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1 Introduction

1.1 Configuration methods

This document was created based on receiver firmware version 5.2.0 and RxTools version 17.0. RxTools will run on Windows 7 and later or Fedora15 and later. RxTools is a group of programs and we will be using RxControl to configure the receiver. A copy of the latest version of RxTools can be found at <http://www.septentrio.com/support>. You will need to provide your e-mail address.

There are two main methods available for the configuration of the PolaRx5. One is through the web GUI interface and the other is using RxControl. While it is possible to setup almost all configuration parameters through the web GUI it can become difficult to create more complex setups. For complete receiver configuration or application of patches the use of RxControl and configuration scripts is preferable. In the web GUI the use of exe and login commands is restricted and uploaded configuration files must be complete.

Connecting to the web GUI interface using the Ethernet port or WiFi. To turn on WiFi there is an icon/button on the front right of the receiver. Once activated it will show up on your computer as a WiFi network named with the SSID printed on the back of the receiver. The default WiFi IP is 192.168.20.1. For power savings and security make sure the WiFi is off before leaving site.

Connect using RxControl via serial, Ethernet, WiFi or USB. The quickest way to connect is likely using WiFi. If you load scripts and leave the box checked to default before applying the WiFi will be turned off during the process. If your PC does not have a serial port use a serial to USB adaptor and it will be assigned a COM port or dev that can be selected when creating the connection. USB works good but connecting can occasionally be problematic. See section 4 for more information on RxControl usage.

The UNAV base configuration found below in section 4.11 UNAV_X5_5-2-0_base_1.txt should be applied first. To customize user passwords and access for PBO apply the additional file in section 4.35 PBO_X5_5-2-0_user-admin_1.txt.

To inform the user how to set up various parts of the configuration examples are provided using the web GUI and the equivalent using scripts and RxControl. With the understanding of these steps the user should be able to successfully make modifications to the receiver using either method.

To apply initial configuration it is best, if possible, to start by resetting the receiver to default. If the receiver is being moved to a new site it may also be prudent to format the internal drive to remove all stored data. Care should be taken that before formatting that all data is saved/archived as needed. Data is not recoverable after format. Once the receiver is cleaned apply the base script and user-admin script if necessary.

The base configuration script is organized in sections similar to the way the file is read and output from the receiver. If you want to edit the configuration to apply only sections you can simply comment out the unwanted sections or use the task specific example scripts provided. An example would be the IP setting. Generally if you were working on a unit that is deployed you would want to comment this out. If you are setting up many receivers in the office you may want to set the IP of all receivers the same.

1.2 Notes on UNAVCO base configuration

COM1 port is left set to default for a maintenance port. If you have problems accessing the receiver via Ethernet or WiFi connect using serial cable CBL_e_COM_1.8 p/n 200416 and RxControl.

UNAV_X5_5-2-0_base_1.txt is set up to record met data from a WXT5n0 met pack when installed. All that needs to be done is plug the metpack into COM2. Use cable CBL_e_COM_1.8M to connect to a serial device. If using cable 'CBL_e_COM_1.8 200416 you will need to use a null adapter and gender changer. Go to the 'External Sensor' section under the 'Station' tab and check for met string to appear. The sample rate is set to 5min and the data will be recorded in the 'A' and 'M' sessions.

The base configuration saves a copy in the 'User1' file so by coping User1 to Current and saving to boot the receiver can be set back to UNAV default. If changes are made to "Current" you should answer 'Save to Boot' in the box that appears in the lower right corner. This will save a copy of current to Boot so on the next reboot changes will not be lost. If you would like to save the modified configuration you should save it to 'User2'.

If editing any script be aware that the order that lines are applied does matter.

1.3 Adding functionality

To add an external disk you can run the script 'UNAV_X5_ext_ses_1.txt' using RxControl. The script can be edited to reflect a different session name, sampling rate or file size.

To add a tiltmeter you can run the script 'PBO_X5_5-2-0_Tiltmater-port3_1.txt'. Use the dual (COM3.4) serial cable (CBL_e_COM_DUO_7_M p/n 215148) and plug the tiltmeter in to the port 3 connector. Gender and null modem adaptors are not required with this cable.

2 Site Installation

2.1 Cables minimum

To install a PolaRx5 GNSS receiver you will need, at a minimum, the following cables.

- DC power open ended CBL_PWR_OE p/n 200422
- Ethernet CBL_e_ETH_MS p/n 200418
- Cable or adaptor to connect to female TNC for antenna.

The receiver requires 9-30V for operation.

2.2 Cables for metpack

If installing a met pack you will need the following cable.

- Serial met/tilt CBL_e_COM_1.8_M p/n 215143
- or optional

- Serial CBL_e_COM_1.8 p/n 200416

If you use the optional cable you will need to provide a gender changer and a null modem adapter. The part number or the gender of the 9-pin connector can easily identify the cable. Cable p/n 215143 has a male connector and p/n 200416 has a female connector.

The receiver will not power external devices so power must be provided separately.

2.3 Cables for tiltmeter or other serial device

If installing a tiltmeter or other serial device you will need the following cable.

- COM3,COM4 cable CBL_e_COM_DUO_7_M p/n 215148

COM3 is the 9-pin connector in the middle and COM4 is the 9-pin connector at the end.

The receiver will not power external devices so power must be provided separately.

2.4 External USB drive

The PolaRx5 receiver supports the use of an external USB drive of up to 32GB for additional storage.

To connect use the following cable in the port identified with the USB icon.

- USB ext. drive CBL_e_USB_HOST p/n 214935

See section 3.4 or 4.21 in the Unav_PolaRx5_Setup guide for instruction on how to configure logging to an external drive.

3 Using Browser Web GUI to Configure

Before changes can be made to the configuration you must log in. Click on the 'Log in' button in the top center and you will be prompted for credentials. If you would like to log out of the receiver click on the 'Log out' button in the top right corner and you will be prompted again but this time leave the fields blank and click 'OK'. Current browsers work well however problems have been reported when using version 10 or earlier of Safari.

3.1 Setup Ethernet

GoTo 'Communication > Ethernet'

- Verify under 'Ethernet interface mode' that the Power is set to 'on'.
- Set up the 'TCP/IP' information with the correct local network settings.

Check 'OK' and save to Boot.

***Changes to network setting do not take effect until a reboot is performed.

UNAV default shown below.

The screenshot shows two configuration panels. The top panel, titled 'Ethernet interface mode', contains a 'Power' label followed by two radio buttons: 'off' and 'on'. The 'on' radio button is selected. The bottom panel, titled 'TCP/IP Settings', contains several fields. At the top, there is a 'Mode' label with two radio buttons: 'DHCP' and 'Static'. The 'Static' radio button is selected. Below this are six input fields: 'IP address' (192.168.1.2), 'Netmask' (255.255.255.0), 'Gateway' (192.168.1.1), 'Domain' (empty), 'DNS1' (0.0.0.0), and 'DNS2' (0.0.0.0).

Ethernet interface mode	
Power	<input type="radio"/> off <input checked="" type="radio"/> on

TCP/IP Settings	
Mode	<input type="radio"/> DHCP <input checked="" type="radio"/> Static
IP address	192.168.1.2
Netmask	255.255.255.0
Gateway	192.168.1.1
Domain	
DNS1	0.0.0.0
DNS2	0.0.0.0

3.2 Set SV Tracking

GoTo 'GNSS > Spectrum'

- Set 'AGC Mode' and 'Notch Filters' as necessary. Care should be taken when adjusting these parameters. Adjust these options if RF noise sources appear to be affecting data quality.

More information can be found in the 'Polarx5_user_manual' and the 'Polarx5 GNSS Firmware v5.2.0 Reference Guide'.

The UNAV default is to leave filters disabled as indicated below with noise issues

assessed on an individual basis.

AGC Mode

	L1	L2L5	E6
Mode	auto	auto	auto
Gain	35 dB	35 dB	35 dB

Baseband Sampling Configuration

Baseband sampling mode ☒ BeforeIM ☐ AfterIM

Notch Filters

	Notch1	Notch2	Notch3
Mode	off	off	off
Center frequency	1100.000 MHz	1100.000 MHz	1100.000 MHz
Double-sided bandwidth	30 kHz	30 kHz	30 kHz

GoTo 'GNSS > Satellites and Signals'

-Select SV signals you wish to track.

The UNAV settings for GNSS are under evaluation.

-Currently set to GLOL1CA and GLOL2CA.

Status

Settings

Signal Tracking

GPS

☒

GLONASS

☒

GLOL1CA

☒

GLOL1P

☐

GLOL2P

☐

GLOL2CA

☒

GLOL3

☐

GALILEO

☒

SBAS

☐

COMPASS

☒

QZSS

☒

Advanced Settings

Default

Ok

7

3.3 Setup Stream

GoTo 'Communication > IP Ports'

-Set IPS connection Port, Mode and UDPAddress.

For UNAV set IPS1 with Port=42042, Mode=TCP and UDPAddress=255.255.255.255.

TCP/IP Server Settings

	Port	Mode	UDPEndress
IPS1	42042	TCP	255.255.255.255
IPS2	0	TCP	255.255.255.255
IPS3	0	TCP	255.255.255.255
IPS4	0	TCP	255.255.255.255
IPS5	0	TCP	255.255.255.255

GoTo'DATA Output' Tab

- Click the 'New BINEX stream' button.
- Select a port for the stream. UNAV selected IPS1.
- Select output interval. UNAV streams at 1sec interval.
- Select the messages to be included in the stream.

UNAV enables the following-

REC01NAV – Rec0101

Rec05Geod

Rec7D00

Rec7E01

Rec7F05

Edit BINEX Stream

Ports

IPS1

Interval

1 sec

Clear

Clear

Rec01Nav

Rec0101

Rec0102

Rec0103

Rec0104

Rec0105

Rec0106

Rec01Raw

Rec00

Rec05Geod

Rec7D00

Rec7E01

Ok

Cancel

Check 'OK' and save to Boot.



















3.4 Setup new internal/external session

GoTo 'Logging > Log Sessions'

-Select 'Create' to the right of the next available Log ID.

UNAV LOGS are LOG1=A, LOG2=B, LOG3=C, LOG4=M, LOG8=STATUS

Log Sessions

ID	Name	Data	Auto-Delete	Disk	FTP
LOG1	A	SBF	After 1 year	Internal	  
LOG2	B	SBF	After 30 days	Internal	  
LOG3	C	SBF	After 7 days	Internal	  
LOG4	M	SBF	After 3 days	Internal	  
LOG5	Unused				
LOG6	Unused				
LOG7	Unused				
LOG8	STATUS	SBF	After 30 days	Internal	  

-Enter 'Session Name' -User should verify that the chosen name is valid. Standard UNAV options are A, B, C, M and STATUS.

-Enter 'Disk' -Internal or External

-Enter 'Auto Delete' time -The disk size and storage of other session should be considered when choosing how much data to store. See Data Storage Estimation for more information.

UNAV files are Internal and A='After 1 year', B='After 30 days', C='After 7 days', M='After 3 days' and STATUS='After 4 days'.



Edit Session LOG1

Session SBF Logging RINEX Logging BINEX Logging

Session name

Disk

Auto-delete

GoTo 'SBF Logging' tab and select 'New SBF stream'.

-Set the sampling rate in the pulldown menu.

UNAV files are A=15sec, B=1Hz, C=5Hz, M=15sec.

Select the following messages-

Measurements - MeasEpoch

GPS - GPSNav

GPSIon

GPSUtc

GLO - GLONav

GAL - GALNav

GALUtc

GALGstGps

GEO - GEONav

CMP - CMPNav

QZS - QZSNav

PVTGeod - PVTGeodetic

ReceiverSetup

ASCIIn <— Only if met/tilt data is to be recorded (sessions A and M).

-Set the 'Naming Type' to IGS15min, 1H, 6H, 24H.



UNAV files are A=IGS24H, B=IGS1H, C=IGS1H, M=IGS1H.


Apply and save to Boot.


Edit Session LOG1

Session **SBF Logging** RINEX Logging BINEX Logging

Streams

Messages	Interval	
MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+ GALGstGps+GEONav+CMPNav+QZSNav+PVTGeodetic+ReceiverSetup+ ASCIIn	15 sec	 


 New SBF stream

 SBF File Name and Duration

Naming type

File name

Compression

 SBF FTP Push Settings

Ok Cancel

GoTo 'Logging > Disk Full Management'

-Set LOG files priority for overwrite. File size management can also be accomplished through 'Auto-Delete' function.

The UNAV configuration leaves the priority set as indicated below and sets Auto-Delete when creating/editing LOG files.

Apply and save to Boot.

Internal Disk

External Disk

Disk Full Action

When disk is full:
☐ Stop logging in all sessions
☒ Delete oldest files by session priority

Session Priority

High priority - will be deleted last
LOG1 — A ▼
LOG2 — B ▼
LOG3 — C ▼
LOG4 — M ▼
Medium priority
LOG8 — STATUS ▲▼
Low priority - will be deleted first
No sessions

3.5 Setup receiver metadata

GoTo 'Station > Name and Marker'

-Update all fields from pnnn or (SEPT) to the station 4-character ID. If receiver is defaulted set other fields as indicated below.

All characters in the pnnn fields must be lower case.

Check 'OK' and save to Boot.

Marker and Station Parameters

Marker name	pnnn
Marker number	pnnn
Marker type	GEODETTIC
Station code	pnnn
Monument index	0
Receiver index	0
Country code	USA

Observer Parameters

Observer name	UNAVCO
Observer agency	UNAVCO

Observer Comment

Observer comment	Unknown
------------------	---------

GoTo 'Station > Antenna'

-Set Delta U for antenna height and Delta E and/or N for other offsets. UNAV SCIGN mount height, Delta U = 0.0083 M.

-Set 'Antenna Type' in pull-down menu to appropriate antenna/dome combination.

For PBO sites the antenna will be TRM59800.00 or TRM59800.80 with domes tall='SCIT' or short='SCIS'.

-Update antenna serial number upon site installation.

Check 'OK' and save to Boot.

Antenna Offset

Main	
Delta E	0.0000 m
Delta N	0.0000 m
Delta U	0.0083 m
Antenna Type	TRM59800.00 SCIT
Serial Number	Unknown
Setup ID	0

GoTo 'Station > Position'
 -Set 'Position Mode' to 'Static'.

Check 'OK' and save to Boot.

Status

Settings

Position Mode

Mode	<input checked="" type="radio"/> Static <input type="radio"/> Rover
RTK	<input checked="" type="checkbox"/>
StandAlone	<input checked="" type="checkbox"/>
SBAS	<input checked="" type="checkbox"/>
DGPS	<input checked="" type="checkbox"/>
Static Position	<input checked="" type="radio"/> auto <input type="radio"/> Geodetic1 <input type="radio"/> Cartesian1

Static Position Geodetic

Geodetic1	
Latitude	0.000000000 deg
Longitude	0.000000000 deg
Altitude	0.0000 m
Datum	WGS84

GoTo 'GNSS > Timing'

- Set 'Clock Sync Threshold / Clock Steering' to 'ClockSteering'.
- Under '10-MHz REF OUT Configuration' verify both 'Enable REF OUT signal' and 'Enable disciplining to GNSS frequency' are set to 'off'.

Check 'OK' and save to Boot.

Clock Sync Threshold / Clock Steering

Threshold ClockSteering

10-MHz REF OUT Configuration

Enable REF OUT signal ☒ off ☐ on

Enable disciplining to GNSS frequency ☒ off ☐ on

3.6 Setup new met or tilt logging

GoTo 'Station > External Sensor'

- Under 'Enable ASCII Input' check COM2*

-Under 'Set Periodic Echo' set the Message and repeat Interval. For the WXT5n0 metpacks set the Message to 'A:0R0%%CR%%LF' and for the Lily tiltmeter set it to 'A:*0100XY%%CR%%LF'.

The normal sample rate for UNAV met data is 5min.

Check 'OK' and save to boot.

Enable ASCII Input

☐ COM1 ☒ COM2 ☐ COM3 ☐ COM4

Set Periodic Echo

	COM1	COM2	COM3	COM4
Message	A:Unknown	A:0R0%%CR%%LF	A:Unknown	A:Unknown
Interval	off	min5	off	off

GoTo 'Corrections > Corrections Input'

- Under COM2 (or other port) select 'ASCIIIN'.

Check 'OK' and save to Boot.

Input	
COM1	auto
COM2	ASCIIN
COM3	auto
COM4	auto
USB1	auto
USB2	auto
IP10	auto

GoTo 'Logging > Log Sessions'

-For normal UNAV setup save met or tilt data to the 'A' and 'M' sessions.
Enter the editor for the session you wish to save the data to.
Go to the 'SBF Logging' tab then open the 'Messages' editor.
In the editor scroll down and check 'ASCIIn'.

Check 'Apply', 'Apply', 'Apply' then save to Boot.

BBSamples	<input type="checkbox"/>
ASCIIIn	<input checked="" type="checkbox"/>
RxComponents	<input type="checkbox"/>
PosProjected	<input type="checkbox"/>
RxMessage	<input type="checkbox"/>
DynDNSStatus	<input type="checkbox"/>









Apply Cancel

3.7 Setup Users and Login Credentials

GoTo 'Admin > User Administration'

-Set user login and privileges.
For PBO set as follows.

Users

	User Name	Password	User Access Level
User1	pbo	User 
User2	unavco	User 
User3			User 
User4			User 
User5			User 
User6			User 
User7			User 
User8			User 

Default Access Level Per Interface

Web	<input type="radio"/> none	<input checked="" type="radio"/> Viewer	<input type="radio"/> User
FTP	<input type="radio"/> none	<input checked="" type="radio"/> Viewer	<input type="radio"/> User
IP Ports	<input type="radio"/> none	<input checked="" type="radio"/> Viewer	<input type="radio"/> User
COM Ports	<input type="radio"/> none	<input checked="" type="radio"/> Viewer	<input type="radio"/> User
USB Ports	<input type="radio"/> none	<input checked="" type="radio"/> Viewer	<input type="radio"/> User

3.8 Resetting Receiver

The Ethernet configuration is not reset during any of the following operations.

To reset the receiver to default there are two options.

Option 1

GoTo 'Admin > Reset'.

- Check all boxes and the 'OK'.

- When the 'Reset Confirmation' message appears click 'Reset' and wait for the receiver to reboot.

Reset Receiver

Level	<input type="radio"/> Soft <input checked="" type="radio"/> Hard
Config	<input checked="" type="checkbox"/>
PVTData	<input checked="" type="checkbox"/>
SatData	<input checked="" type="checkbox"/>
BaseStations	<input checked="" type="checkbox"/>
WiFiAccessPoints	<input checked="" type="checkbox"/>

Press "OK" to apply the changes.

Option 2

GoTo 'Admin > Configurations'

-Select 'RxDefault' in the 'Source' pull-down menu, leave 'Target' set to 'Boot' and click 'OK'. DO NOT click in lower left corner to 'Save'. Reboot receiver. It will restart with default settings.

Copy Configuration File

Source	RxDefault
Target	Boot

Press "OK" to apply the changes.

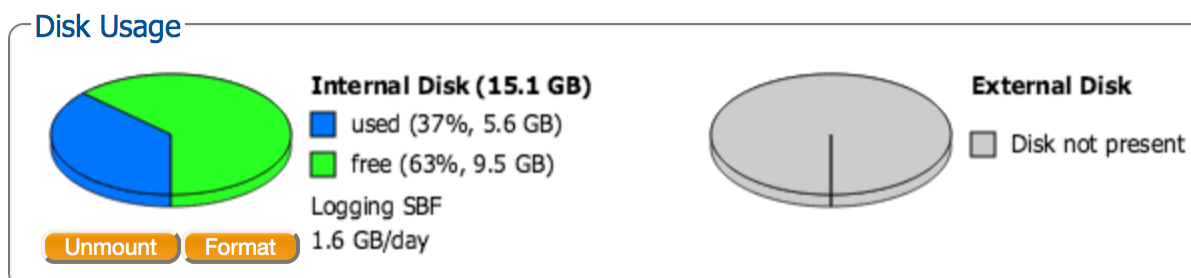
Receiver Configurations

<input checked="" type="checkbox"/> Current	Different from factory default	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Boot	Different from factory default	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> User1	Different from factory default	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
User2	Equal to factory default		<input checked="" type="checkbox"/>

To format the internal or external disk

GoTo 'Logging > Disk Contents'

-Click 'Format' then at the prompt click 'format' again.



4 Using RxControl to Configure

Run the program RxControl for configuration of the unit. You can connect to the PolaRx5 via serial or Ethernet. For serial connection use CBL_e_COM_1.8 p/n 200416 and for Ethernet connection use CBL_e_ETH_MS p/n 200418. Select the connection under 'File' > 'Change Connection' or 'Manage Connections'. Once connected go to 'Tools' > 'Expert Console' to open console and go to 'File' > 'Upload script...' (Ctrl+U) to load scripts. **Be sure to check 'NO' in the dialog box that comes up asking 'Reset SSRC7's settings to default before applying the script?'**

The scripts to be loaded can be downloaded from UNAVCO or the text can be copied from each section below and pasted into a text document.

Use the 'Expert Console' to watch for errors or messages while loading the scripts. If the receiver is not defaulted and it has a password there are two approaches. 1) In the 'Expert Console' login by entering login,un,pw in the text field at bottom. 2) Uncomment (remove the '#') from the line #login, username, password at the top of script and add the required credentials.

4.1 UNAV Base configuration

4.11 UNAV_X5_5-2-0_base_1.txt

```
# Review and comment out sections such as # Metadata or # Set receiver IP.
# If the receiver has already been configured it is recommended you reset the receiver to
  default and format the internal drive.
# Save data before reformatting.

# Setup streams
setSBFOutput, Stream1, LOG1
setSBFOutput, Stream2, LOG2
setSBFOutput, Stream3, LOG3
setSBFOutput, Stream4, LOG4
setSBFOutput, Stream8, LOG8
setSBFOutput, Stream16, IPS1
setSBFOutput, Stream1, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav+ASCIIN
setSBFOutput, Stream2, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
setSBFOutput, Stream3, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
```

```

    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
setSBFOutput, Stream4, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav+ASCIIN
setSBFOutput, Stream8, ,
    MeasEpoch+MeasExtra+EndOfMeas+OutputLink+GPSRawCA+GPSRawL2C+GPS
    RawL5+GLORawCA+GALRawFNAV+GALRawINAV+GALRawCNAV+GEORawL1+
    GEORawL5+GPSNav+GPSAlm+GPSIon+GPSUtc+GLONav+GLOAlm+GLOTime+G
    ALNav+GALAlm+GALIon+GALUtc+GALGstGps+GEONav+GEOAlm+BaseVectorGe
    od+PVTGeodetic+PosCovGeodetic+DOP+EndOfPVT+ExtEvent+DiffCorrIn+BaseSt
    ation+InputLink+ChannelStatus+ReceiverStatus+ReceiverSetup+Commands+CMP
    Raw+IPStatus+QZSRawL1CA+QZSRawL2C+QZSRawL5+PVTSupport+CMPNav+
    QualityInd+NTRIPClientStatus+WiFiAPStatus+RxComponents+DiskStatus+RFStatu
    s+IRNSSRaw+QZSNav+WiFiClientStatus+LogStatus+RxMessage
setSBFOutput, Stream16, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
setSBFOutput, Stream1, , , sec15
setSBFOutput, Stream2, , , sec1
setSBFOutput, Stream3, , , msec200
setSBFOutput, Stream4, , , sec15
setSBFOutput, Stream8, , , min2
setSBFOutput, Stream16, , , sec1

# Setup Met/Tilt
setDataInOut, COM2, ASCIIIN
setPeriodicEcho, COM2, 'A:0R0%%CR%%LF'
setPeriodicEcho, COM2, , min5
setCOMSettings, COM2, baud19200

#Set up server port 42042 for stream
setIPServerSettings, IPS1, 42042

# Position
setPVTMode, Static

# Tracking
setMultipathMitigation, off
setMultipathMitigation, , off
setSatelliteUsage,
    G01+G02+G03+G04+G05+G06+G07+G08+G09+G10+G11+G12+G13+G14+G15+
    G16+G17+G18+G19+G20+G21+G22+G23+G24+G25+G26+G27+G28+G29+G30+
    G31+G32+R01+R02+R03+R04+R05+R06+R07+R08+R09+R10+R11+R12+R13+R
    14+R15+R16+R17+R18+R19+R20+R21+R22+R23+R24+R25+R26+R27+R28+R29

```

```

+R30+E01+E02+E03+E04+E05+E06+E07+E08+E09+E10+E11+E12+E13+E14+E1
5+E16+E17+E18+E19+E20+E21+E22+E23+E24+E25+E26+E27+E28+E29+E30+E
31+E32+S120+S121+S122+S123+S124+S125+S126+S127+S128+S129+S130+S1
31+S132+S133+S134+S135+S136+S137+S138+S139+S140+S141+S142+S143+S
144+S145+S146+S147+S148+S149+S150+S151+S152+S153+S154+S155+S156+
S157+S158+C01+C02+C03+C04+C05+C06+C07+C08+C09+C10+C11+C12+C13+
C14+C15+C16+C17+C18+C19+C20+C21+C22+C23+C24+C25+C26+C27+C28+C2
9+C30+C31+C32+C33+C34+C35+C36+C37
setSignalUsage,
GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLOL2CA+GALL1
BC+GALE6BC+GALE5a+GALE5b+GALE5+GEOL1+GEOL5+CMPL1+CMPE5b+CM
PB3
setSignalUsage, ,
GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLOL2CA+GALL1
BC+GALE6BC+GALE5a+GALE5b+GALE5+GEOL1+GEOL5+CMPL1+CMPE5b+CM
PB3+QZSL1CA+QZSL2C+QZSL5
setSignalTracking,
GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLOL2CA+GALL1
BC+GALE6BC+GALE5a+GALE5b+GALE5+GEOL1+GEOL5+CMPL1+CMPE5b+CM
PB3+QZSL1CA+QZSL2C+QZSL5+IRNL5
setNotchFiltering, Notch1, off
setNotchFiltering, Notch2, off
setNotchFiltering, Notch3, off

# Clock
setClockSyncThreshold, ClockSteering
setREFOUTMode, off

# Metadata
setAntennaOffset, Main, , , 0.0083
setAntennaOffset, Main, , , , 'TRM59800.00    SCIT'
setMarkerParameters, 'pnnn'
setMarkerParameters, , 'pnnn'
setMarkerParameters, , , 'pnnn'
setMarkerParameters, , , , 'pnnn'
setMarkerParameters, , , , , 'USA'
setObserverParameters, 'UNAVCO'
setObserverParameters, , 'UNAVCO'

# Setup sessions
setLogSession, LOG1, Enabled
setLogSession, LOG2, Enabled
setLogSession, LOG3, Enabled
setLogSession, LOG4, Enabled

```

```

setLogSession, LOG8, Enabled
setLogSession, LOG1, , , 'A'
setLogSession, LOG2, , , 'B'
setLogSession, LOG3, , , 'C'
setLogSession, LOG4, , , 'M'
setLogSession, LOG8, , , 'STATUS'
setLogSession, LOG1, , , , After1Year
setLogSession, LOG2, , , , After30Days
setLogSession, LOG3, , , , After7Days
setLogSession, LOG4, , , , After3Days
setLogSession, LOG8, , , , After30Days
setLogSession, LOG1, , , , , High
setLogSession, LOG2, , , , , High
setLogSession, LOG3, , , , , High
setLogSession, LOG4, , , , , High
setLogSession, LOG8, , , , , Medium
setFileNaming, LOG1, IGS24H
setFileNaming, LOG2, IGS1H
setFileNaming, LOG3, IGS1H
setFileNaming, LOG4, IGS1H
setFileNaming, LOG8, IGS24H

```

```

# Set receiver IP
#setIPSettings,Static,192.168.1.2,255.255.255.0,192.168.1.1

```

```

# copy config to Boot and User1
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1
#exeCopyConfigFile,RxDefault,User2

```

4.2 Adding Functionality to base configuration

4.21 UNAV_X5_5-2-0_ext_ses_1.txt

```

# Login to make changes if necessary
#login, username, password

# Setup Logging sessions for External DSK2
setSBFOutput, Stream5, LOG5
setSBFOutput, Stream5, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav

```

```

setSBFOutput, Stream5, , , sec15
setLogSession, LOG5, , DSK2
setLogSession, LOG5, Enabled
setLogSession, LOG5, , 'AE'
setLogSession, LOG5, , , After1Year
setLogSession, LOG5, , , , High
setFileNaming, LOG5, IGS24H

# copy config to Boot
exeCopyConfigFile,Current,Boot

```

4.22 PBO_X5_5-2-0_Tiltmater-port3_1.txt

```

# Login to make changes if necessary
#login, username, password

# Setup Tilt
setDataInOut, COM3, ASCIIIN
setPeriodicEcho, COM3, 'A:*0100XY%%CR%%LF'
setPeriodicEcho, COM3, , min5
setCOMSettings, COM3, baud19200

# copy config to Boot
exeCopyConfigFile,Current,Boot

```

4.3 Configuration Blocks

To set up the configuration piecewise you can apply the following. Note the individual blocks are also saved to 'User1'. This is so the results will be the same as loading UNAV_X5_5-2-0_base_1.txt in section 4.11.

4.31 UNAV_X5_5-2-0_set-IP_1.txt

Changes to network setting do not take effect until a reboot is performed.

```

# Login to make changes if there is already a config installed.
# Edit IP setting for you new network requirements.
# For changes to take effect the receiver will need a reboot once this is applied.
# Use care if you are using Ethernet for your current communications.
#login, username, password

```

```
# Set receiver IP
setIPSettings,Static,192.168.1.2,255.255.255.0,192.168.1.1
```

```
# copy config to Boot
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1
```

4.32 UNAV_X5_5-2-0_tracking_1.txt

```
# Login to make changes if necessary
#login, username, password
```

```
# Tracking
setMultipathMitigation, off
setMultipathMitigation, , off
setSatelliteUsage,
    G01+G02+G03+G04+G05+G06+G07+G08+G09+G10+G11+G12+G13+G14+G15+
    G16+G17+G18+G19+G20+G21+G22+G23+G24+G25+G26+G27+G28+G29+G30+
    G31+G32+R01+R02+R03+R04+R05+R06+R07+R08+R09+R10+R11+R12+R13+R
    14+R15+R16+R17+R18+R19+R20+R21+R22+R23+R24+R25+R26+R27+R28+R29
    +R30+E01+E02+E03+E04+E05+E06+E07+E08+E09+E10+E11+E12+E13+E14+E1
    5+E16+E17+E18+E19+E20+E21+E22+E23+E24+E25+E26+E27+E28+E29+E30+E
    31+E32+S120+S121+S122+S123+S124+S125+S126+S127+S128+S129+S130+S1
    31+S132+S133+S134+S135+S136+S137+S138+S139+S140+S141+S142+S143+S
    144+S145+S146+S147+S148+S149+S150+S151+S152+S153+S154+S155+S156+
    S157+S158+C01+C02+C03+C04+C05+C06+C07+C08+C09+C10+C11+C12+C13+
    C14+C15+C16+C17+C18+C19+C20+C21+C22+C23+C24+C25+C26+C27+C28+C2
    9+C30+C31+C32+C33+C34+C35+C36+C37
setSignalUsage,
    GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLOL2CA
    +GALL1BC+GALE6BC+GALE5a+GALE5b+GALE5+GEOL1+GEOL5+CMPL1+CMP
    E5b+CMPB3
setSignalUsage, ,
    GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLOL2CA
    +GALL1BC+GALE6BC+GALE5a+GALE5b+GALE5+GEOL1+GEOL5+CMPL1+CMP
    E5b+CMPB3+QZSL1CA+QZSL2C+QZSL5
setSignalTracking,
    GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLOL2CA
    +GALL1BC+GALE6BC+GALE5a+GALE5b+GALE5+GEOL1+GEOL5+CMPL1+CMP
    E5b+CMPB3+QZSL1CA+QZSL2C+QZSL5+IRNL5
setNotchFiltering, Notch1, off
setNotchFiltering, Notch2, off
setNotchFiltering, Notch3, off
```

```
# copy config to Boot
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1
```

4.33 UNAV_X5_5-2-0_42042stream_1.txt

```
# Login to make changes if necessary
#login, username, password

# Setup stream. Available streams are 1-16.
setSBFOutput, Stream16, IPS1
setSBFOutput, Stream16, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
setSBFOutput, Stream16, , , sec1

#Set up server port 42042 for stream
setIPServerSettings, IPS1, 42042

# copy config to Boot
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1
```

4.34 UNAV_X5_5-2-0_sessions_1.txt

```
# Login to make changes if necessary
#login, username, password

# Setup streams
setSBFOutput, Stream1, LOG1
setSBFOutput, Stream2, LOG2
setSBFOutput, Stream3, LOG3
setSBFOutput, Stream4, LOG4
setSBFOutput, Stream8, LOG8
setSBFOutput, Stream16, IPS1
setSBFOutput, Stream1, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav+ASCIIIN
setSBFOutput, Stream2, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
```

```

setSBFOutput, Stream3, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
setSBFOutput, Stream4, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav+ASCIIIN
setSBFOutput, Stream8, ,
    MeasEpoch+MeasExtra+EndOfMeas+OutputLink+GPSRawCA+GPSRawL2C+GPS
    RawL5+GLORawCA+GALRawFNAV+GALRawINAV+GALRawCNAV+GEORawL1+
    GEORawL5+GPSNav+GPSAIm+GPSIon+GPSUtc+GLONav+GLOAIm+GLOTime+G
    ALNav+GALAIm+GALIon+GALUtc+GALGstGps+GEONav+GEOAIm+BaseVectorGe
    od+PVTGeodetic+PosCovGeodetic+DOP+EndOfPVT+ExtEvent+DiffCorrIn+BaseSt
    ation+InputLink+ChannelStatus+ReceiverStatus+ReceiverSetup+Commands+CMP
    Raw+IPStatus+QZSRawL1CA+QZSRawL2C+QZSRawL5+PVTSupport+CMPNav+
    QualityInd+NTRIPClientStatus+WiFiAPStatus+RxComponents+DiskStatus+RFStatu
    s+IRNSSRaw+QZSNav+WiFiClientStatus+LogStatus+RxMessage
setSBFOutput, Stream16, ,
    MeasEpoch+GPSNav+GPSIon+GPSUtc+GLONav+GALNav+GALUtc+GALGstGps+
    GEONav+PVTGeodetic+ReceiverSetup+CMPNav+QZSNav
setSBFOutput, Stream1, , , sec15
setSBFOutput, Stream2, , , sec1
setSBFOutput, Stream3, , , msec200
setSBFOutput, Stream4, , , sec15
setSBFOutput, Stream8, , , min2

# Setup sessions
setLogSession, LOG1, Enabled
setLogSession, LOG2, Enabled
setLogSession, LOG3, Enabled
setLogSession, LOG4, Enabled
setLogSession, LOG8, Enabled
setLogSession, LOG1, , , 'A'
setLogSession, LOG2, , , 'B'
setLogSession, LOG3, , , 'C'
setLogSession, LOG4, , , 'M'
setLogSession, LOG8, , , 'STATUS'
setLogSession, LOG1, , , , After1Year
setLogSession, LOG2, , , , After30Days
setLogSession, LOG3, , , , After7Days
setLogSession, LOG4, , , , After3Days
setLogSession, LOG8, , , , After30Days
setLogSession, LOG1, , , , , High
setLogSession, LOG2, , , , , High
setLogSession, LOG3, , , , , High

```

```

setLogSession, LOG4, , , , High
setLogSession, LOG8, , , , Medium
setFileNaming, LOG1, IGS24H
setFileNaming, LOG2, IGS1H
setFileNaming, LOG3, IGS1H
setFileNaming, LOG4, IGS1H
setFileNaming, LOG8, IGS24H

```

```

# copy config to Boot
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1

```

4.35 UNAV_X5_5-2-0_meta_1.txt

```

# Login to make changes if necessary
#login, username, password

# Metadata
setAntennaOffset, Main, , , 0.0083
setAntennaOffset, Main, , , 'TRM59800.00 SCIT'
setMarkerParameters, 'pnnn'
setMarkerParameters, , 'pnnn'
setMarkerParameters, , , 'pnnn'
setMarkerParameters, , , , 'pnnn'
setMarkerParameters, , , , , 'USA'
setObserverParameters, 'UNAVCO'
setObserverParameters, , 'UNAVCO'

# copy config to Boot and User1
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1

```

4.36 PBO_X5_5-2-0_user-admin_1.txt

You must edit the login un/pw for this script to work!

```

# Setup PBO Login Credentials
setUserAccessLevel, User1, 'pbo'
setUserAccessLevel, User1, , '8CODZDSFGI3FZS1TX1EQ62A98UR'

# Login to complete changes
login, un, pw

```

```
setUserAccessLevel, User2, 'unavco'
setUserAccessLevel, User2, , '814VI4ROF77L3QZ1ZDXFLOZPZU2'
setDefaultAccessLevel, Viewer
setDefaultAccessLevel, , Viewer
setDefaultAccessLevel, , , Viewer
setDefaultAccessLevel, , , , Viewer
setDefaultAccessLevel, , , , , Viewer

# copy config to Boot
exeCopyConfigFile,Current,Boot
exeCopyConfigFile,Current,User1
```

4.4 Resetting Receiver

The Ethernet configuration is not reset for any of the following commands.

To reset configuration to default.

GoTo 'File > Reset Receiver'

Select 'All' and 'OK'.

In the expert console or in a script run the following command.

```
exeCopyConfigFile,RxDefault,Boot
```

Reboot the receiver

To format the internal or external disk.

GoTo 'Logging > Disk Management'

Select appropriate disk, 'Format' and 'OK'.

In the expert console or in a script run the following command.

```
exeManageDisk ,DSK1,Format
```

Change to DSK2 for external disk.

6.0 Data Storage Estimation

File size can/will change over time as new SVs are placed in service. The user should be conservative when choosing the amount of data to be stored. If the memory is over allocated there could be data loss. Also it may be necessary to review the data allocation of all sessions if new sessions, constellations, signals, etc. are added.

The receivers purchased for PBO have 16GB of internal memory available and the external drive can be up to 32GB. This memory is only used for data storage.

Data file size examples

15sec 24hr files all constellations - 8.5MB

1Hz 24hr files all constellations - 110.6MB

5Hz 24hr files all constellations - 517.2MB

15sec 24hr files GPS+GLONASS - 7.4MB

1Hz 24hr files GPS+GLONASS - 110MB

5Hz 24hr files GPS+GLONASS - 520MB

15sec 24hr files GPS only - 7.3MB

1Hz 24hr files GPS only - 109MB

5Hz 24hr files GPS only - 520MB

In order to achieve substantial file size reduction by turning off constellations you must turn off satellite tracking and signals under 'GNSS > Satellites and Signals'. If these are turned off the messages will not be available for any LOG sessions.

Data file size examples with Satellites and Signals disabled.

15sec 24hr files all constellations - 8.5MB

1Hz 24hr files all constellations - 110.6MB

5Hz 24hr files all constellations - 517.2MB

15sec 24hr files GPS+GLONASS - 5.4MB

1Hz 24hr files GPS+GLONASS - 79.6MB

5Hz 24hr files GPS+GLONASS - 366MB

15sec 24hr files GPS only - 3.9MB

1Hz 24hr files GPS only - 57.5MB

5Hz 24hr files GPS only - 255MB

GoTo 'NMEA/SBF Out' Tab

- Click the 'Add Stream' button.

- Select type of stream. UNAV is using an SBF stream.

- Click 'Next'.

Back Next Cancel

Which type of data do you want to output?

SBF

- Select the IPS port chosen under 'Communication > IP Ports'
- UNAV selected IPS1.
- Click 'Next'.

Back Next Cancel

Which output communication port do you want to use?

Ports IPS1

- Select the messages you want to be included in the stream.
- UNAV enables the following-
 - Measurements - MeasEpoch
 - GPS - GPSNav
GPSlon
GPSUtc
 - GLO - GLONav
 - GAL - GALNav
GALUtc
GALGstGps
 - GEO - GEONav
 - CMP - CMPNav
 - QZS - QZSNav
 - PVTGeod - PVTGeodetic
 - ReceiverSetup
 - ASCIIIn <— — Only if met/tilt data is to be included.
- Click 'Next'.
- Select the data stream interval.
- UNAV sets the stream to 1sec.
- Click 'Next'.

Check 'OK' and save to Boot.

BackNextCancel

At which interval do you want to sent those messages?

Interval

1 sec

⬆⬇⬆