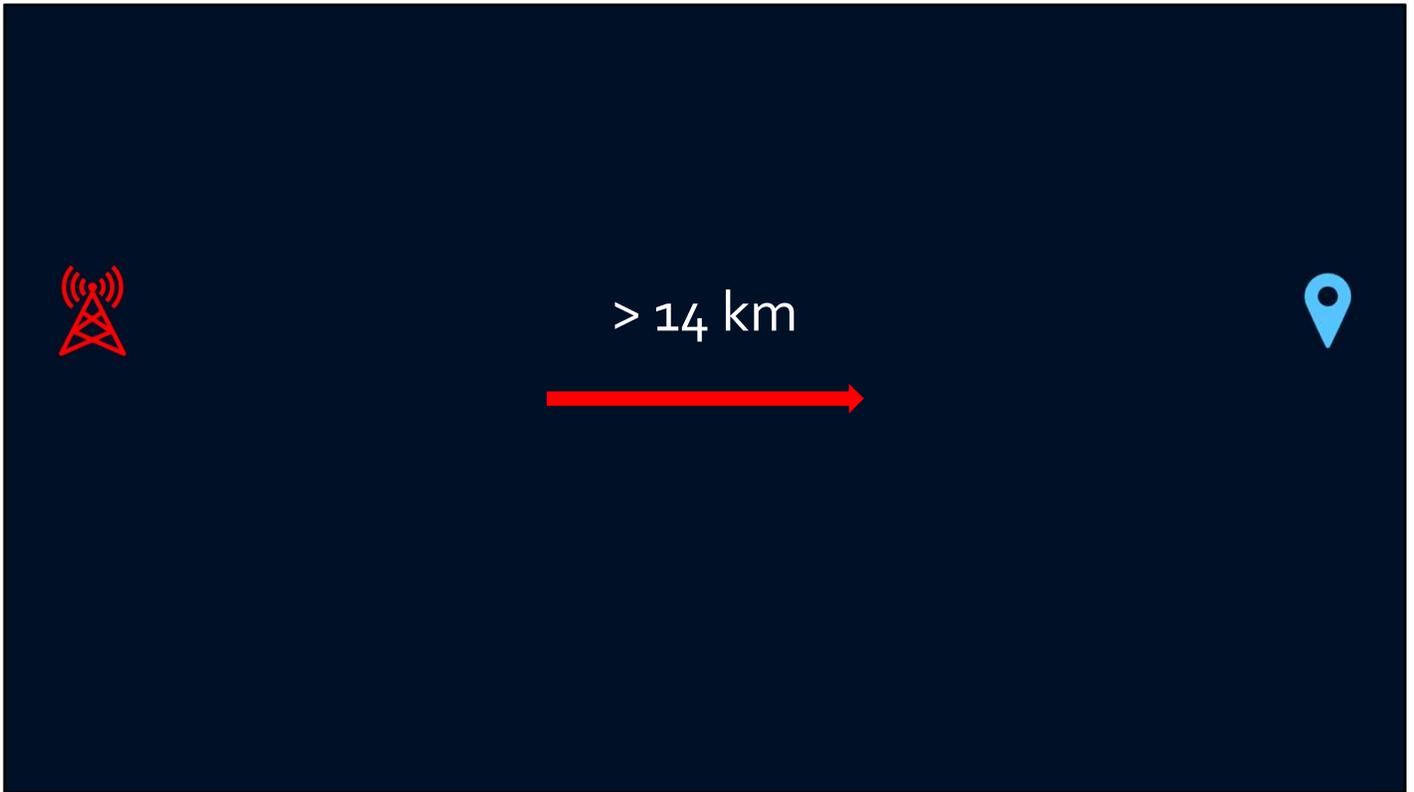
If you wish to use Virtual Rinex during the computation you will need to specify it on the computation screen.

(CLICK)



By clicking on the Use Virtual Rinex Checkbox

(CLICK)

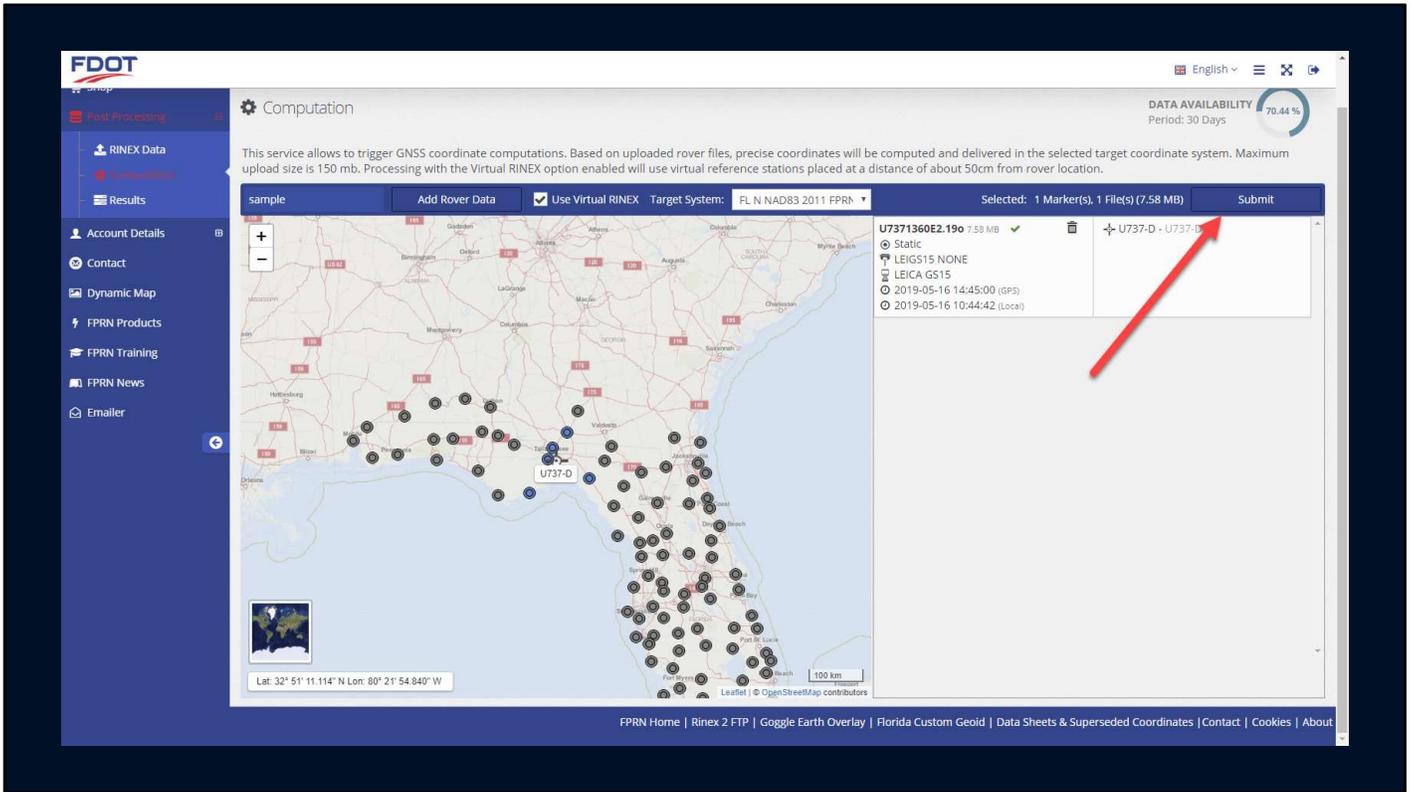


So the question is when should I was Virtual Rinex?

(CLICK)

As a basic guide, If your point is greater than 14 km from any base station.

(CLICK)



Click the submit button when you are ready to start the computation.

(CLICK)

The screenshot shows the FDOT RINEX Data Computation web application. A confirmation dialog box is centered on the screen, overlaid on a map of Florida. The dialog box contains the following text:

Coordinate Computation "sample"  
1 File(s), 7.58 MB  
Requested by Ron Hanson on 2019-07-19 12:08:02

Below the text are two buttons: "Confirm" and "Cancel".

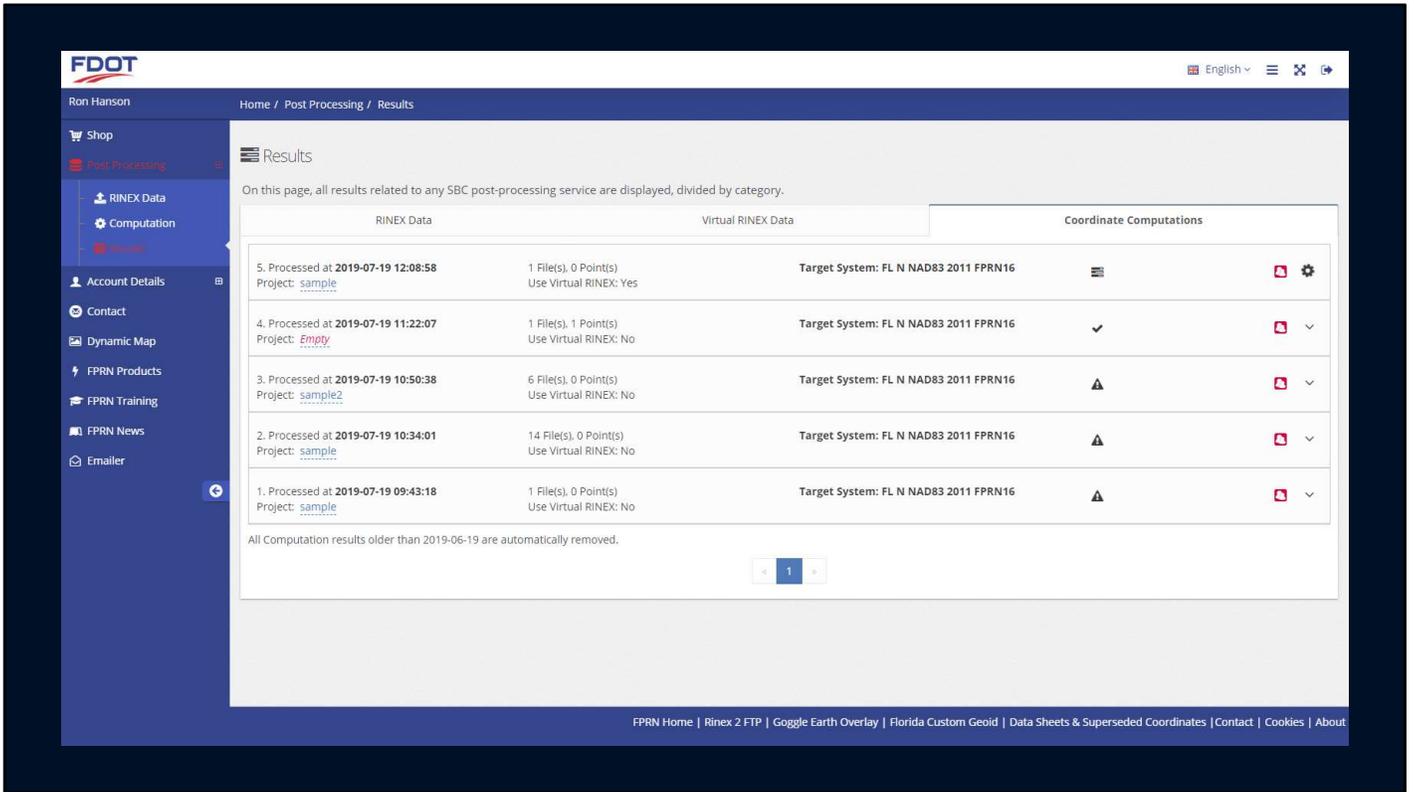
The background interface includes a sidebar on the left with navigation options: "RINEX Data", "Results", "Account Details", "Contact", "Dynamic Map", "FPRN Products", "FPRN Training", "FPRN News", and "Emailer". The main content area features a map of Florida with a marker for "U737-D". To the right of the map is a table with the following data:

U7371360E2.19	7.58 MB	U737-D - U737-D
Static		
LEIGS15 NONE		
LEICA GS15		
2019-05-16 14:45:00 (GPS)		

The interface also includes a "DATA AVAILABILITY" indicator showing 70.44% and a "Period: 30 Days". The footer contains navigation links: "FPRN Home | Rinex 2 FTP | Goggle Earth Overlay | Florida Custom Geoid | Data Sheets & Superseded Coordinates | Contact | Cookies | About".

Again, a confirmation screen will appear. Click confirm to continue.

(CLICK)



You will again be taken to the Results page.

(CLICK)

FDOT English

Ron Hanson Home / Post Processing / Results

Shop Post Processing RINEX Data Computation Results Account Details Contact Dynamic Map FPRN Products FPRN Training FPRN News Emailer

Results

On this page, all results related to any SBC post-processing service are displayed, divided by category.

RINEX Data Virtual RINEX Data **Coordinate Computations**

5. Processed at 2019-07-19 12:08:58 1 File(s), 1 Point(s) Target System: FL N NAD83 2011 FPRN16 ✓   
 Project: sample Use Virtual RINEX: Yes

Show File Details

Point	Observation Time	Local Grid (E,N,h,H) FL N NAD83 2011 FPRN16	WGS84 Geodetic	Quality	
U737-D	2019-05-16 10:44:42, 30 min	628949.4286 m ± 0.0023 m 152170.5374 m ± 0.0017 m 12.1597 m	30° 22' 20.7869" N ± 0.0023 m 84° 11' 55.7461" W ± 0.0017 m -15.5473 m ± 0.0039 m	0.0048 m xRTK	

4. Processed at 2019-07-19 11:22:07 1 File(s), 1 Point(s) Target System: FL N NAD83 2011 FPRN16 ✓  
 Project: Empty Use Virtual RINEX: No

3. Processed at 2019-07-19 10:50:38 6 File(s), 0 Point(s) Target System: FL N NAD83 2011 FPRN16 ⚠  
 Project: sample2 Use Virtual RINEX: No

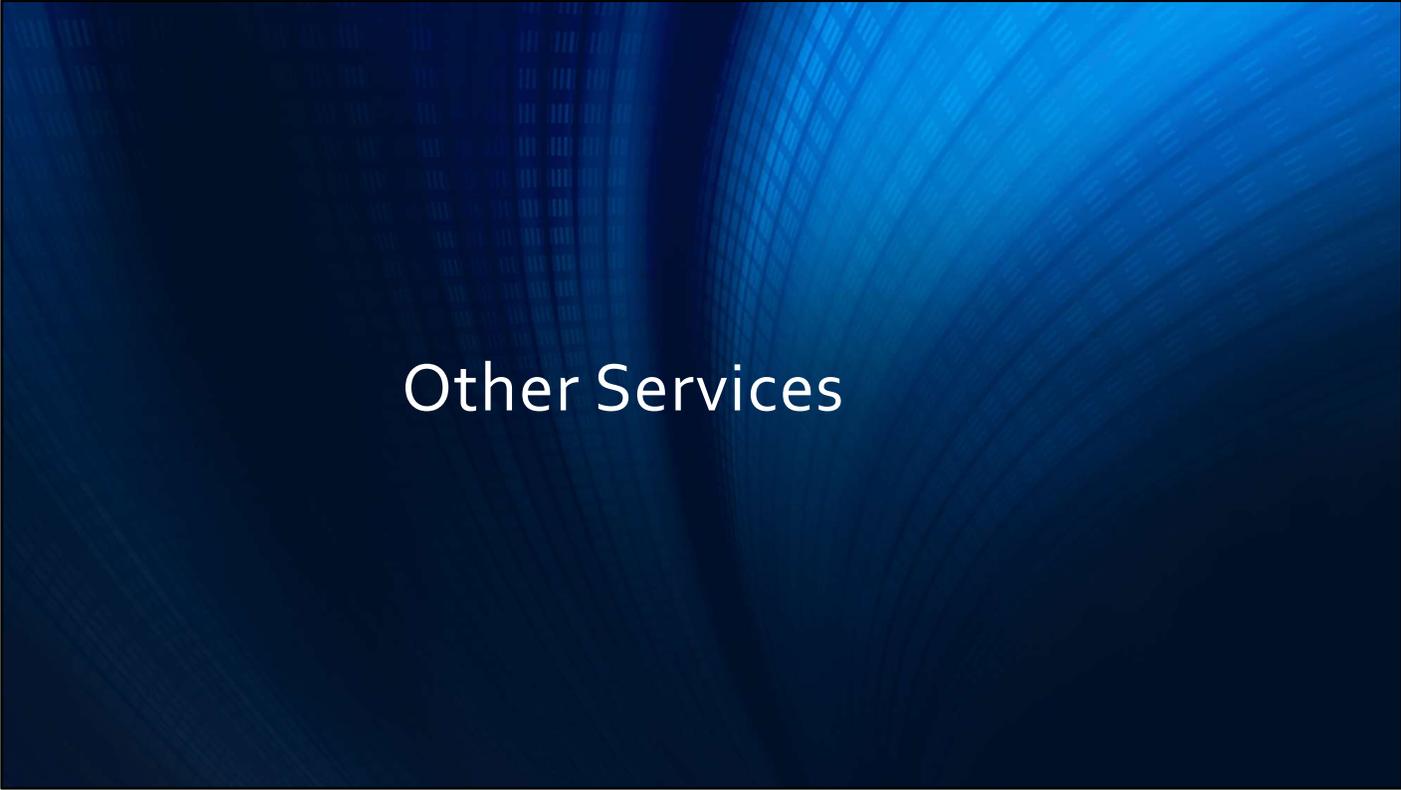
2. Processed at 2019-07-19 10:34:01 14 File(s), 0 Point(s) Target System: FL N NAD83 2011 FPRN16 ⚠  
 Project: sample Use Virtual RINEX: No

1. Processed at 2019-07-19 09:43:18 1 File(s), 0 Point(s) Target System: FL N NAD83 2011 FPRN16 ⚠  
 Project: sample Use Virtual RINEX: No

All Computation results older than 2019-06-19 are automatically removed.

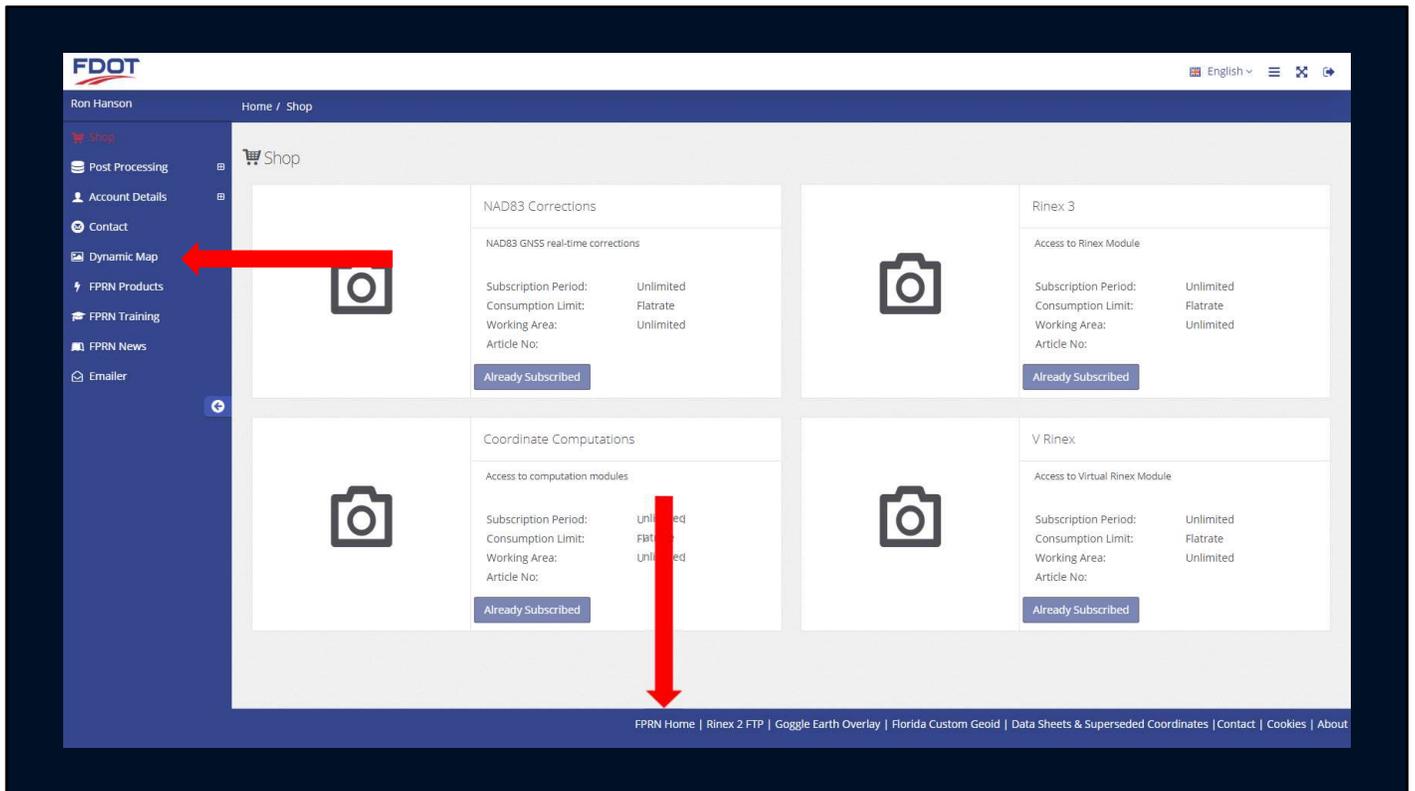
Click on the Full Report button to view, print, or save the document.

(CLICK)



# Other Services

What else is available on the Customer Portal?



We offer many of the same links on the Customer Portal that are on the FPRN Home Page.

(CLICK)

A link to our dynamic station map that is updated every fifteen seconds.

(CLICK)

You can pull up a list of our Real-Time Products with IP addresses and Ports

(CLICK)

We keep a library of different training presented by myself and others that is free to download

(CLICK)

We have an archive of all the Newsletters that have been sent out to the end users.

(CLICK)

We also have a link to our alternate emailer. We use this email option when we don't have access to the Customer Portal.

If you sign up it will allow you to receive an email when the system is down.

(CLICK)

The links across the bottom of the screen will take you to our homepage

(CLICK)

Download our Google Earth overlay

(CLICK)

Download the Florida Custom Geoid

(CLICK)

And finally view and download our FDOT data sheets and superseded Control sheets

(CLICK)



# Direction

FDOT WILL FOLLOW NGS INTO 2022

The NGS has proposed a new set of datums that will go into effect in 2022.

The FDOT will follow the NGS into the new National Spatial Reference System.

Actually, We will jump in front of the NGS.

We are going to start broadcasting the ITRF 2014 solution in the near future.

Why?

There will be upcoming projects that will require transformation to the new NSRS of 2022.

# Data Sheets

CORS Stations

Points included in Geoid (2470 monuments)

Monuments adjusted to NAD 83 (2011)

New data sheets will not include previous datums

The screenshot shows the 'Data Delivery System' interface for station AB9786 (Schmitt) Main Record. It provides a comprehensive overview of the station's geodetic data, including coordinates in Geometric, Geopotential, and Projected systems, a position plot, a map, and photographs of the monument. At the bottom, there are links to various NGS tools for this station.

Geometric Coordinates	Geopotential Coordinates	Projected Coordinates
Reference Frame: NAD83 2011 Survey Epoch: 2012.03	Datum: NAD83 2011 Survey Epoch: 2012.03	Reference Frame: NAD83 2011 Survey Epoch: 2012.03
LAT: 44° 52' 14.70" ± 0.006" LON: -99° 13' 58.70" ± 0.006" ELL HT: 230.94 ± 0.006m	ORTHO HT: 238.025 ± 0.010m GEOID HT: -7.109 ± 0.006m (GEOID11)	SPC: 230XN11 S UTM ZONE: 18 Easting: 651213.856m Northing: 620812.146m 4485.149m CONVERGENCE: 0° 20' 45.74" -20.717 24.47" SCALE FACTOR: 0.9997169 0.9997171 COMB FACTOR: 0.9997164 0.9997171 US NATIONAL GRID: UTM/K: 48Q: 30223

**Position Plot**

**Map**

**Photos**

- Close-up Photo: A photograph of the station monument, a circular metal disk with 'AB9786' and 'NGS' inscribed on it.
- Eye-level Photo: A photograph showing the monument in its natural setting, a grassy field.
- Surrounding Photo: A wide-angle photograph of the station's location, showing a large open field with trees in the background.

**NGS Tools for AB9786 (Schmitt)**

- NSAT: Use this position in other formats, units.
- GEOID: Get geoid height and ellipsoid height and convert to other datums.
- DEFLEC: Convert deflection angles to other datums.
- VELOCITY: Get velocity in units used for this station.
- HTDP: Use this position in other formats, units, and ellipsoids.
- VDATUM: Show datum heights and convert to other datums.
- DATA EXPORTER: Get raw data, converted, and formatted data.
- OTHER NGS TOOLS

## Positive Longitudes

Florida lies between

80° W (West Palm Beach)

and

88°W (Pensacola)

Positive East Longitudes

280° E (West Palm Beach)

and

272° E (Pensacola)

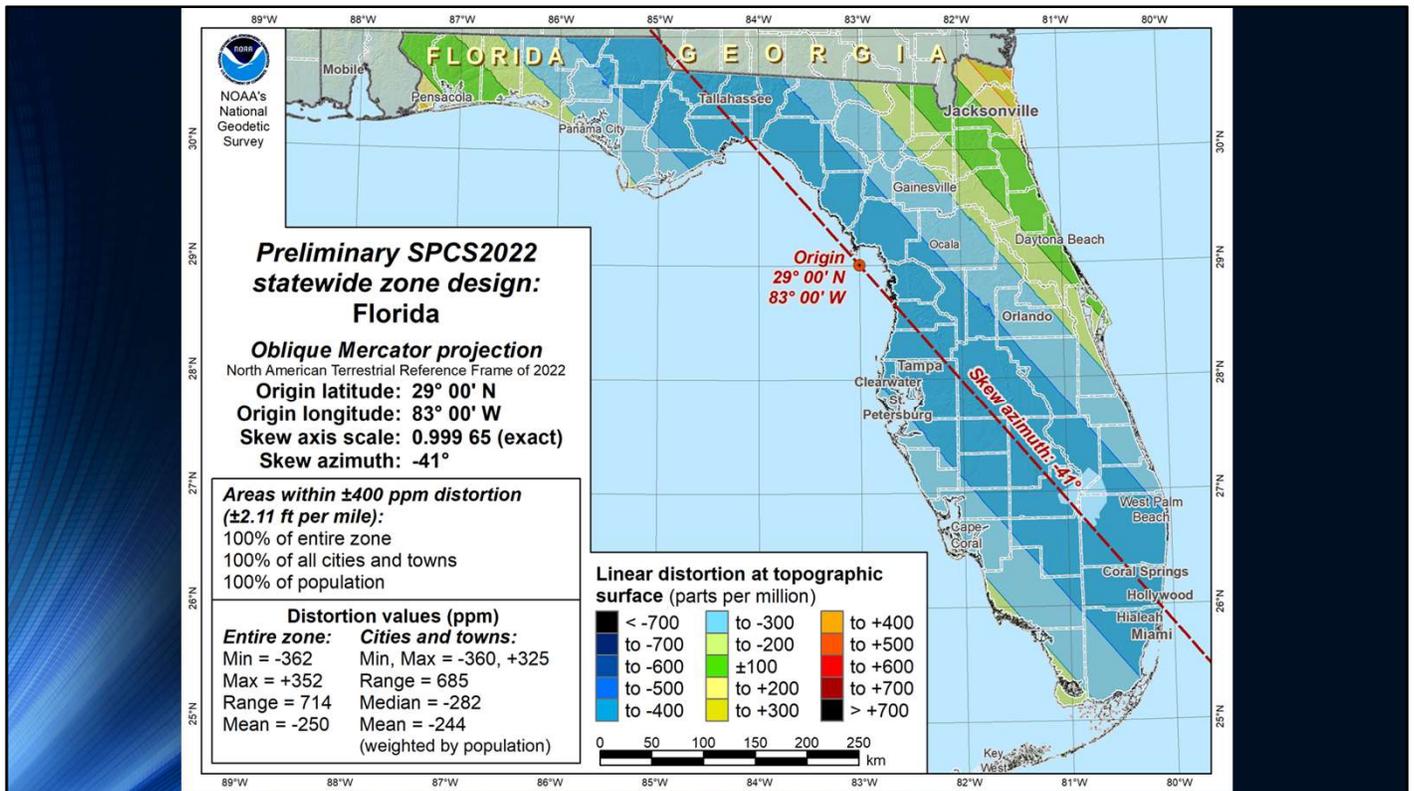
- Historically used west longitudes at NGS
  - Both negative and positive west longitudes
  - Sometimes  $\pm 180^\circ$  at anti-prime meridian (Guam  $145^\circ\text{E}$ )
  - Sometimes keep increasing west (Guam  $215^\circ\text{W}$ )
- Advantages of positive east longitudes
  - NSRS spans anti-prime but **NOT** prime meridian
    - From  $+140^\circ \rightarrow +300^\circ$  (vs.  $+140^\circ \rightarrow -60^\circ$ )
    - No  $\pm 180^\circ$  "switch" at anti-prime meridian
  - GEOID2022 grid from  $+170^\circ \rightarrow +350^\circ$  (vs.  $+10^\circ \rightarrow -10^\circ$ )
  - Longitude increases east (just like SPCS eastings)
- ***It just makes sense***
  - ***Default*** positive east (but west longitude still available)

Another major impact will be switching over to positive longitudes

Currently Florida lies between 80° W and 88° W

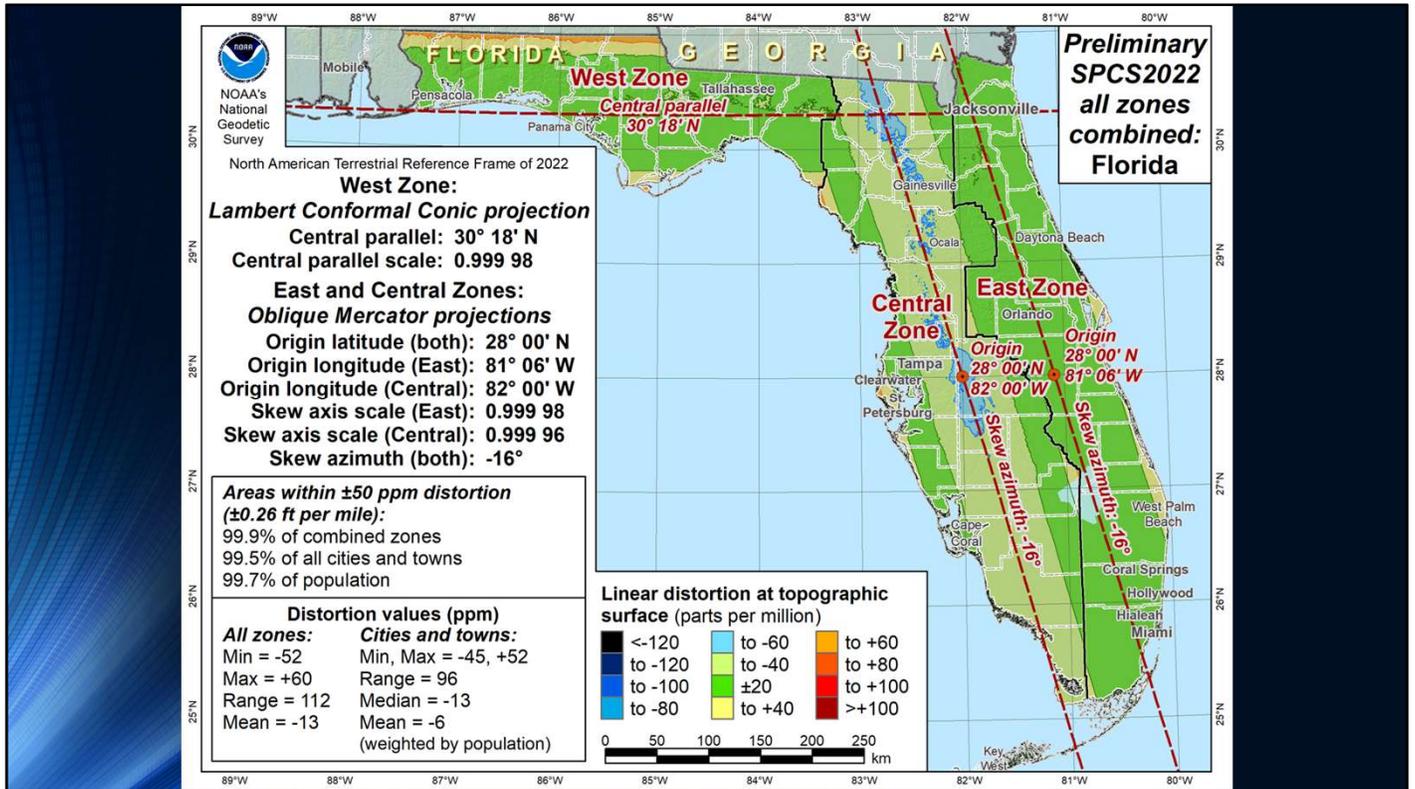
In the new system it will lie between 280° E and 272° E





Since we are changing things around why not change our State Plane Coordinate System

- Statewide design for Florida, using an OM projection
- Design criterion of ±400 ppm has all percentages of 100%
  - Next lower criterion of ±300 ppm did not meet all three (90%, 75%, 50%) minimum requirements, so ±400 ppm is smallest available criterion value
  - ±400 ppm corresponds to the distortion limits of a UTM zone (with respect to the ellipsoid)



- Replaces the existing 3 SPCS 83 zones (shown on the next slide)
- Note that following characteristics:
  - Uses 2 OM projections to replace existing 2 TM projections for the peninsula
  - Uses 1-parallel LCC to replace existing 2-parallel LCC for panhandle
  - Uses ±40 ppm design criterion (less than minimum of ±50 ppm) because existing areas are too narrow for a ±50 ppm criterion

## What are we doing to keep up with NGS?

- FPRN will broadcast ITRF 2014 and NAD83 (2011) coordinates (soon)
- New State Plane coordinate systems will be supported in computations
- Data sheets will include both ITRF 2014 and NAD 83 (2011)
- Hybrid Geoids will be customized until 2022 Gravity based Geoid is released

What are we doing to keep up with NGS?

By the end of the year the FPRN will be broadcasting ITRF2014 coordinates in addition to NAD 83 (2011) coordinates.

Along with the ITRF Broadcast we will be adding the New coordinate systems into the computation service.

The datasheets will be updated to include both NAD 83 (2011) and ITRF 2014.

We will be customizing Geoid models as they are released.

## Compliance

- As an Agency we may be “coerced” to comply with the new standard.
- Strings may be attached to any Federally Funded Projects
- Due to the symbiotic relationship between the FPRN and Foundation CORS (NGS) the Statewide Reference Network WILL migrate to the new datum.