

## General Information

### Mission Information

Project name	XSS20054A_177
Processing date	2020-02-25 14:05:33
Mission date	2020-02-23 13:29:26
Mission duration	04:19:48.000
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	Unknown External

## Project File List

### Rover Data Files

File name	File type
XSS20054.002	POS Data
XSS20054.003	POS Data
XSS20054.004	POS Data
XSS20054.005	POS Data
XSS20054.006	POS Data
XSS20054.007	POS Data
XSS20054.008	POS Data
XSS20054.009	POS Data
XSS20054.010	POS Data
XSS20054.011	POS Data
XSS20054.012	POS Data
XSS20054.013	POS Data
XSS20054.014	POS Data
XSS20054.015	POS Data
XSS20054.016	POS Data
XSS20054.017	POS Data
XSS20054.018	POS Data
XSS20054.019	POS Data
XSS20054.020	POS Data
XSS20054.021	POS Data
XSS20054.022	POS Data
XSS20054.023	POS Data
XSS20054.024	POS Data
XSS20054.025	POS Data
XSS20054.026	POS Data
XSS20054.027	POS Data
XSS20054.028	POS Data
XSS20054.029	POS Data
XSS20054.030	POS Data
XSS20054.031	POS Data
XSS20054.032	POS Data
XSS20054.033	POS Data
XSS20054.034	POS Data
XSS20054.035	POS Data
XSS20054.036	POS Data
XSS20054.037	POS Data
XSS20054.038	POS Data
XSS20054.039	POS Data
XSS20054.040	POS Data
XSS20054.041	POS Data
XSS20054.042	POS Data
XSS20054.043	POS Data
XSS20054.044	POS Data
XSS20054.045	POS Data
XSS20054.046	POS Data
XSS20054.047	POS Data
XSS20054.048	POS Data
XSS20054.049	POS Data

### Input Files

File Name	File Type
brdc0540.20n	GPS Broadcast Ephemeris
Ephm0540.20g	GLONASS Broadcast Ephemeris
ls080540.20o	GNSS SingleBase
wvbr0540.20o	GNSS SingleBase
wvcv0540.20o	GNSS SingleBase
wvmz0540.20o	GNSS SingleBase
wvnr0540.20o	GNSS SingleBase
wvta0540.20o	GNSS SingleBase

File Name	File Type
Ephm0530.20g	GLONASS Broadcast Ephemeris
Ephm0530.20n	GPS Broadcast Ephemeris
Ephm0550.20g	GLONASS Broadcast Ephemeris
Ephm0550.20n	GPS Broadcast Ephemeris
igu20935_18.sp3	GPS Precise Ephemeris
igu20936_18.sp3	GPS Precise Ephemeris
igu20940_18.sp3	GPS Precise Ephemeris
igu20941_18.sp3	GPS Precise Ephemeris

## Output Files

Filename	File type
sbet_XSS20054A_177.out	SBET Trajectory File
export_XSS20054A_177.kml	Google KML Export Output

## Rover Data Summary

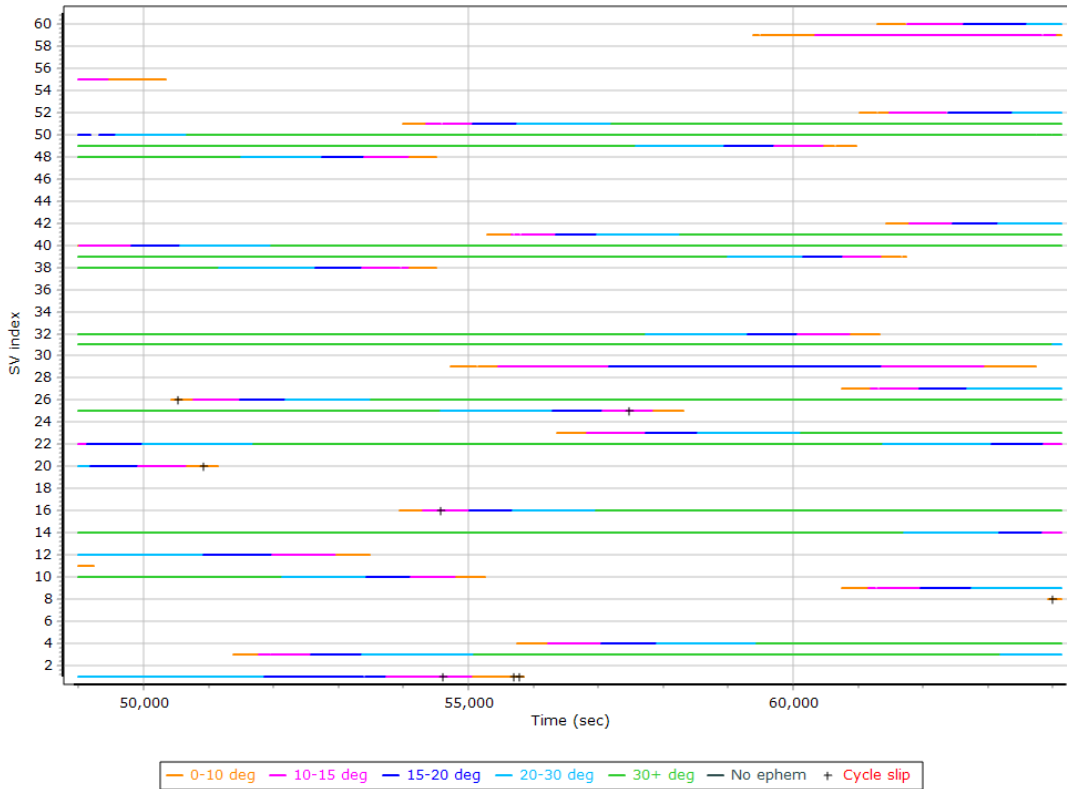
First raw data file	XSS20054.002		
Last raw data file	XSS20054.049		
Start GPS week	2094		
Start time	48547.334 (2/23/2020 1:29:07 PM)		
End time	64136.143 (2/23/2020 5:48:56 PM)		
Start of fine alignment	48925.241 (2/23/2020 1:35:25 PM)		
Available subsystems	Primary GNSS, Gimbal, IMU		
POS Event Input	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

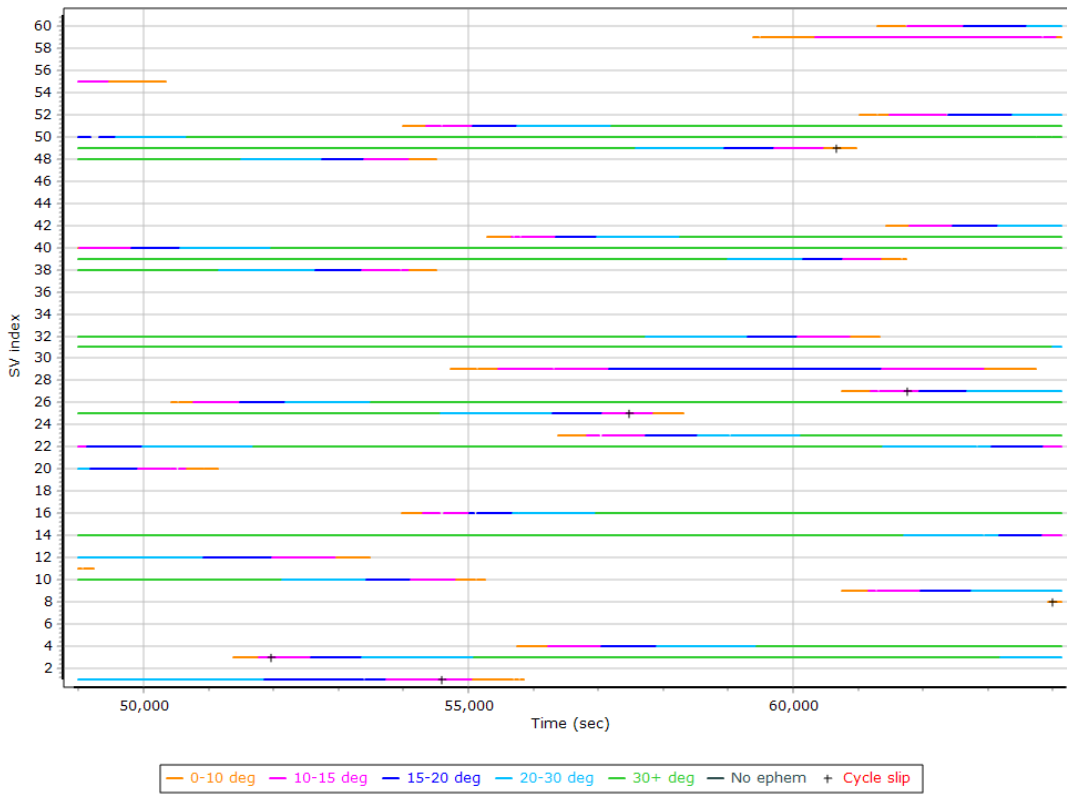
## Raw IMU Import QC Summary

IMU data input file	imu_XSS20054A_177.dat
IMU data check log file	imudt_XSS20054A_177.log
IMU Records Processed	3117035
Termination Status	Normal
IMU Anomalies	0

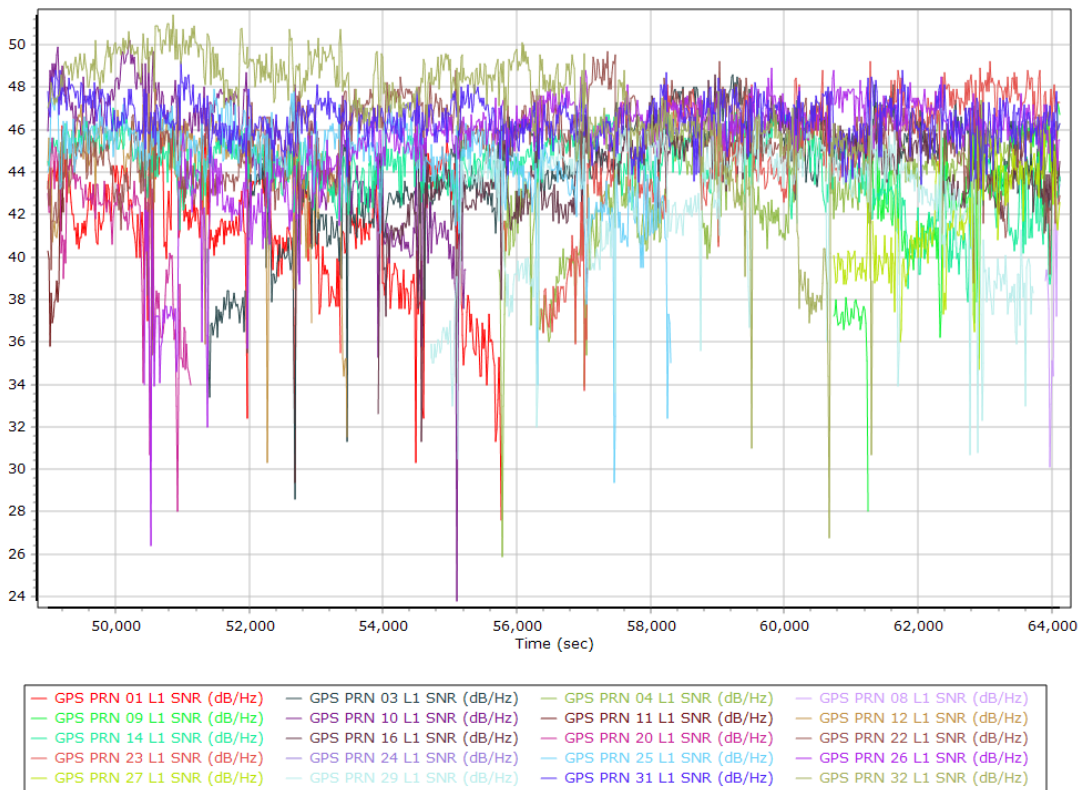
### L1 Satellite Lock/Elevation



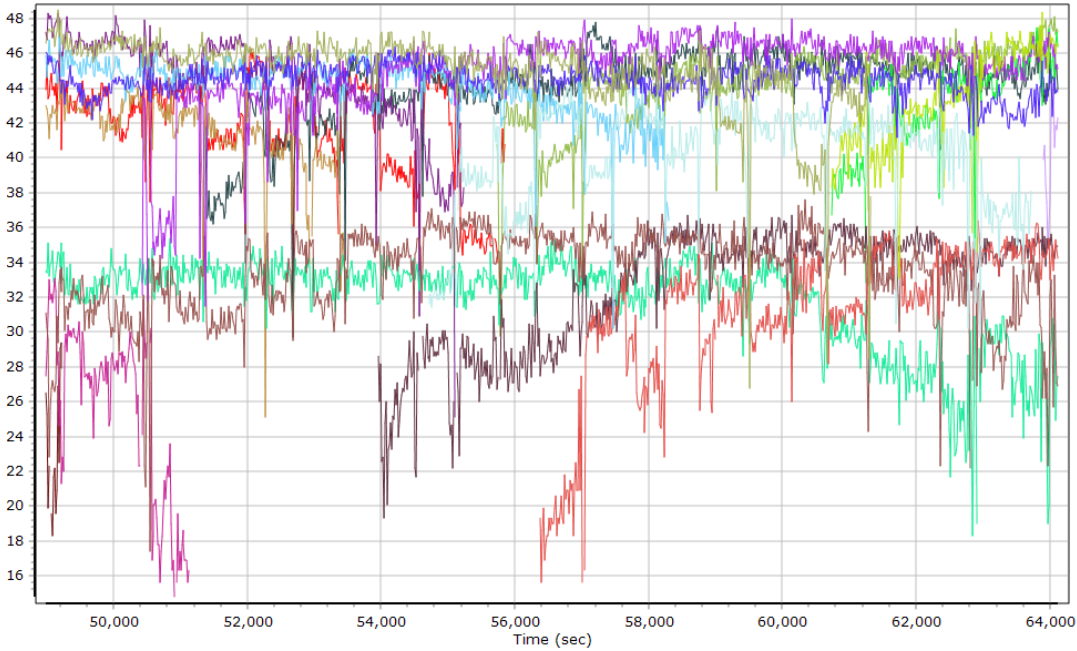
## L2 Satellite Lock/Elevation



## GPS L1 SNR

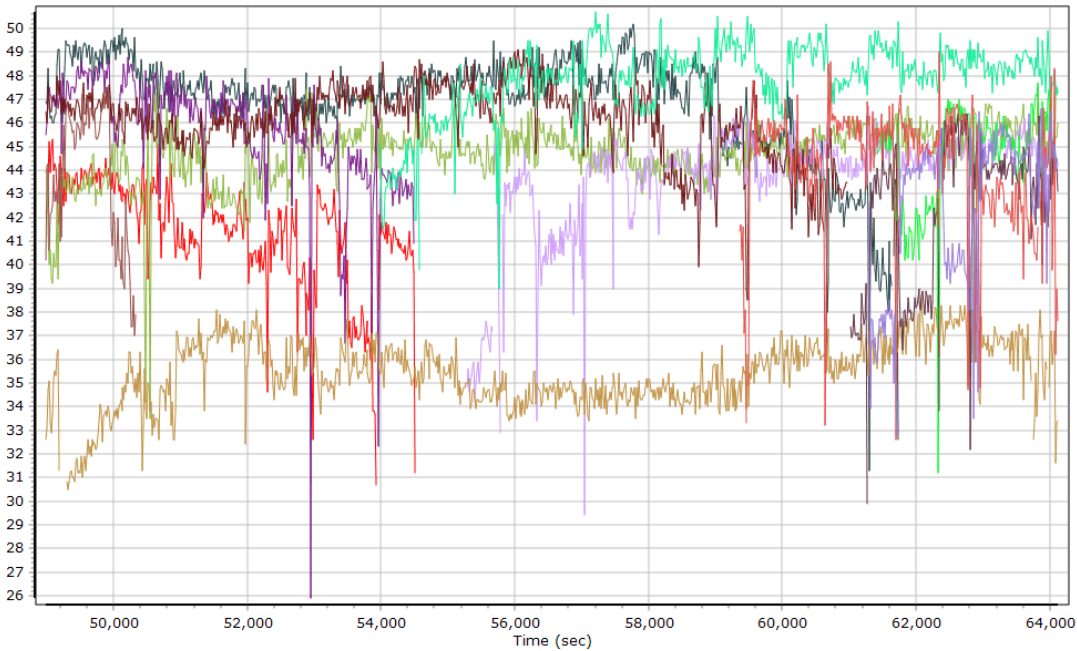


## GPS L2 SNR



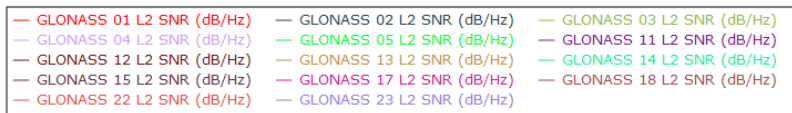
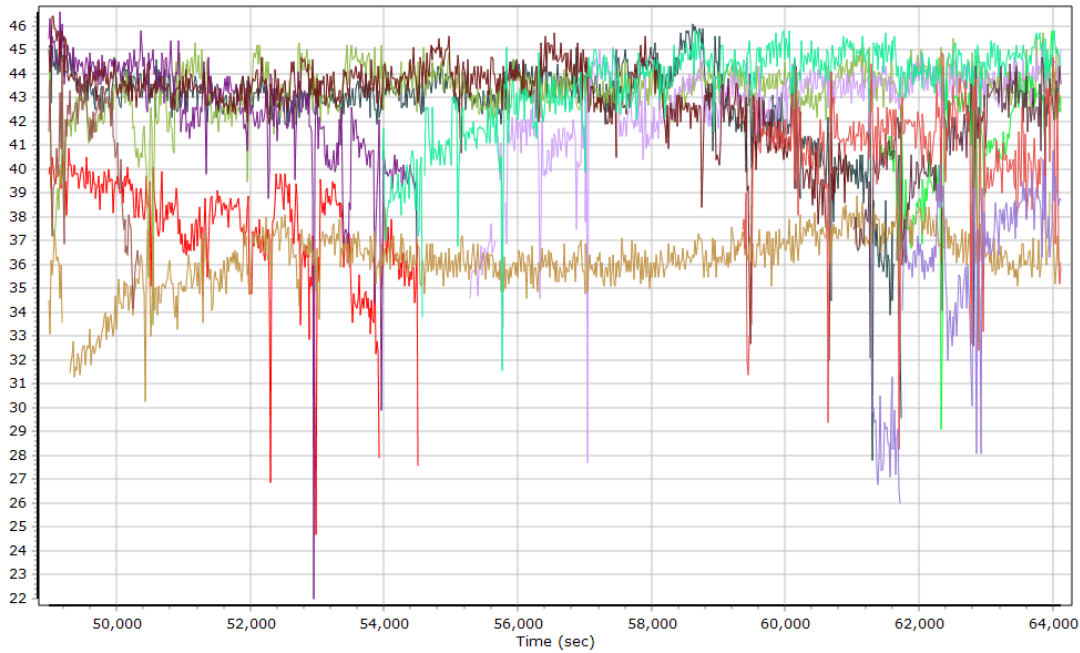
- |                           |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|---------------------------|
| GPS PRN 01 L2 SNR (dB/Hz) | GPS PRN 03 L2 SNR (dB/Hz) | GPS PRN 04 L2 SNR (dB/Hz) | GPS PRN 08 L2 SNR (dB/Hz) |
| GPS PRN 09 L2 SNR (dB/Hz) | GPS PRN 10 L2 SNR (dB/Hz) | GPS PRN 11 L2 SNR (dB/Hz) | GPS PRN 12 L2 SNR (dB/Hz) |
| GPS PRN 14 L2 SNR (dB/Hz) | GPS PRN 16 L2 SNR (dB/Hz) | GPS PRN 20 L2 SNR (dB/Hz) | GPS PRN 22 L2 SNR (dB/Hz) |
| GPS PRN 23 L2 SNR (dB/Hz) | GPS PRN 24 L2 SNR (dB/Hz) | GPS PRN 25 L2 SNR (dB/Hz) | GPS PRN 26 L2 SNR (dB/Hz) |
| GPS PRN 27 L2 SNR (dB/Hz) | GPS PRN 29 L2 SNR (dB/Hz) | GPS PRN 31 L2 SNR (dB/Hz) | GPS PRN 32 L2 SNR (dB/Hz) |

## GLONASS L1 SNR

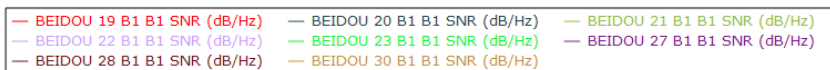
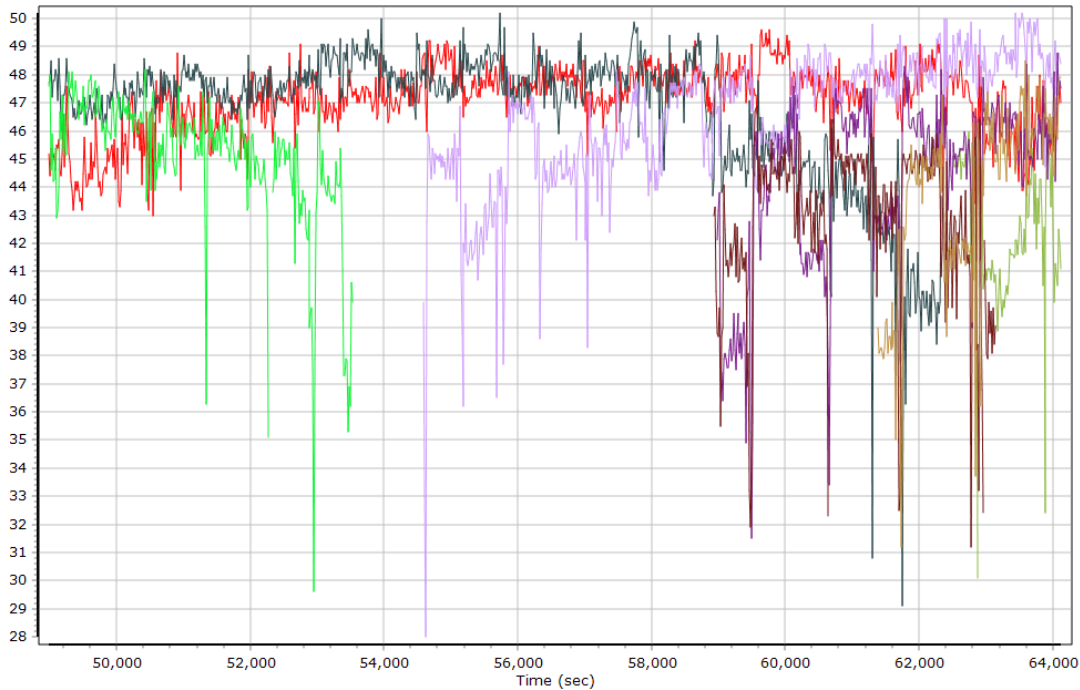


- |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|
| GLONASS 01 L1 SNR (dB/Hz) | GLONASS 02 L1 SNR (dB/Hz) | GLONASS 03 L1 SNR (dB/Hz) |
| GLONASS 04 L1 SNR (dB/Hz) | GLONASS 05 L1 SNR (dB/Hz) | GLONASS 11 L1 SNR (dB/Hz) |
| GLONASS 12 L1 SNR (dB/Hz) | GLONASS 13 L1 SNR (dB/Hz) | GLONASS 14 L1 SNR (dB/Hz) |
| GLONASS 15 L1 SNR (dB/Hz) | GLONASS 17 L1 SNR (dB/Hz) | GLONASS 18 L1 SNR (dB/Hz) |
| GLONASS 22 L1 SNR (dB/Hz) | GLONASS 23 L1 SNR (dB/Hz) |                           |

## GLONASS L2 SNR

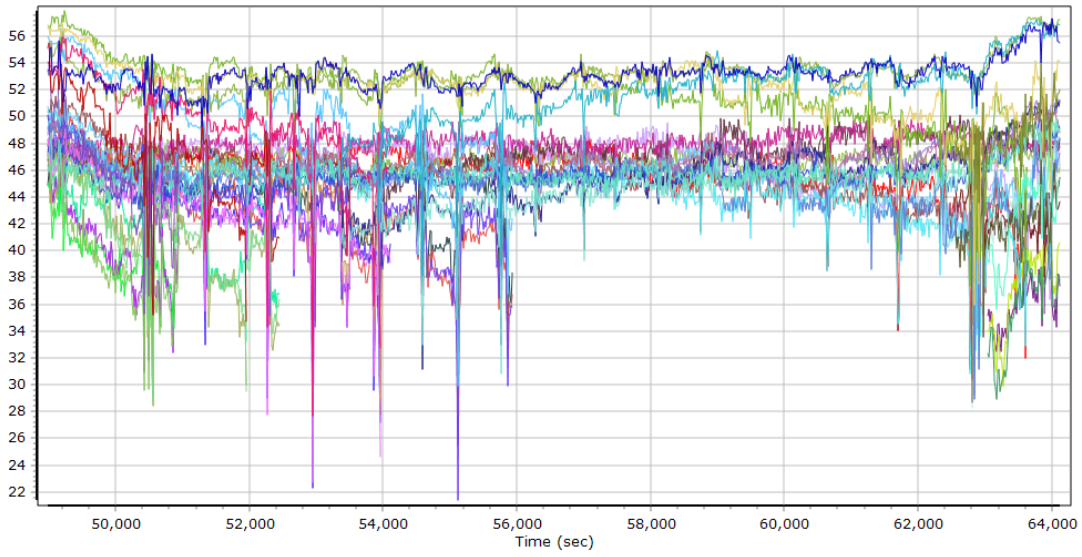


## BEIDOU SNR





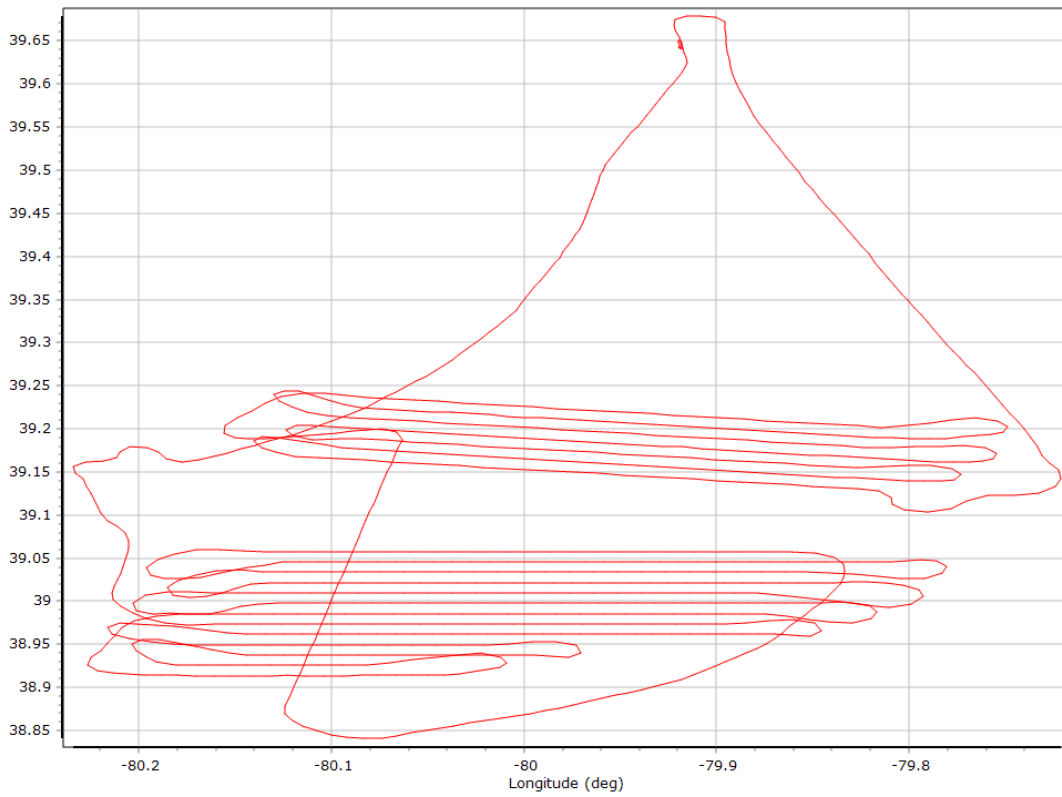
## GALILEO SNR



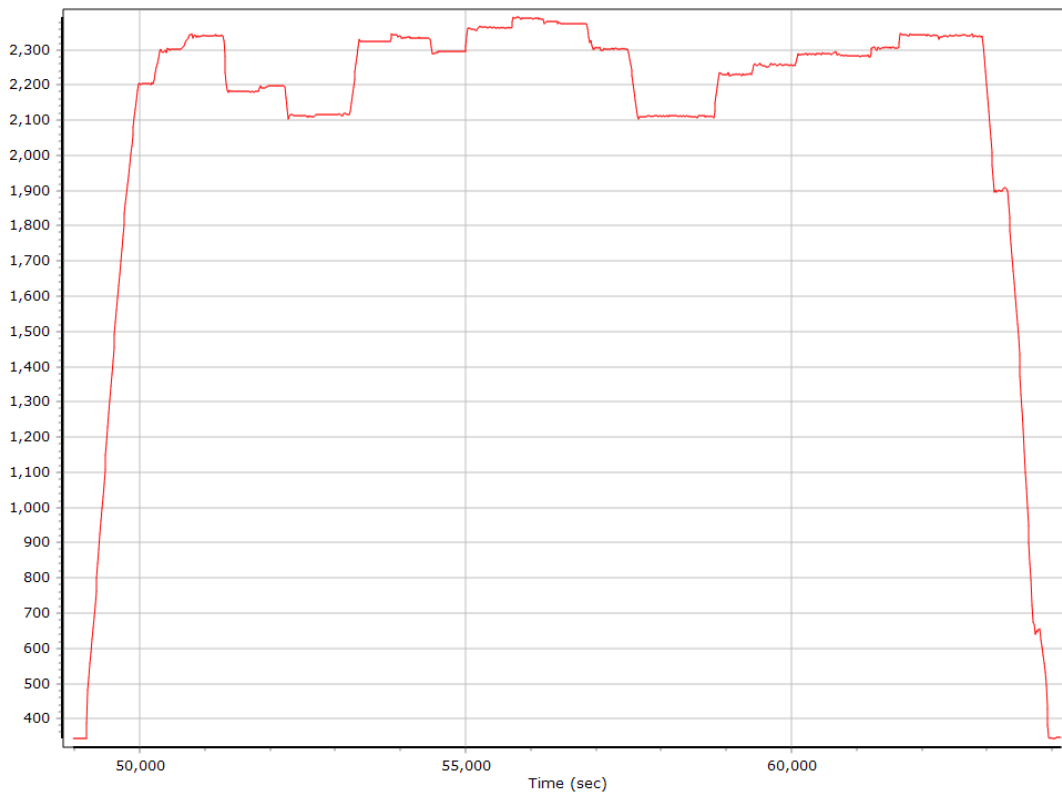
— GALILEO 02 L1 BOC_1_1_D_MBOC SNR (dB/Hz)	— GALILEO 03 L1 BOC_1_1_D_MBOC SNR (dB/Hz)
— GALILEO 07 L1 BOC_1_1_D_MBOC SNR (dB/Hz)	— GALILEO 08 L1 BOC_1_1_D_MBOC SNR (dB/Hz)
— GALILEO 13 L1 BOC_1_1_D_MBOC SNR (dB/Hz)	— GALILEO 19 L1 BOC_1_1_D_MBOC SNR (dB/Hz)
— GALILEO 21 L1 BOC_1_1_D_MBOC SNR (dB/Hz)	— GALILEO 25 L1 BOC_1_1_D_MBOC SNR (dB/Hz)
— GALILEO 26 L1 BOC_1_1_D_MBOC SNR (dB/Hz)	— GALILEO 27 L1 BOC_1_1_D_MBOC SNR (dB/Hz)
— GALILEO 30 L1 BOC_1_1_D_MBOC SNR (dB/Hz)	— GALILEO 02 L5E5A BPSK10_PD SNR (dB/Hz)
— GALILEO 03 L5E5A BPSK10_PD SNR (dB/Hz)	— GALILEO 07 L5E5A BPSK10_PD SNR (dB/Hz)
— GALILEO 08 L5E5A BPSK10_PD SNR (dB/Hz)	— GALILEO 13 L5E5A BPSK10_PD SNR (dB/Hz)
— GALILEO 19 L5E5A BPSK10_PD SNR (dB/Hz)	— GALILEO 21 L5E5A BPSK10_PD SNR (dB/Hz)
— GALILEO 25 L5E5A BPSK10_PD SNR (dB/Hz)	— GALILEO 26 L5E5A BPSK10_PD SNR (dB/Hz)

## Trajectory Information

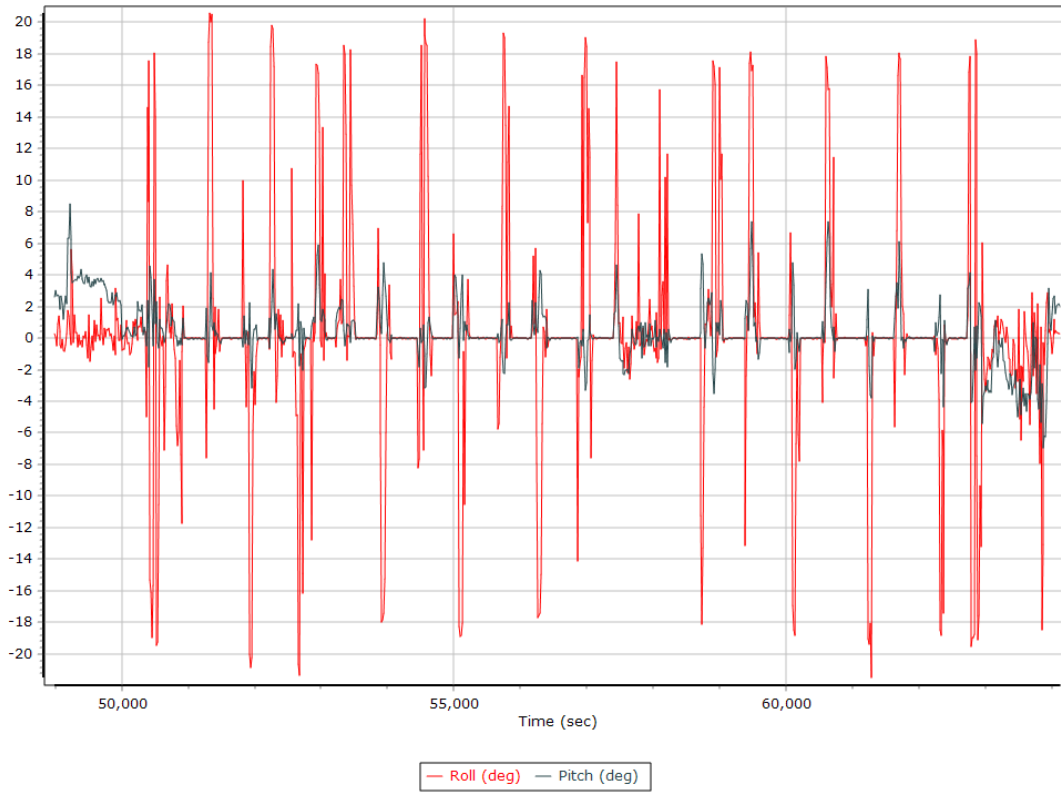
### Top View



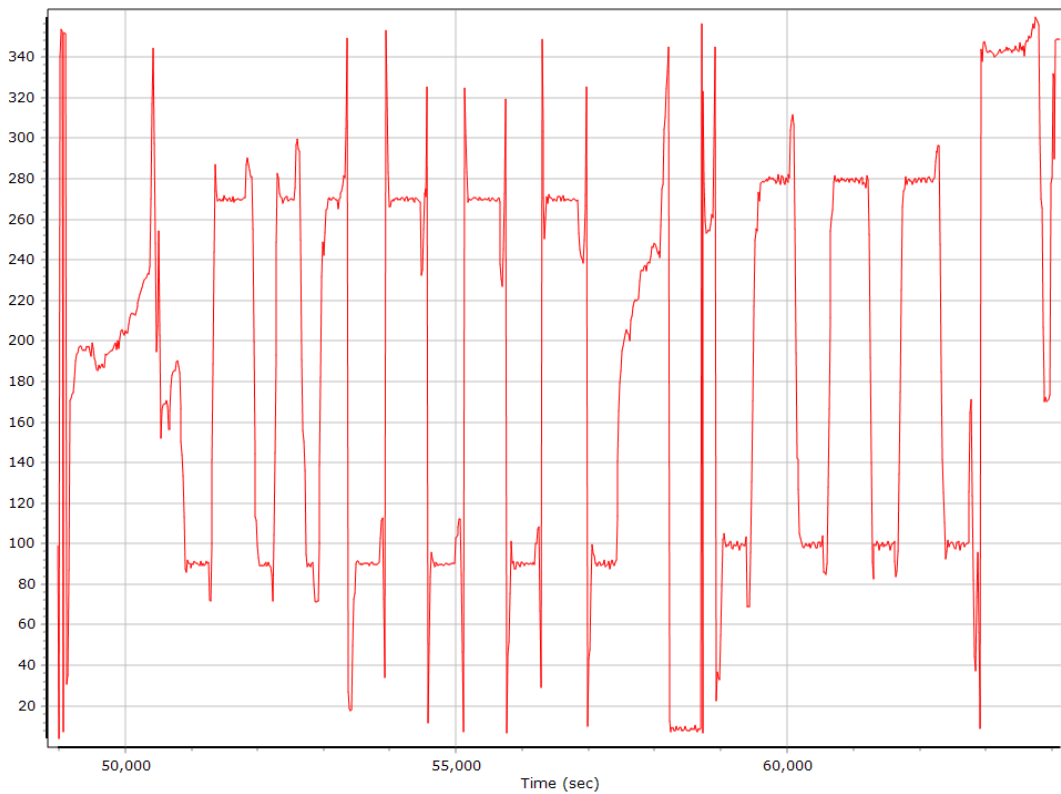
### Altitude



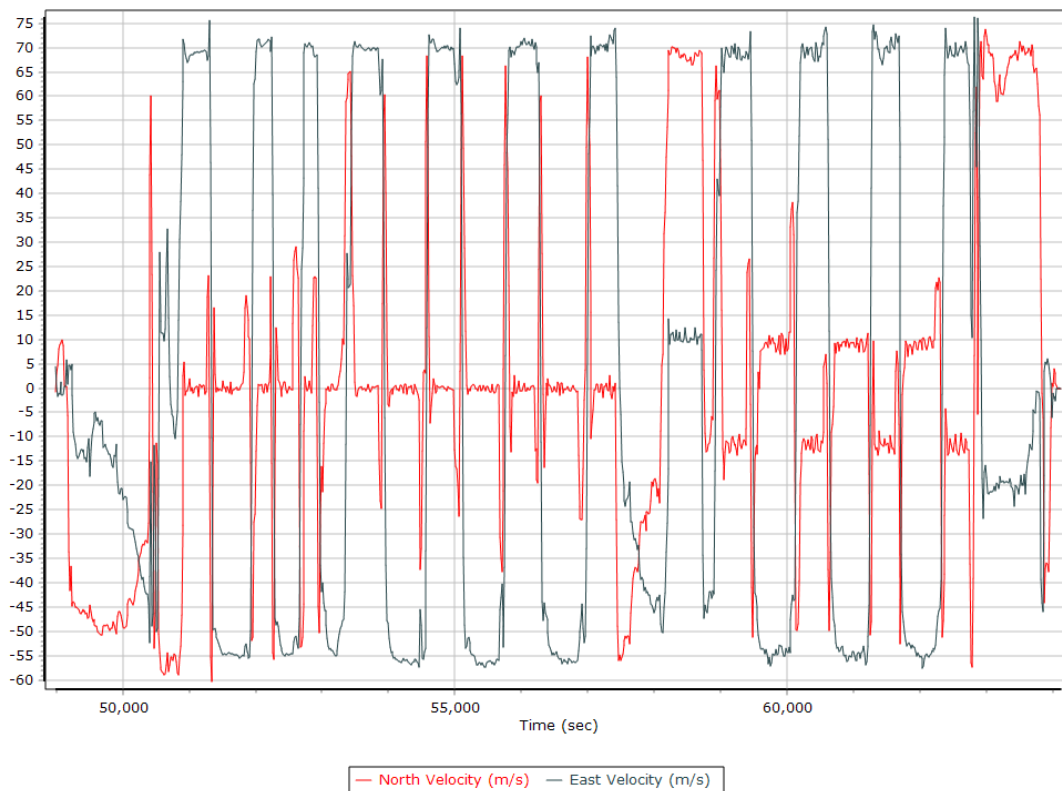
## Roll/Pitch



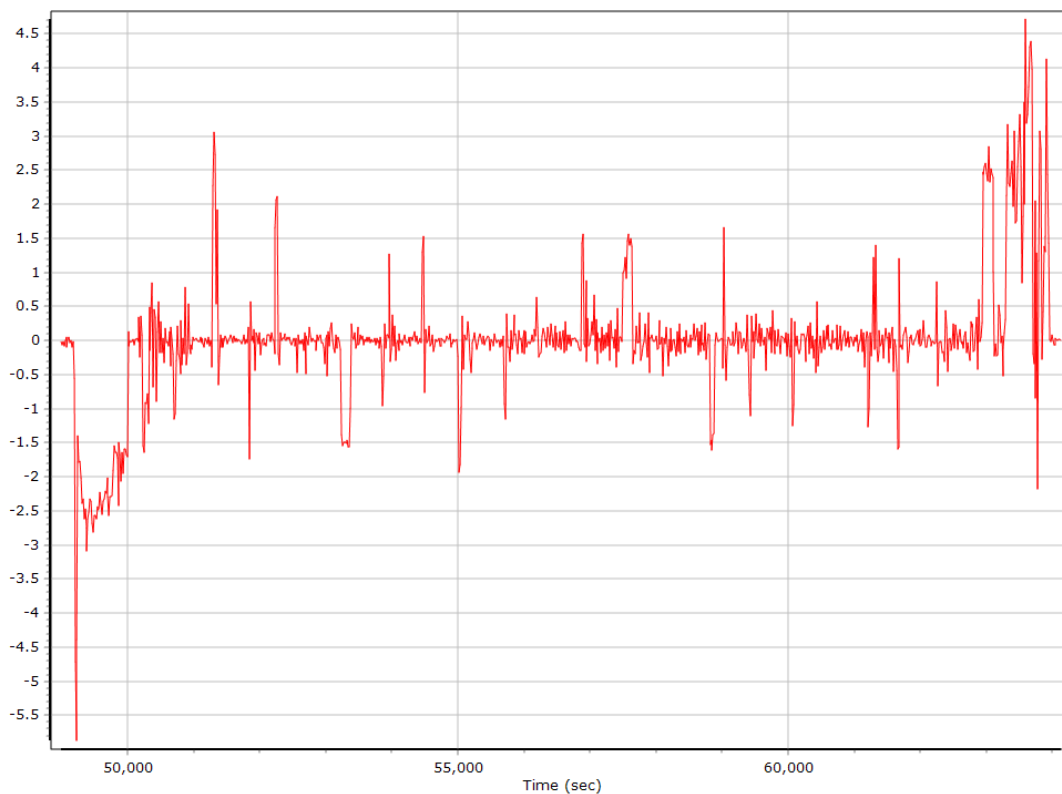
## Heading



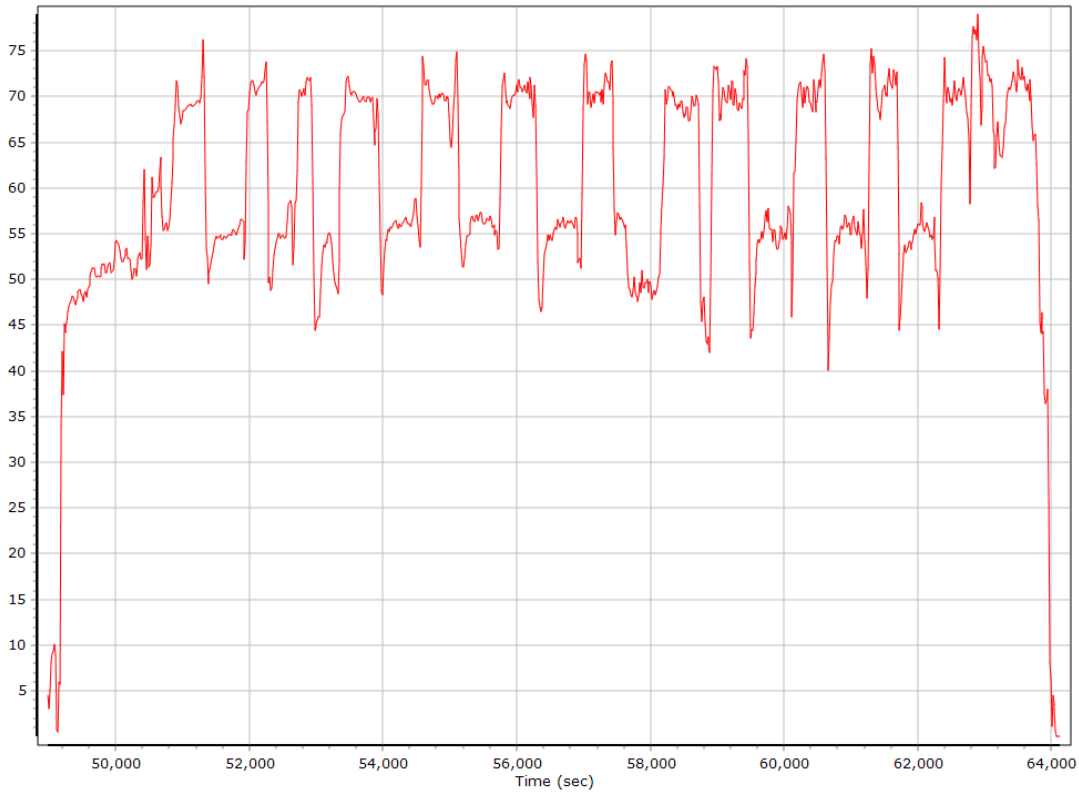
### North/East Velocity



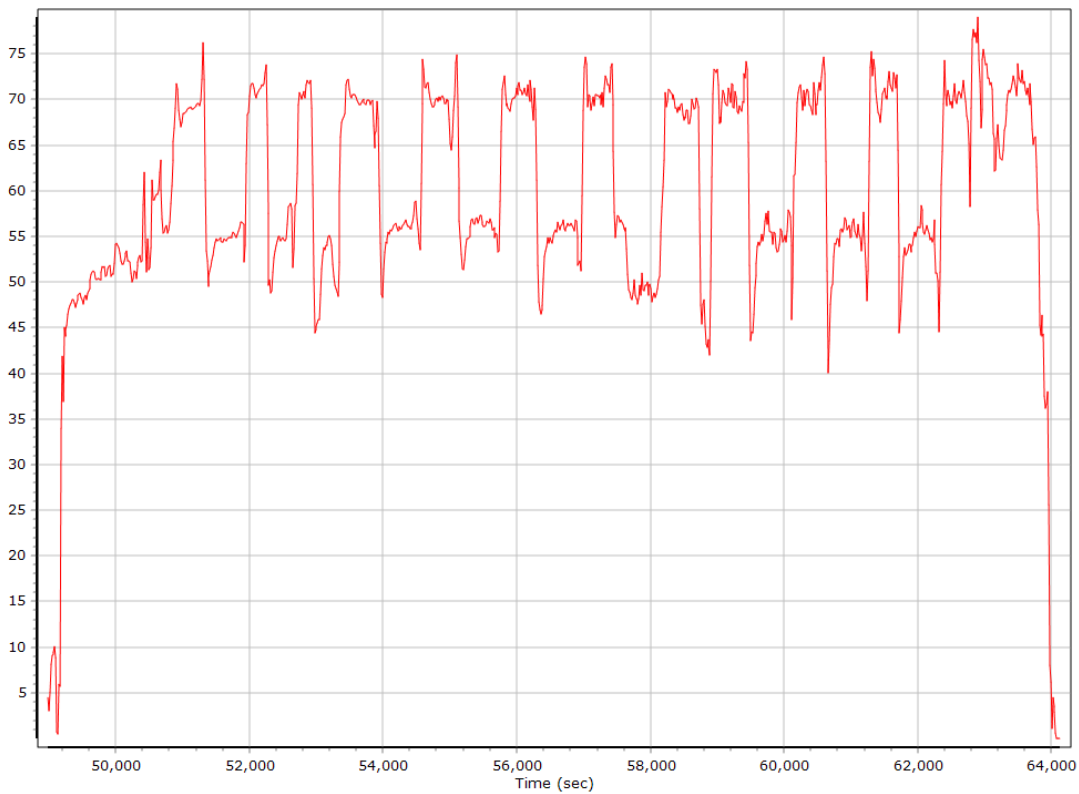
### Down Velocity



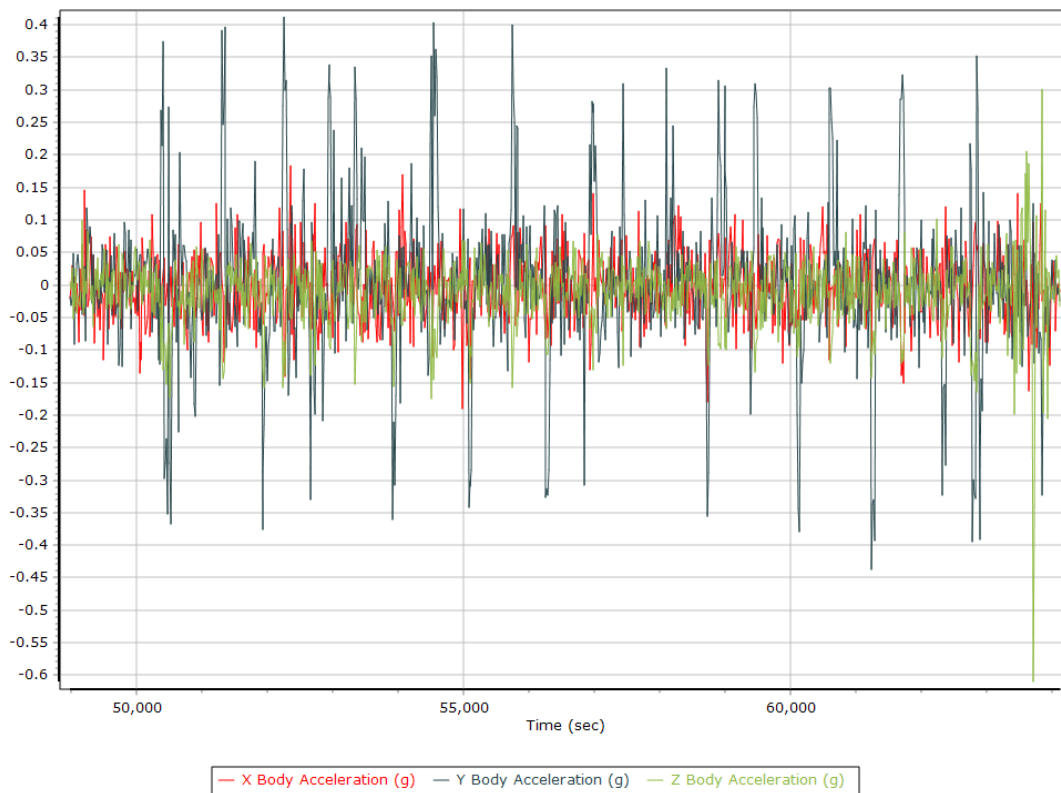
## Total Speed



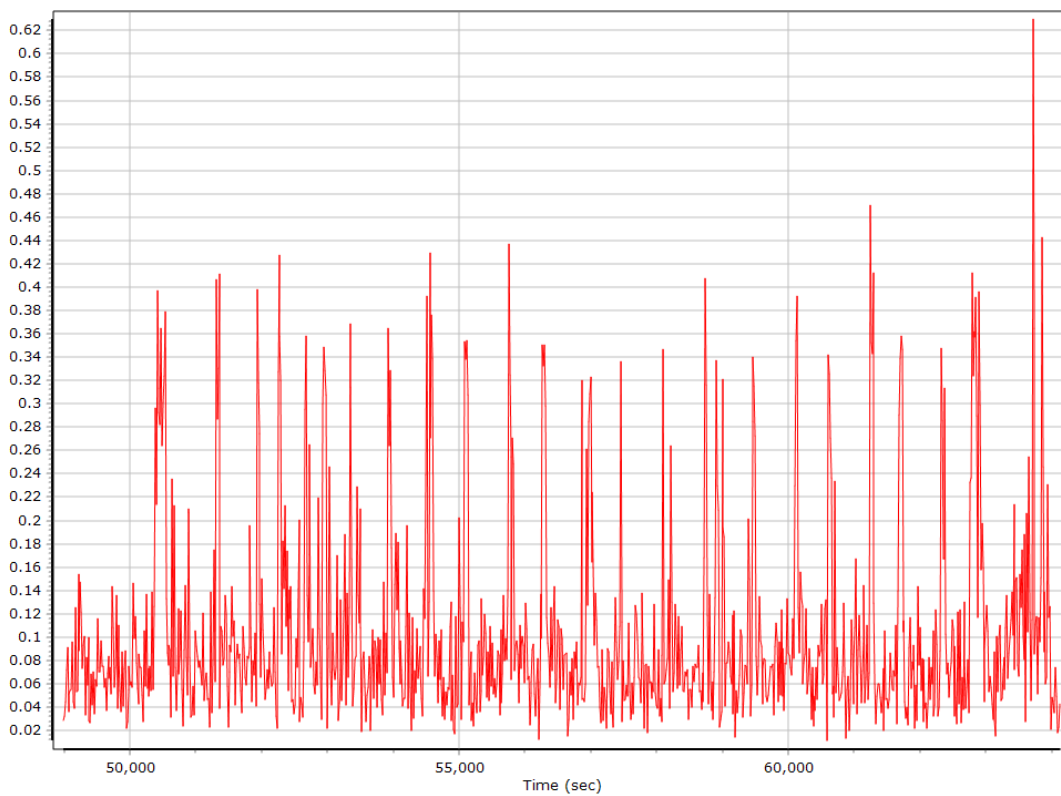
## Ground Speed



## 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
02/23/2020	WVTA	52.87	GNSS	1	User	None	Imported
02/23/2020	WVNR	29.40	GNSS	1	User	None	Imported
02/23/2020	WVMZ	102.43	GNSS	1	User	None	Imported
02/23/2020	WVCV	48.25	GNSS	1	User	None	Imported
02/23/2020	WVBR	31.09	GNSS	1	User	None	Imported
02/23/2020	LS08	26.54	GNSS	1	User	None	Imported

### SmartBase Results

SmartBase status	PROC_STATUS_OK
Primary station Id	WVNR
Primary station data rate (sec)	1.0
VRS/ASB generation rate (sec)	1.0
VRS/ASB timespan	15588 s (2094 48566 - 2094 64154)
Number of reference stations	6
Primary station GPS measurement usage (%)	99.6
Primary station GLONASS measurement usage (%)	86.9
Average number of satellites per epoch	15.0
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)	13120
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	CONTROL	SBQI	0	
Duration (Hours)	23.70	Output Coordinates	Control	
Solution Epochs	5688	Mean Epoch SVs	8.6	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N39°26'16.64399"	W79°30'52.95303"	726.066
Adjusted		N39°26'16.64399"	W79°30'52.95303"	726.066
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.000	0.000	0.000

### Base Station Information

Station ID	WVTA		
Filename	wvta0540.20o		
Start date	2/23/2020 12:00:00 AM		
End date	2/23/2020 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 - WVNR

Status	OK	SBQI	0	
Duration (Hours)	23.70	Output Coordinates	Original	
Solution Epochs	5688	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°53'44.50555"	W79°51'30.27023"	582.775
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.004	0.002	0.004

### Base Station Information

Station ID	WVNR		
Filename	wvnr0540.20o		
Start date	2/23/2020 12:00:00 AM		
End date	2/23/2020 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)	23.70	Output Coordinates	Original
Solution Epochs	5688	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°50'20.04321"	W81°06'31.58313"	296.814
Coordinate Adjustments	Horizontal (m)	Vertical (m)	Total (m)
Adjustments	0.011	0.020	0.023

### Base Station Information

Station ID	WVMZ		
Filename	wvmz0540.20o		
Start date	2/23/2020 12:00:00 AM		
End date	2/23/2020 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)	23.70	Output Coordinates	Original
Solution Epochs	5688	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°00'55.07533"	W79°27'25.00847"	969.230
Coordinate Adjustments	Horizontal (m)	Vertical (m)	Total (m)
Adjustments	0.038	0.005	0.039

### Base Station Information

Station ID	WVCV		
Filename	wvcv0540.20o		
Start date	2/23/2020 12:00:00 AM		
End date	2/23/2020 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)	23.70	Output Coordinates	Original
Solution Epochs	5688	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°18'28.88426"	W80°16'38.61946"	270.253
Coordinate Adjustments	Horizontal (m)	Vertical (m)	Total (m)
Adjustments	0.015	0.007	0.017

## Base Station Information

Station ID	WVBR		
Filename	wvbr0540.20o		
Start date	2/23/2020 12:00:00 AM		
End date	2/23/2020 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 - LS08

Status	OK	SBQI	0	
Duration (Hours)	23.70	Output Coordinates	Original	
Solution Epochs	5688	Mean Epoch SVs	8.7	
Base Station Coordinates		Latitude	Longitude	Height (m)
Original		N38°58'49.21723"	W80°13'11.03487"	407.315
Adjusted		N38°58'49.21707"	W80°13'11.03502"	407.309
Coordinate Adjustments		Horizontal (m)	Vertical (m)	Total (m)
Adjustments		0.006	0.006	0.009

### Base Station Information

Station ID	LS08		
Filename	1s080540.20o		
Start date	2/23/2020 12:00:00 AM		
End date	2/23/2020 11:59:59 PM		
Duration	23:59:59.000		
Data type	GNSS		
Receiver manufacturer, model, serial no.	Leica	GRX1200+GNSS	495025
Antenna manufacturer, model	Leica	AX1203+GNSS	
Antenna height [m]	0.000		
Antenna measurement method	Bottom of antenna mount		
Offset from measured point to APC (m)	0.0825		
Latitude	N38°58'49.21723"		
Longitude	W80°13'11.03487"		
Ellipsoidal height (m)	407.31500		
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)	1.47	60.43	
Number of GPS SV	7	11	10
Number of GLONASS SV	0	8	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	19	15
PDOP	1.06	1.90	1.36
QC Solution Gaps	1.00	1.00	
Solution Type	Fixed	Float	No solution
Epoch (sec)	15585.00	0.00	1.00
Percentage	99.99	0.00	0.01

## GNSS-Inertial Processor Configuration

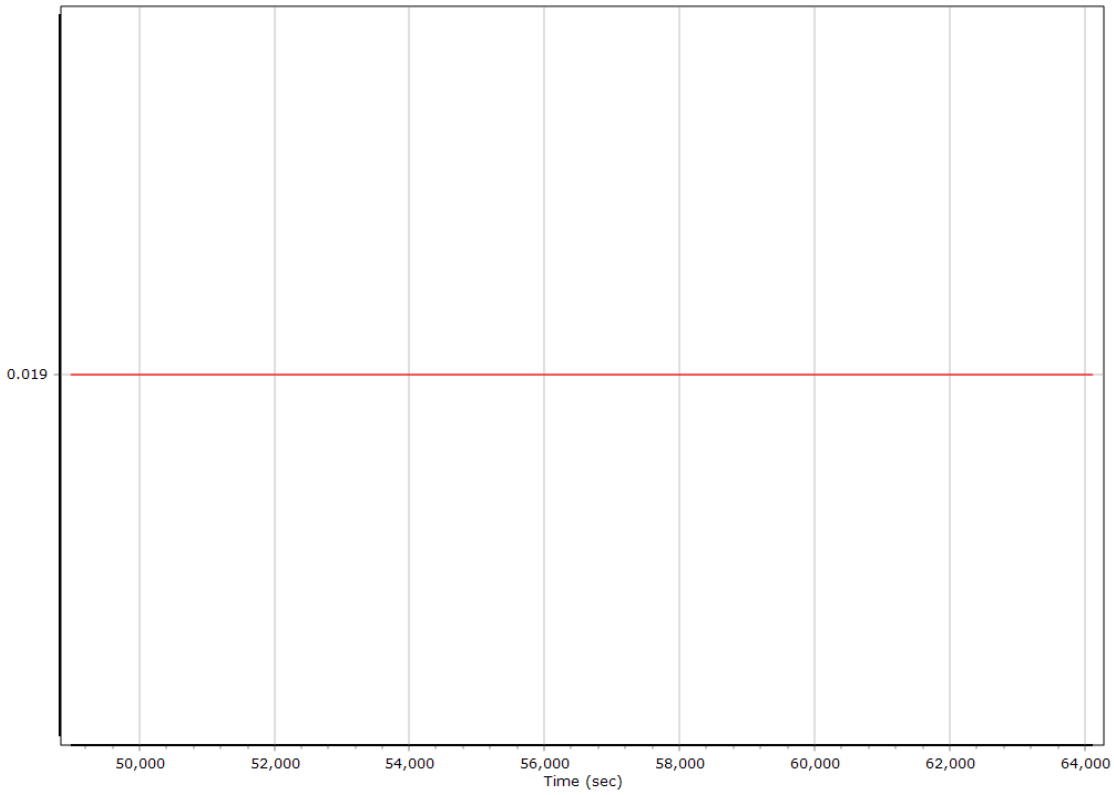
Processing mode	IN-Fusion SmartBase		
Stabilized mount	True		
Base station	ASB		
Processing start time	48548.000 (2/23/2020 1:29:08 PM)		
Processing end time	64136.000 (2/23/2020 5:48:56 PM)		
Initial attitude source	Real-Time VNAV/RNAV Attitude		
IMU Sensor Context	Processing with Onboard IMU		
Gimbal 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



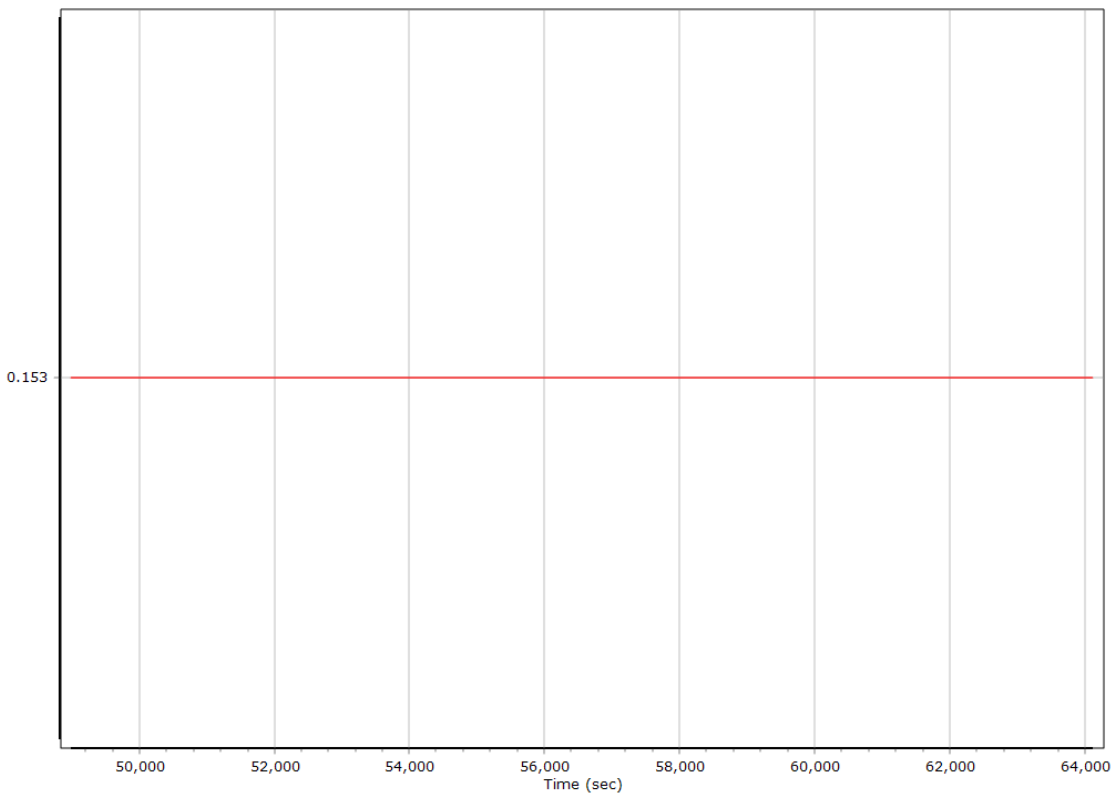
## Calibrated Installation Parameters

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

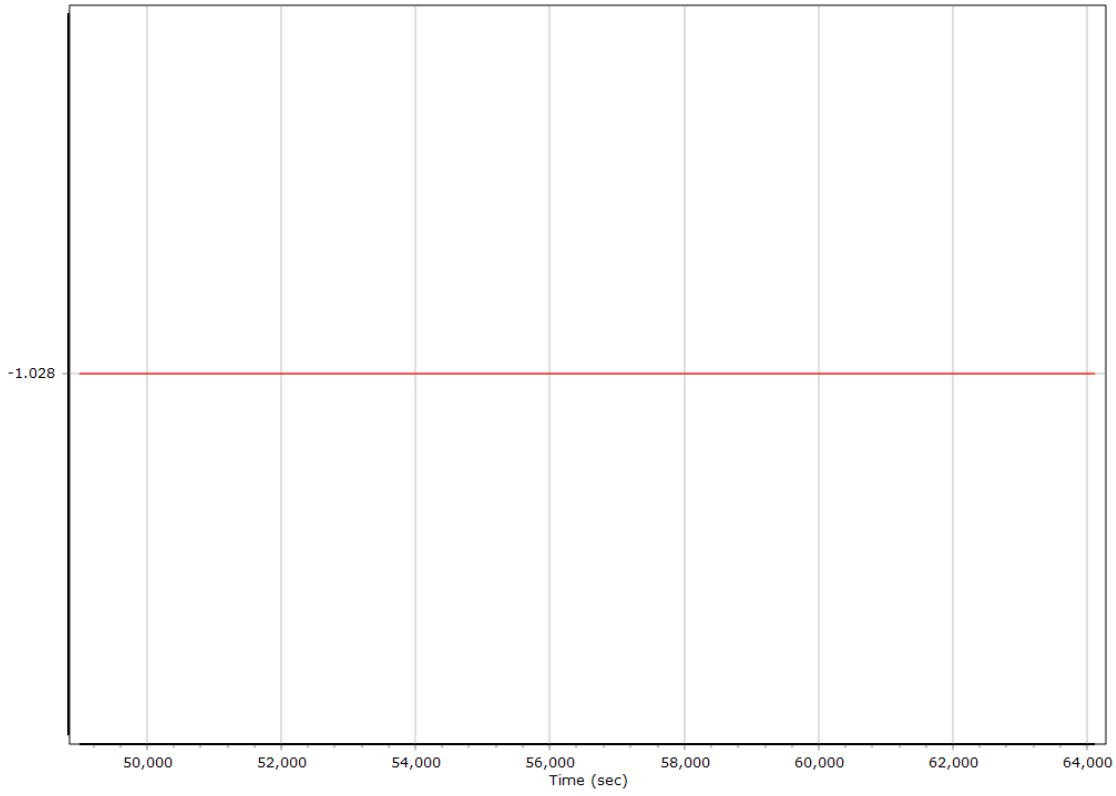
#### X Reference-Primary GNSS Lever Arm (m)



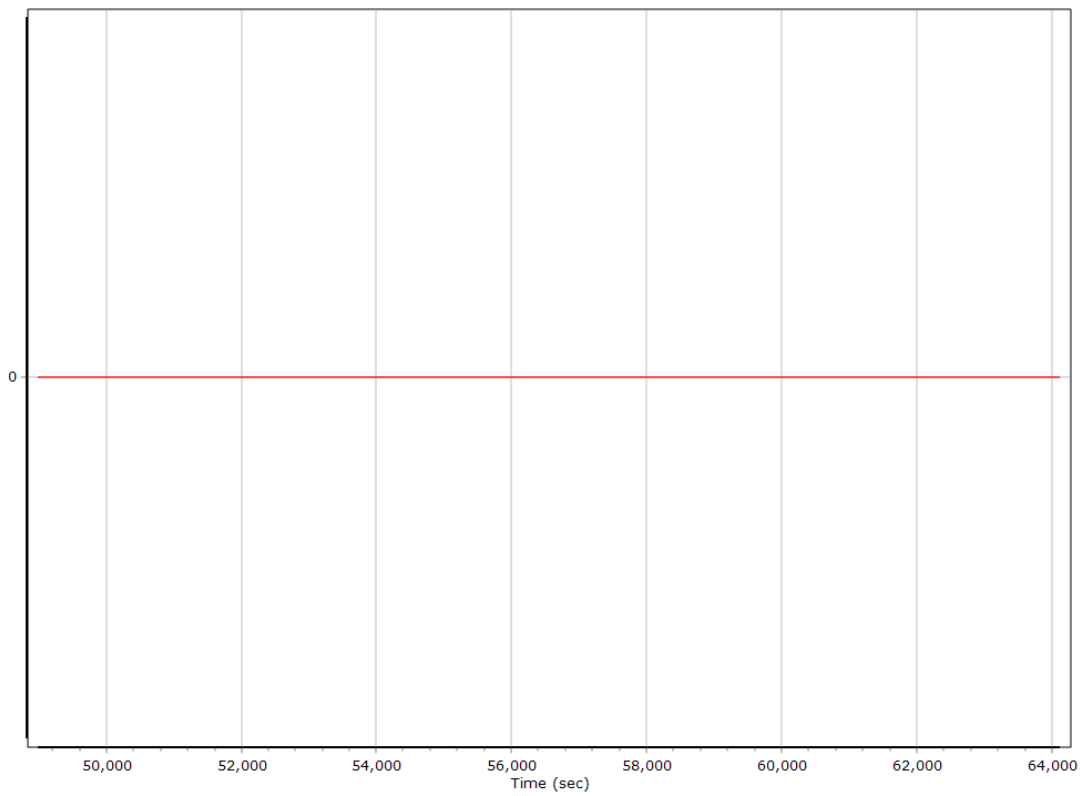
#### Y Reference-Primary GNSS Lever Arm (m)



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



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



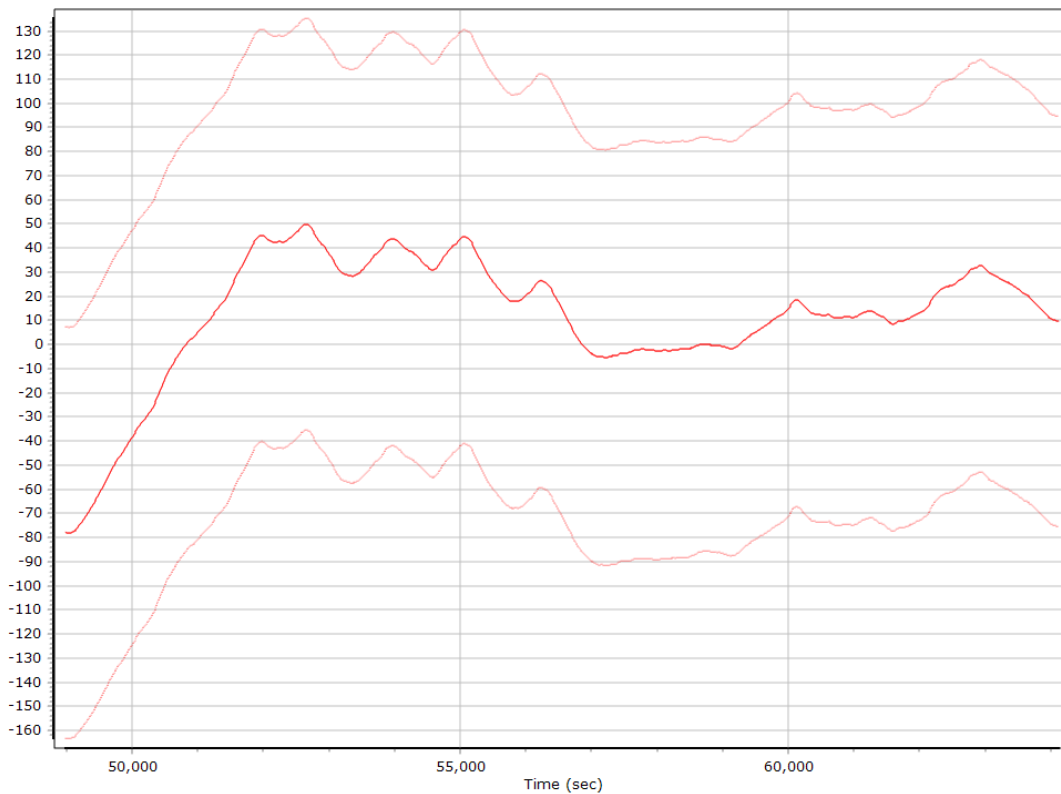
## Smoothed IN-Fusion QC

### Smoothed Estimated Errors, Reference Frame

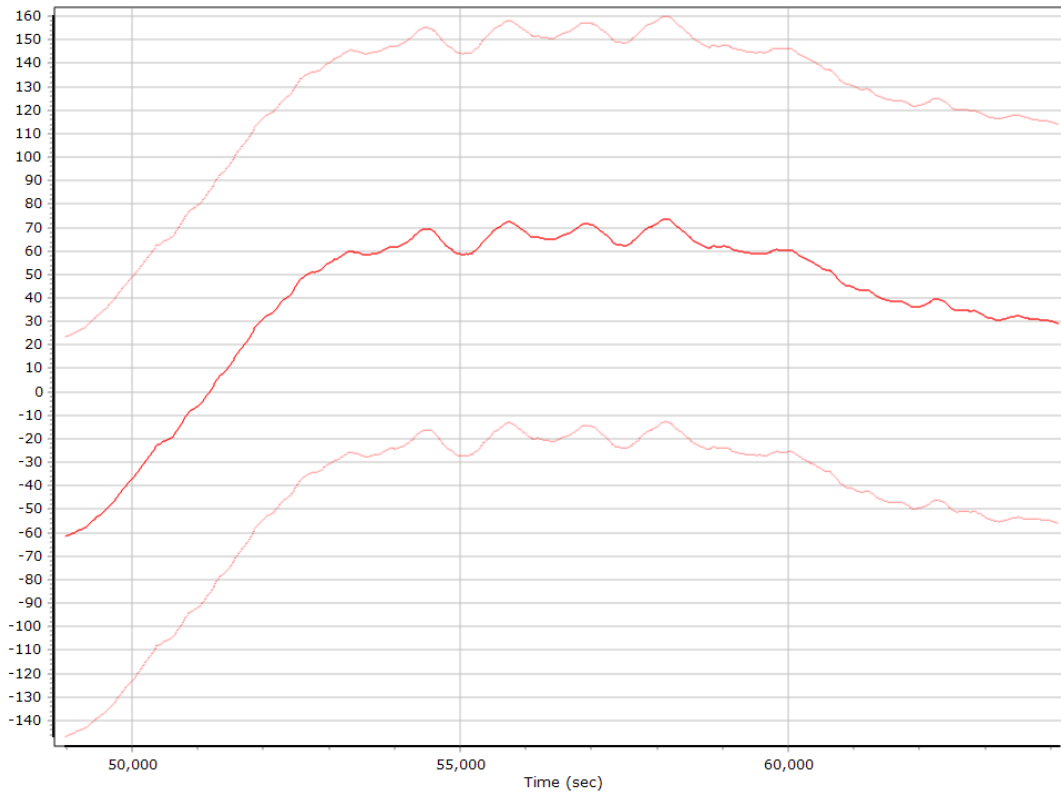
#### Accelerometer Bias (micro-g)



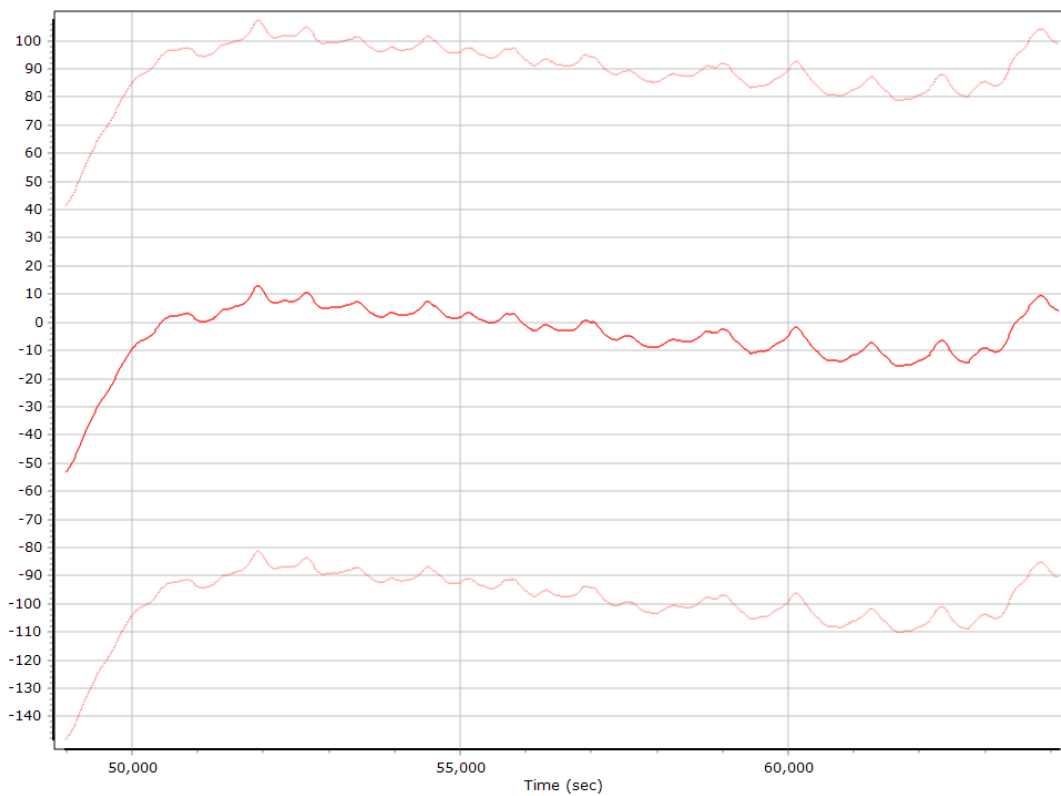
#### X Accelerometer Bias (micro-g)



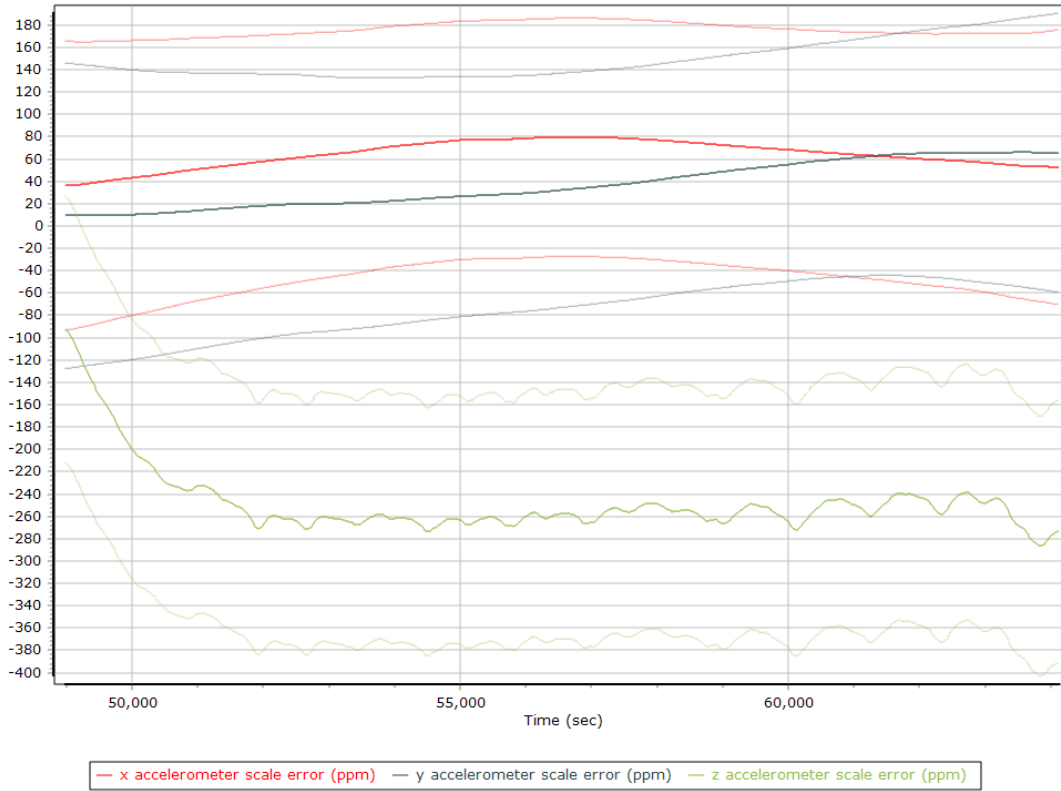
### Y Accelerometer Bias (micro-g)



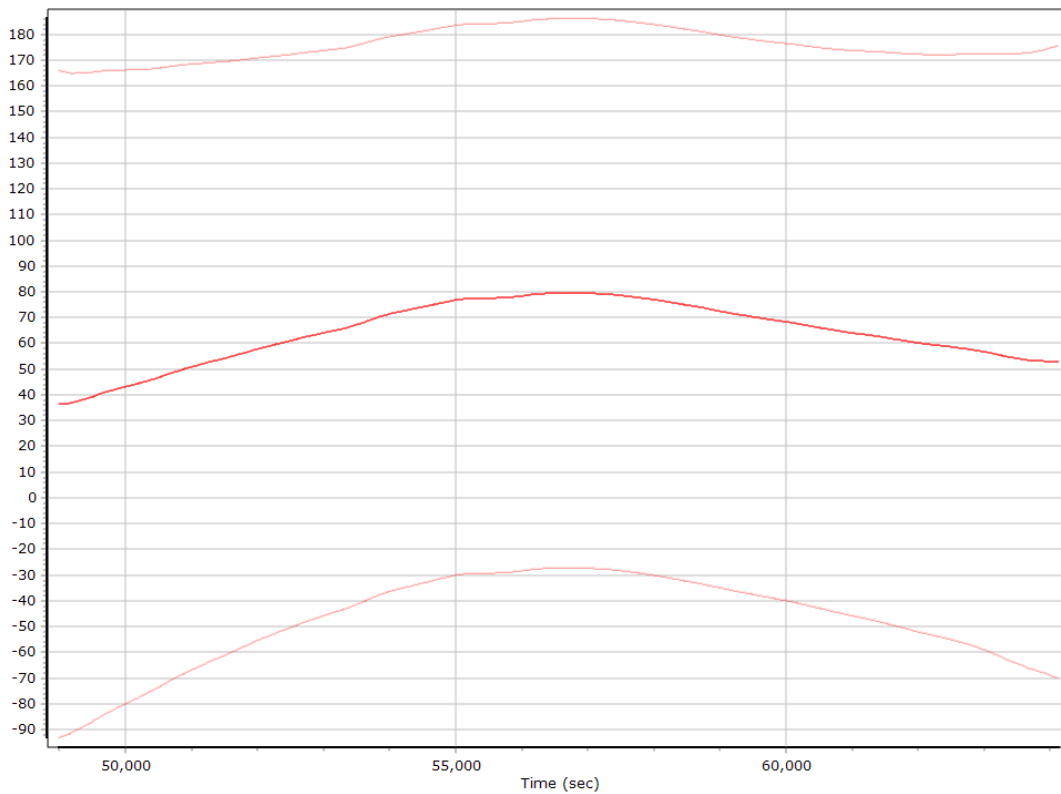
### Z Accelerometer Bias (micro-g)



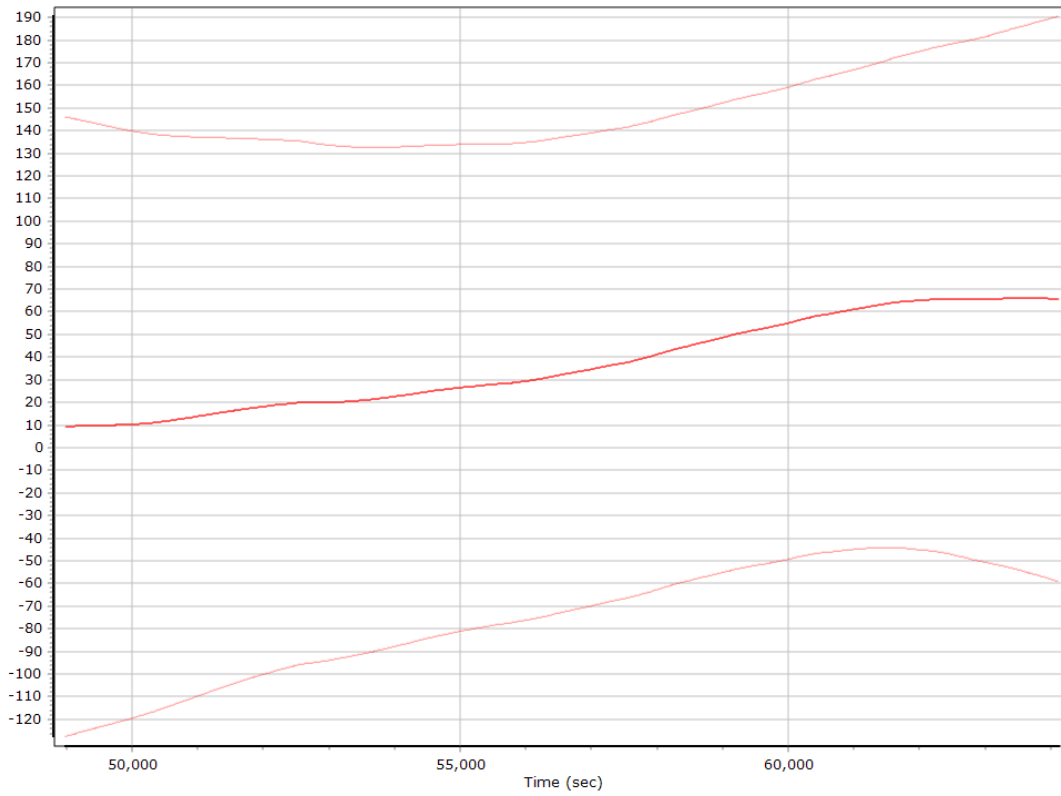
### Accelerometer Scale Error (ppm)



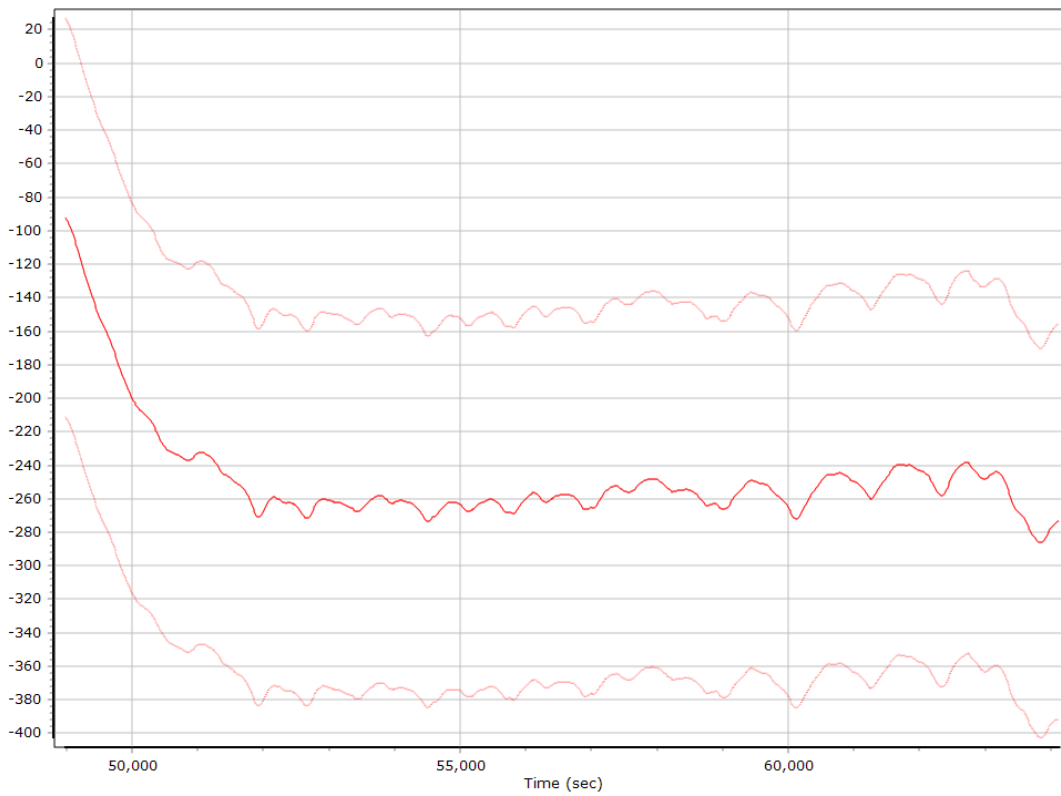
### X Accelerometer Scale Error (ppm)



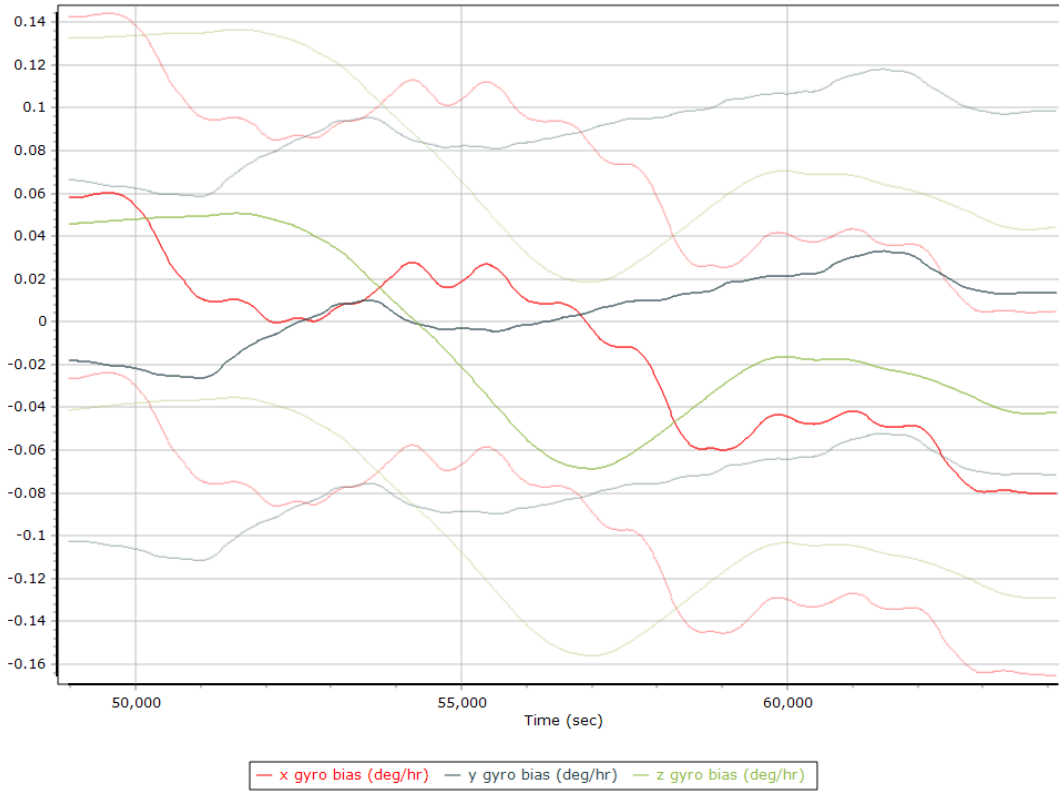
### Y Accelerometer Scale Error (ppm)



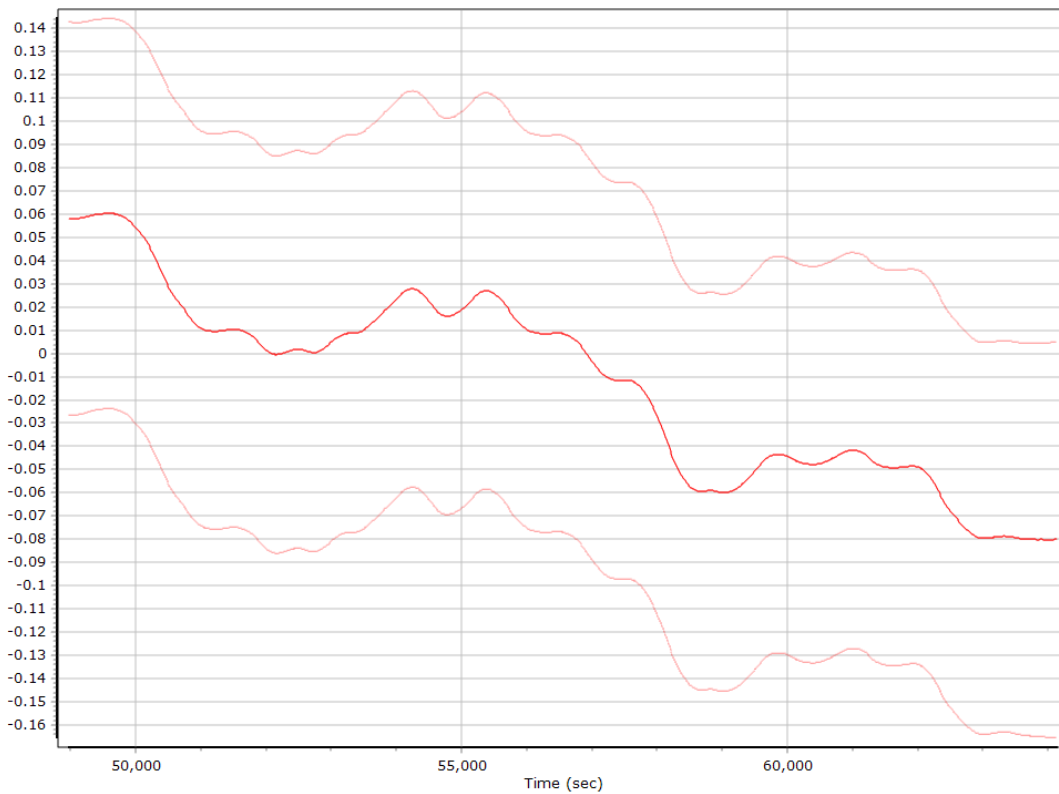
### Z Accelerometer Scale Error (ppm)



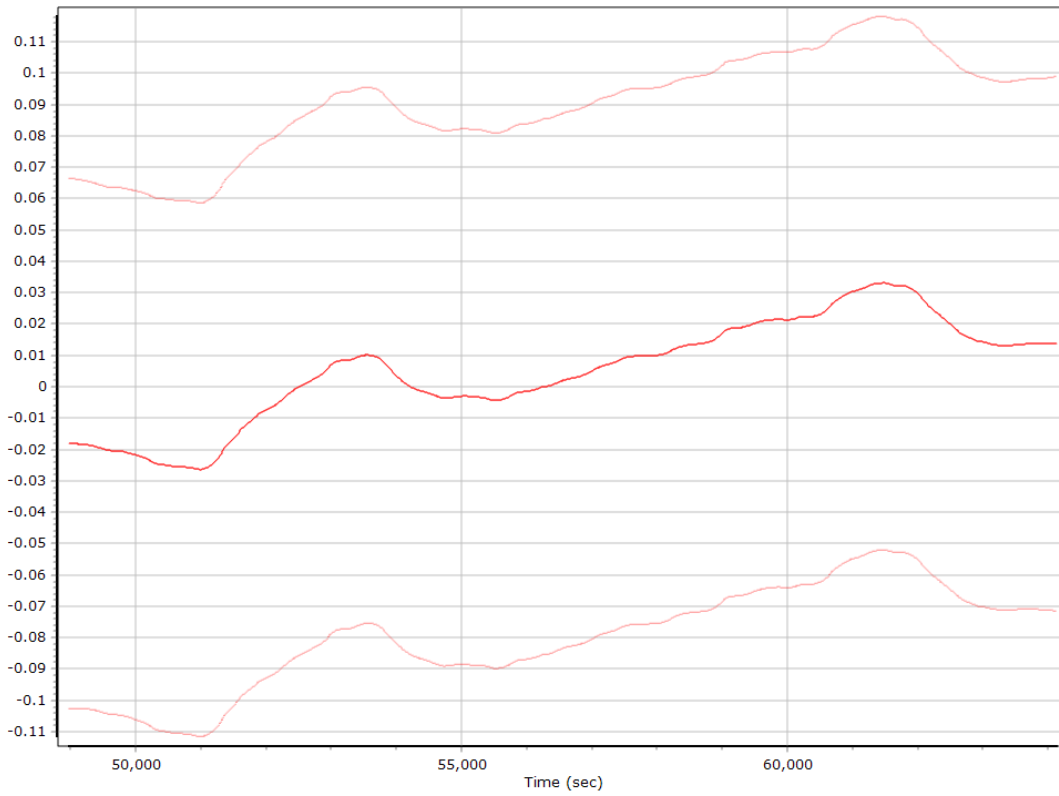
### Gyro Bias (deg/h)



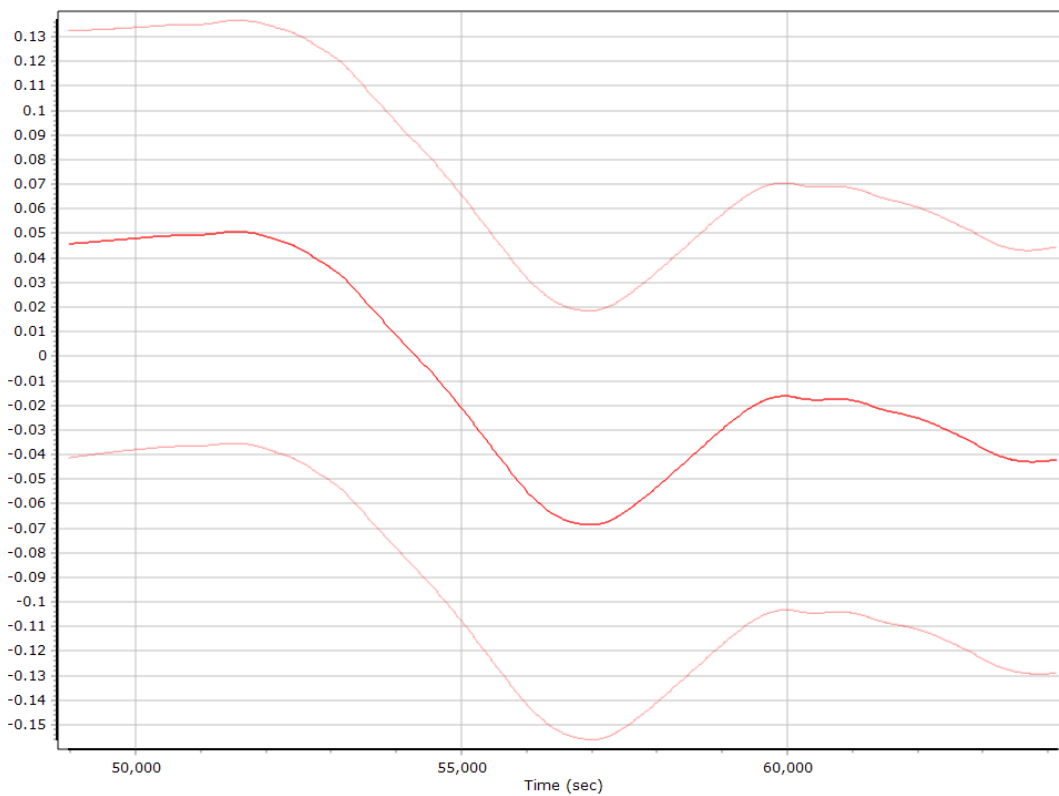
### X Gyro Bias (deg/h)



### Y Gyro Bias (deg/h)

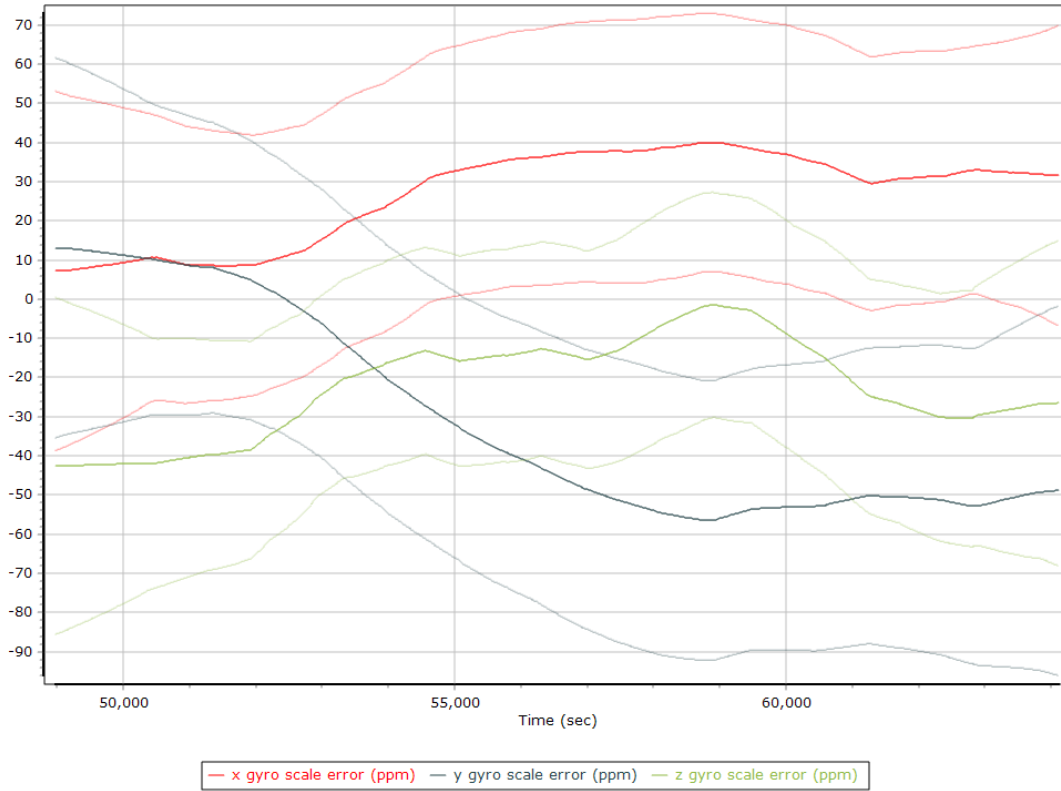


### Z Gyro Bias (deg/h)

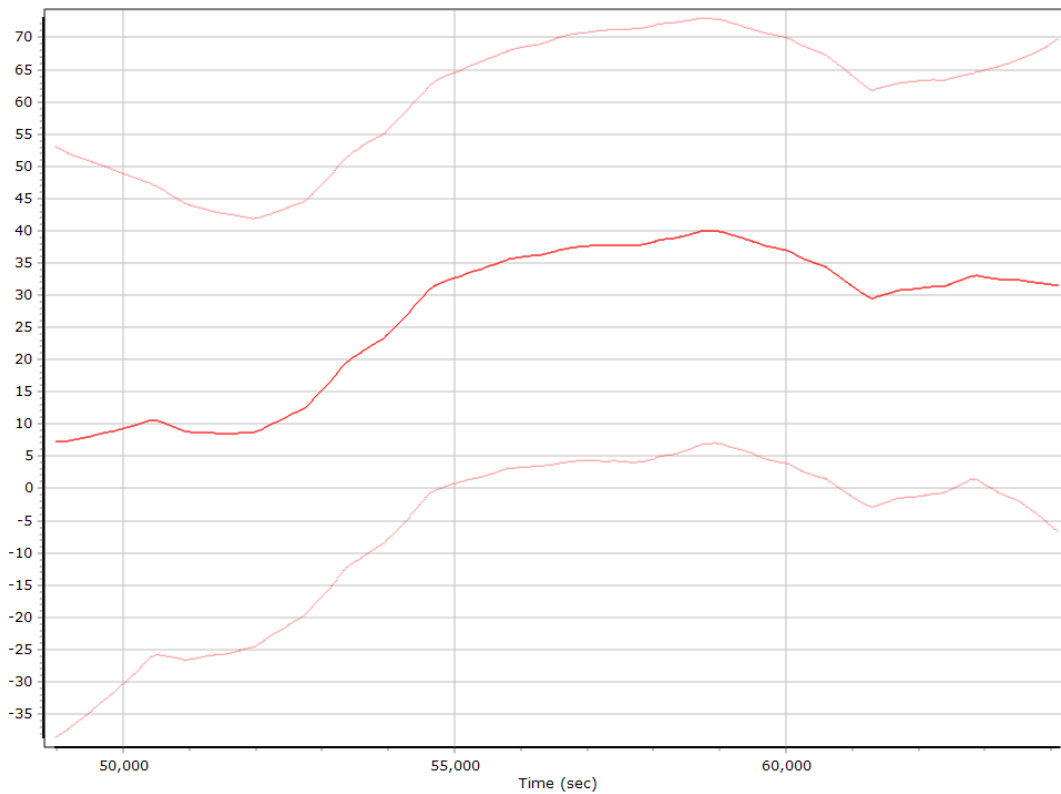




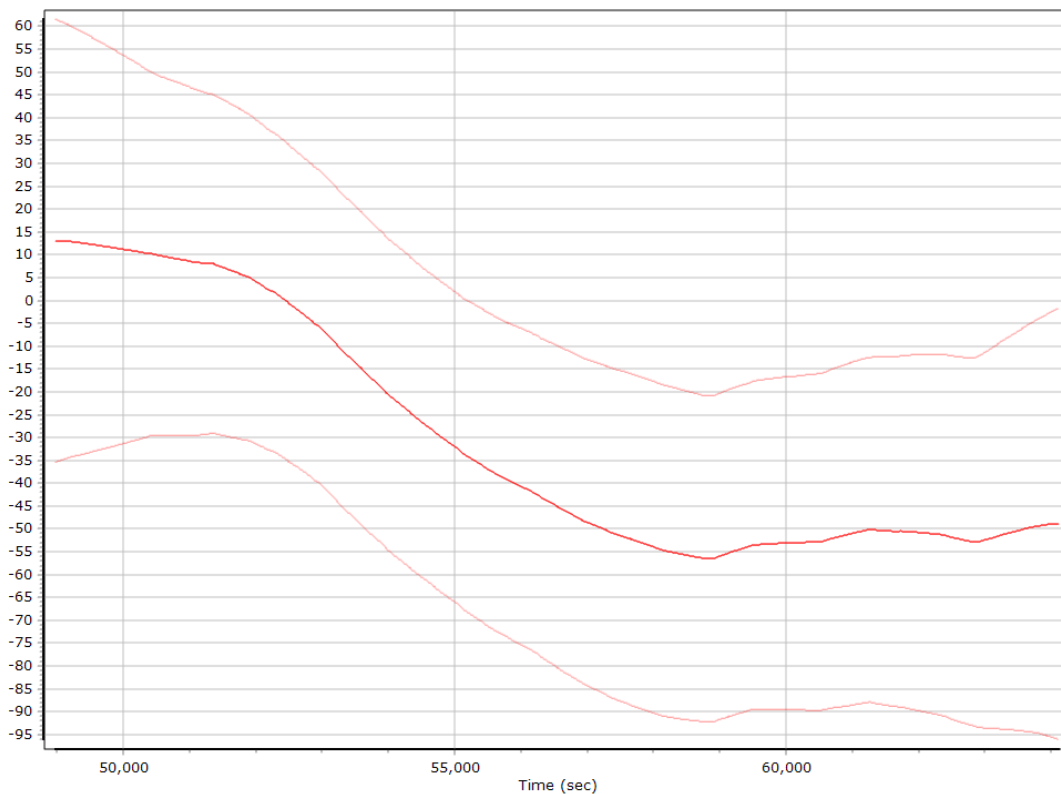
### Gyro Scale Error (ppm)



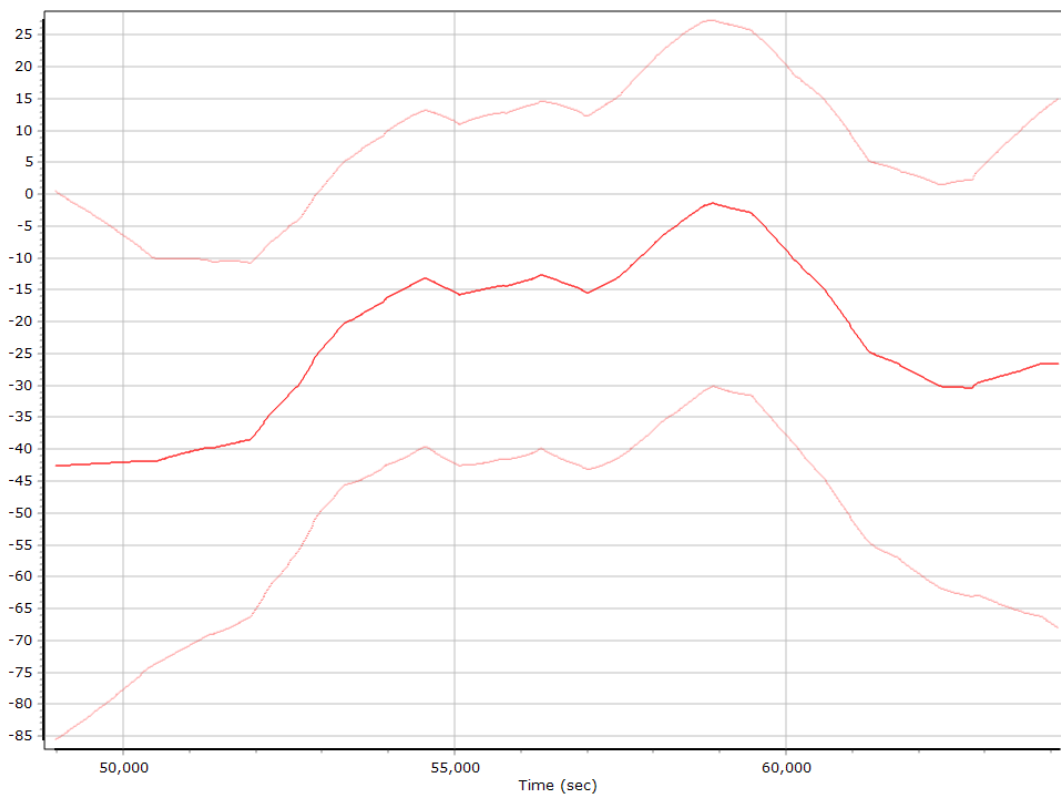
### X Gyro Scale Error (ppm)



### Y Gyro Scale Error (ppm)

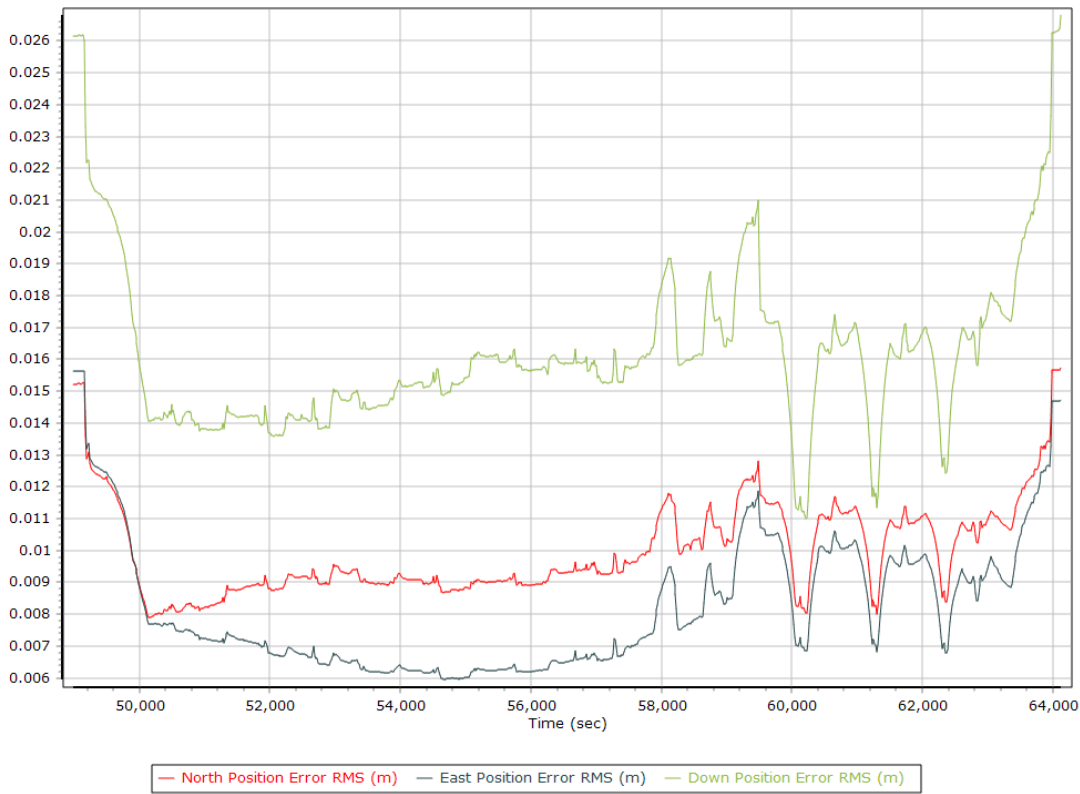


### Z Gyro Scale Error (ppm)

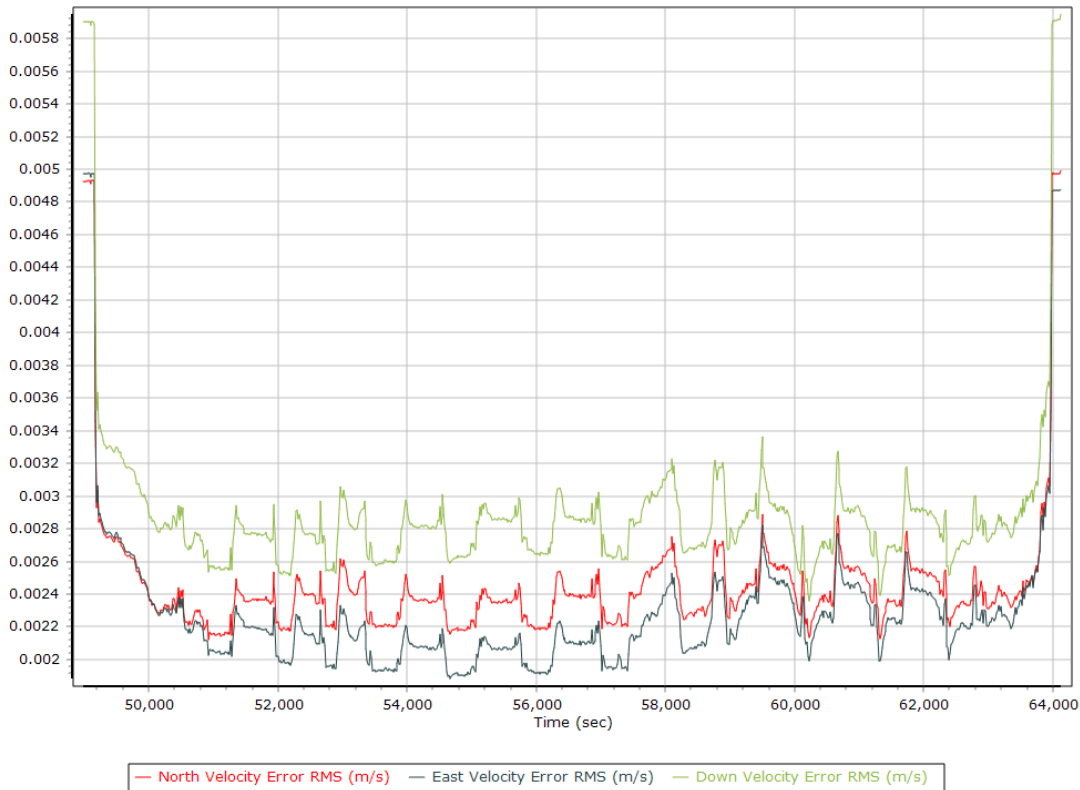


## Smoothed Performance Metrics

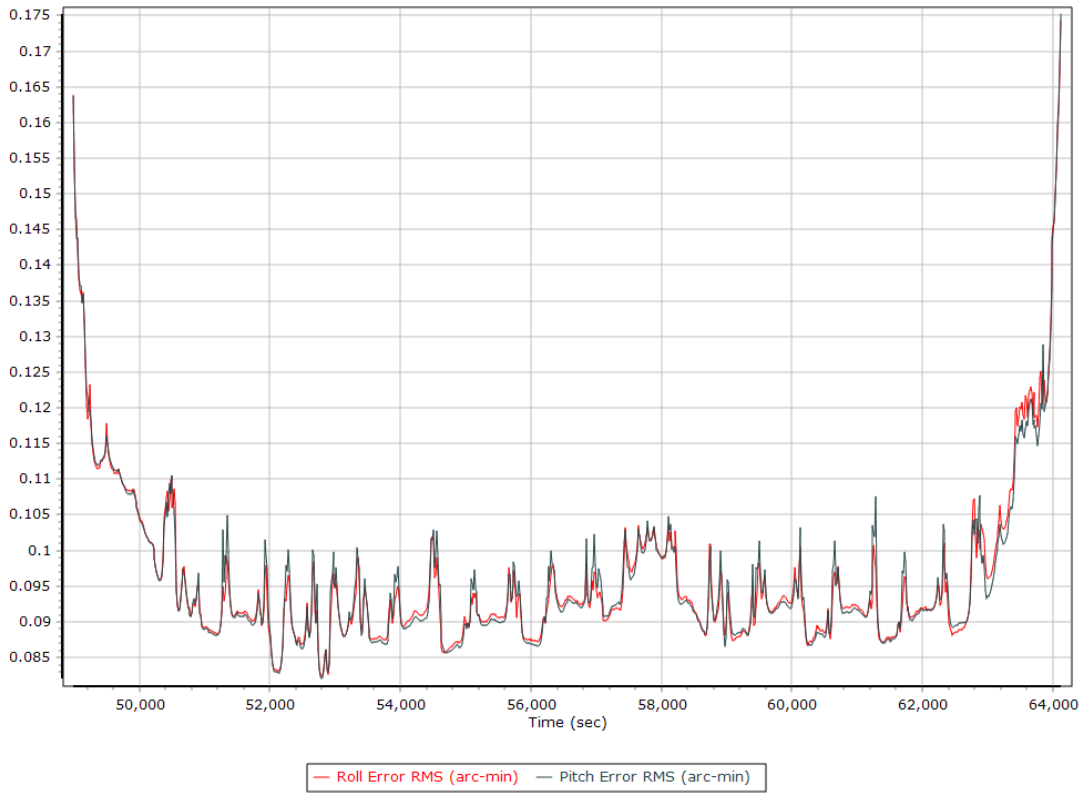
### Position Error RMS (m)



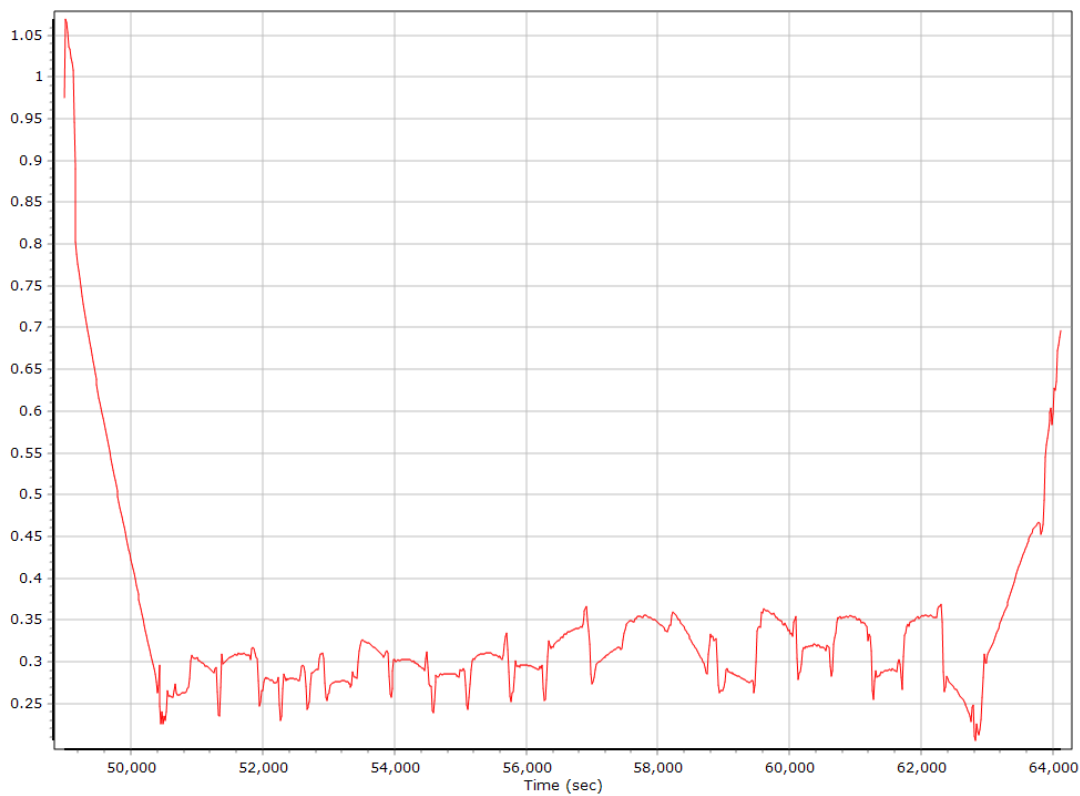
### Velocity Error RMS (m/s)



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

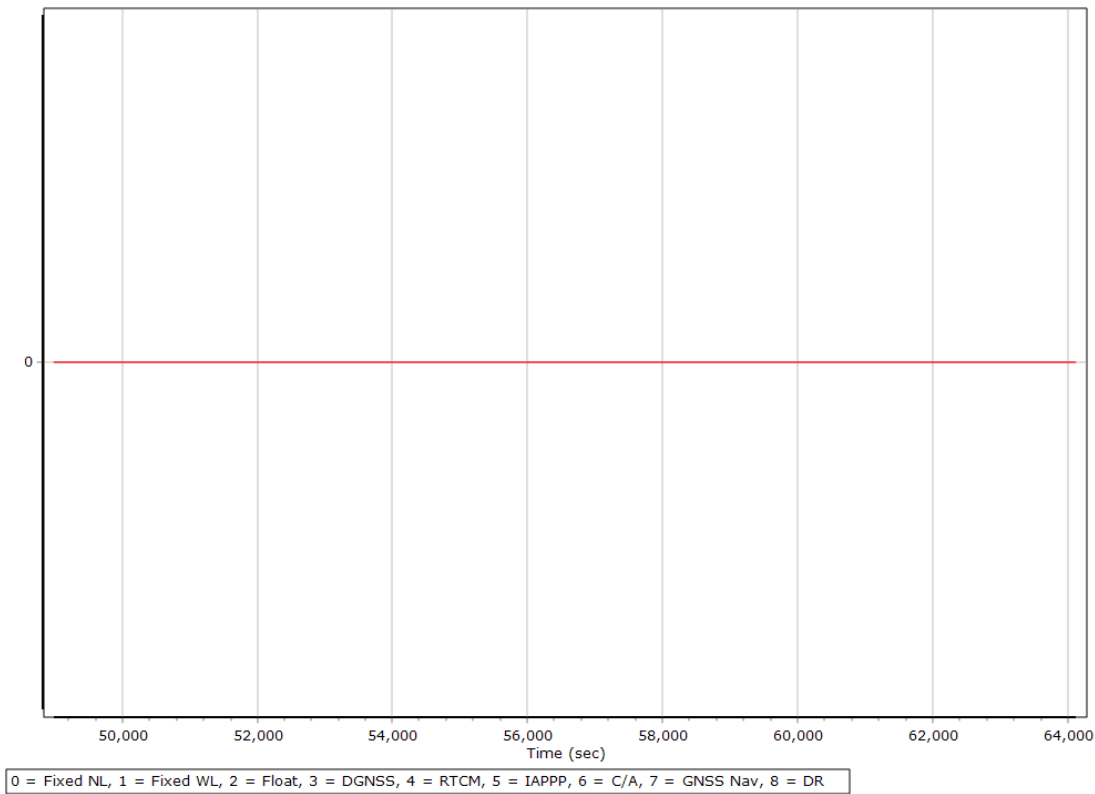


### Heading Error RMS (arc-min)

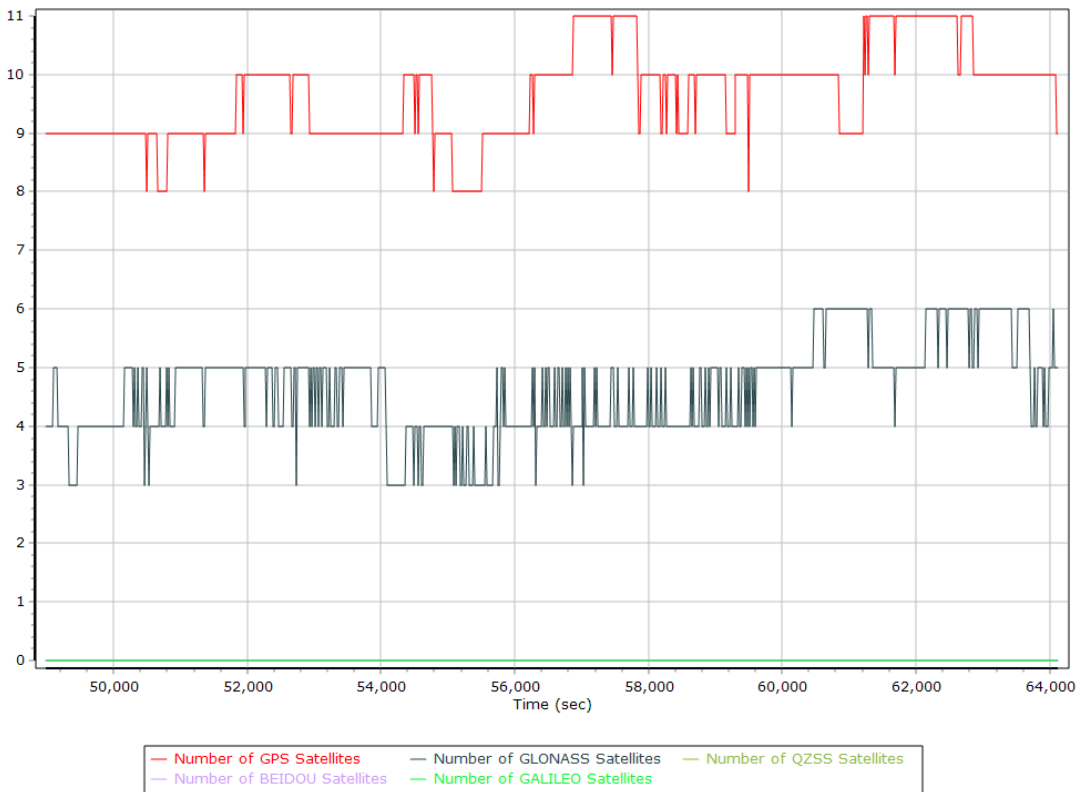


## Smoothed Solution Status

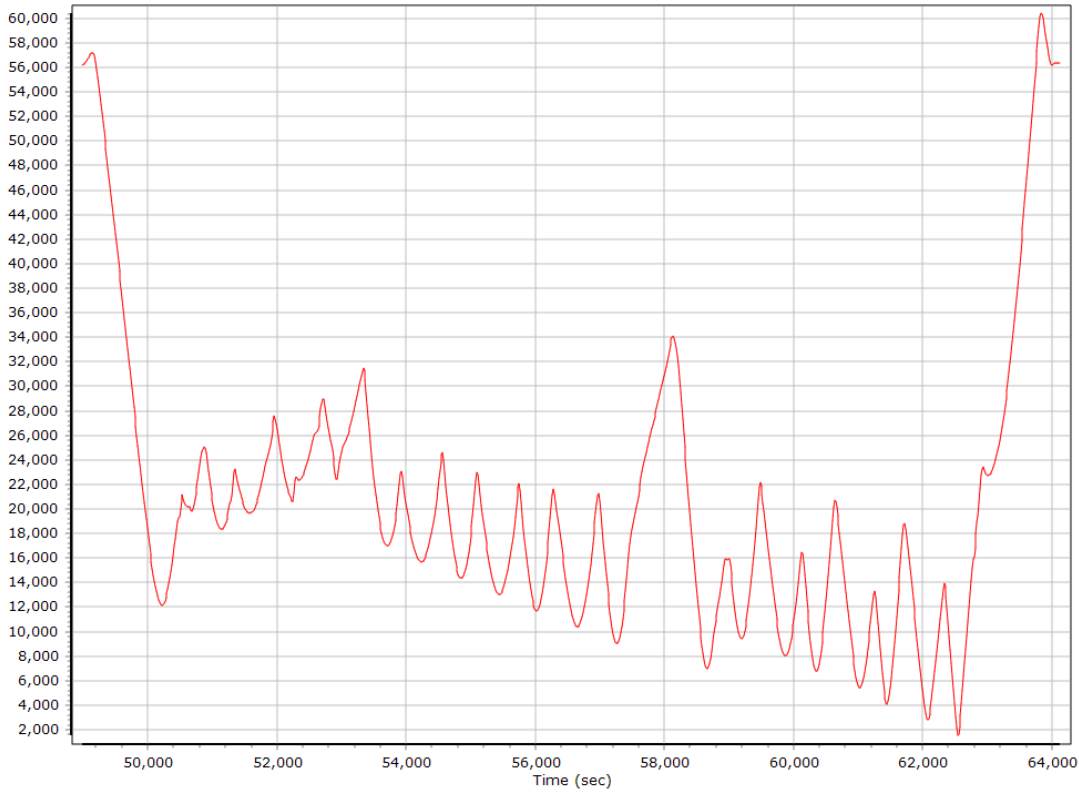
### Processing Mode



### Number of Satellites



### Baseline Length



### SBET IAKAR Separation



## Export Summary

Export file	export_XSS20054A_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	48927.002 (2/23/2020 1:35:27 PM)		
Export end time	64136.003 (2/23/2020 5:48:56 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	2020.144809		