

## General Information

### Mission Information

Project name	XSS20052A_177
Processing date	2020-02-24 18:35:14
Mission date	2020-02-21 13:43:34
Mission duration	04:17:30.000
Processing mode	IN-Fusion SmartBase
GPS Station	ASB

### Rover Hardware Information

Product	POS AV 610 VER6 HW2.5-12
Serial number	S/N9876
IMU type	57
Receiver type	BD982
Antenna type	AV39

## Project File List

### Rover Data Files

File name	File type
XSS20052.933	POS Data
XSS20052.934	POS Data
XSS20052.935	POS Data
XSS20052.936	POS Data
XSS20052.937	POS Data
XSS20052.938	POS Data
XSS20052.939	POS Data
XSS20052.940	POS Data
XSS20052.941	POS Data
XSS20052.942	POS Data
XSS20052.943	POS Data
XSS20052.944	POS Data
XSS20052.945	POS Data
XSS20052.946	POS Data
XSS20052.947	POS Data
XSS20052.948	POS Data
XSS20052.949	POS Data
XSS20052.950	POS Data
XSS20052.951	POS Data
XSS20052.952	POS Data
XSS20052.953	POS Data
XSS20052.954	POS Data
XSS20052.955	POS Data
XSS20052.956	POS Data
XSS20052.957	POS Data
XSS20052.958	POS Data
XSS20052.959	POS Data
XSS20052.960	POS Data
XSS20052.961	POS Data
XSS20052.962	POS Data
XSS20052.963	POS Data
XSS20052.964	POS Data
XSS20052.965	POS Data
XSS20052.966	POS Data
XSS20052.967	POS Data
XSS20052.968	POS Data
XSS20052.969	POS Data
XSS20052.970	POS Data
XSS20052.971	POS Data
XSS20052.972	POS Data
XSS20052.973	POS Data
XSS20052.974	POS Data
XSS20052.975	POS Data
XSS20052.976	POS Data
XSS20052.977	POS Data
XSS20052.978	POS Data
XSS20052.979	POS Data
XSS20052.980	POS Data

### Input Files

File Name	File Type
Ephm0520.20g	GLONASS Broadcast Ephemeris
Ephm0520.20n	GPS Broadcast Ephemeris
wvbr0520.20o	GNSS SingleBase
wvcv0520.20o	GNSS SingleBase
wvmz0520.20o	GNSS SingleBase
wvnr0520.20o	GNSS SingleBase
wvra0520.20o	GNSS SingleBase
wvsh0520.20o	GNSS SingleBase

File Name	File Type
wvta0520.20o	GNSS SingleBase
igr20934.sp3	GPS Precise Ephemeris
igr20935.sp3	GPS Precise Ephemeris
igr20936.sp3	GPS Precise Ephemeris

## Output Files

Filename	File type
sbet_XSS20052A_177.out	SBET Trajectory File
export_XSS20052A_177.kml	Google KML Export Output

## Rover Data Summary

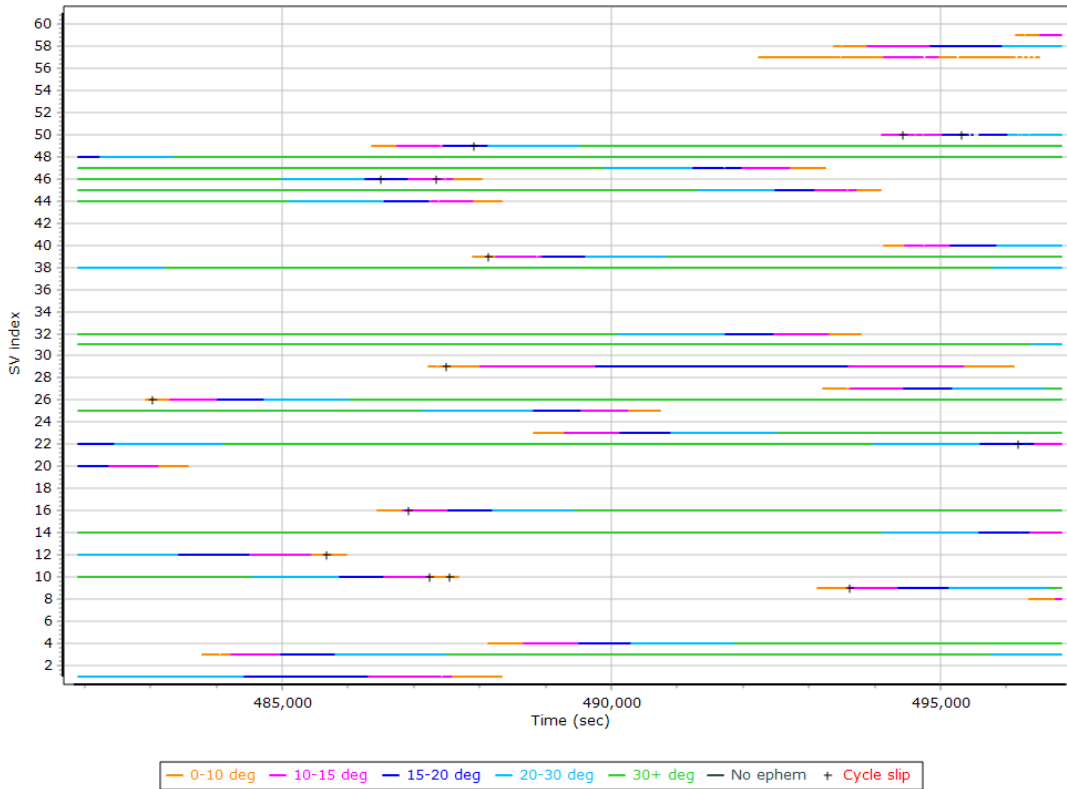
First raw data file	XSS20052.933		
Last raw data file	XSS20052.980		
Start GPS week	2093		
Start time	481395.799 (2/21/2020 1:43:15 PM)		
End time	496845.557 (2/21/2020 6:00:45 PM)		
Start of fine alignment	481841.951 (2/21/2020 1:50:41 PM)		
Available subsystems	Primary GNSS, Gimbal, IMU		
POS Event Input	None		
Correction data	None		
<b>IMU Installation Lever Arms &amp; Mounting Angles</b>			
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

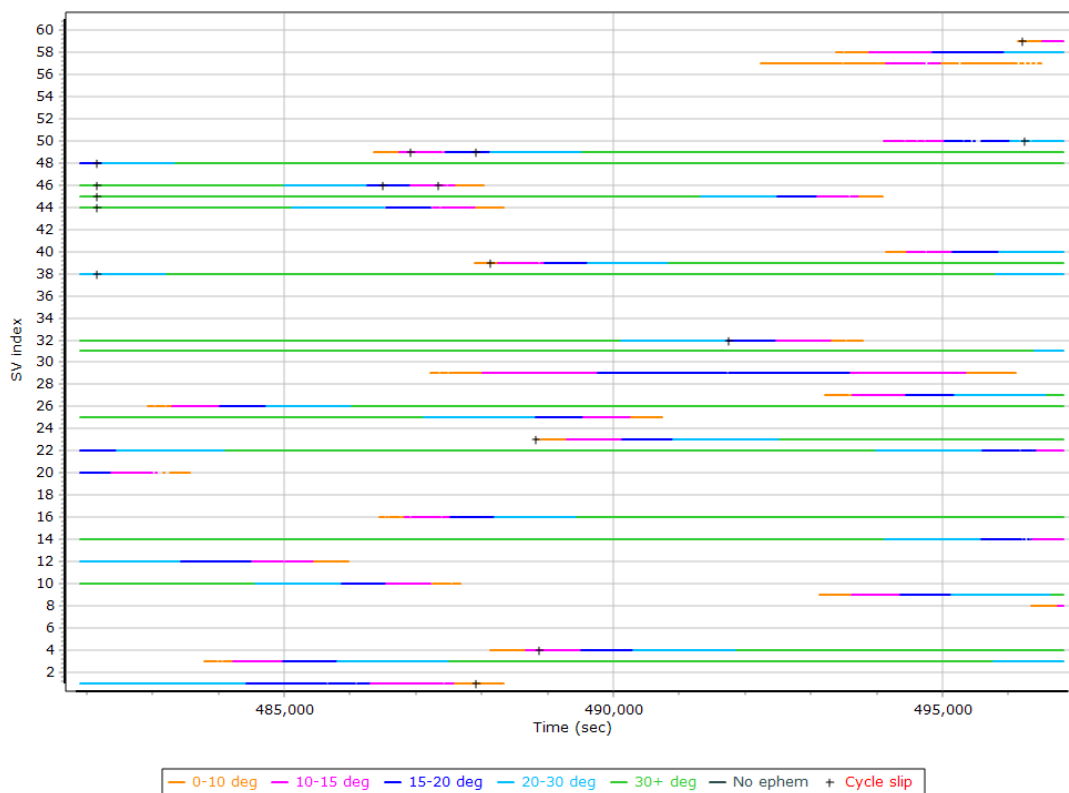
## Raw IMU Import QC Summary

IMU data input file	imu_XSS20052A_177.dat
IMU data check log file	imudt_XSS20052A_177.log
IMU Records Processed	3089354
Termination Status	Normal
IMU Anomalies	0

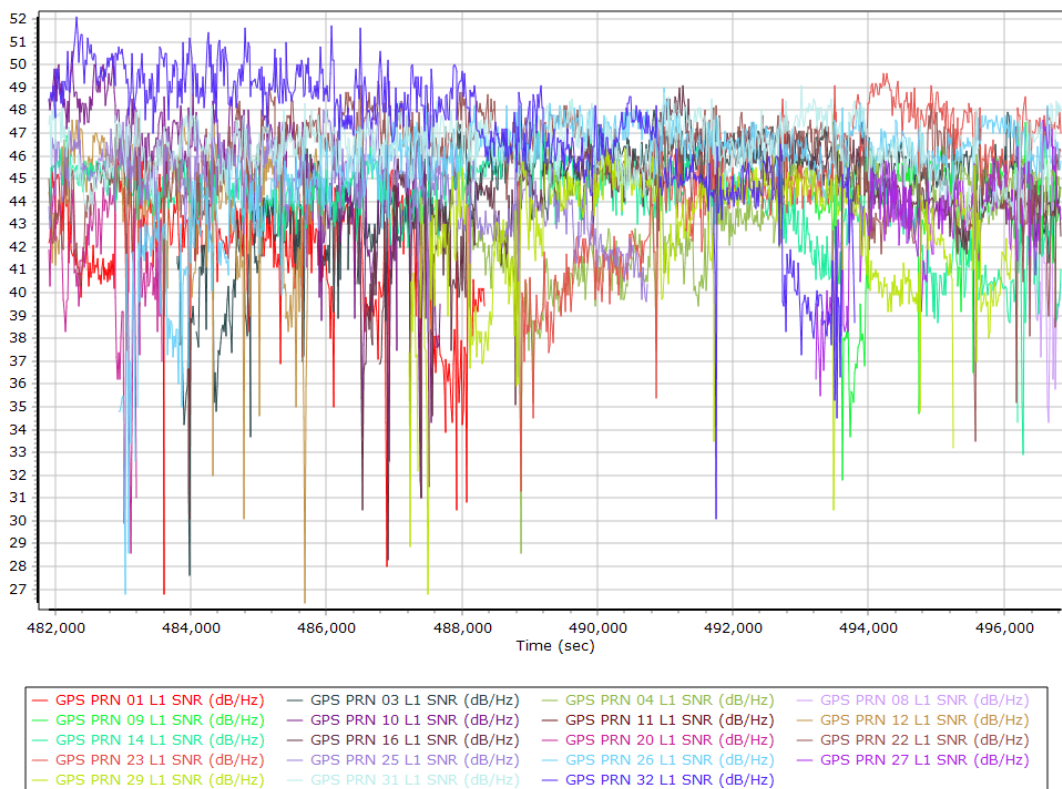
### L1 Satellite Lock/Elevation



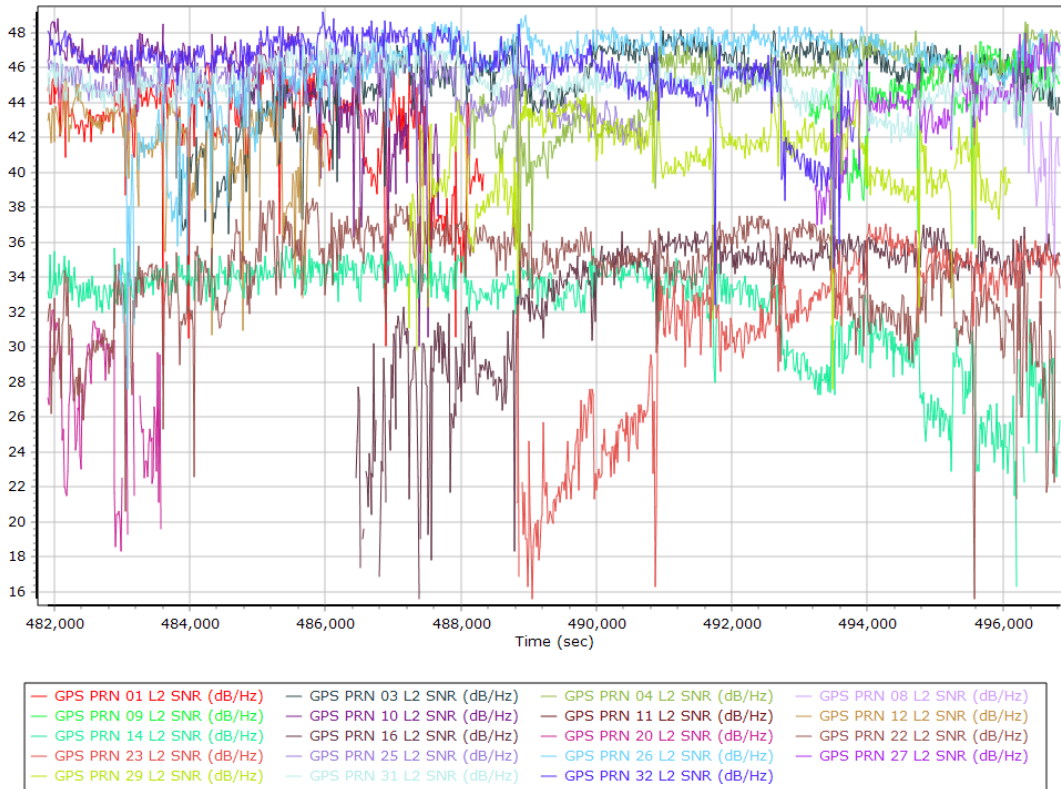
## L2 Satellite Lock/Elevation



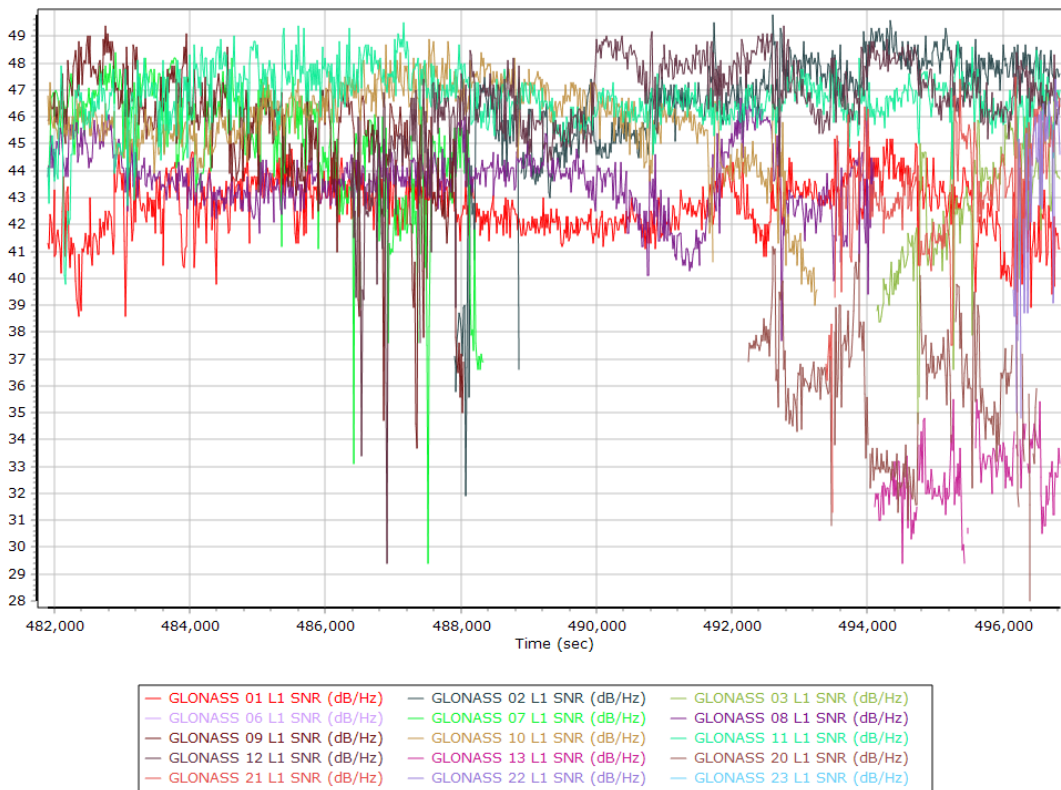
## GPS L1 SNR



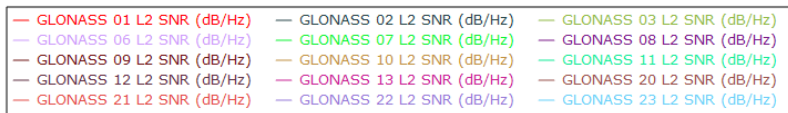
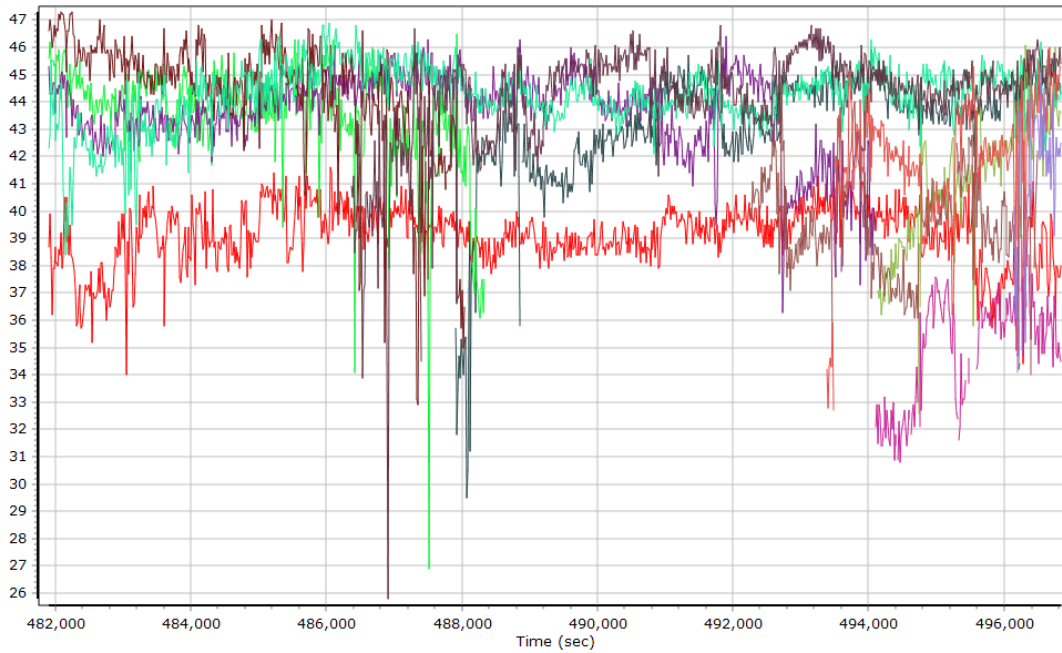
## GPS L2 SNR



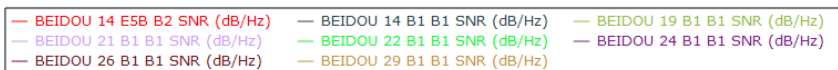
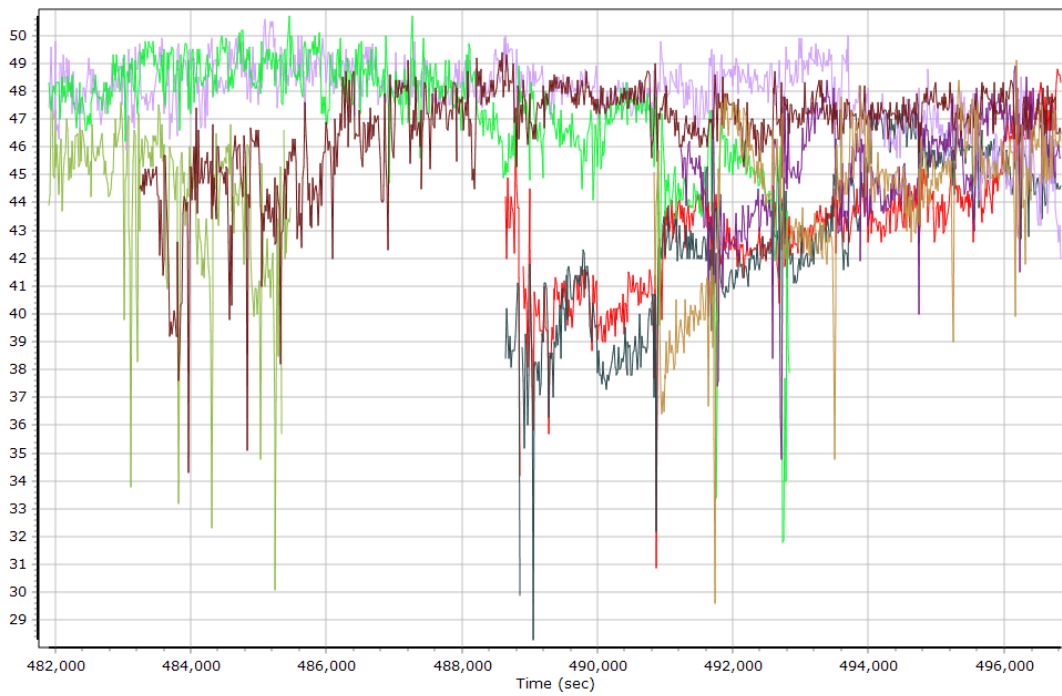
## GLONASS L1 SNR



## GLONASS L2 SNR

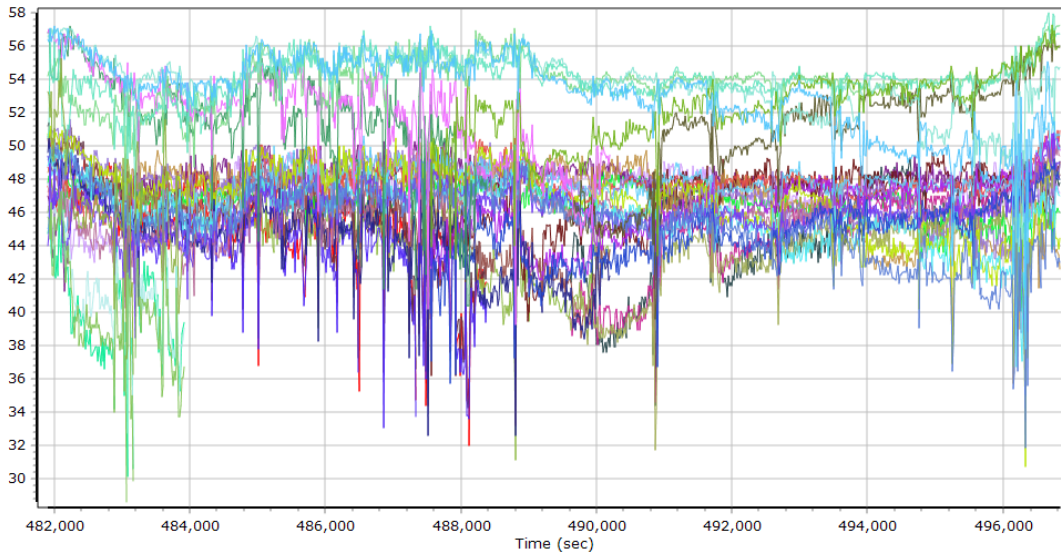


## BEIDOU SNR





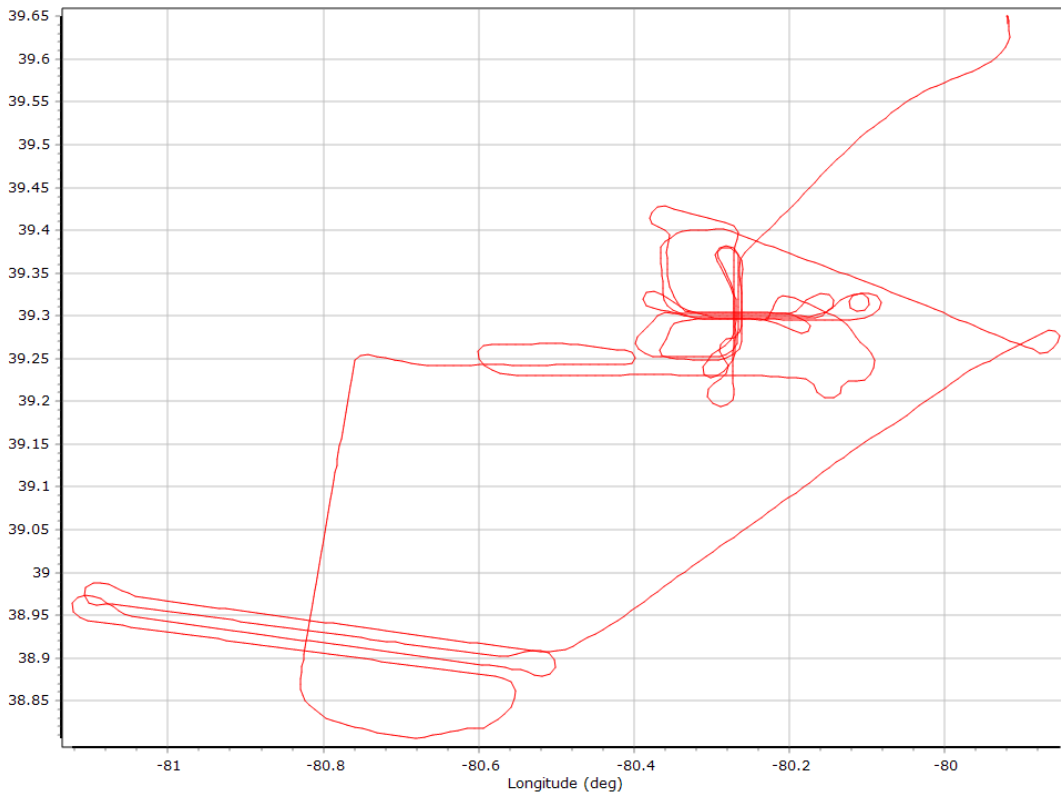
## GALILEO SNR



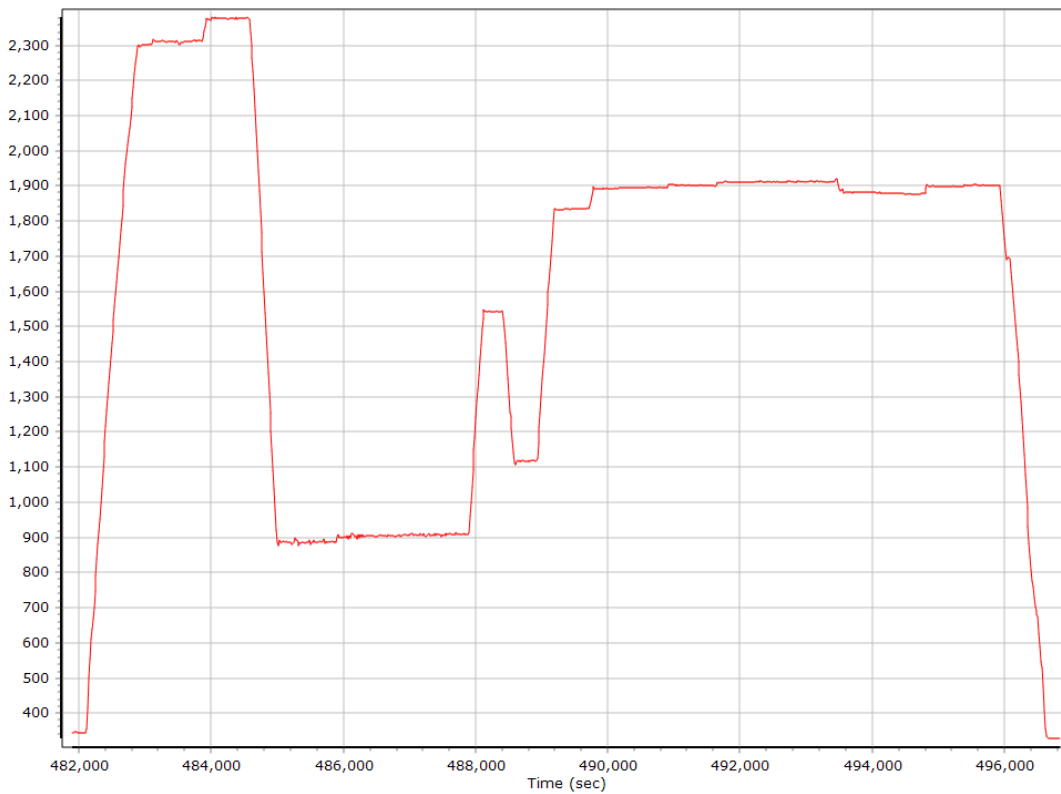
- |  |  |
|--|--|
| — GALILEO 01 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 03 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 04 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 05 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 09 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 24 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 25 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 31 L1 BOC_1_1_D_MBOC SNR (dB/Hz) |
| — GALILEO 36 L1 BOC_1_1_D_MBOC SNR (dB/Hz) | — GALILEO 01 L5E5A BPSK10_PD SNR (dB/Hz)   |
| — GALILEO 03 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 24 L5E5A BPSK10_PD SNR (dB/Hz)   | — GALILEO 25 L5E5A BPSK10_PD SNR (dB/Hz)   |
| — GALILEO 31 L5E5A BPSK10_PD SNR (dB/Hz)   | — GALILEO 36 L5E5A BPSK10_PD SNR (dB/Hz)   |
| — GALILEO 01 E5B BPSK10_PD SNR (dB/Hz)     | — GALILEO 03 E5B BPSK10_PD SNR (dB/Hz)     |

## Trajectory Information

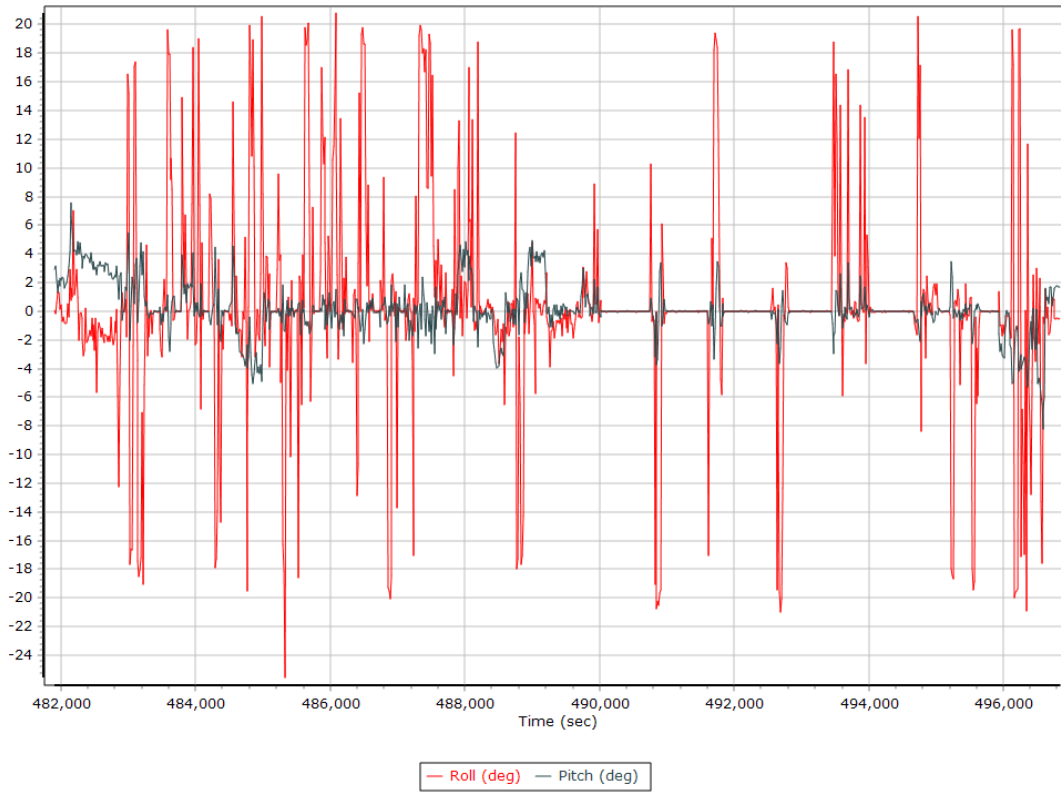
### Top View



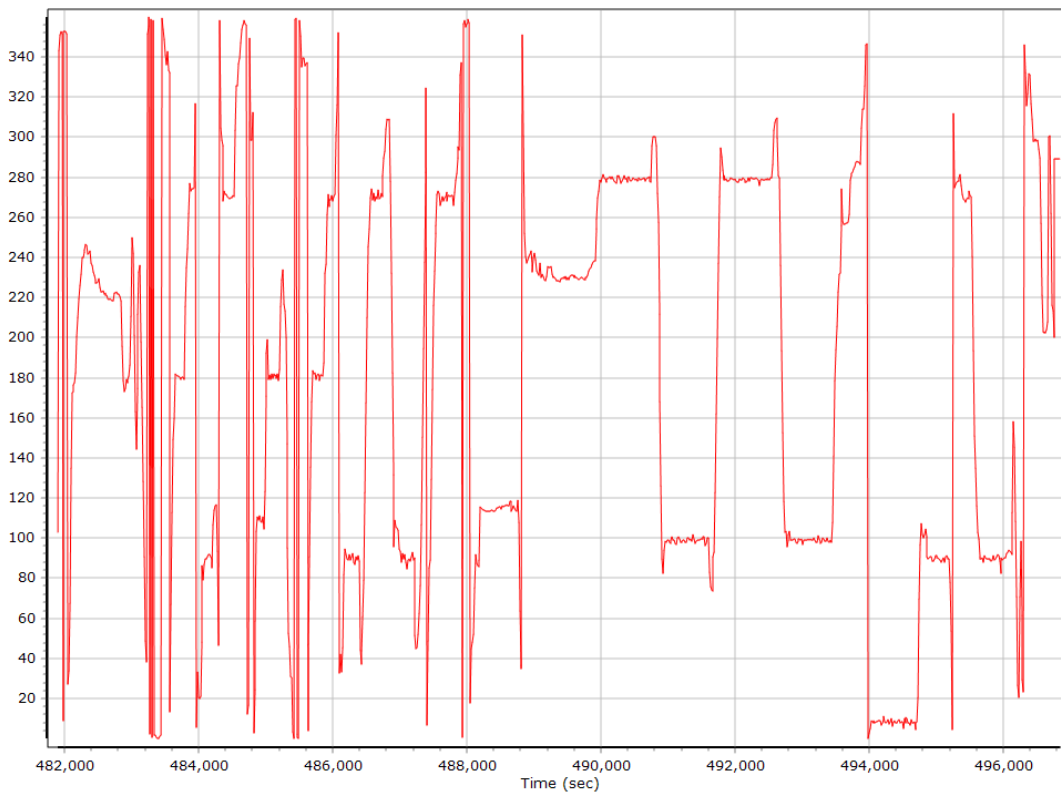
### Altitude



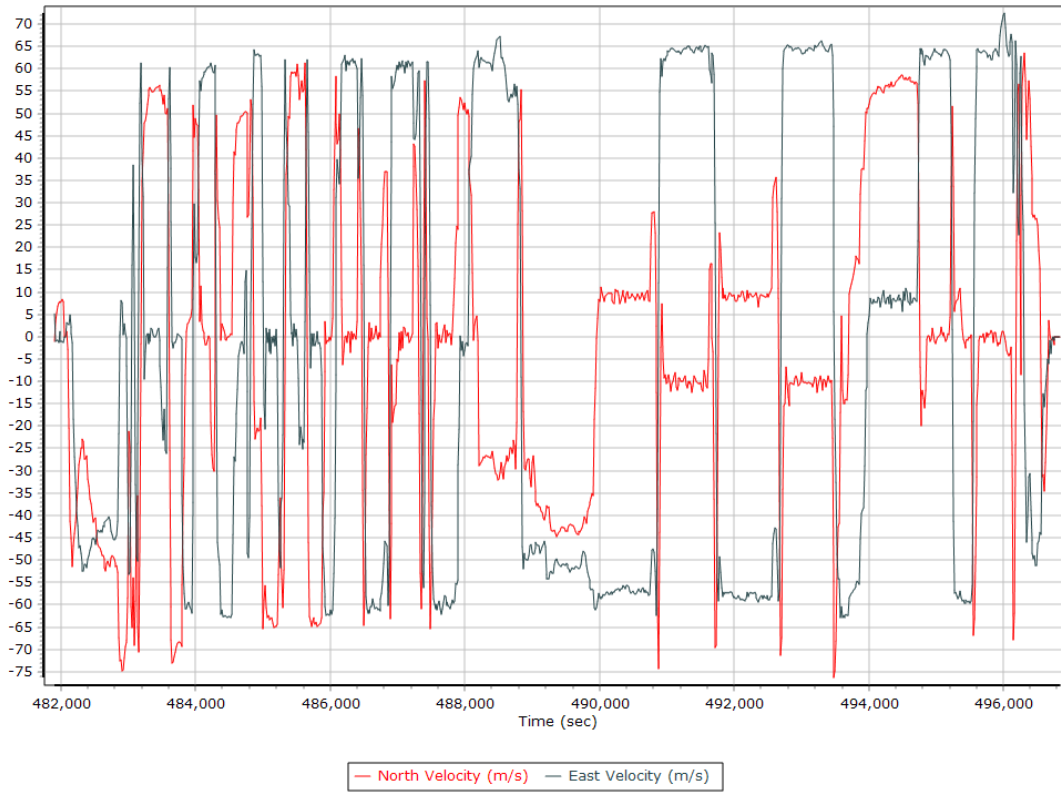
## Roll/Pitch



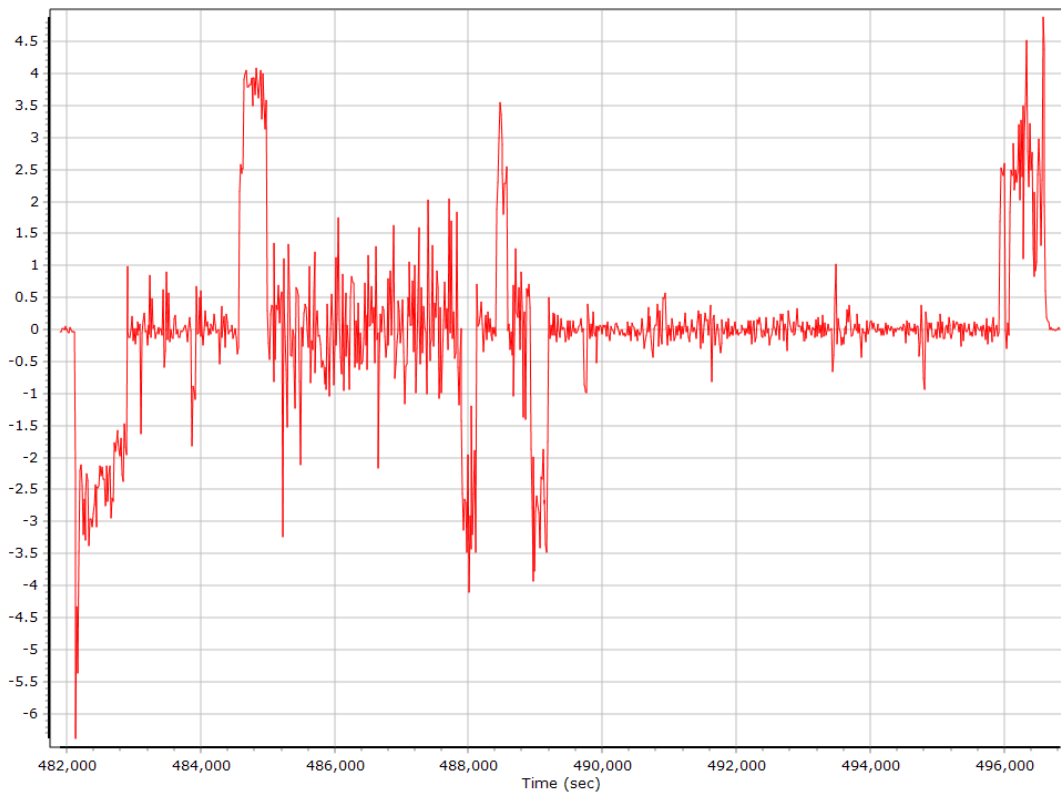
## Heading



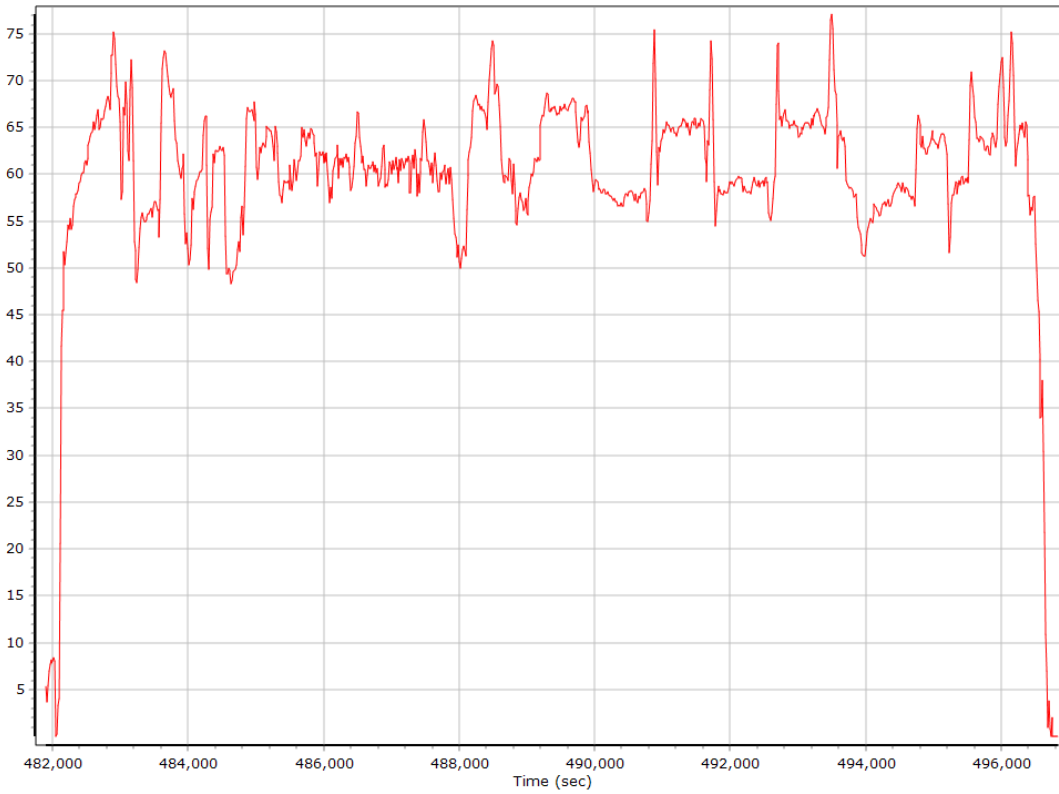
## North/East Velocity



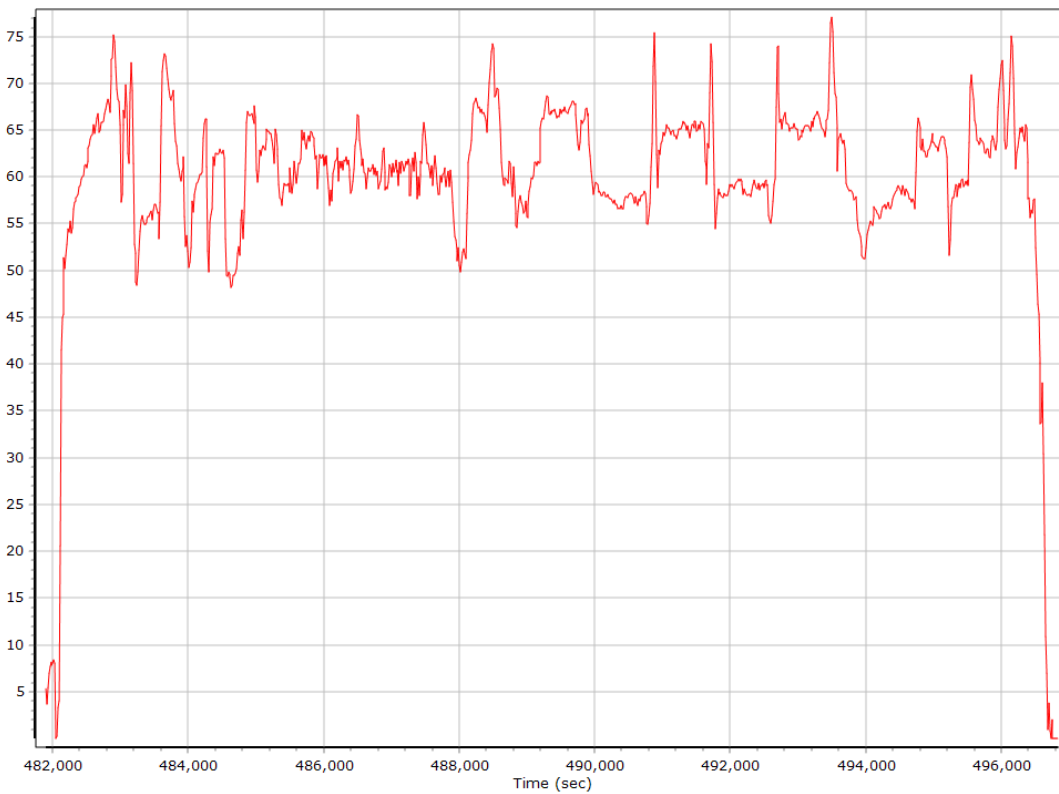
## Down Velocity



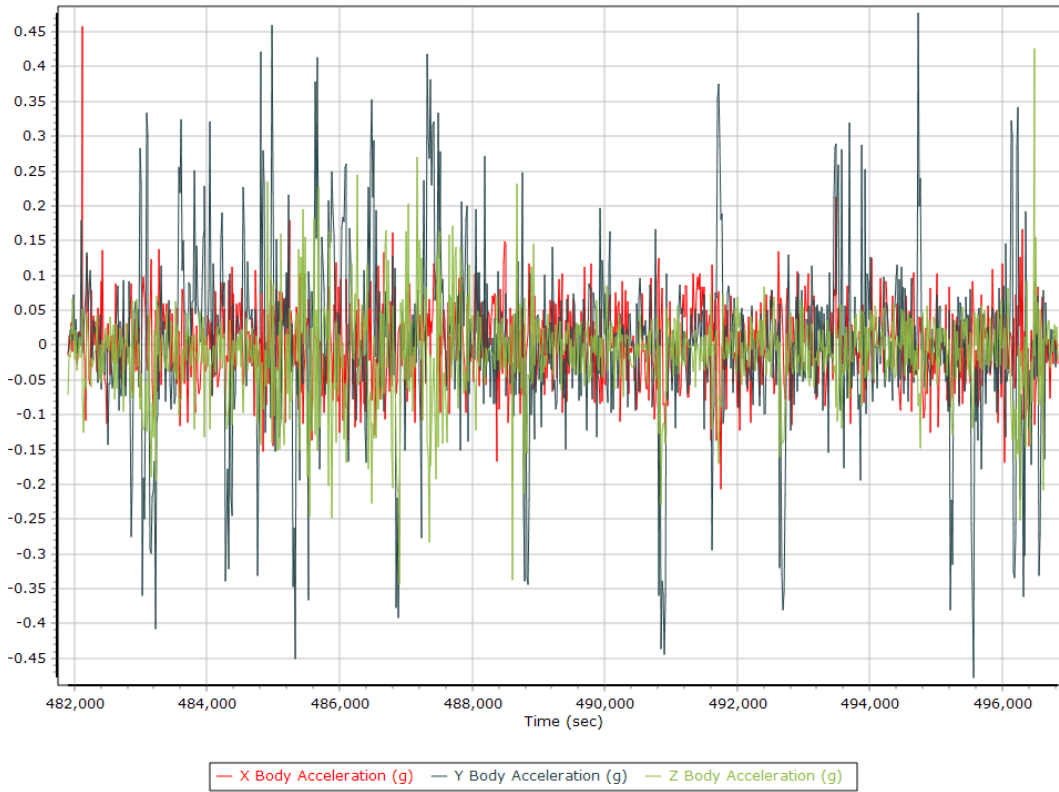
## Total Speed



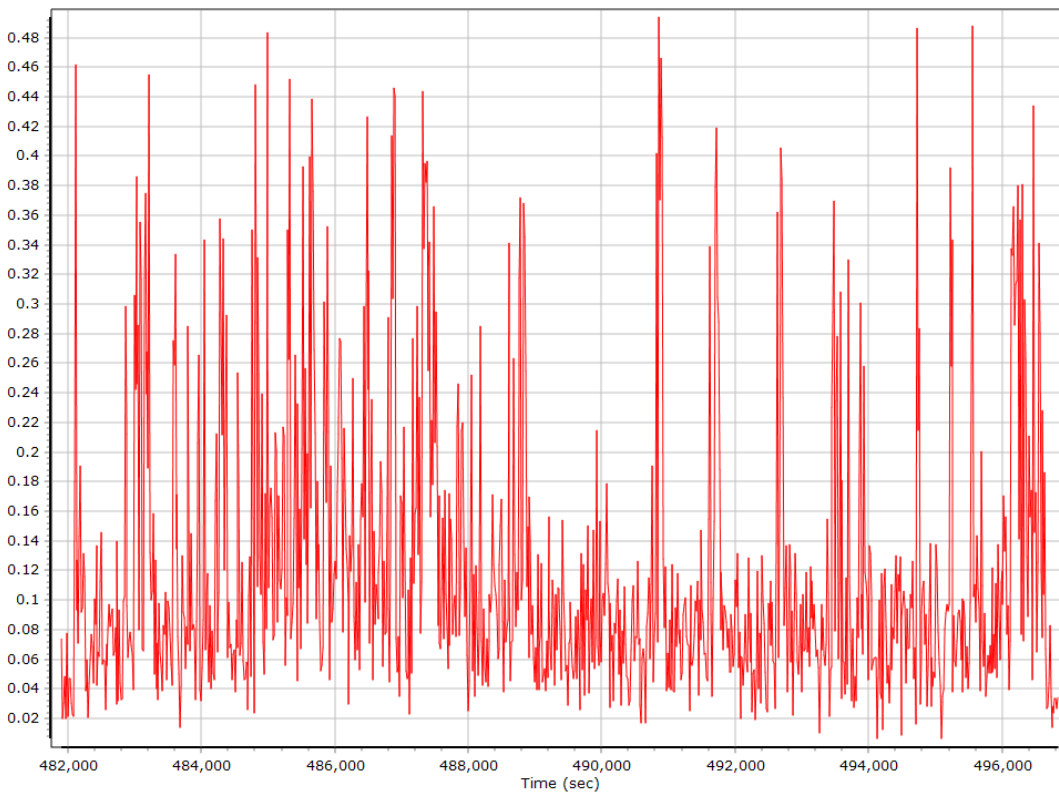
## Ground Speed



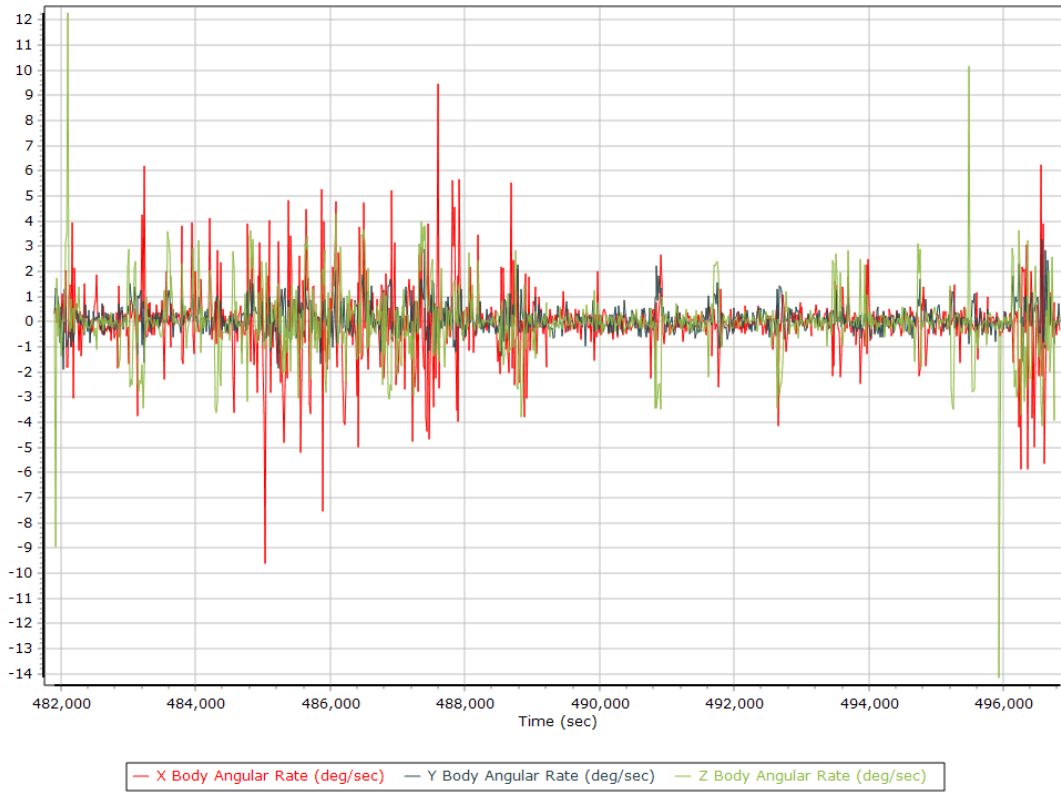
## Body Acceleration



## Total Body Acceleration



## Body Angular Rate



## SmartBase Processing Summary

### Smart Select Options

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

### Basestation Selection

Date	ID	Dist	System	Rate	Service	Database	Status
02/21/2020	WVTA	81.69	GNSS	1	User	None	Imported
02/21/2020	WVSH	91.72	GNSS	1	User	None	Imported
02/21/2020	WVRA	119.56	GNSS	1	User	None	Imported
02/21/2020	WVNR	58.36	GNSS	1	User	None	Imported
02/21/2020	WVMZ	72.49	GNSS	1	User	None	Imported
02/21/2020	WVCV	84.90	GNSS	1	User	None	Imported
02/21/2020	WVBR	16.80	GNSS	1	User	None	Imported

### SmartBase Results

SmartBase status	PROC_STATUS_OK
Primary station Id	WVBR
Primary station data rate (sec)	1.0
VRS/ASB generation rate (sec)	1.0
VRS/ASB timespan	15450 s (2093 481414 - 2093 496864)
Number of reference stations	7
Primary station GPS measurement usage (%)	99.9
Primary station GLONASS measurement usage (%)	77.5
Average number of satellites per epoch	14.6
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)	21769
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 - WVTA

Status	OK	SBQI	0	
Duration (Hours)	23.80	Output Coordinates	Original	
Solution Epochs	5712	Mean Epoch SVs	8.5	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°26'16.64399"	W79°30'52.95303"	726.066
Adjusted		N39°26'16.64394"	W79°30'52.95285"	726.067
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.004	0.001	0.005

### Base Station Information

Station ID	WVTA		
Filename	wvta0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 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 - WVSH

Status	OK	SBQI	0	
Duration (Hours)	23.46	Output Coordinates	Original	
Solution Epochs	5630	Mean Epoch SVs	8.6	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°59'49.09954"	W80°40'46.36115"	384.551
Adjusted		N39°59'49.09946"	W80°40'46.36169"	384.557
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.013	0.006	0.014

### Base Station Information

Station ID	WVSH		
Filename	wvsh0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4924K62366
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°59'49.09954"		
Longitude	W80°40'46.36115"		
Ellipsoidal height (m)	384.55100		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

## Base Station - WVRA

Status	OK	SBQI	0
Duration (Hours)	23.80	Output Coordinates	Original
Solution Epochs	5712	Mean Epoch SVs	8.6
Base Station Coordinates	Latitude	Longitude	Height (m)
Original	N38°56'28.86373"	W81°45'04.84260"	149.248
Adjusted	N38°56'28.86306"	W81°45'04.84250"	149.245
Coordinate Adjustments	Horizontal (m)	Vertical (m)	Total (m)
Adjustments	0.021	0.003	0.021

## Base Station Information

Station ID	WVRA		
Filename	wvra0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4923K62358
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°56'28.86373"		
Longitude	W81°45'04.84260"		
Ellipsoidal height (m)	149.24800		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

### Base Station - WVNR

Status	CONTROL	SBQI	0	
Duration (Hours)	23.80	Output Coordinates	Control	
Solution Epochs	5712	Mean Epoch SVs	8.6	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N38°53'44.50553"	W79°51'30.27007"	582.773
Adjusted		N38°53'44.50553"	W79°51'30.27007"	582.773
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.000	0.000	0.000

### Base Station Information

Station ID	WVNR		
Filename	wvnr0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 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 - WVMZ

Status	OK	SBQI	0
Duration (Hours)	23.80	Output Coordinates	Original
Solution Epochs	5712	Mean Epoch SVs	8.6
Base Station Coordinates	Latitude	Longitude	Height (m)
Original	N38°50'20.04352"	W81°06'31.58289"	296.834
Adjusted	N38°50'20.04319"	W81°06'31.58304"	296.813
Coordinate Adjustments	Horizontal (m)	Vertical (m)	Total (m)
Adjustments	0.011	0.021	0.023

## Base Station Information

Station ID	WVMZ		
Filename	wvmz0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4922K62061
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°50'20.04352"		
Longitude	W81°06'31.58289"		
Ellipsoidal height (m)	296.83400		
Frame	ITRF00		
Epoch	1997		
Ellipsoid	WGS84		
Velocity North (mm/y)	0		
Velocity East (mm/y)	0		
Velocity Up (mm/y)	0		

### Base Station - WVCV

Status	OK	SBQI	0	
Duration (Hours)	23.80	Output Coordinates	Original	
Solution Epochs	5712	Mean Epoch SVs	8.6	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°00'55.07616"	W79°27'25.00965"	969.235
Adjusted		N39°00'55.07529"	W79°27'25.00837"	969.232
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.041	0.003	0.041

### Base Station Information

Station ID	WVCV		
Filename	wvcv0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Trimble	NetR5	4922K62079
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°00'55.07616"		
Longitude	W79°27'25.00965"		
Ellipsoidal height (m)	969.23500		
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	OK	SBQI	0	
Duration (Hours)	23.80	Output Coordinates	Original	
Solution Epochs	5712	Mean Epoch SVs	8.6	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°18'28.88440"	W80°16'38.61885"	270.246
Adjusted		N39°18'28.88423"	W80°16'38.61928"	270.254
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.012	0.008	0.014

## Base Station Information

Station ID	WVBR		
Filename	wvbr0520.20o		
Start date	2/21/2020 12:00:00 AM		
End date	2/21/2020 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		

## GNSS QC

### GNSS QC Statistics

Statistics	Min	Max	Mean
Baseline length (km)	3.70	67.34	
Number of GPS SV	6	11	10
Number of GLONASS SV	0	7	5
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	9	18	14
PDOP	1.09	1.99	1.39
QC Solution Gaps	1.00	1.00	
Solution Type	Fixed	Float	No solution
Epoch (sec)	15414.00	0.00	1.00
Percentage	99.99	0.00	0.01



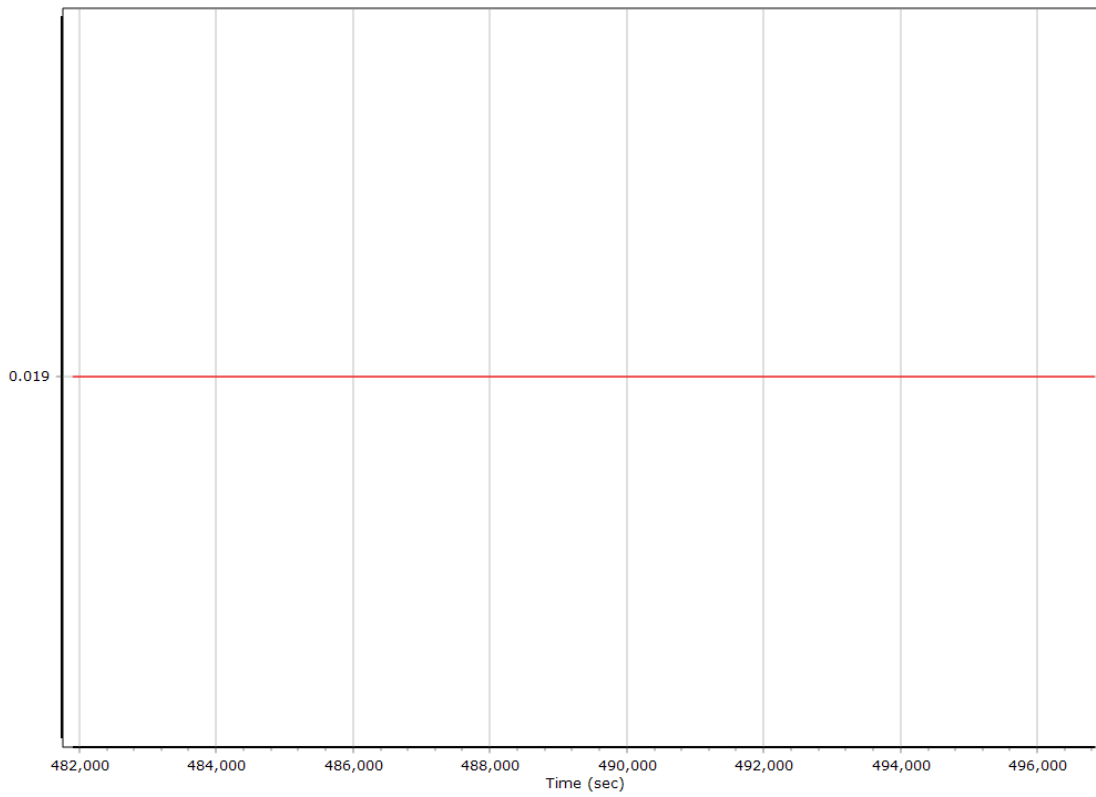
## GNSS-Inertial Processor Configuration

Processing mode	IN-Fusion SmartBase		
Stabilized mount	True		
Base station	ASB		
Processing start time	481396.000 (2/21/2020 1:43:16 PM)		
Processing end time	496846.000 (2/21/2020 6:00:46 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)	0.019	0.153	-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

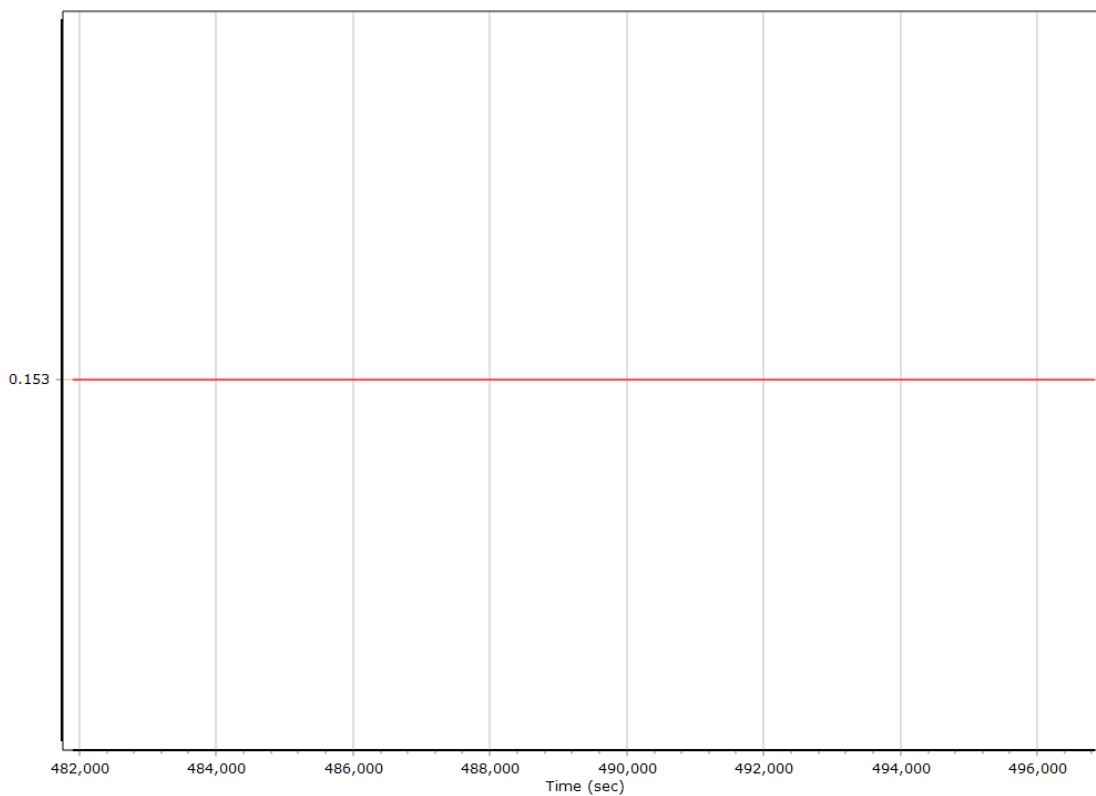
## Calibrated Installation Parameters

### Reference-Primary GNSS Lever Arm (m)

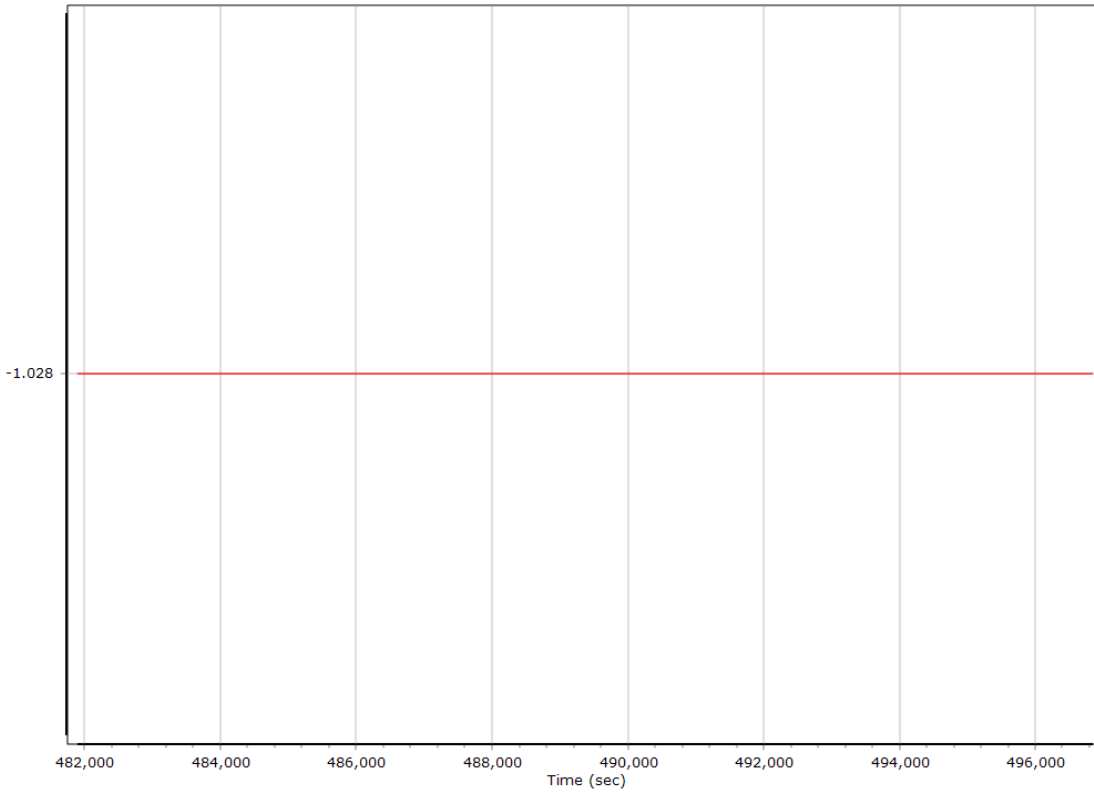
#### X Reference-Primary GNSS Lever Arm (m)



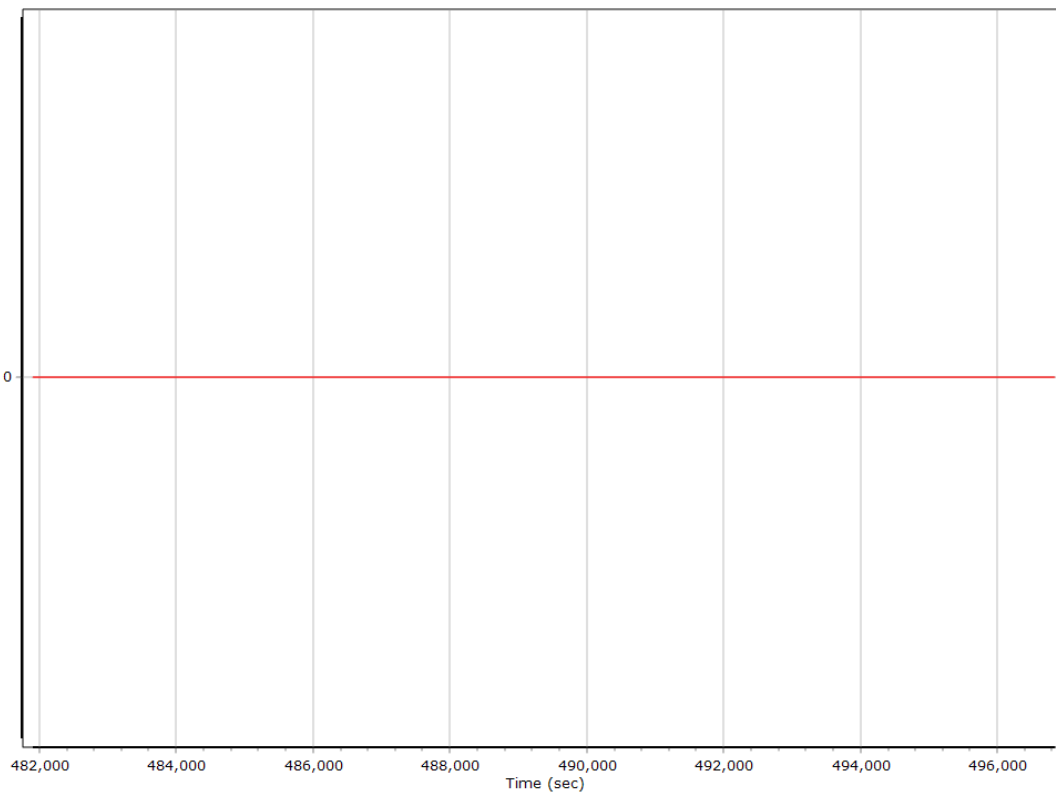
#### Y Reference-Primary GNSS Lever Arm (m)



### Z Reference-Primary GNSS Lever Arm (m)



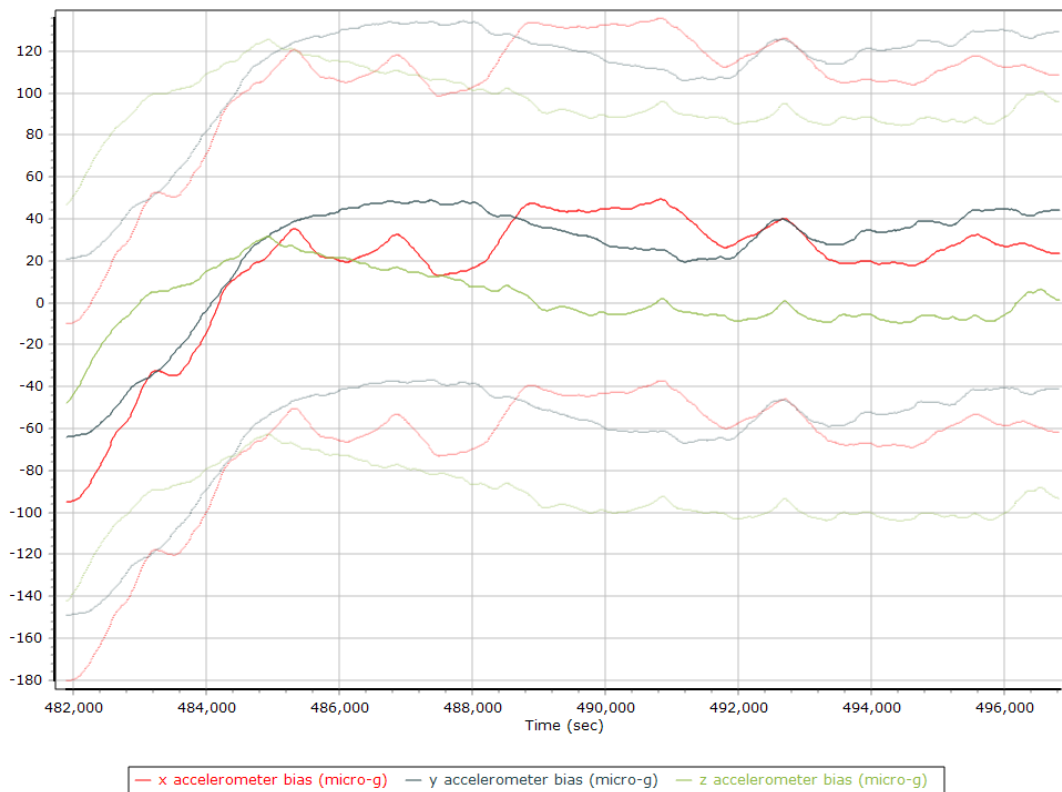
### Reference-Primary GNSS Lever Arm Figure of Merit



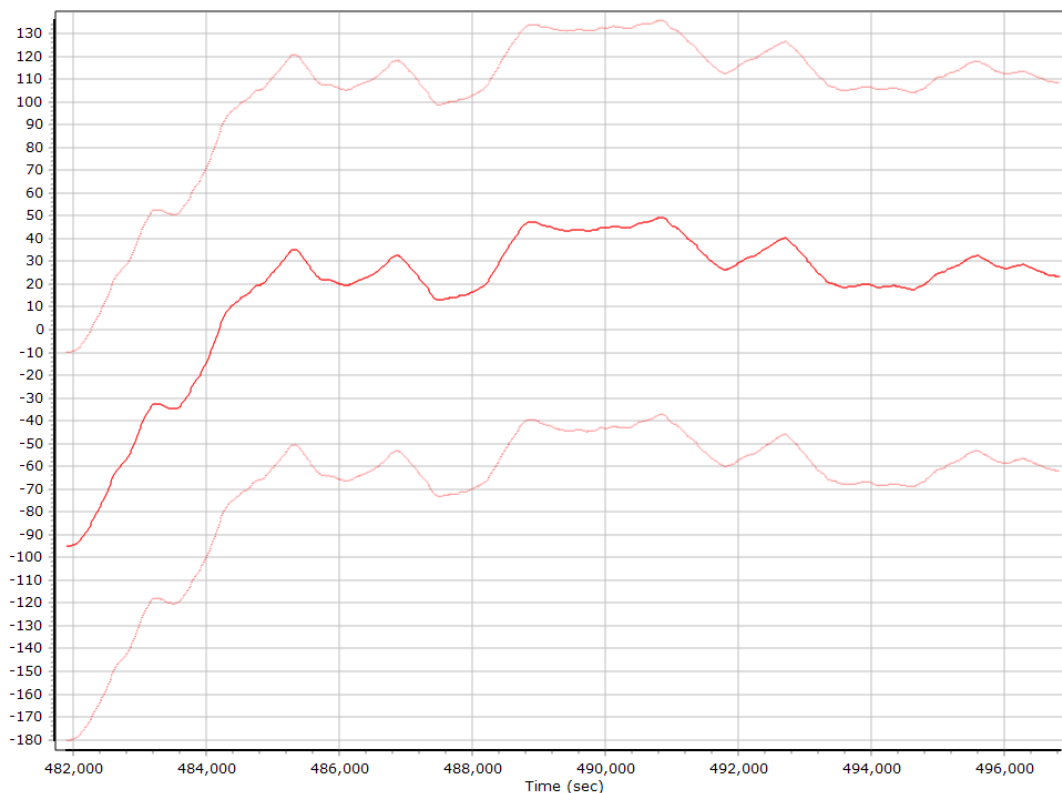
## Smoothed IN-Fusion QC

### Smoothed Estimated Errors, Reference Frame

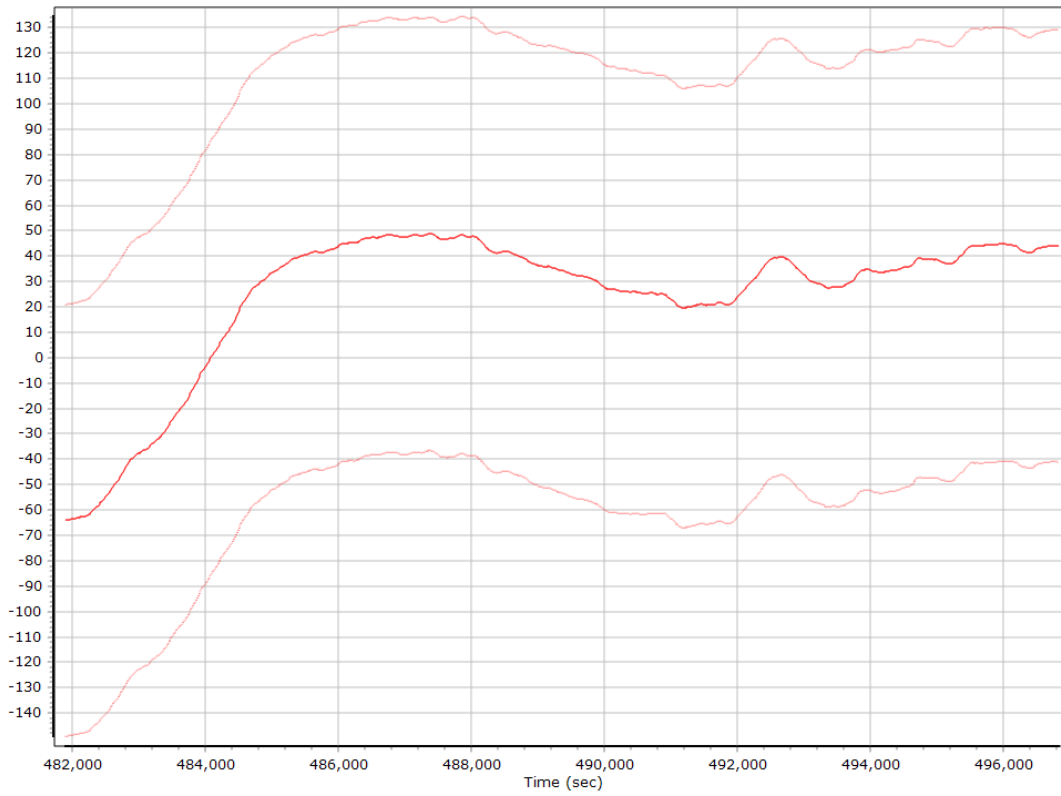
#### Accelerometer Bias (micro-g)



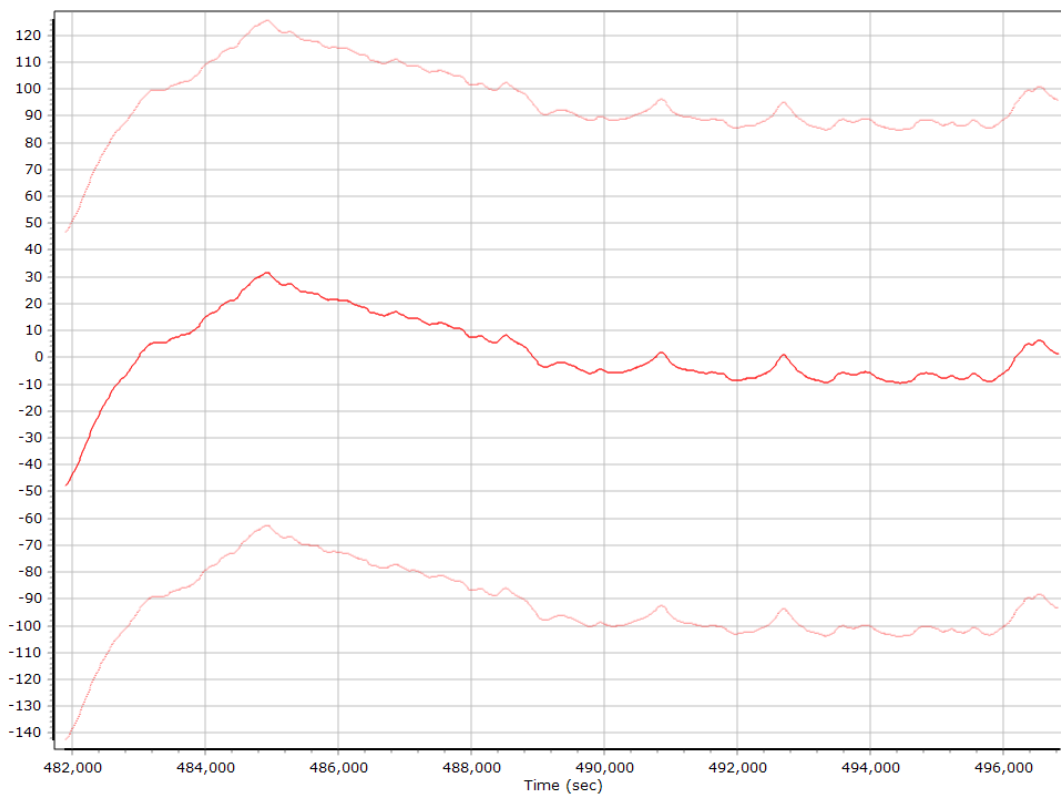
#### X Accelerometer Bias (micro-g)



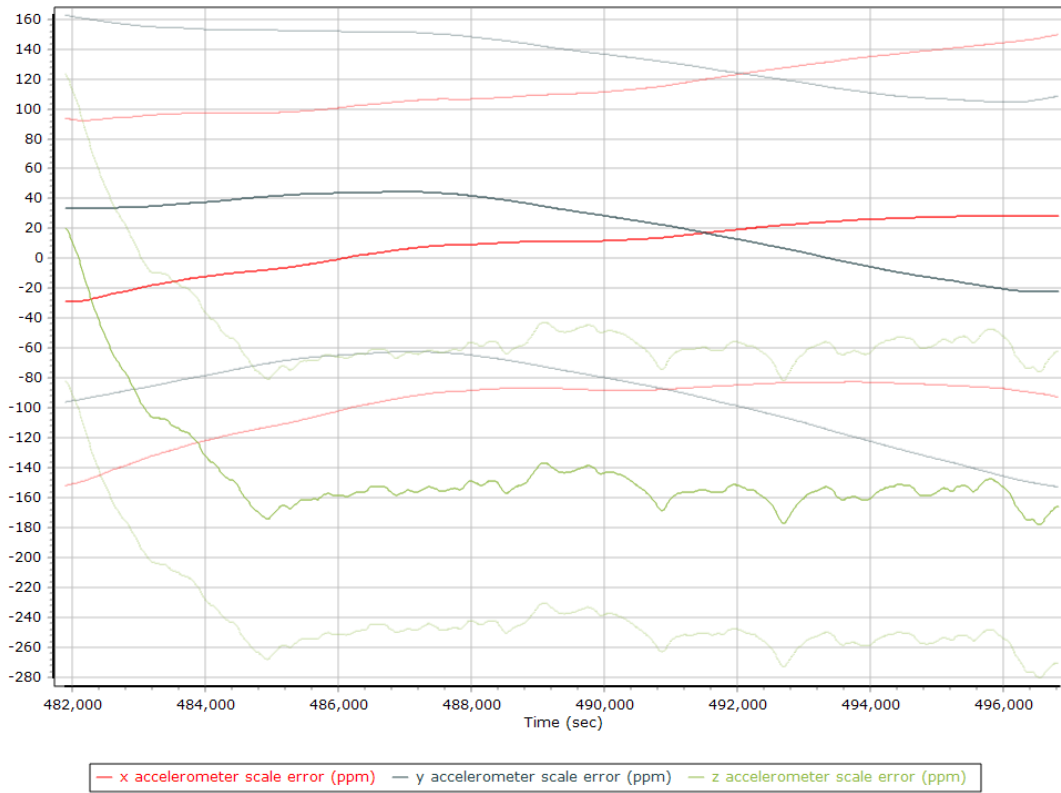
### Y Accelerometer Bias (micro-g)



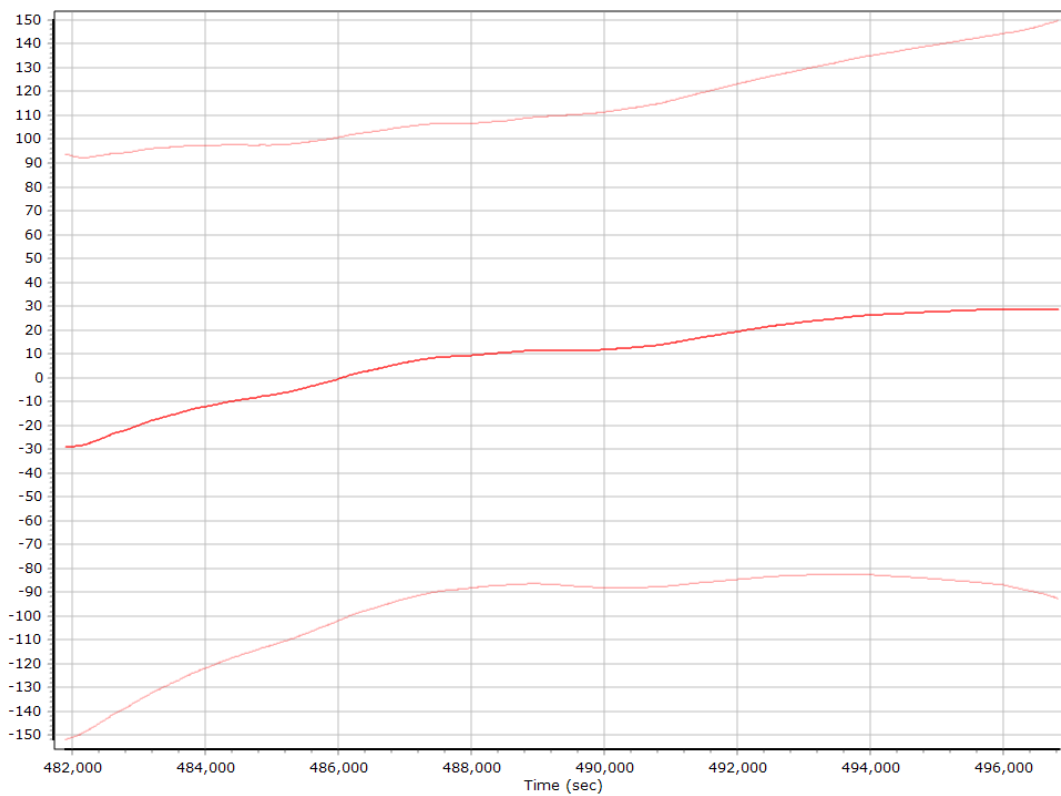
### Z Accelerometer Bias (micro-g)



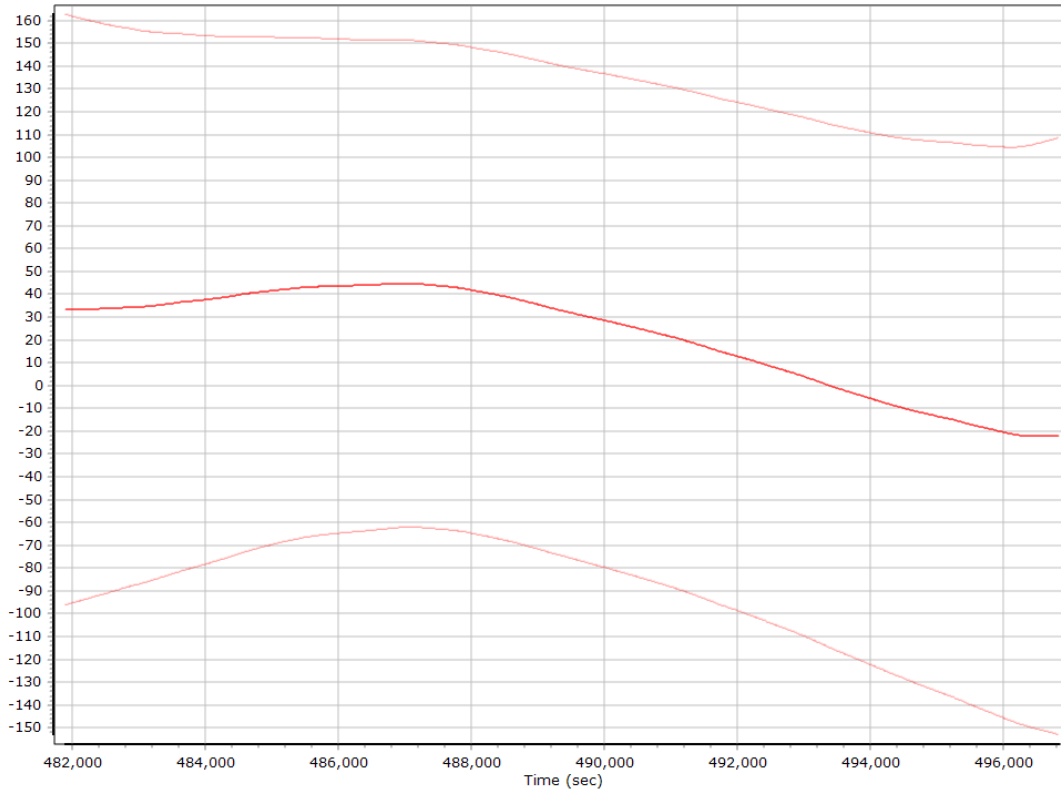
### Accelerometer Scale Error (ppm)



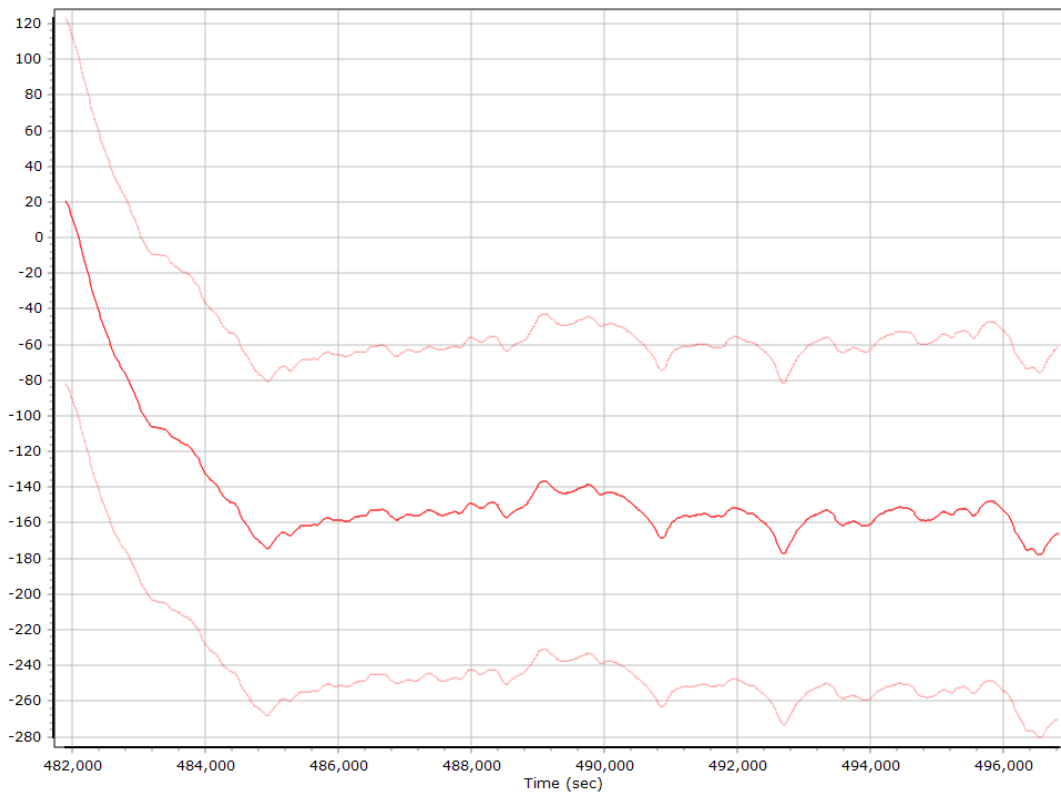
### X Accelerometer Scale Error (ppm)



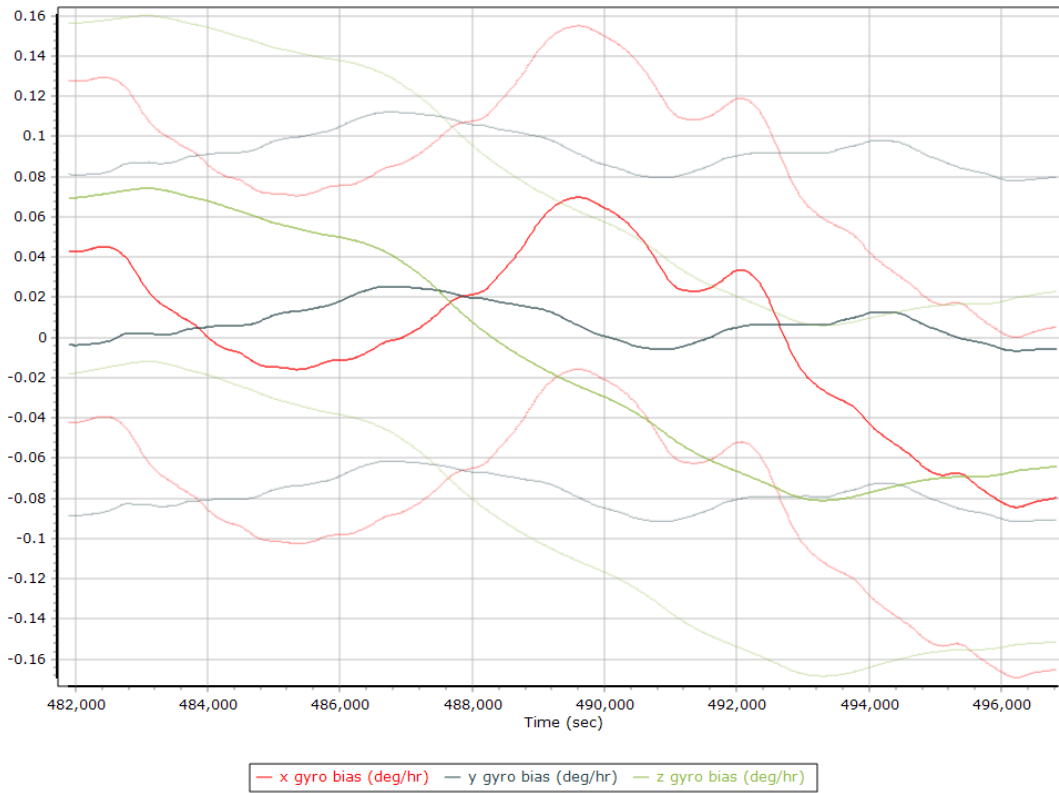
### Y Accelerometer Scale Error (ppm)



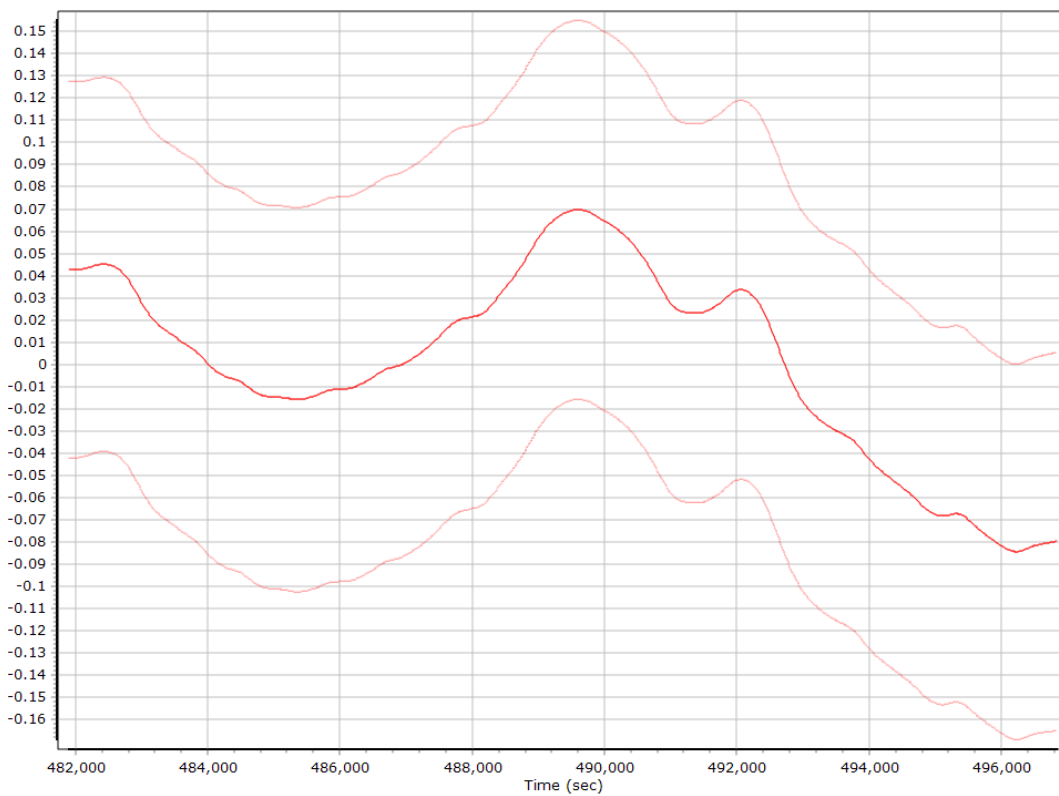
### Z Accelerometer Scale Error (ppm)



### Gyro Bias (deg/h)

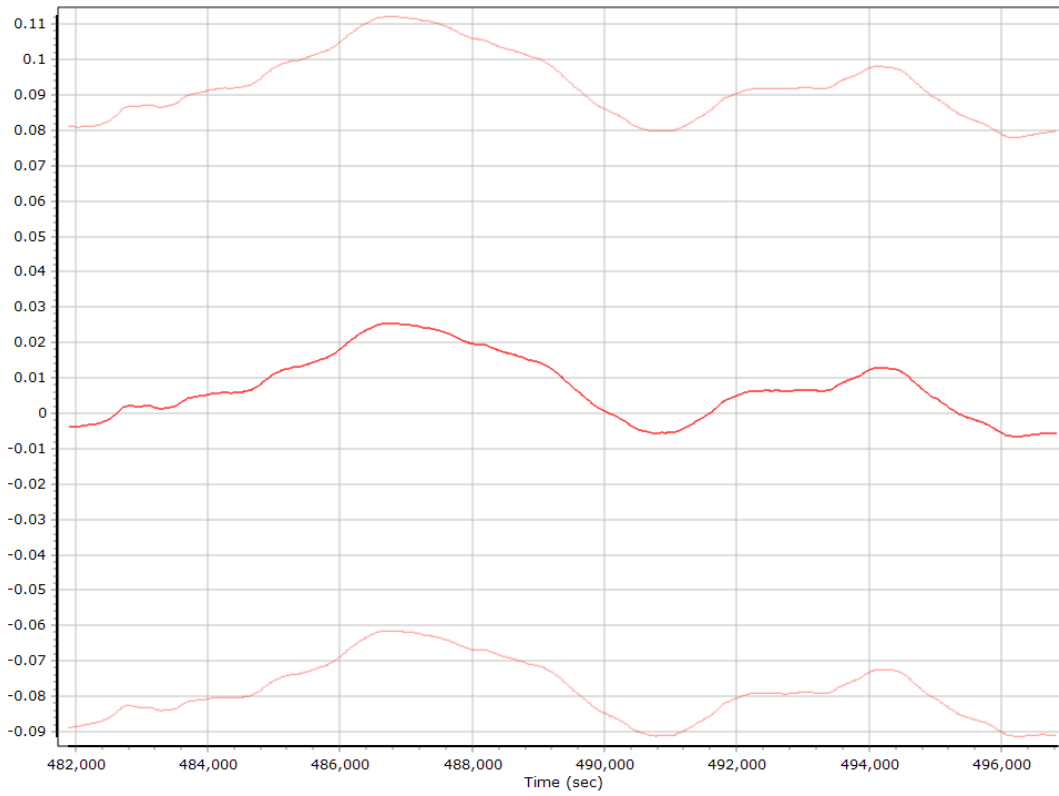


### X Gyro Bias (deg/h)

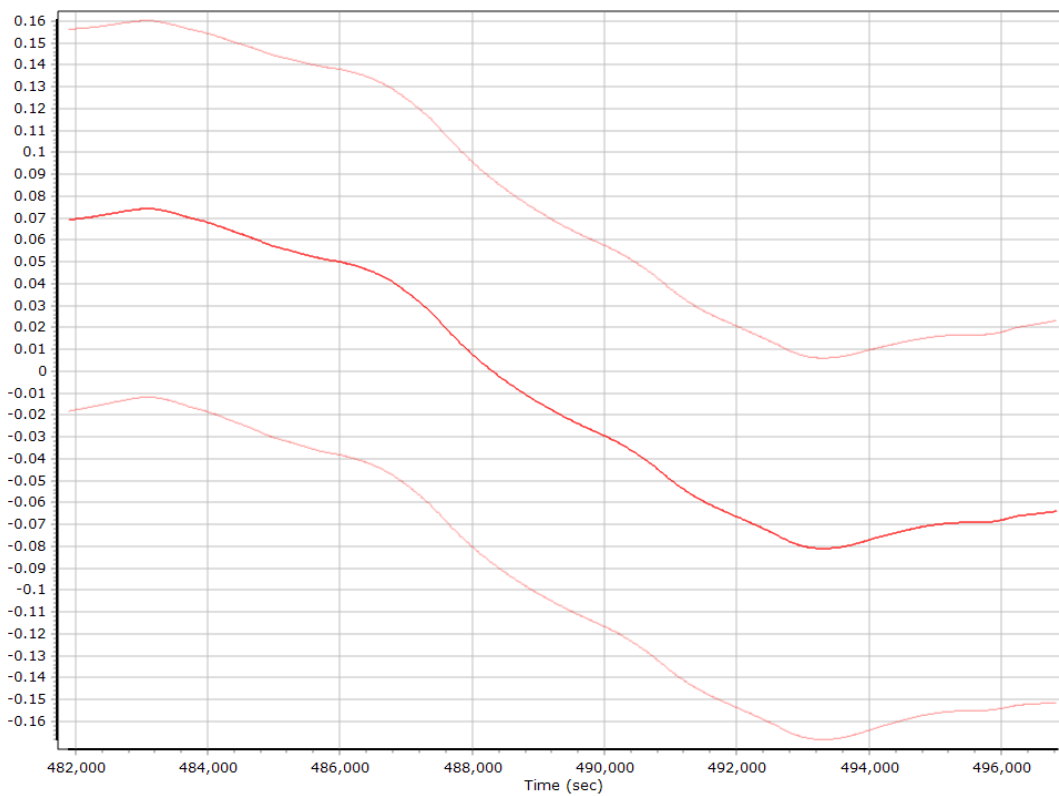




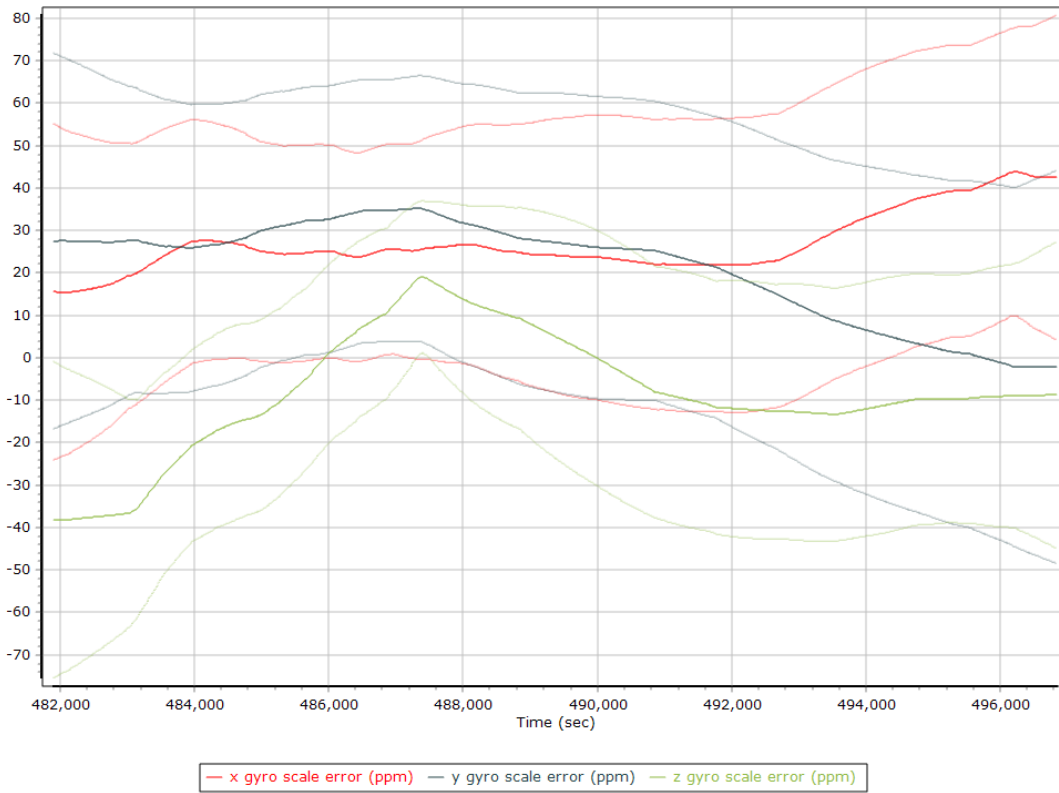
### Y Gyro Bias (deg/h)



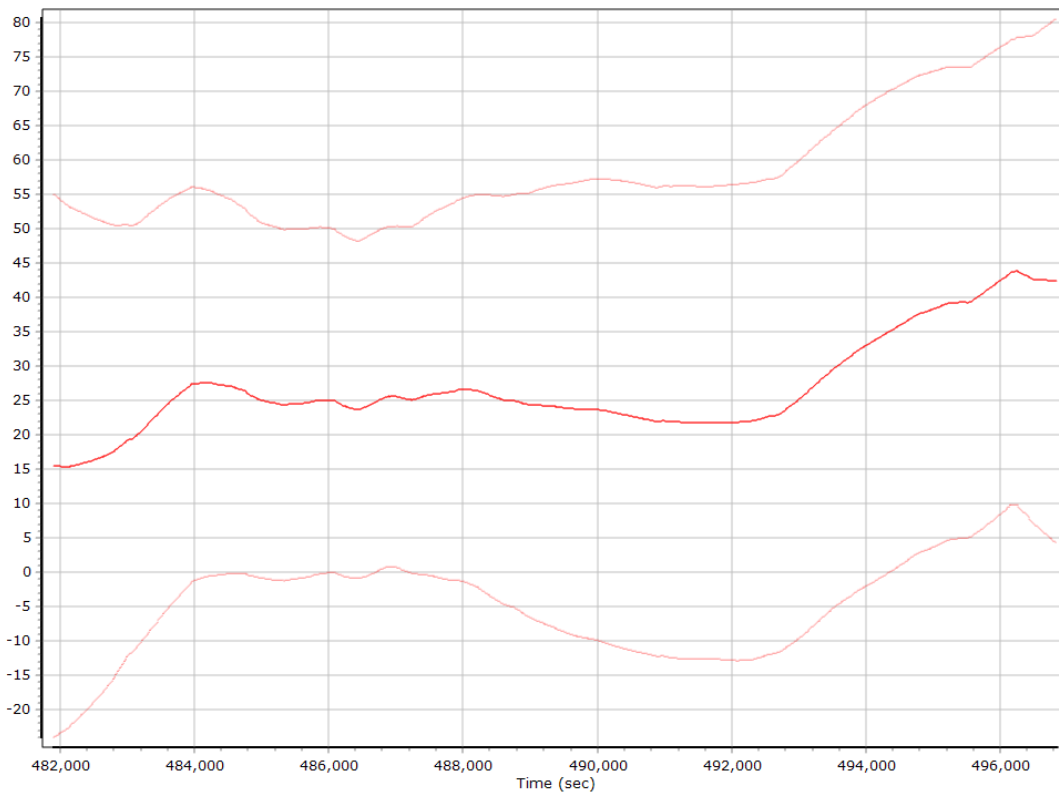
### Z Gyro Bias (deg/h)



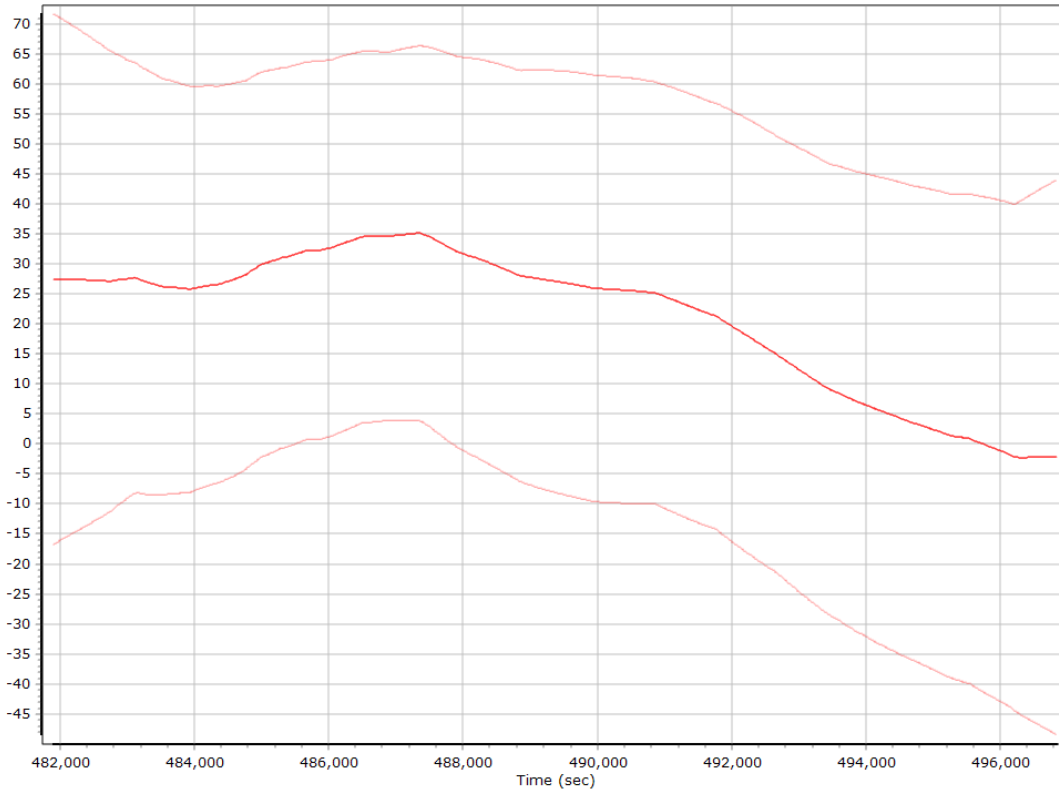
### Gyro Scale Error (ppm)



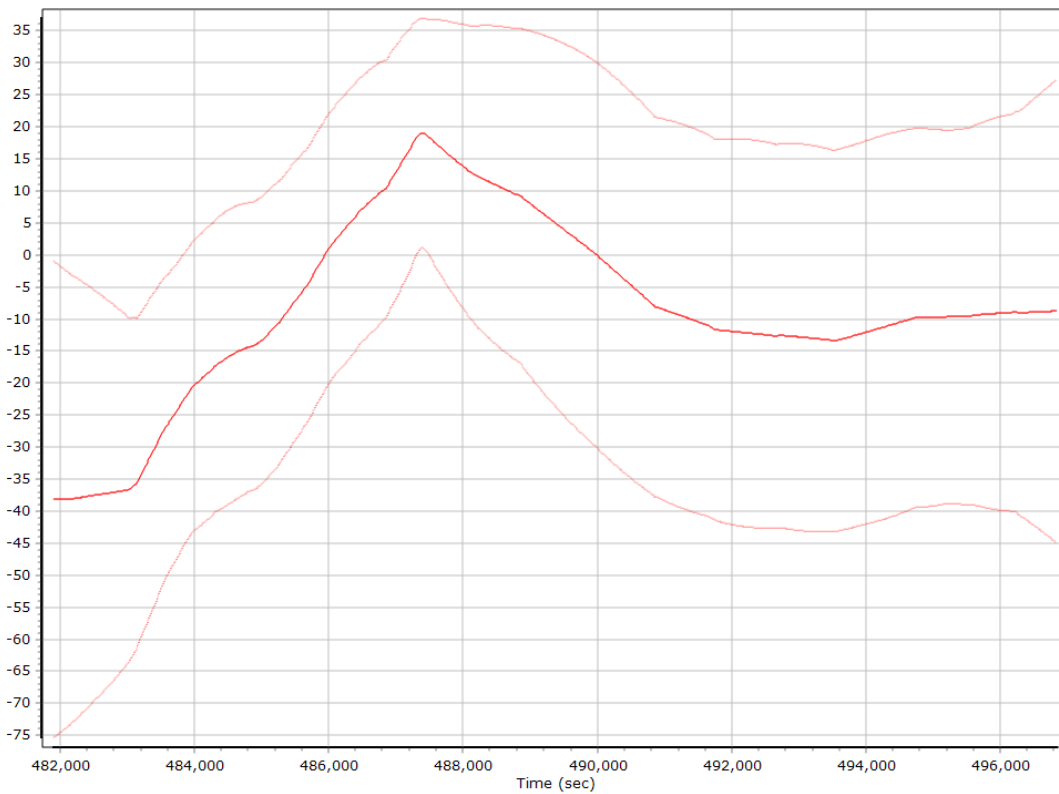
### X Gyro Scale Error (ppm)



### Y Gyro Scale Error (ppm)

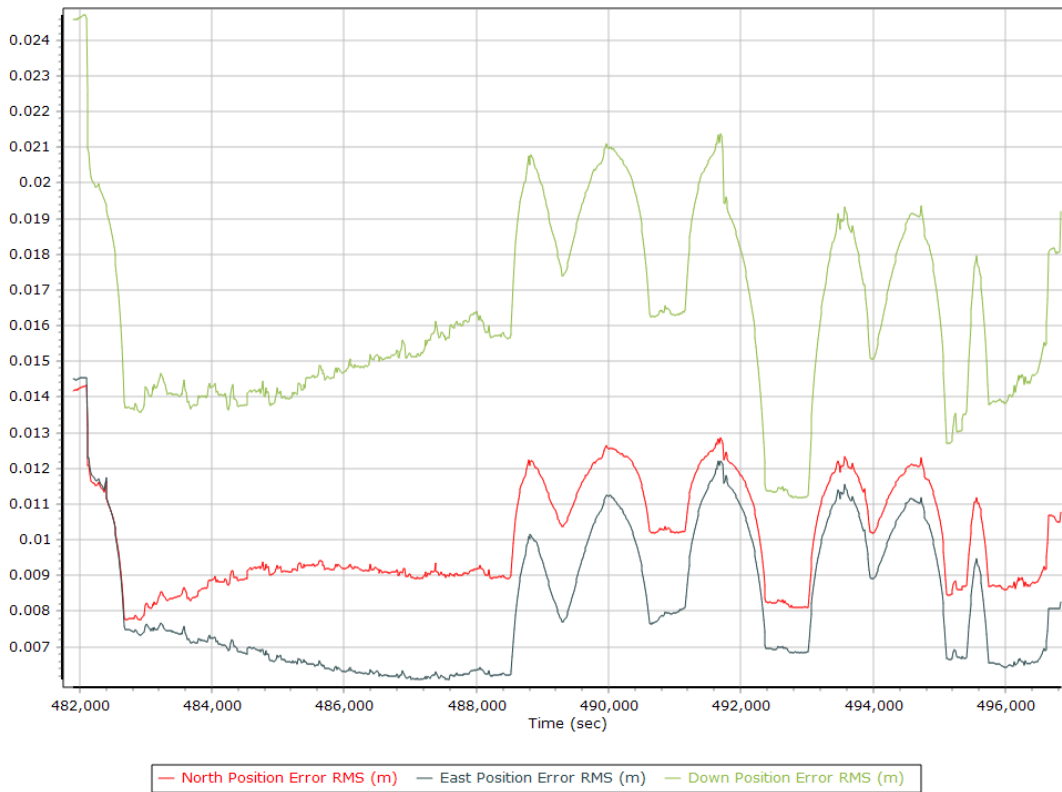


### Z Gyro Scale Error (ppm)

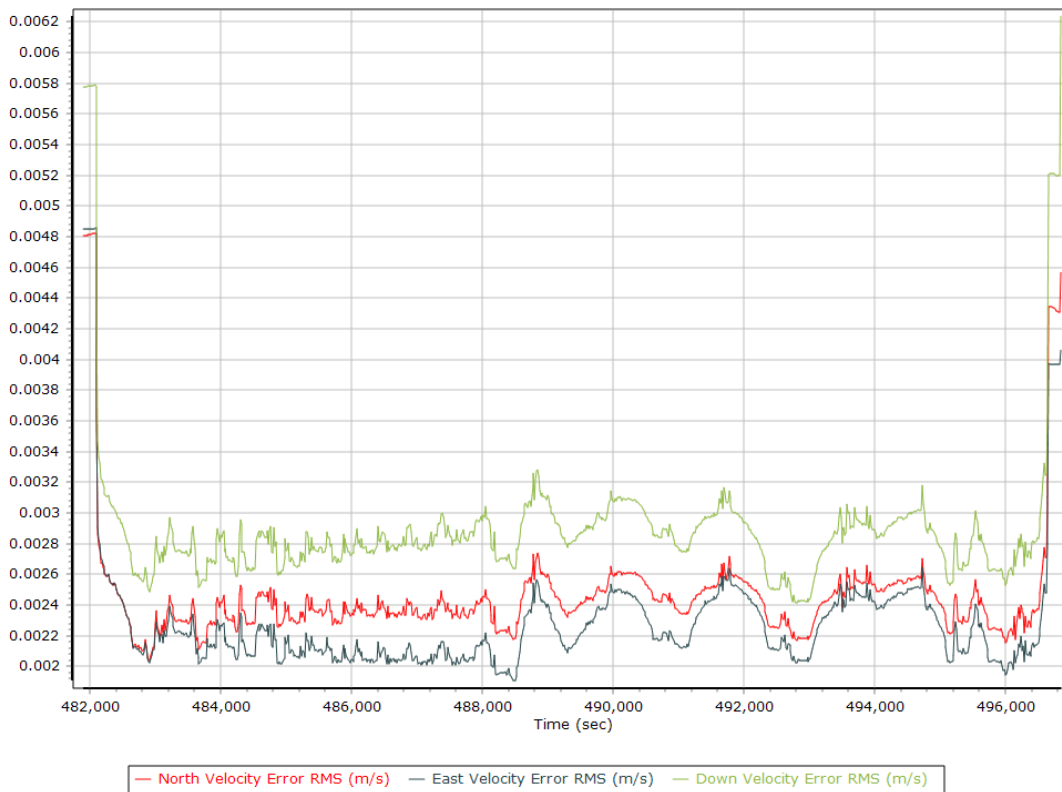


## Smoothed Performance Metrics

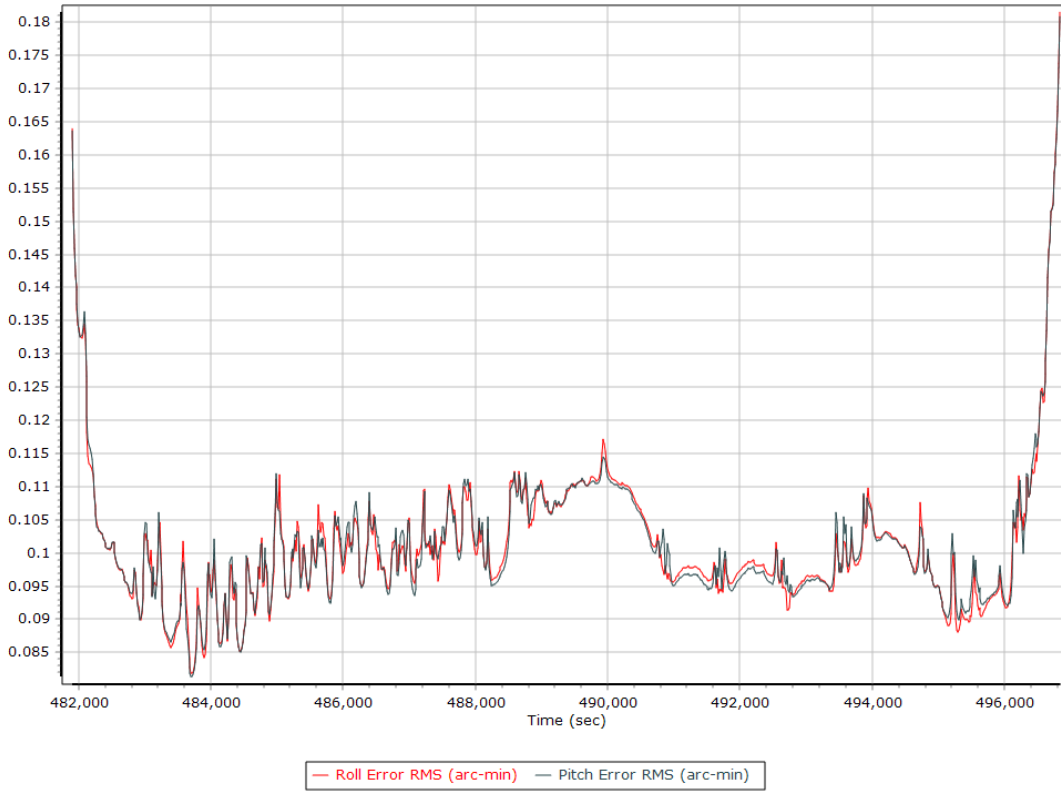
### Position Error RMS (m)



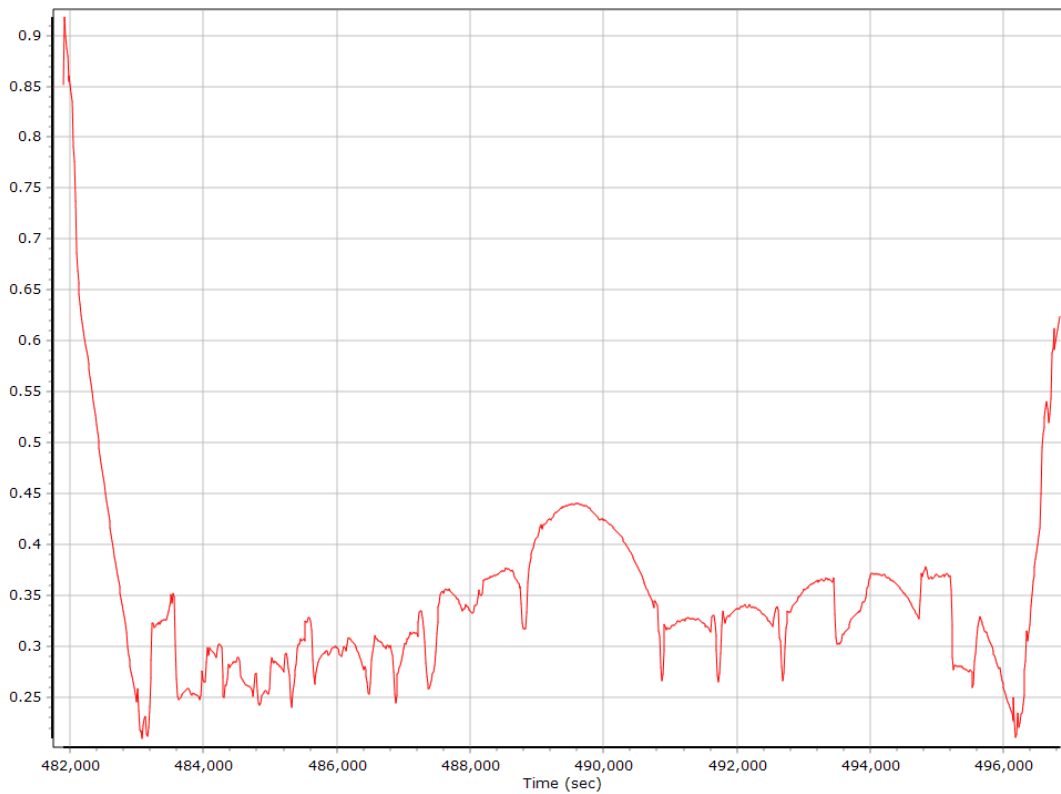
### Velocity Error RMS (m/s)



### Roll/Pitch Error RMS (arc-min)

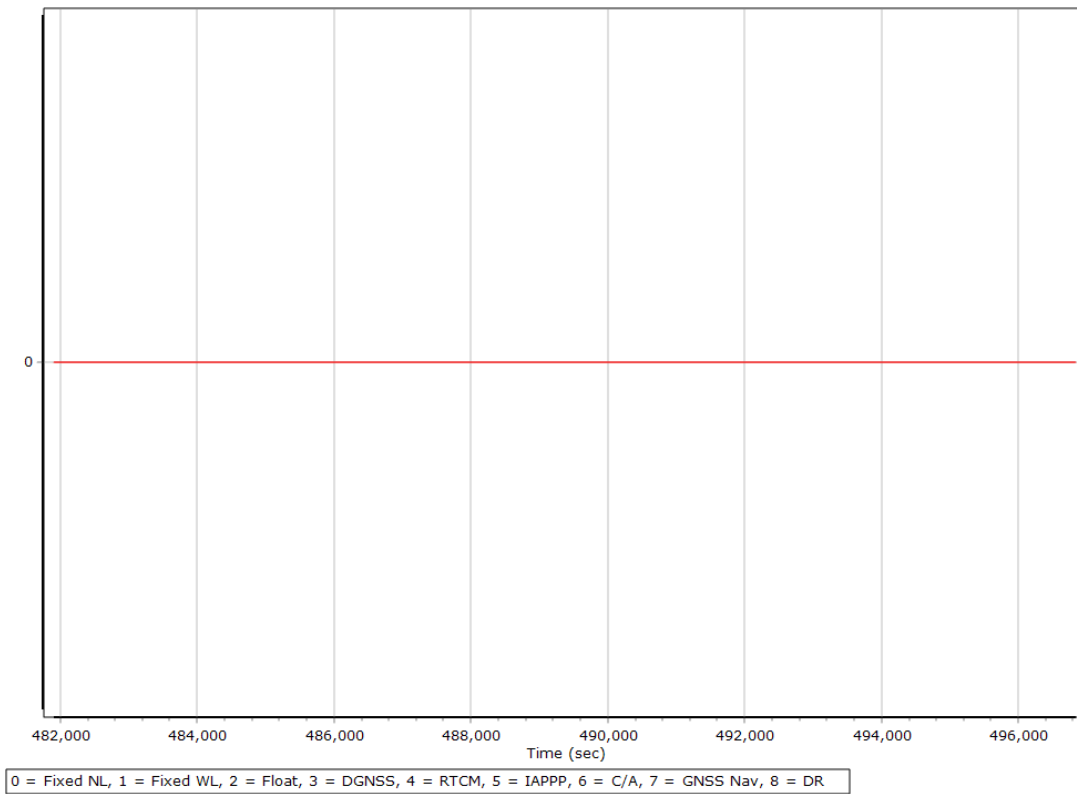


### Heading Error RMS (arc-min)

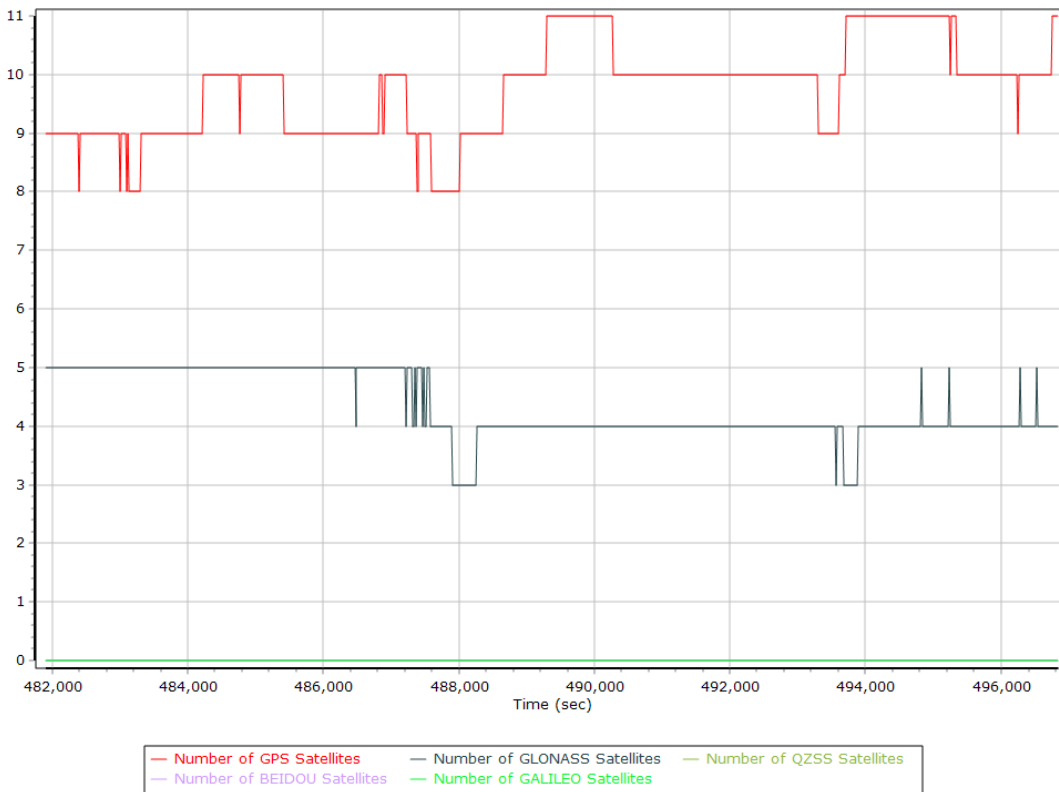


## Smoothed Solution Status

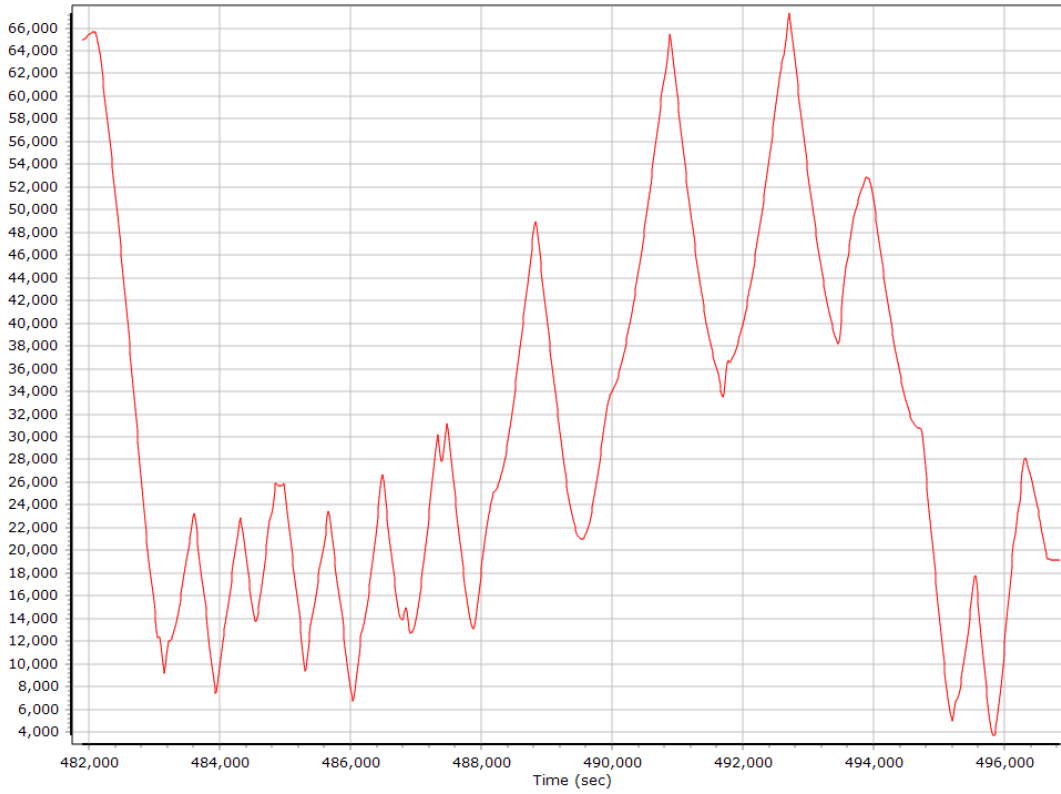
### Processing Mode



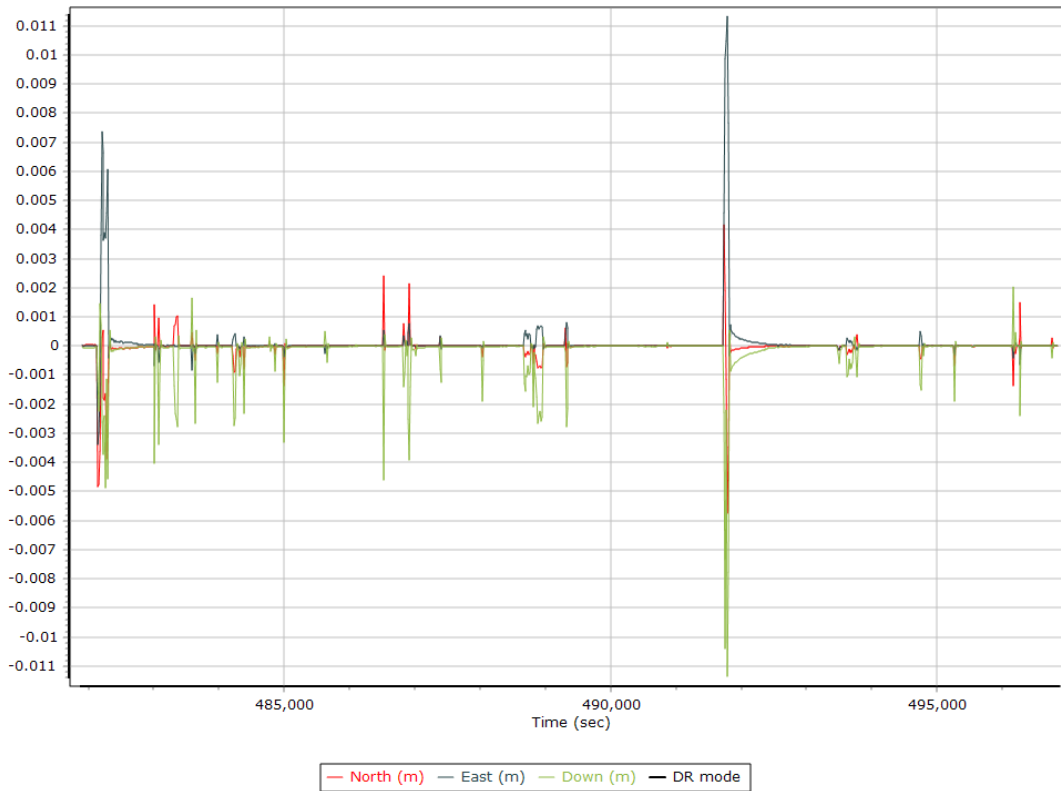
### Number of Satellites



### Baseline Length



### SBET IAkar Separation



## Export Summary

Export file	export_XSS20052A_177.kml		
Export format	Google KML		
Solution in use	Post-processed		
Output rate	Specified Distance Interval		
Distance Interval (m)	10.000		
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	481395.799 (2/21/2020 1:43:15 PM)		
Export end time	496845.557 (2/21/2020 6:00:45 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	2020.139344		