

General Information

Mission Information

Project name	RBV20073A_176
Processing date	2020-03-16 13:20:37
Mission date	2020-03-13 17:37:57
Mission duration	02:09:57.000
Processing mode	IN-Fusion SmartBase
GPS Station	ASB

Rover Hardware Information

Product	POS AV 610 VER6 HW2.5-12
Serial number	S/N9642
IMU type	57
Receiver type	BD982
Antenna type	Unknown External

Project File List

Rover Data Files

File name	File type
RBV20073A.788	POS Data
RBV20073A.789	POS Data
RBV20073A.790	POS Data
RBV20073A.791	POS Data
RBV20073A.792	POS Data
RBV20073A.793	POS Data
RBV20073A.794	POS Data
RBV20073A.795	POS Data
RBV20073A.796	POS Data
RBV20073A.797	POS Data
RBV20073A.798	POS Data
RBV20073A.799	POS Data
RBV20073A.800	POS Data
RBV20073A.801	POS Data
RBV20073A.802	POS Data
RBV20073A.803	POS Data
RBV20073A.804	POS Data
RBV20073A.805	POS Data
RBV20073A.806	POS Data
RBV20073A.807	POS Data

Input Files

File Name	File Type
Ephm0730.20g	GLONASS Broadcast Ephemeris
Ephm0730.20n	GPS Broadcast Ephemeris
loys0730.20o	GNSS SingleBase
pafu0730.20o	GNSS SingleBase
wvbr0730.20o	GNSS SingleBase
wvbu0730.20o	GNSS SingleBase
wvmf0730.20o	GNSS SingleBase
wvta0730.20o	GNSS SingleBase
Ephm0720.20g	GLONASS Broadcast Ephemeris
Ephm0720.20n	GPS Broadcast Ephemeris
Ephm0740.20g	GLONASS Broadcast Ephemeris
Ephm0740.20n	GPS Broadcast Ephemeris
igu20963_18.sp3	GPS Precise Ephemeris
igu20964_18.sp3	GPS Precise Ephemeris
igu20965_18.sp3	GPS Precise Ephemeris
igu20966_18.sp3	GPS Precise Ephemeris
igu20970_18.sp3	GPS Precise Ephemeris
wvnr0730.20o	GNSS SingleBase

Output Files

Filename	File type
sbt RBV20073A_176.out	SBET Trajectory File
export_RB20073A_176.shp	Shapefile Export Output

Rover Data Summary

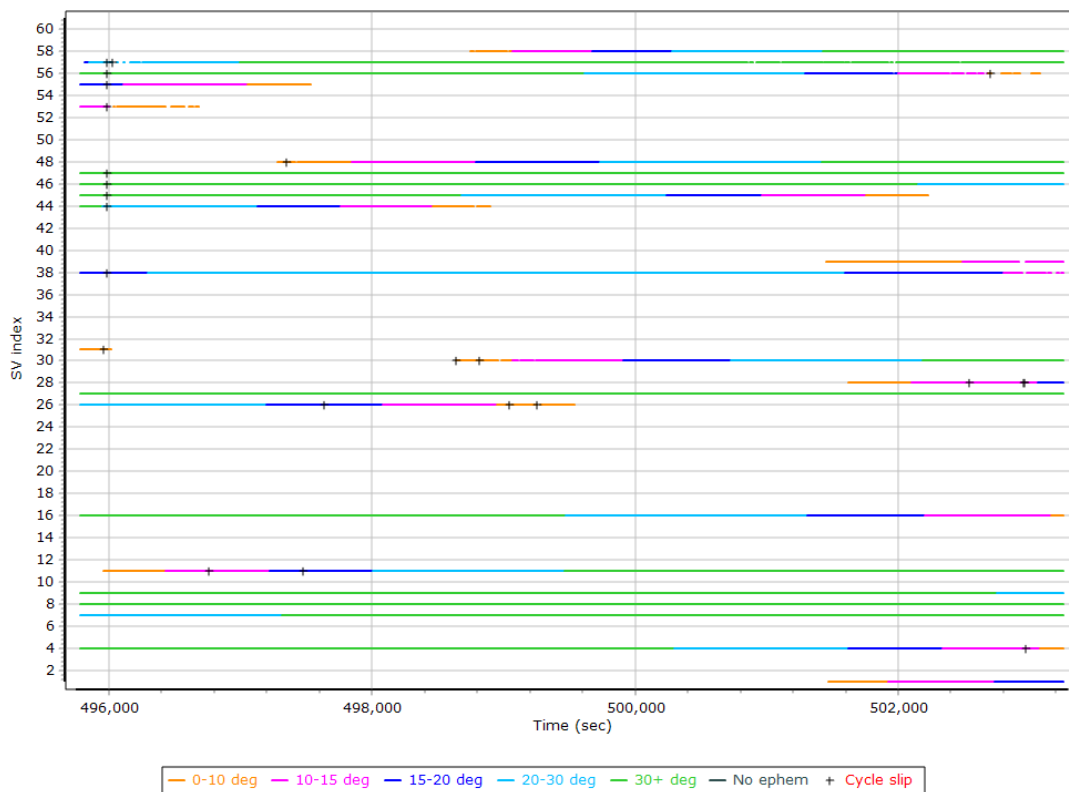
First raw data file	RBV20073A.788		
Last raw data file	RBV20073A.807		
Start GPS week	2096		
Start time	495458.058 (3/13/2020 5:37:38 PM)		
End time	503256.519 (3/13/2020 7:47:36 PM)		
Start of fine alignment	495719.999 (3/13/2020 5:41:59 PM)		
Available subsystems	Primary GNSS, Gimbal, IMU		
POS Event Input	None		
Correction data	None		
IMU Installation Lever Arms & Mounting Angles			
Gimbal to IMU lever arm (m)	0.000	0.000	0.000
Gimbal to IMU mounting angles (deg)	0.000	0.000	0.000
Gimbal to Primary GNSS lever arm (m)	0.000	0.000	0.000
Gimbal to Primary GNSS lever arm std dev (m)	-1.000		
Aircraft to Reference mounting angles (deg)	0.000	0.000	0.000

Raw Data QC

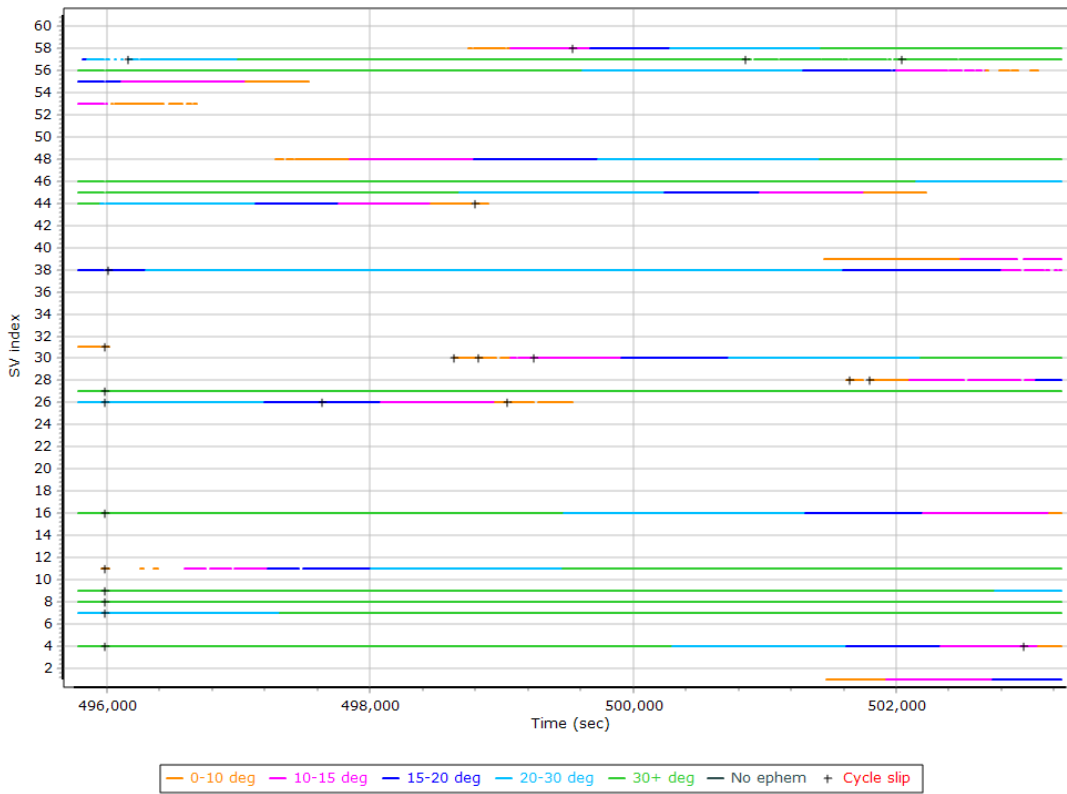
Raw IMU Import QC Summary

IMU data input file	imu_RB20073A_176.dat
IMU data check log file	imudt_RB20073A_176.log
IMU Records Processed	1559589
Termination Status	Normal
IMU Anomalies	0

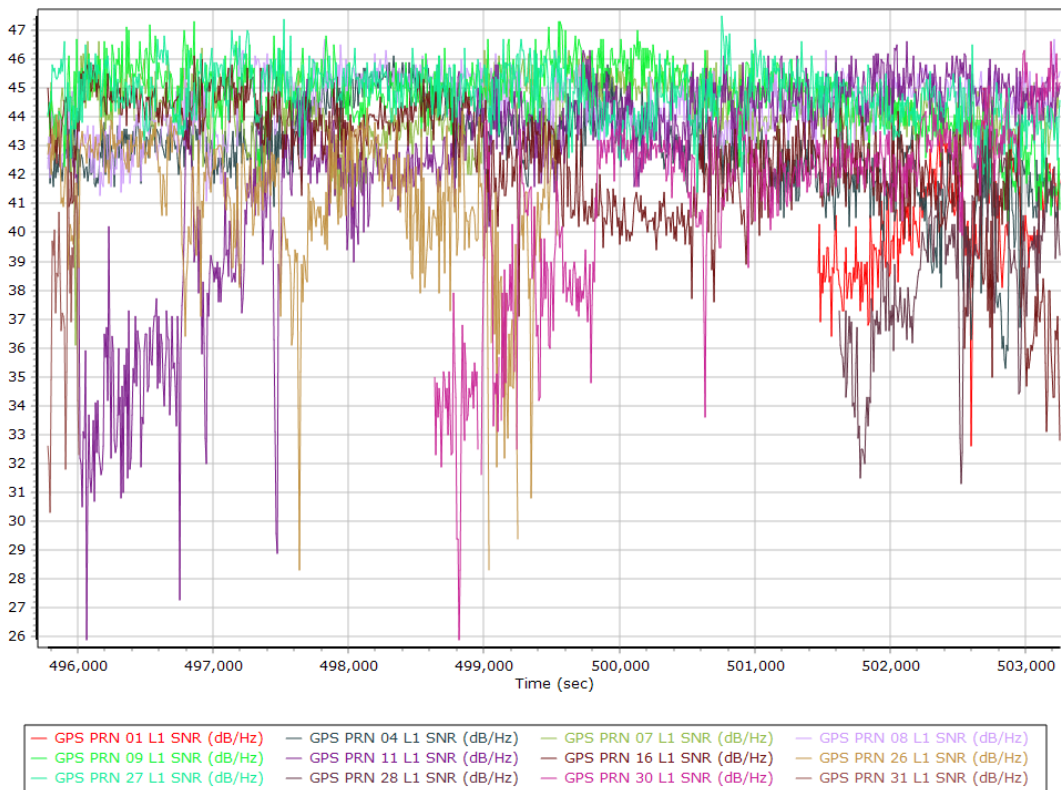
L1 Satellite Lock/Elevation



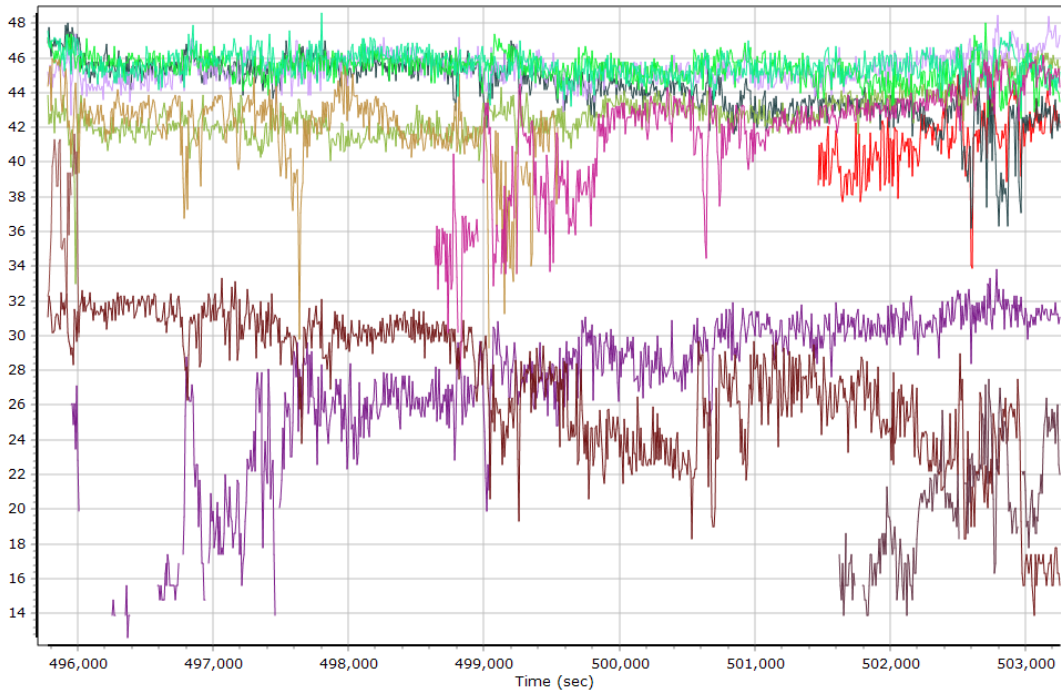
L2 Satellite Lock/Elevation



GPS L1 SNR

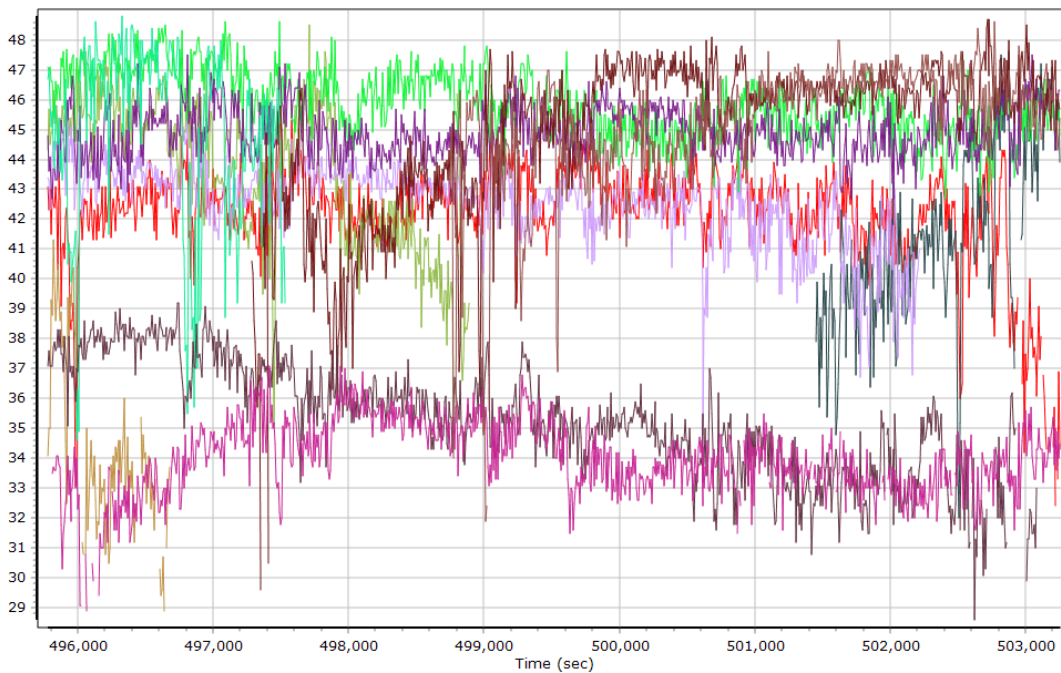


GPS L2 SNR



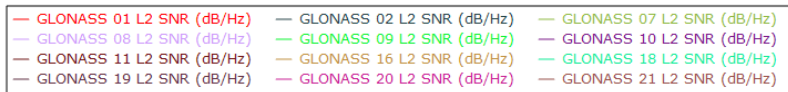
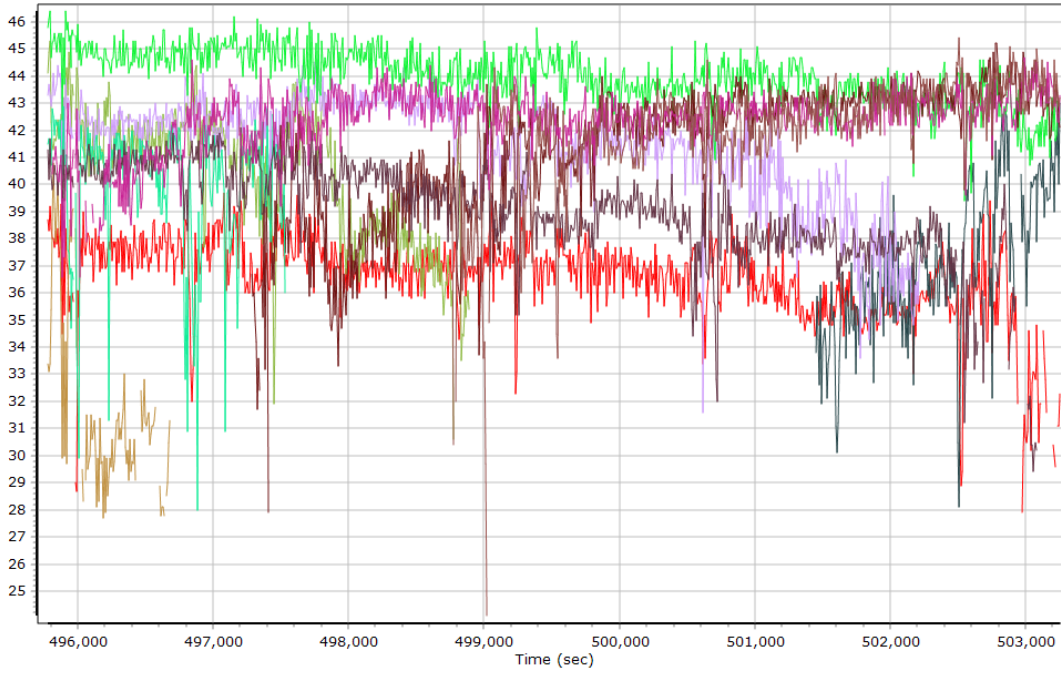
- | | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| GPS PRN 01 L2 SNR (dB/Hz) | GPS PRN 04 L2 SNR (dB/Hz) | GPS PRN 07 L2 SNR (dB/Hz) | GPS PRN 08 L2 SNR (dB/Hz) |
| GPS PRN 09 L2 SNR (dB/Hz) | GPS PRN 11 L2 SNR (dB/Hz) | GPS PRN 16 L2 SNR (dB/Hz) | GPS PRN 26 L2 SNR (dB/Hz) |
| GPS PRN 27 L2 SNR (dB/Hz) | GPS PRN 28 L2 SNR (dB/Hz) | GPS PRN 30 L2 SNR (dB/Hz) | GPS PRN 31 L2 SNR (dB/Hz) |

GLONASS L1 SNR

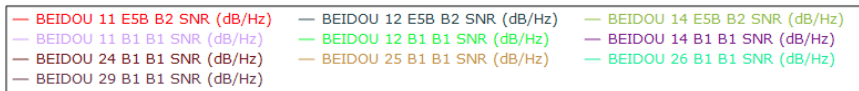
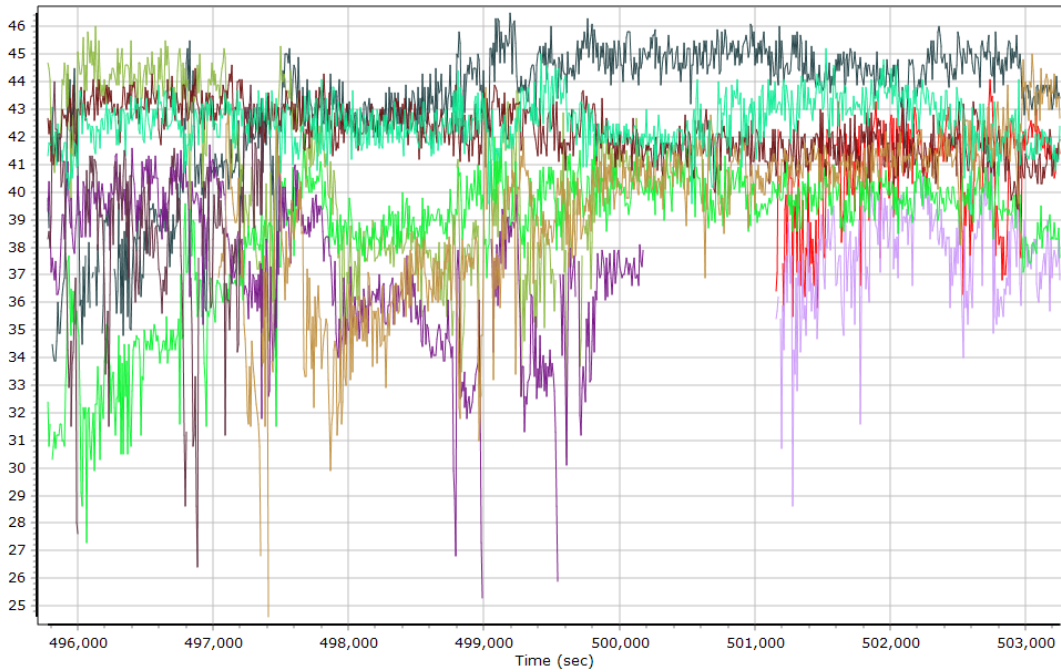


- | | | |
|---------------------------|---------------------------|---------------------------|
| GLONASS 01 L1 SNR (dB/Hz) | GLONASS 02 L1 SNR (dB/Hz) | GLONASS 07 L1 SNR (dB/Hz) |
| GLONASS 08 L1 SNR (dB/Hz) | GLONASS 09 L1 SNR (dB/Hz) | GLONASS 10 L1 SNR (dB/Hz) |
| GLONASS 11 L1 SNR (dB/Hz) | GLONASS 16 L1 SNR (dB/Hz) | GLONASS 18 L1 SNR (dB/Hz) |
| GLONASS 19 L1 SNR (dB/Hz) | GLONASS 20 L1 SNR (dB/Hz) | GLONASS 21 L1 SNR (dB/Hz) |

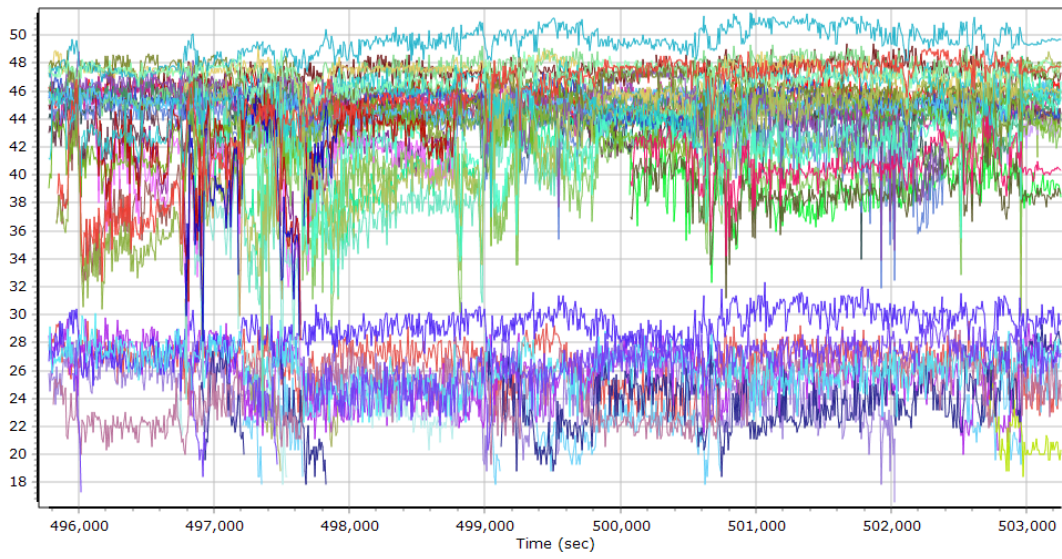
GLONASS L2 SNR



BEIDOU SNR



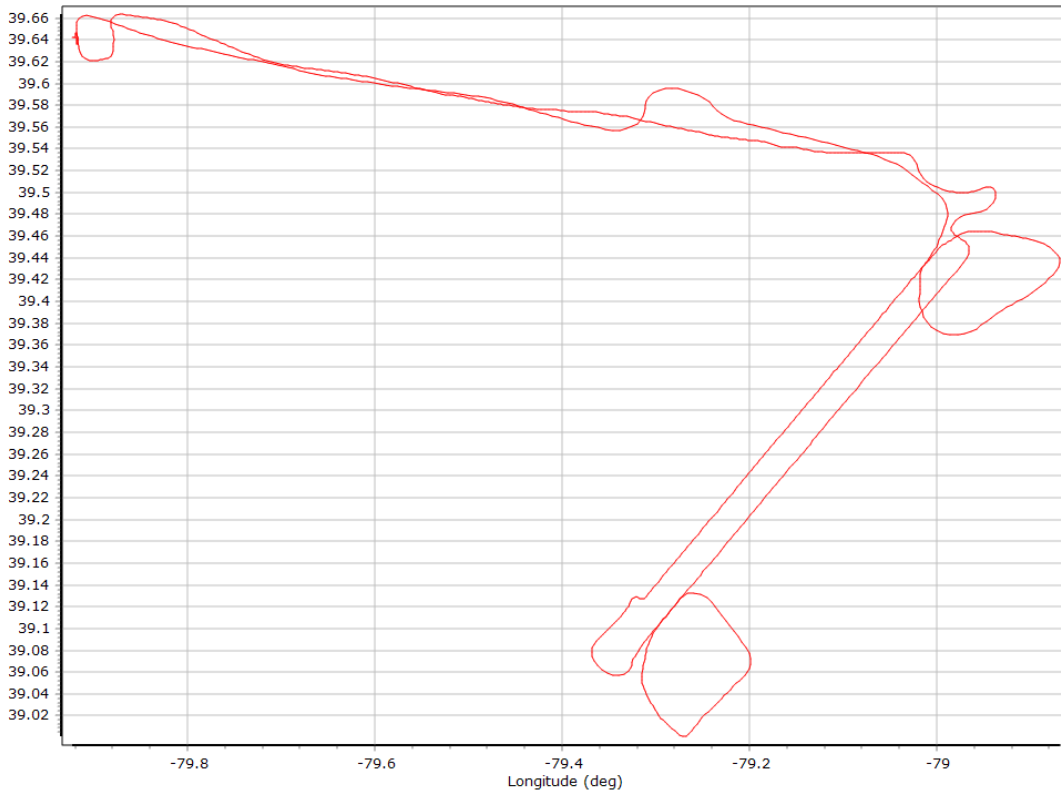
GALILEO SNR



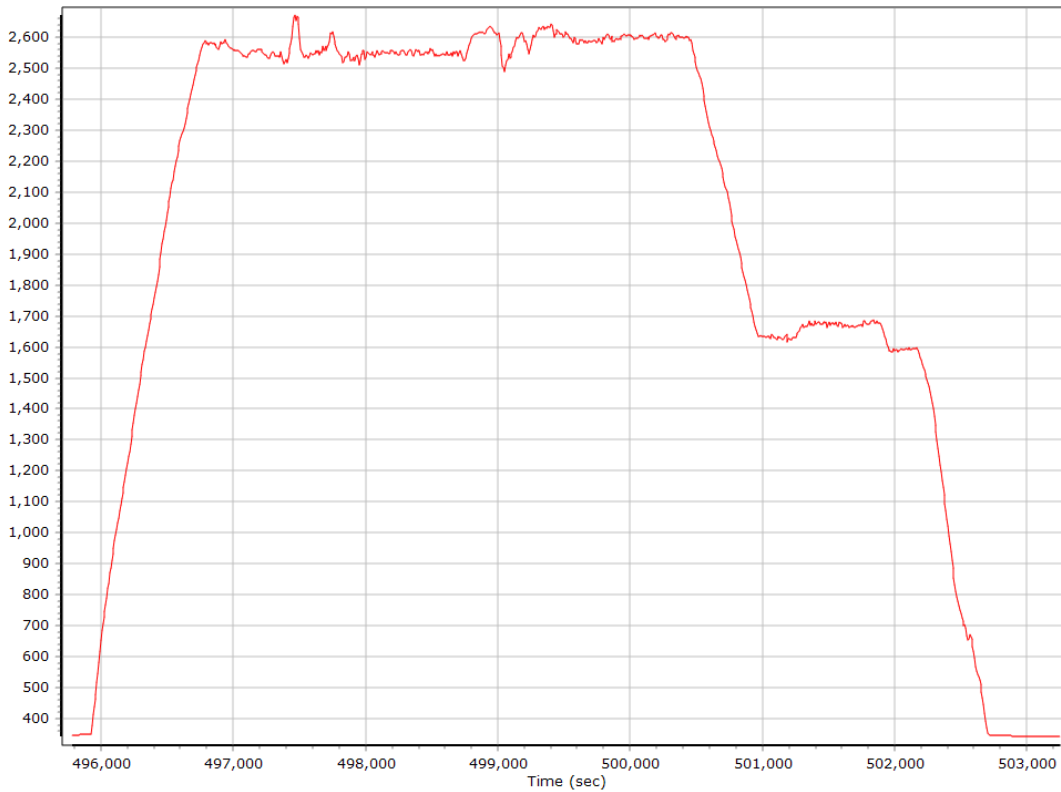
- | | |
|--|--|
| — GALILEO 01 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 04 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 05 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 09 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 12 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 13 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 14 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 21 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 24 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 26 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 31 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 33 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 01 L5E5A BPSK10_PD SNR (dB/Hz) | — GALILEO 04 L5E5A BPSK10_PD SNR (dB/Hz) |
| — GALILEO 05 L5E5A BPSK10_PD SNR (dB/Hz) | — GALILEO 09 L5E5A BPSK10_PD SNR (dB/Hz) |
| — GALILEO 12 L5E5A BPSK10_PD SNR (dB/Hz) | — GALILEO 13 L5E5A BPSK10_PD SNR (dB/Hz) |
| — GALILEO 14 L5E5A BPSK10_PD SNR (dB/Hz) | — GALILEO 21 L5E5A BPSK10_PD SNR (dB/Hz) |

Trajectory Information

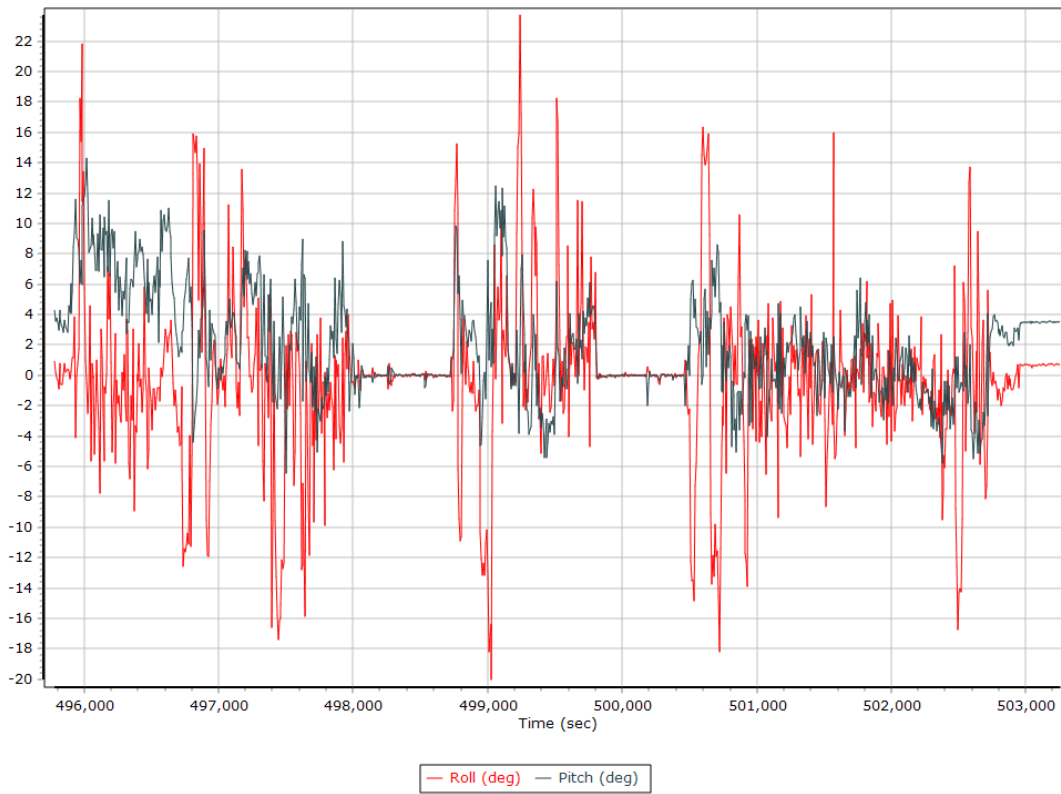
Top View



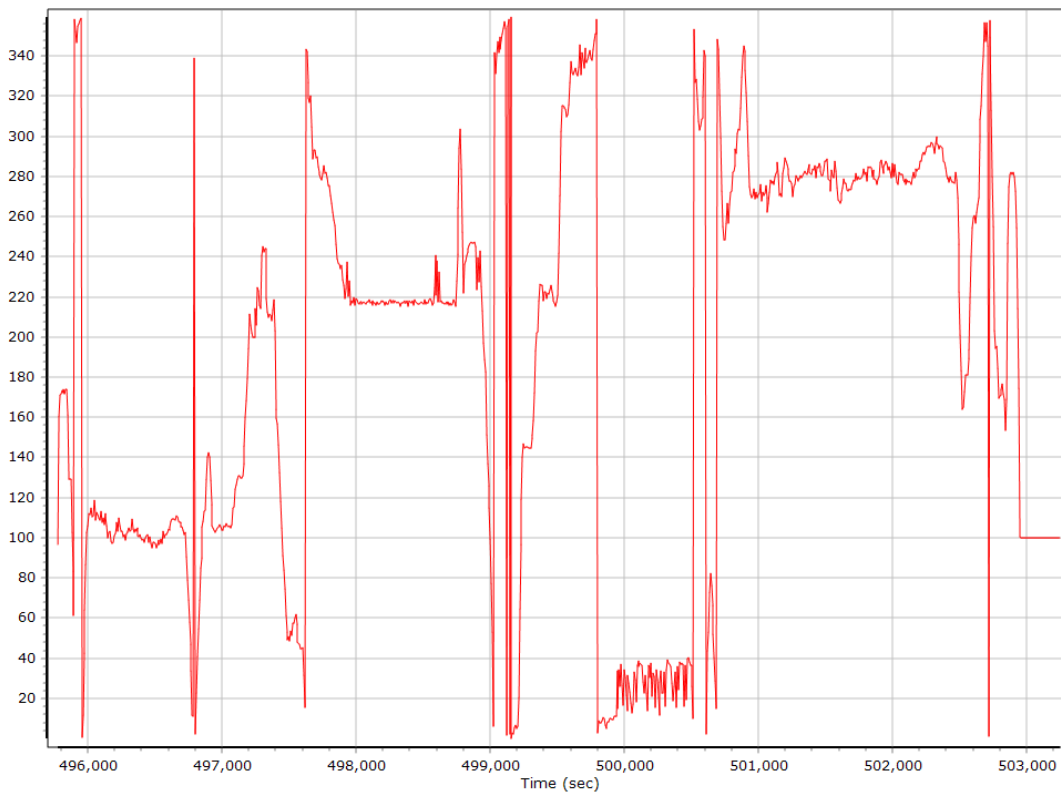
Altitude



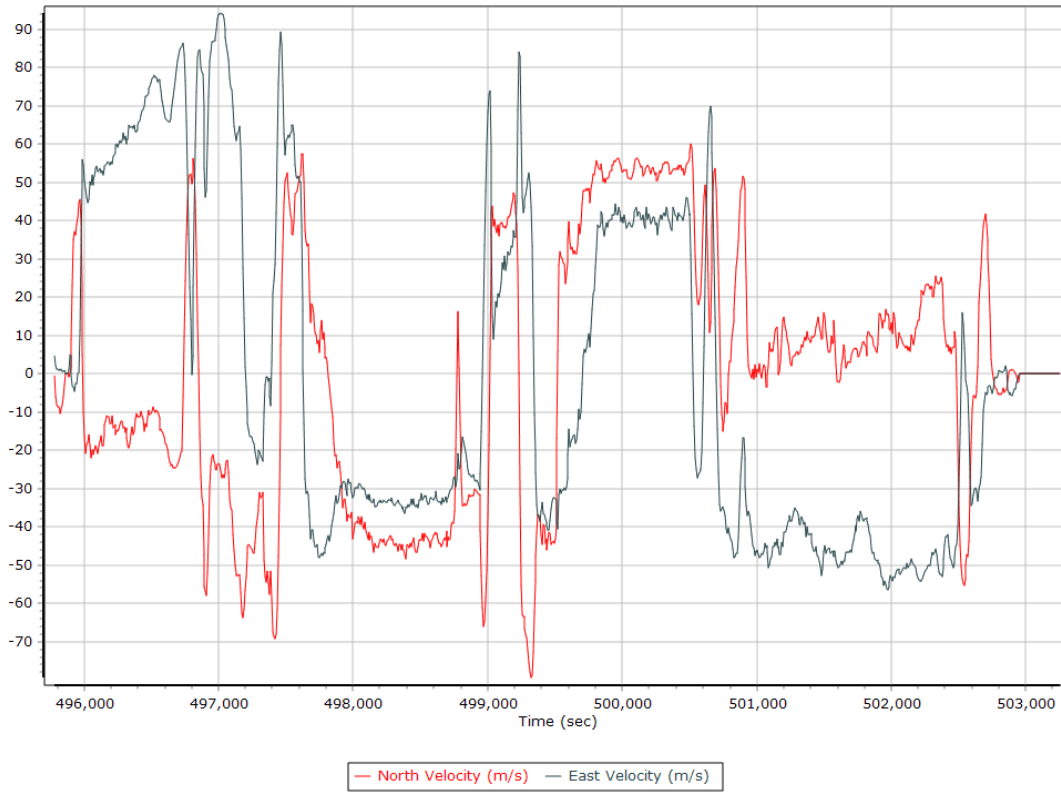
Roll/Pitch



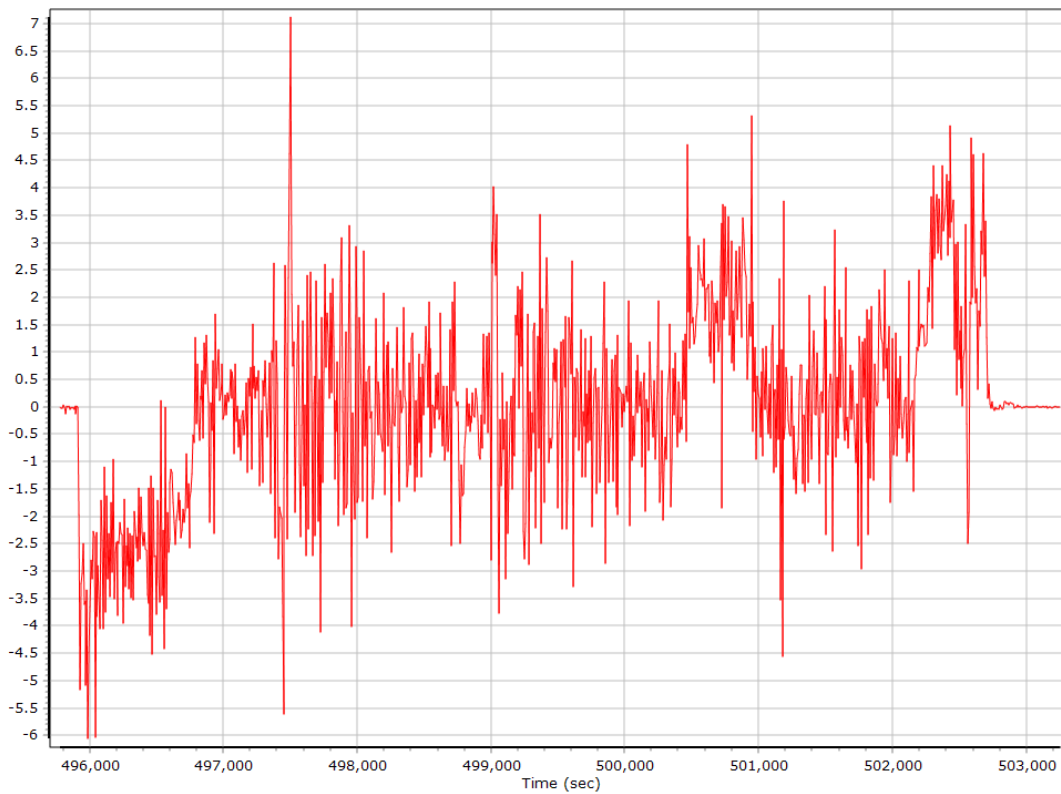
Heading



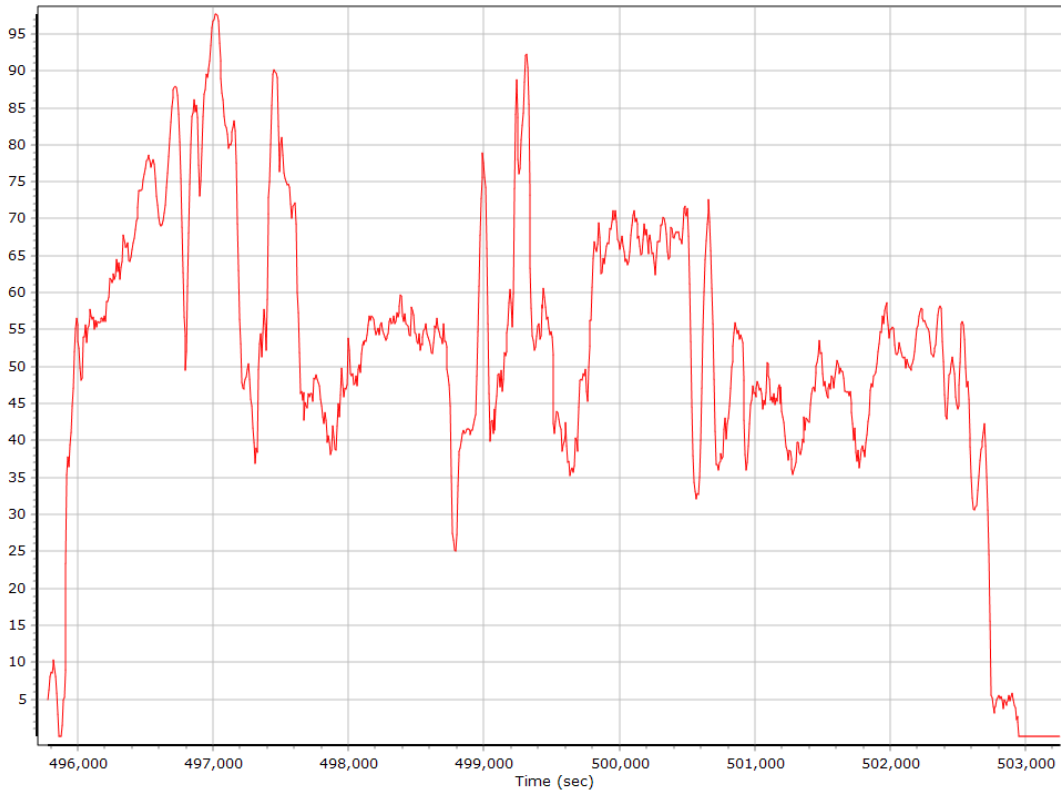
North/East Velocity



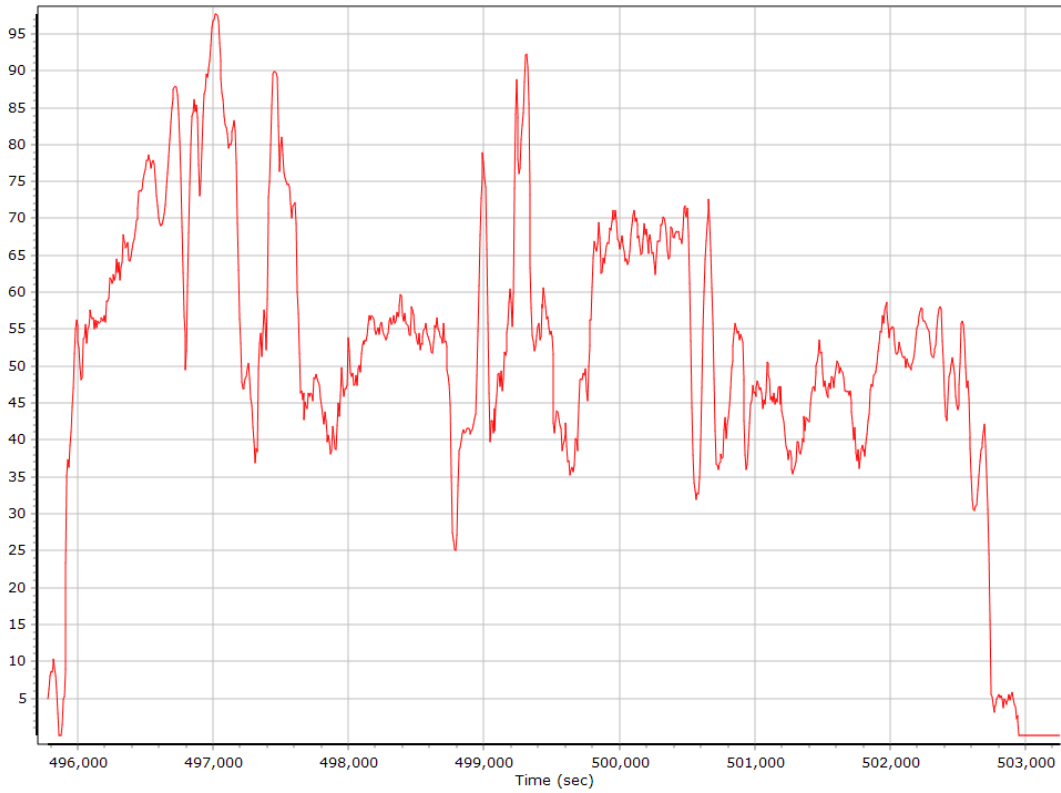
Down Velocity



Total Speed



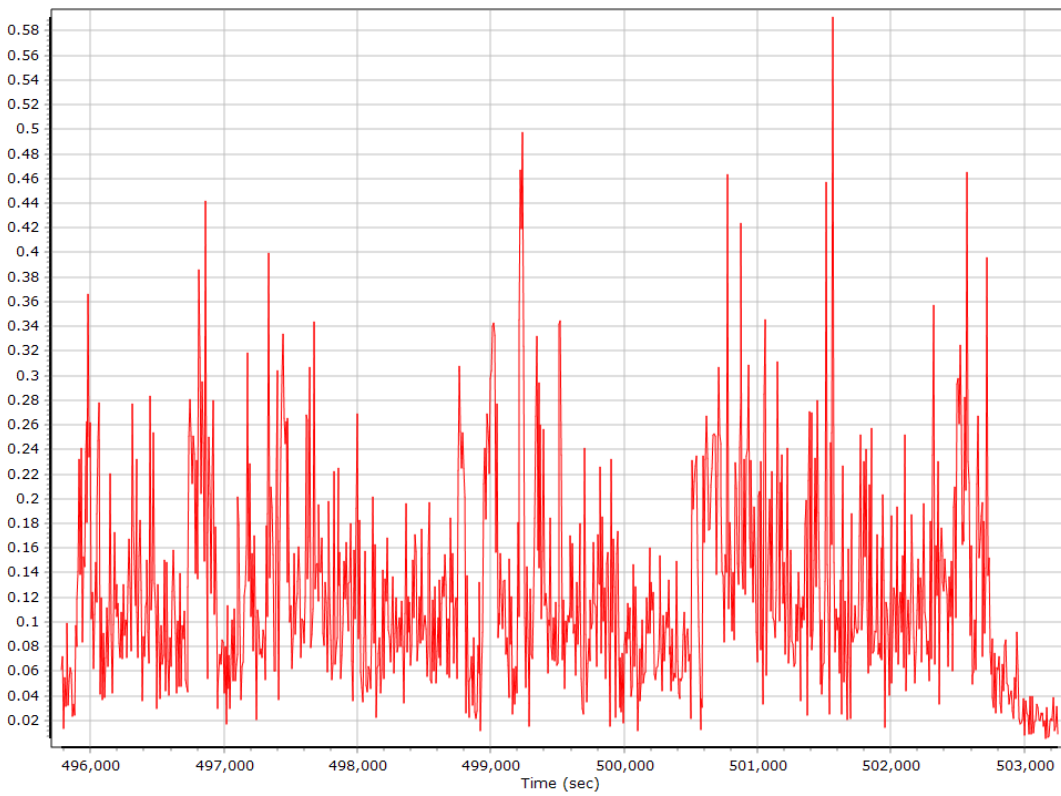
Ground Speed



Body Acceleration



Total Body Acceleration



Body Angular Rate



SmartBase Processing Summary

Smart Select Options

Archive enabled	False
User database enabled	False
Include high-rate data sites	True
Target GNSS Selection	GNSS

Basestation Selection

Date	ID	Dist	System	Rate	Service	Database	Status
03/13/2020	WVNR	74.06	GNSS	1	User	None	Imported
03/13/2020	WVTA	12.16	GNSS	1	User	None	Imported
03/13/2020	WVMF	56.12	GNSS	1	User	None	Imported
03/13/2020	WVBU	41.53	GNSS	1	User	None	Imported
03/13/2020	WVBR	79.32	GNSS	1	User	None	Imported
03/13/2020	PAFU	60.14	GNSS	1	User	None	Imported
03/13/2020	LOYS	59.73	GNSS	1	User	None	Imported

SmartBase Results

SmartBase status	PROC_STATUS_OK
Primary station Id	WVTA
Primary station data rate (sec)	1.0
VRS/ASB generation rate (sec)	1.0
VRS/ASB timespan	7797 s (2096 495477 - 2096 503274)
Number of reference stations	7
Primary station GPS measurement usage (%)	99.2
Primary station GLONASS measurement usage (%)	85.9
Average number of satellites per epoch	14.7
Max number of GPS stations used	6
Min number of GPS stations used	3
Max number of GLONASS stations used	6
Min number of GLONASS stations used	3
Total full data gap (sec)	0
Total GPS full data gaps	0
Total GLONASS full data gaps	0
Total individual satellite data gap (sec)	8955
GPS precise vs. broadcast ephemeris used	100.0 % / 0.0 %
GLONASS precise vs. broadcast ephemeris used	0.0 % / 100.0 %
Termination Status	Normal

SmartBase Quality Check

Base Station - WVNR

Status	OK	SBQI	0	
Duration (Hours)	23.90	Output Coordinates	Original	
Solution Epochs	5736	Mean Epoch SVs	8.3	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N38°53'44.50553"	W79°51'30.27007"	582.773
Adjusted		N38°53'44.50565"	W79°51'30.26943"	582.776
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.016	0.003	0.016

Base Station Information

Station ID	WVNR		
Filename	wvnr0730.200		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4922K62042
Antenna manufacturer, model	Trimble	Zephyr Geodetic 2 RoHS	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.08546		
Latitude	N38°53'44.50553"		
Longitude	W79°51'30.27007"		
Ellipsoidal height (m)	582.77300		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

Base Station - WVTA

Status	OK	SBQI	0
Duration (Hours)	23.90	Output Coordinates	Original
Solution Epochs	5736	Mean Epoch SVs	8.3
Base Station Coordinates	Latitude	Longitude	Height (m)
Original	N39°26'16.64399"	W79°30'52.95303"	726.066
Adjusted	N39°26'16.64419"	W79°30'52.95247"	726.067
Coordinate Adjustments	Horizontal (m)	Vertical (m)	Total (m)
Adjustments	0.015	0.001	0.015

Base Station Information

Station ID	WVTA		
Filename	wvta0730.20o		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4922K62119
Antenna manufacturer, model	Trimble	Zephyr Geodetic 2 RoHS	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.08546		
Latitude	N39°26'16.64399"		
Longitude	W79°30'52.95303"		
Ellipsoidal height (m)	726.06600		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

Base Station - WVMF

Status	OK	SBQI	0	
Duration (Hours)	23.90	Output Coordinates	Original	
Solution Epochs	5736	Mean Epoch SVs	8.4	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°04'32.34430"	W78°55'56.99819"	313.553
Adjusted		N39°04'32.34482"	W78°55'56.99730"	313.550
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.027	0.003	0.027

Base Station Information

Station ID	WVMF		
Filename	wvmf0730.20o		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4924K62476
Antenna manufacturer, model	Trimble	Zephyr Geodetic 2 RoHS	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.08546		
Latitude	N39°04'32.34430"		
Longitude	W78°55'56.99819"		
Ellipsoidal height (m)	313.55300		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

Base Station - WVBU

Status	OK	SBQI	0	
Duration (Hours)	23.90	Output Coordinates	Original	
Solution Epochs	5736	Mean Epoch SVs	8.3	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°20'16.82171"	W78°54'48.58712"	200.059
Adjusted		N39°20'16.82210"	W78°54'48.58683"	200.059
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.014	0.000	0.014

Base Station Information

Station ID	WVBU		
Filename	wvbu0730.20o		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4922K62096
Antenna manufacturer, model	Trimble	Zephyr Geodetic 2 RoHS	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.08546		
Latitude	N39°20'16.82171"		
Longitude	W78°54'48.58712"		
Ellipsoidal height (m)	200.05900		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

Base Station - WVBR

Status	CONTROL	SBQI	0	
Duration (Hours)	23.90	Output Coordinates	Control	
Solution Epochs	5736	Mean Epoch SVs	8.4	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°18'28.88440"	W80°16'38.61885"	270.246
Adjusted		N39°18'28.88440"	W80°16'38.61885"	270.246
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.000	0.000	0.000

Base Station Information

Station ID	WVBR		
Filename	wvbr0730.20o		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4922K62070
Antenna manufacturer, model	Trimble	Zephyr Geodetic 2 RoHS	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.08546		
Latitude	N39°18'28.88440"		
Longitude	W80°16'38.61885"		
Ellipsoidal height (m)	270.24600		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

Base Station - PAFU

Status	OK	SBQI	0	
Duration (Hours)	23.90	Output Coordinates	Original	
Solution Epochs	5736	Mean Epoch SVs	8.3	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°55'35.68892"	W79°41'50.51027"	328.002
Adjusted		N39°55'35.68923"	W79°41'50.51032"	328.009
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.010	0.007	0.012

Base Station Information

Station ID	PAFU		
Filename	pafu0730.20o		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	Alloy	5838R40082
Antenna manufacturer, model	Trimble	Zephyr 3 Geodetic	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.06519		
Latitude	N39°55'35.68892"		
Longitude	W79°41'50.51027"		
Ellipsoidal height (m)	328.00200		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

Base Station - LOYS

Status	OK	SBQI	0	
Duration (Hours)	23.90	Output Coordinates	Original	
Solution Epochs	5736	Mean Epoch SVs	8.3	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°38'46.39064"	W78°43'47.89728"	169.358
Adjusted		N39°38'46.39116"	W78°43'47.89722"	169.358
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.016	0.000	0.016

Base Station Information

Station ID	LOYS		
Filename	loys0730.20o		
Start date	3/13/2020 12:00:00 AM		
End date	3/13/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Leica	GR30	1705733
Antenna manufacturer, model	Leica	AR10	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.1085		
Latitude	N39°38'46.39064"		
Longitude	W78°43'47.89728"		
Ellipsoidal height (m)	169.35800		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

GNSS QC

GNSS QC Statistics

Statistics	Min	Max	Mean
Baseline length (km)	12.57	52.22	
Number of GPS SV	7	10	8
Number of GLONASS SV	0	7	6
Number of QZSS SV	0	0	0
Number of BEIDOU SV	0	0	0
Number of GALILEO SV	0	0	0
Total number of SV	7	16	15
PDOP	1.16	2.69	1.52
QC Solution Gaps	1.00	1.00	
Solution Type	Fixed	Float	No solution
Epoch (sec)	7791.00	0.00	3.00
Percentage	99.96	0.00	0.04

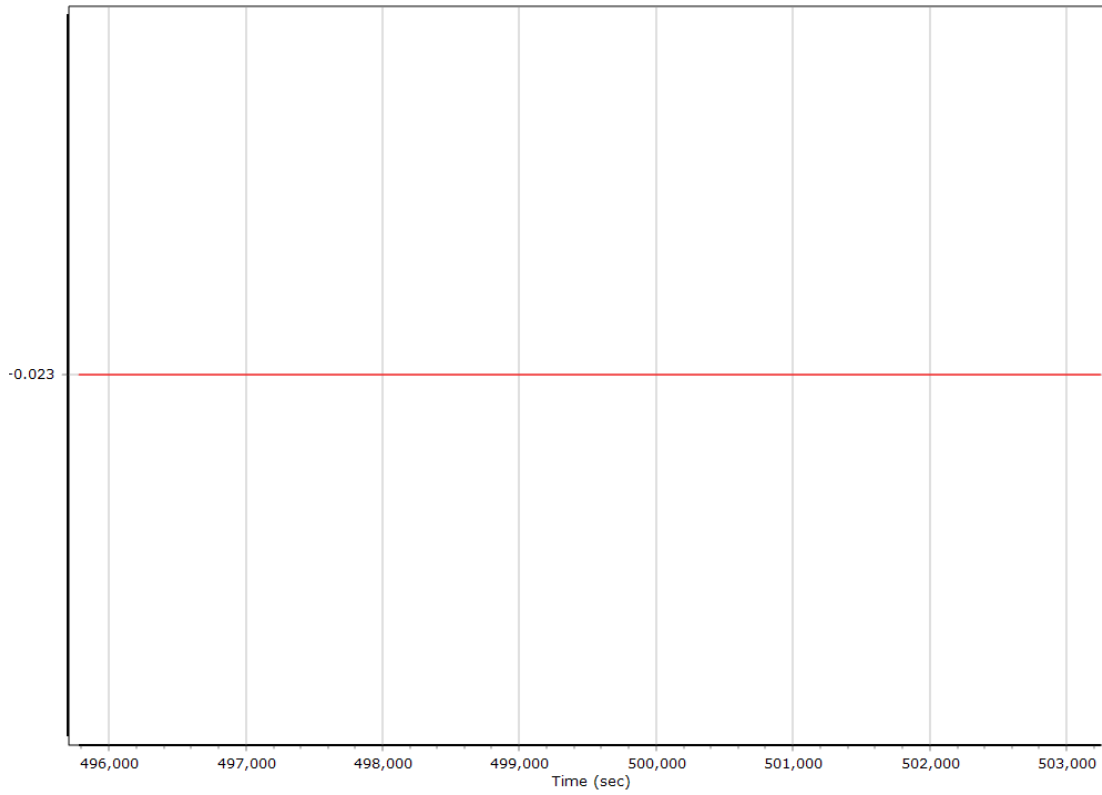
GNSS-Inertial Processor Configuration

Processing mode	IN-Fusion SmartBase		
Stabilized mount	True		
Base station	ASB		
Processing start time	495459.000 (3/13/2020 5:37:39 PM)		
Processing end time	503256.000 (3/13/2020 7:47:36 PM)		
Initial attitude source	Real-Time VNAV/RNAV Attitude		
IMU Sensor Context	Processing with Onboard IMU		
Gimbal to IMU lever arm (m)	0.000	0.000	0.000
Gimbal to IMU mounting angles (deg)	0.000	0.000	0.000
Gimbal to Primary GNSS lever arm (m)	-0.023	0.000	-1.028
Gimbal to Primary GNSS lever arm std dev (m)	0.030	0.030	0.030
Aircraft to Reference mounting angles (deg)	0.000	0.000	0.000

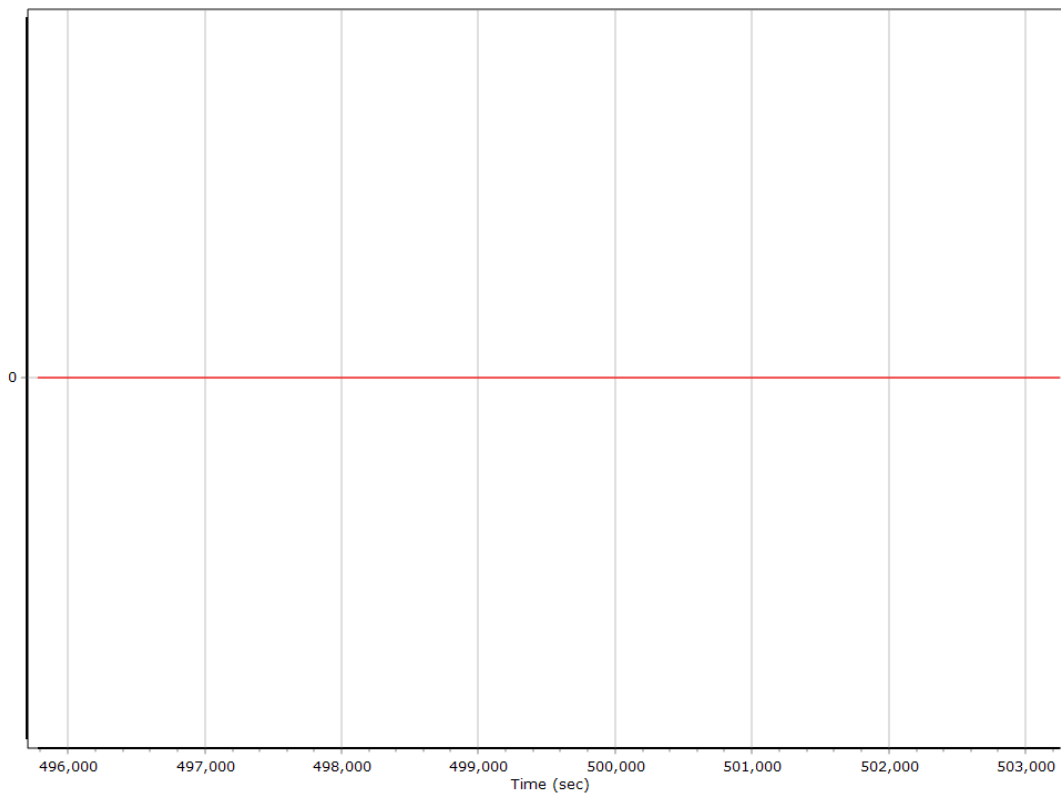
Calibrated Installation Parameters

Reference-Primary GNSS Lever Arm (m)

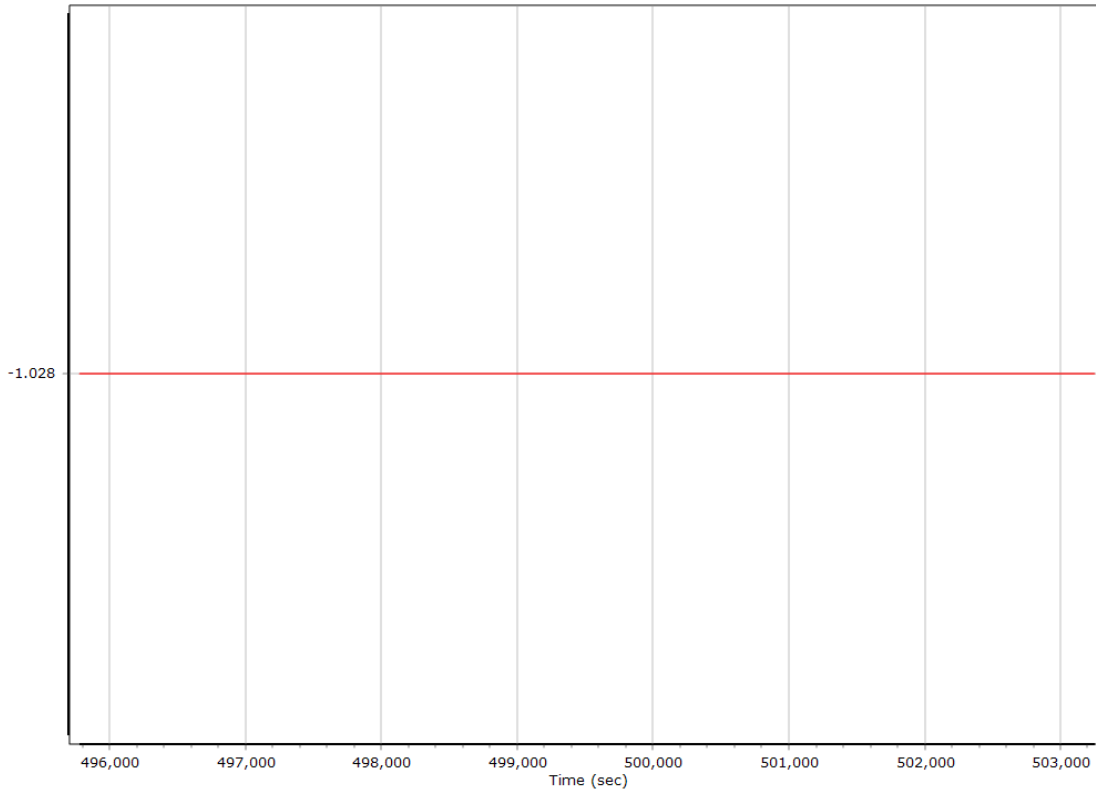
X Reference-Primary GNSS Lever Arm (m)



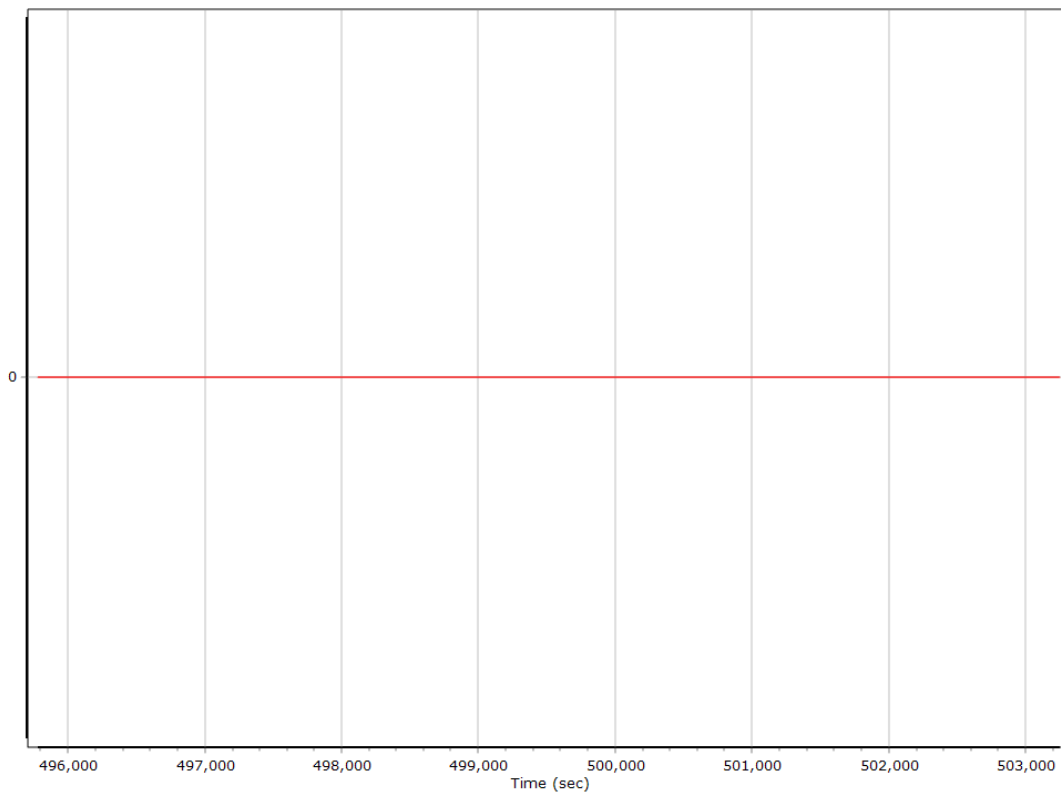
Y Reference-Primary GNSS Lever Arm (m)



Z Reference-Primary GNSS Lever Arm (m)



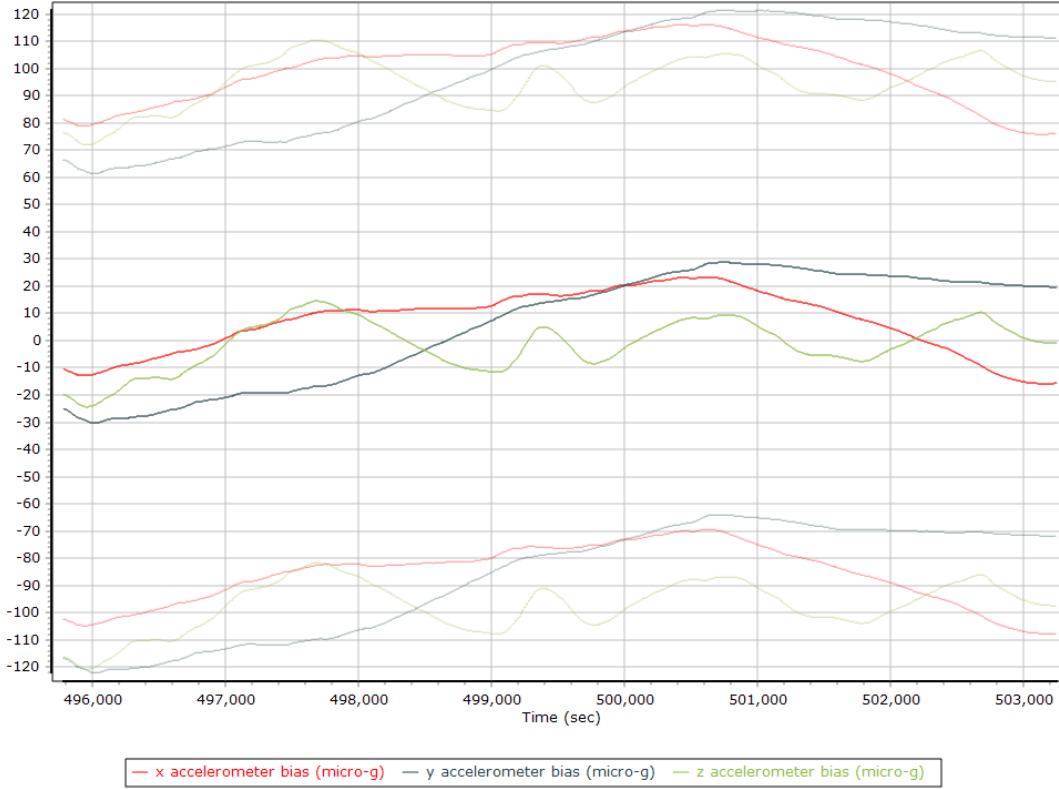
Reference-Primary GNSS Lever Arm Figure of Merit



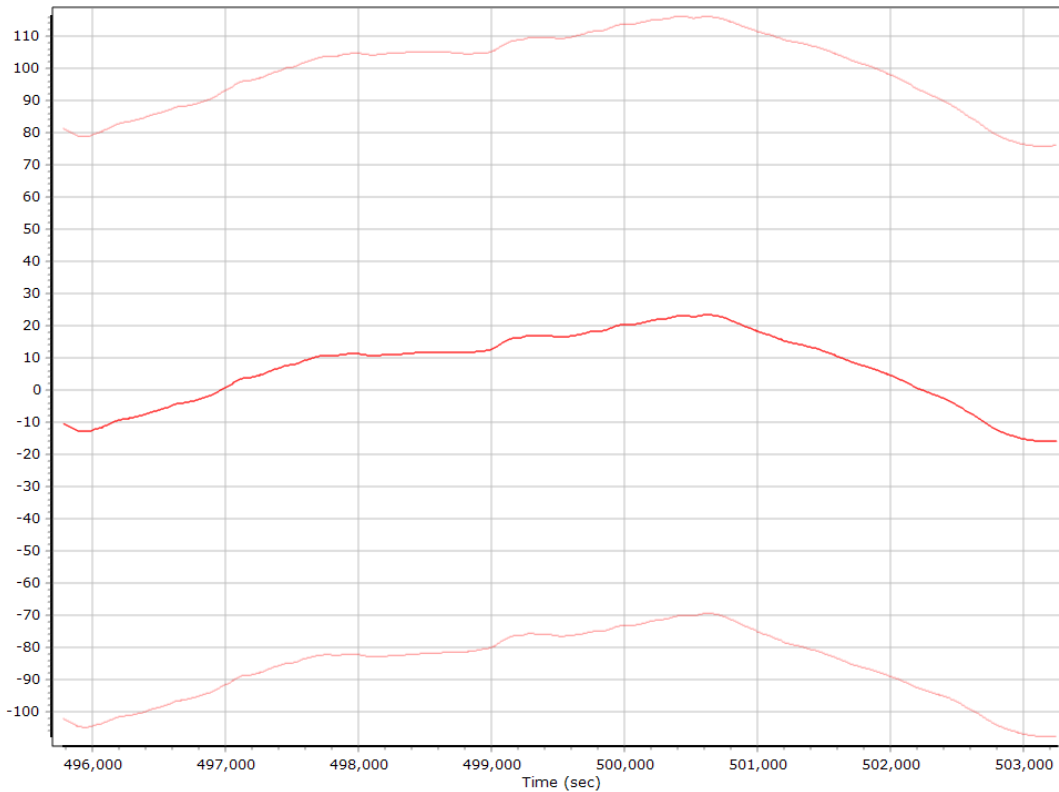
Smoothed IN-Fusion QC

Smoothed Estimated Errors, Reference Frame

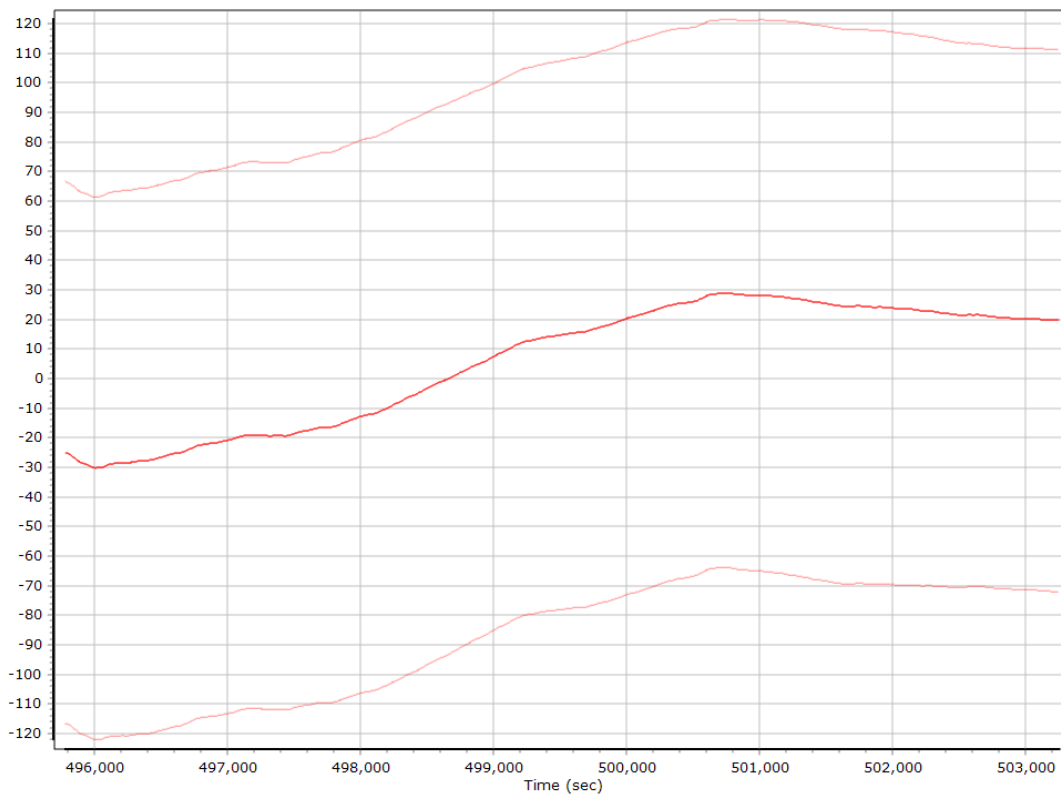
Accelerometer Bias (micro-g)



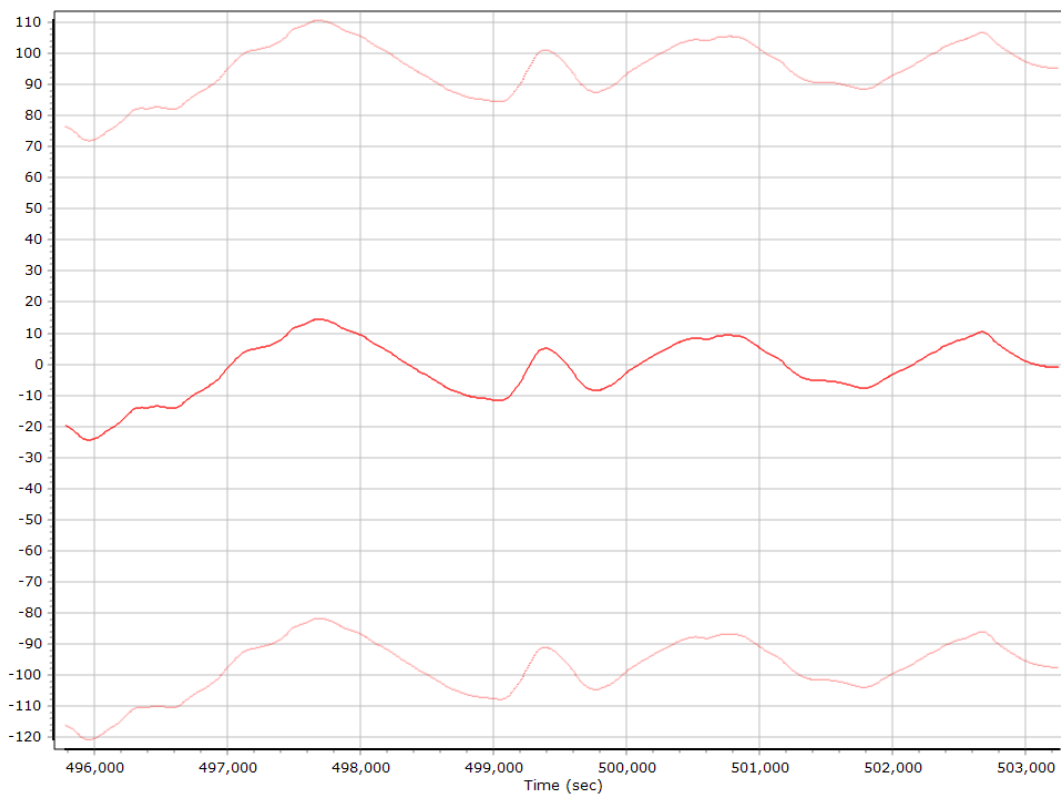
X Accelerometer Bias (micro-g)



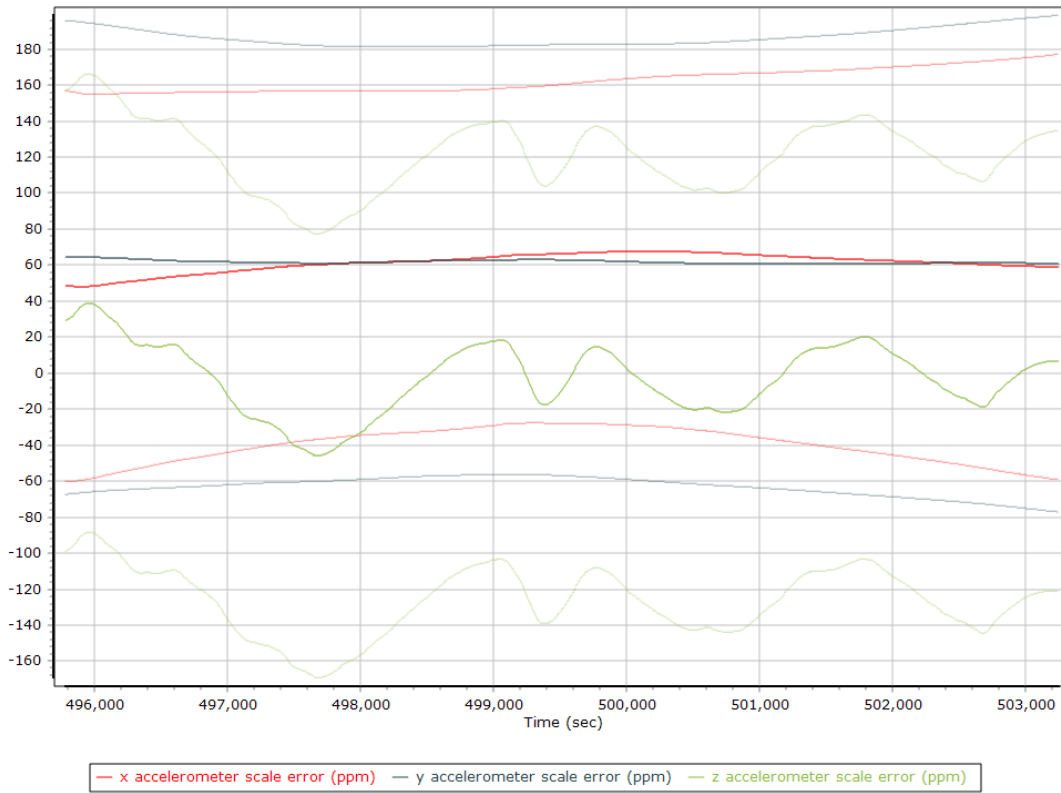
Y Accelerometer Bias (micro-g)



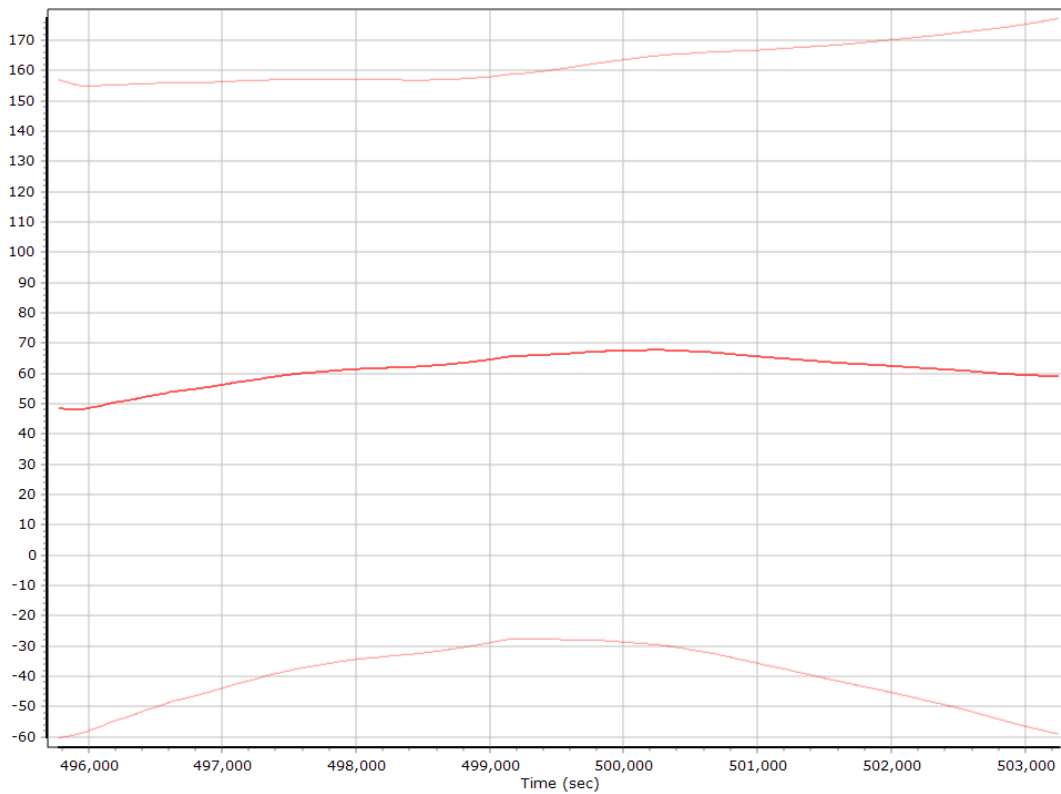
Z Accelerometer Bias (micro-g)



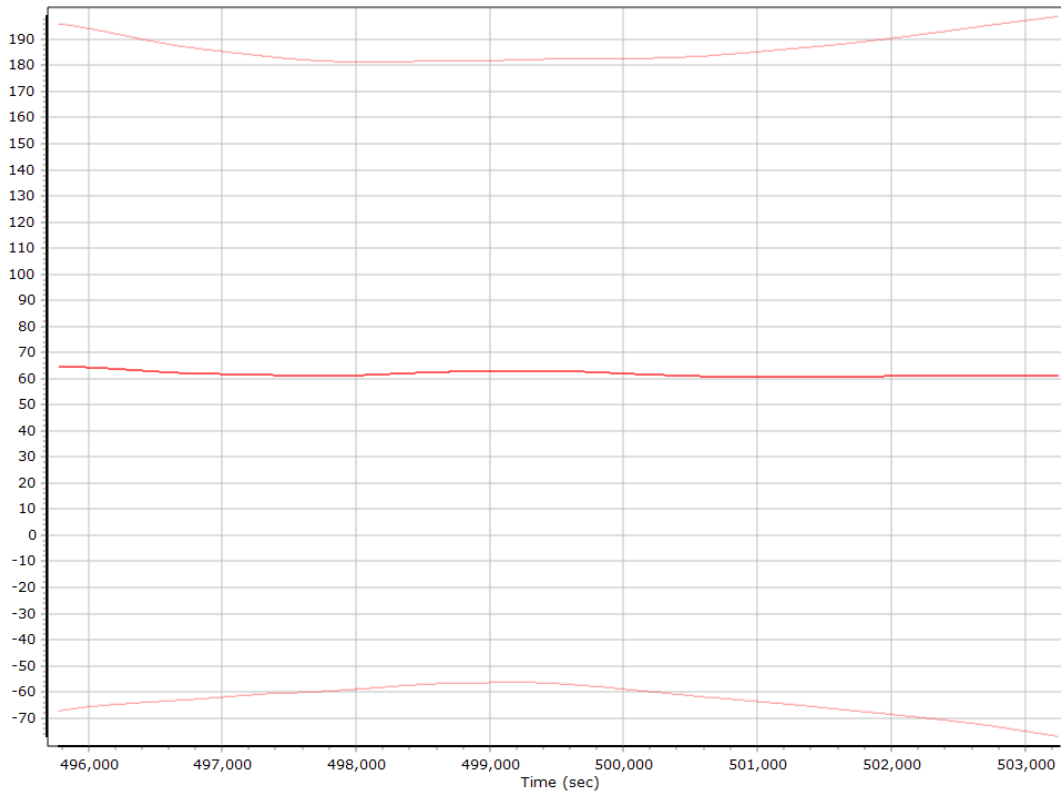
Accelerometer Scale Error (ppm)



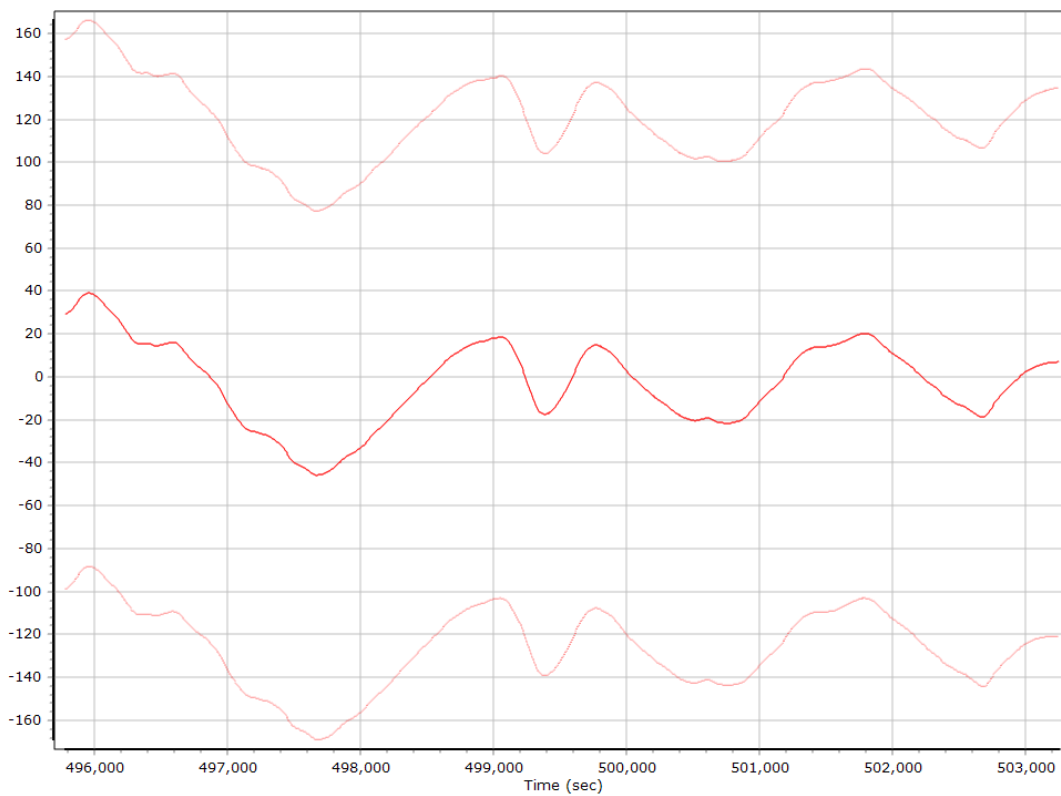
X Accelerometer Scale Error (ppm)



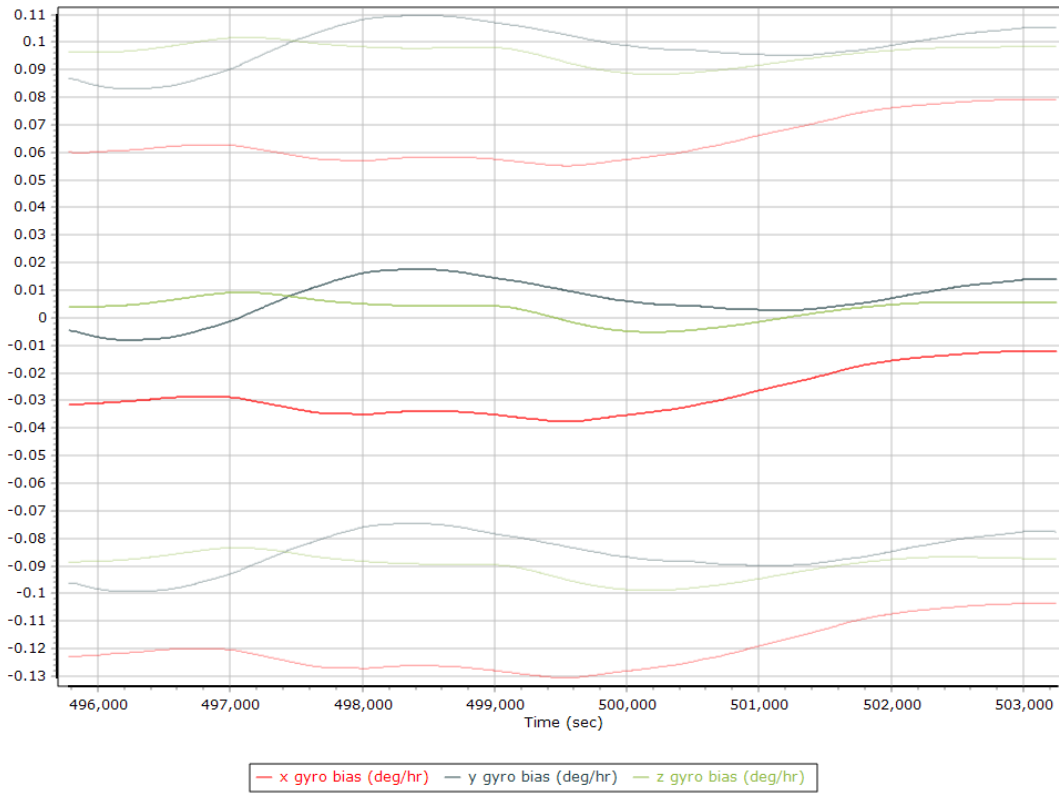
Y Accelerometer Scale Error (ppm)



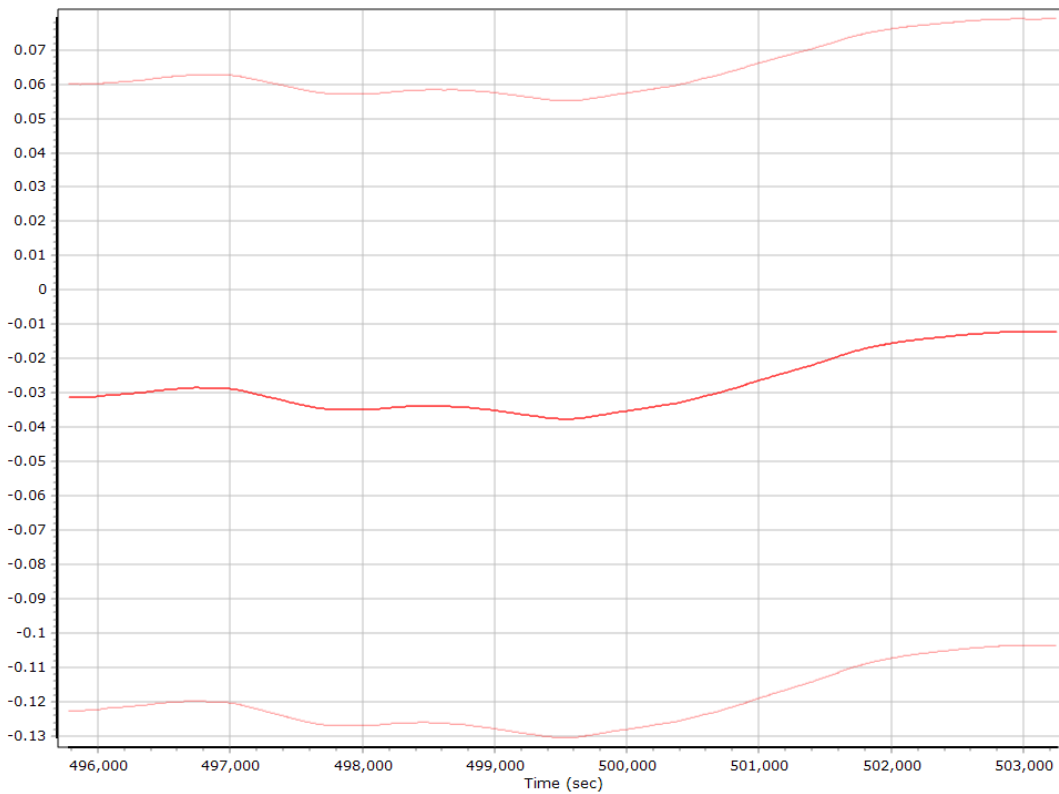
Z Accelerometer Scale Error (ppm)



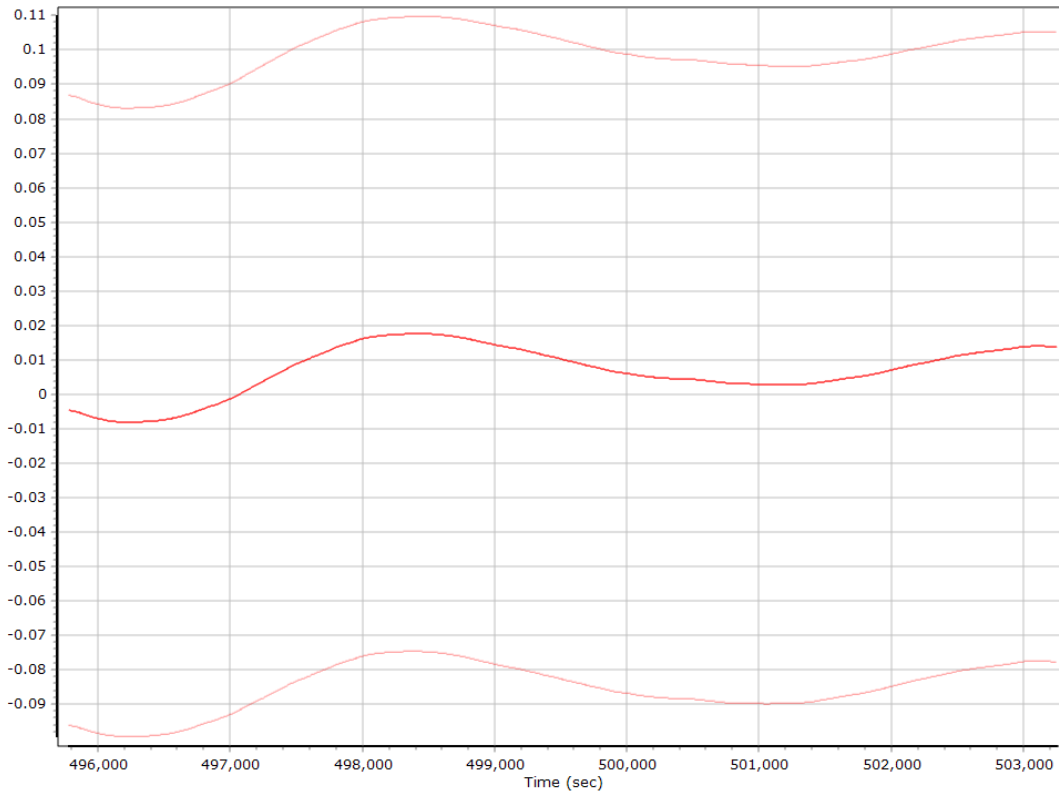
Gyro Bias (deg/h)



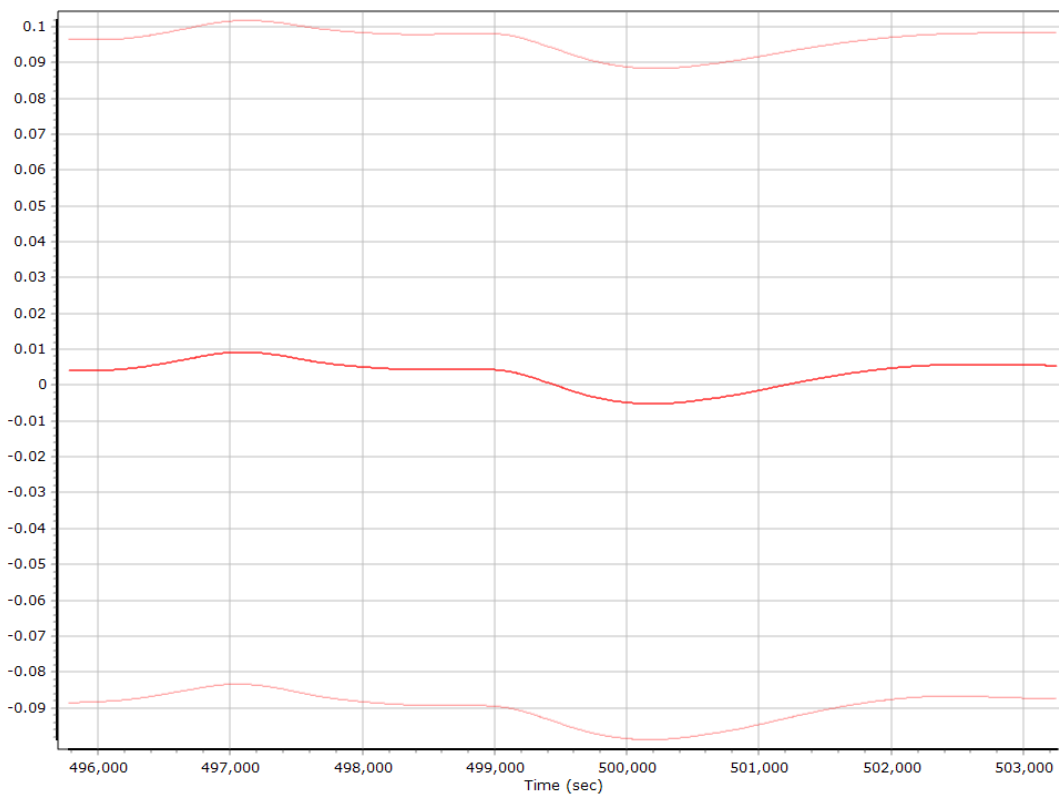
X Gyro Bias (deg/h)



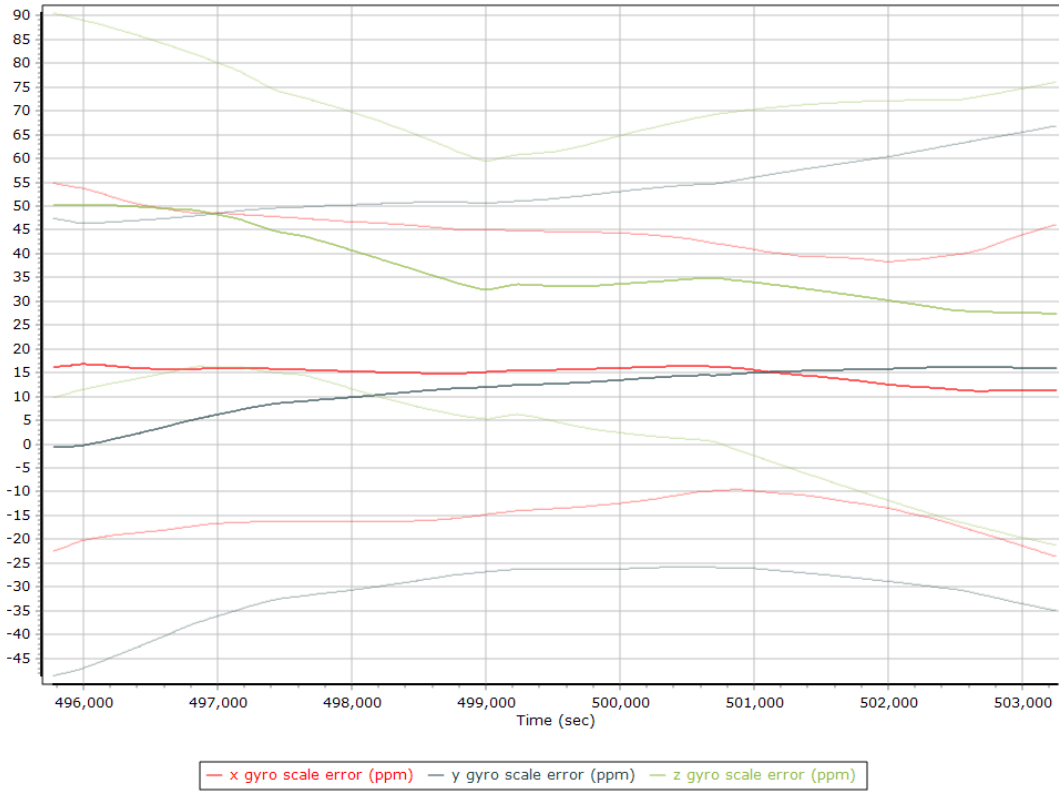
Y Gyro Bias (deg/h)



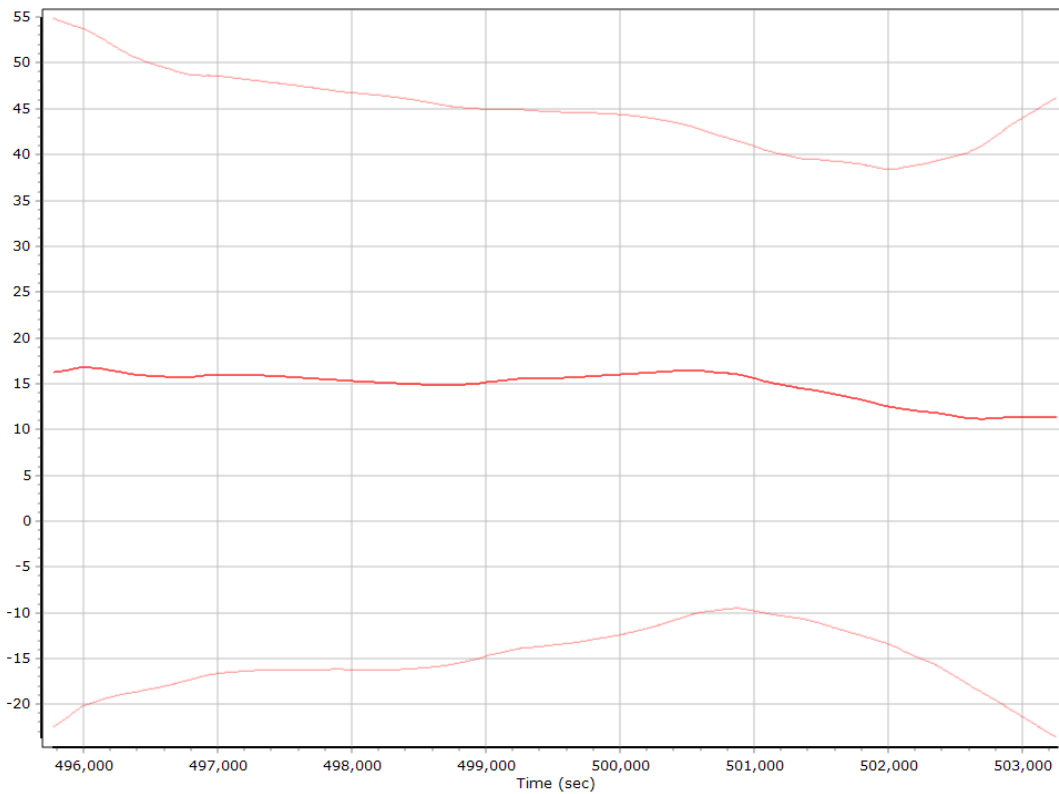
Z Gyro Bias (deg/h)



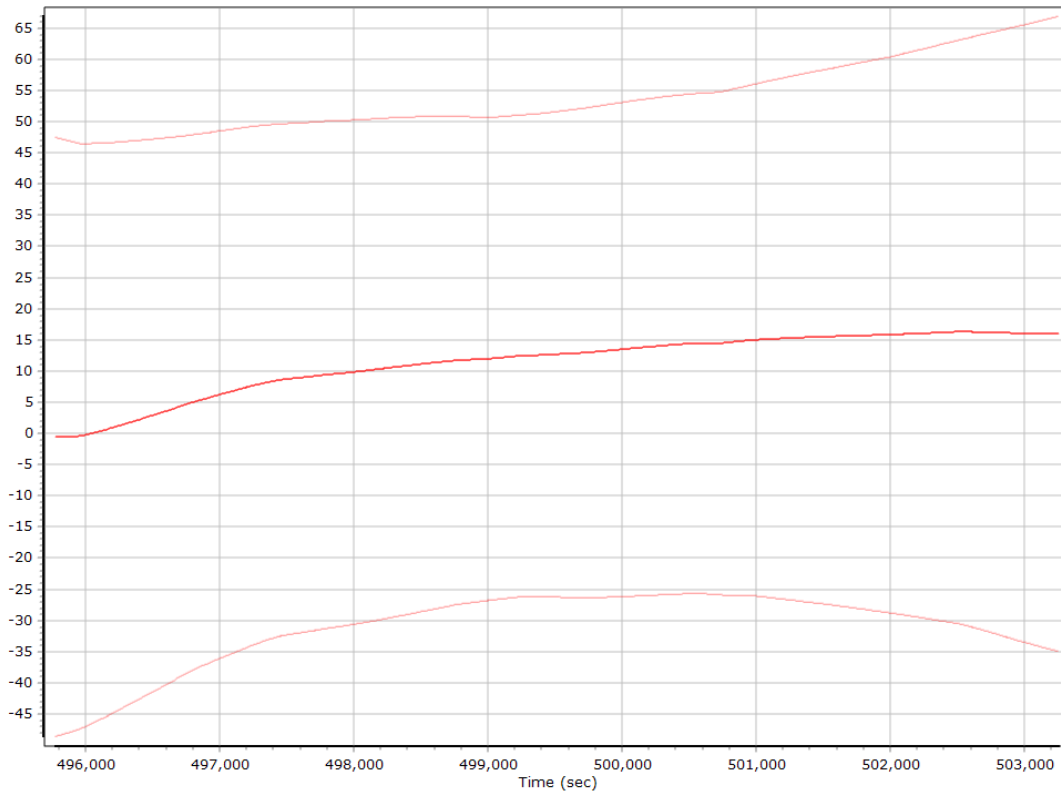
Gyro Scale Error (ppm)



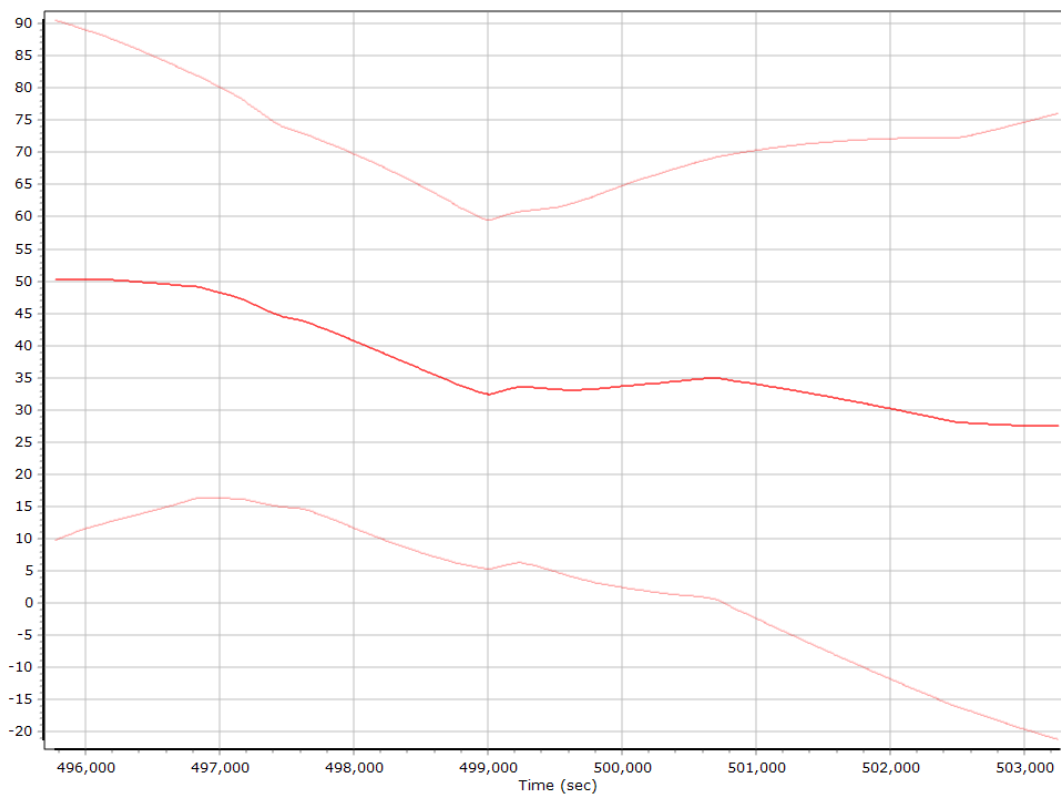
X Gyro Scale Error (ppm)



Y Gyro Scale Error (ppm)

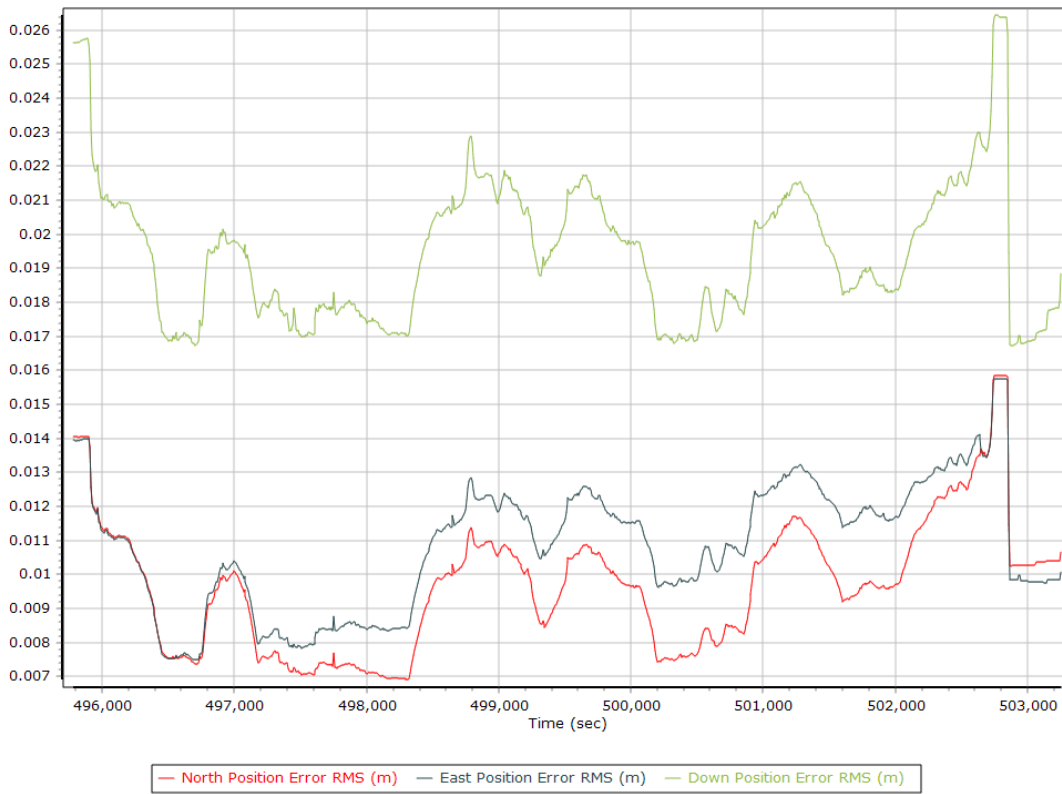


Z Gyro Scale Error (ppm)

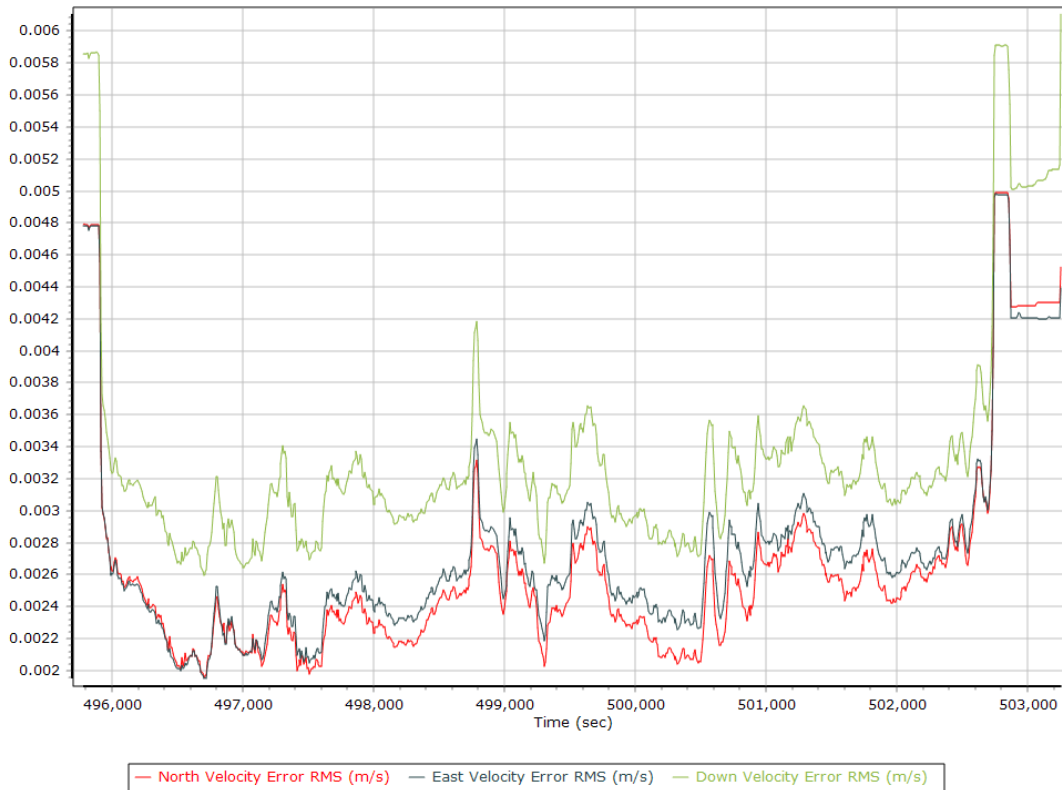


Smoothed Performance Metrics

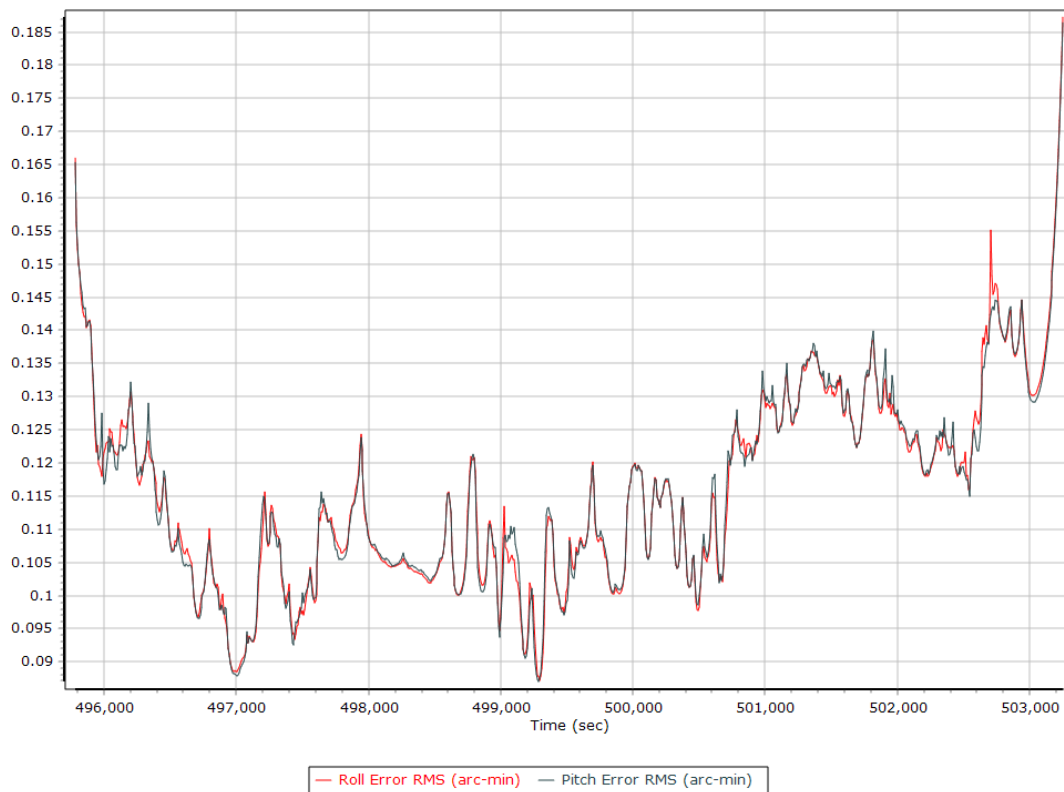
Position Error RMS (m)



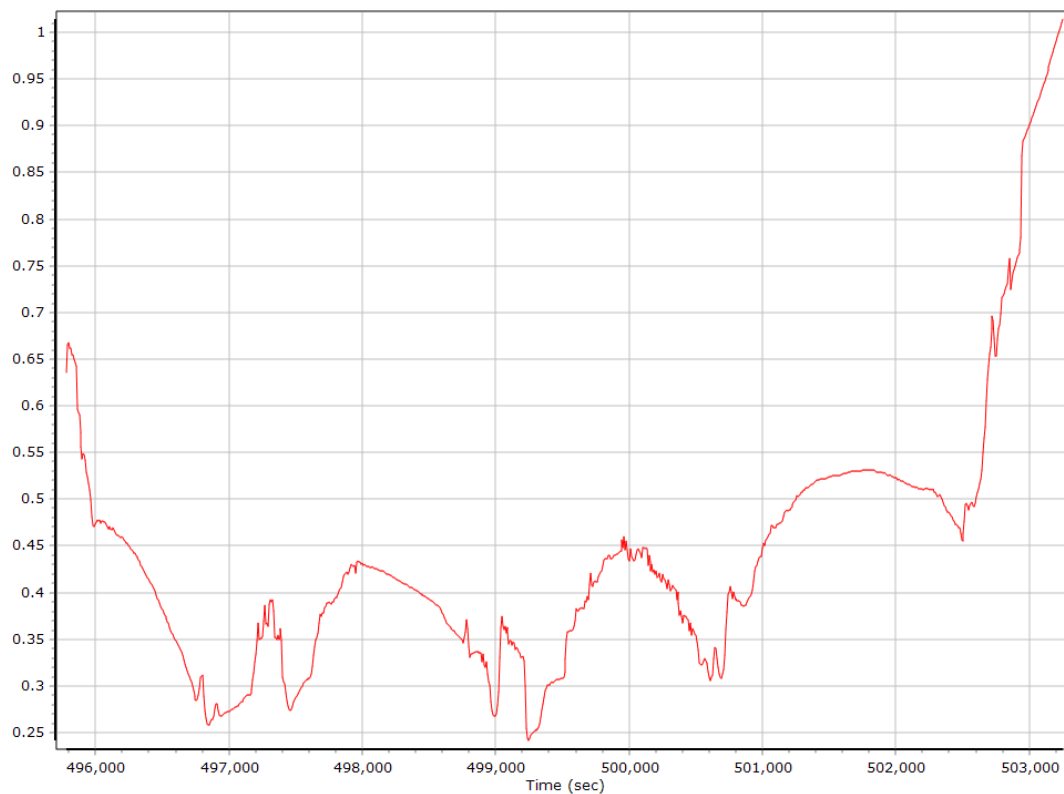
Velocity Error RMS (m/s)



Roll/Pitch Error RMS (arc-min)

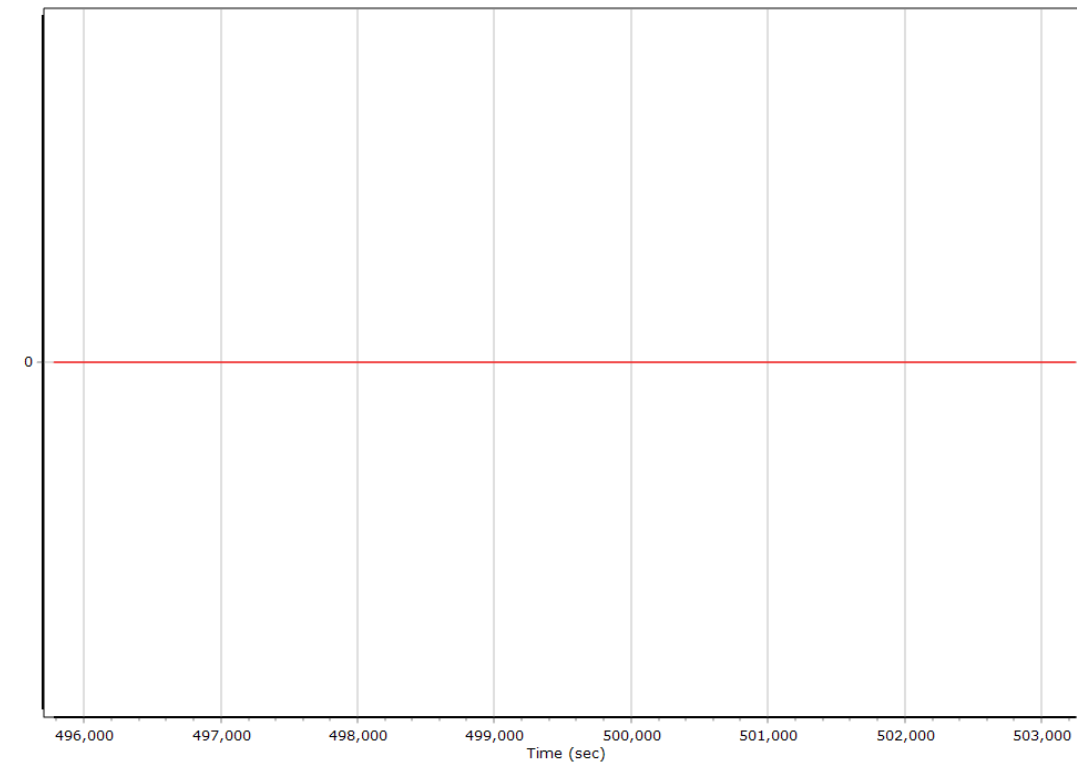


Heading Error RMS (arc-min)



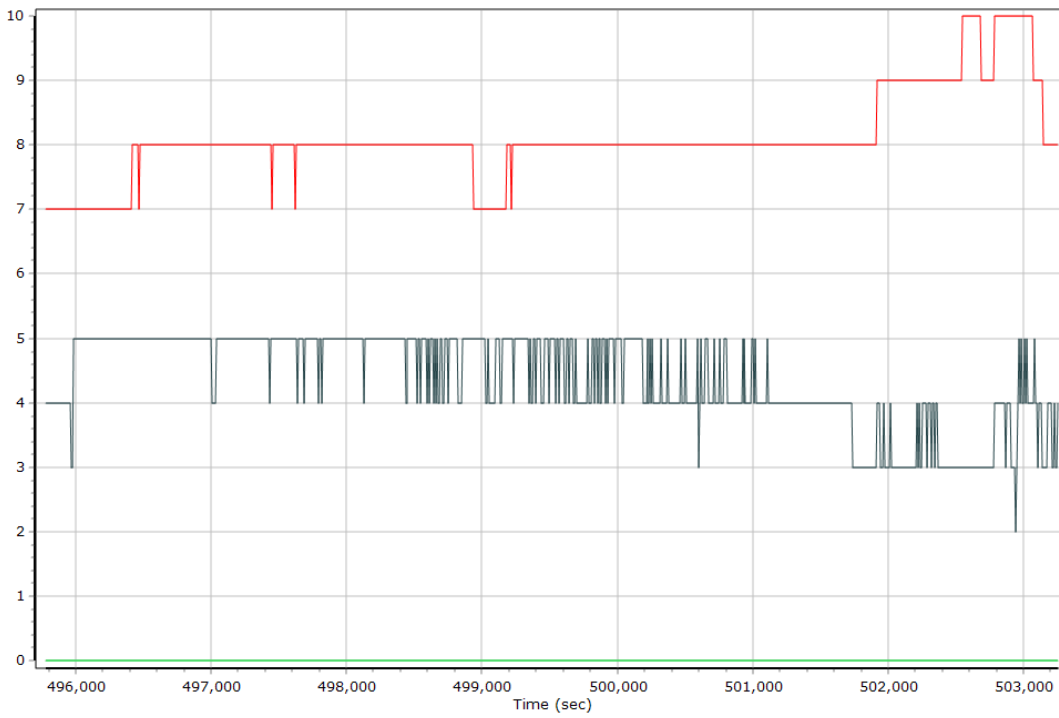
Smoothed Solution Status

Processing Mode



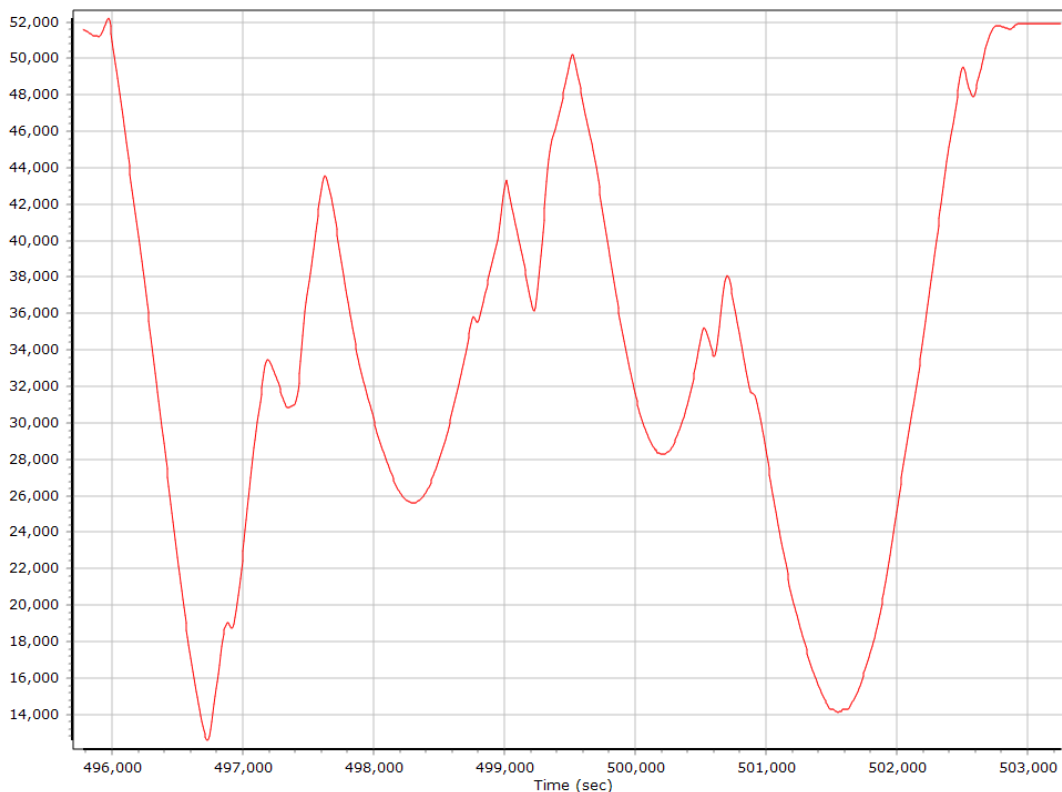
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav, 8 = DR

Number of Satellites



— Number of GPS Satellites — Number of GLONASS Satellites — Number of QZSS Satellites
— Number of BEIDOU Satellites — Number of GALILEO Satellites

Baseline Length



SBET IAkar Separation



Export Summary

Export file	export_RB20073A_176.shp		
Export format	Shapefile		
Solution in use	Post-processed		
Output rate	All Records		
Reference to Output lever arm (m)	0.000	0.000	0.000
Reference mounting angles (deg)	0.000	0.000	0.000
Output units (Coordinate / Lat & Lon)	Meter	Deg Decimal	
Export start time	495722.005 (3/13/2020 5:42:02 PM)		
Export end time	503256.004 (3/13/2020 7:47:36 PM)		
Height option	Ellipsoid Height		
WGS84 height flag	False		
Grid	Universal Transverse Mercator		
Zone	UTM North 17 (84W to 78W)		
Datum	WGS84		
Ellipsoid	WGS84		
Local Transformation	NONE		
Target Epoch	2020.196721		