

Support Document

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Post-Processing with GLONASS Base Station Data - for GeoExplorer 6000 and Pro6 units with FloodLight activated.

Currently, GLONASS data is not stored in the standard location on the National Geodetic Survey's (NGS) web site. This means that when Pathfinder Office, Positions Desktop or GPSAnalyst download data for post-processing from a CORS station it will not differentially correct the GLONASS data in the data file. The differential process will run correctly but the .COR file will not have any GLONASS data in it, thus reducing the productivity of the unit.

However, NGS is currently storing GPS and GLONASS data in a temporary location on their FTP site. This temporary location can be accessed by Pathfinder Office or Positions Desktop (unfortunately this is not accessible with GPS Analyst) with some minor modifications by the user. Please note that part of the problem is that not all CORS Reference Stations are able to process GLONASS data. Thus, even by following this Support Note, there will be some CORS stations that do not have GLONASS data because the actual GNSS receiver used does not support GLONASS.

The following instructions will guide you through how to add a GPS&GLONASS base station manually to your list in Pathfinder Office.

1. Proceed through differential correction as normal until reaching the Select Base Provider window. Identify the CORS ID of the base station you wish to use, which is the four letter identifier in parentheses.

Image 1.1 CORS Base ID

Provider	L2	! G Dis	tance Integr	ity Ind
CORS, WAVERL (NYWV), EW YORK (derived	from IGS08) 🛛 🛪		22 km	94.
CORS, WAVERLY (NYWY), NEW YORK (offline)	×		22 km	94.
a CORS, TOWANDA (PABT), PENNSYLVANIA (deri	ived from ×		24 km	
a CORS, TOWANDA (PABT), PENNSYLVANIA (offi	ine) ×		24 km	
a cors, coopers plains (NYCP), NEW YORK (offline) ×		50 km	93.
CORS, COOPERS PLAINS (NYCP), NEW YORK (c)	derived fr ×		50 km	93.
↓	1			•
Show Base Providers of Type: All types			▼ Updat	e List
New Copy Proj	perties	Delete]	
Help		ОК		ancel

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2. Proceed to the CORS NGS Website <u>http://geodesy.noaa.gov/</u> <u>CORS/</u> to confirm the desired base station is a GLONASS capable receiver. See Image 2.1 below. Enter the SiteID in top left text box and click EnterSiteID.



Image 2.1 CORS NGS Website Enter Site ID

3. Click SiteLog on top left to open page with station information. Scroll down page to section "3. GNSS Information" and scroll through to identify the current receiver installed and confirm satellite system type is GPS + GLONASS. If the base is GLONASS capable proceed to step 4

to add this base station to your Differential Correction base station list. If this is a GPS only base station proceed through steps 1-3 above until finding a nearby base station with both GPS + GLONASS base data.

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← → C ♠ 🔇 www.ngs.nd	aa.gov/cgi-cors/corsage.prl?site	e=WIL1			
🚼 Google (Pin It Irimble Part	ners Trimble - Support A-Z 🔇 T	rimble Support Tic	🕒 Log Me In Rescue	Upvise - Sales	🔇 Cartopac Ti
WIL1 WILKES BARRE 1 Lehman, PA USA		Nat	ional Geo	detic Sur	vey - C
Site operated by: PADT	Additional Information	: Firmware up	grade.		
3. Coordinates	6 Receiver Type Satellite System Serial Number	: TRIMBLE NET : GPS+GLONASS	R9		
SiteLos Photographs	Firmware Version Elevation Cutoff Setting Date Installed	: 4.43 ; 5 ; 2011-09-13			
Data Availability Standard Files Custom Files (UECORS)	Date Removed Temperature Stabiliz. Additional Information	: 2012-04-16 : (none or to : Receiver in	lerance in degre stalled.	ees C)	
Time Series (60-day)	7 Receiver Type Satellite System	: TRIMBLE NET : GPS+GLONASS	R9		
<u>Time Series (longterm)</u>	Firmware Version	: 4.46	_		
<u>Google Map will only</u> <u>Google Map all CORS</u>	Date Installed Date Removed Temperature Stabiliz. Additional Information	: 2012-04-16 : (CCYY-MM-DE : (none of co : Receiver in	Thh:mmZ ferance in degre stalled.	ees C)	
Enter SiteID 3.	x Receiver Type Satellite System Serial Number Firmware Version Elevation Cutoff Setting Date Installed Date Removed Temperature Stabiliz.	: (A20, from : (GP5/GLONAS : (A20, but n : (A11) ; (deg) : (CCYY-MM-DI : (CCYY-MM-DI : (none or to	rcvr_ant.tab; se S/GPS+GLONASS) ote the first AS Thh:mmZ) Thh:mmZ) lerance in degree	ee instructions 5 is used in SJ 2005 C)	3) INEX)
	Additional Information	: (multiple 1	ines)		

GNSS Antenna Information

Image 3.1 ID GLONASS Capable

4. Return the Differential Correction wizard and select the base station confirmed to have GPS + GLONASS data. Then select the Copy... button.

A window with Base Provider Properties appears. Rename the base station under the General tab and Organization text box. It is best to name this something that keeps the base ID and identifies this as GLONASS. See Image 4.2 below.



Image 4.2 Rename Copied Base

5. Turn on checkbox for GLONASS Capability under Base Station Tab

Base Provider Properties						
General Base Station Interne	t Server Security					
Receiver Type:						
Base Station Software:						
Other Information:						
Reference Position (ITF	3F00 (Epoch 1997.0))					
Latitude:	41°18'18.94339''N					
Longitude:	76°00'55.10883'W					
Altitude (m HAE):	384.481					
GPS L2						
GLONASS						
ОК	Cancel Apply Help					

Select Base Provider	Transa Tanat			X
Provider		L2 G	Distance	In 🔺
🙇 CORS, BINGHAMTON (NYBH), NE	W YORK (derived from IGS08)	×	78 km	
👗 CORS, BINGHAMTON (NYBH), NE	W YORK (offline)	×	78 km	
🔊 CORS, WILKES BARRE (WIL1), PI	ENNSYLVANIA (offline)	×	85 km	
🚨 CORS, WILKES BARRE (WIL 1), PI	ENNSYLVANIA (derived from IGS08)	×	85 km	
CORS, CORTLAND (NYCL), NEW	YORK (offline)	×	89 km	
CORS, CORTLAND (NYCL), NEW	YORK (derived from IGS08)	×	89 km	-
Ĩ				F.
Show Base Providers of Type:	All types	.	Update Li	st
New Copy	Properties	elete		
Help		ОК	Cano	el

Image 4.1 Copy Base Properties

6. Go to the Internet Server Tab

- A. UNcheck the Nav File required.
- B. Replace the Base File Address Format string with the following;

ftp://www.ngs.noaa.gov/cors/rinex/%YYY%/%DDDDDD%/%cccc%/%cccc%%DDDDDb%/%yy%d.Z

	Base Provider Properties							
ĺ	General Base Station Internet Server Security							
в —	Base File Address Format: no&metfile=no&datasheets=no&orbits=no&compress=P&SUBMIT=SUBMIT							
	Time Format File Time Span (Hours): C Local Time 1 ÷ GPS Time (UTC) Station ID:							
A	Nav File Required Nav File Address Format (Optional):							
	OK Cancel Apply Help							

Image 6.1 Internet Server Tab

7. The Base Station will now appear in your Base Provider List with a blue icon, this identifies it as a manually added base station. Select this new base station and continuing post-processing your data as you normally would.

Select Base Provider				x
Provider		L2 G	Distance	In 🔺
CORS, BINGHAMTON (NYBH), NEW	YORK (derived from IGS08)	×	78 km	
CORS, BINGHAMTON (NYBH), NEW	YORK (offline)	×	78 km	
🙇 CORS, WILKES BARRE (WIL 1), PENI	NSYLVANIA (offline)	×	85 km	
🙇 CORS, WILKES BARRE (WIL 1), PEN	NSYLVANIA (derived from IGS08)	Ħ	85 km	
👗 WIL1 GLONASS(derived from IGS08)		нн	85 km	
& CORS, CORTLAND (NYCL), NEW YO	RK (offline)	×	89 km	-
₹				Þ.
Show Base Providers of Type:	All types	•	Update Lis	st
Base Provider				
New Copy	Properties De	elete		
Help		ОК	Canc	el

Image 8.1 Blue Icon Base Provider

Understanding Floodlight and Post-Processing with GLONASS in More Detail

Understanding how the Trimble post-processing engine handles GLONASS data is important to generating accurate data. Below is an image of the position properties from an uncorrected .ssf file where there were GLONASS satellites tracked in the field. Note that under the DOP's for this position the satellites with an R indicating the 7 GLONASS satellites acquired in the field (see image 9.1 below.)

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nage 9.1	otions	Window	Help						
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			North:		431203.028 USft	Point feature: Str	<u>s z .</u>		
			East:		1369478.167 USft	Attribute Name	s	Value	
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			0:	3 06 13 16 20 23 30	31 32 R04 R05	Positions:		. 39	
				RU6 RT-	1 KIS KI7 K24	Std Deviation:		0.7 m	
		_				Filename:		R071012B.SSF	
						<u>S</u> tatus		New	
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When post-processing a GPS and GLONASS data file with GPS only base data, GLONASS records will be removed from the corrected file (see image 9.2 below). This will negatively impact the post-processed accuracy and in some cases can remove entire features from the corrected file.

Options	Window	Help			
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		Altitude (MSL): Summary 68% Precisions DOPs	975.993 USft	Attribute Name AssemblyID (ID) PostRepl (Recommend P	Value ^ 2 Yost No
		Max. PDOP Max. HDOP Max. VDOP Max. TDOP	4.3 1.9 3.9 2.9	Photo1 NumofPhotos (2nd Photo Photo2	corner2 C:\Users\Dwner\Documen ?) 2 C:\Users\Dwner\Documen ←
		Satellites:		Summary Attributes 6	8% Precisions
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In the case that there are no GPS and GLONASS base stations within 75 miles of the project site, Floodlight may need to be turned off prior to field collection. If unsure, use step 2 (page 2) to verify if a GPS and GLONASS base station is available within 75 miles prior to collecting data in the field. Some states may have a GPS only base network and others may have a combination of GPS only and GPS + GLONASS base stations.

Customers using the Geo6000, Geo7x, or the Pro6 receivers will achieve the best data collection results with the Floodlight technology activated, ON, and with WAAS disabled (Use the "Uncorrected GNSS" option in Setup -> Realtime Settings). A WAAS (SBAS) correction can still be used to increase in the field accuracy for navigating or staking out in the field (use the "SBAS" option in Setup -> Realtime Settings), but is a GPS only correction. When WAAS is being used, GLONASS satellites will not be tracked by the receiver.

Other Useful Information GLONASS / Floodlight Information

It is important to verify when renting a Geo6000 or using newly purchased equipment that Floodlight has been activated. This information is available under the Settings/System/System Information/Options tab, see image 10a. It is only necessary to Activate Floodlight once.

It is also beneficial to know how to turn ON and OFF Floodlight if so desired. By clicking on the Windows icon in the bottom left hand corner scroll to the bottom and select the program, Option Override, see image 10b.

The Option Override app allows the user to turn ON/OFF the various options available on a Geo6000 or Geo7x. The Pro6 receiver will require a connection to a PC running the Option Activation Manager to change these settings. The unit listed below (10c) has Floodlight, NMEA, and centimeter Edition activated displaying all 3 options as ON with the checkmark displayed.



Images 10a, 10b, 10c - Activating & Overriding FloodLight

Other Sources of GLONASS Corrections

Other resources for GPS and GLONASS base stations are available beyond the NGS ftp site. A Virtual Reference System (VRS) can be used for real-time corrections in the field. These networks use an internet connection in the field via cell phone Bluetooth tethering, Wifi hotspot, or Mifi to apply a real-time correction to the data being collected. The availability of this correction may vary from state to state and may provide GPS only corrections depending on the base stations available. A list of the VRS networks can be viewed from the USGS real-time network page <u>http://water.usgs.gov/osw/gps/real-time_network.html</u>. Each network will require a username and password to access the correction and some may require a yearly subscription fee.

Lastly, with the release of the Geo7x and Geo6000 centimeter Editions a correction can be broadcast from a survey receiver to achieve centimeter level accuracy on a Geo6000 or Geo7x. A Pacific Crest XDL radio (see image below) can be used to broadcast the correction from the survey base to the Geo handheld to achieve these accuracies even when cell coverage is limited.

If you have more questions on this support document or how best to handle GLONASS corrections please contact your local Precision Laser & Instrument Inc sales or support representative.

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Pacific Crest XDL radio