

Project Report Appendices

The following section contains the appendices as listed in the West Virginia 2016 QL2 LiDAR Project Report.

Appendix A

GPS/IMU Processing Statistics Flight Logs

There were 29 total lifts. Graph reports generated from processing software and flight logs are found on the following pages.

Nov 22, 2016-A (N812TB, SN356).....	2	Dec 21, 2016-A (N4181T, SN354).....	112
Flight Log	6	Dec 21, 2016-B (N812TB, SN356)	116
Nov 23, 2016-A (N812TB, SN356).....	7	Flight Log	120
Flight Log	11	Dec 23, 2016-A (N4181T, SN354)	121
Nov 27, 2016-A (N812TB, SN356).....	12	Flight Log	125
Flight Log	16	Dec 23, 2016-A (N812TB, SN356)	126
Nov 27, 2016-B (N812TB, SN356)	17	Flight Log	130
Flight Log	21	Dec 23, 2016-B (N4181T, SN354)	131
Nov 28, 2016-A (N812TB, SN356).....	22	Flight Log	135
Flight Log	26	Dec 28, 2016-A (N4181T, SN354)	136
Dec 4, 2016-A (N4181T, SN354)	27	Flight Log	140
Flight Log	31	Dec 28, 2016-A (N812TB, SN356)	141
Dec 5, 2016-A (N4181T, SN354)	32	Flight Log	145
Flight Log	36		
Dec 5, 2016-B (N4181T, SN354).....	37		
Flight Log	41		
Dec 7, 2016-A (N4181T, SN354)	42		
Flight Log	46		
Dec 7, 2016-A (N4181T, SN354)	47		
Flight Log	51		
Dec 7, 2016-A (N4181T, SN354)	52		
Flight Log	56		
Dec 7, 2016-B (N4181T, SN354).....	57		
Flight Log	61		
Dec 10, 2016-A (N4181T, SN354)	62		
Flight Log	66		
Dec 10, 2016-A (N812TB, SN356).....	67		
Flight Log	71		
Dec 11, 2016-A (N4181T, SN354).....	72		
Flight Log	76		
Dec 11, 2016-A (N812TB, SN356).....	77		
Flight Log	81		
Dec 11, 2016-B (N812TB, SN356)	82		
Flight Log	86		
Dec 13, 2016-A (N812TB, SN354).....	87		
Flight Log	91		
Dec 13, 2016-A (N812TB, SN356).....	92		
Flight Log	96		
Dec 20, 2016-A (N4181T, SN354).....	97		
Flight Log	101		
Dec 20, 2016-A (N812TB, SN356).....	102		
Flight Log	106		
Dec 20, 2016-B (N4181T, SN354).....	107		
Flight Log	111		

Nov 22, 2016-A (N812TB, SN356)

Display - GW_11-22-16A_356_N812TB - Solution Status

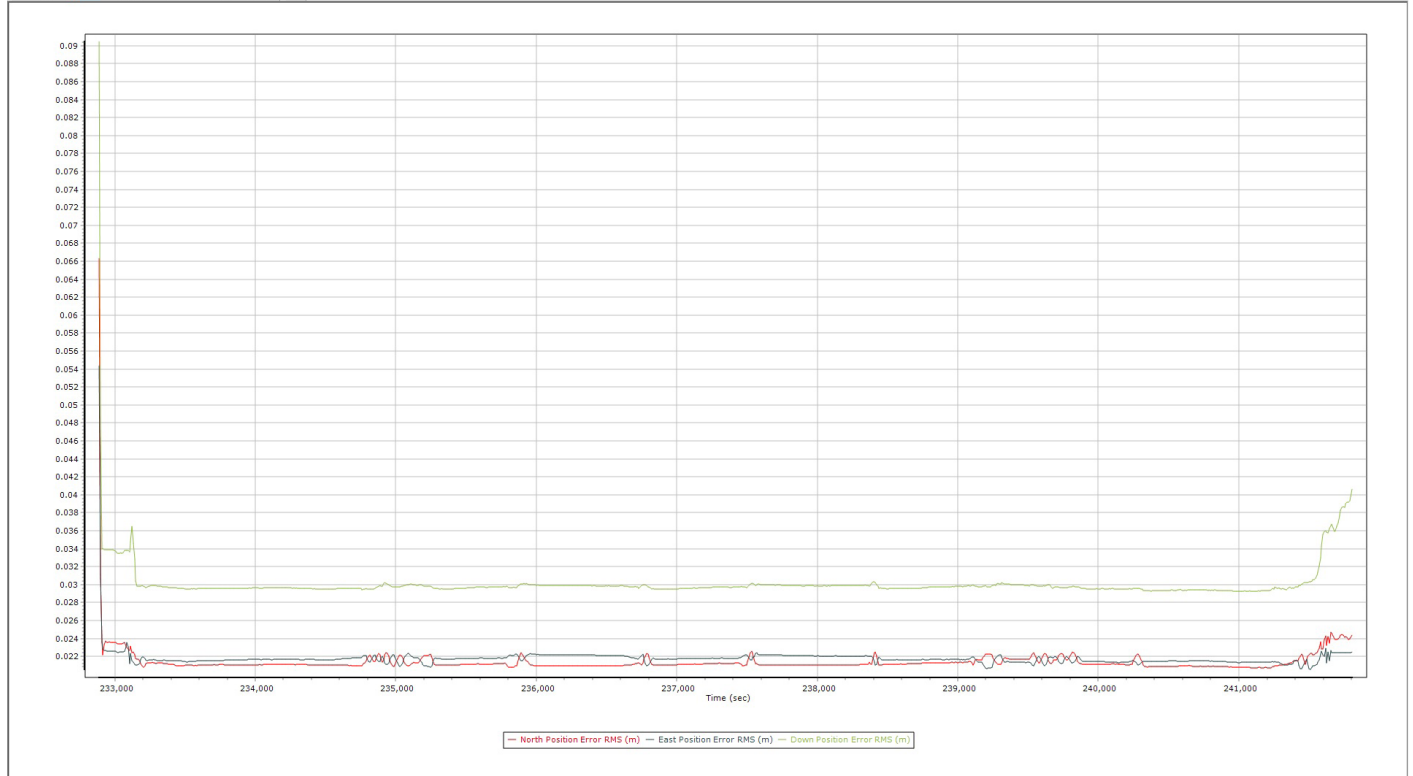
File Edit Tools View Help



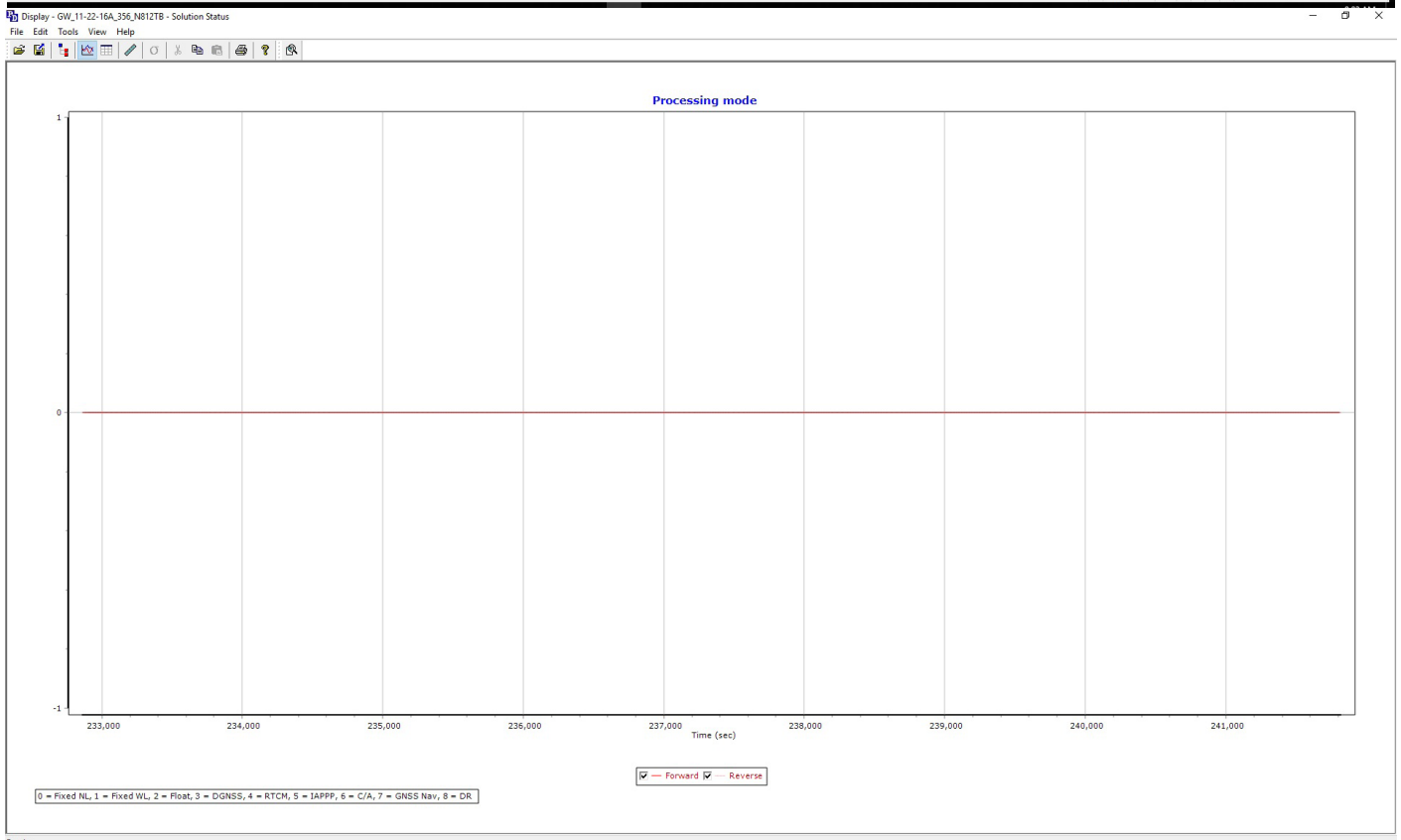
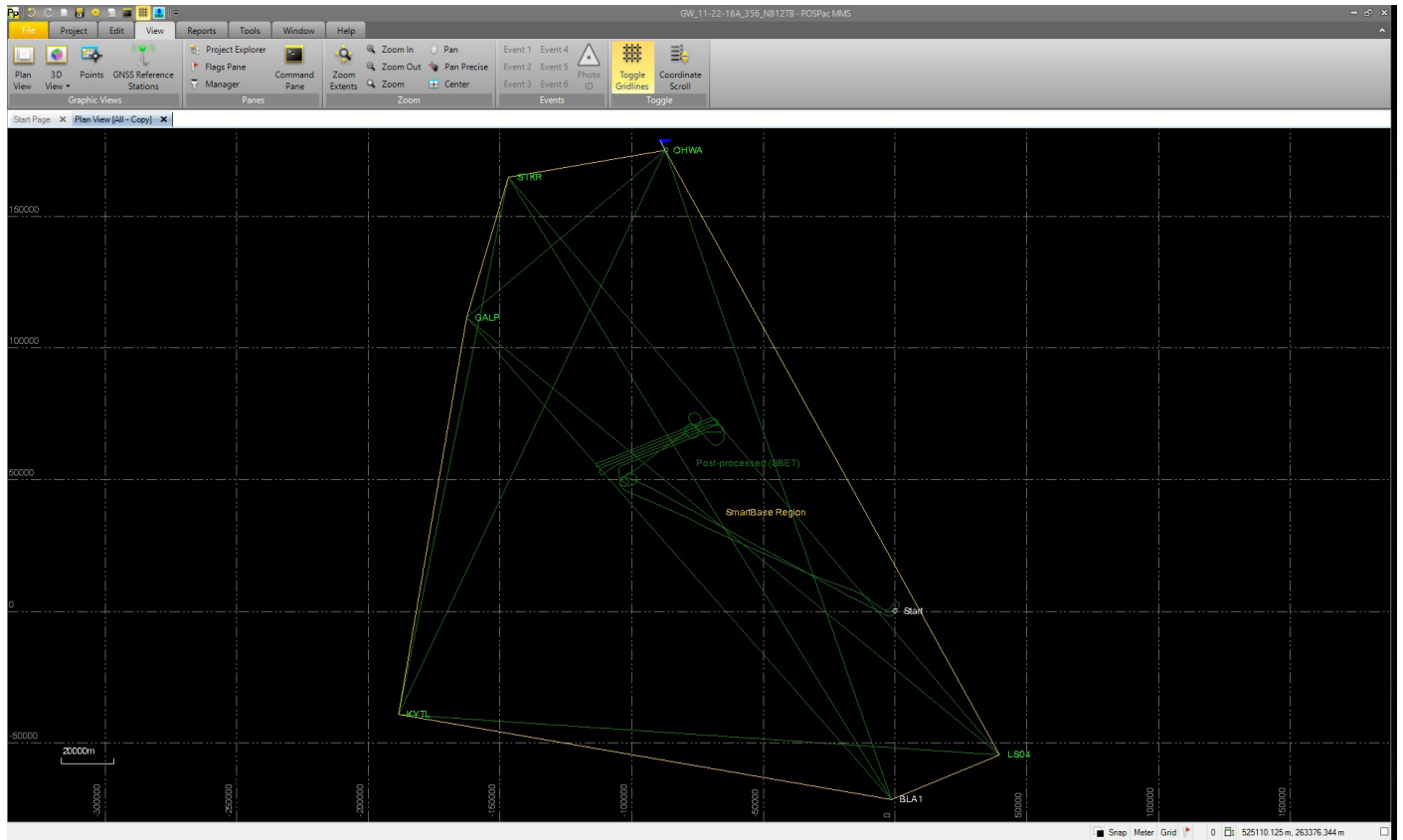
Ready

Display - GW_11-22-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

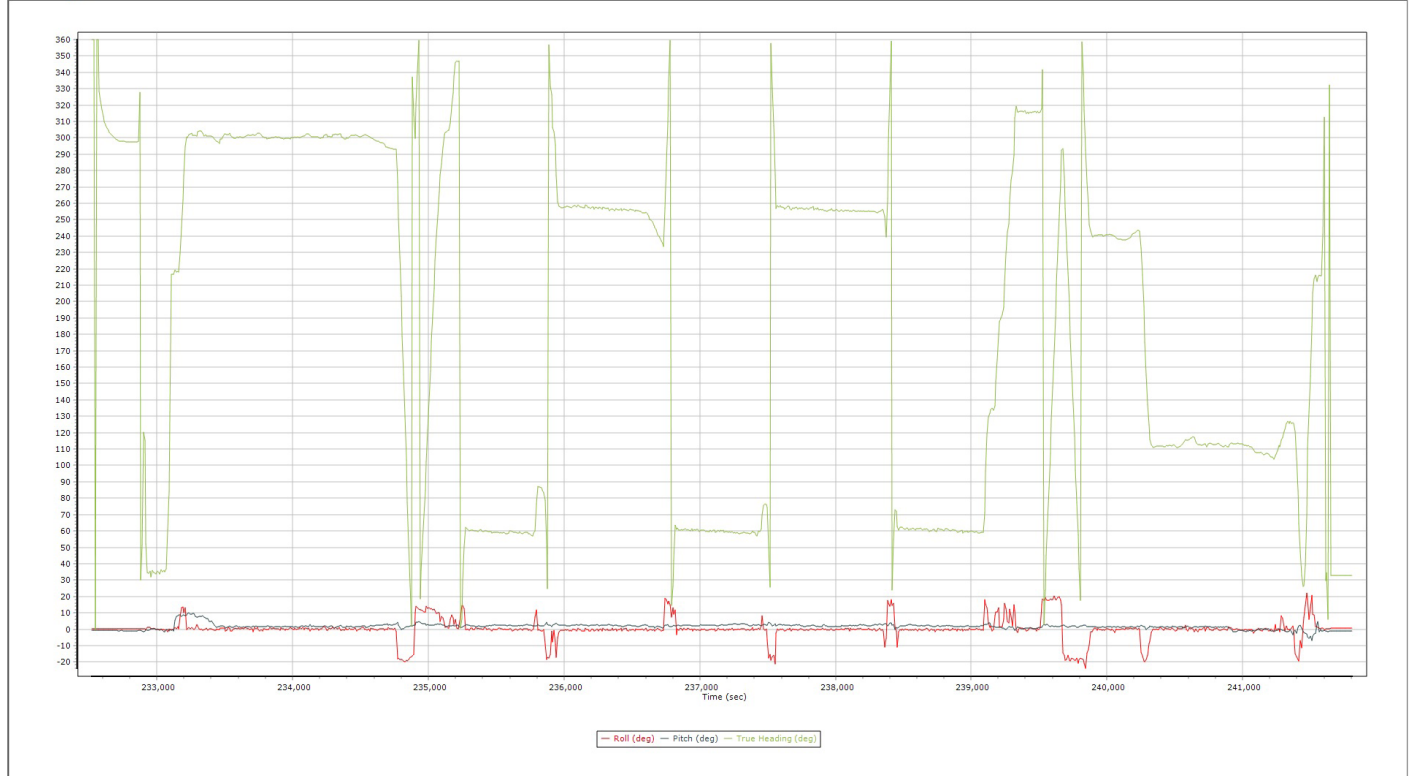


Ready



Display - GW_11-22-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height:

Method:

Manufacturer:

Type:

Offset from Measured Point to APC:

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

Secondary Service ID:

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Flight Log

Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc

(email log daily to flight_log_distribution_list@quantumspace.com) (2-0161122A-356)

Date: Nov 22nd, 2016

LITE (A) B C D E Pg. 1 of 1

Project: W.VIRGINIA FEMA 2016 Proj #: 29331

Flight Mgmt File: 29331-FEMA-WV-NW-Galaxy1950m

Aircraft: N812TB Begin Hobbs: 4174.3 End Hobbs: 4176.6 Total: 2.3 Pilot: C. STEVENSON Co-Pilot: - Tech: HRCBAM

Dep Apt: KLLWB Dep Time (Ldt): 11:45A [Z]: 16:45Z Arr Apt: KLLWB Arr Time (Local): 14:06 [Z]: 19:06Z Tot Time Aloft: 2:21

CORS: Y/N Sta 1: WVCH CORS Sta 2: - Flyovers: Y/N If Y, times: Sta 1] 17:12 Z 4:10:43, Sta 2] -

GPS Unit: Y/(N) Sta 1: - Sta 2: - Flyovers: Y/N If Y, times: Sta 1] - Sta 2] -

Gd Temp beg: +02 °C End: +06 °C OAT beg: +04 °C End: +06 °C Altimeter begin: 30.30" end: 30.32"

Type	Serial #	Alt	Alt	Avg Terr	Max	Avg Pt
LIDAR	OPTICA GALAXY	S060356	AGL 1950 m	Ht VARIES	Gapped 141 kts	Spending 0.64 m
FOV 43°/21.5°	Scan Freq	52.0 Hz	MPIA Y/N	Pulses In Air / Pulse/Fram Rate	Power HIGH	PPSM 2.96

Line #	Hdg	Start UTC	End UTC	Gd Spd	POOP/Sats	GPS Altitude	Crsb	Turb
--------	-----	-----------	---------	--------	-----------	--------------	------	------

1	ENE	17:22	17:29	130 kts	1.3/15	7430'	8°	0
2	WSW	17:33	17:42	115 kts	1.3/15	7430'	9°	0
3	ENE	17:47	17:57	130 kts	1.0/16	7350'	7°	0
4	WSW	17:59	18:12	115 kts	1.2/15	7320'	10°	0
5	ENE	18:14	18:24	135 kts	1.1/16	7300'	6°	0
16	NW	18:29	18:31	120 kts	1.0/18	7370'	1°	0

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. ("Fig 8" 017:12→17:18)

ovc above, clear below, smooth, h-z
ovc above, clear below, smooth, h-z
ovc above, clear below, smooth, h-z
ovc above, clear below, smooth, h-z
ovc above, clear below, smooth, h-z
ovc above, clear below, smooth, h-z

[CROSS LINE] (PARTIAL)

("Fig 8" 18:31→18:37)

[LANDED TO ENSURE DATA COULD BE FEDEXED FOR TOMORROW DELIVERY TO ENSURE PLANNED SENSOR SETTINGS]

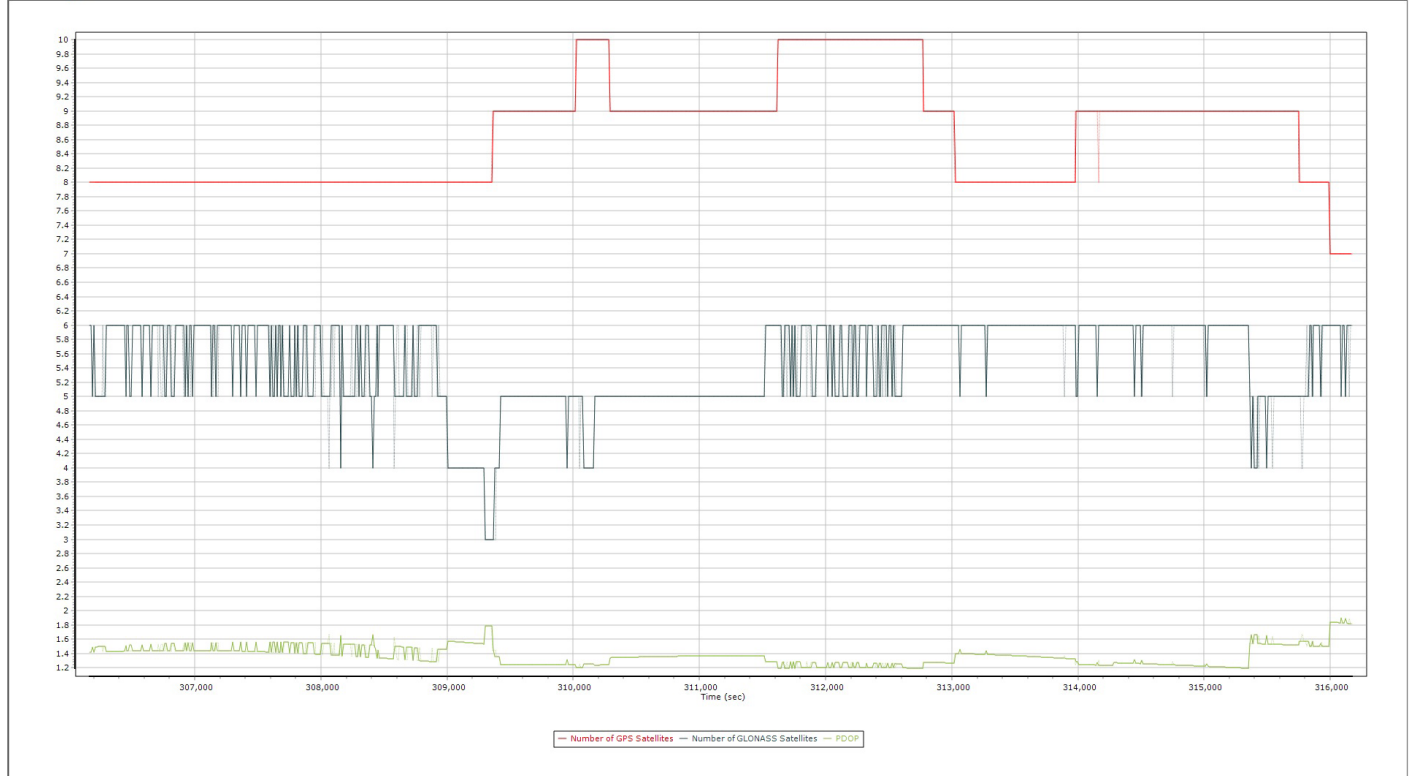
YIELD APPROPRIATE DATA PARAMETERS]

Total Proj Lines:	16	Lines Flown:	5	Lines Remain:	11	Online Time:	1:09	Job Time:	1:12	Notes:	(20161122A-356)
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Nov 23, 2016-A (N812TB, SN356)

Display - GW_11-23-16A_356_QC_ONLY - Solution Status

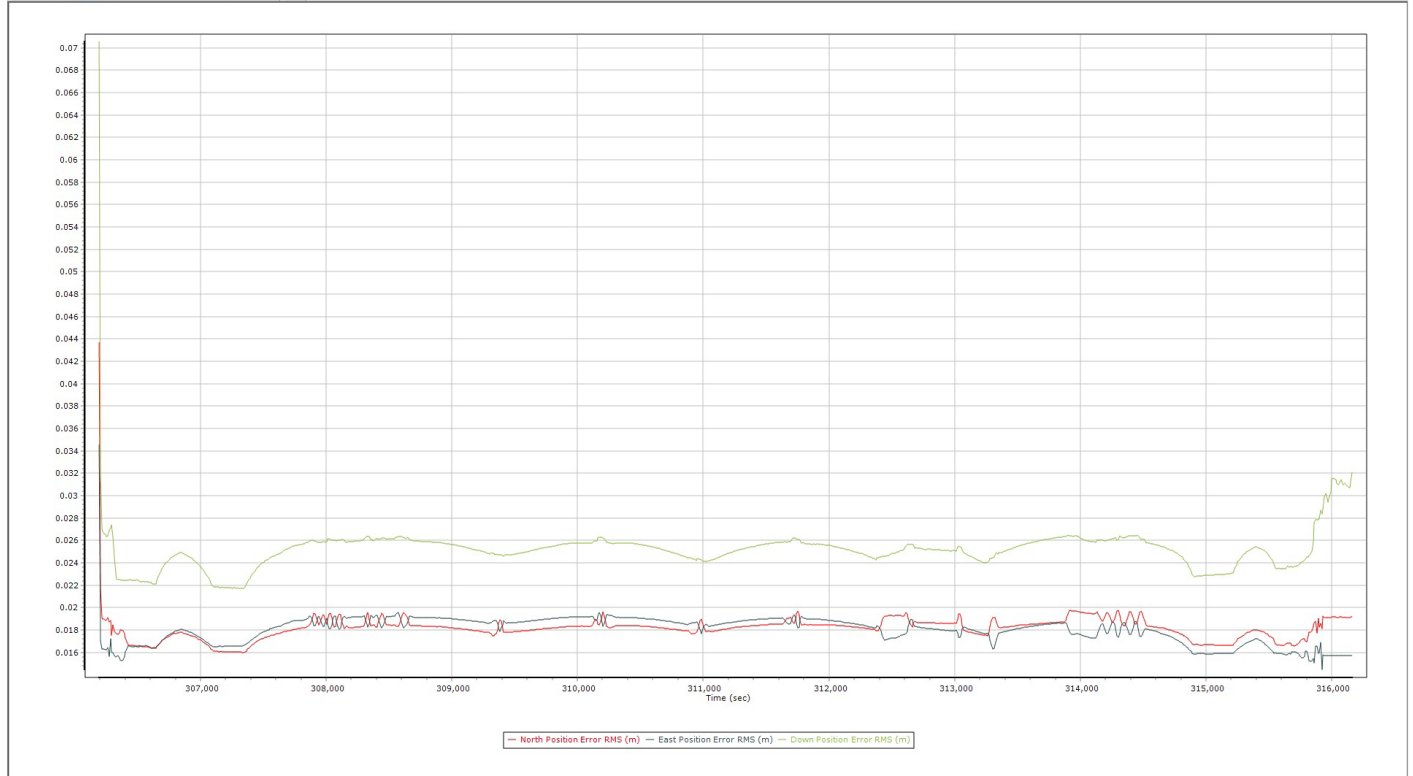
File Edit Tools View Help



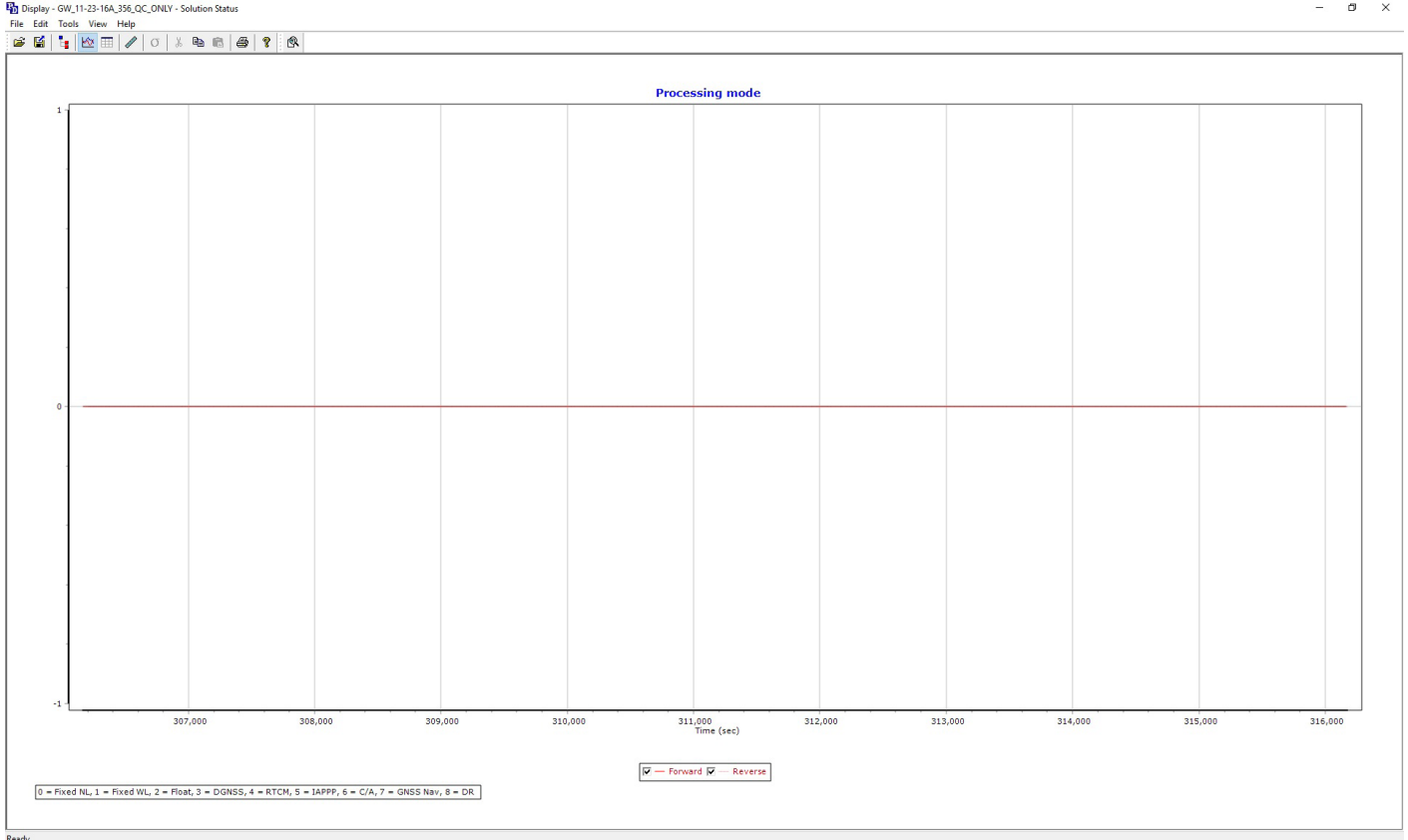
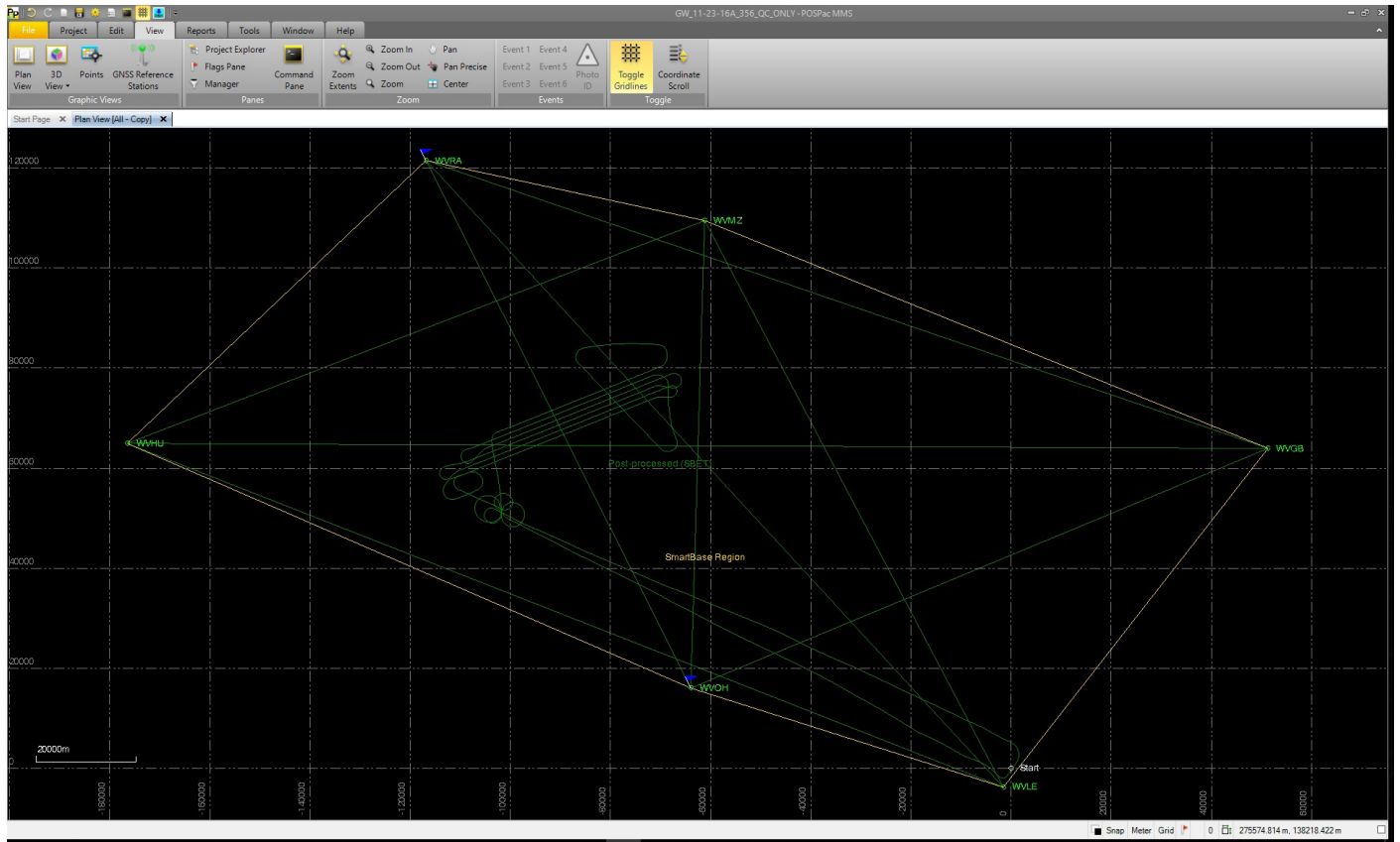
Ready

Display - GW_11-23-16A_356_QC_ONLY - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

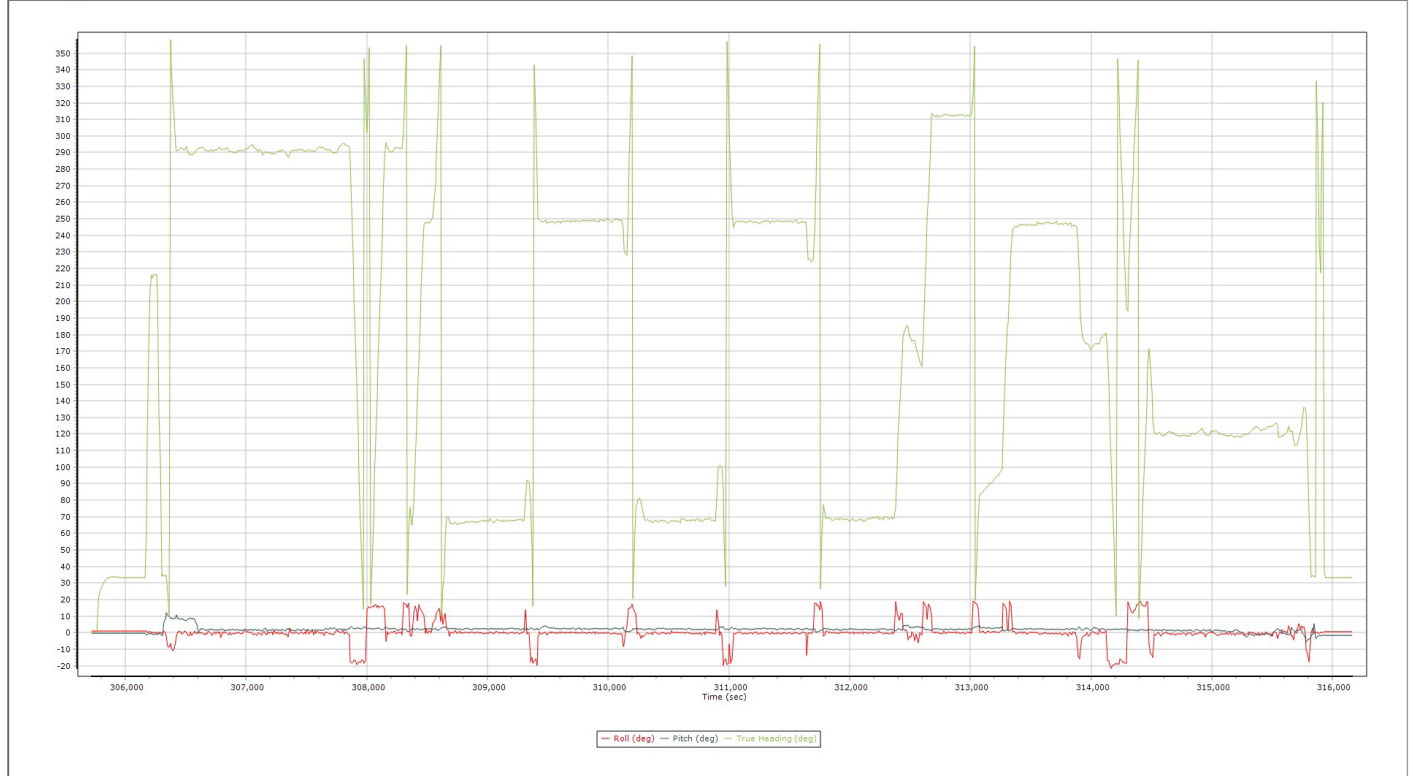


Ready



Display - GW_11-23-16A_356_QC_ONLY - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc

(email log daily to flight_log_distribution_list@quantumspace.com)

(20161123A-Gelny-338)

Date: Nov 23 rd, 2016

LINE A B C D E

Pg 1 of -

Project: W. VIRGINIA FEMA 2016 Proj #: 29331 Flight Mgmt File: 29331.FEMA-WV_NW.GMAXY1950m
Altitude: N912TB Begin Hobbs: 4176.6 End Hobbs: 4179.2 Total: 2.6 Pilot: C. STEVENSON Co-Pilot: - Tech: P. HRABAK
Dep Apt: KLTWB Dep Time (Ldt): 8:05 Zt: 13:05Z Arr Apt: KLTWB Arr Time (Local): 9:44 Zt: 15:44Z Tot Time Aloft: 2:39
CORRS: Y/N Sta 1: WVCH COB Sta 2: - Flyovers: Y/N If Y, times: Sta 1) 13:30 & 15:15z Sta 2) -
GPS Unit: Y/N Sta 1: "GVAP" Sta 2: - Flyovers: Y(N) If Y, times: Sta 1) STARTL Sta 2) -

Gd Temp beg: -05 °C End: +02 °C OAT beg: +06 °C End: +06 °C Altimeter begin: 30,25" end: 30,25"
LIDAR Type OPTTECH GMAXY Serial # S060350 Alt AGL 1950m Alt VARIES Max Gddpd 141 kts Spacing 0.64 m Storage Nameplate 105036
FOV 43°/215° Scan Freq 52.0 Hz MPJA Y/N Pulses 4/pulse 300 kHz Power HIGH PRPM 2.96 Tor 38.1

Line #	Hdg	Start [UTC]	End [UTC]	Gd Spd	POD/Sun	GPS Altitude	Crb	Turb (0.-+)
--------	-----	-------------	-----------	--------	---------	--------------	-----	-------------

6	ENE	13:44	13:55	130 kt	1.0/18	7300'	2°	0
7	WSW	13:57	14:08	120 kt	0.9/19	7300'	1°	0
8	ENE	14:12	14:21	130 kt	1.0/18	7350'	1°	0
9	WSW	14:24	14:33	125 kt	1.1/17	7350'	1°	0
10	ENE	14:37	14:46	130 kt	1.0/18	7350'	1°	0
11	NW	14:51	14:56	135 kt	1.1/17	7370'	3°	0
	WSW	15:02	15:11	125 kt	1.1/16	7370'	2°	0

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. (FIG 8 @ 13:31 → 13:36)

high thin scab, clear below, smooth, -hz
high thin blk, clear below, smooth, -hz
high thin blk, clear below, smooth, -hz
high thin blk, clear below, smooth, -hz
blk above, clear below, few below near, smooth, -hz
one above, clear below, few below near, rain/wing nearby, smooth, -hz
one above, clear below, few below near, rain/wing nearby, smooth, -hz (REFLY)
↑ encountered wing @ W 1/2, affected ranges -VOID?

(FIG 8 @ 15:16 → 15:21)

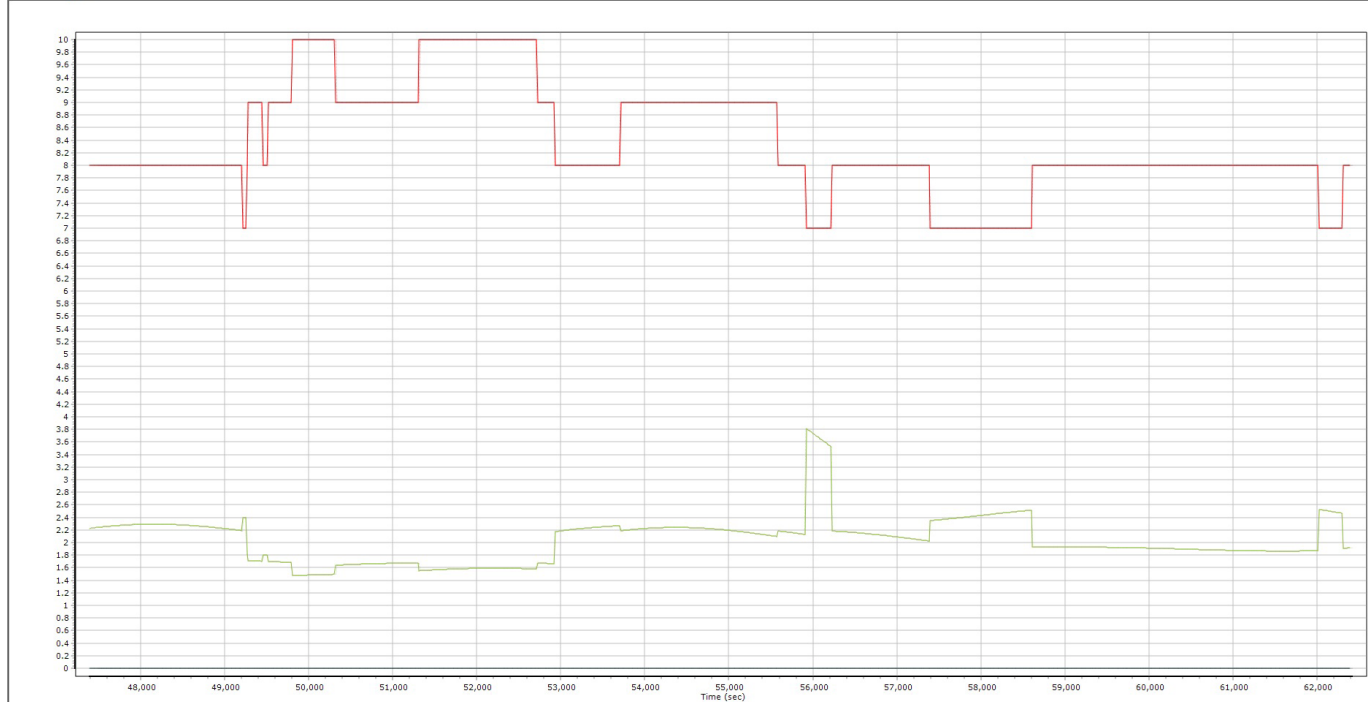
[LANDED DUE TO RAPIDLY DEGRADATING ATMOSPHERICS]

Total Proj Lines: 16 Lines Flown: 7 Lines Remain: 5 Online Time: 1:27 Mob Time: 1:12 Notes: (20161123A-Gelny-338)

Nov 27, 2016-A (N812TB, SN356)

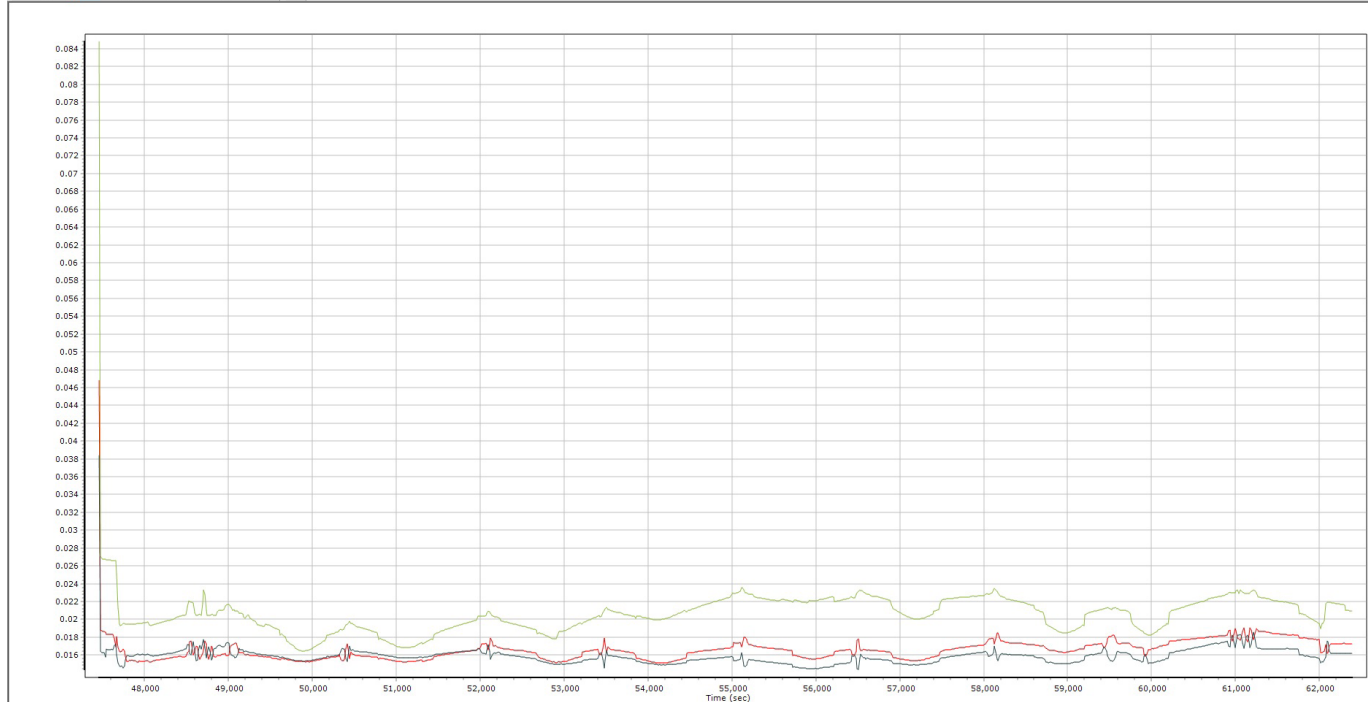
Display - GW_11-27-16A_356_N812TB - Solution Status

File Edit Tools View Help



Ready
Display - GW_11-27-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

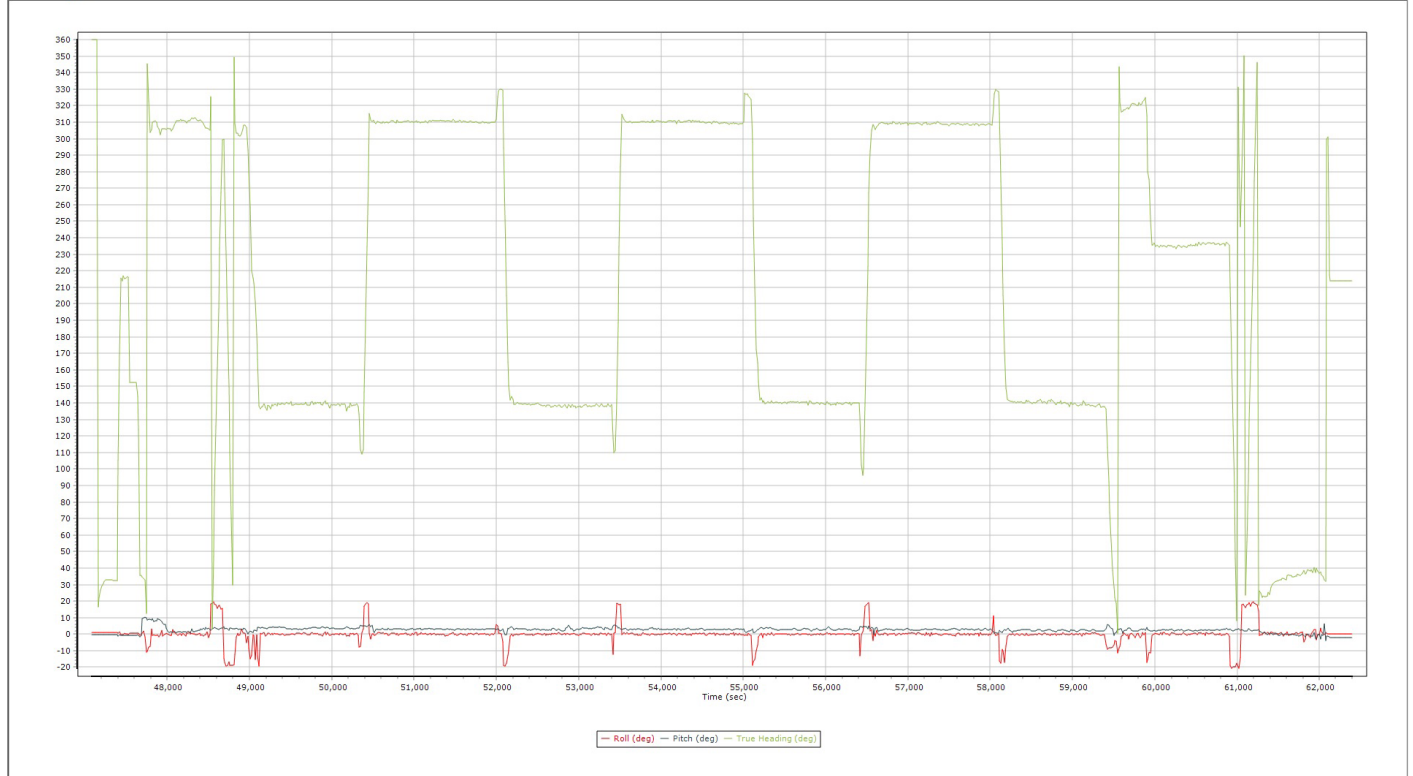


Ready



Display - GW_11-27-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Frame

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Ground Reference Point (GRP) coordinates

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

[illegible]

Nov 27, 2016-B (N812TB, SN356)

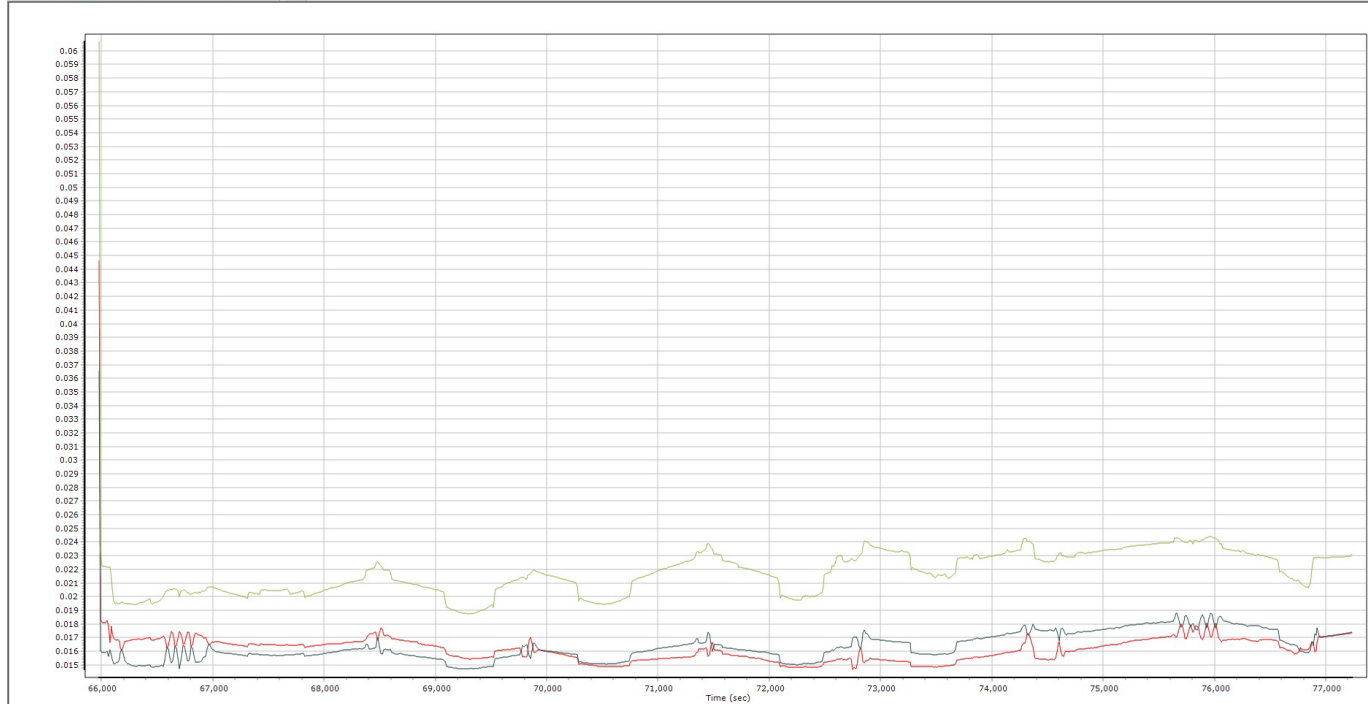
Display - GW_11-27-168_356_N812TB - Solution Status

File Edit Tools View Help

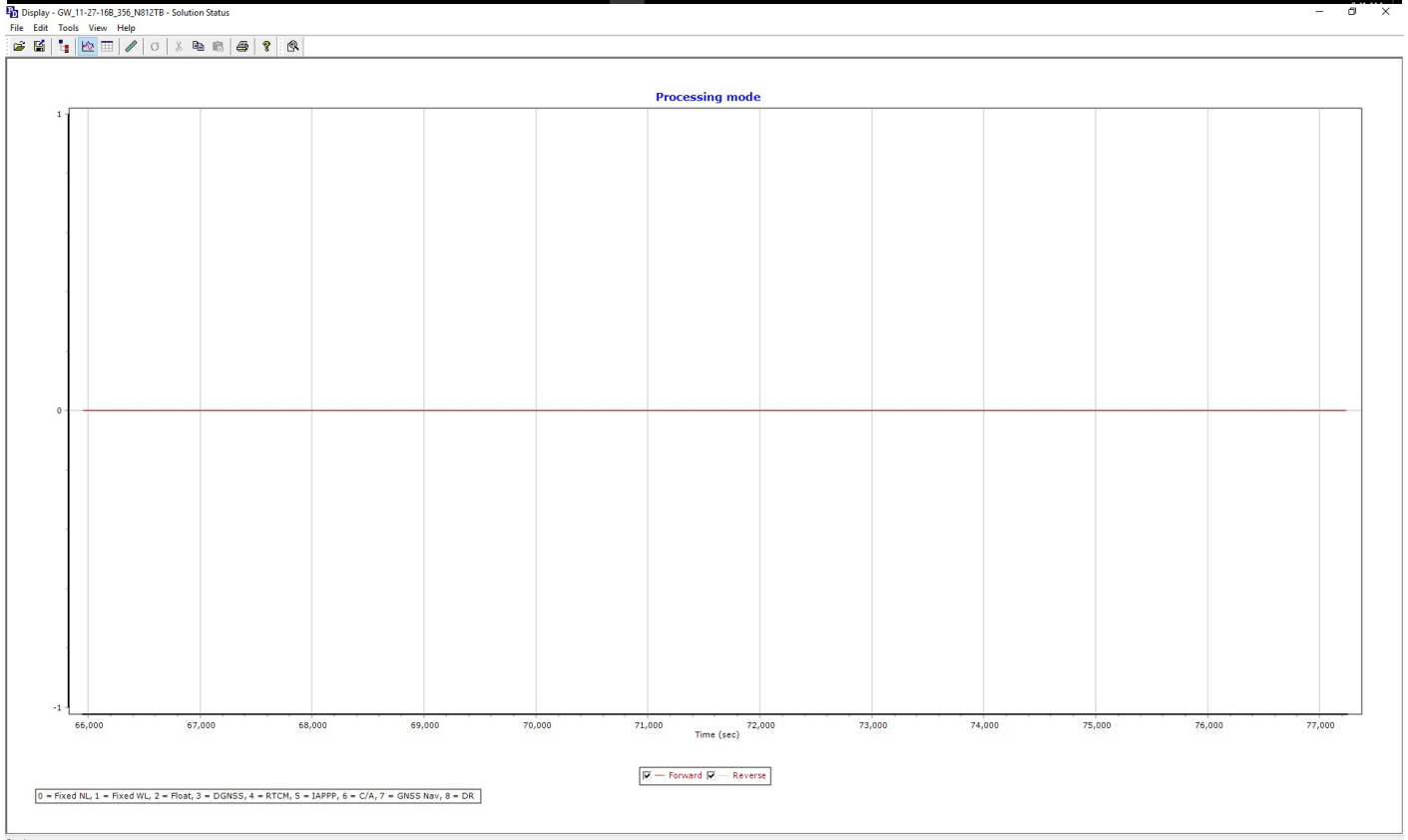
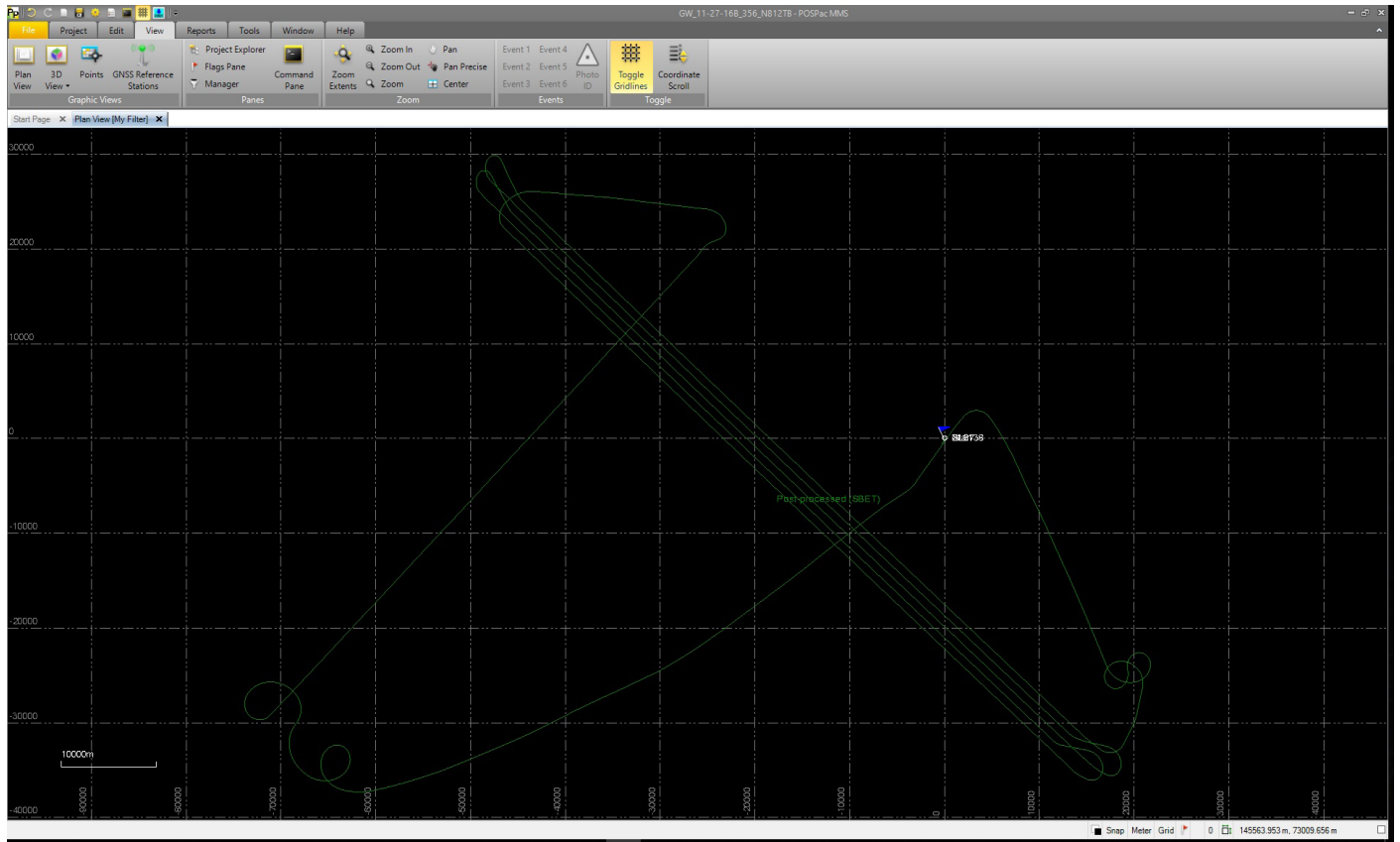


Ready
Display - GW_11-27-168_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

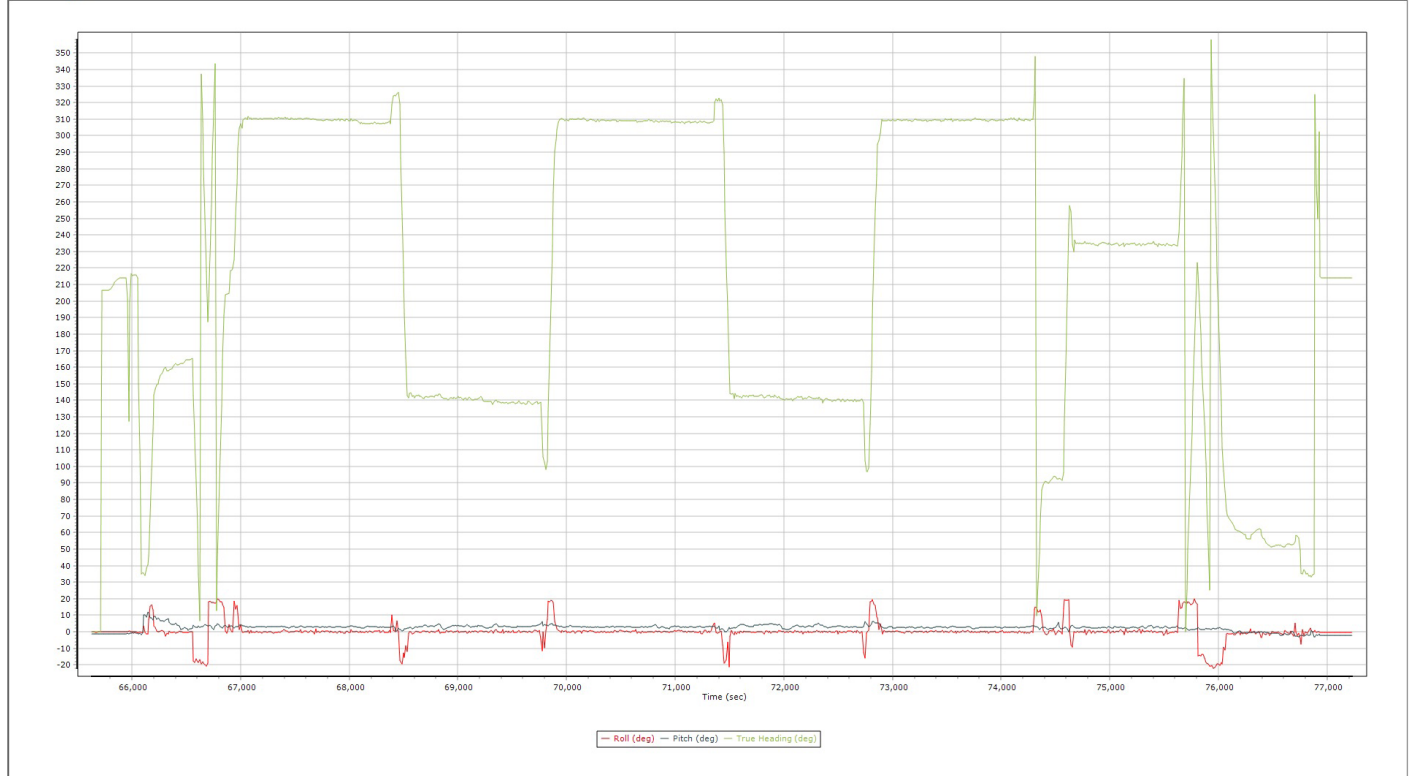


Ready



Display - GW_11-27-168_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID **DL6738**

Coordinates

Latitude **N** 37 51 22.96505000

Longitude **W** 80 24 17.69345000

Altitude 663.6450 m

☐ Decimal Degrees

Ground Reference Point (GRP) coordinates

Antenna Frame

Height 2.000m

Method **Antenna Phase Center**

Manufacturer **NovAtel**

Type **701-GG 1.03**

Offset from Measured Point to APC 0.000 m

Apply Changes

Station Database

Station ID **DL6738**

Station Fullname **DL6738**

Primary Service ID **Edit**

Coordinate Accuracy **UNKNOWN_ACC**

Secondary Service ID **Edit**

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log

Airborne LiDAR Data Collection Log Sheet :: Quantum Spatial, Inc

Date: NOVEMBER 27th, 2016

Project: W. VIRGINIA FEMA 2016

Flight Mgmt File: 29331 - FEMA - WV Galaxy - 1550m - S

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

Aircraft: N812TB

Begin Hobbs: 4183.1

End Hobbs: 4186.1

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

Dep Apt: KLLWB

Dep Time (Ldt): 13:21 Z

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

CORS: 01 N

Sta 1: WVLE CORS

Sta 2: -

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

GPS Unit: 01 N

Sta 1: "GVAP" (0 KLLWB)

Sta 2: -

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

Gd Temp beg: +06 °C

End: +08 °C

OAT beg: 008 °C

End: +02 °C

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

Type: OPTICAL GALAXY

Serial #: 50600352

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

FOV: 21.5/43°

Scan Freq: 52.0 Hz

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

Mag CB: 153.9

End CB: 217.6

Tot CB: 63.7

Scale: 1050 g/s

Unit: s/h

Alt: 1550m

End Hobbs: 4186.1

Total: 3.0

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HARRIS

Line #

Start (UTC)

End (UTC)

Gd Spd

PDOP/sats

GPS Altitude

Crab

Turb (0-4)

Alt

AMSL

VARIABLES

Avg Pt

Spd

PPSM

Mag CB

End CB

Tot CB

Scale

Unit

65

NW 18:37

18:59

115 kts

1.1/19

7500'

3°

0

1550m

1410 kts

116 ft

3.06

153.9

217.6

63.7

1050 g/s

s/h

64

SE 19:03

19:22

135 kts

1.1/19

7500'

9°

0

1550m

1410 kts

116 ft

3.06

153.9

217.6

63.7

1050 g/s

s/h

63

NW 19:26

19:49

115 kts

1.1/20

7500'

3°

0

1550m

1410 kts

116 ft

3.06

153.9

217.6

63.7

1050 g/s

s/h

62

SE 19:52

20:12

130 kts

1.2/20

7500'

8°

0

1550m

1410 kts

116 ft

3.06

153.9

217.6

63.7

1050 g/s

s/h

61

NW 20:16

20:38

115 kts

1.2/20

7500'

4°

0

1550m

1410 kts

116 ft

3.06

153.9

217.6

63.7

1050 g/s

s/h

73

SW 20:44

21:00

135 kts

1.1/20

7020'

12°

0

1550m

1410 kts

116 ft

3.06

153.9

217.6

63.7

1050 g/s

s/h

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. ("F16 8" 18:29 → 18:34)

clear above & below, smooth, -h2 (SWAMP CONTROL WARNING & START OF LINE)

clear above & below, smooth, -h2

clear above & below, smooth, -h2 ("TARGET ANGLE IS BEYOND THE BOUNDARIES FOR AERIAL PHOTOGRAPHY")

clear above & below, smooth, -h2

clear above & below, smooth, -h2 (REALTIME SWATH DEPICTS ADDITIONAL STRAITS OF LINE)

clear above & below, acc - turn, -h2 (CROSS LINE)

("F16 8" 21:00 → 21:06)

[LANDED TO FACILITATE PILOT ROTATION DYNAMICS]

Total Proj Lines: 74

Lines Flown: 6

Lines Remain: 60

Online Time: 2:23

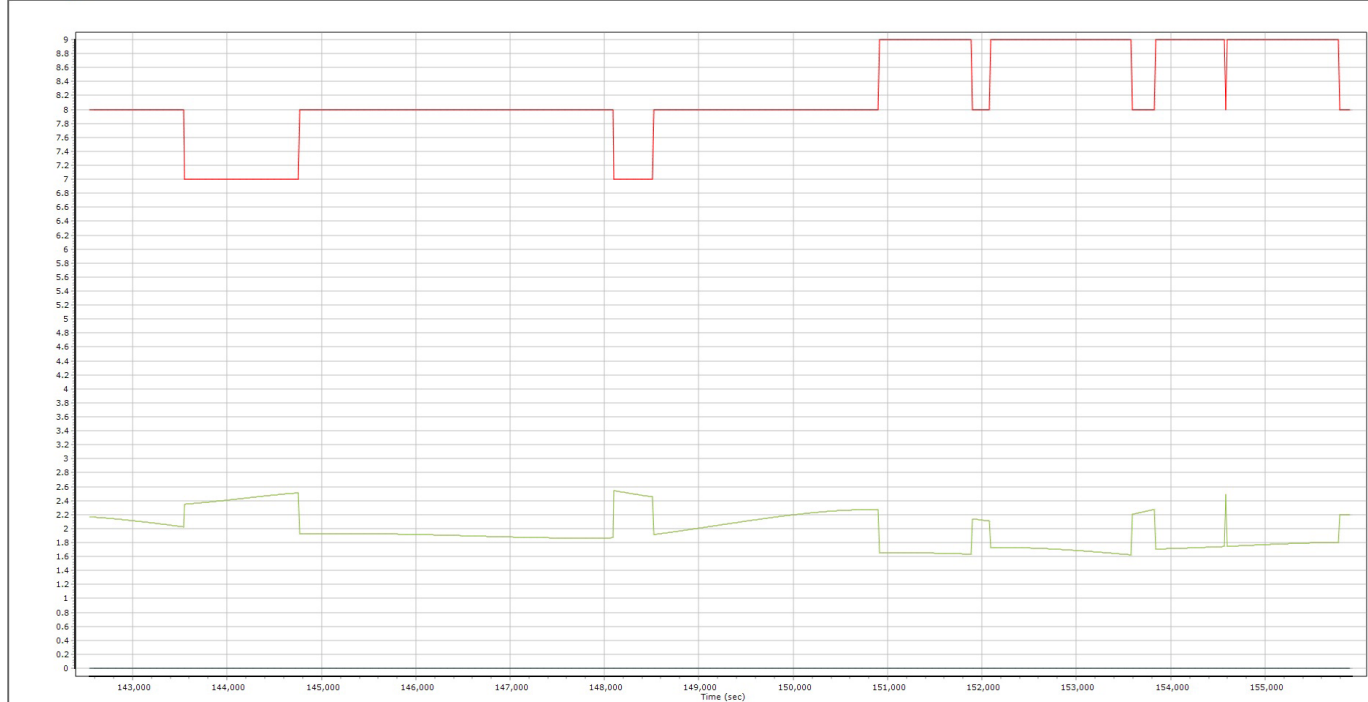
Job Time: 0:37

Notes: 20161127B - GALAXY - 352

Nov 28, 2016-A (N812TB, SN356)

Display - GW_11-28-16A_356_N812TB - Solution Status

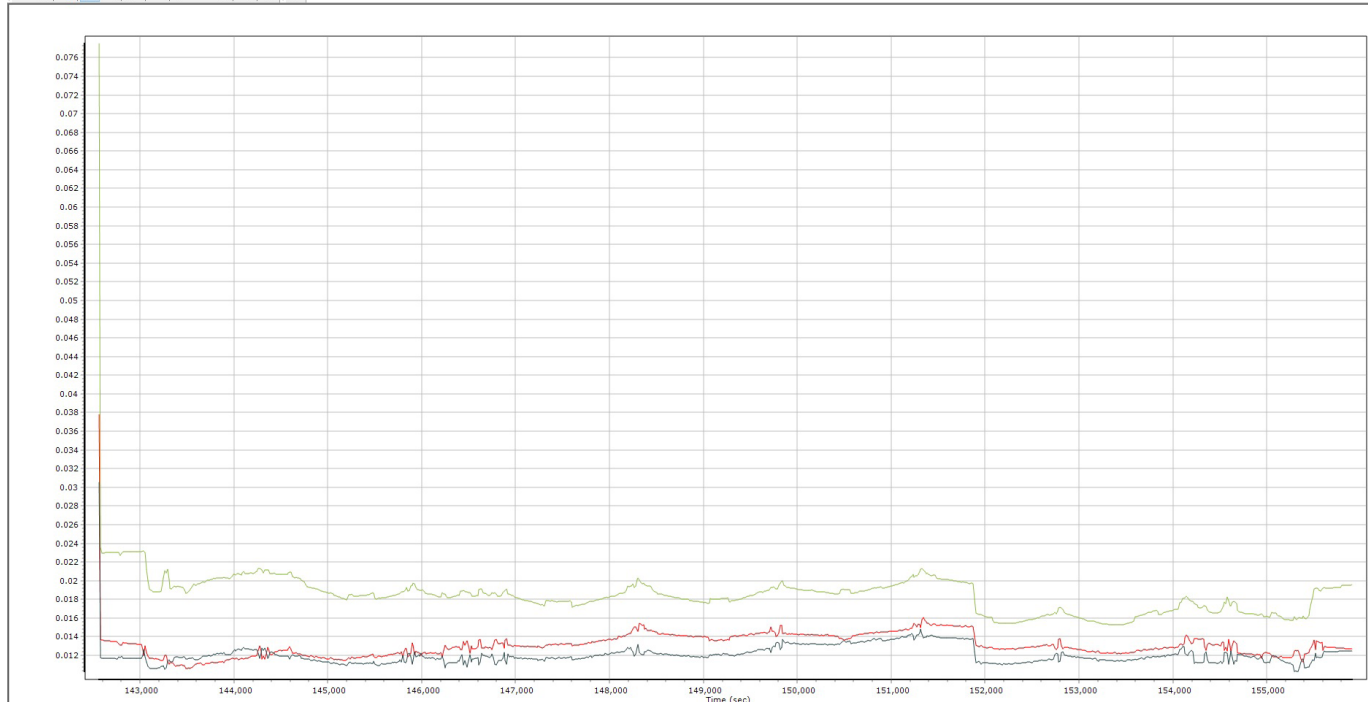
File Edit Tools View Help



— Number of GPS Satellites — Number of GLONASS Satellites — PDOP

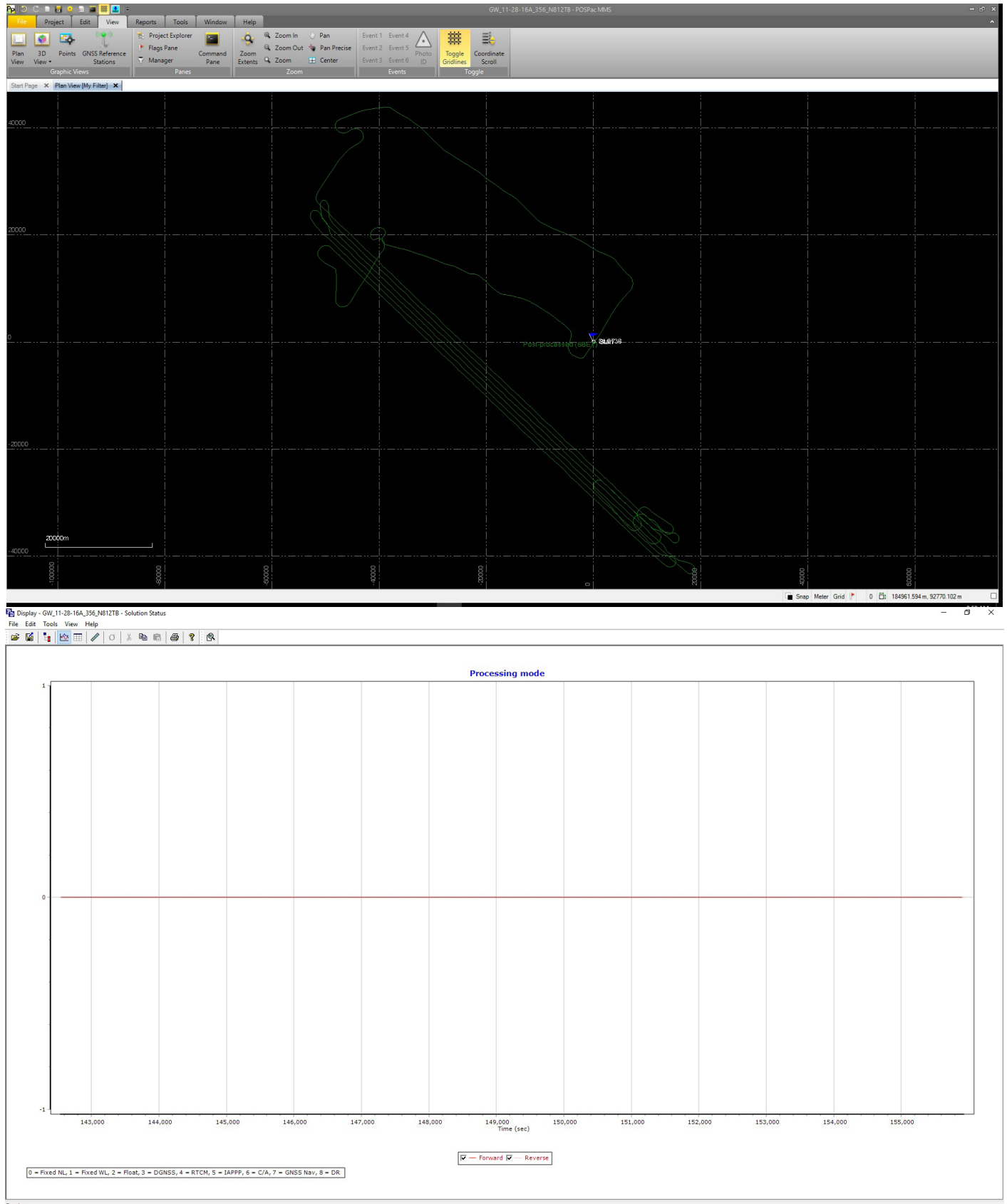
Ready
Display - GW_11-28-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



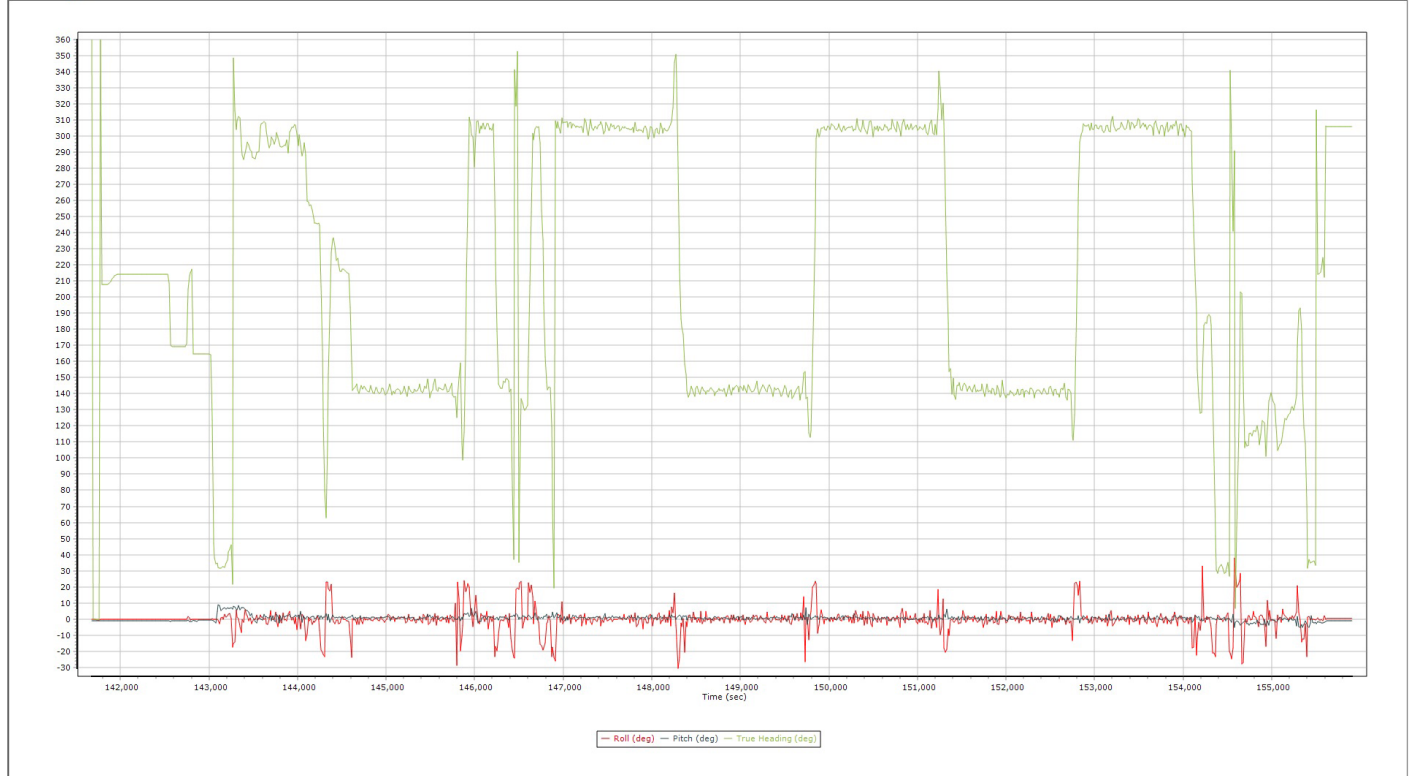
— North Position Error RMS (m) — East Position Error RMS (m) — Down Position Error RMS (m)

Ready



Display - GW_11-28-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Frame

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Ground Reference Point (GRP) coordinates

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Project: W. VIRGINIA FEMA 2016

Project #: 29331

Flight Mgmt File: 29331_FEMA_WV_Gelzxy_1550m_S

Aircraft: NB12TB

Begin Hobbs: 4186.1

End Hobbs: 4189.5

Total: 3.4

Pilot: B. PHILLIPS

Co-Pilot: -

Tech: P. HRABAK

Dep Apt: KLVW

Dep Time (Lcl): 10:44 (Z): 15:44 (Z)

Arr Apt: KLVW

Arr Time (Local): 14:10 (Z): 19:10 (Z)

Tot Time Aloft: 3:26

CORS: (Y) N

Sta 1: WVLE CORS

Sta 2: -

Flyovers: Y / (N)

IF Y, times: Sta1) STATIC

Sta2) -

GPS Unit: (Y) N

Sta 1: "GVAP" (KLVW)

Sta 2: -

Flyovers: Y / (N)

IF Y, times: Sta1) STATIC

Sta2) -

Gd Temp beg: +02 °C

End: +09 °C

OAT beg: +10 °C

End: +11 °C

Altimeter begin: 30,000' end: 29,980'

Date: November 28th, 2016

Log #: 00000000

Page: 1 of 1

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POD/Sats	GPS Altitude	Crab	Turb (0-1)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. (Storage 16:04 → 16:06)
60	SE	16:11	16:29	140 kts	1.3/14	7540'	9°	0	no clouds below, over above, smooth, significant haze/smoke (*) (VOID)
59	NW	16:34	16:36	120 kts	1.2/15	7540'	9°	0	no clouds below, over above, smooth, significant haze/smoke (*) (VOID)
59	NW	16:49	17:09	125 kts	1.2/15	7540'	7°	0	no clouds below, over above, occ -turb, significant haze/smoke (REFUGIT OF ABOVE)
58	SE	17:13	17:34	130 kts	1.1/17	7540'	8°	0	no clouds below, over above, occ -turb, significant haze/smoke
57	NW	17:39	18:00	125 kts	1.1/17	7550'	7°	0	no clouds below, over above, occ -turb, significant haze/smoke
56	SE	18:04	18:25	130 kts	1.0/19	7550'	10°	0	no clouds below, over above, occ -turb, significant haze/smoke
55	NW	18:28	18:48	135 kts	1.1/18	7540'	9°	0	few below nearby, over above, occ -turb, significant haze/smoke (***)
73	NE	18:53	18:55	150 kts	1.3/17	7600'	1°	0	few below nearby, over above, smooth, significant haze/smoke (CLASS TIME) (PARENT PLANNED)
(Storage 18:55 → 18:59)									
[Landed due to deteriorating atmospheric conditions & sensor concerns]									
* : USED SPONTANEOUSLY SHUT-OFF & BACK ON w/ A 15-SECOND GAP - NO RECOVERY CONDITION INDICATED									
** : WARNING OF "TARGET ANGLE IS BEYOND THE BOUNDARIES FOR GALAXY SYSTEM (1/30 DEG)"									
*** : (REALTIME SWATH) DEPICTION VERY NARROW, LARGE DIFF IN RANGE VALUES, SEEMS NO FIDELITY									

Total Proj Lines: 74

Lines Flown: 6

Lines Remain: 54

Online Time: 2:44

Mobile Time: 0:42

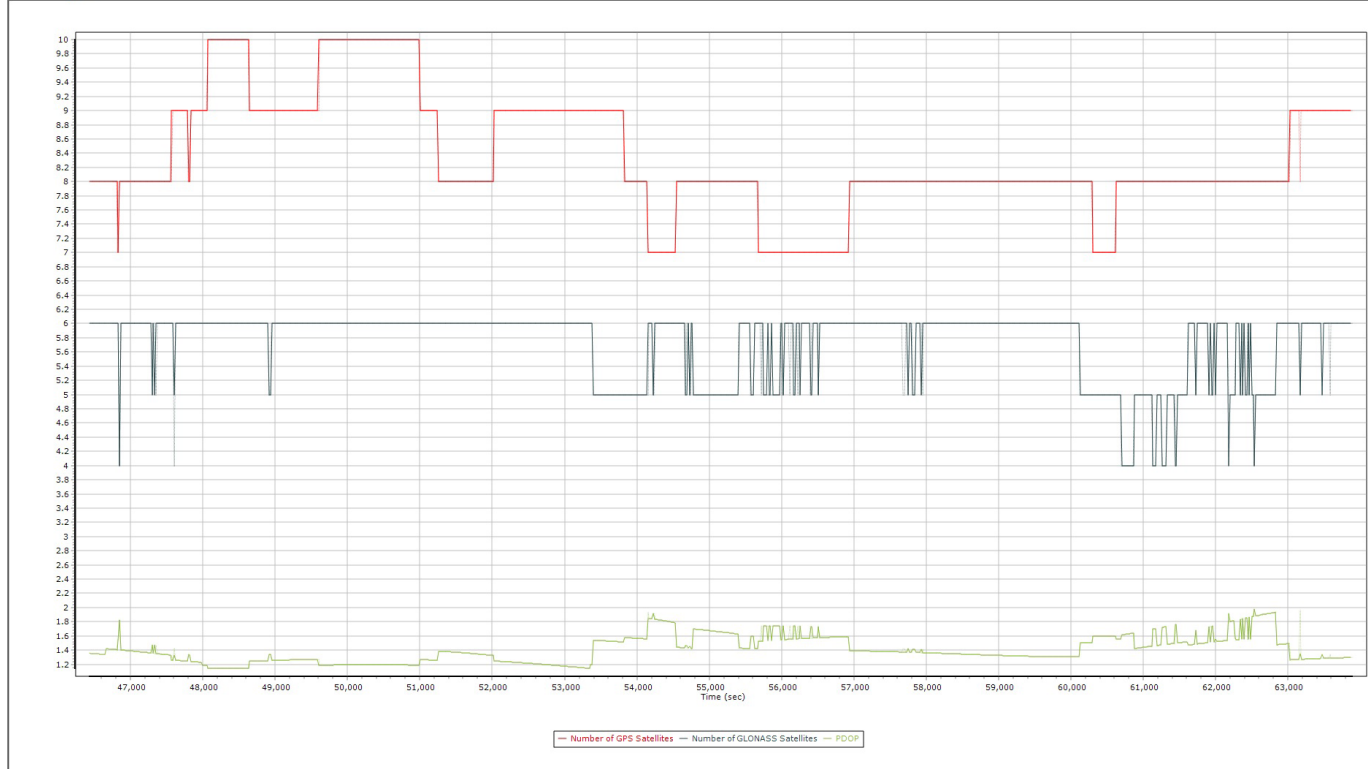
Notes:

13:45

Dec 4, 2016-A (N4181T, SN354)

Display - GW_12-04-16A_354_N4181T - Solution Status

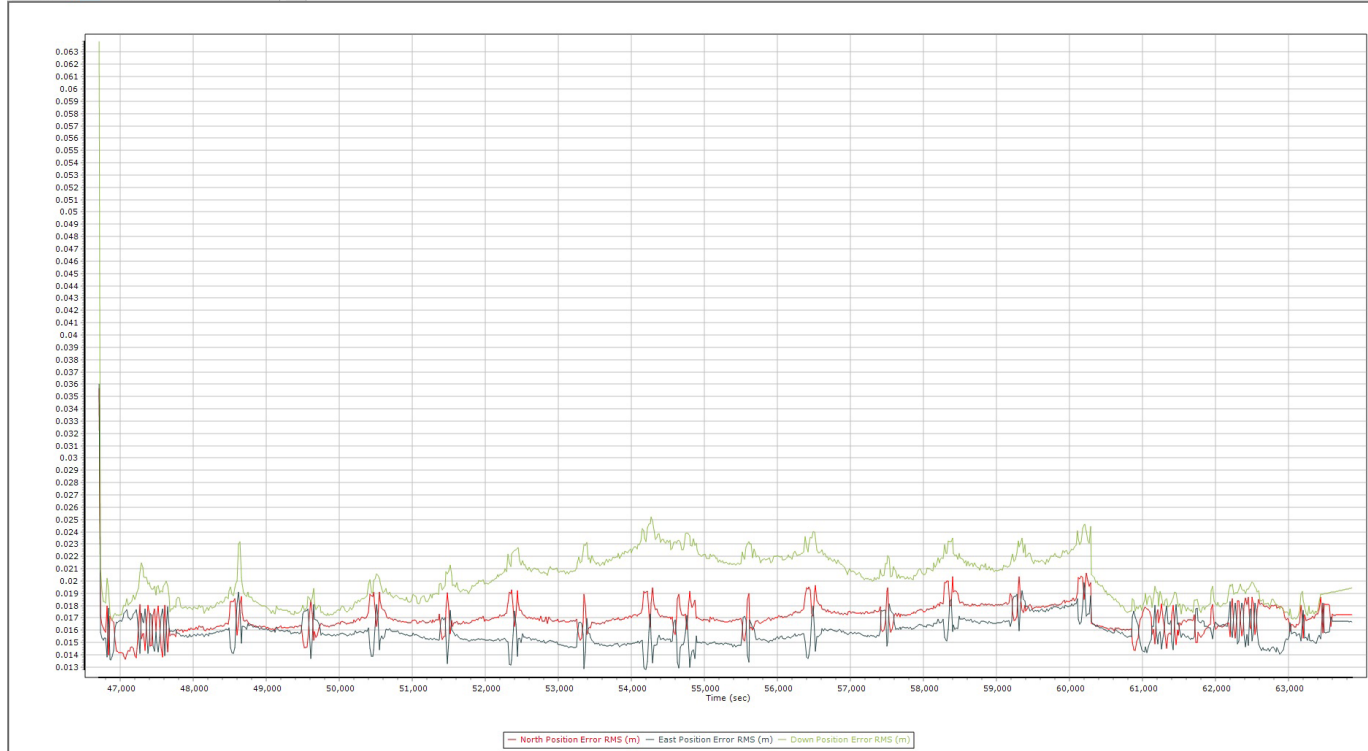
File Edit Tools View Help



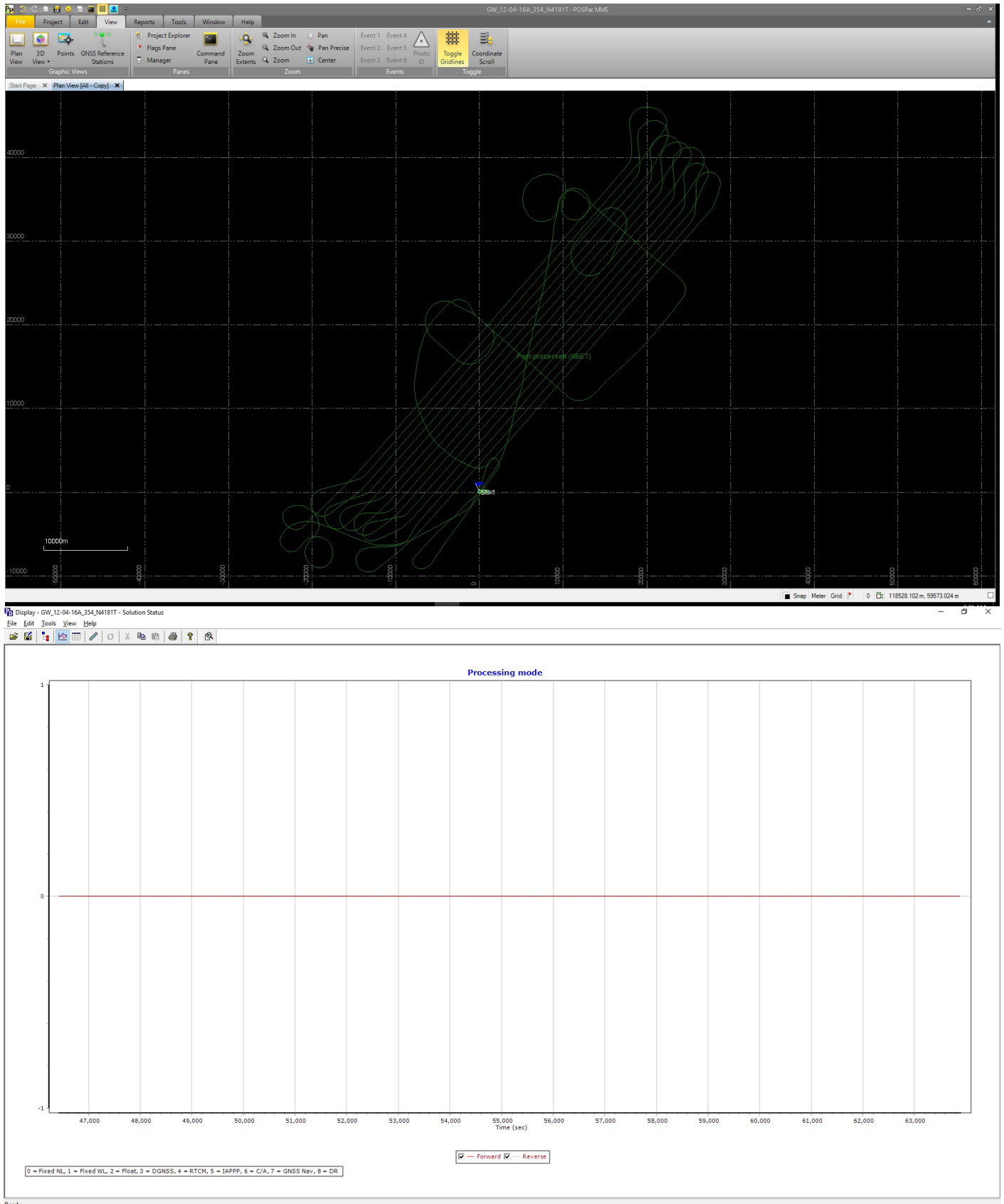
Ready

Display - GW_12-04-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

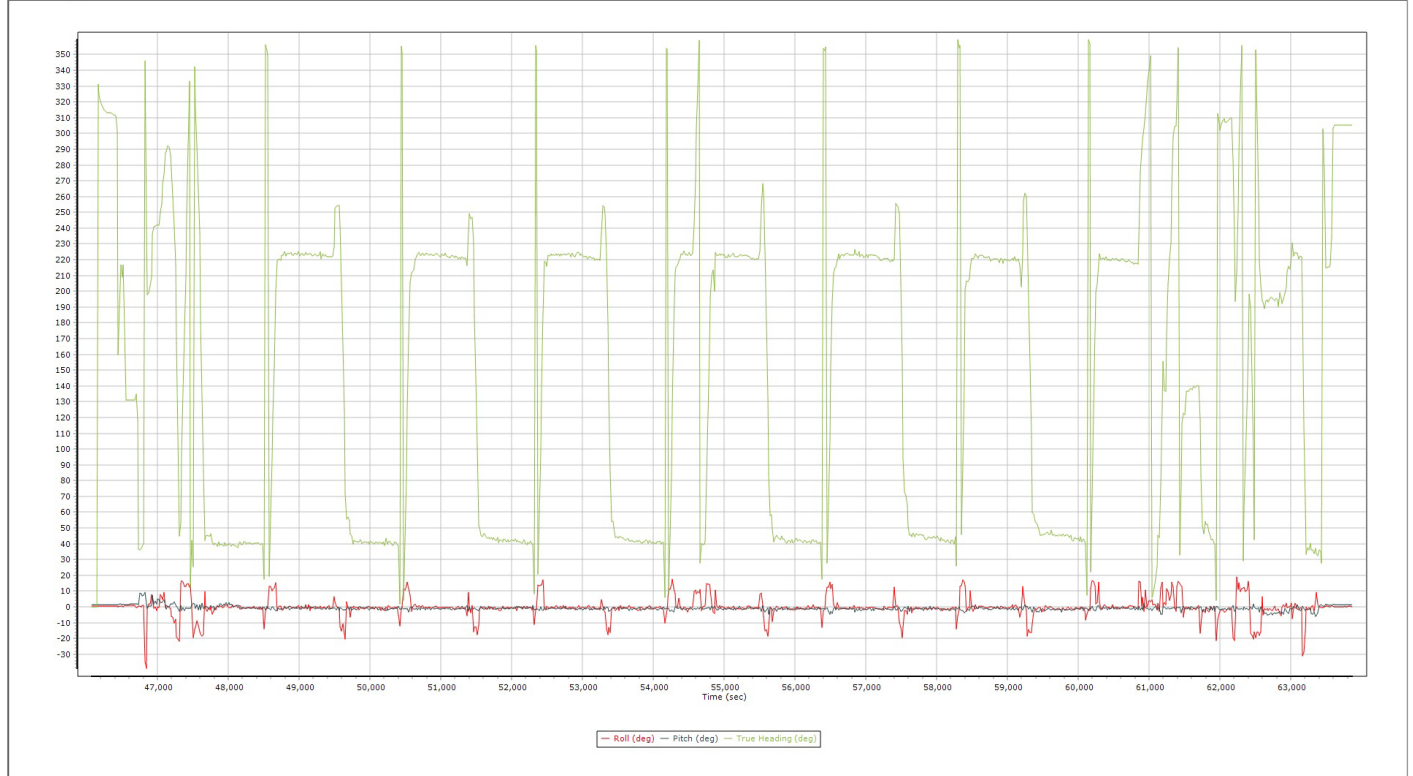


Ready



Display - GW_12-04-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID gw

Coordinates

Latitude N 37 51 22.96505000

Longitude W 80 24 17.69345000

Altitude 663.6450 m

☐ Decimal Degrees

Ground Reference Point (GRP) coordinates

Antenna Frame

Height 2.000 m

Method Antenna Phase Center

Manufacturer NovAtel

Type 702GG

Offset from Measured Point to APC 0.000 m

Apply Changes

Station Database

Station ID gw

Station Fullname gw

Primary Service ID Edit

Coordinate Accuracy UNKNOWN_ACC

Secondary Service ID Edit

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 4 / 2016 Pilot: JJ
 Project: 16PA-816 Operator: MLM
 Aircraft: N4181J
 Sensor: 5030354 HD: A

POS/AV Filename: Dec4a

Flight Plan		Weather
Roll Comp:	On	Pressure (gnd):
Scan Rate:	52	Temperature (gnd):
Pulse Rate:	250	Temperature (air):
Scan Angle:	21.5	Dew Point:
Desired Range:	1550	Turbulence:
Planned GPS:	130	Visibility:

[illegible]

Base Station	Location: KLWB
Point ID: DL6738	Time On(UTC): 12 10
Position Type: Kuwn	Time Off(UTC): 1800
Antenna Height: 2 Meters	PQOP: 1.2
Latitude: _____	SVs: 16

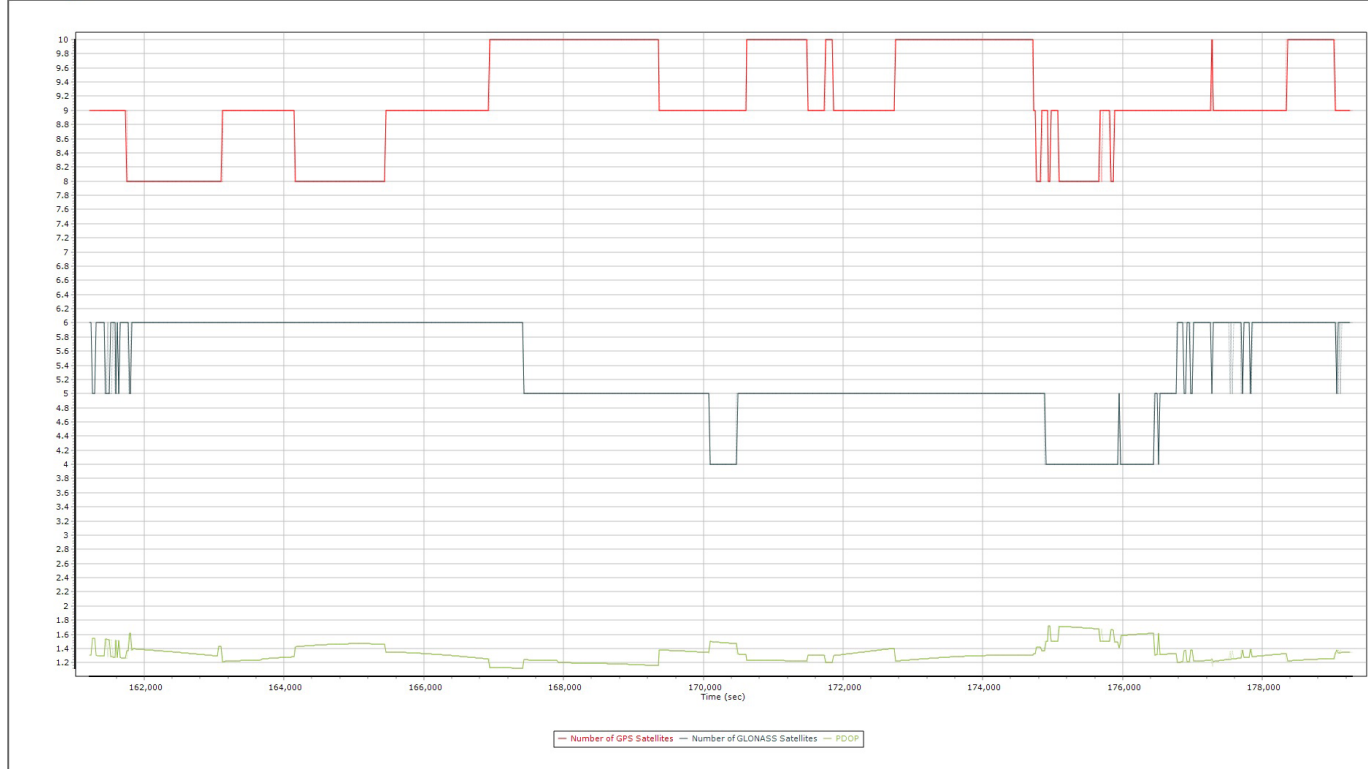
Airborne Station
Time On: 1249 UTC
Kinematic On: 1254 UTC
Kinematic Off: 1740 UTC

Engine Start(24HR LCL): 0735 Hobbs Start: _____
 Engine Stop(24HR LCL): 1247 Hobbs Stop: _____
 Page _____ of _____

Dec 5, 2016-A (N4181T, SN354)

Display - GW_12-05-16A_354_N4181T - Solution Status

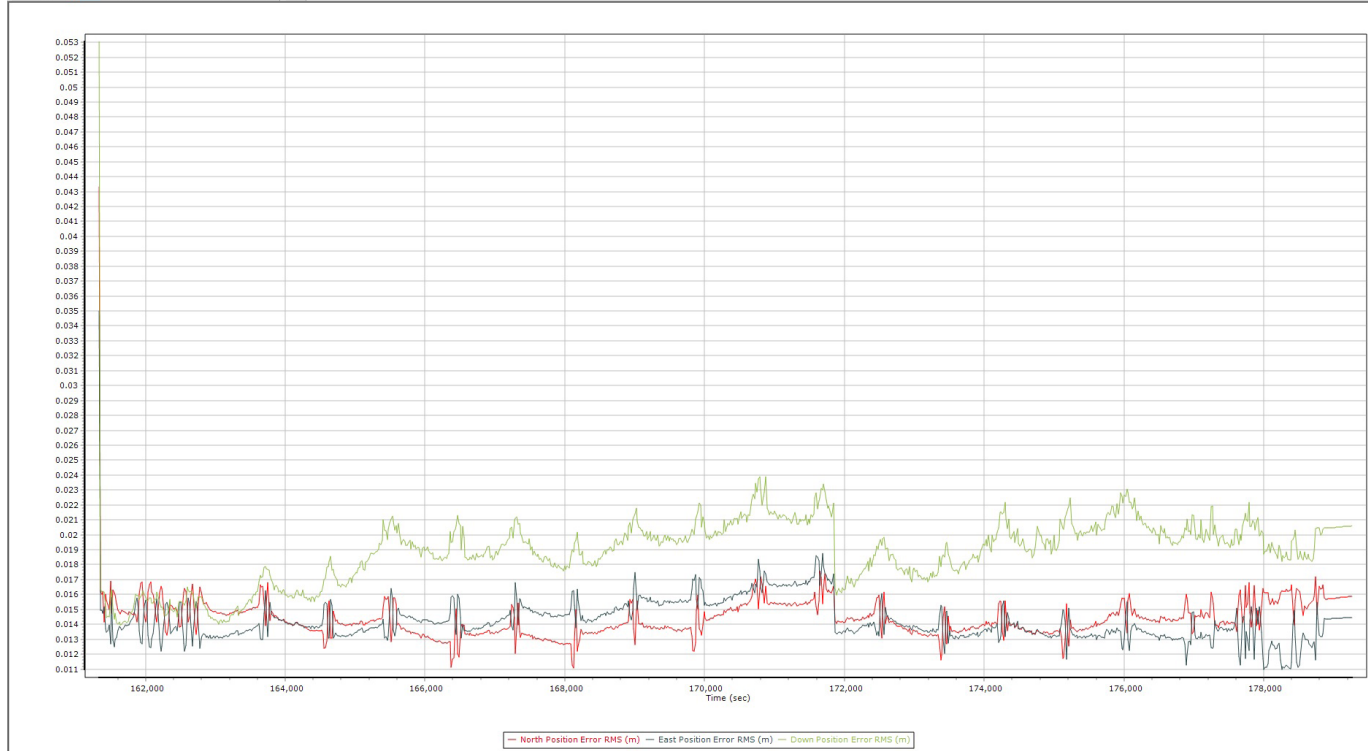
File Edit Tools View Help



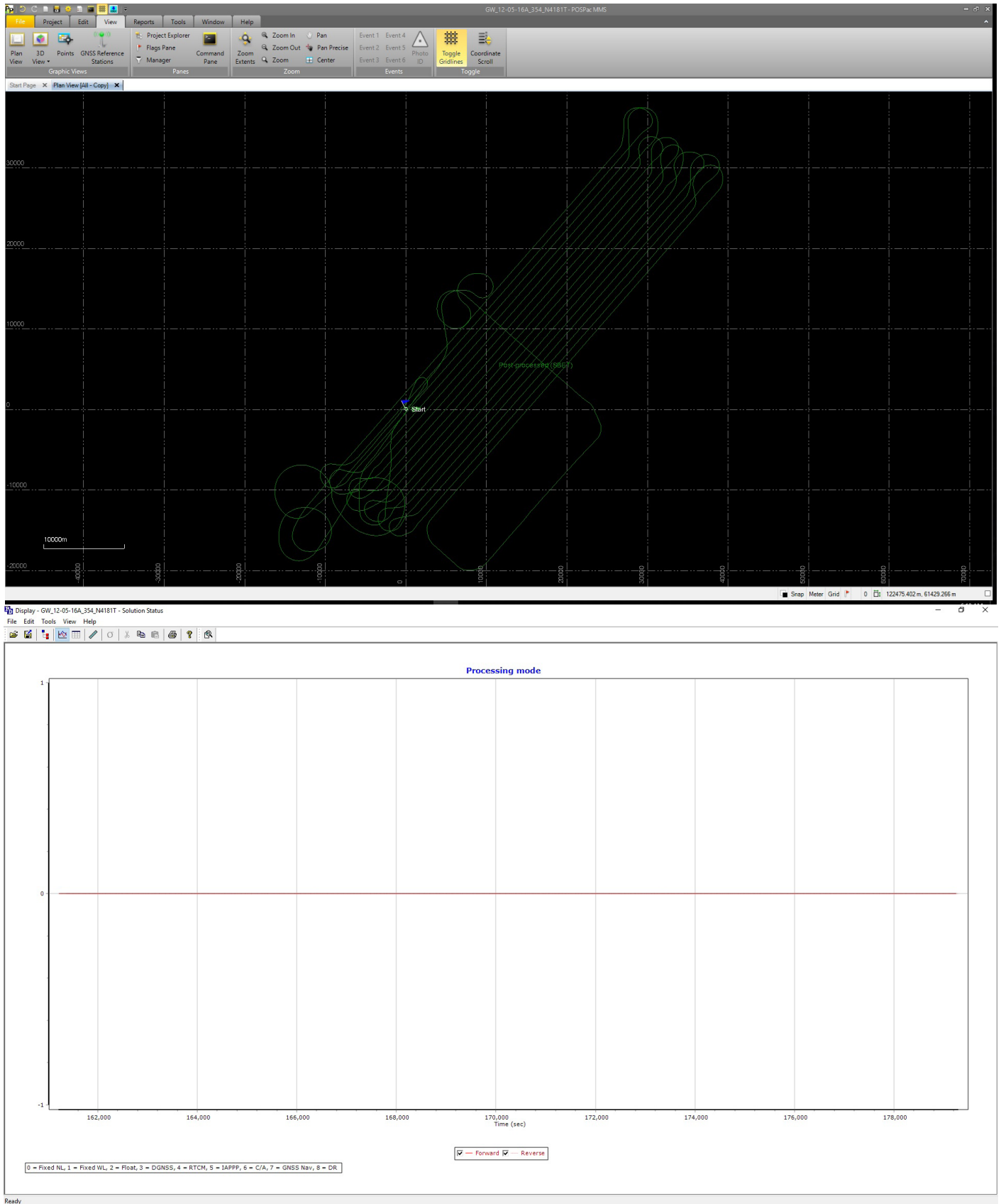
Ready

Display - GW_12-05-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

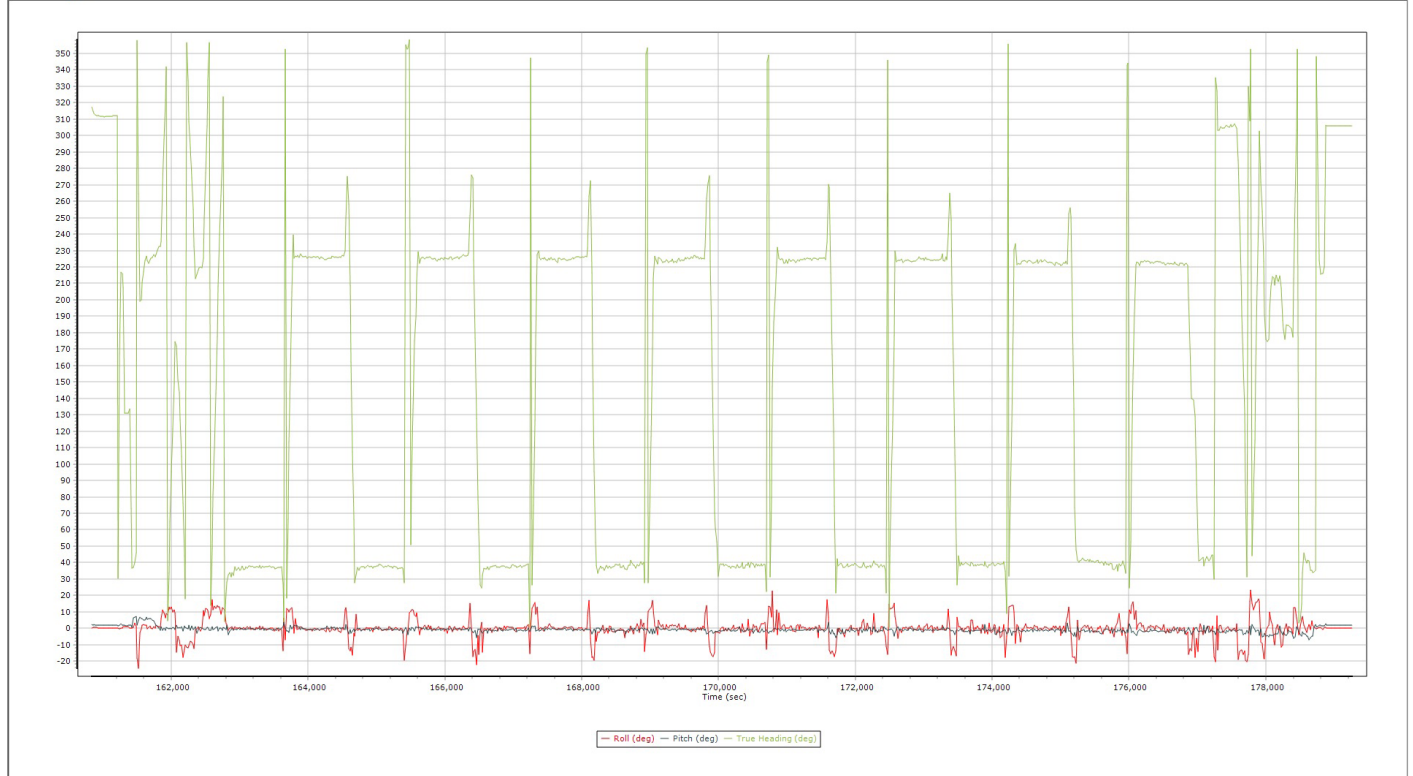


Ready



Display - GW_12-05-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID gw

Coordinates

Latitude N 37 51 22.96505000

Longitude W 80 24 17.69345000

Altitude 663.6450 m

☐ Decimal Degrees

Ground Reference Point (GRP) coordinates

Antenna Frame

Height 2.000 m

Method Bottom of antenna mount

Manufacturer NovAtel

Type 702GG

Offset from Measured Point to APC 0.086 m

Apply Changes

Station Database

Station ID gw

Station Fullname gw

Primary Service ID Edit

Coordinate Accuracy UNKNOWN_ACC

Secondary Service ID Edit

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2

A Flight



Date: 12 / 05 / 2016 Pilot: AC
Project: 160A-80E Operator: EF
Aircraft: M18T
Sensor: S060354 HD: B

POS/AV Filename: NOV05

Flight Plan		Weather
Roll Comp:	(On) or Off	Pressure (gnd):
Multipulse:	(On) or Off	Temperature (gnd):
Beam Divergence:	Wide or Narrow	Temperature (air):
Scan Rate:	51	Dew Point:
Pulse Rate:	250	Turbulence:
Scan Angle:	(1/2) 21.5	Visibility:
Desired Range:	1550	
Planned GPS:		

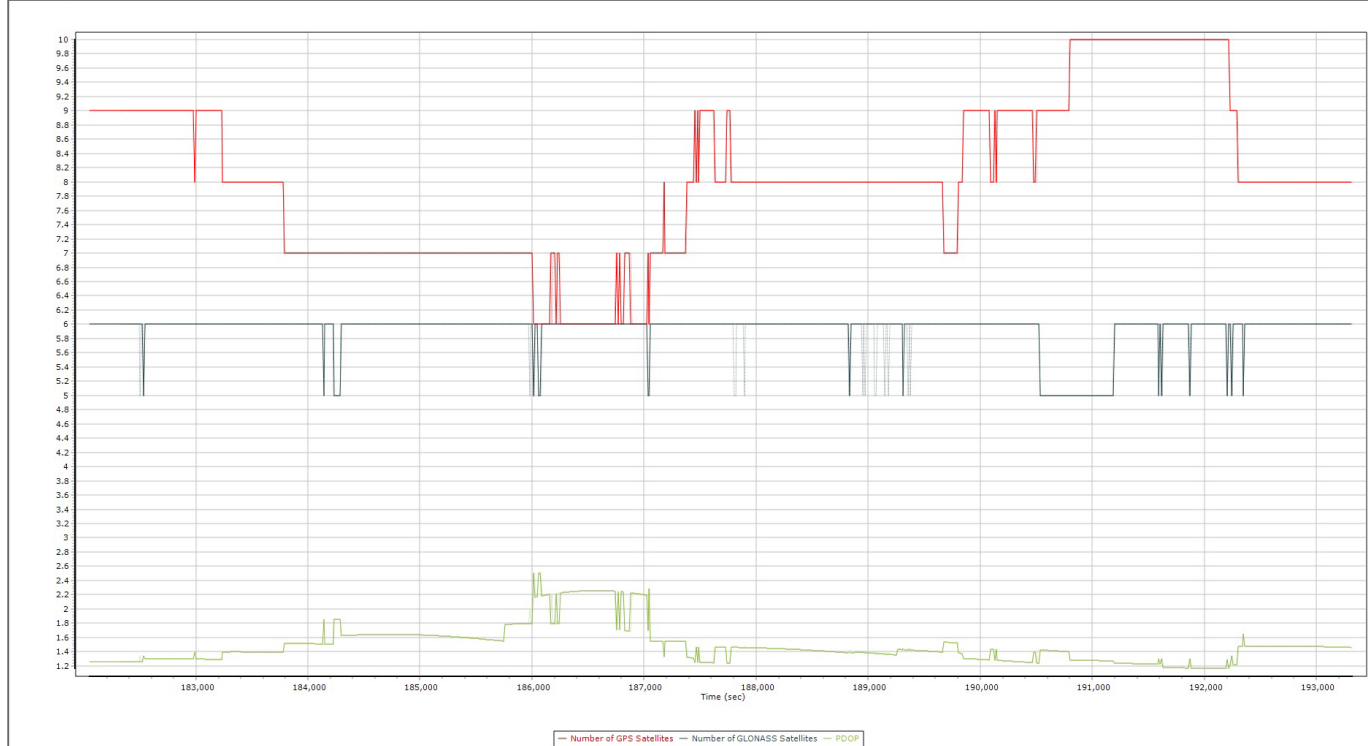
Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
Test line								
26	21:16	21:27	41.4	1641	.96	19	140	Test line
25	21:31	21:42	221.4	1480	1.13	17	146	Ref light
24	21:45	21:57	41.4	1670	1.26	15	138	
23	22:01	22:12	221.4	1500	1.18	16	138	
22	22:16	22:27	41.4	1450	1.04	16	138	
21	22:30	22:41	221.4	1500	1.03	16	134	
20	22:44	22:55	41.4	1600	1.07	16	140	
19	22:58	23:09	221.4	1500	1.12	15	140	
18	23:13	23:24	41.4	1600	1.19	15	140	
17	23:28	23:39	221.4	1500	1.06	16	142	
16	23:42	23:53	41.4	1600	1.22	16	138	
15	23:58	00:09	221.4	1500	1.17	15	142	
14	00:12	00:23	41.4	1300	1.08	15	164	
13	00:26	00:38	221.4	1500	1.08	15	142	
12	00:41	00:52	41.4	1600	1.18	15	142	
11	00:56	01:07	221.4	1500	1.09	15	140	
Tie line	01:15	01:19	21.2	1600	1.13	17	142	Tie line

Base Station Point ID: _____ Position Type: ☒ Known ☐ Autonomous Antenna Height: 2 Meters Latitude: _____ Longitude: _____	Location: MLW/B Time On(UTC): 18:53 Time Off(UTC): 16:03 PDOP: 1.01 SVs: 17	Airborne Station Time On: 20:50 UTC Kinematic On: 20:50 UTC Kinematic Off: 01:14 UTC Time Off: 01:14 UTC	Engine Start(24HR LCL): 15:33 Hobbs Start: _____ Engine Stop(24HR LCL): 20:49 Hobbs Stop: _____ Page ____ of ____
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Dec 5, 2016-B (N4181T, SN354)

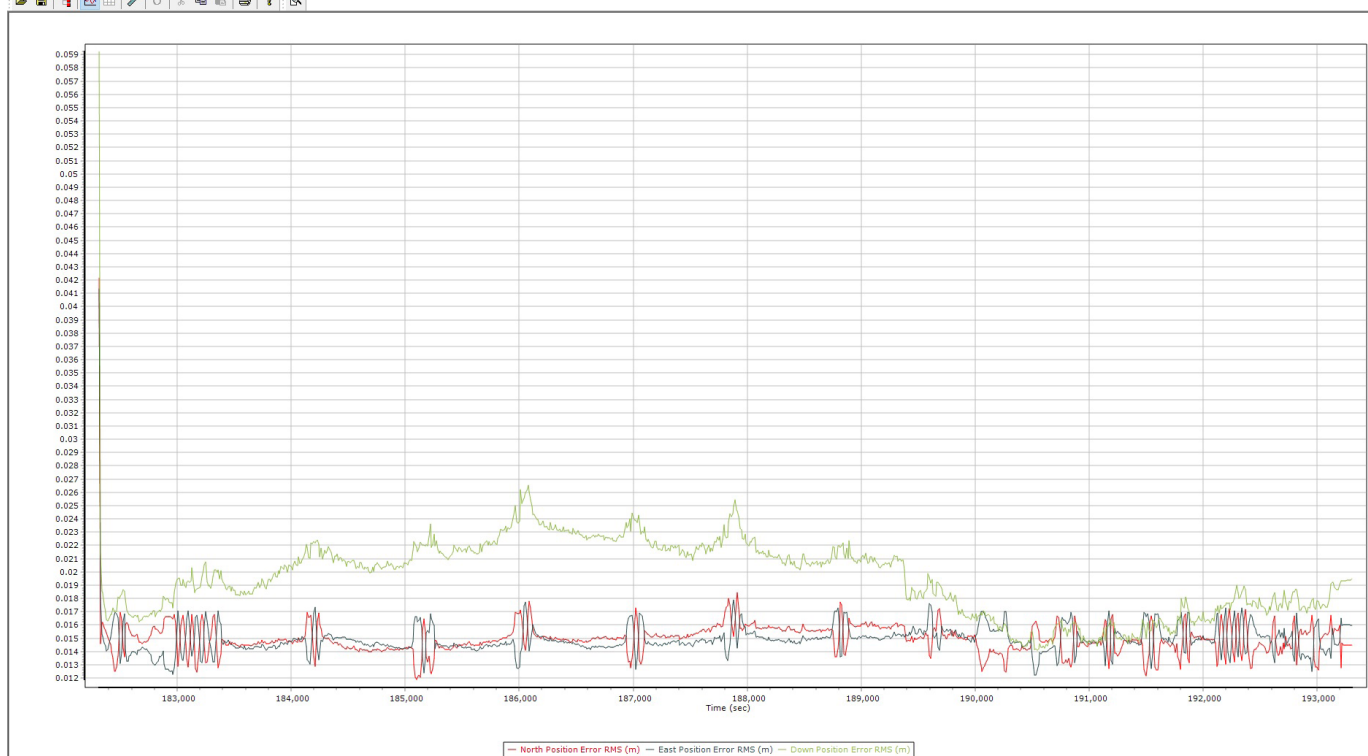
Display - GW_12-05-168_354_N4181T - Solution Status

File Edit Tools View Help

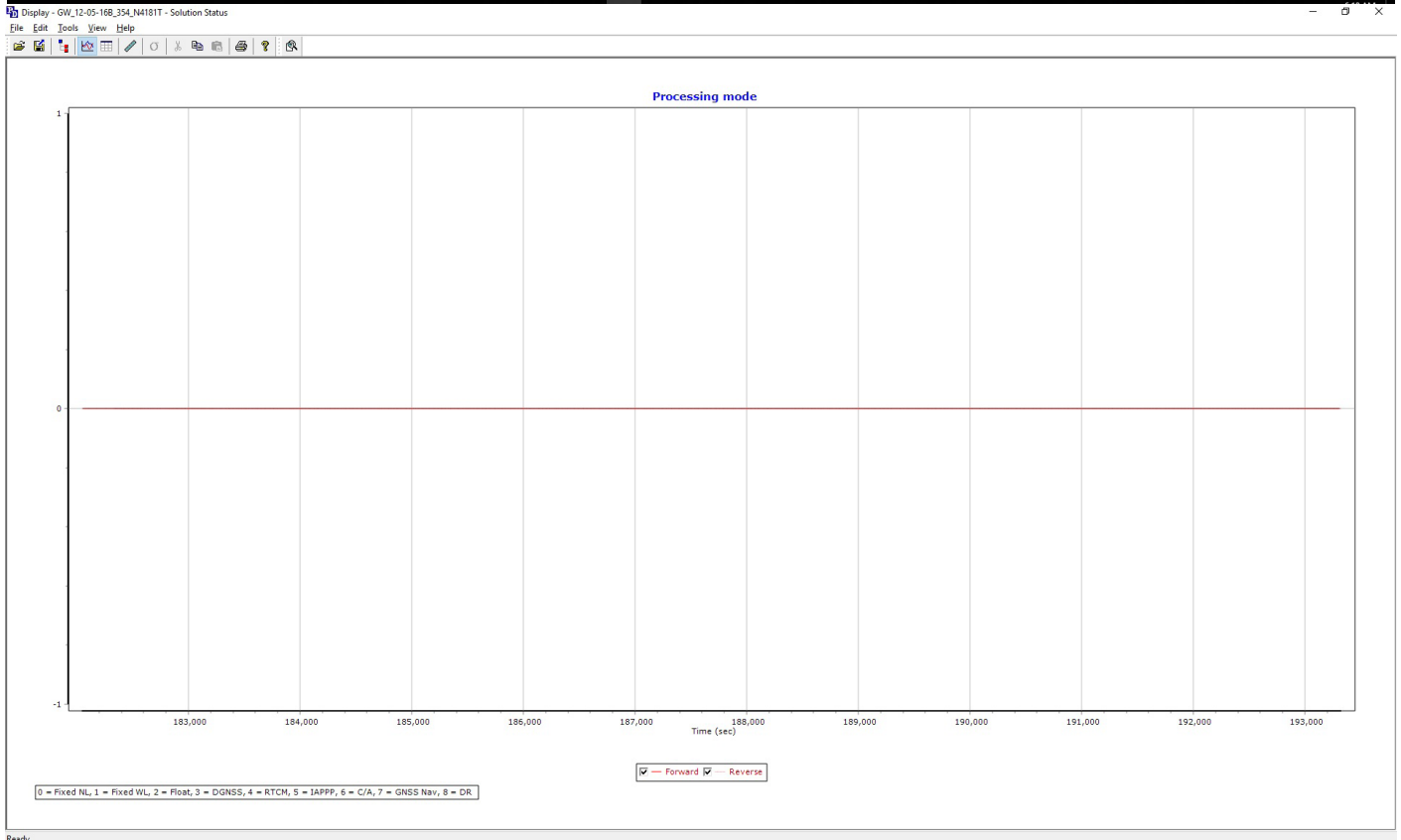
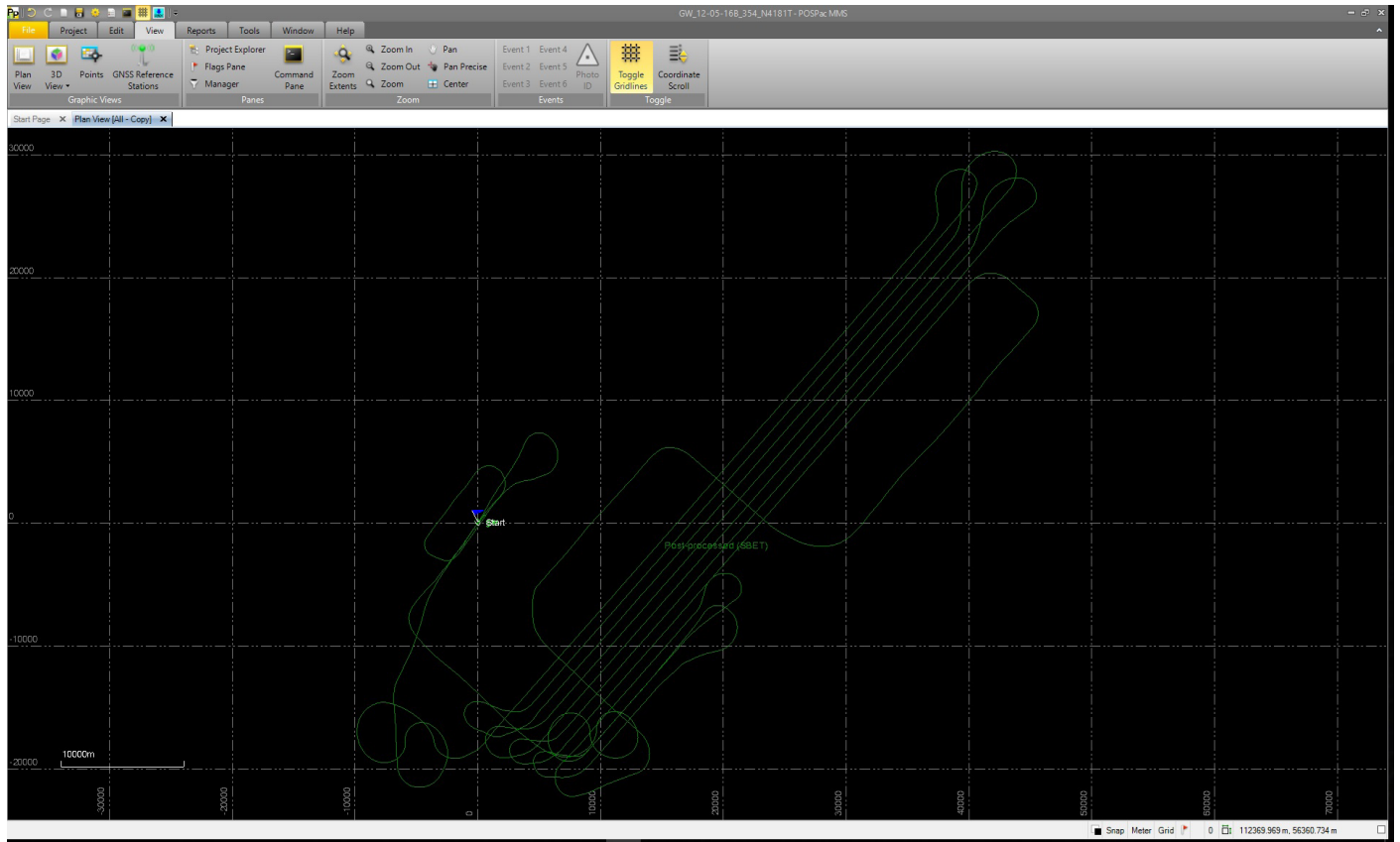


Ready
Display - GW_12-05-168_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready





Coordinate Manager

Station Information

Station ID: gw

Coordinates

Latitude: N 37 51 22.96505000
Longitude: W 80 24 17.69345000
Altitude: 663.6450 m
☐ Decimal Degrees

Ground Reference Point (GRP) coordinates

Antenna Frame

Height: 2.000 m
Method: Bottom of antenna mount
Manufacturer: NovAtel
Type: 702GG
Offset from Measured Point to APC: 0.086 m

[Apply Changes]

Station Database

Station ID: gw	Station FullName: gw
Primary Service ID:	Coordinate Accuracy: UNKNOWN_ACC
Secondary Service ID:	[Add] [Delete] [Update]

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc
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< >

[Import Coordinates] [Export Coordinates]

[Close]

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2

B flight



Date: 12 / 05 / 2016
Project: 60A-816E-b
Aircraft: N418T
Sensor: S960354

Pilot: AC
Operator: EF
HD: B

POS/AV Filename: N6005b

Flight Plan		Weather
Roll Comp:	On or Off	Pressure (gnd):
Multipulse:	On or Off	Temperature (gnd):
Beam Divergence:	Wide or Narrow	Temperature (air):
Scan Rate:	52	Dew Point:
Pulse Rate:	250	Turbulence:
Scan Angle:	1/2°	Visibility:
Desired Range:	1550	
Planned GPS:		

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
Test line								Test line
10	02:57	03:08	41.4	1600	1.03	16	144	
9	03:10	03:24	221.4	1600	1.10	13	134	
8	03:28	03:39	41.4	1550	1.15	14	140	
7	03:43	03:55	221.4	1600	1.26	14	134	
6	03:59	04:09	41.4	1500	1.06	16	144	
5	04:14	04:25	221.4	1600	1.05	16	134	
4	04:28	04:39	41.4	1500	1.19	15	132	
Tie line	04:48	04:51	311.2	1700	1.13	16	144	Tie line
Tie line	04:55	04:58	140.2	1600	1.0	16	148	Tie line
3	05:02	05:05	41.4	1600	1.06	17	146	
2	05:09	05:11	221.4	1600	1.01	18	144	didn't cover all the south
1	05:14	05:15	41.4	1600	1.0	18	140	range markings @ south
2	05:20	05:21	221.4	1600	0.99	18	142	reflight - stopped shooting in middle, return

Base Station		Airborne Station	
Point ID:	Location: KLVJ13	Time On: 01:28 UTC	Time Off: 05:50 UTC
Position Type: Known / Autonomous	Time On(UTC): 10:57	Kinematic On: 02:34 UTC	Kinematic Off: 05:10 UTC
Antenna Height: 2 Meters	Time Off(UTC): 06:03		
Latitude:	PDOP: 1.01		
Longitude:	SV's: 17		

Engine Start(24HR LCL): 21:22 Hobbs Start: _____
Engine Stop(24HR LCL): 00:52 Hobbs Stop: _____
Page ____ of ____

Dec 7, 2016-A (N4181T, SN354)

Display - GW_12-07-16_354_N4181T_Reflight_Smartbase - Solution Status

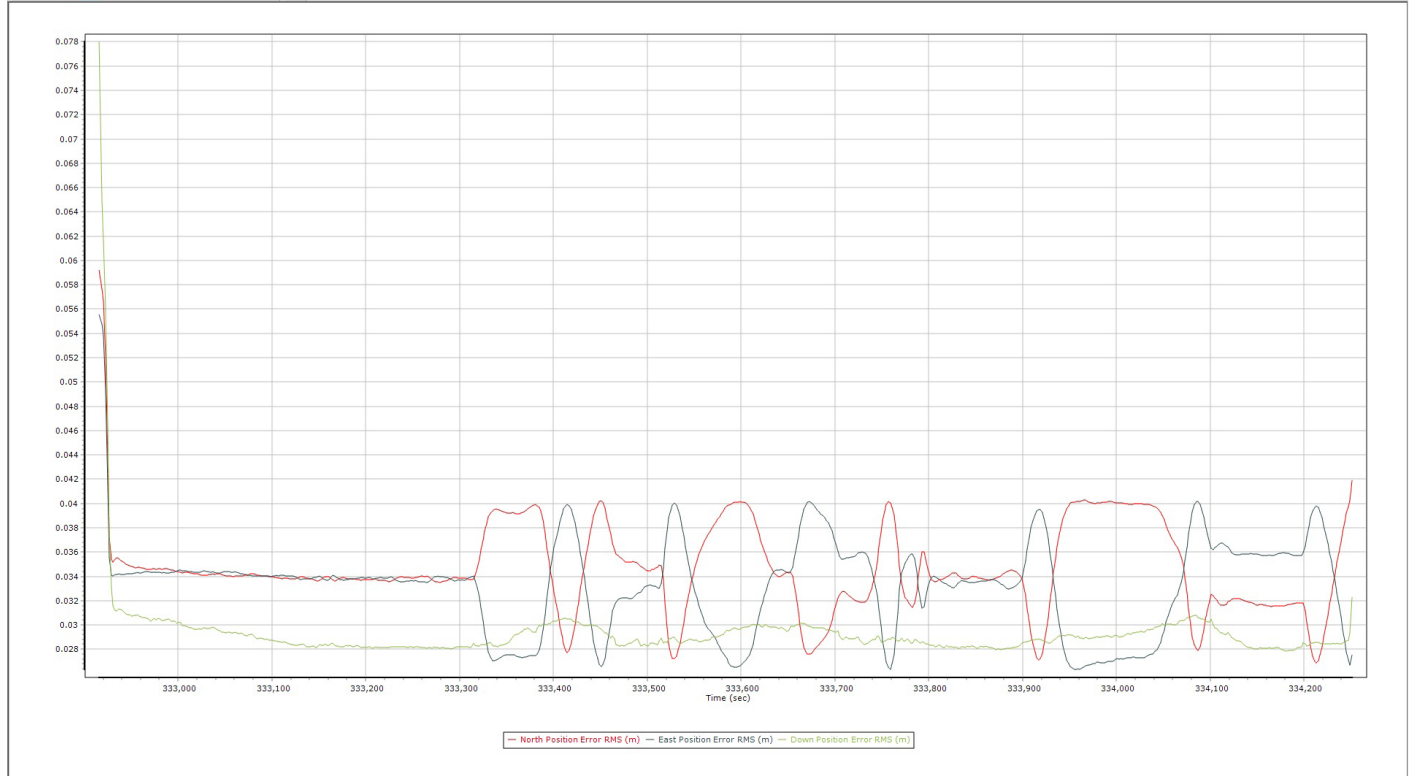
File Edit Tools View Help



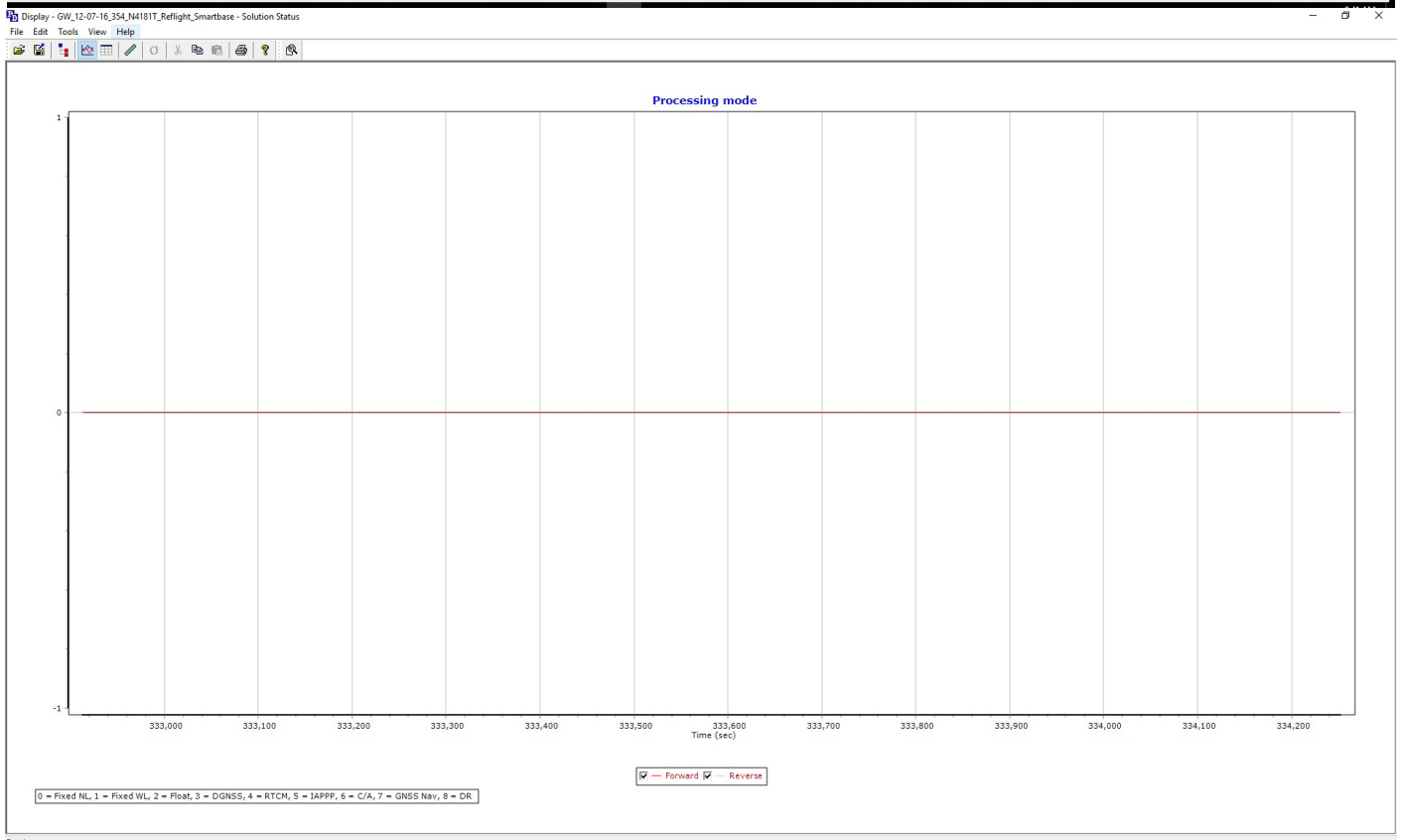
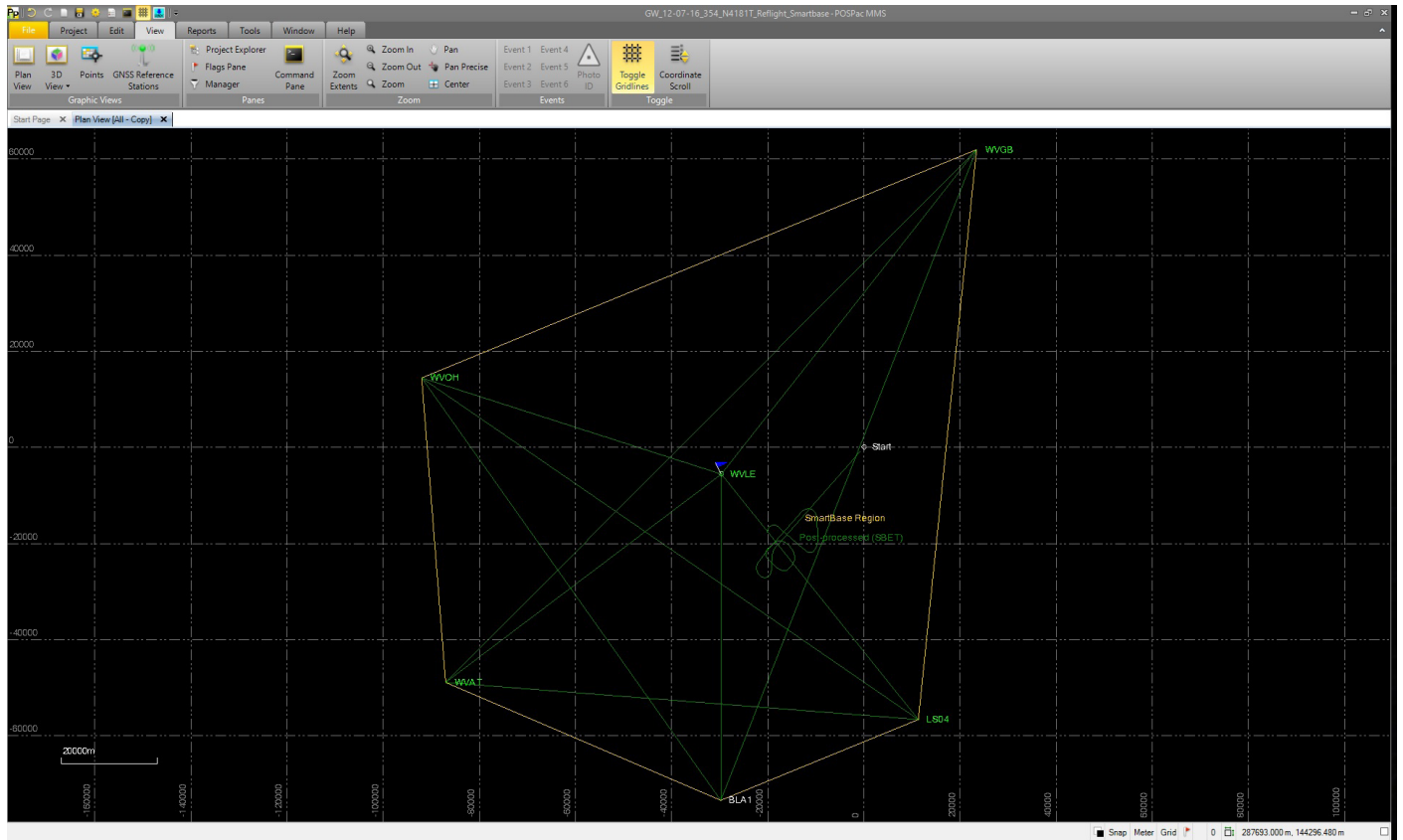
Ready

Display - GW_12-07-16_354_N4181T_Reflight_Smartbase - Smoothed Performance Metrics, Reference Frame

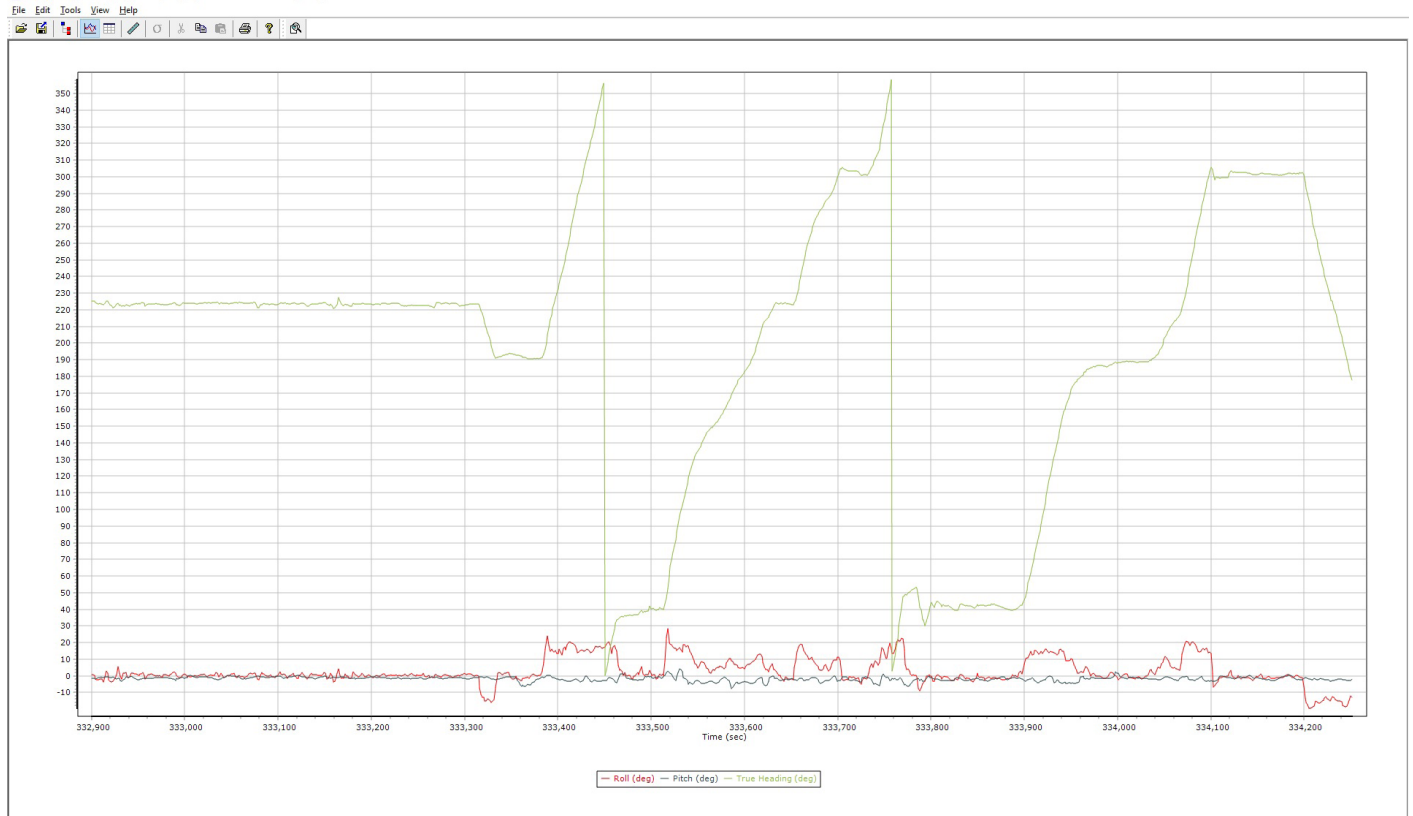
File Edit Tools View Help



Ready



Display - GW_12-07-16_354_N4181T_RefFlight_Smartbase - Real Time Trajectory, Vehicle Frame



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 7 / 201 Pilot: J
 Project: 16PA-816_E_Refight Operator: MUM
 Aircraft: N4181T
 Sensor: 5060354 HD: A

POS/AV Filename: Dec7a

Flight Plan		Weather
Roll Comp:	On	Pressure (gnd):
Scan Rate:	52	Temperature (gnd):
Pulse Rate:	250	Temperature (air):
Scan Angle:	43	Dew Point:
Desired Range:	1550	Turbulence:
Planned GPS:	130	Visibility:

[illegible]

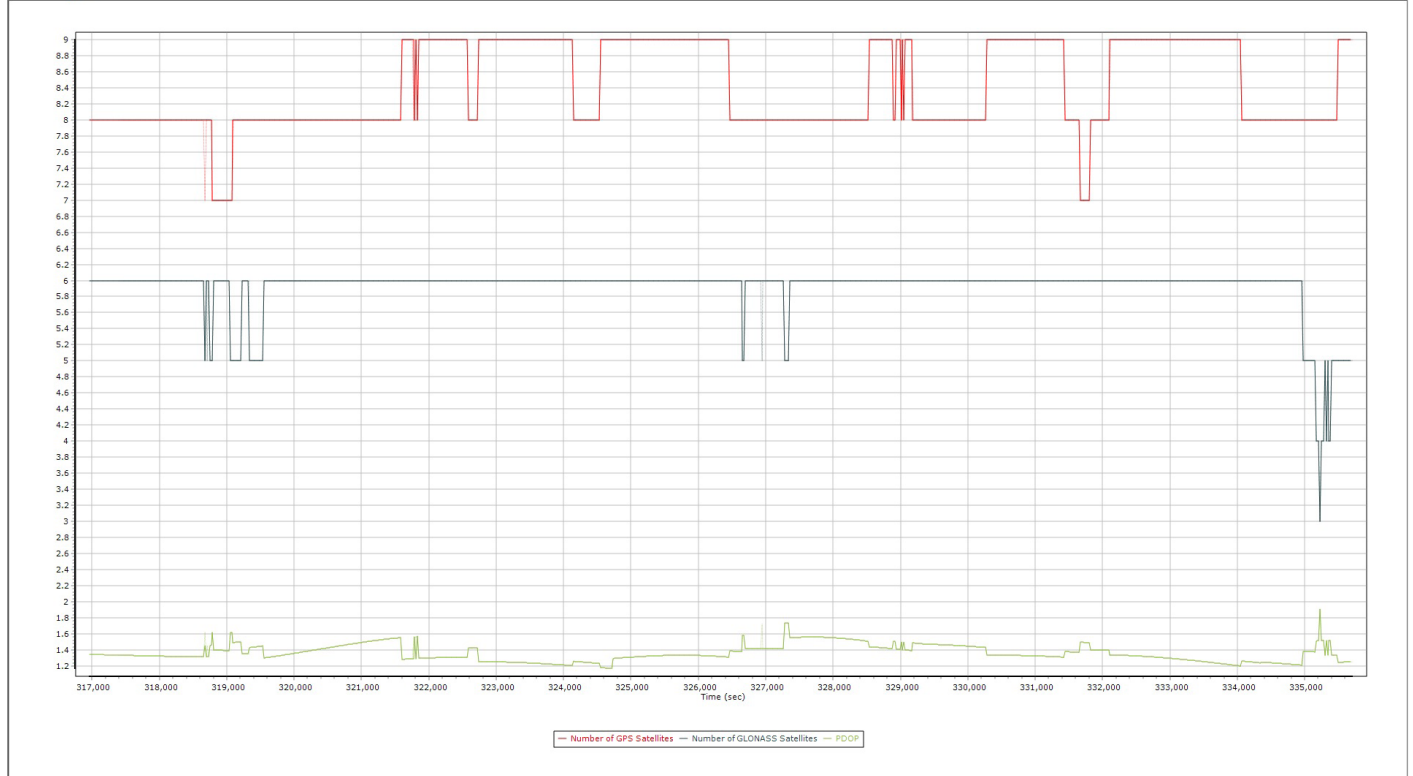
Base Station		Location: KHSP	
Point ID: _____		Time On(UTC): <u>1540</u>	
Position Type: <u>Autonomous</u>		Time Off(UTC): <u>2120</u>	
Antenna Height: <u>2</u> Meters		PROB: <u>1-1</u>	
Altitude: _____		SVs: <u>15</u>	

Airborne Station		Engine Start(24HR LCL): Hobbs Start: _____	
Time On: _____ UTC		Engine Stop(24HR LCL): Hobbs Stop: _____	
Kinematic On: _____ UTC		Page _____ of _____	
Kinematic Off: _____ UTC			
Time Off: _____ UTC			

Dec 7, 2016-A (N4181T, SN354)

Display - GW_12-0716A1_354_N4181T - Solution Status

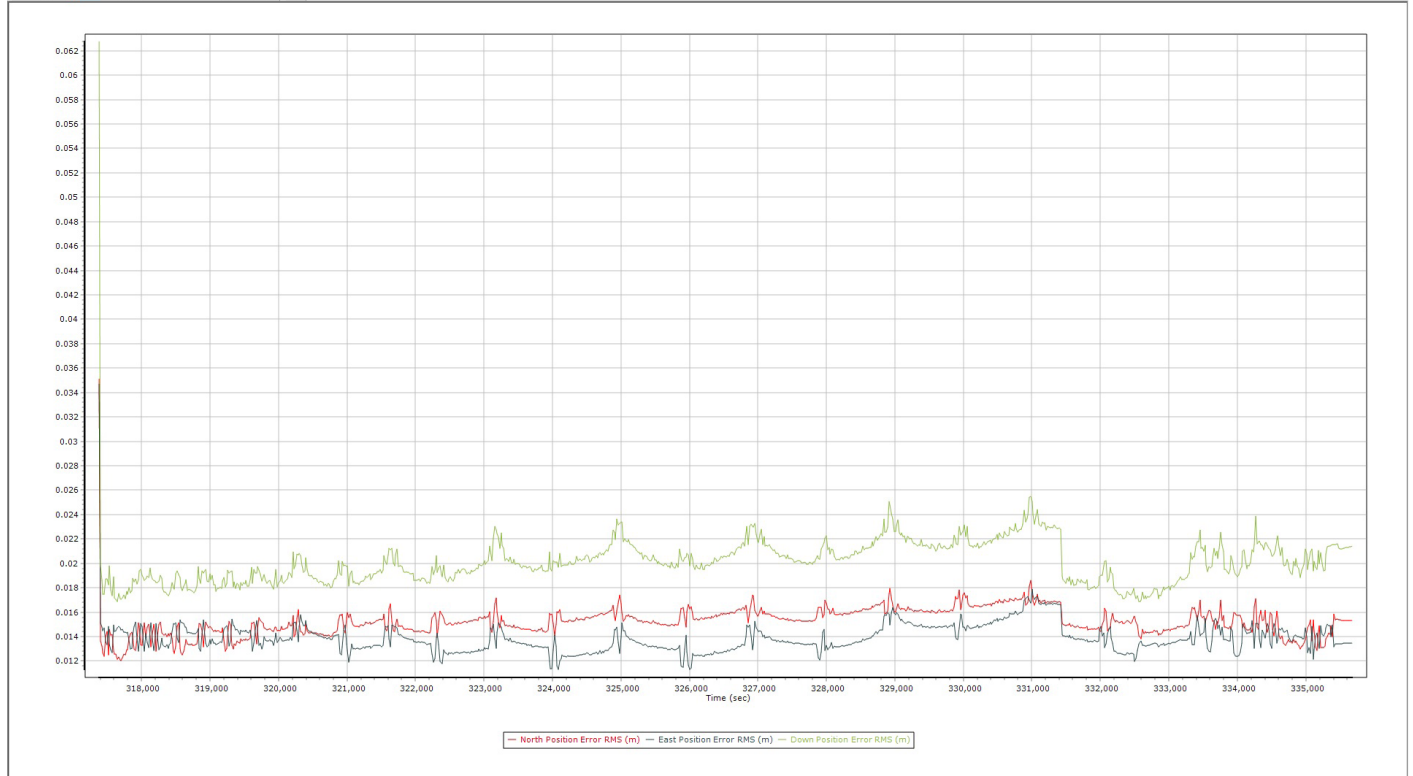
File Edit Tools View Help



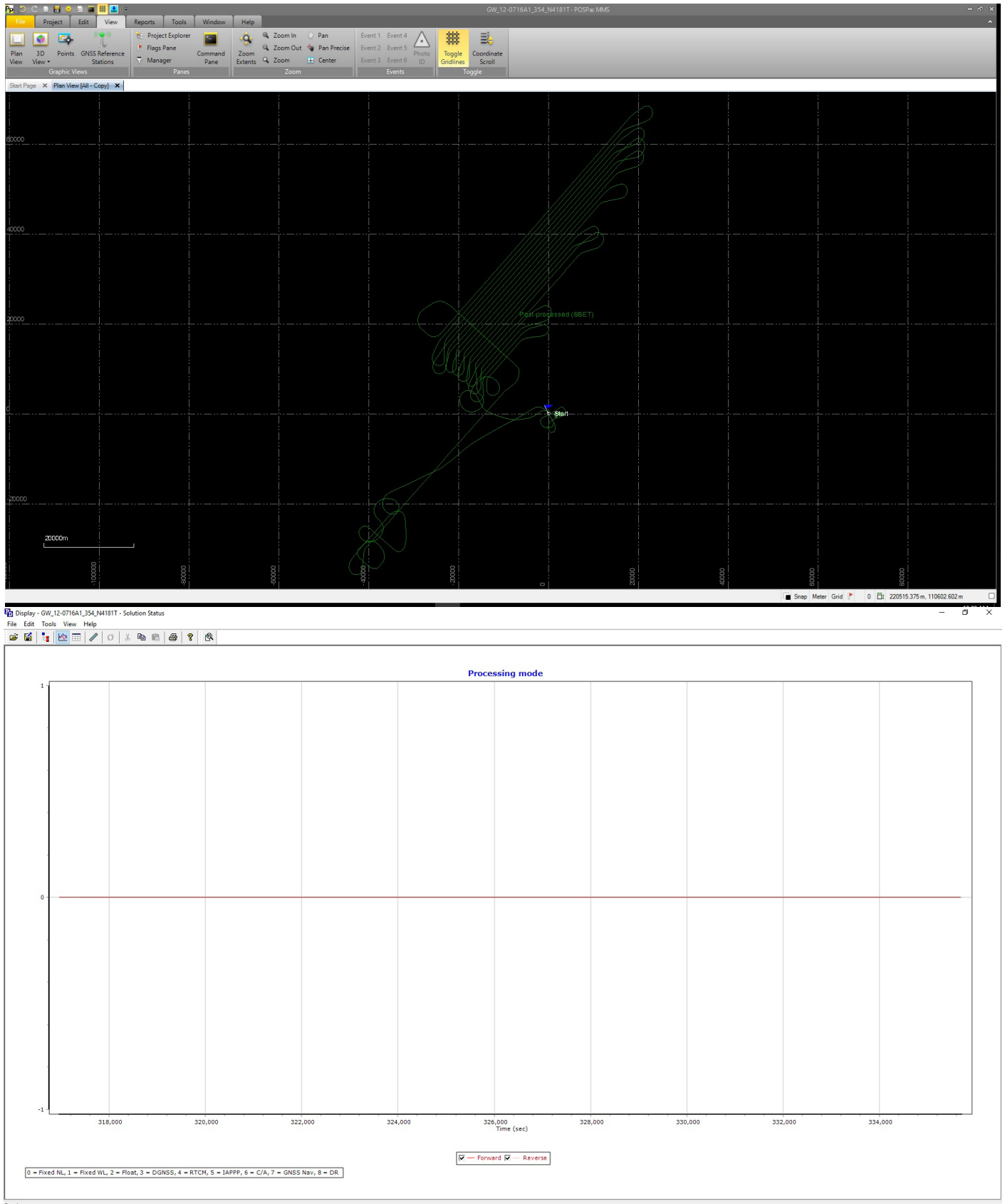
Ready

Display - GW_12-0716A1_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

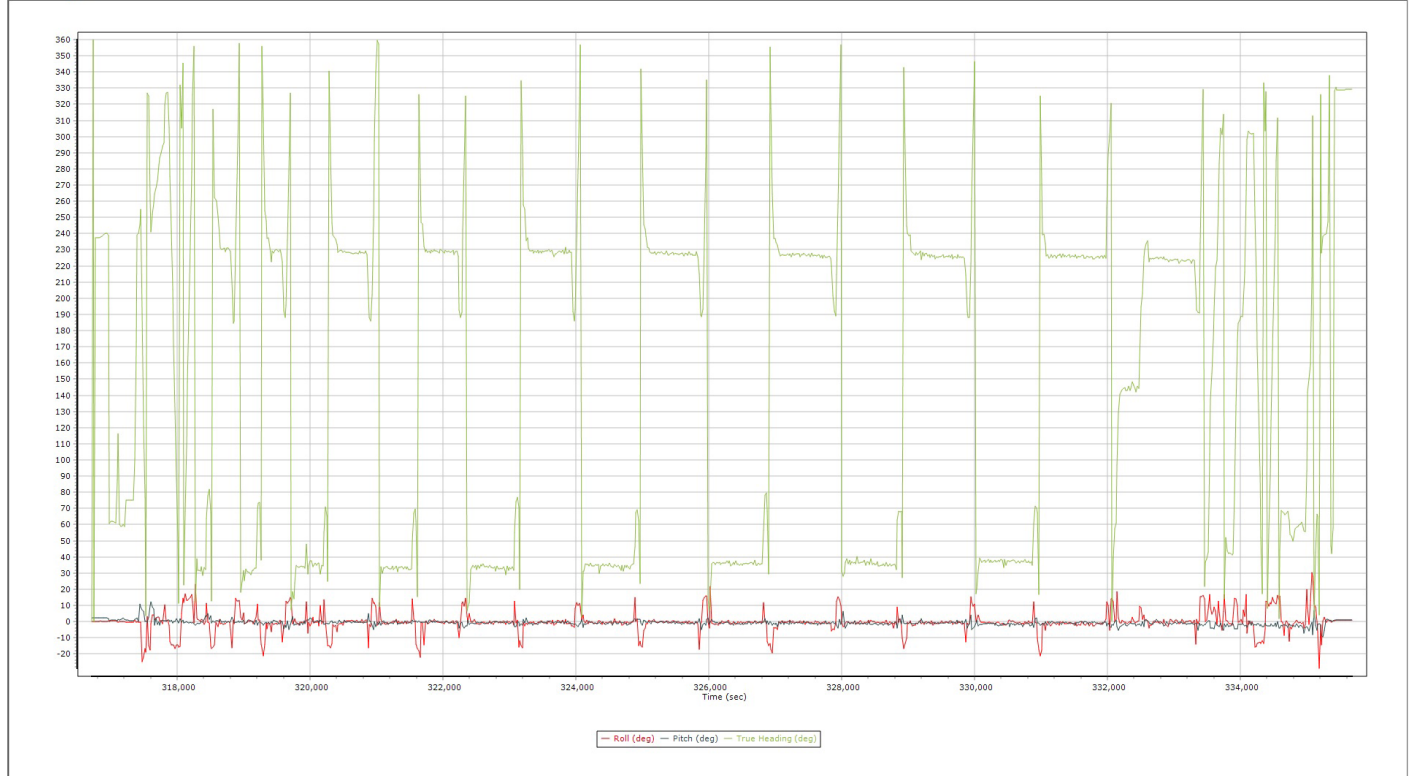


Ready



Display - GW_12-0716A1_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: gw

Coordinates

Latitude: N 37 57 11.65532000

Longitude: W 79 50 5.86991000

Altitude: 1,115.7190 m

☐ Decimal Degrees

Antenna: Frame

Height: 2.000 m

Method: Antenna Phase Center

Manufacturer: NovAtel

Type: 702GG

Offset from Measured Point to APC: 0.000 m

Ground Reference Point (GRP) coordinates

Apply Changes

Station Database

Station ID: gw

Station Fullname: gw

Primary Service ID: Edit

Coordinate Accuracy: UNKNOWN_ACC

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 7 / 2017 Pilot: ML
 Project: 16PA-816 NE Lift1 Operator: MLM
 Aircraft: M181T
 Sensor: 5060354 HD: A

POS/AV Filename: Dec7a

Flight Plan		Weather	
Roll Comp:	On	Pressure (gnd):	
Scan Rate:	52	Temperature (gnd):	
Pulse Rate:	250	Temperature (air):	
Scan Angle:	43	Dew Point:	
Desired Range:	1550	Turbulence:	
Planned GPS:	130	Visibility:	

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
1	1625	1626	41	1560	1.1	16	144	
2	1631	1633	221	1548	1.1	16	140	
3	1637	1639	41	1525	0.99	17	132	
4	1644	1646	221	1590	0.9	18	142	
5	1650	1652	41	1560	1.0	16	142	
6	1700	1707	221	1650	1.0	16	140	
7	1711	1718	41	1690	1.0	17	136	
8	1723	1730	221	1507	0.9	18	136	
9	1734	1744	41	1565	1.0	18	130	
10	1748	1758	221	1530	1.0	18	138	
11	1802	1814	41	1700	1.0	17	134	
12	1819	1830	221	1580	1.1	17	134	
13	1834	1846	41	1602	1.1	18	132	
14	1851	1903	221	1400	1.1	17	140	
15	1906	1920	41	1610	1.3	17	140	
16	1925	1937	221	1400	1.3	17	134	
17	1941	1954	41	1727	1.2	17	140	
18	1958	2013	221	1495	1.2	16	138	
57	2016	2021	132	1559	1.0	18	132	

Base Station	Location: <u>KHSP</u>
Point ID: _____	Time On(UTC): <u>1540</u>
Position Type: <u>Autonomous</u>	Time Off(UTC): <u>0118</u>
Antenna Height: <u>2</u> Meters	PDOP: <u>1.1</u>
Latitude: _____	SVs: <u>15</u>
Longitude: _____	

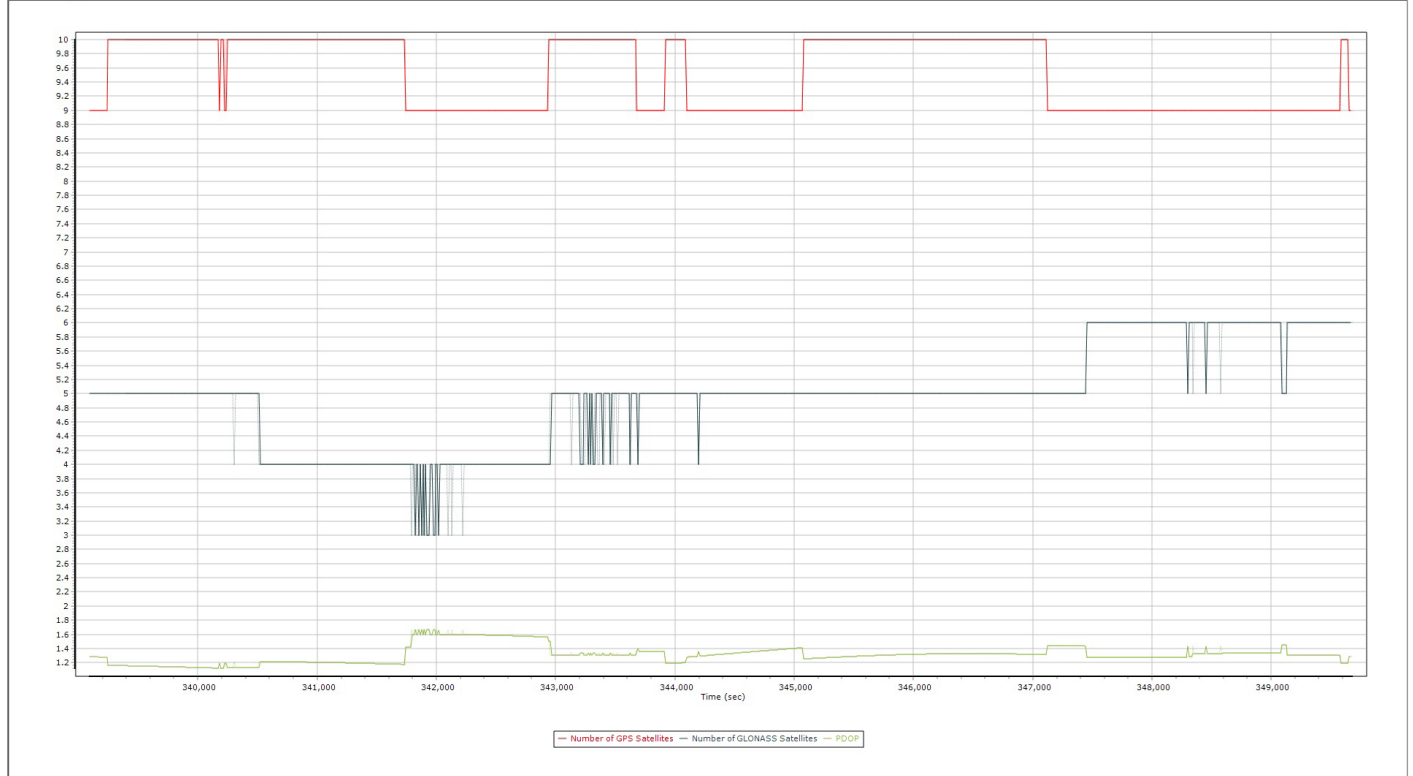
Airborne Station
Time On: <u>1558</u> UTC
Kinematic On: <u>1604</u> UTC
Kinematic Off: <u>2110</u> UTC
Time Off: <u>2115</u> UTC

Engine Start(24HR LCL): 1053 Hobbs Start: _____
 Engine Stop(24HR LCL): 1616 Hobbs Stop: _____
 Page _____ of _____

Dec 7, 2016-A (N4181T, SN354)

Display - GW_12-07-16A2_354_N4181T - Solution Status

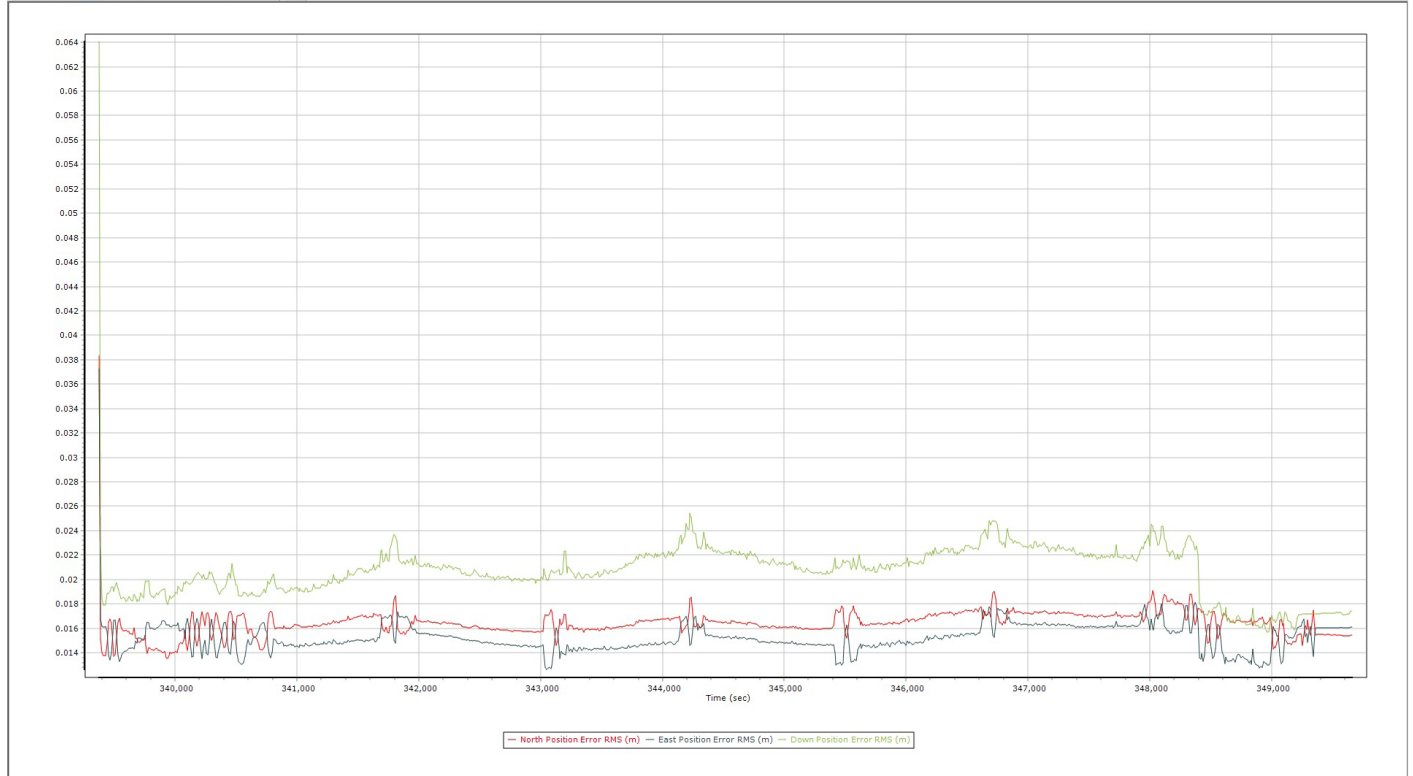
File Edit Tools View Help



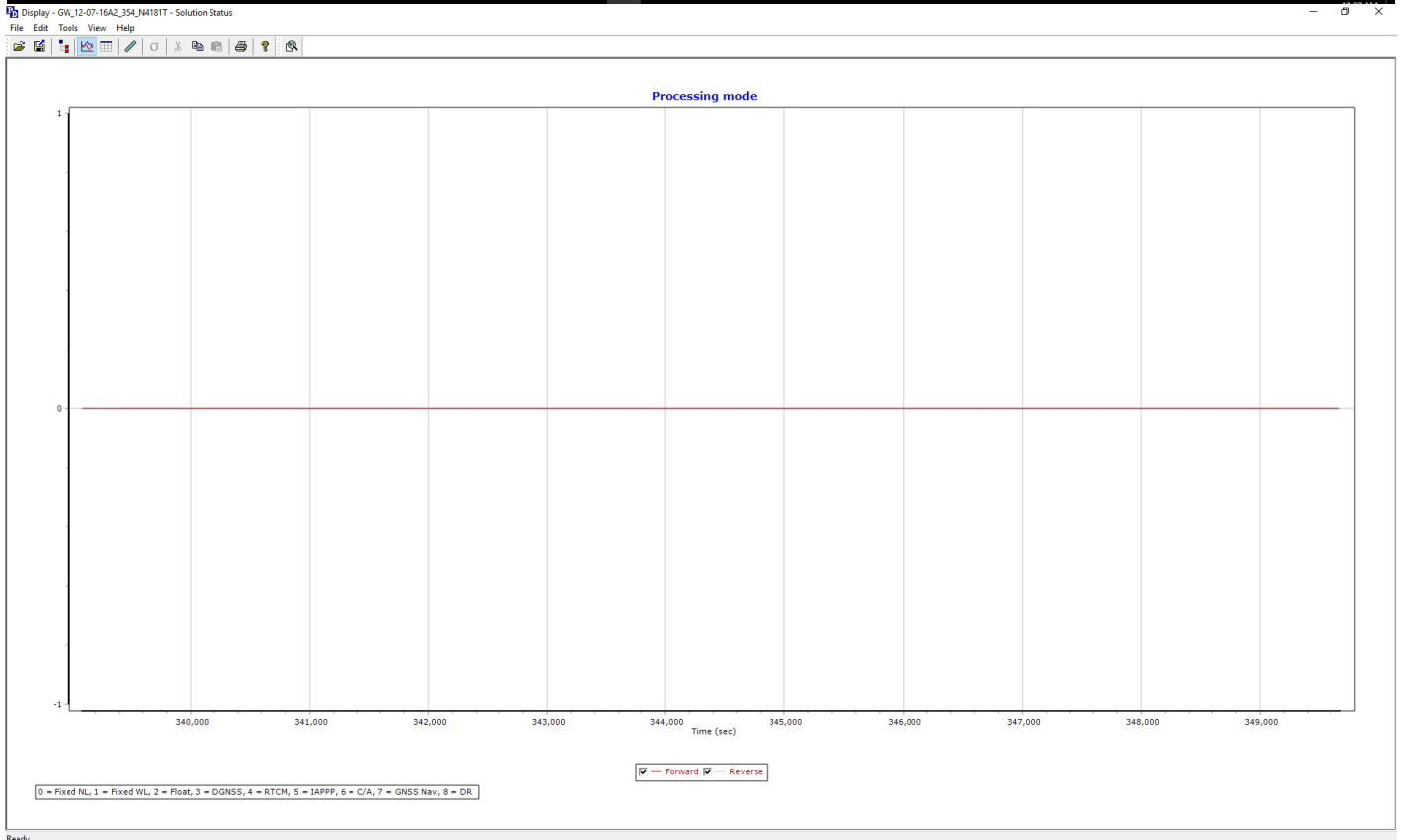
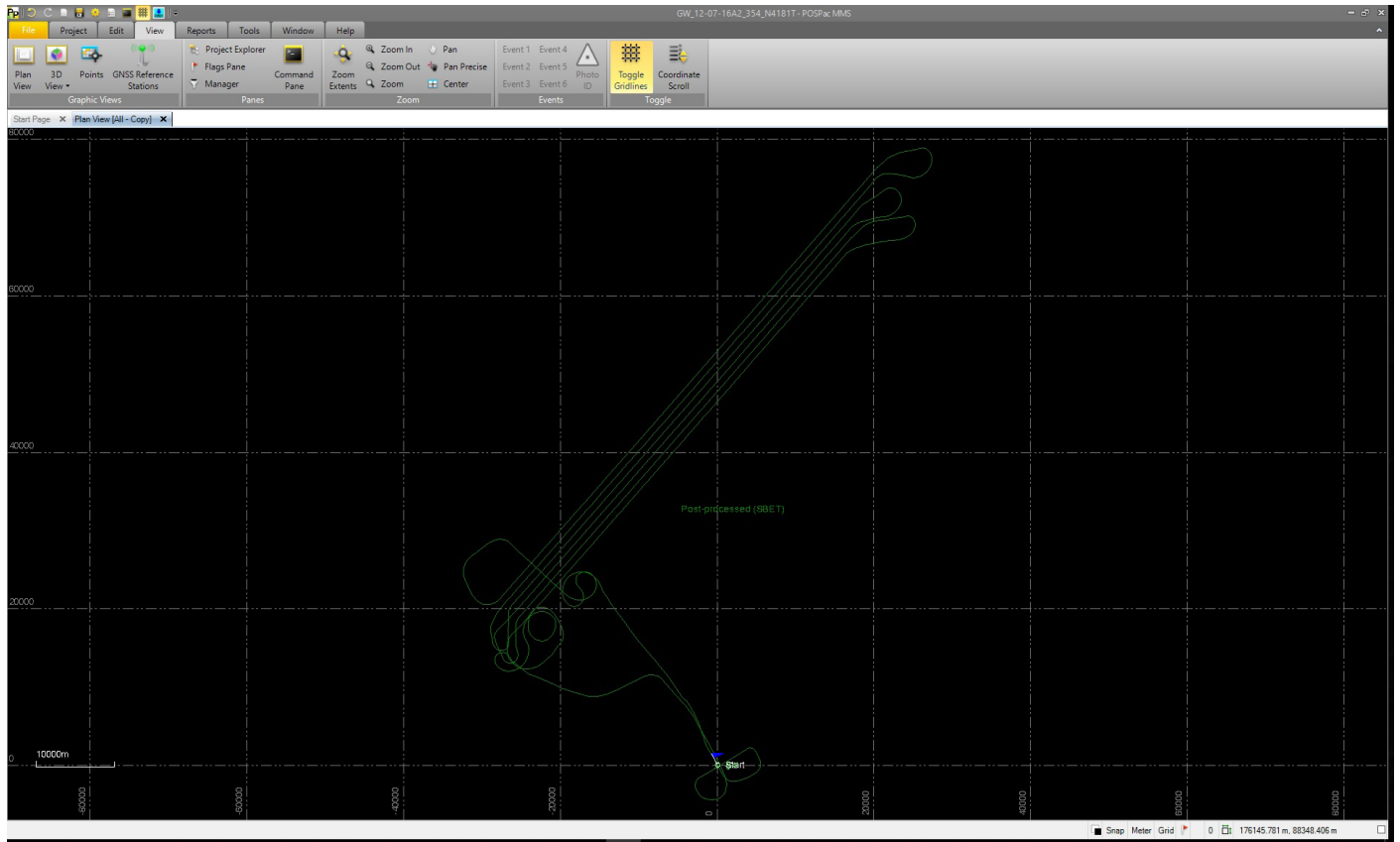
Ready

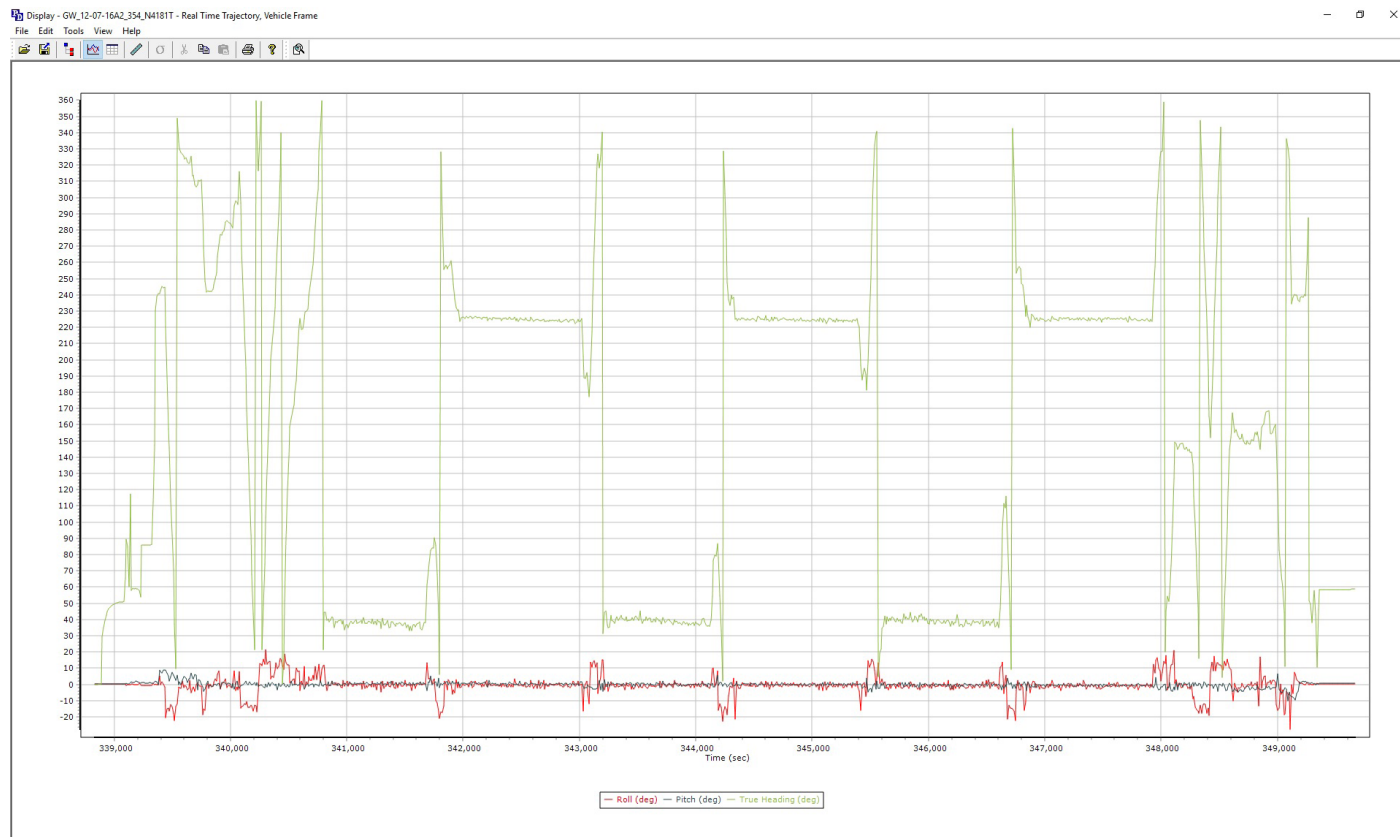
Display - GW_12-07-16A2_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready





Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude: N 11.65532000
Longitude: W 5.86991000
Altitude: m
☐ Decimal Degrees

Antenna / Frame

Height: m
Method:
Manufacturer:
Type:
Offset from Measured Point to APC: m

Ground Reference Point (GRP) coordinates

Station Database

Station ID	Station Fullname	Primary Service ID	Secondary Service ID	Coordinate Accuracy	Action
gw	gw			UNKNOWN_ACC	[Edit] [Add] [Delete] [Update]

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc
------------	-----------------	-------	-------	-----------	----------	-----------	----------	-----------

< _____ >

Import Coordinates | Export Coordinates

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 7 / 201 Pilot: J
 Project: 16PA-816_NE_Lift2 Operator: MLM
 Aircraft: N4181T HD: A
 Sensor: 5060354

POS/AV Filename: Dec7a

Flight Plan		Weather
Roll Comp:	On	Pressure (gnd):
Scan Rate:	52	Temperature (gnd):
Pulse Rate:	250	Temperature (air):
Scan Angle:	43	Dew Point:
Desired Range:	1550	Turbulence:
Planned GPS:	130	Visibility:

[illegible]

Base Station	Location:	KHSP
Point ID: _____	Time On(UTC):	1540
Position Type: Autonomous	Time Off(UTC):	2120
Antenna Height: 2 _____ Meters	PDOF:	1.1
Latitude: _____	SVs	15

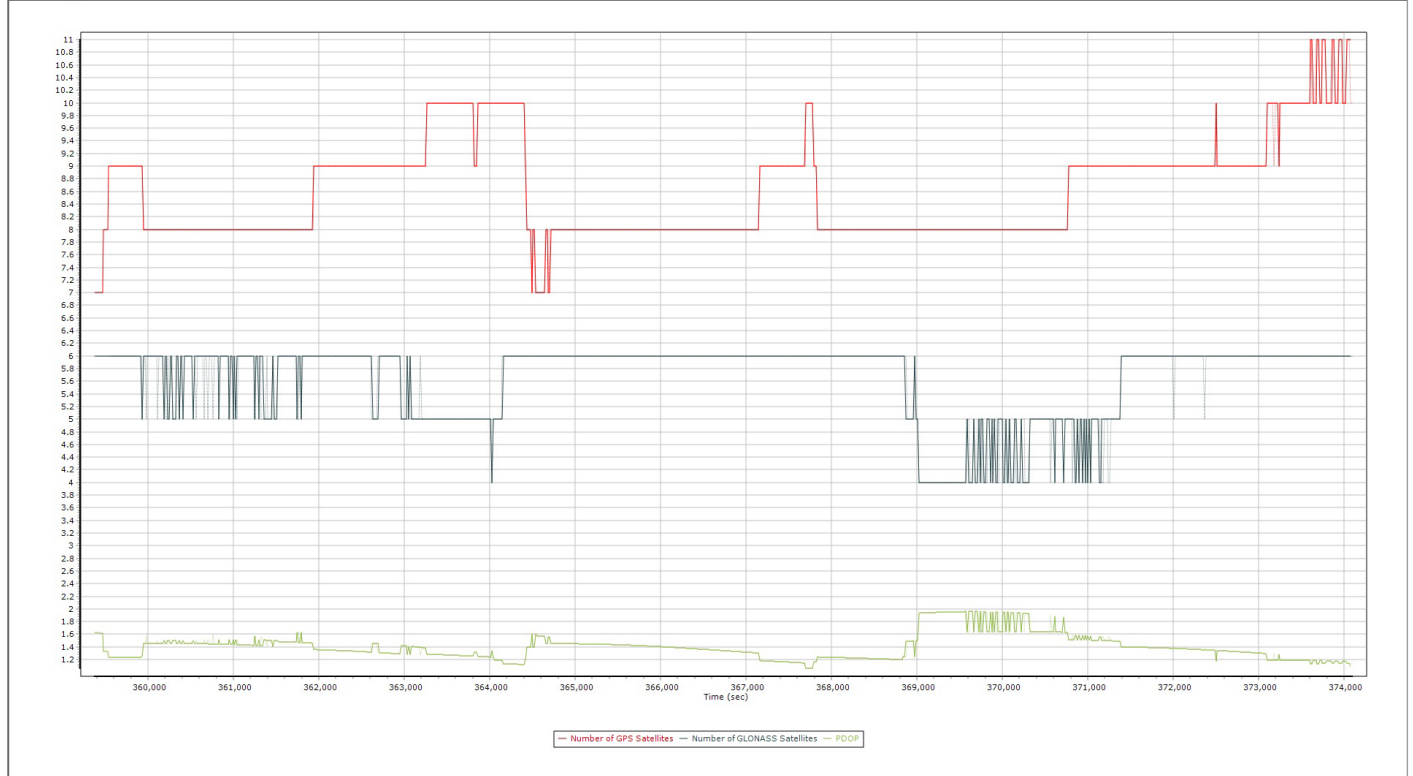
Airborne Station
Time On: 2205 UTC
Kinematic On: 2210 UTC
Kinematic Off: 0103 UTC

Engine Start(24HR LCL): 1703 Hobbs Start: _____
 Engine Stop(24HR LCL): 2009 Hobbs Stop: _____
 Page _____ of _____

Dec 7, 2016-B (N4181T, SN354)

Display - GW_12-07-168_354_N4181T - Solution Status

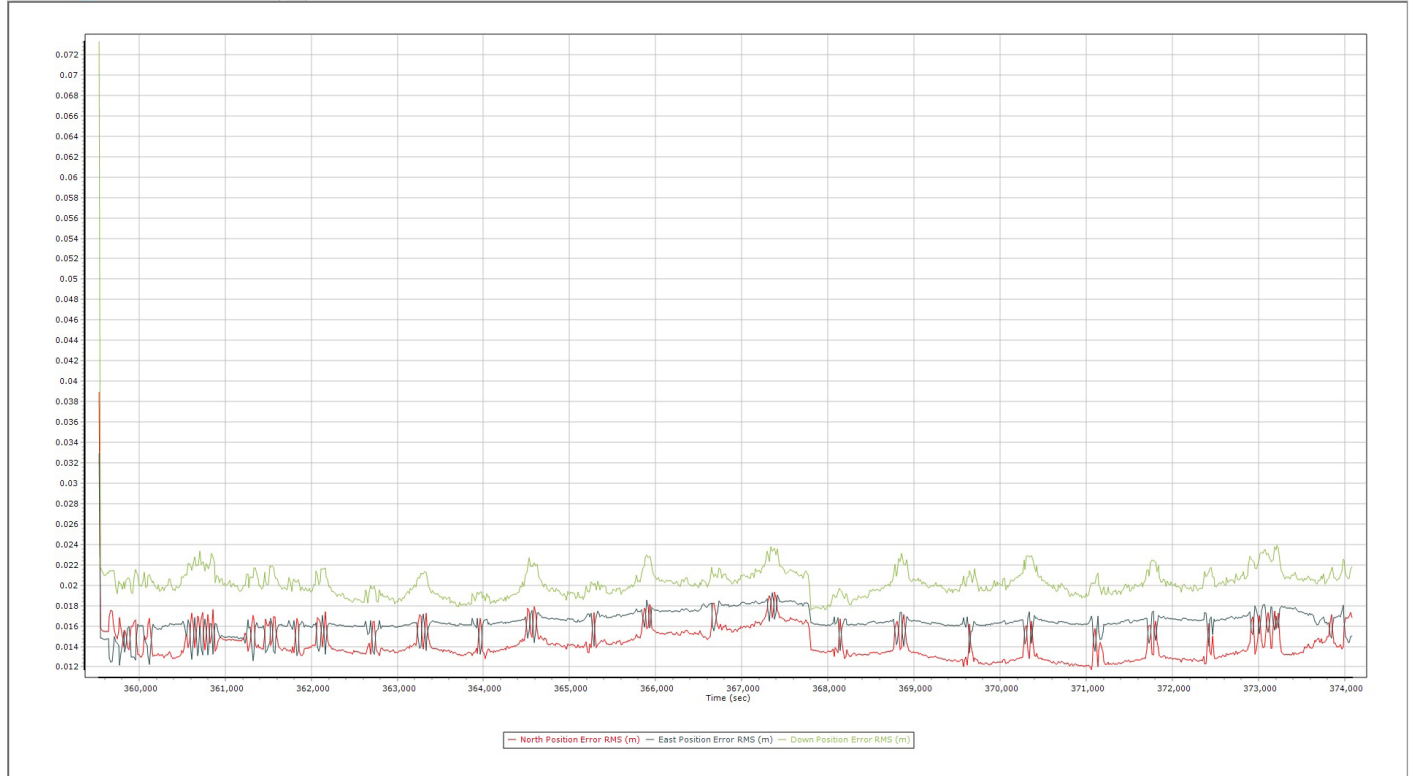
File Edit Tools View Help



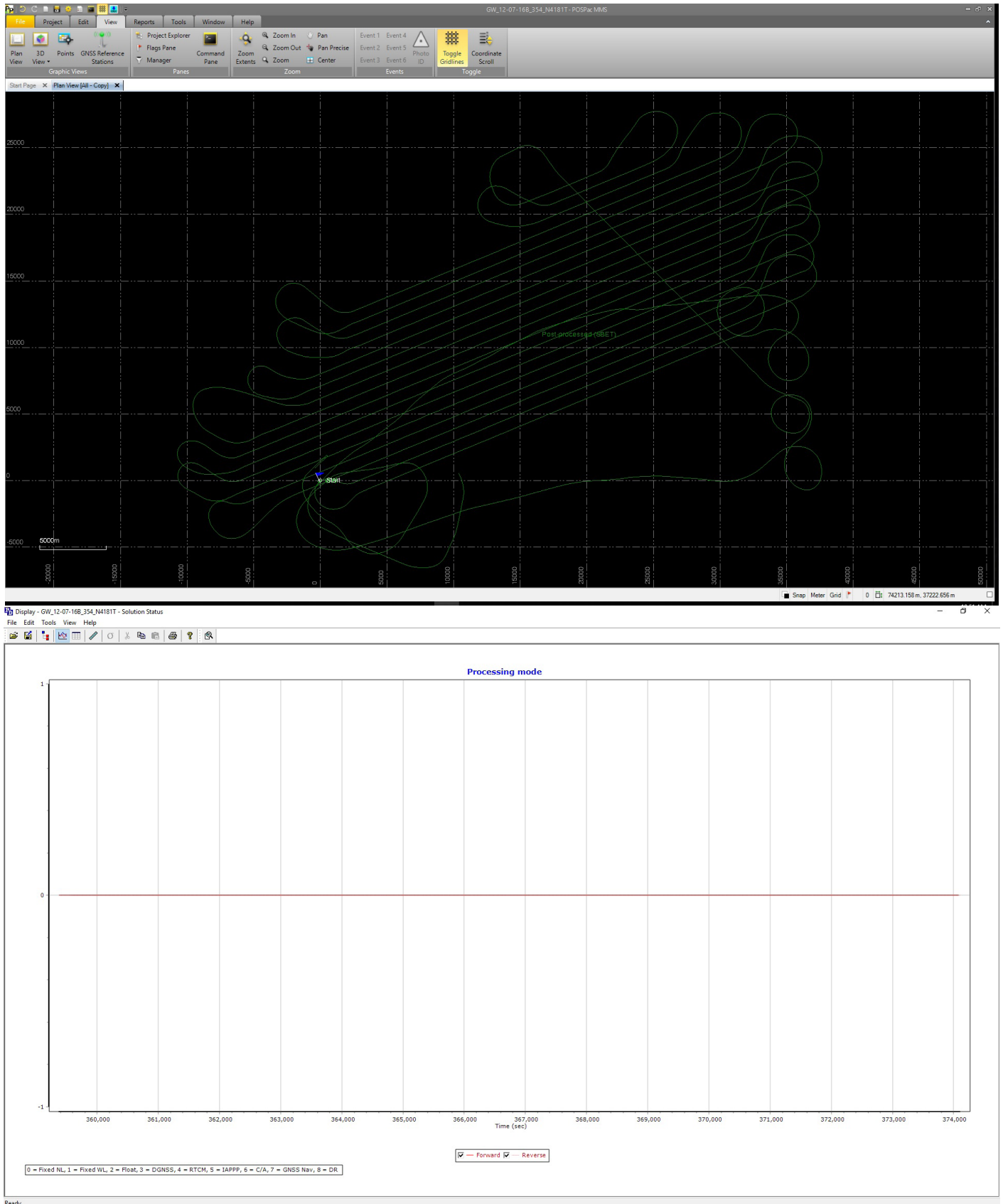
Ready

Display - GW_12-07-168_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

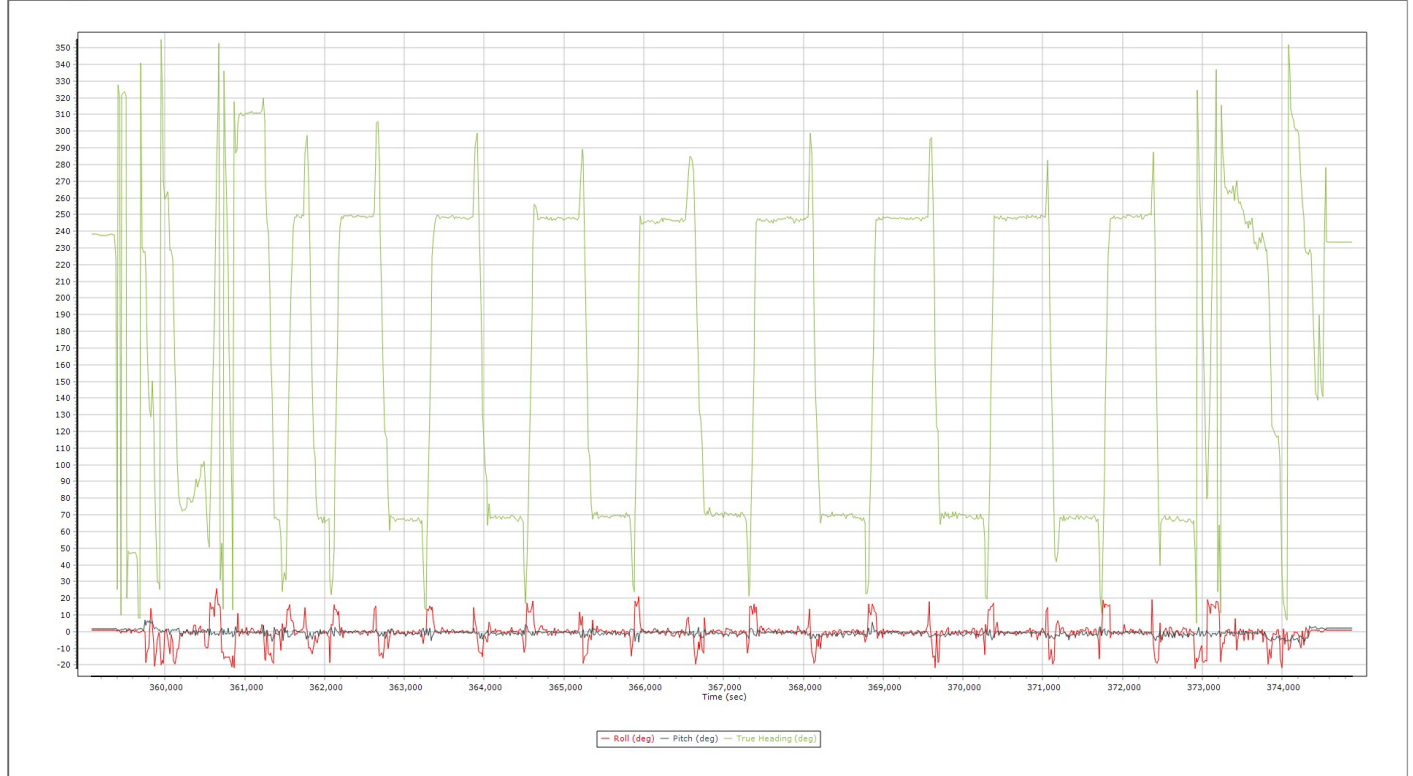


Ready



Display - GW_12-07-168_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID

Coordinates

Latitude

Longitude

Altitude m

☐ Decimal Degrees

Ground Reference Point (GRP) coordinates

Antenna Frame

Height m

Method

Manufacturer

Type

Offset from Measured Point to APC m

Apply Changes

Station Database

Station ID

Station Fullname

Primary Service ID

Coordinate Accuracy

Secondary Service ID

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Flight Log

KEYSTONE AERIAL SURVEYS

Date: 12 / 02 / 2016 Pilot: AC

Project: 1600A-816 NW Operator: EF

Aircraft: N4121T

Sensor: S660559 HD: 3

POS/AV Filename: Dec07b

KeyStone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2

Flight Plan		Weather	
Roll Comp:	<u>On</u> or Off	Pressure (gnd):	
Multipulse:	<u>On</u> or Off	Temperature (gnd):	
Beam Divergence:	Wide or Narrow	Temperature (air):	
Scan Rate:	<u>52</u>	Dew Point:	
Pulse Rate:	<u>250</u>	Turbulence:	<u>High</u>
Scan Angle:	<u>1/2</u>	Visibility:	
Desired Range:	<u>1550</u>		
Planned GPS:			

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
Test line								Test line
16	04:16	04:20	315.2	1600	1.22	16	140	Tie line
19	04:25	04:29	63.7	1580	1.09	18	142	
18	04:27	04:28	243.7	1570	1.07	18	138	
17	04:32	04:34	67.7	1570	1.08	18	138	
16	04:37	04:43	247.7	1600	1.13	17	140	
15	04:47	04:53	67.7	1600	0.97	19	148	
14	04:57	05:04	247.7	1650	1.00	19	138	
13	05:07	05:14	67.7	1600	0.94	19	142	
12	05:18	05:26	243.7	1640	1.00	17	136	
11	05:29	05:37	67.7	1600	1.2	15	140	
10	05:40	05:48	247.7	15500	1.29	14	138	
9	05:57	06:01	67.7	1600	1.21	15	142	
8	06:04	06:14	247.7	1500	1.12	16	136	
7	06:17	06:26	67.7	1600	1.41	14	142	
6	06:30	06:39	247.7	1550	1.21	14	136	
5	06:42	06:51	67.7	1640	1.25	14	140	
4	06:54	07:04	247.7	1570	1.32	14	136	
3	07:07	07:15	67.7	1630	1.23	15	146	
2	07:18	07:26	247.7	1620	1.09	16	134	
1	07:28	07:34	67.7	1600	1.1	16	142	

Base Station

Point ID: _____

Position Type: Known (Autonomous)

Antenna Height: 2 Meters

Latitude: 38.2546218

Longitude: -81.5303305

Location: 15C614

Time On(UTC): 05:15

Time Off(UTC): 08:13

PDOP: 1.08

SVs: 17

Airborne Station

Time On: 05:44 UTC

Kinematic On: 05:44 UTC

Kinematic Off: 08:02 UTC

Time Off: 08:06 UTC

Engine Start(24HR LCL): 22:37 Hobbs Start: _____

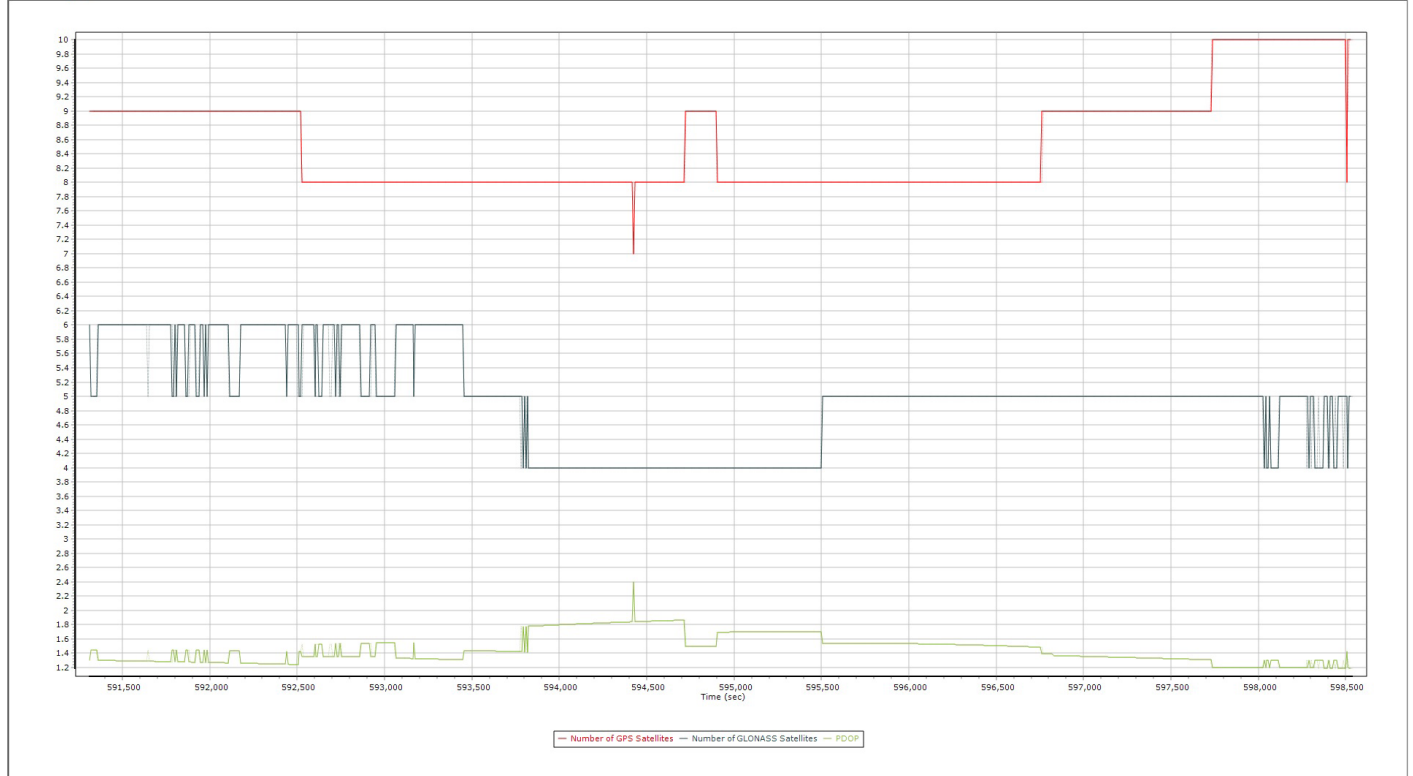
Engine Stop(24HR LCL): 03:10 Hobbs Stop: _____

Page _____ of _____

Dec 10, 2016-A (N4181T, SN354)

Display - GW_12-10-16A_354_N4181T - Solution Status

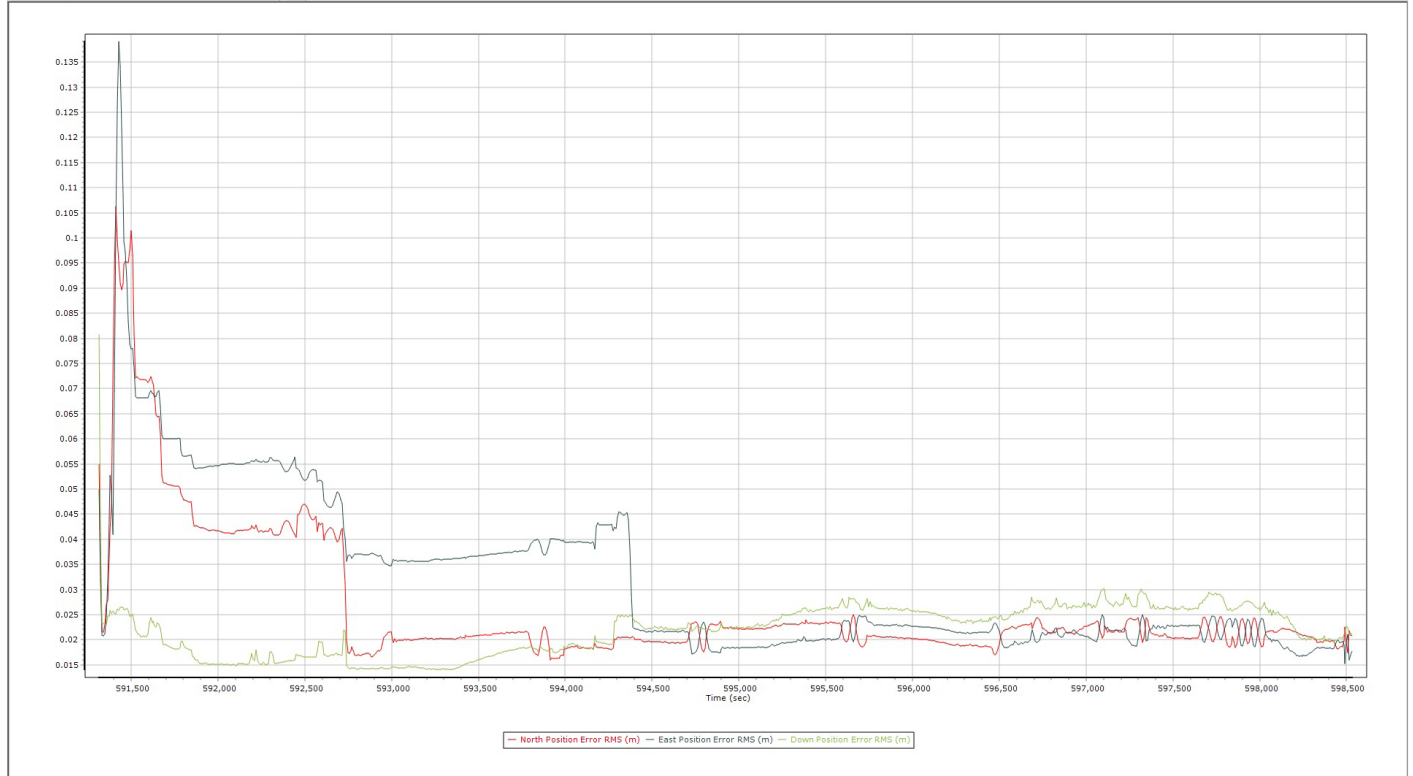
File Edit Tools View Help



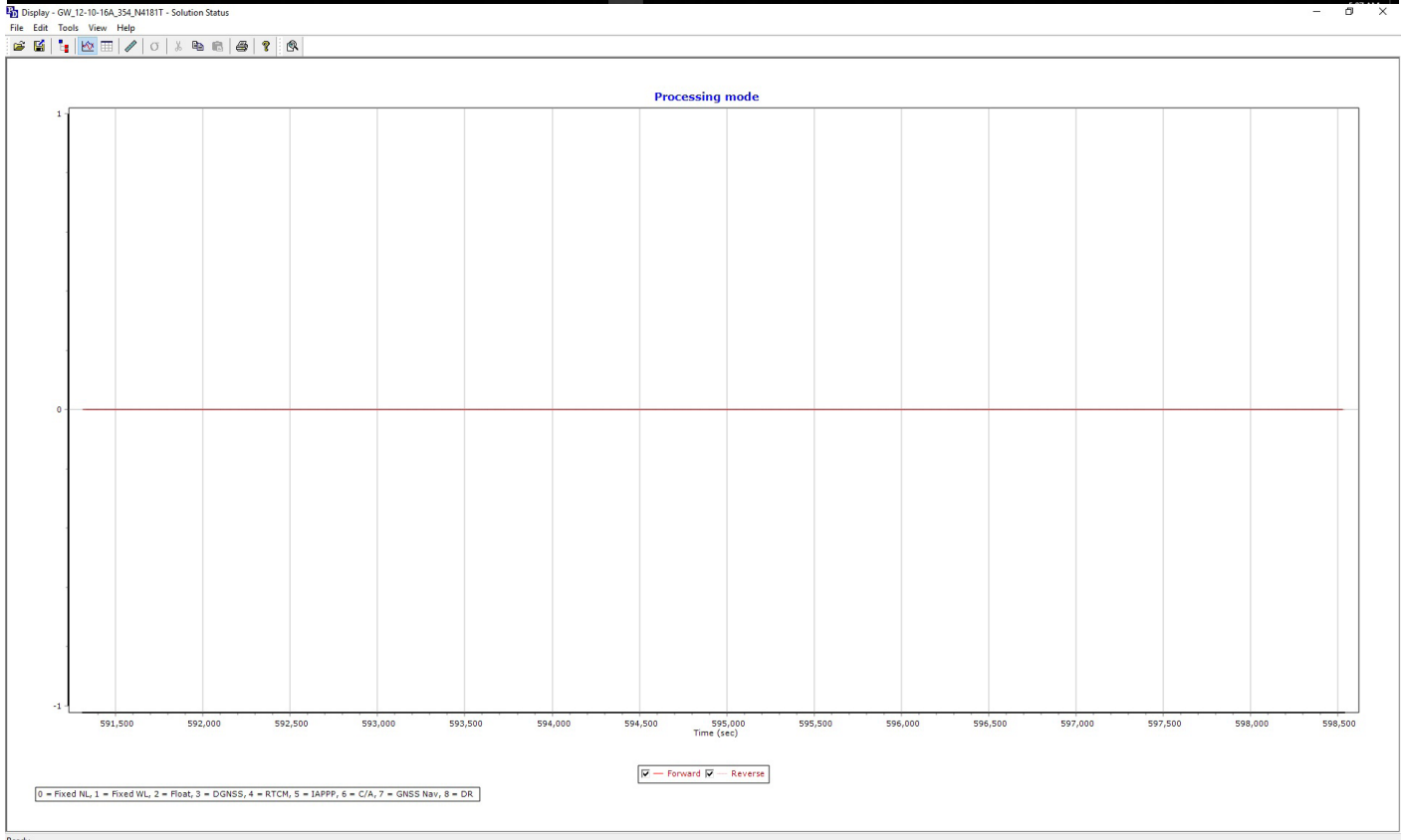
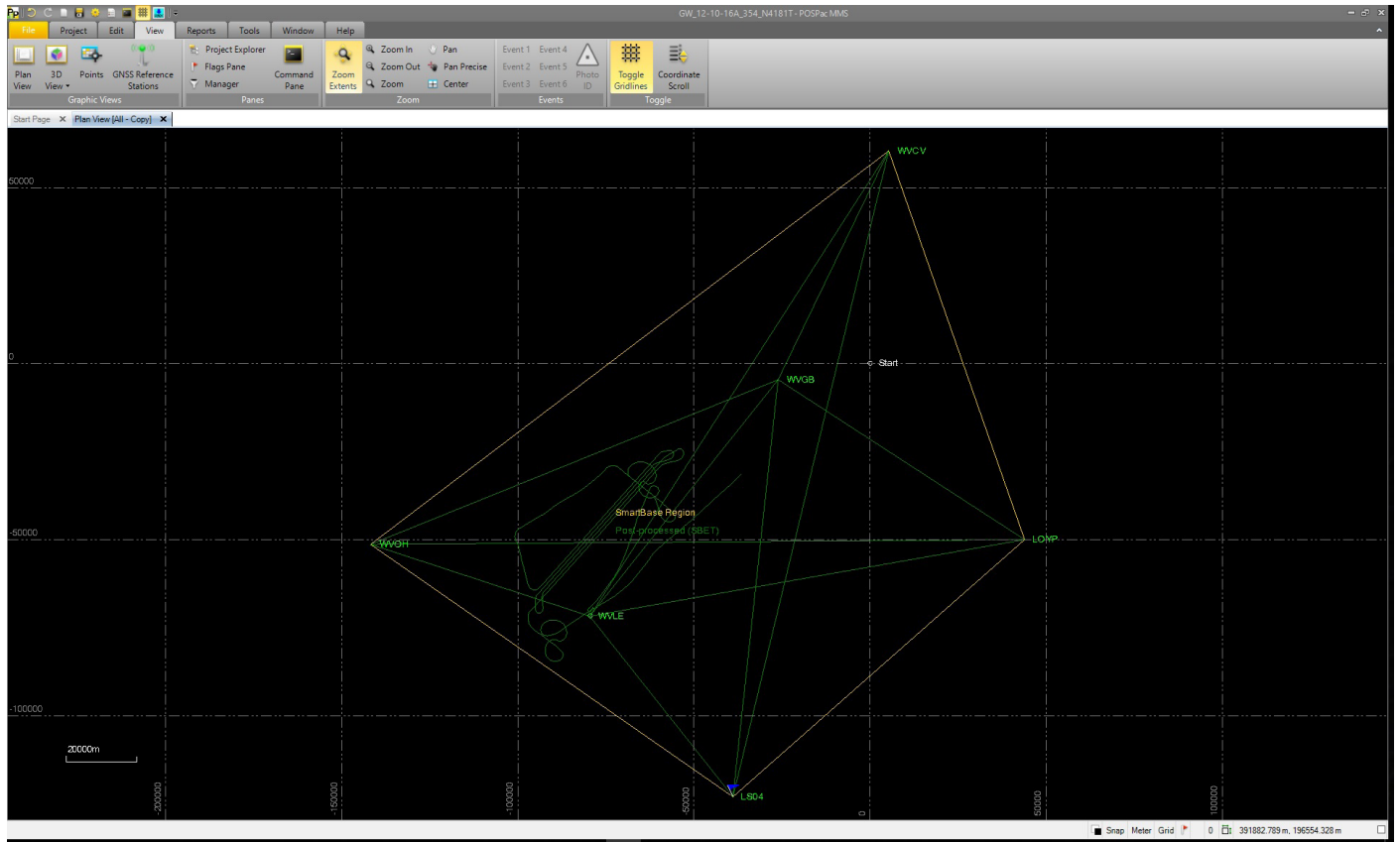
Ready

Display - GW_12-10-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready



Display - GW_12-10-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

Secondary Service ID:

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 10 / 20 Pilot: JJ
 Project: KAS16PA-816 West Operator: MUM
 Aircraft: N4181T HD: A
 Sensor: 5060354

POS/AV Filename: Dec10

Flight Plan		Weather
Roll Comp:	On	Pressure (gnd):
Scan Rate:	52	Temperature (gnd):
Pulse Rate:	250	Temperature (air):
Scan Angle:	43	Dew Point:
Desired Range:	1550	Turbulence:
Planned GPS:	130	Visibility:

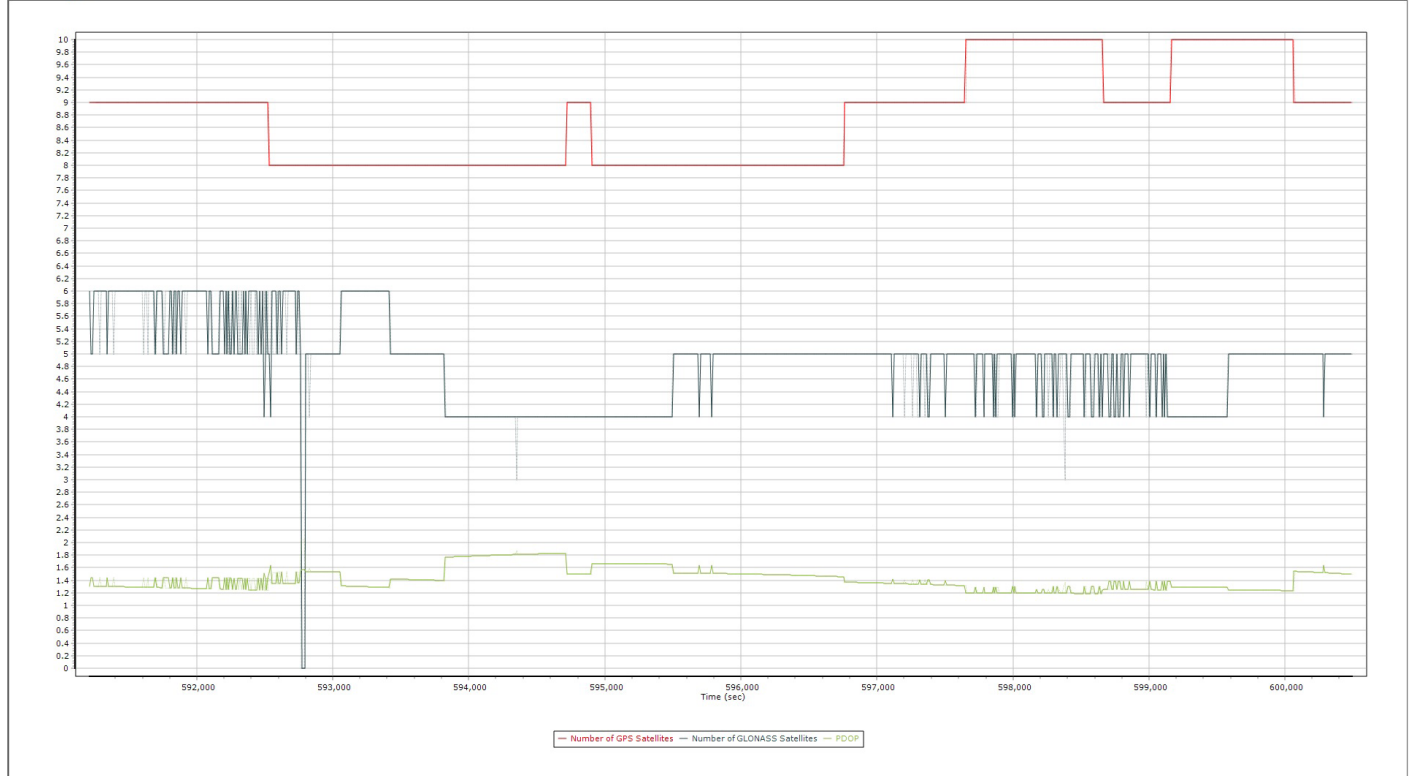
[illegible]

Base Station		Location: <u>KLWB</u>	
Point ID: _____		Time On(UTC): _____	
Position Type: <u>Known</u>		Time Off(UTC): _____	
Antenna Height: <u>2</u> Meters		PDOP: _____	
Altitude: _____		SVs: <u>15</u>	

Dec 10, 2016-A (N812TB, SN356)

Display - GW_12-10-16A_356_N812TB_Smartbase - Solution Status

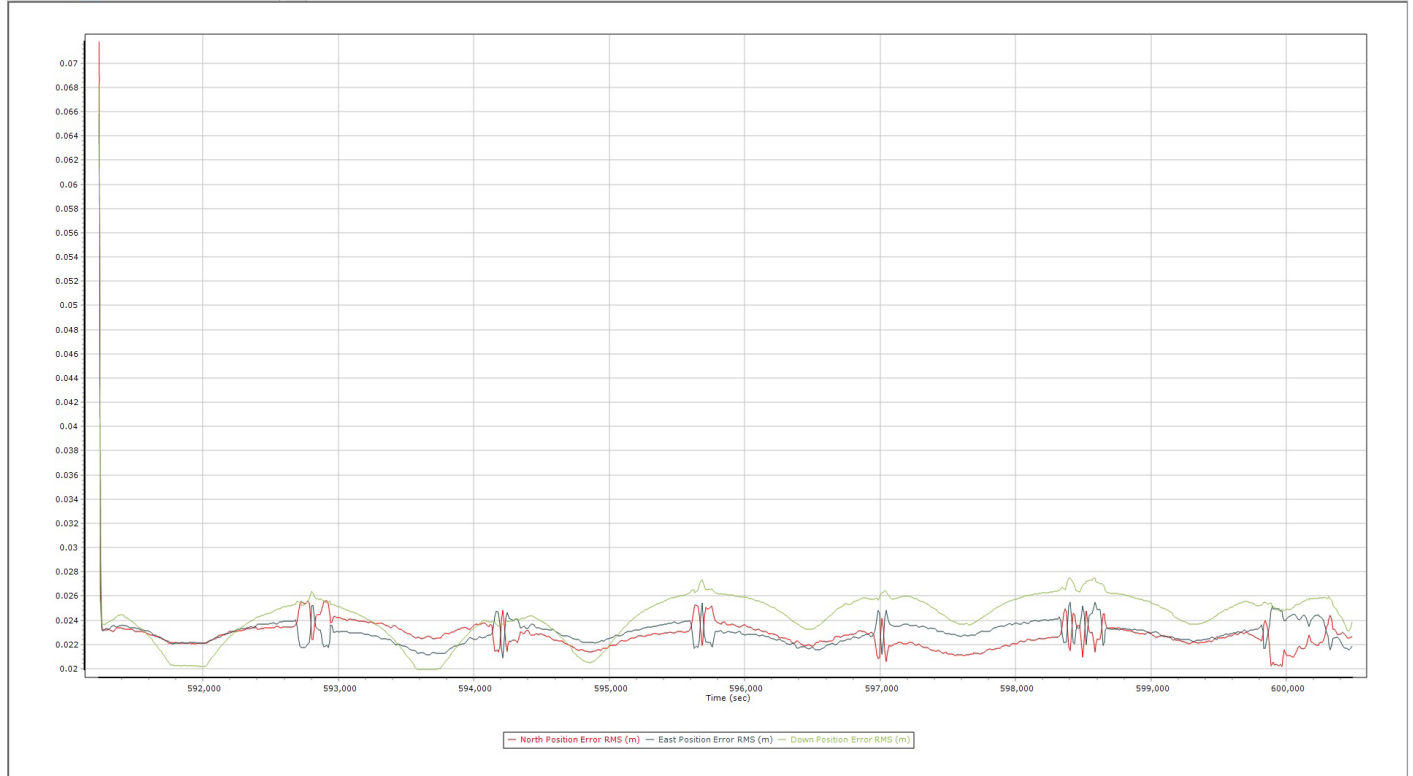
File Edit Tools View Help



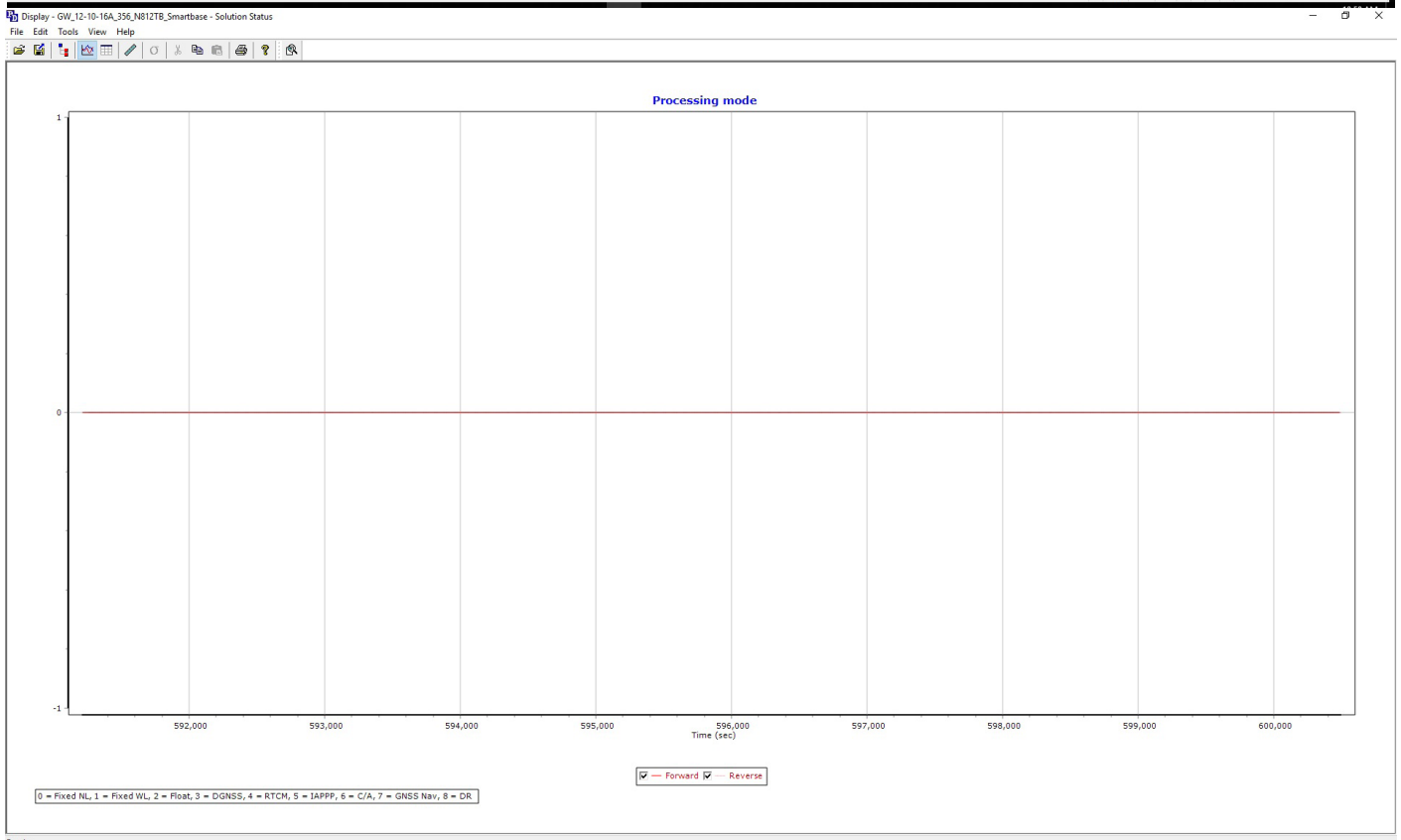
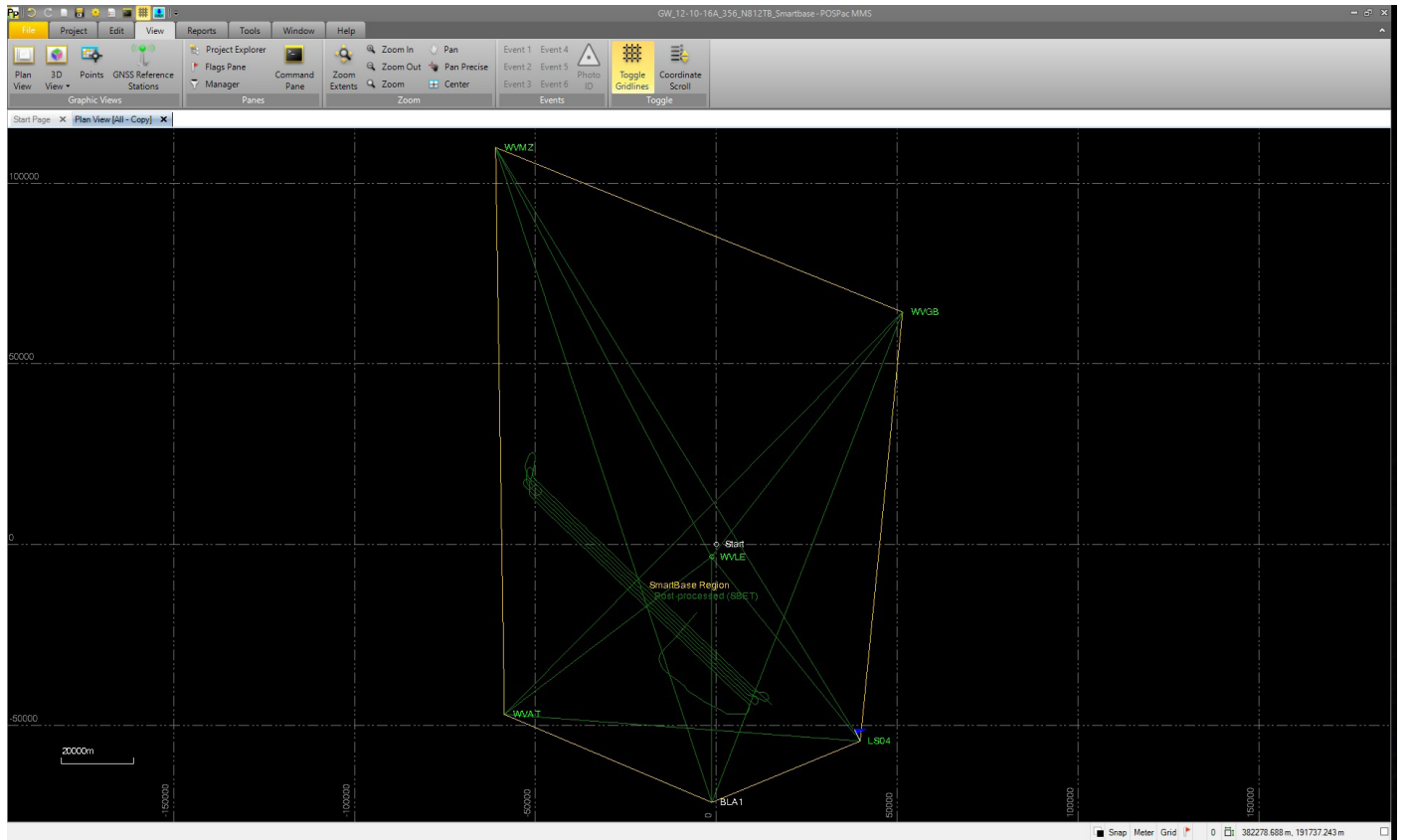
Ready

Display - GW_12-10-16A_356_N812TB_Smartbase - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

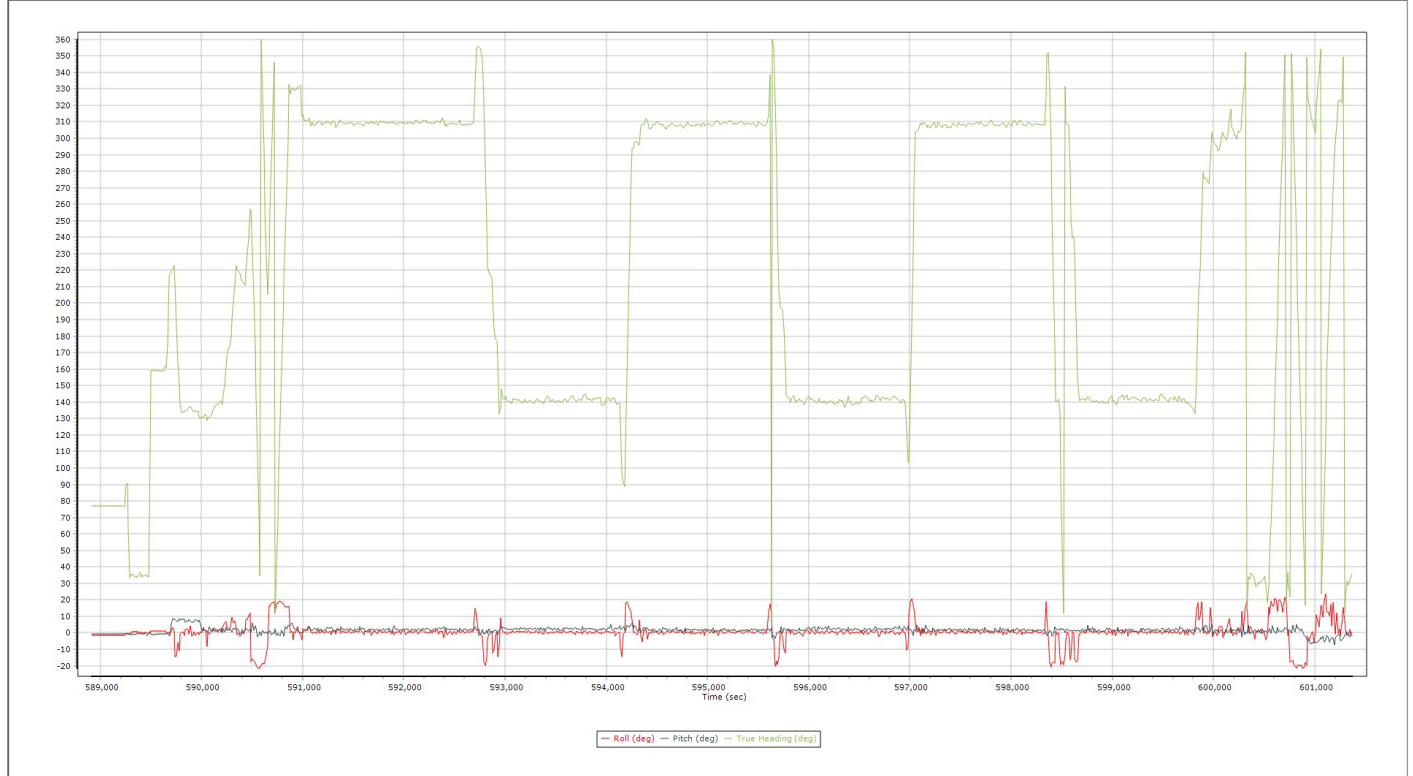


Ready



Display - GW_12-10-16A_356_N812TB_Smartbase - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

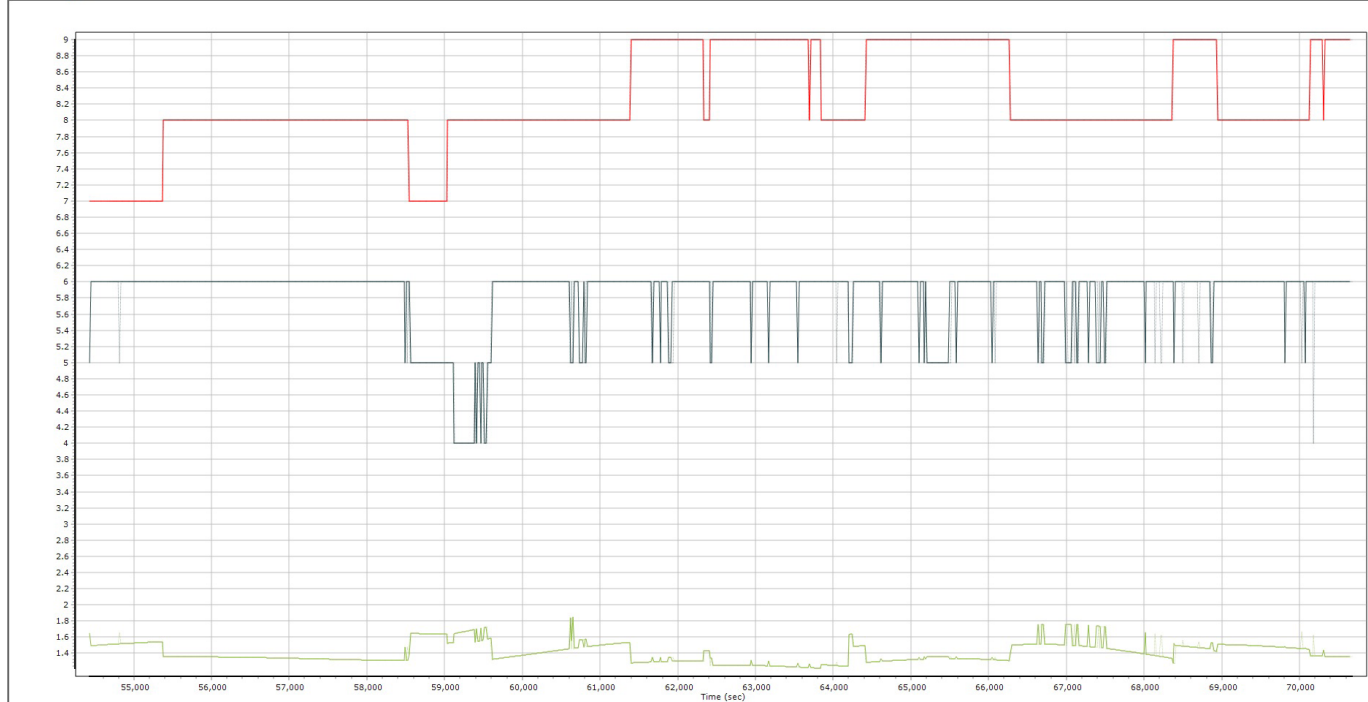
Flight Log

[illegible]

Dec 11, 2016-A (N4181T, SN354)

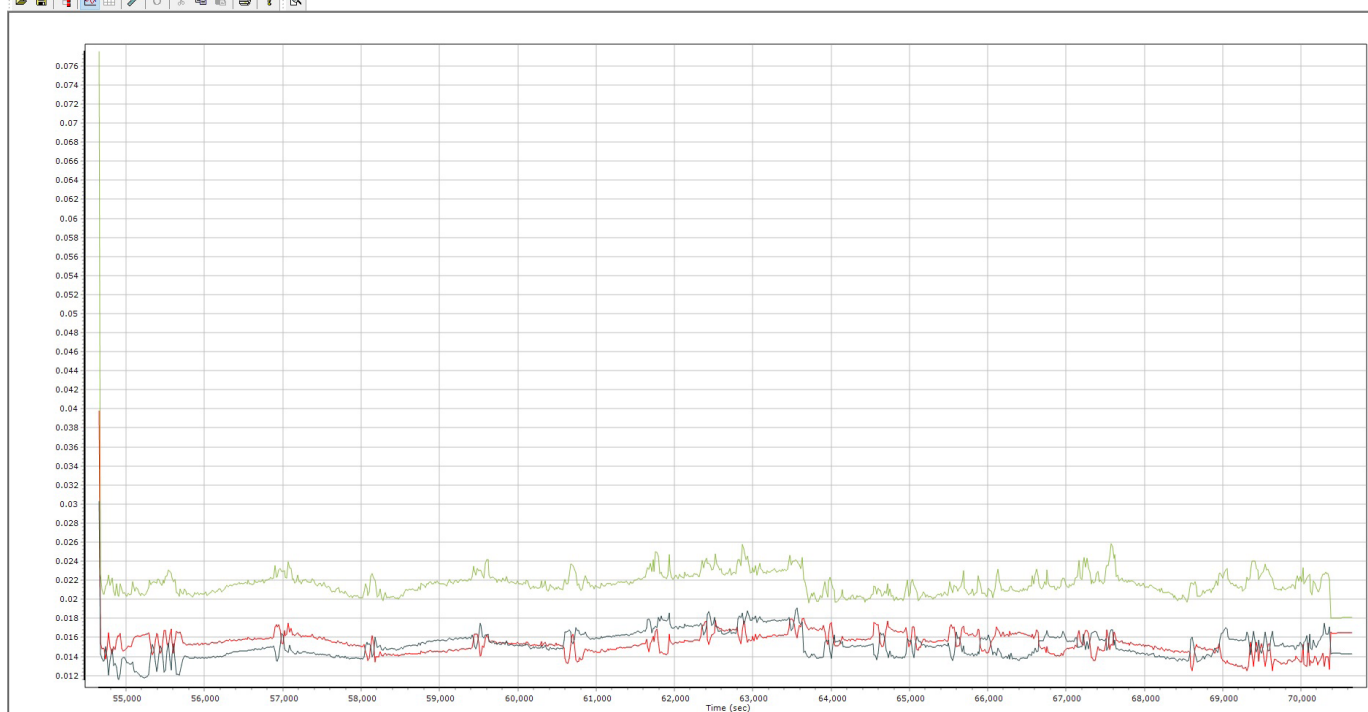
Display - GW_12-11-16A_354_N4181T - Solution Status

File Edit Tools View Help

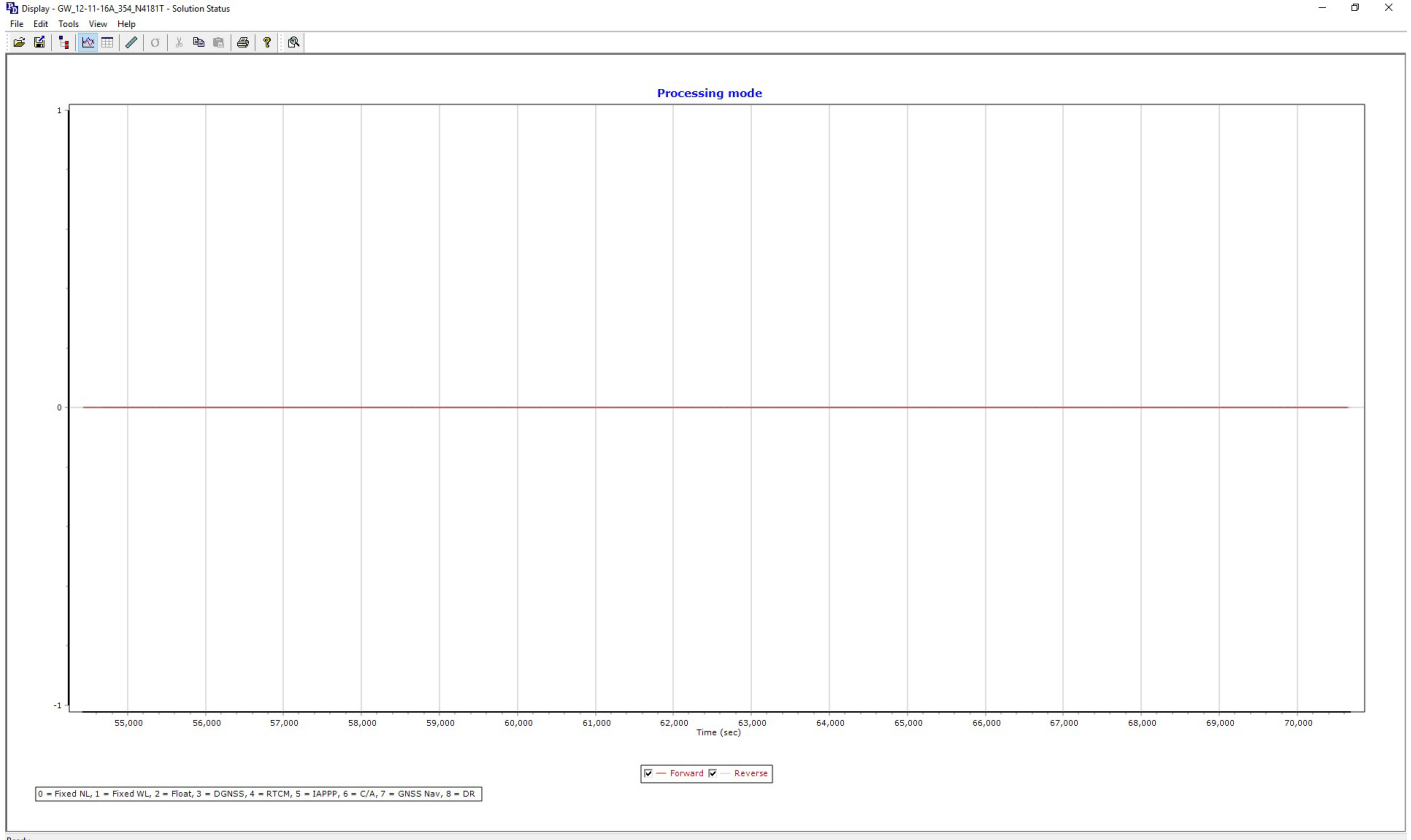
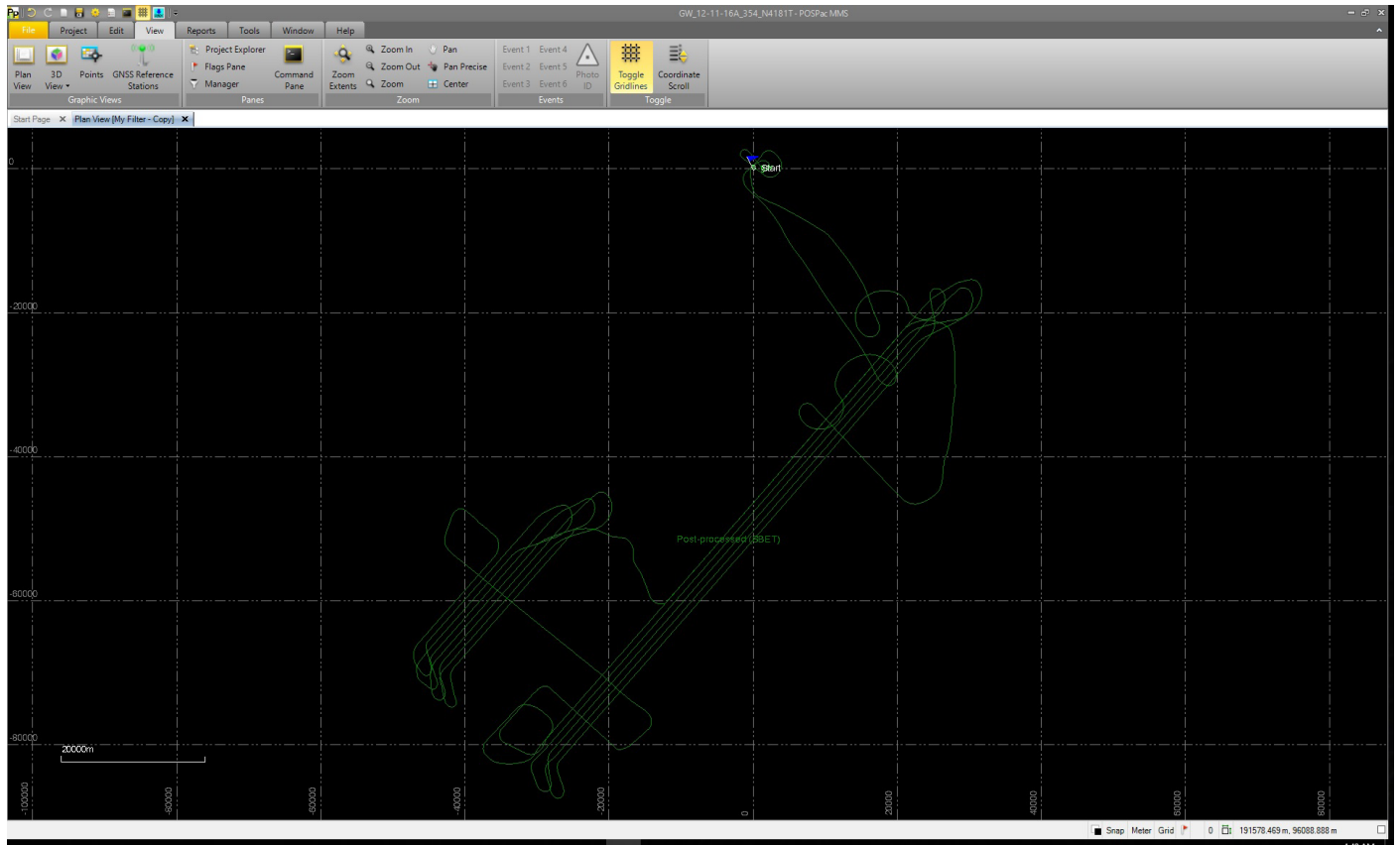


Ready
Display - GW_12-11-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready



Display - GW_12-11-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID gw

Coordinates

Latitude N 38 53 15.02161000

Longitude W 79 51 26.64719000

Altitude 567.6710 m

☐ Decimal Degrees

Ground Reference Point (GRP) coordinates

Apply Changes

Antenna Frame

Height 2.000 m

Method Antenna Phase Center

Manufacturer NovAtel

Type 701-GG 1.03

Offset from Measured Point to APC 0.000 m

Station Database

Station ID gw

Station Fullname gw

Primary Service ID Edit

Coordinate Accuracy UNKNOWN_ACC

Secondary Service ID Edit

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 11 / 2016
 Project: KAS16PA-816_NE
 Aircraft: N4181T
 Sensor: 5060354

Pilot: JJ
 Operator: MLM
 HD: A

POS/AV Filename: Dec11a

Flight Plan		Weather
Roll Comp:	On	Pressure (gnd):
Scan Rate:	52	Temperature (gnd):
Pulse Rate:	250	Temperature (air):
Scan Angle:	43	Dew Point:
Desired Range:	1550	Turbulence:
Planned GPS:	130	Visibility:

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
25	1530	1547	221	1455	1.1	15	107	Range spike due to ice
26	1551	1607	41	1700	1.2	15	152	Tailwind
27	1612	1630	221	1278	1.0	15	132	
28	1634	1649	41	1529	2.0	15	157	Tailwind
29	1656	1707	221	1512	1.0	16	132	Snow layer under sensor
48	1713	1718	221	1513	0.9	18	121	Range spike due to ice
49	1722	1726	41	1660	0.9	18	165	
50	1732	1737	221	1592	1.0	17	121	
51	1741	1745	41	1546	1.1	17	161	
52	1750	1756	221	1540	1.0	18	124	
53	1759	1802	41	1500	1.1	17	161	Range spike due to ice
54	1808	1811	221	1689	1.1	17	130	
55	1815	1817	41	1641	1.0	18	167	
56	1822	1828	128	1521	1.0	18	140	
57	1833	1835	312	1594	1.0	17	124	
29	1847	1902	41	1611	1.0	16	165	
58	1911	1914	316	1527	1.1	17	146	Extended tie
								Hi speeds due to winds despite full flaps + min safe power settings

Base Station	Location: KEKN
Point ID: _____	Time On(UTC): <u>1455</u>
Position Type: <u>Autonomous</u>	Time Off(UTC): <u>1945</u>
Antenna Height: <u>2</u> Meters	PDOP: <u>1.3</u>
Latitude: _____	SVs: <u>13</u>
Longitude: _____	

Airborne Station
Time On: <u>1501</u> UTC
Kinematic On: <u>1507</u> UTC
Kinematic Off: <u>1933</u> UTC
Time Off: <u>1938</u> UTC

Engine Start(24HR LCL): 1000 Hobbs Start: _____

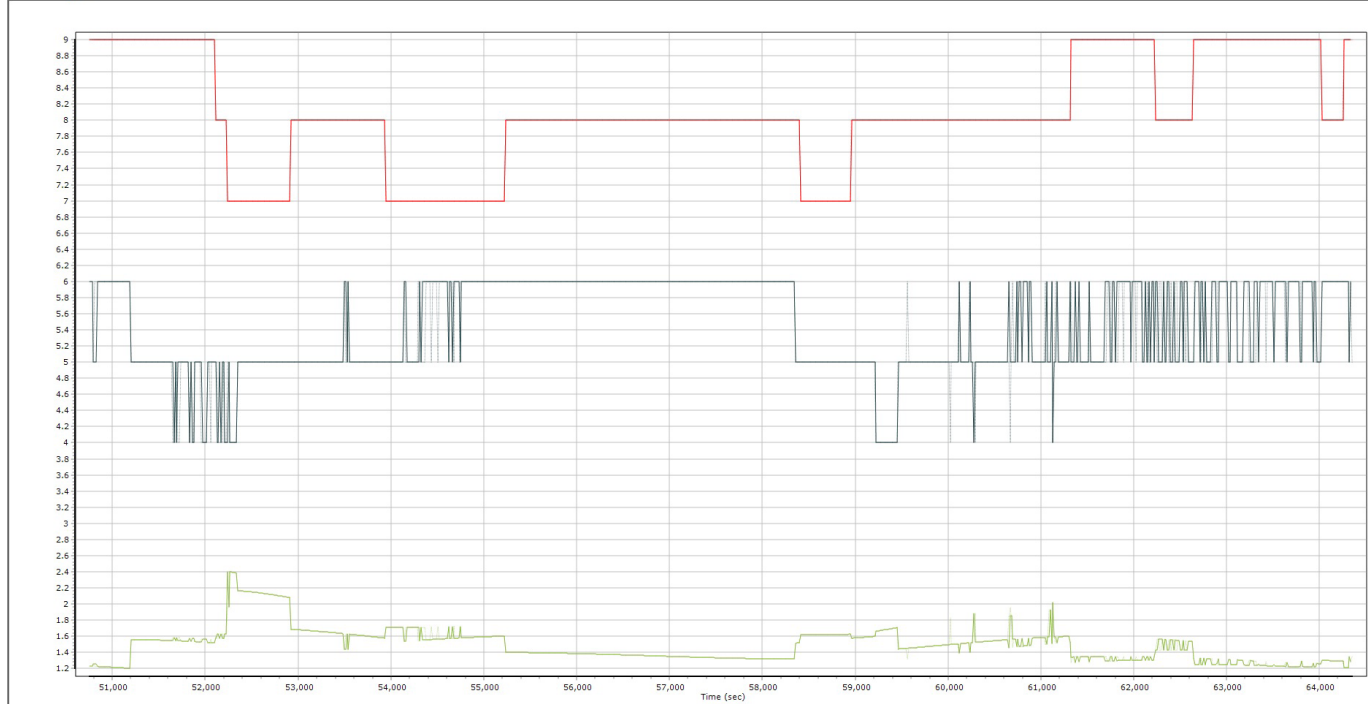
Engine Stop(24HR LCL): 1438 Hobbs Stop: _____

Page _____ of _____

Dec 11, 2016-A (N812TB, SN356)

Display - GW_12-11-16A_356_N812TB - Solution Status

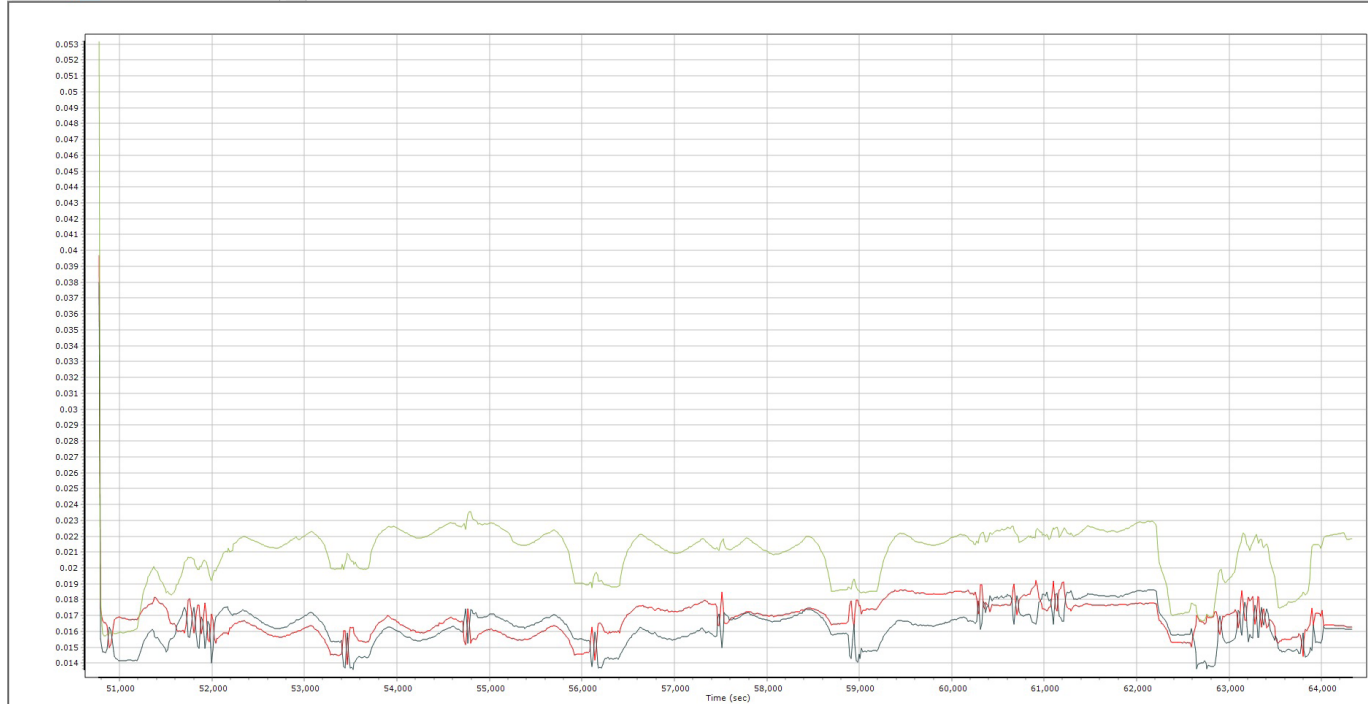
File Edit Tools View Help



— Number of GPS Satellites — Number of GLONASS Satellites — PDOP

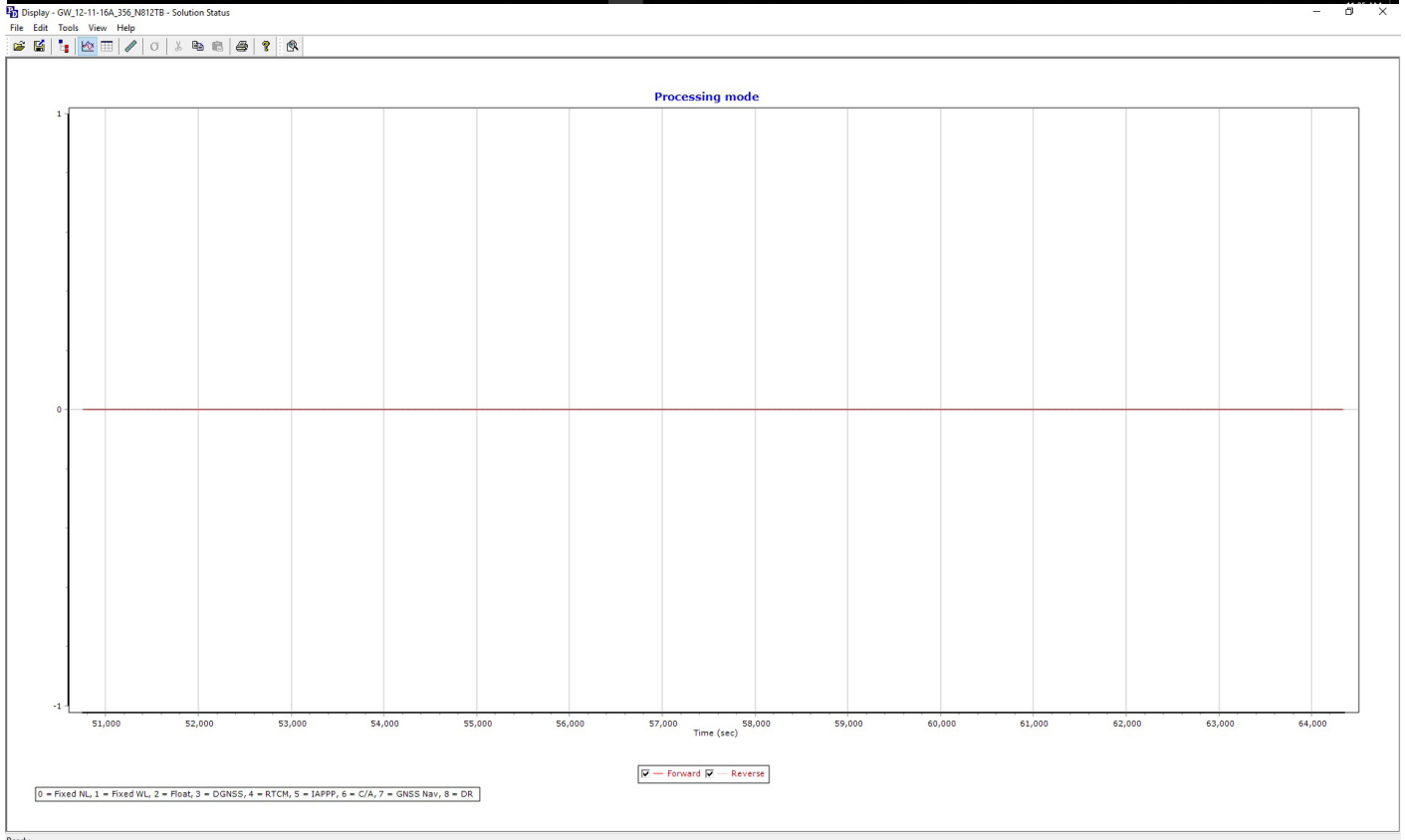
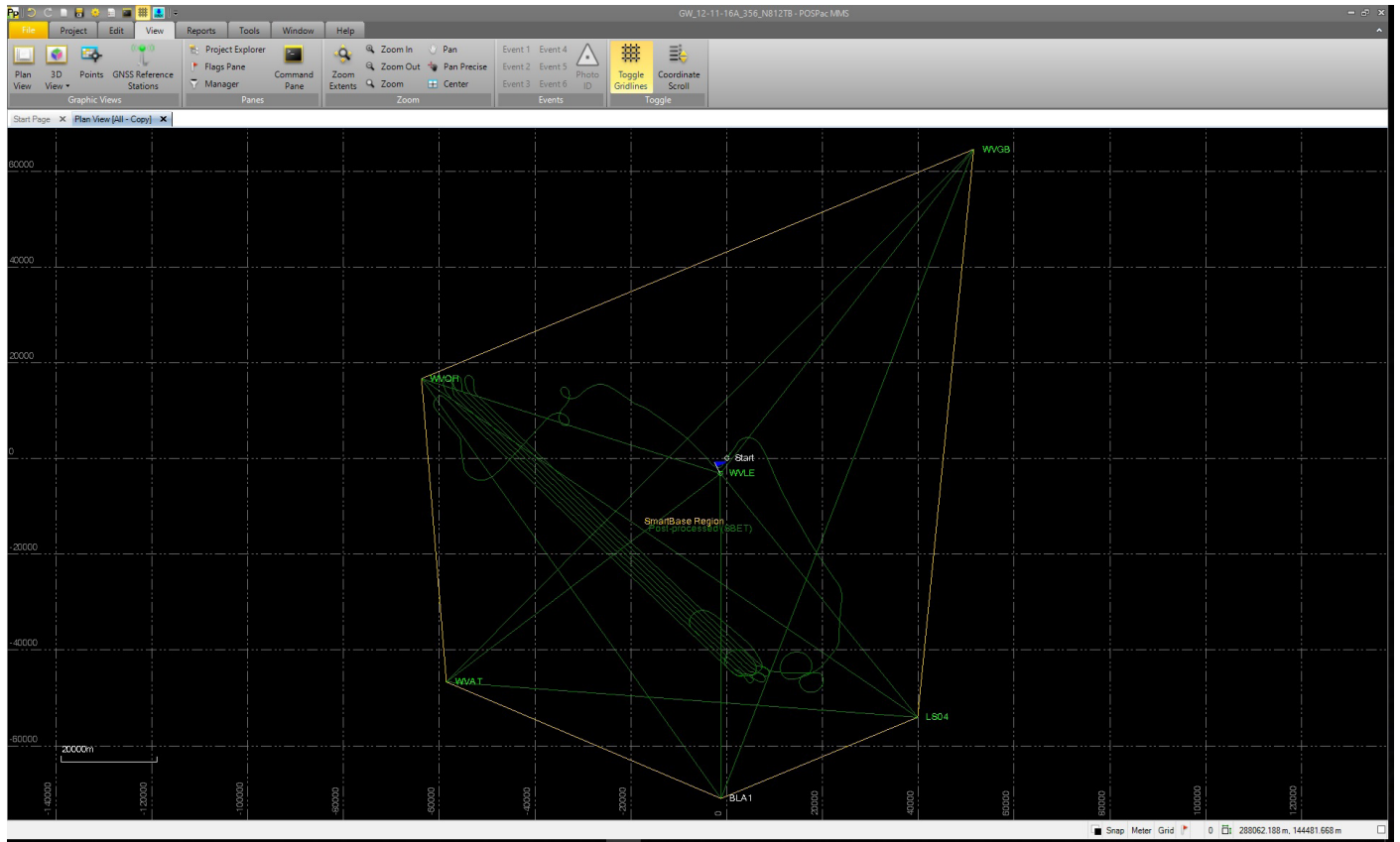
Ready
Display - GW_12-11-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



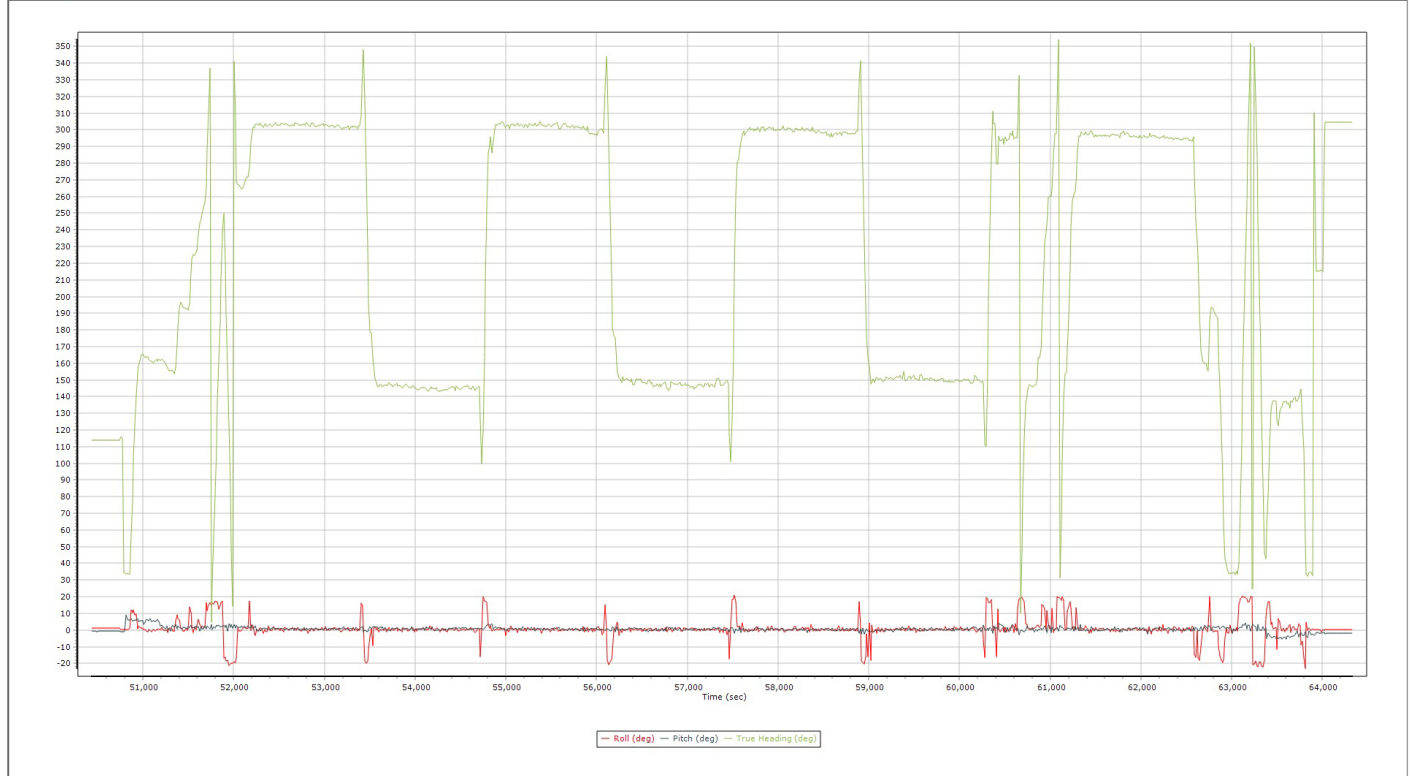
— North Position Error RMS (m) — East Position Error RMS (m) — Down Position Error RMS (m)

Ready



Display - GW_12-11-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

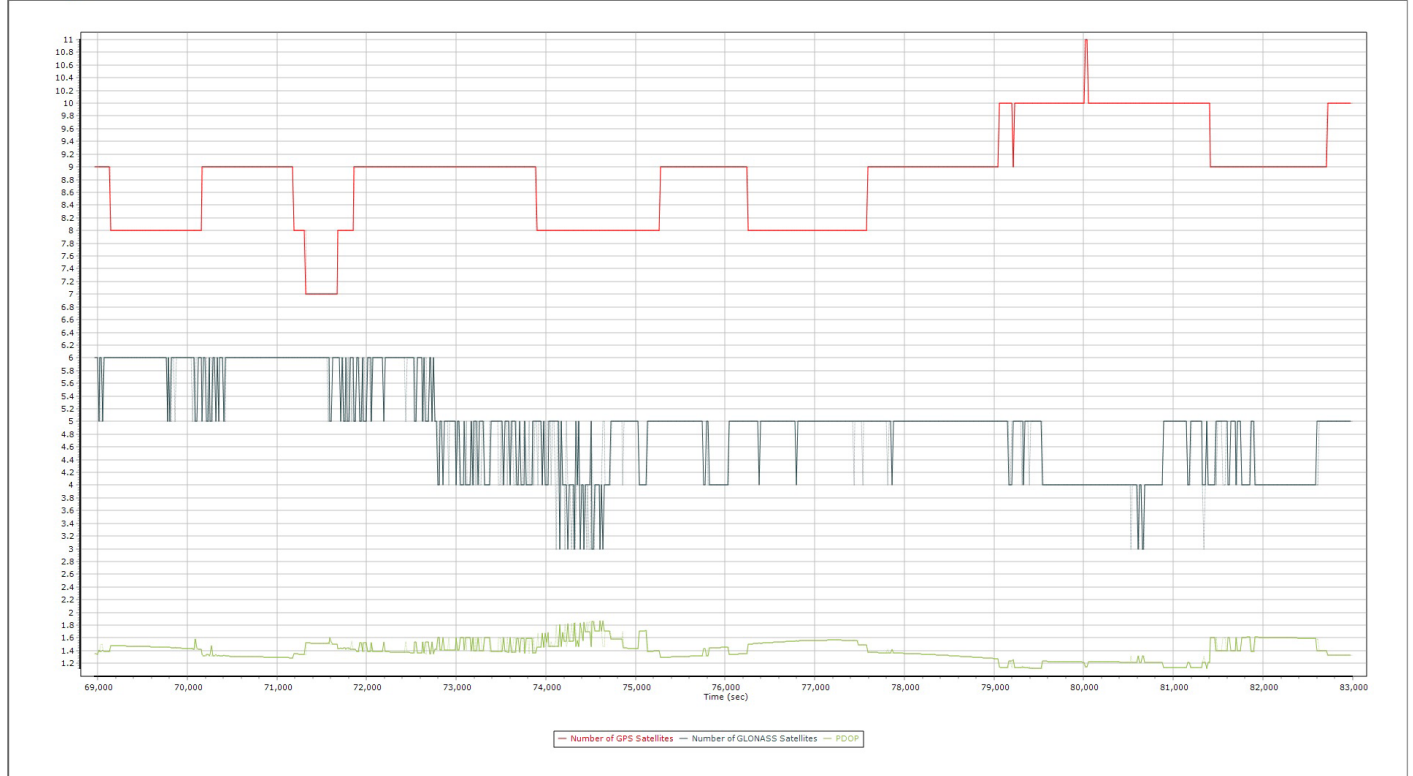
Flight Log

[illegible]

Dec 11, 2016-B (N812TB, SN356)

Display - GW_12-11-168_356_N812TB - Solution Status

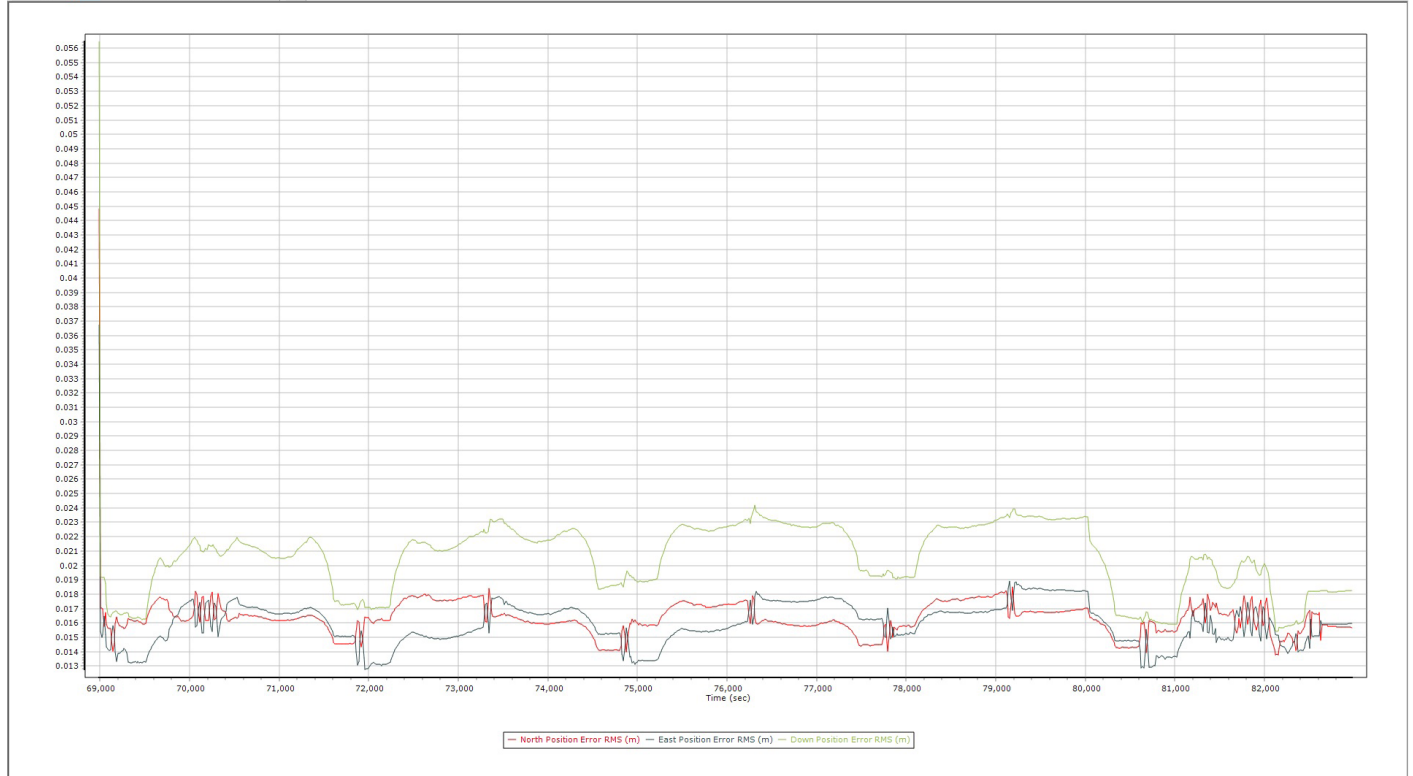
File Edit Tools View Help



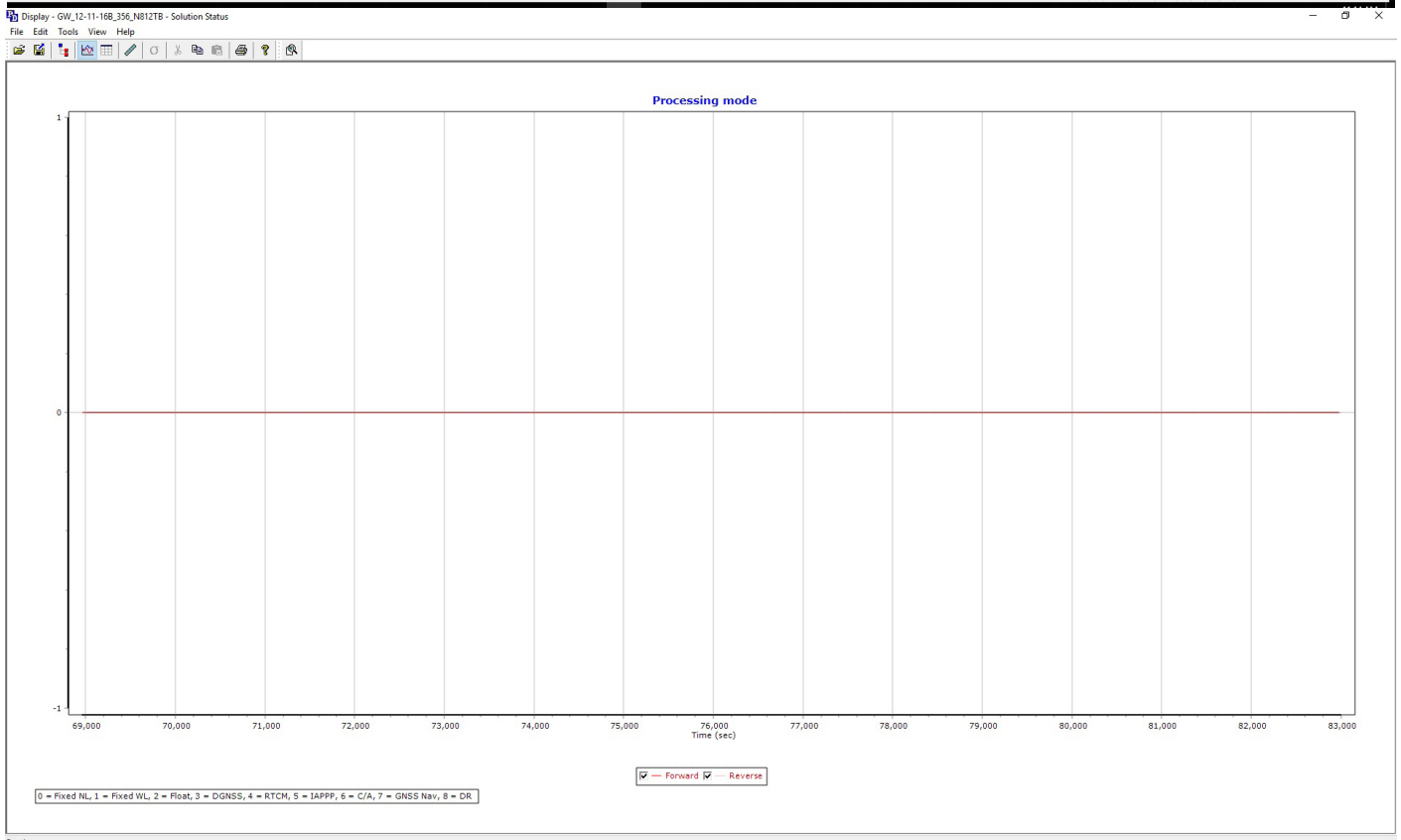
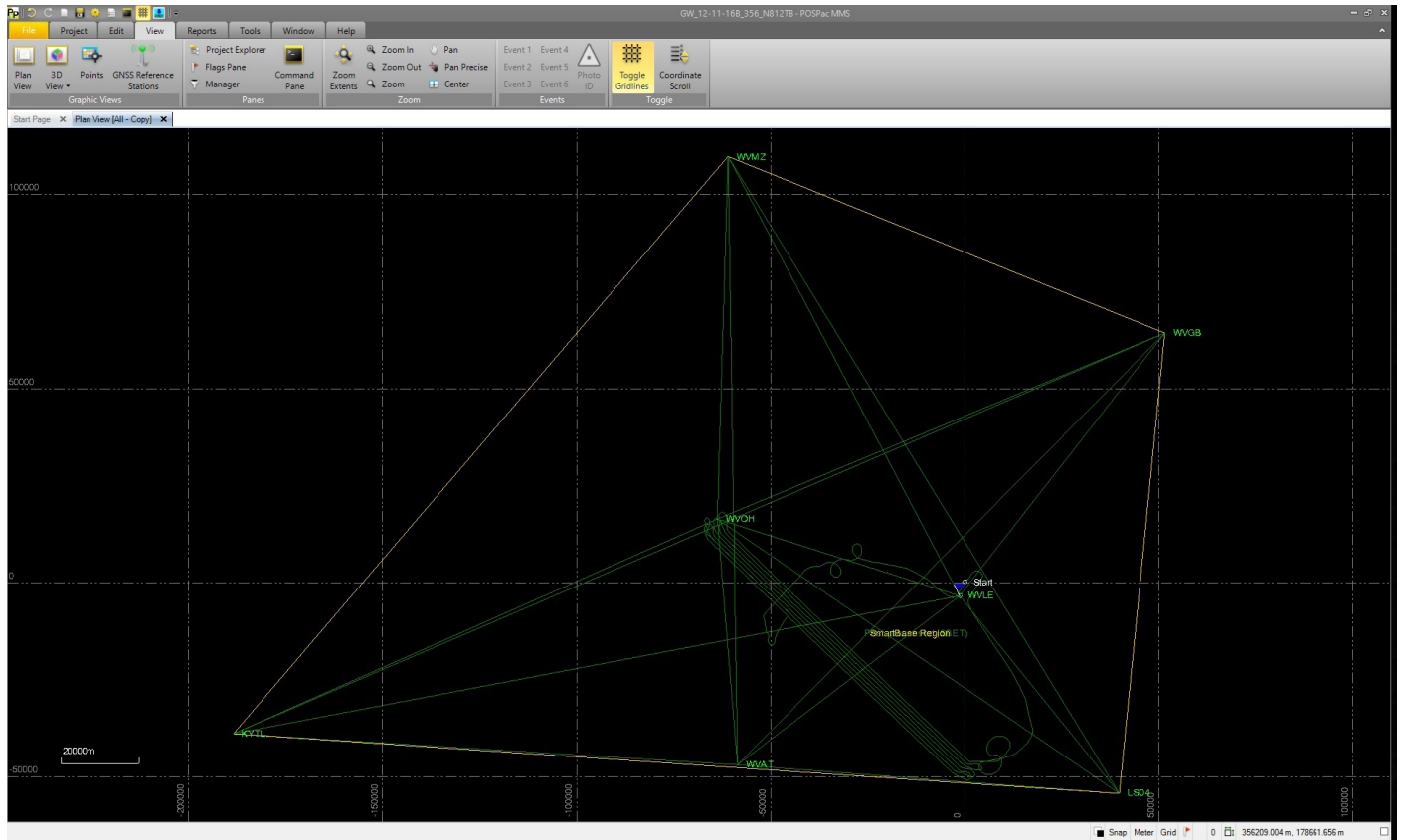
Ready

Display - GW_12-11-168_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

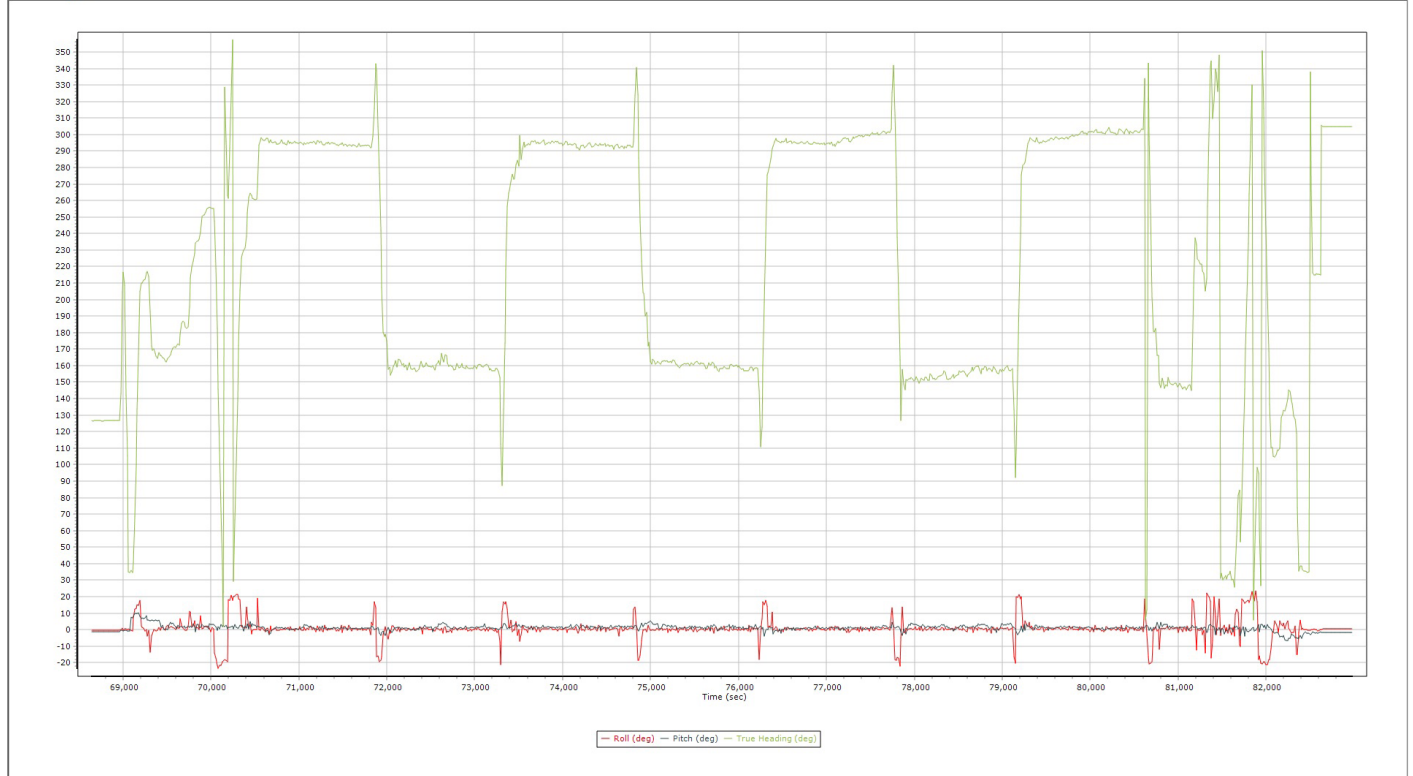


Ready



Display - GW_12-11-168_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

Secondary Service ID:

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

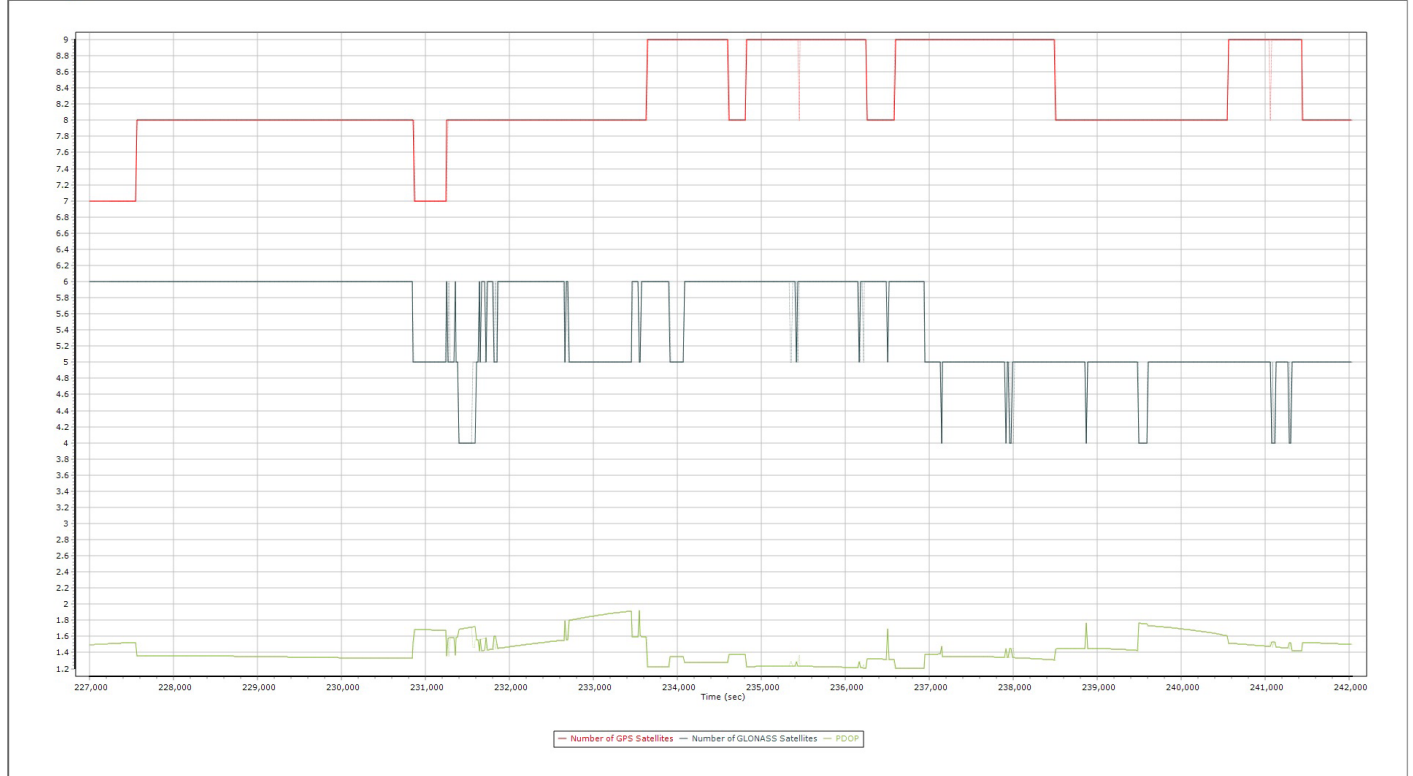
Flight Log

[illegible]

Dec 13, 2016-A (N812TB, SN354)

Display - GW_12-13-16A_354_N4181T - Solution Status

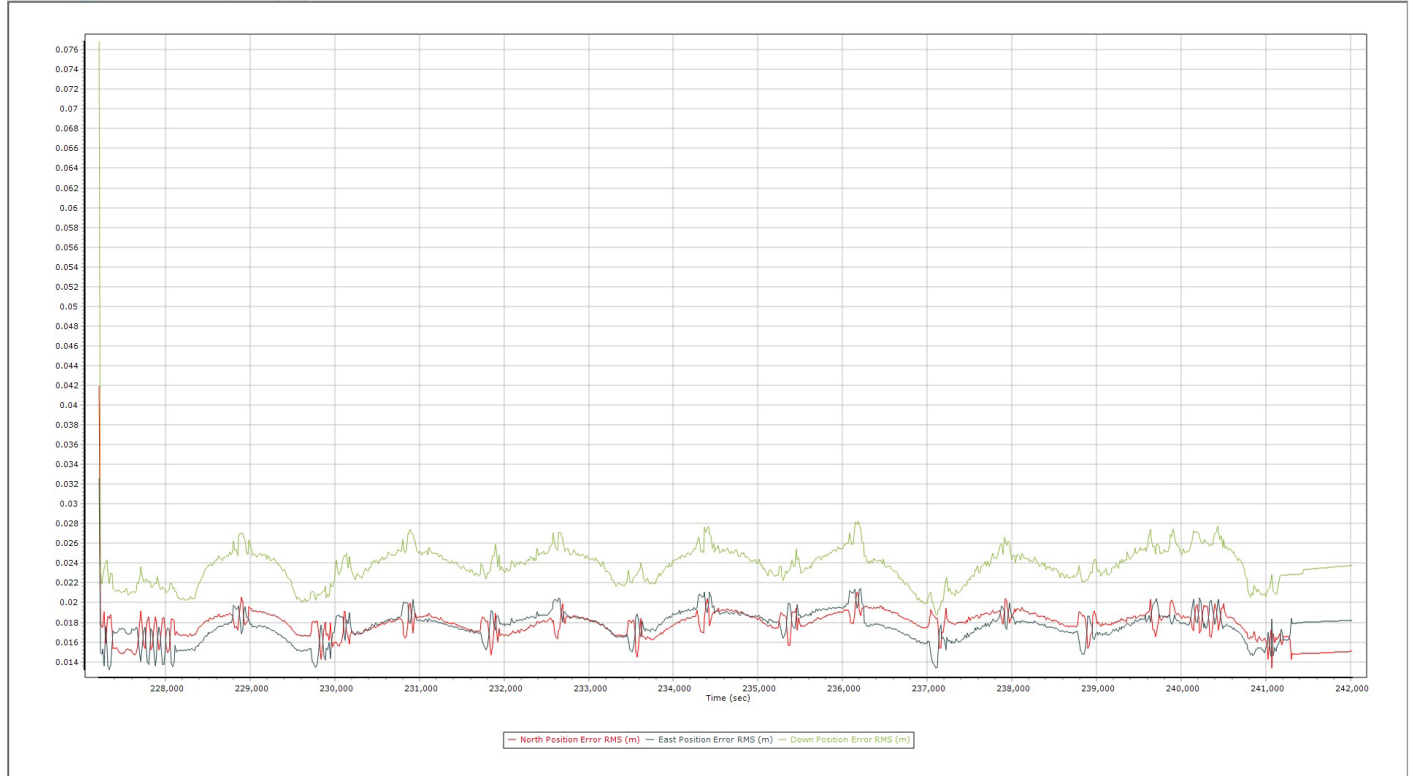
File Edit Tools View Help



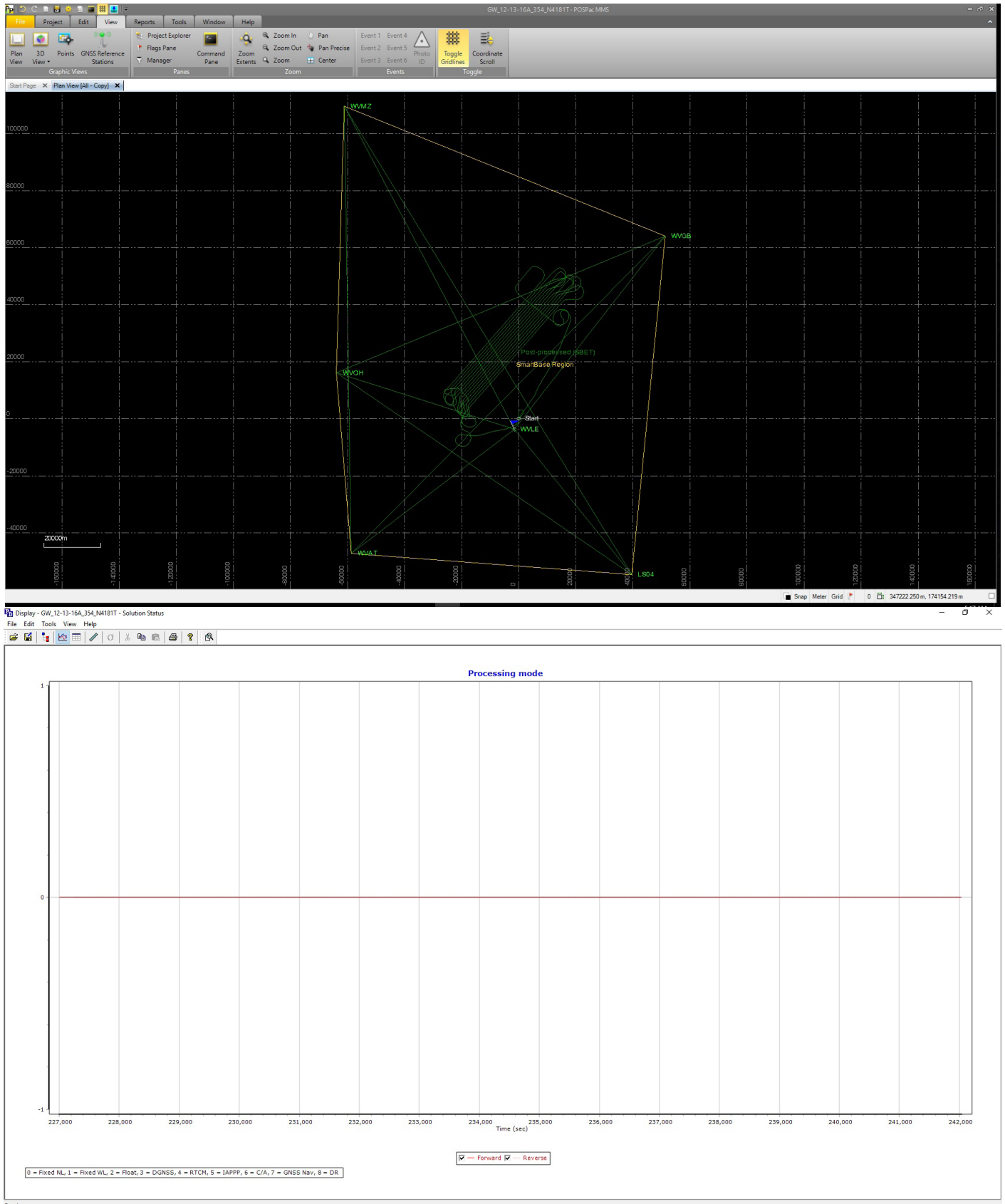
Ready

Display - GW_12-13-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready



Display - GW_12-13-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID **WVLE**

Coordinates

Latitude **N** 37 49 20.20234000

Longitude **W** 80 25 18.55683000

Altitude 656.5010 m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna Frame

Height 0.000 m

Method Bottom of antenna mount

Manufacturer Trimble

Type Zephyr Geodetic 2 RoHS

Offset from Measured Point to APC 0.085 m

Apply Changes

Station Database

Station ID **WVLE**

Station Fullname **WVLE**

Primary Service ID **Edit**

Coordinate Accuracy **UNKNOWN_ACC**

Secondary Service ID **Edit**

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 13 / 20 Pilot: JJ
 Project: KAS16PA-816 West Operator: MUM
 Aircraft: N4181T HD: A
 Sensor: 5060354

POS/AV Filename: Dec13

Flight Plan		Weather
Roll Comp:	On	Pressure (gnd):
Scan Rate:	52	Temperature (gnd):
Pulse Rate:	250	Temperature (air):
Scan Angle:	43	Dew Point:
Desired Range:	1550	Turbulence:
Planned GPS:	130	Visibility:

[illegible]

Base Station	Location: KLWB
Point ID: DL6738	Time On(UTC): 1247
Position Type: KuWn	Time Off(UTC): 1920
Antenna Height: 2 Meters	POOP: 1
Latitude: _____	SVs: 15

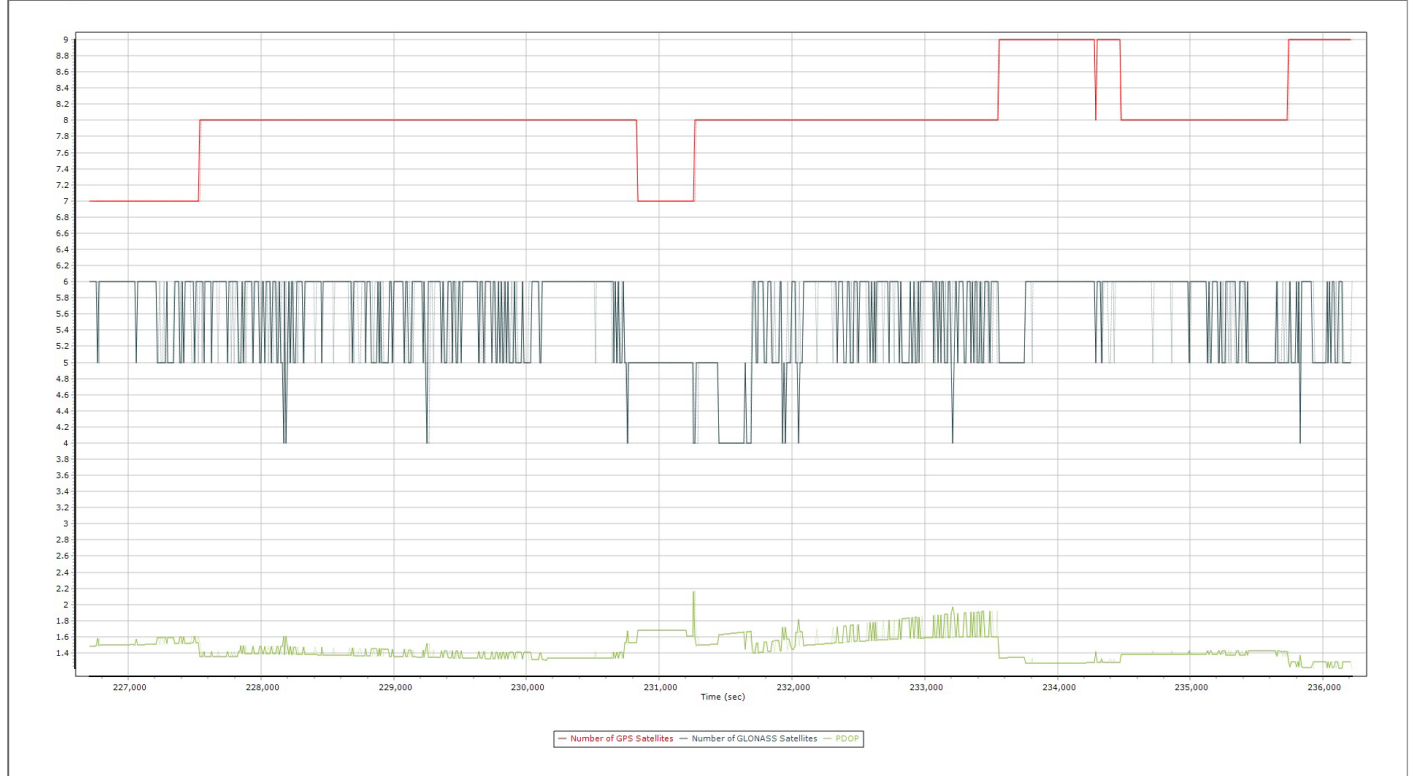
Airborne Station
Time On: 1458 UTC
Kinematic On: 1504 UTC
Kinematic Off: 1502 UTC

Engine Start(24HR LCL): 0942 Hobbs Start: _____
 Engine Stop(24HR LCL): 1413 Hobbs Stop: _____
 Page _____ of _____

Dec 13, 2016-A (N812TB, SN356)

Display - GW_12-13-16A_356_N812TB - Solution Status

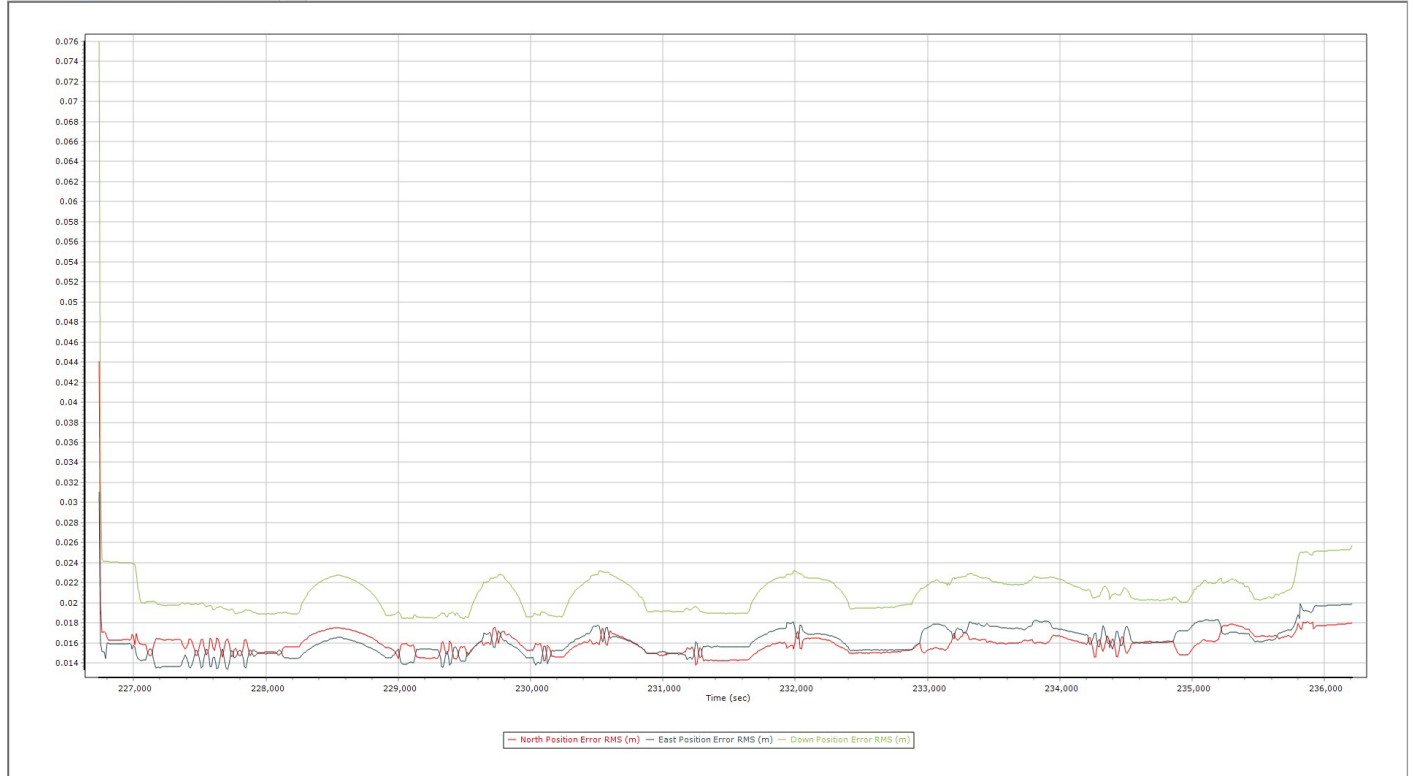
File Edit Tools View Help



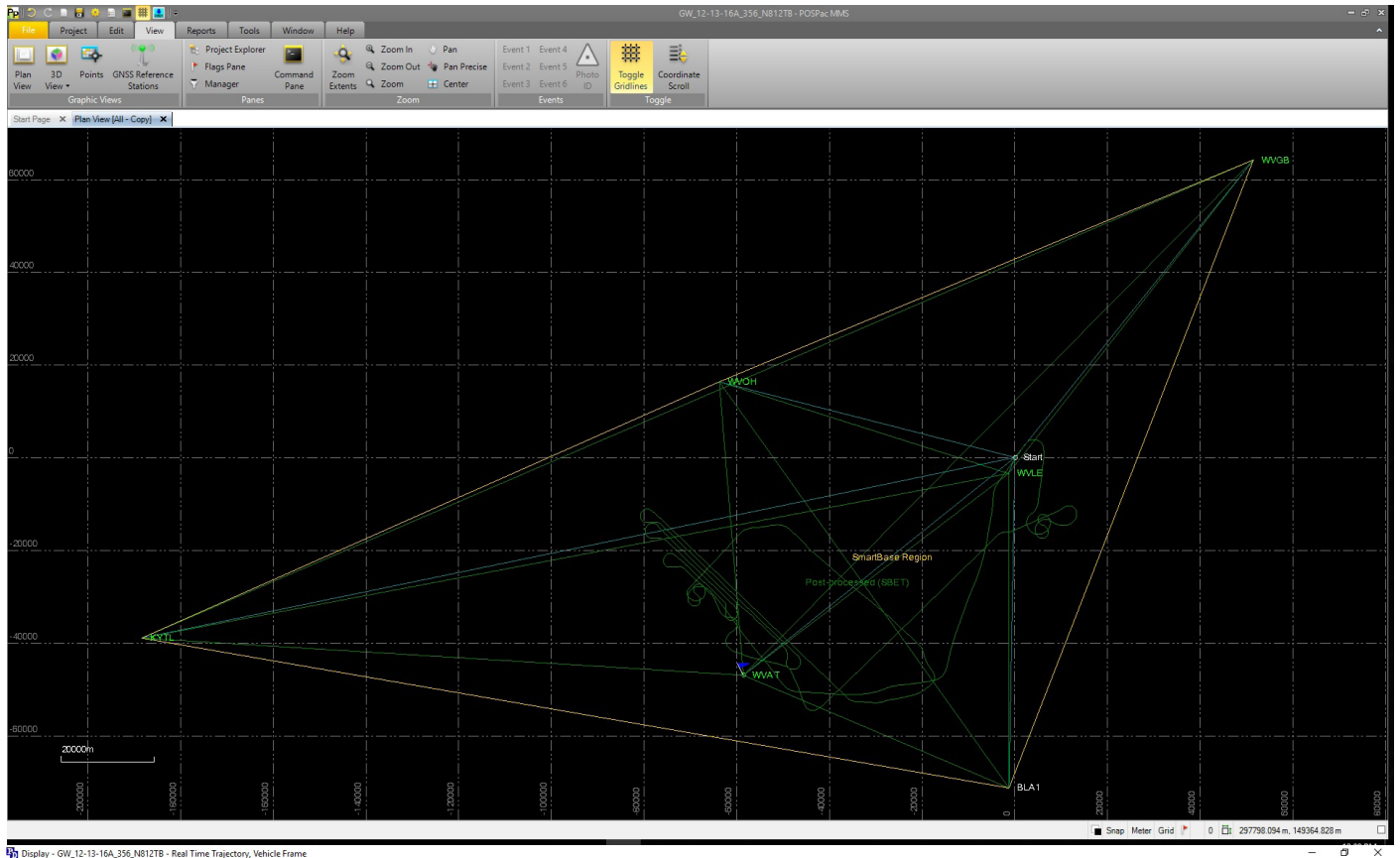
Ready

Display - GW_12-13-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

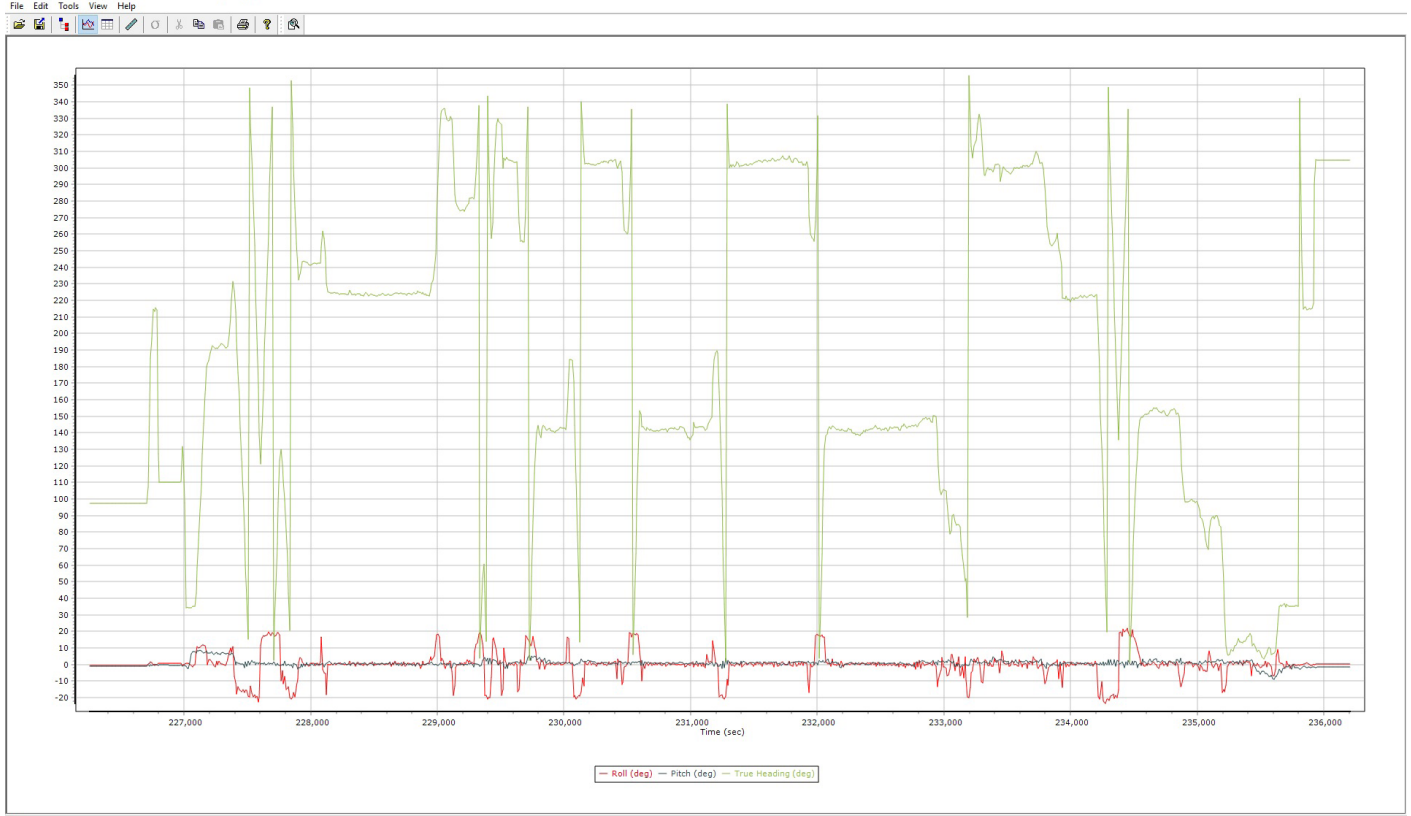
File Edit Tools View Help

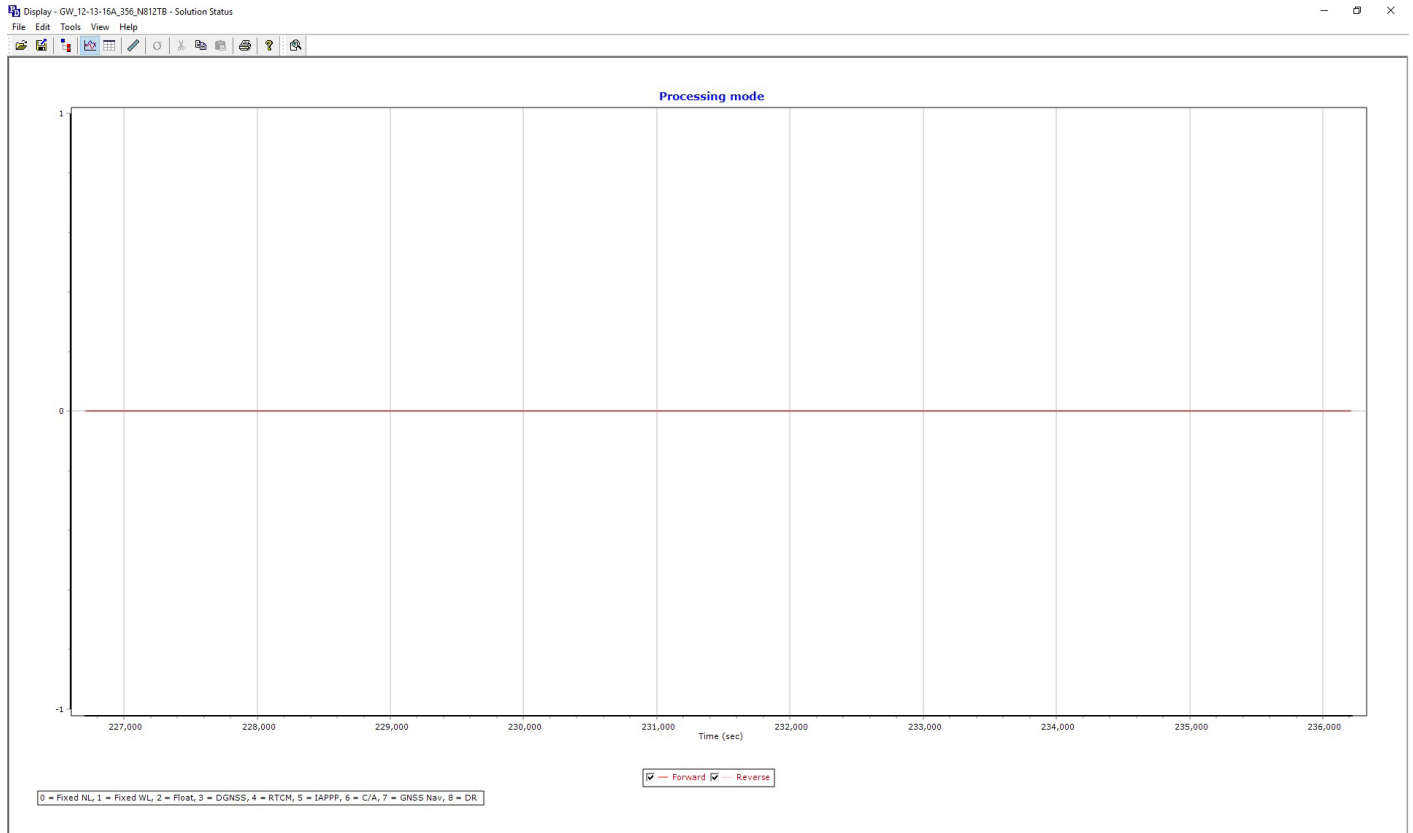


Ready



Display - GW_12-13-16A_356_N812TB - Real Time Trajectory, Vehicle Frame





Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

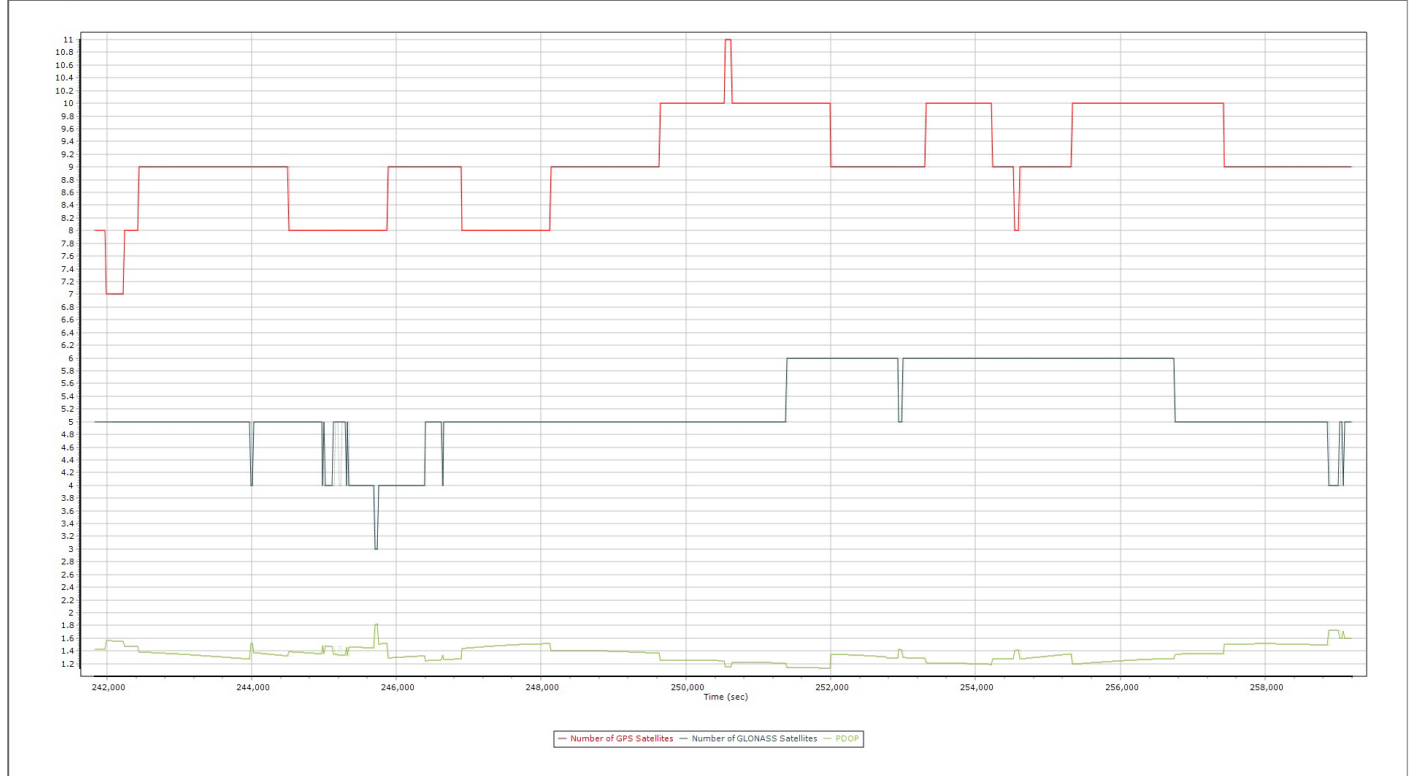
Flight Log

[illegible]

Dec 20, 2016-A (N4181T, SN354)

Display - GW_12-20-16A_354_N4181T - Solution Status

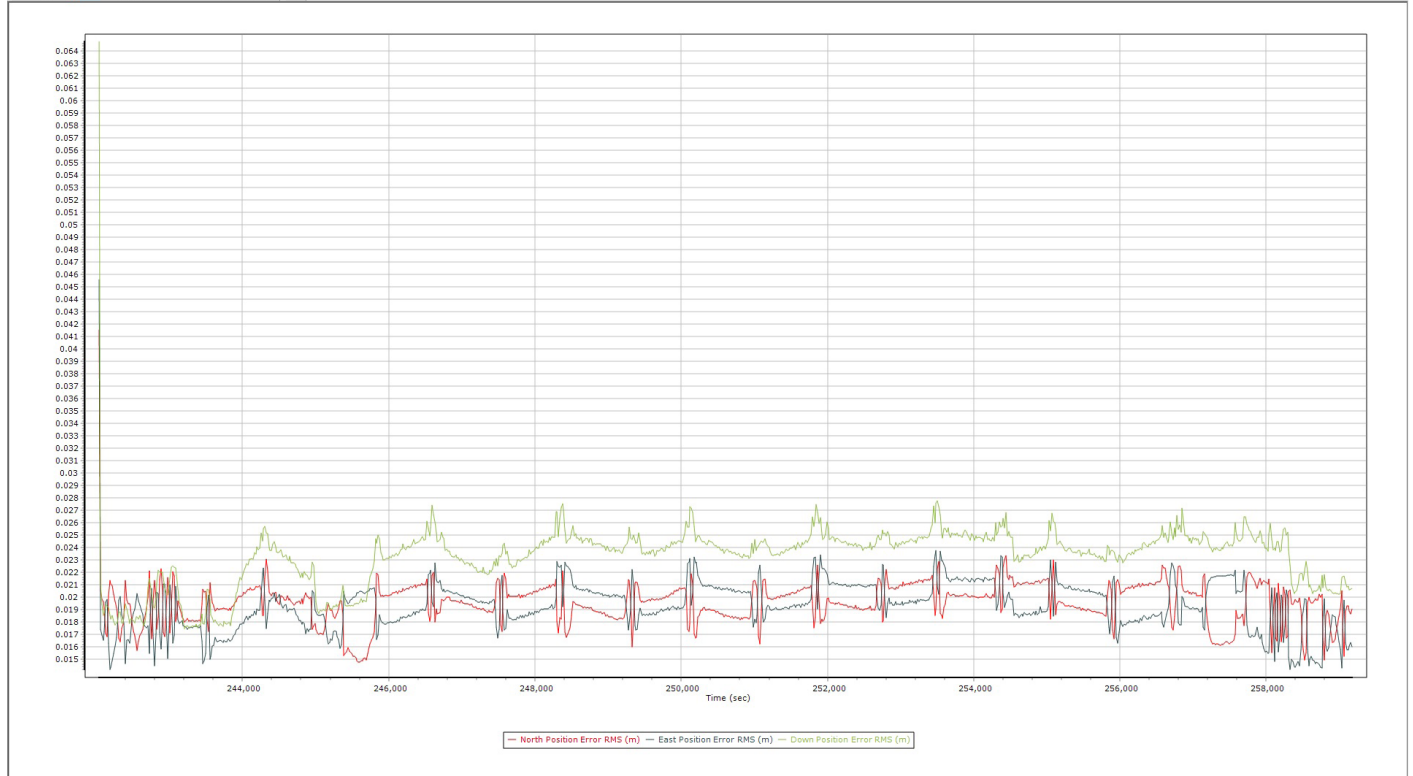
File Edit Tools View Help



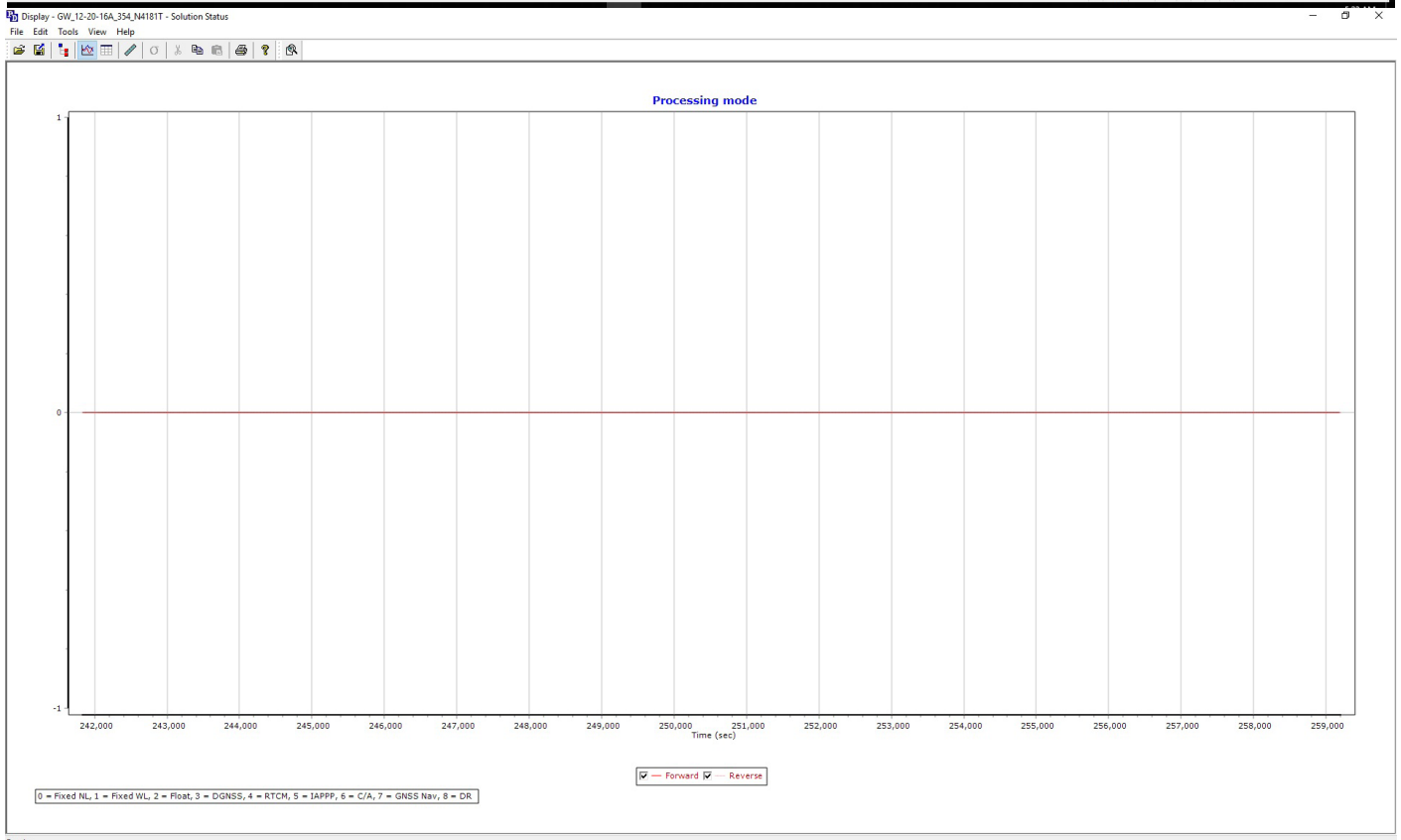
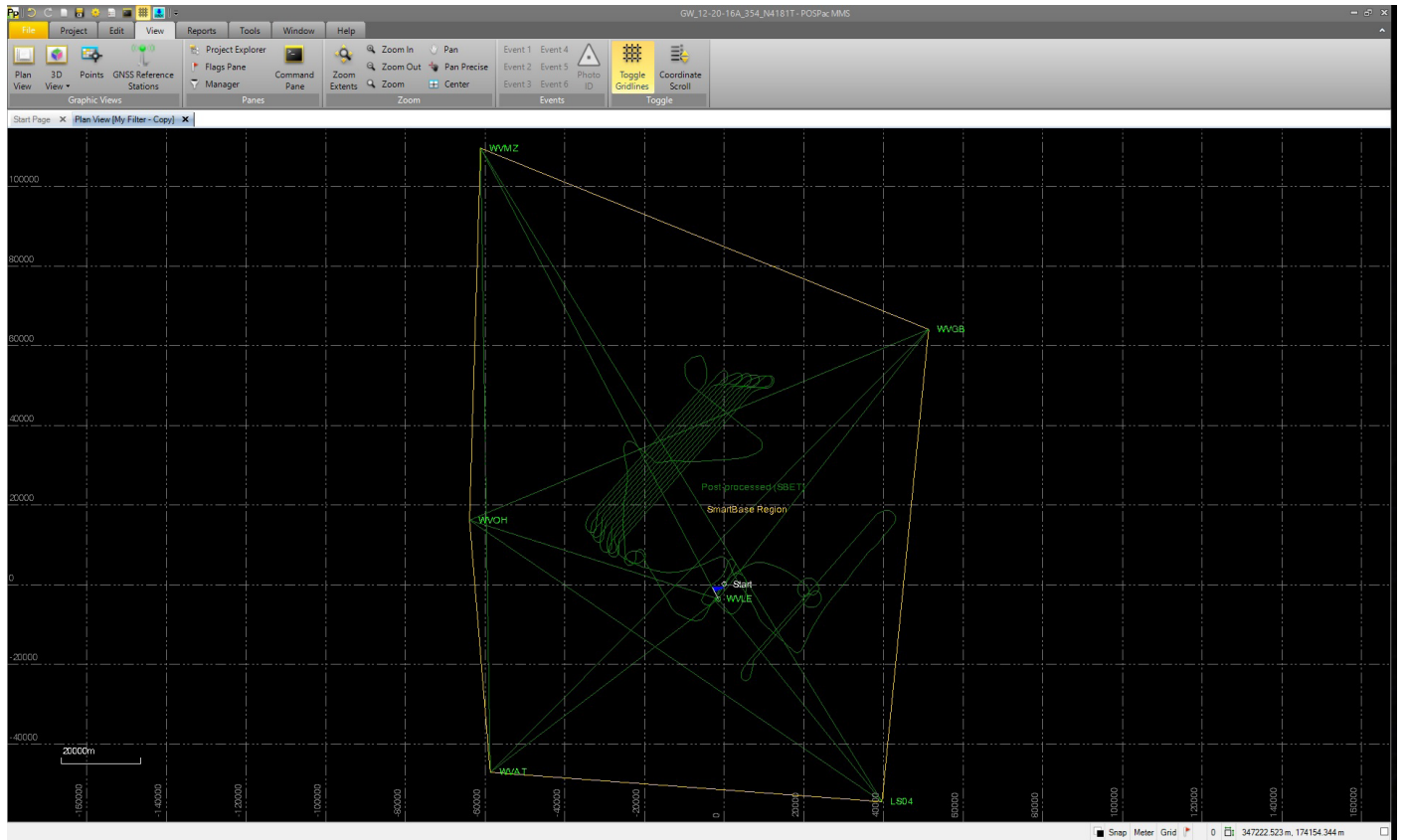
Ready

Display - GW_12-20-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

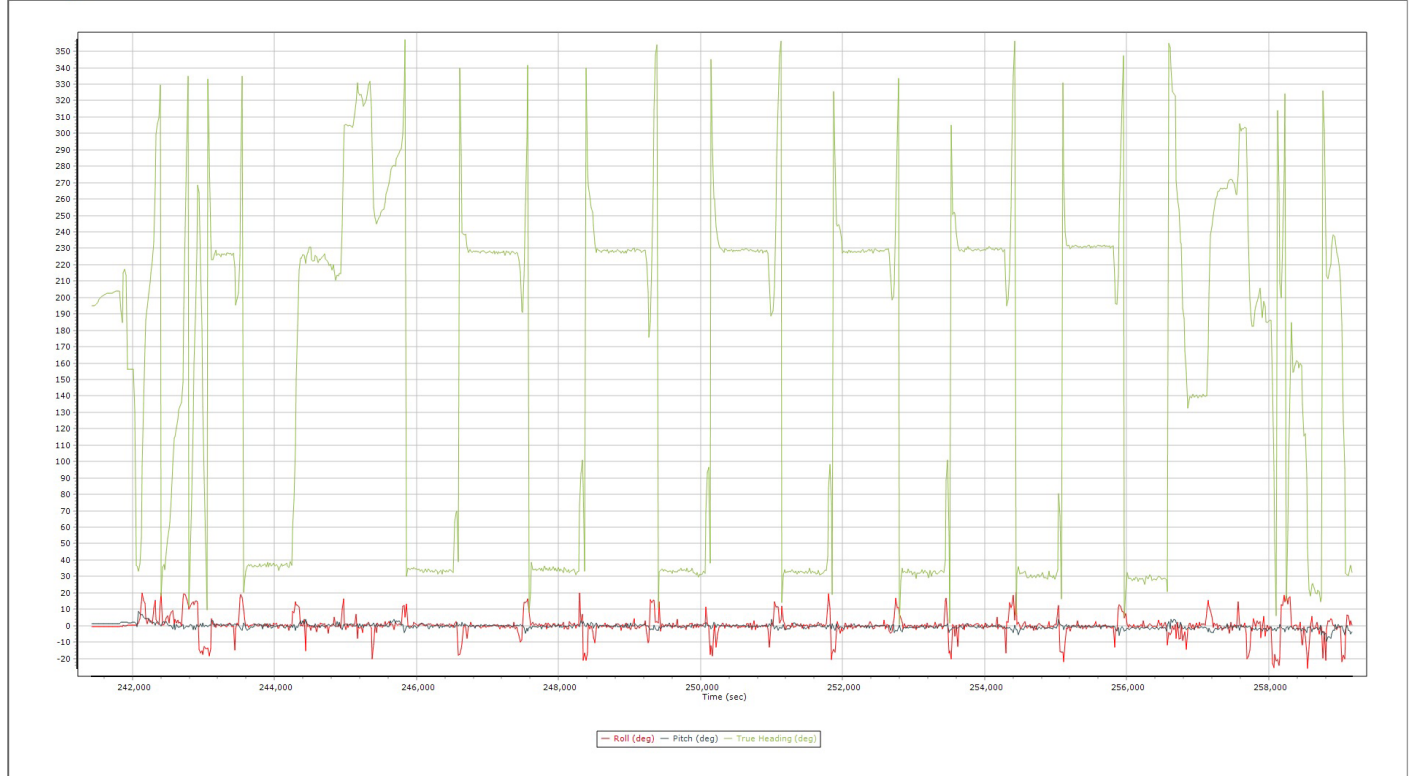


Ready



Display - GW_12-20-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID

Coordinates

Latitude

Longitude

Altitude m

☐ Decimal Degrees

Antenna Frame

Height m

Method

Manufacturer

Type

Offset from Measured Point to APC m

Antenna Reference Point (ARP) coordinates

Apply Changes

Station Database

Station ID

Station Fullname

Primary Service ID

Coordinate Accuracy

Secondary Service ID

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

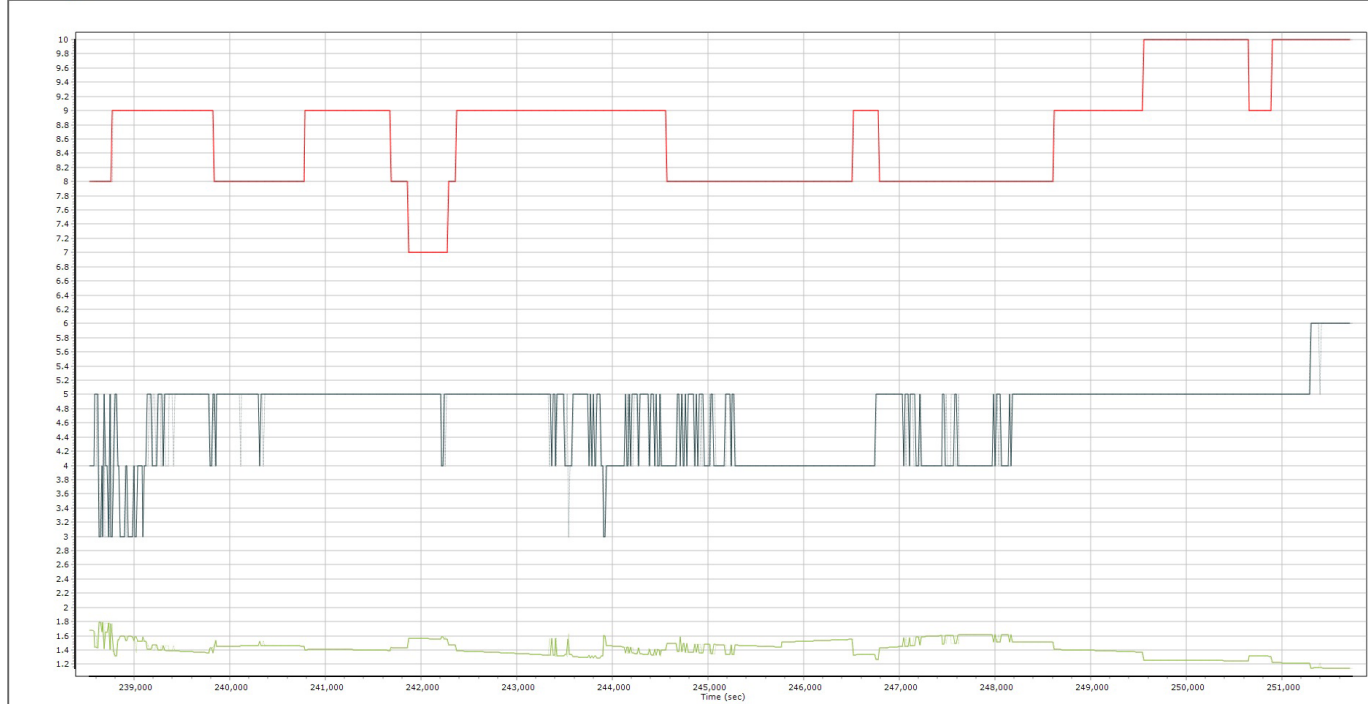
Flight Log

[illegible]

Dec 20, 2016-A (N812TB, SN356)

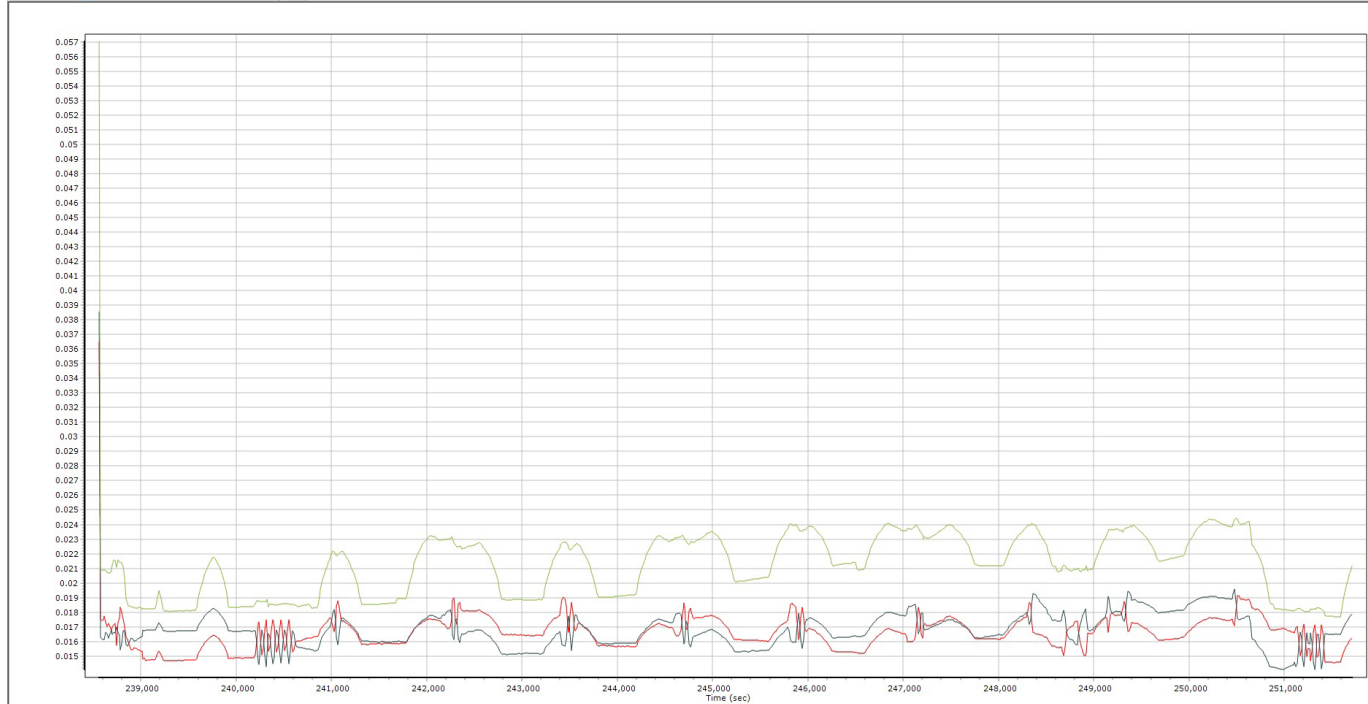
Display - GW_11-20-16A_356_N812TB - Solution Status

File Edit Tools View Help

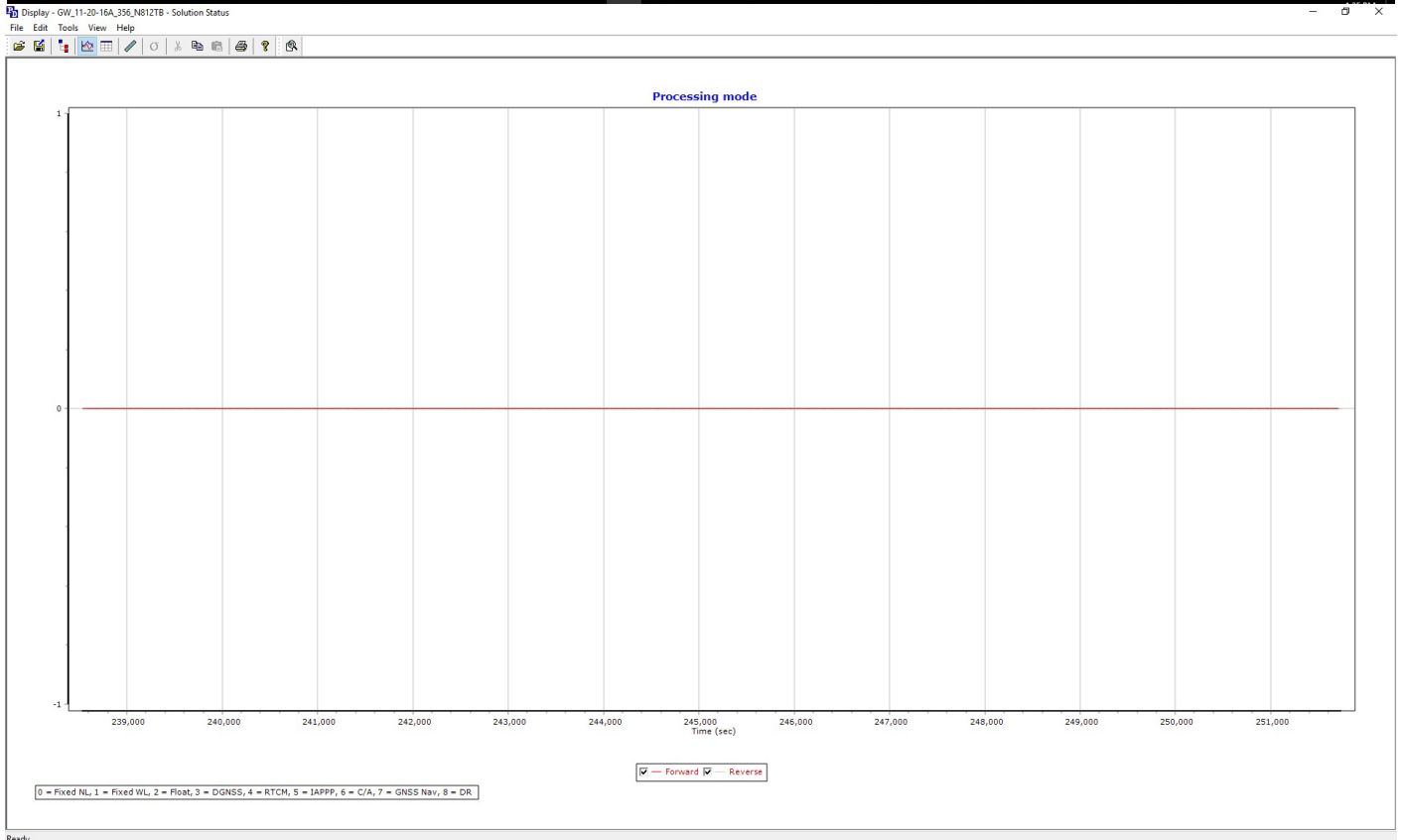
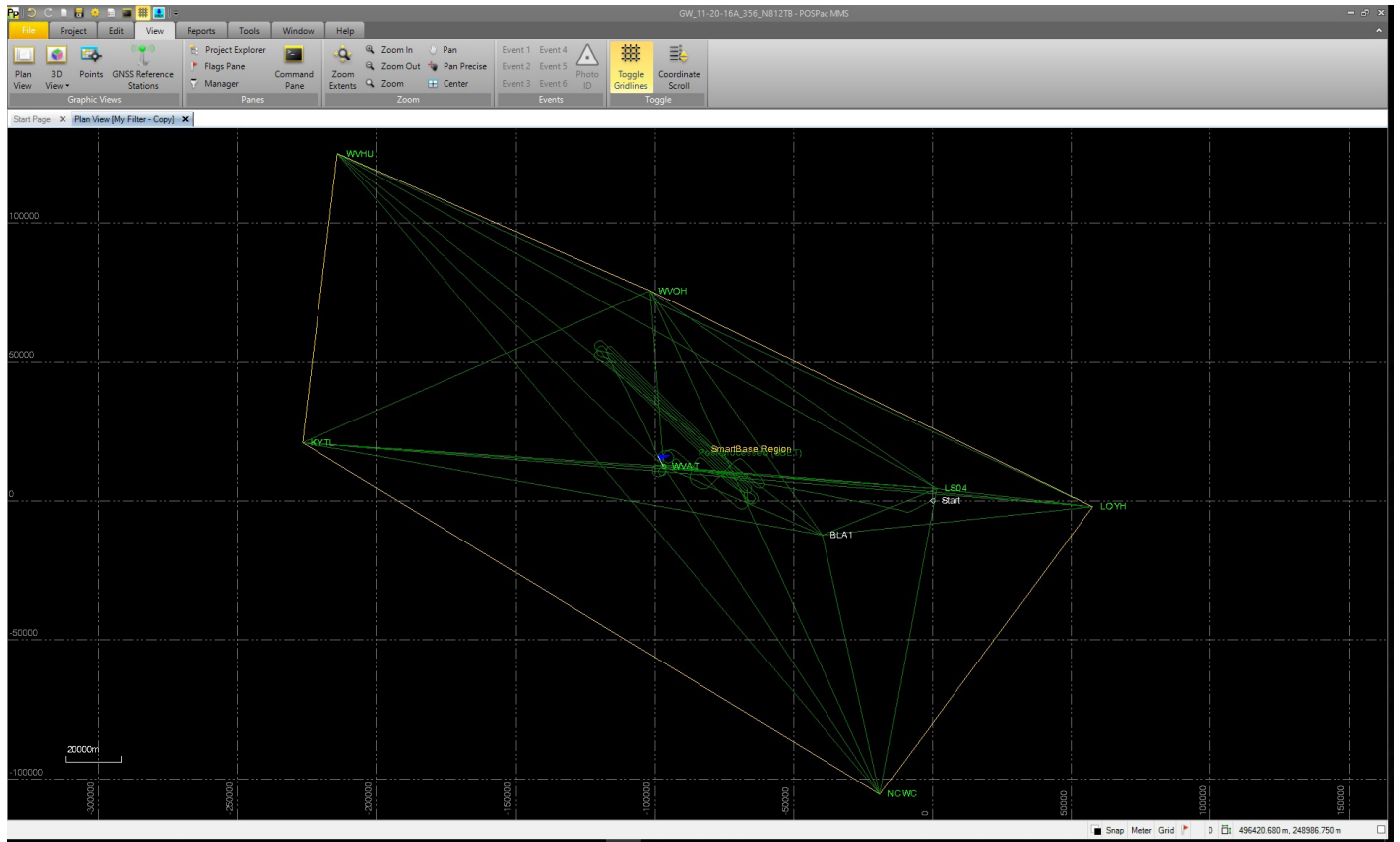


Ready
Display - GW_11-20-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

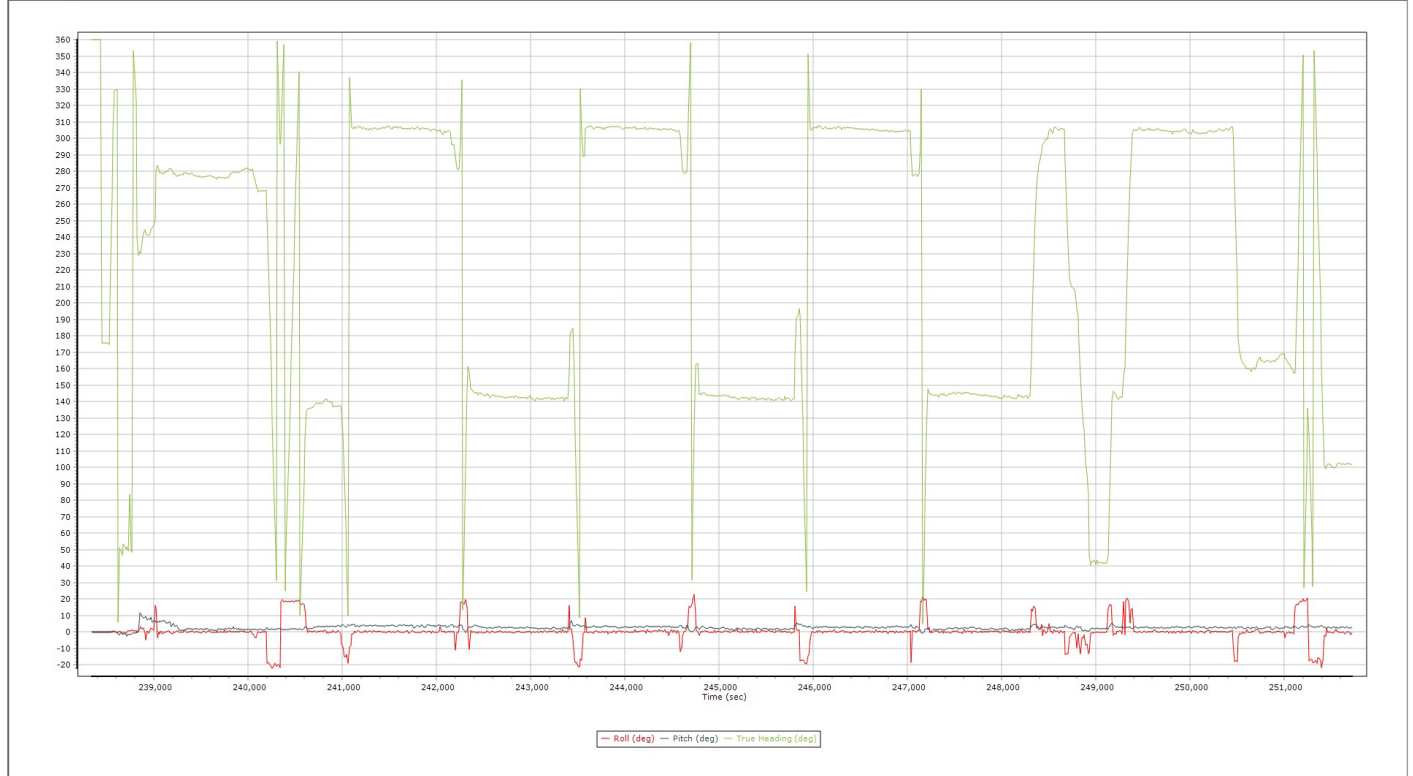


Ready



Display - GW_11-20-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc

(email log daily to flight_log_distribution_list@quantumspatial.com)

20161220A - GADAPT - 356

Date: DEC. 20th, 2016

LITE (X) E C D E Pg. 1 of 1

Project: W. VIRGINIA FEMA 2016

Proj #: 29331

Flight Mgmt File: 29331_FEMA_WV_Galaxy_1550m_S.xml

Aircraft: NB12TB Begin Hobbs: 4211.0 End Hobbs: 4214.8 Total: 3.8

Pilot: C. STEVENSON Co-Pilot: -

Tech: P. HRASAK

Dep Apt: KROA Dep Time (Ldt): 13:20 Zt: 18:20Z

Arr Apt: KROA Arr Time (Local): 17:09 Zt: 22:09Z

Total Aloft: 3:49

CORRS: (X) N Sta 1: WVAT CORRS

Flyovers: (X) N IF Y, times: Sta 1) 18:42 & 21:45 = Sta 2) -

Flyovers: Y / N IF Y, times: Sta 1) - Sta 2) -

GPS Unit: Y (N) Sta 1: - Sta 2: -

Gd Temp beg: +42 °C End: +45 °C OAT beg: +42 °C End: +42 °C Altimeter begin: 30,41" end: 30,31"

Type FOV	OPTICAL GRANNY 43°/21.5°	Serial # STG 0356	Scan Freq 52.0 Hz	Alt AGL 1550 m	ALT VARIES	AVG Tilt 141 kts	Max Colpid ~0.63 m	Power HIGH	PPPM 3.06	Log CB	Storage Nameplate

Line #	Hdg	Start UTC	End UTC	Gd Spd	POD/Sns	GPS Altitude	Cntrl	Turb (0..+)	Pulse In Air	3/ pulse/sec	Rate	250 kHz	Power	Avg Ft Spacing	Max Colpid	IF H	End CB	Total CB	Storage Nameplate
--------	-----	-----------	---------	--------	---------	--------------	-------	----------------	-----------------	-----------------	------	---------	-------	-------------------	---------------	------	-----------	-------------	----------------------

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. (FIG 8 @ 18:43 → 18:48)

7	NW	18:58	19:15	~125 kts	1.1/18	7500'	7°	Ø	ske above, few to blw below nearby, hz, smooth, *										1050 Ø 3/4 S/H 102013- H619AB
8	SE	19:20	19:36	~125 kts	1.0/19	7450'	11°	Ø	ske above, few to blw below nearby, hz, smooth, *										
9	NW	19:40	19:56	~130 kts	1.0/18	7450'	8°	Ø	ske above, scrt below nearby, hz, smooth, *										
10	SE	20:00	20:16	~130 kts	1.1/16	7480'	10°	Ø	ske above, scrt below nearby, hz, smooth, *										
11	NW	20:20	20:37	~130 kts	1.0/18	7500'	6°	Ø	ske above, scrt below nearby, hz, smooth, *										
12	SE	20:41	20:58	~130 kts	1.0/16	7460'	10°	Ø	ske above, few below nearby, hz, smooth, *										
6	NW	21:02	21:04	~135 kts	1.2/16	7500'	7°	Ø	ske above & below, hz, smooth										
74	NE	21:09	21:11	~130 kts	1.1/16	7350'	3°	Ø	ske above & below, hz, smooth										
13	NW	21:16	21:34	~135 kts	1.1/16	7400'	7°	Ø	ske above & below, hz, smooth, *										

(FIG 8 @ 21:45 → 21:50Z)

*: patchy traces of snow on few NW facing slopes @ NW 1/2 of line

[LANDED FOR FUEL & IMPENDING SUNSET]

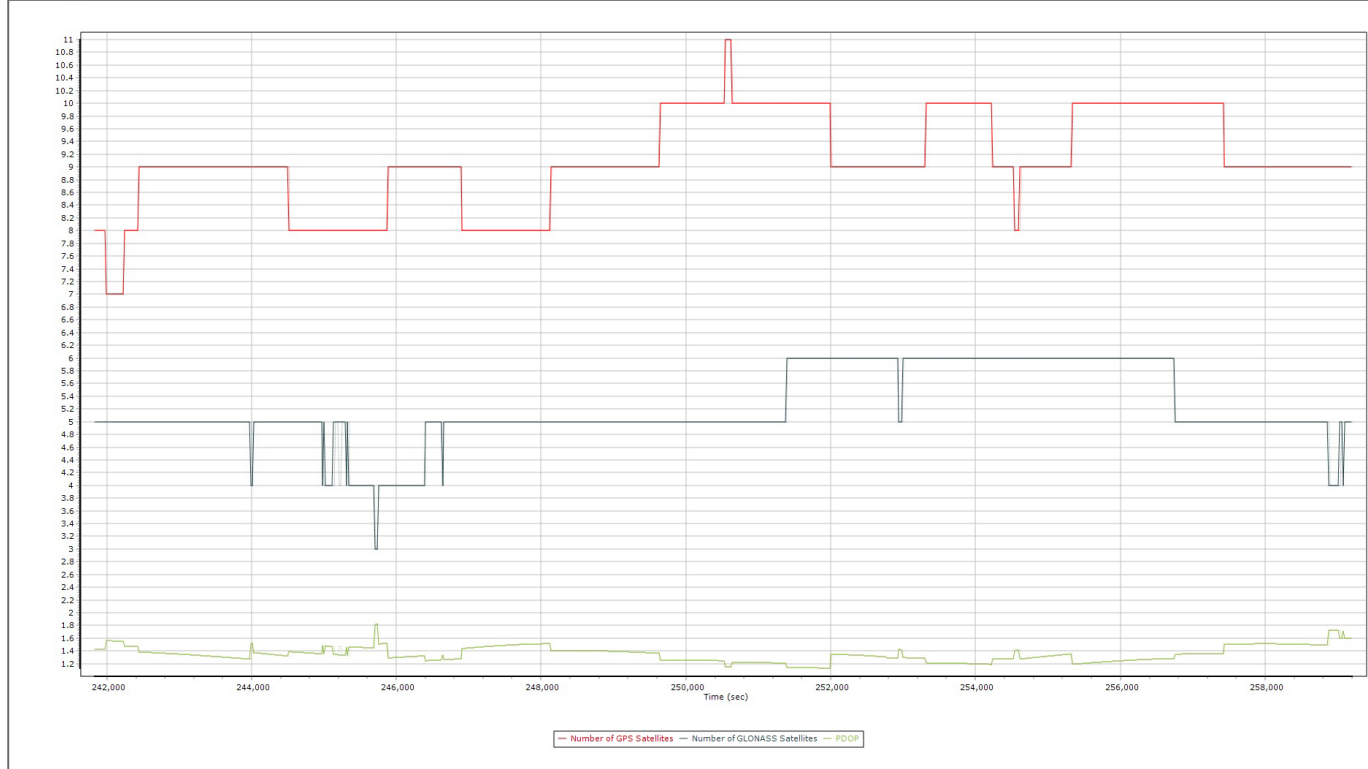
Notes: 20161220A - GALAXY 356

Total Proj Lines: 74 Lines Flown: 7 Lines Remain: 25 Online Time: 2:36 Mob Time: 1:13

Dec 20, 2016-B (N4181T, SN354)

Display - GW_12-20-168_354_N4181T - Solution Status

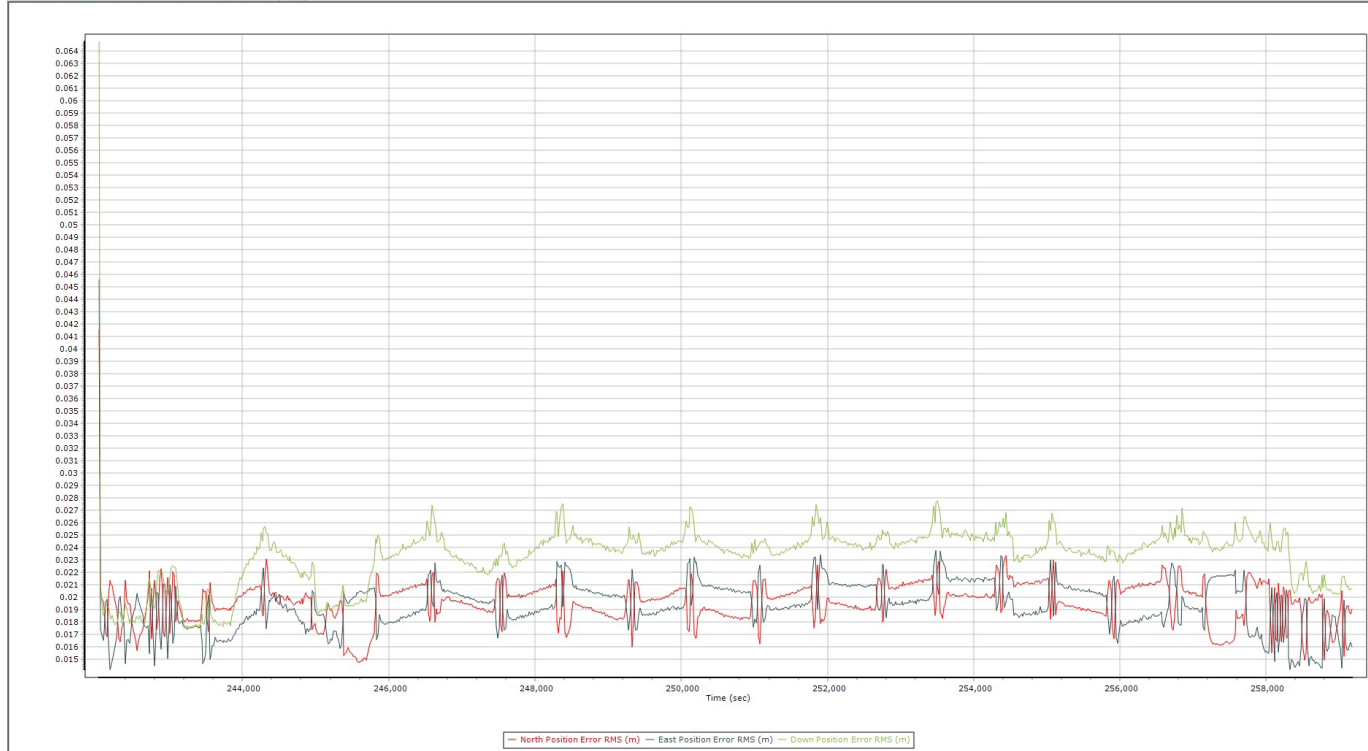
File Edit Tools View Help



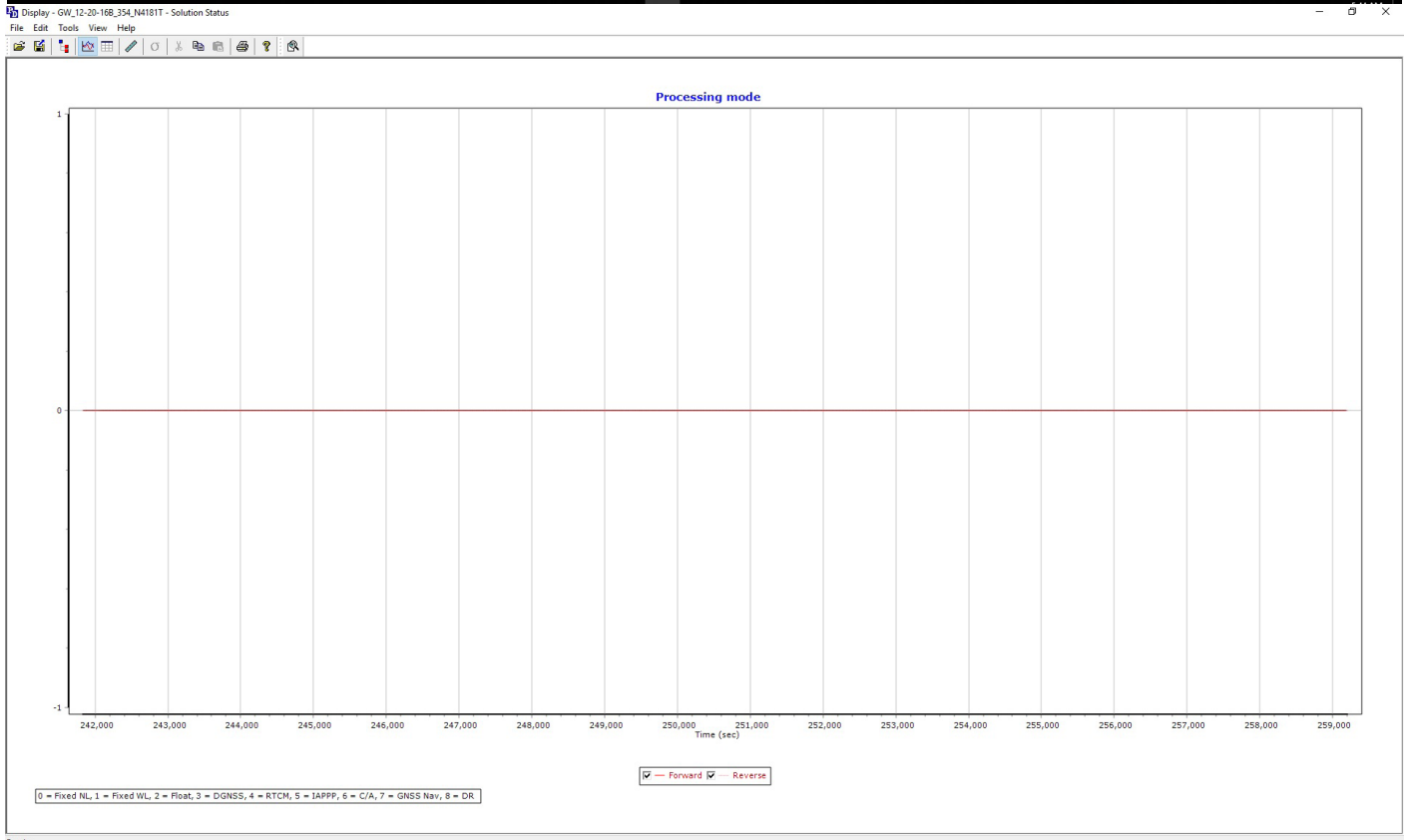
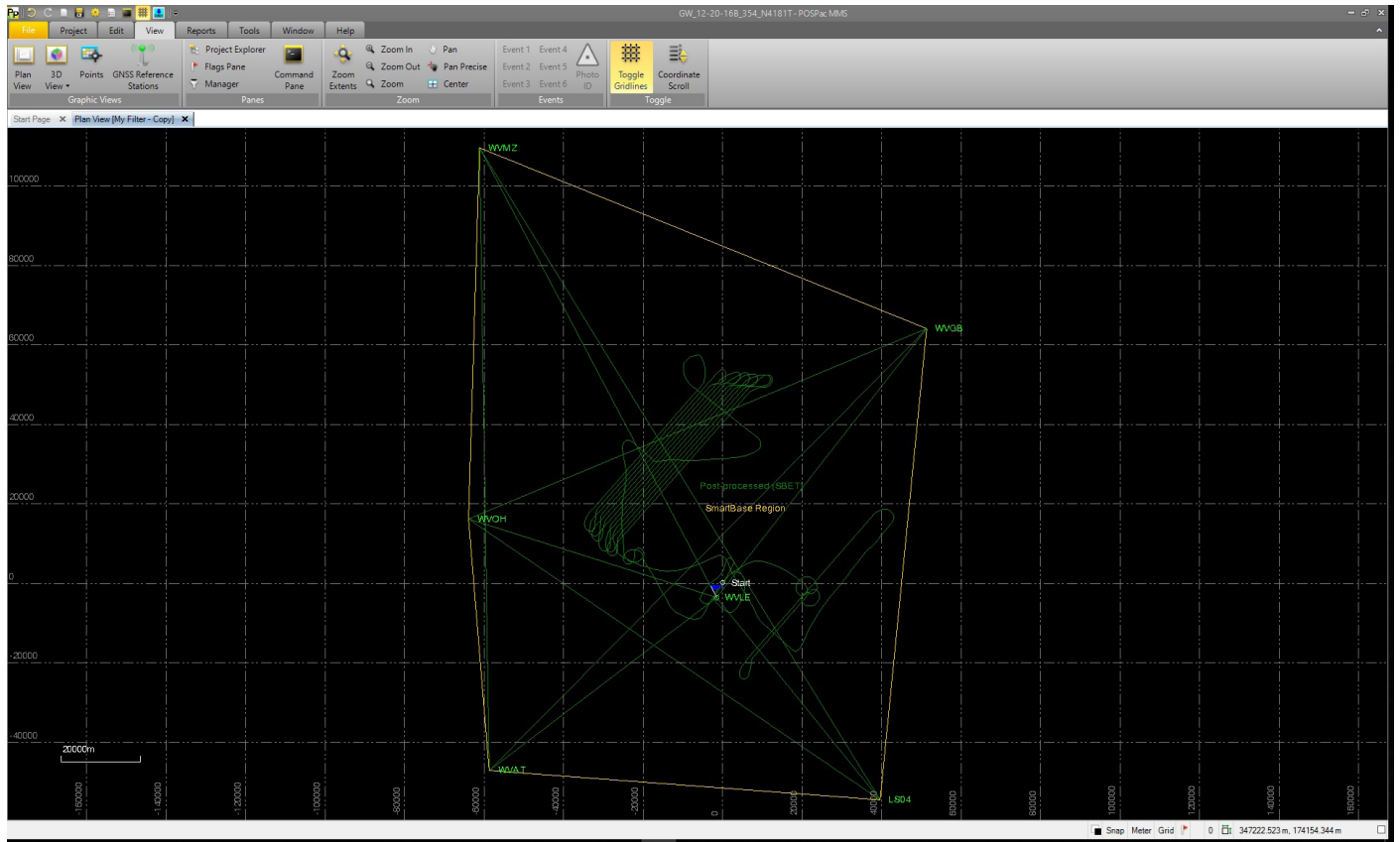
Ready

Display - GW_12-20-168_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

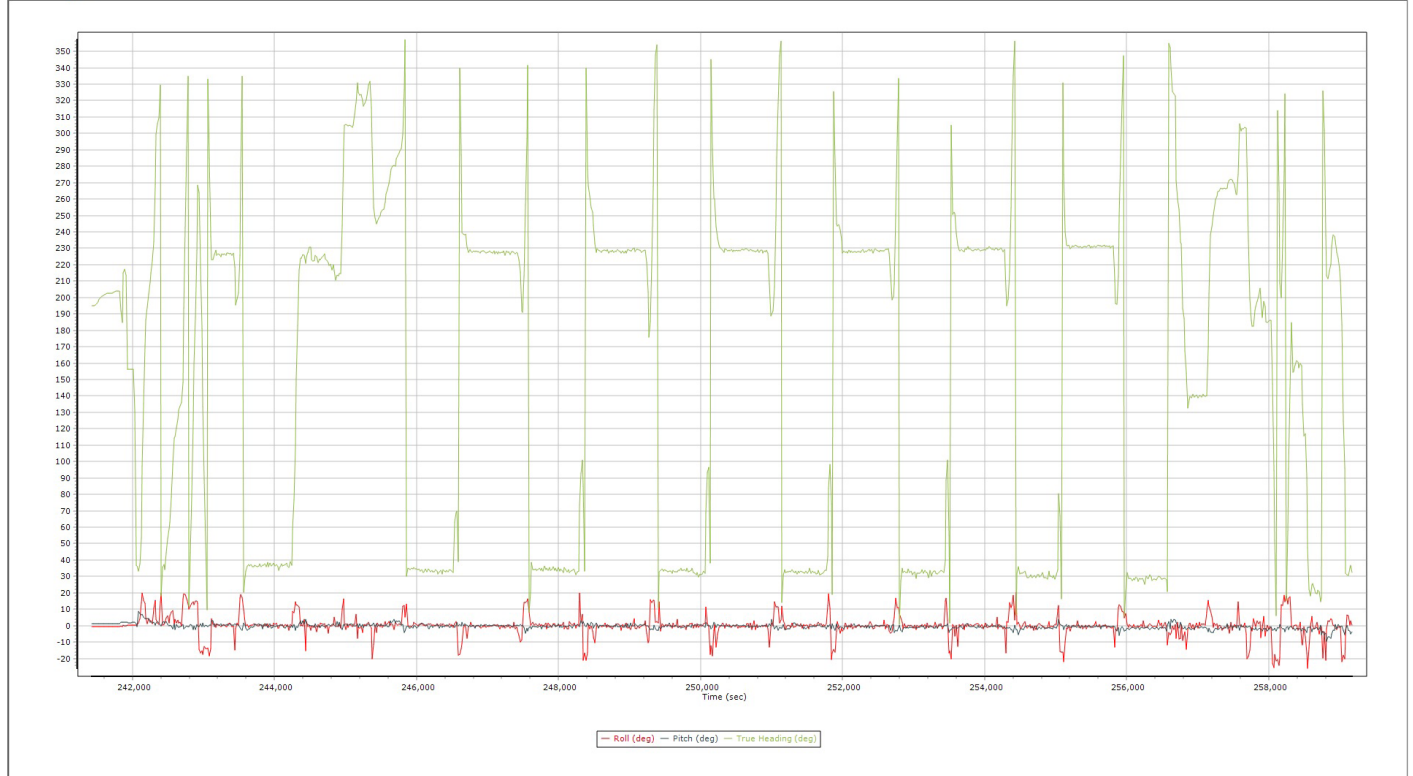


Ready



Display - GW_12-20-168_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID

Coordinates

Latitude

Longitude

Altitude m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna Frame

Height m

Method

Manufacturer

Type

Offset from Measured Point to APC m

Apply Changes

Station Database

Station ID

Station Fullname

Primary Service ID

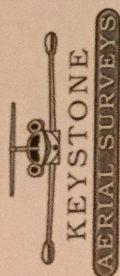
Coordinate Accuracy

Secondary Service ID

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 20 / 2016
 Project: 160A-816-1
 Aircraft: N418T
 Sensor: S660354
 Pilot: AC
 Operator: EF
 HD: 0

POS/AV Filename: Dec20 + Dec20b - last 3 minutes

Flight Plan		Weather	
Roll Comp:	<u>On</u> or Off	Pressure (gnd):	
Multipulse:	<u>On</u> or Off	Temperature (gnd):	
Beam Divergence:	Wide or Narrow	Temperature (air):	
Scan Rate:	<u>52</u>	Dew Point:	
Pulse Rate:	<u>250</u>	Turbulence:	<u>light</u>
Scan Angle:	<u>1/2</u>	Visibility:	
Desired Range:	<u>1550</u>		
Planned GPS:			

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
18	20:18	20:28	41.4	1600	1.03	18	144	
19	20:32	20:43	221.4	1650	1.04	17	136	
20	20:47	20:58	41.4	1600	1.16	16	141	
21	21:02	21:13	241.4	1550	1.14	16	130	
22	21:17	21:27	41.4	1600	1.09	16	143	
23	21:31	21:42	221.4	1650	1.00	17	130	
24	21:46	21:56	41.4	1700	0.99	17	146	
25	22:00	22:10	221.4	1750	1.07	16	134	
26	22:14	22:24	41.4	1600	1.07	17	146	
27	22:28	22:38	221.4	1450	1.02	17	121	
28	22:41	22:50	41.4	1500	0.90	18	146	
29	22:54	23:03	221.4	1460	1.14	16	124	
30	23:07	23:15	41.4	1600	1.22	16	140	
61-Tie	23:21	23:23	128.1	970	1.25	16	140	Tie line
63-Tie	23:33	23:42	310.6	1500	1.15	16	132	Tie line

Base Station	Airborne Station
Point ID: _____	Time On: <u>19:04</u> UTC
Position Type: <u>Known</u> / Autonomous	Kinematic On: <u>19:11</u> UTC
Antenna Height: <u>2</u> Meters	Kinematic Off: <u>00:09</u> UTC
Latitude: _____	Time Off: <u>00:14</u> UTC
Longitude: _____	

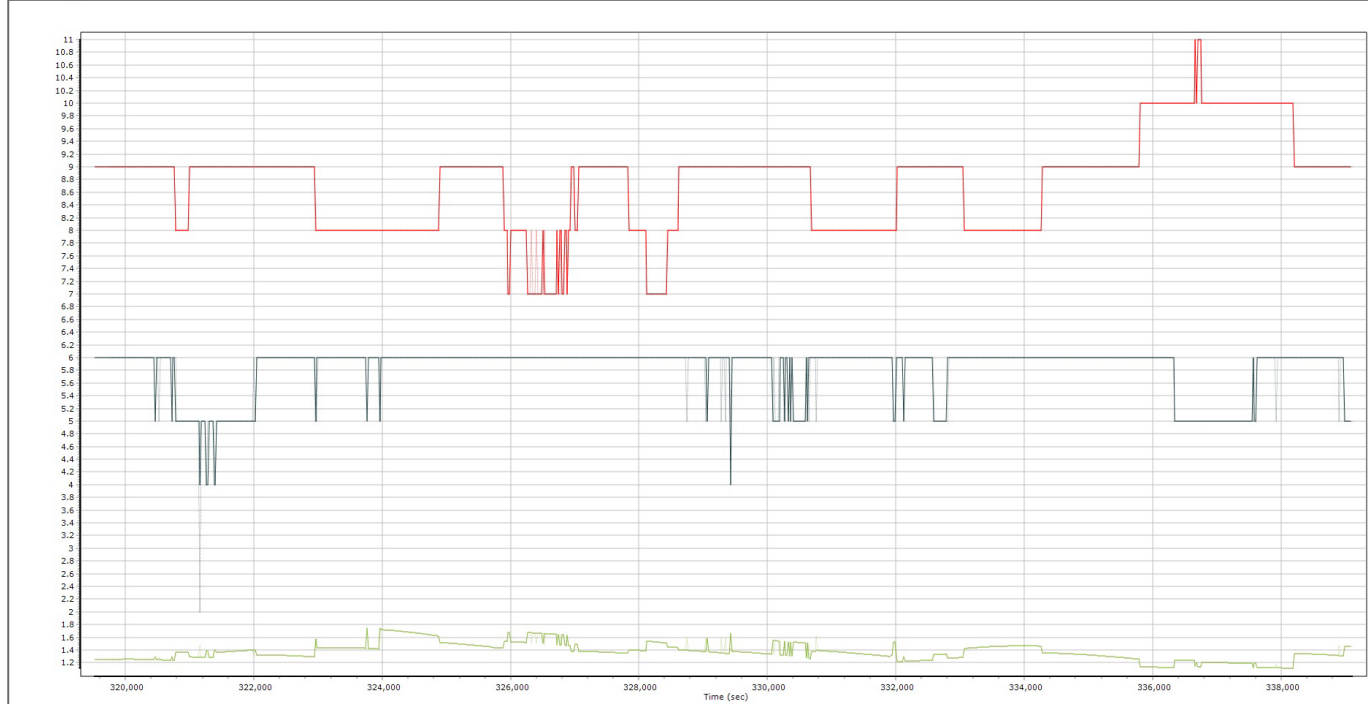
Engine Start(24HR LCL): 13:55 Hobbs Start: _____
 Engine Stop(24HR LCL): 19:16 Hobbs Stop: _____
 Page of

Lidar shut down in landing.

Dec 21, 2016-A (N4181T, SN354)

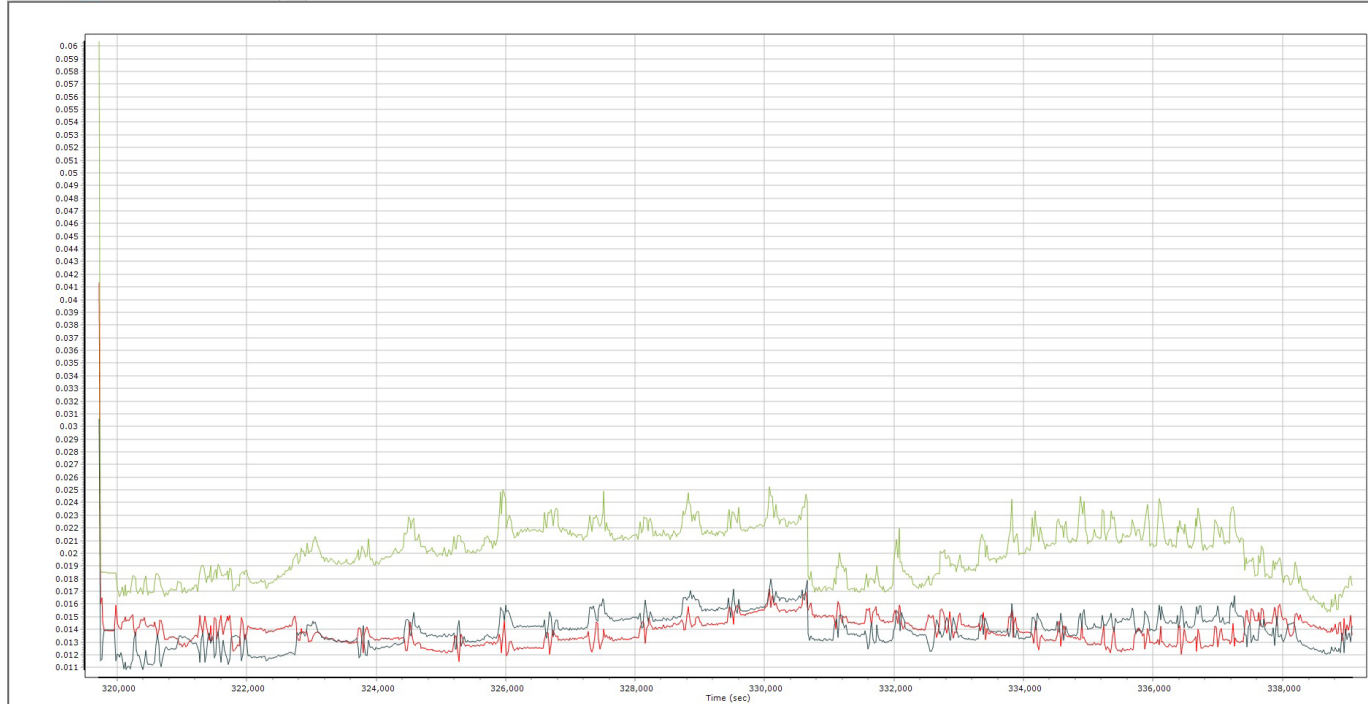
Display - GW_12-21-16A_SN354_N4181T - Solution Status

File Edit Tools View Help

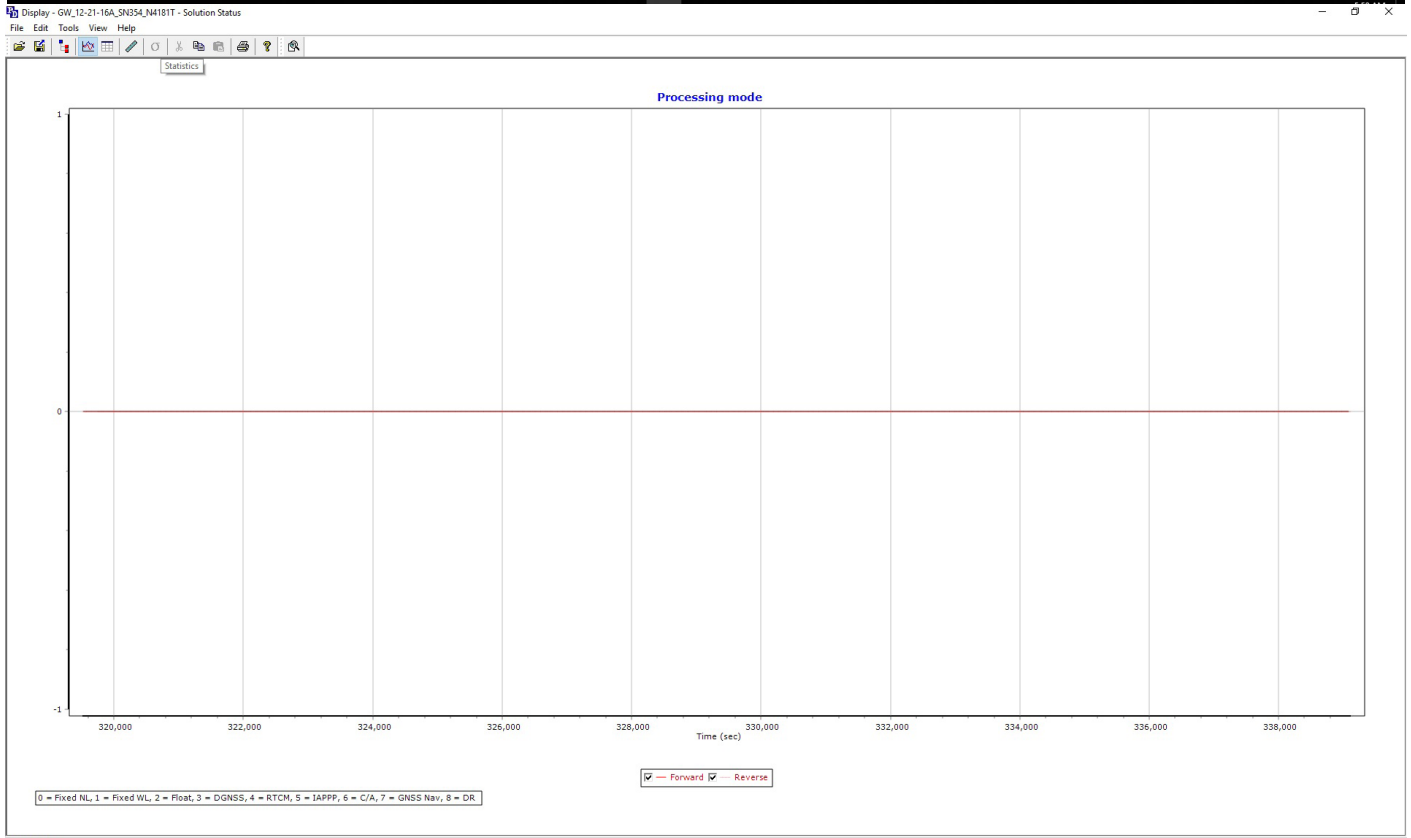
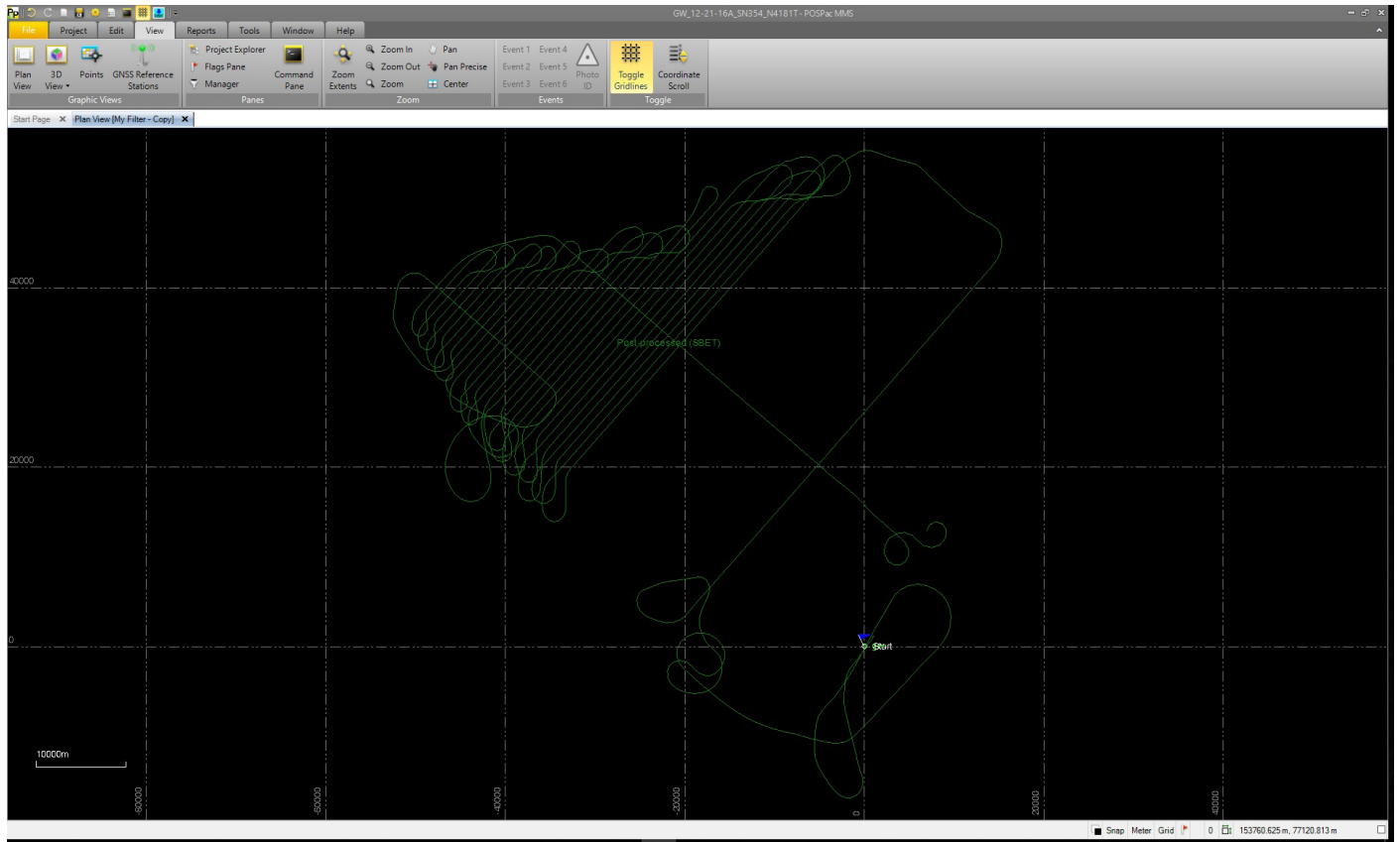


Ready
Display - GW_12-21-16A_SN354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

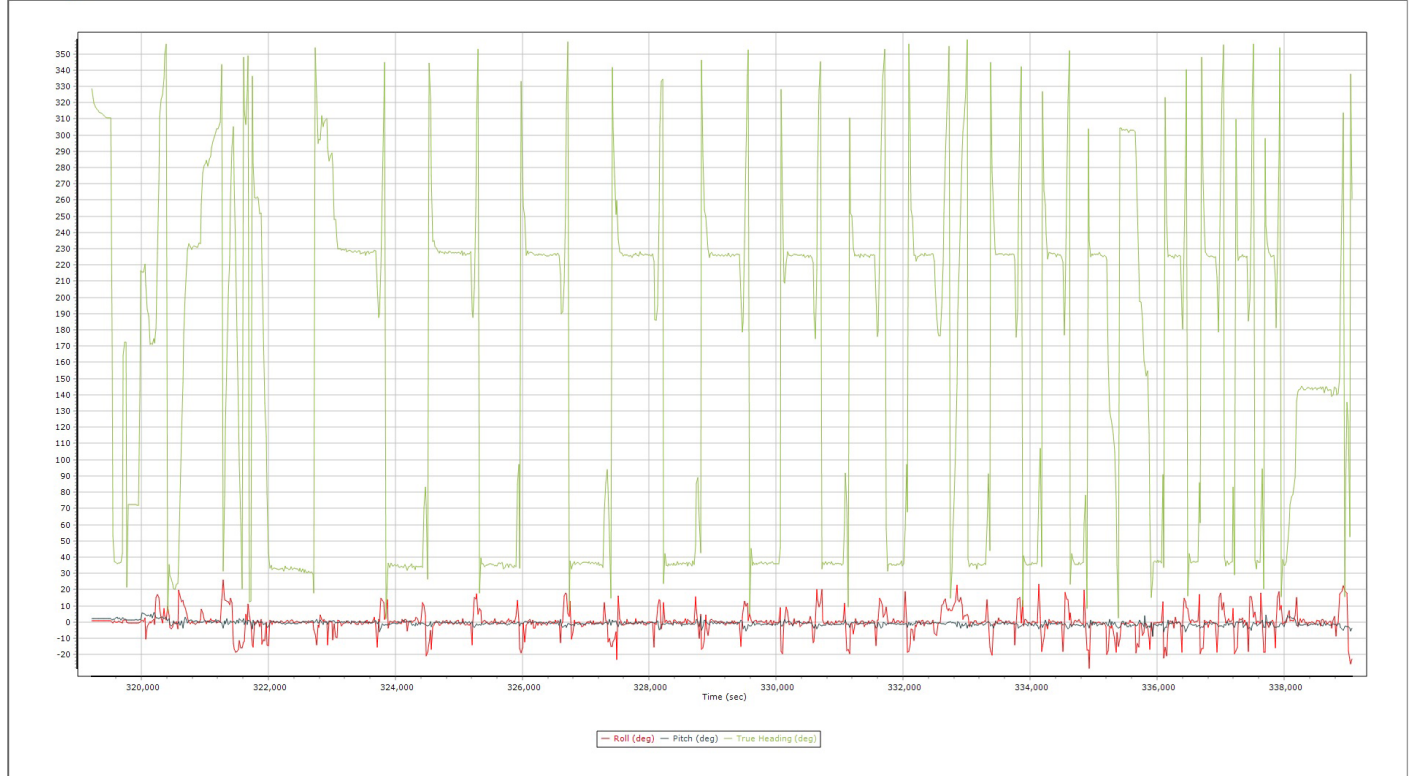


Ready



Display - GW_12-21-16A_SN354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Frame

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Ground Reference Point (GRP) coordinates

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

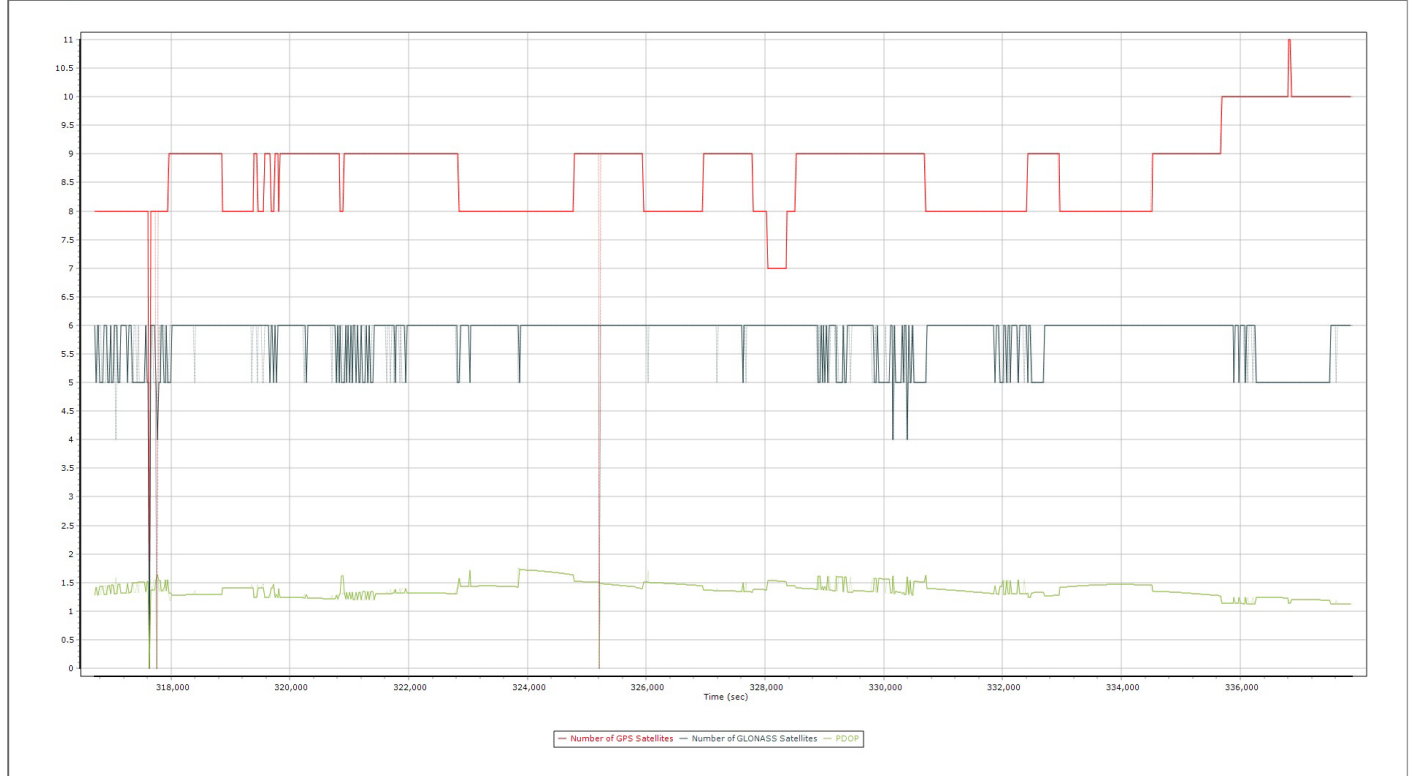
Import Coordinates Export Coordinates

Close

Dec 21, 2016-B (N812TB, SN356)

Display - GW_12-21-168_SN356_N812TB - Solution Status

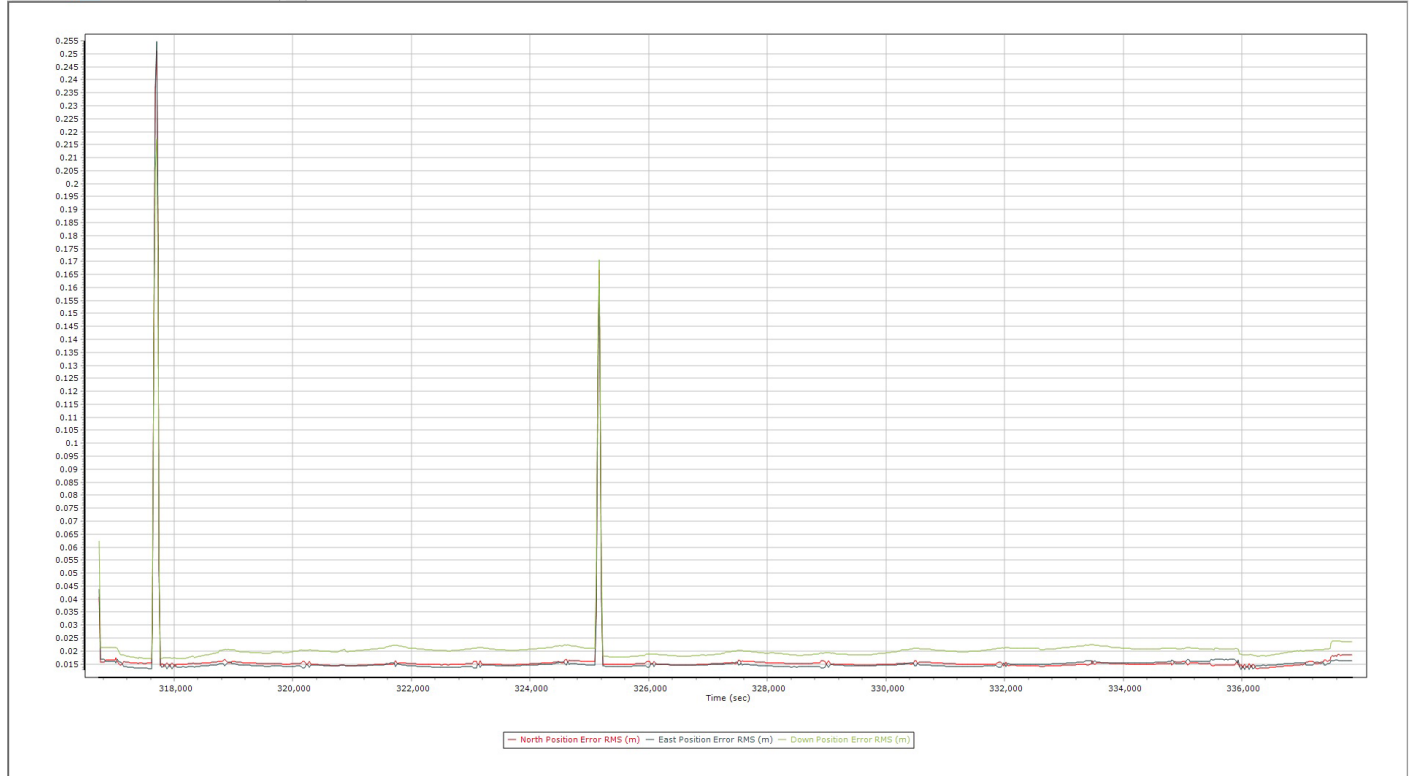
File Edit Tools View Help



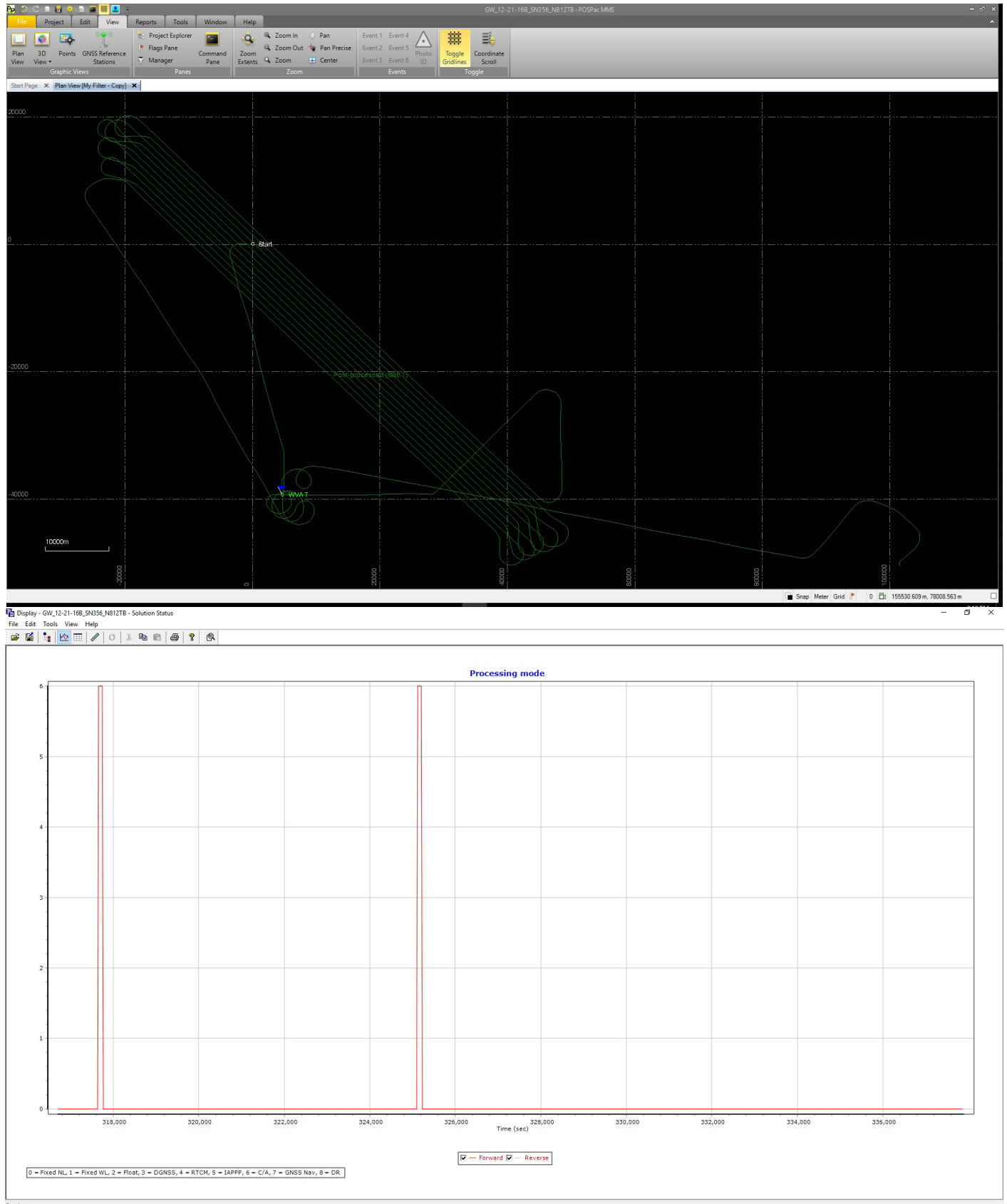
Ready

Display - GW_12-21-168_SN356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

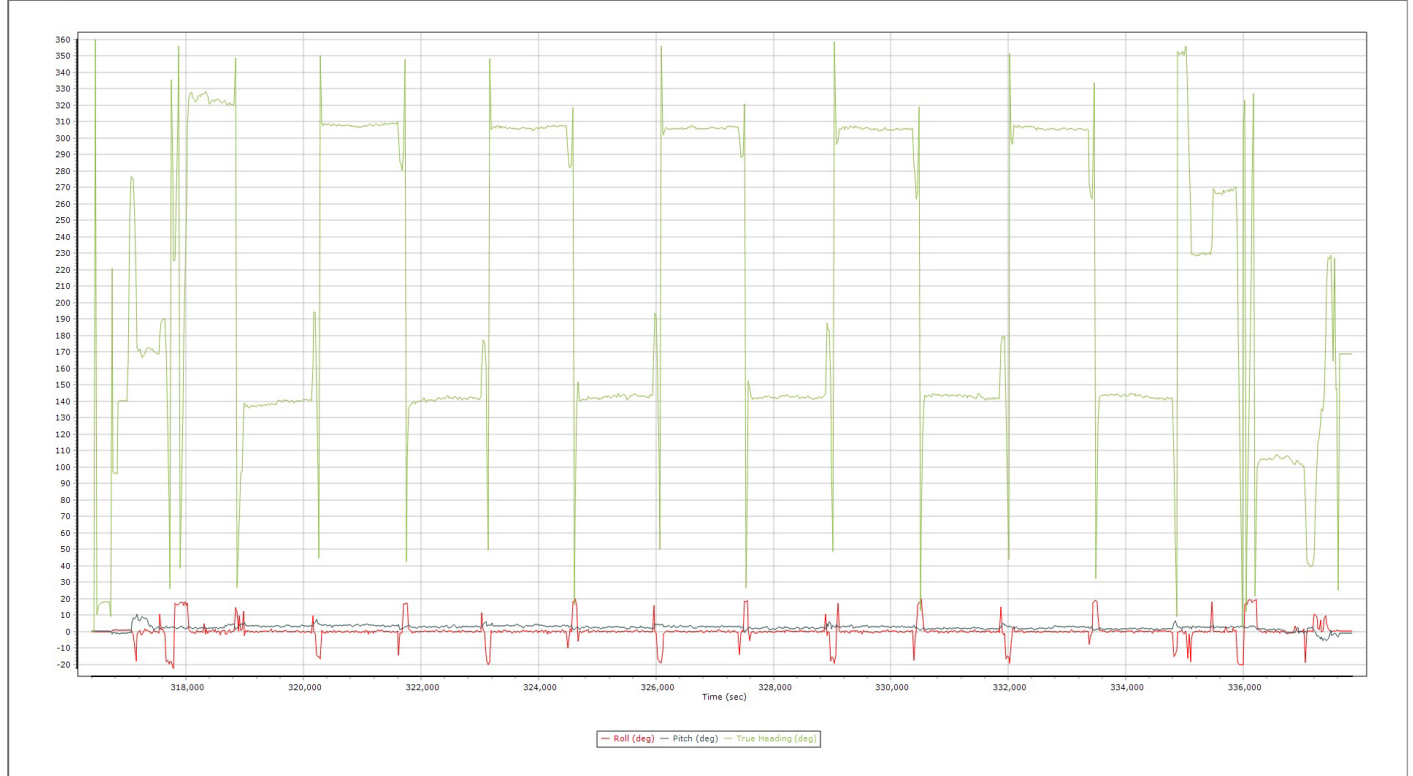


Ready



Display - GW_12-21-168_SN356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Airborne LiDAR Data Collection Log Sheet :: Quantum Spatial, Inc

(email log daily to flight_log_distribution_list@quantumspace.com) 20161221B-GALAXY-336

Date: DEC. 21st, 2016

LIFE A B C D E

Pg 1 of 1

Project:	W. VIRGINIA FEMA 2016	Proj #:	29331	Flight Mgmt File:	29331_FEMA_WV_GALAXY_1550m_S_x.m								
Aircraft:	N812JB	Beginn Hobbs:	4215.8	End Hobbs:	4221.4	Total:	Pilot:	C. STEVENSON	Co-Pilot:	-	Tech:	P. HEARAK	
Dep Apt:	KBRKW	Dep Time (Ldt):	11:04 Z	Alt:	16:04 Z	Arr Apt:	KROA	Arr Time (Local):	16:44 Z	Alt:	21:44 Z	Tot Time Aloft:	S: 30
CORS:	(X)/N	Sta 1:	WVAT COR3	Sta 2:	-	Flyovers:	(X) N	If Y, times:	Sta 1	16:13 ± 21:17 ±	Sta 2	-	
GPS Unit:	Y (N)	Sta 1:	-	Sta 2:	-	Flyovers:	Y / N	If Y, times:	Sta 1	-	Sta 2	-	

Gd Temp beg:	+03 °C	End:	+12 °C	OAT beg:	+03 °C	End:	+03 °C	Altimeter begin:	30.27"	end:	30.22"		
Type	OPTICAL GALAXY SDB0356	Serial #	5060356	Alt	1550 m	AVSL	VARIABLES	Avg Terr Ht	VARIES	Max Gapd	141 kft	Avg Pt Spacing	~ 0.63 m
LIDAR	FOV 42°/21.5°	Scan Freq	52.0 Hz	MPIA	(X) N	Pulses In Air	3/Pulse	Rate	250 kHz	Power	HIGH	PPSM	3.06

Line #	Hdg	Start [UTC]	End [UTC]	Gd Spd	MOOP/sen	GPS Altitude	Turb (0-+)	Crab
--------	-----	-------------	-----------	--------	----------	--------------	------------	------

14	SE	16:37	16:55	~130 kts	0.9/19	7400'	5°	0	high thin scat, clear below, hz, smooth, *
15	NW	16:59	17:19	~120 kts	1.1/17	7350'	6°	0	high thin scat, clear below, hz, occ -twb, *
16	SE	17:24	17:43	~130 kts	1.2/17	7300'	8°	0	high thin scat, clear below, hz, occ -twb, *
17	NW	17:47	18:08	~125 kts	1.1/18	7350'	6°	0	high thin few, clear below, hz, occ -twb, *
18	SE	18:12	18:32	~130 kts	1.2/17	7350'	8°	0	high thin few, clear below, hz, occ -twb, *
19	NW	18:36	18:56	~130 kts	1.2/17	7350'	7°	0	high thin scat, clear below, hz, occ -twb, *
20	SE	19:01	19:21	~130 kts	1.3/17	7350'	9°	0	high thin blk, clear below, hz, occ -twb, *
21	NW	19:25	19:46	~130 kts	1.0/18	7400'	7°	0	high thin blk, clear below, hz, occ -twb, *
22	SE	19:50	20:10	~130 kts	1.0/18	7400'	10°	0	high thin ovc, clear below, hz, occ -twb, *
23	NW	20:15	20:36	~130 kts	1.0/19	7350'	7°	0	high thin ovc, clear below, hz, occ -twb, *
24	SE	20:40	21:00	~130 kts	1.2/16	7320'	10°	0	high thin ovc, clear below, hz, smooth, *
74	SW	21:06	21:10	~125 kts	1.1/16	7300'	3°	0	high thin ovc, clear below, hz, smooth, * (PARTIAL OF PLANNED CROSS LINE FOR THE LINE

[LANDED DUE TO FUEL CONSTRAINTS & IMPENDING SUNDOWN]
(Fig B @ 21:18 → 21:23Z)

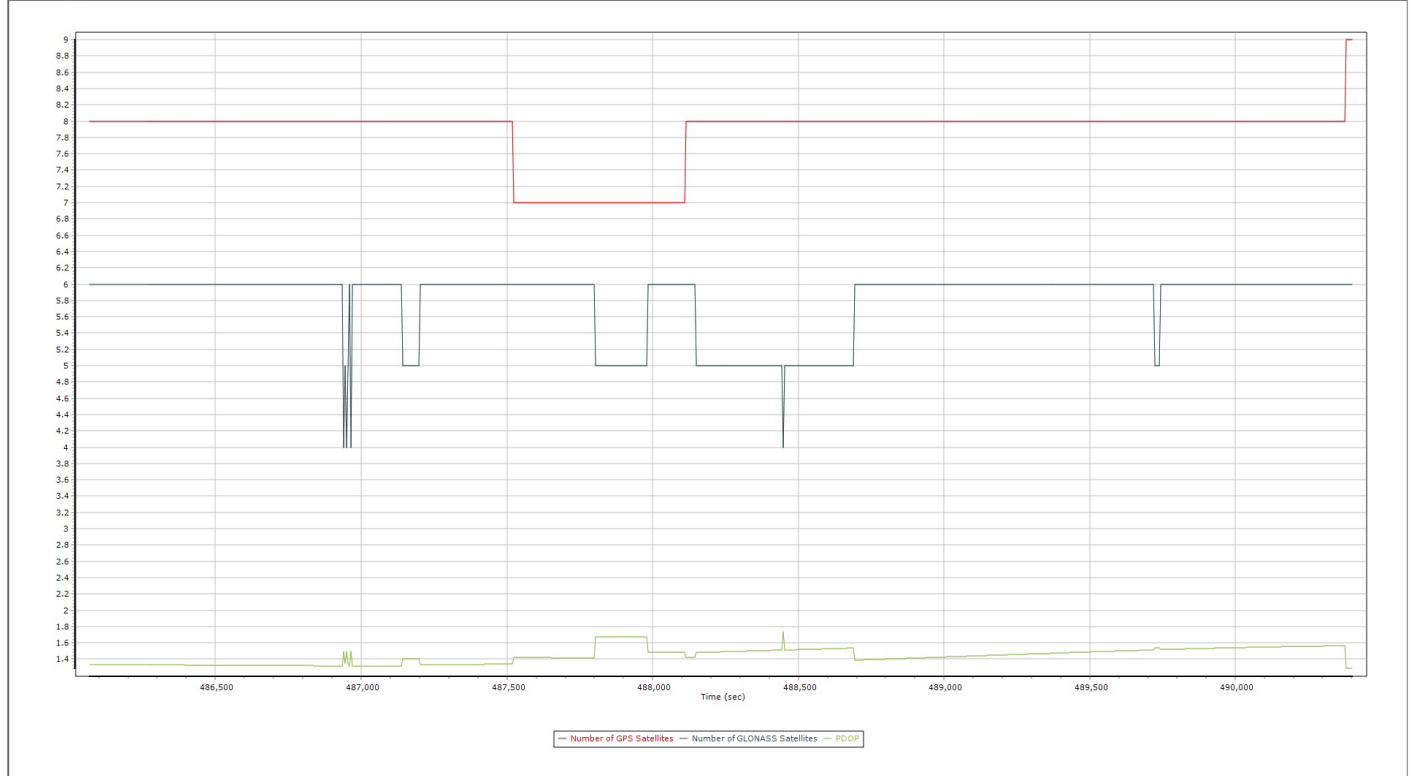
*: patchy traces of snow on low NW facing slopes @ NW 1/2 of line.

Total Proj Lines:	74	Lines Flown:	11	Lines Remains:	10	Online Time:	4:33	Job Time:	0:57	Notes:	20161221B-GALAXY-336
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Dec 23, 2016-A (N4181T, SN354)

Display - GW_12-23-16A_354_N4181T - Solution Status

File Edit Tools View Help



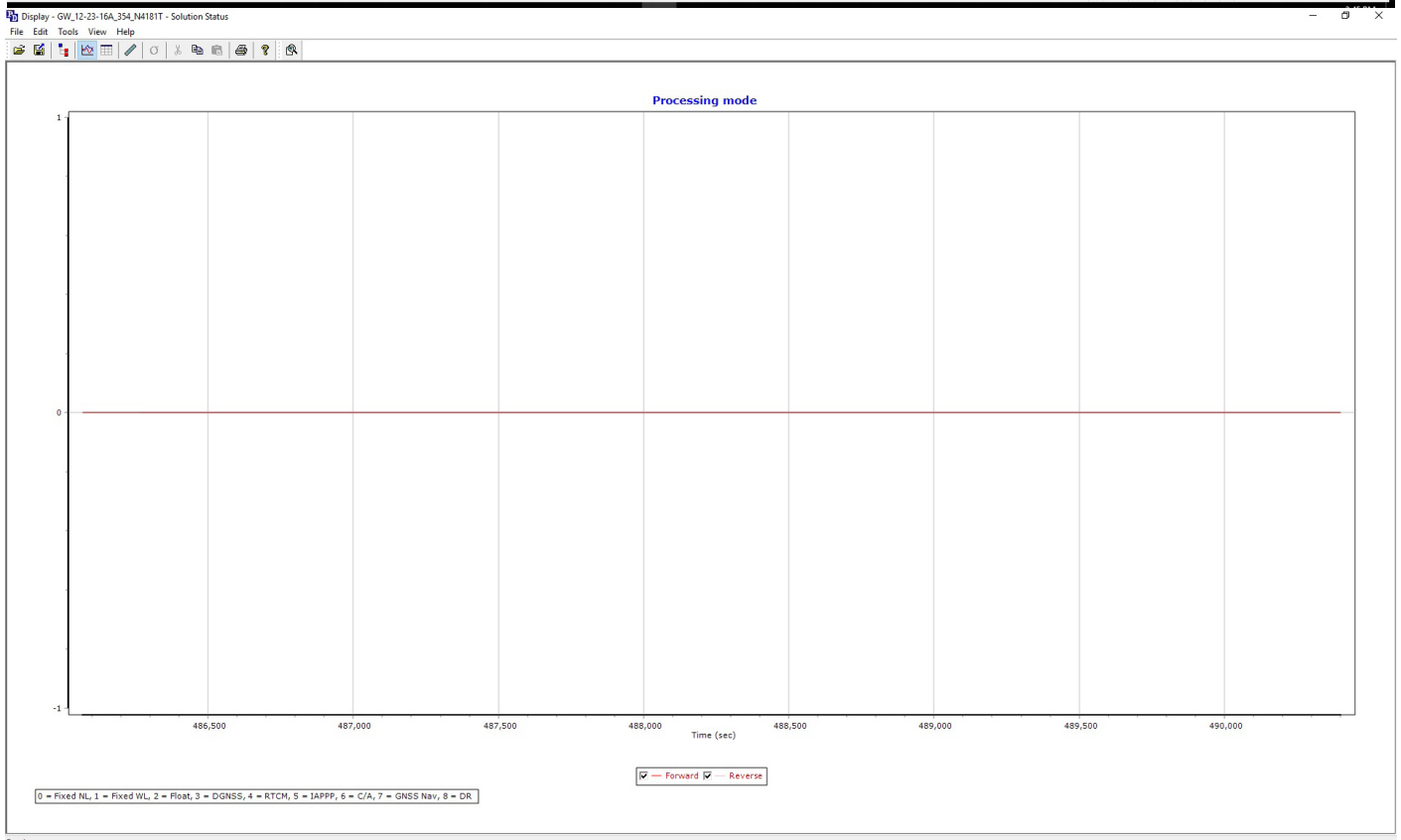
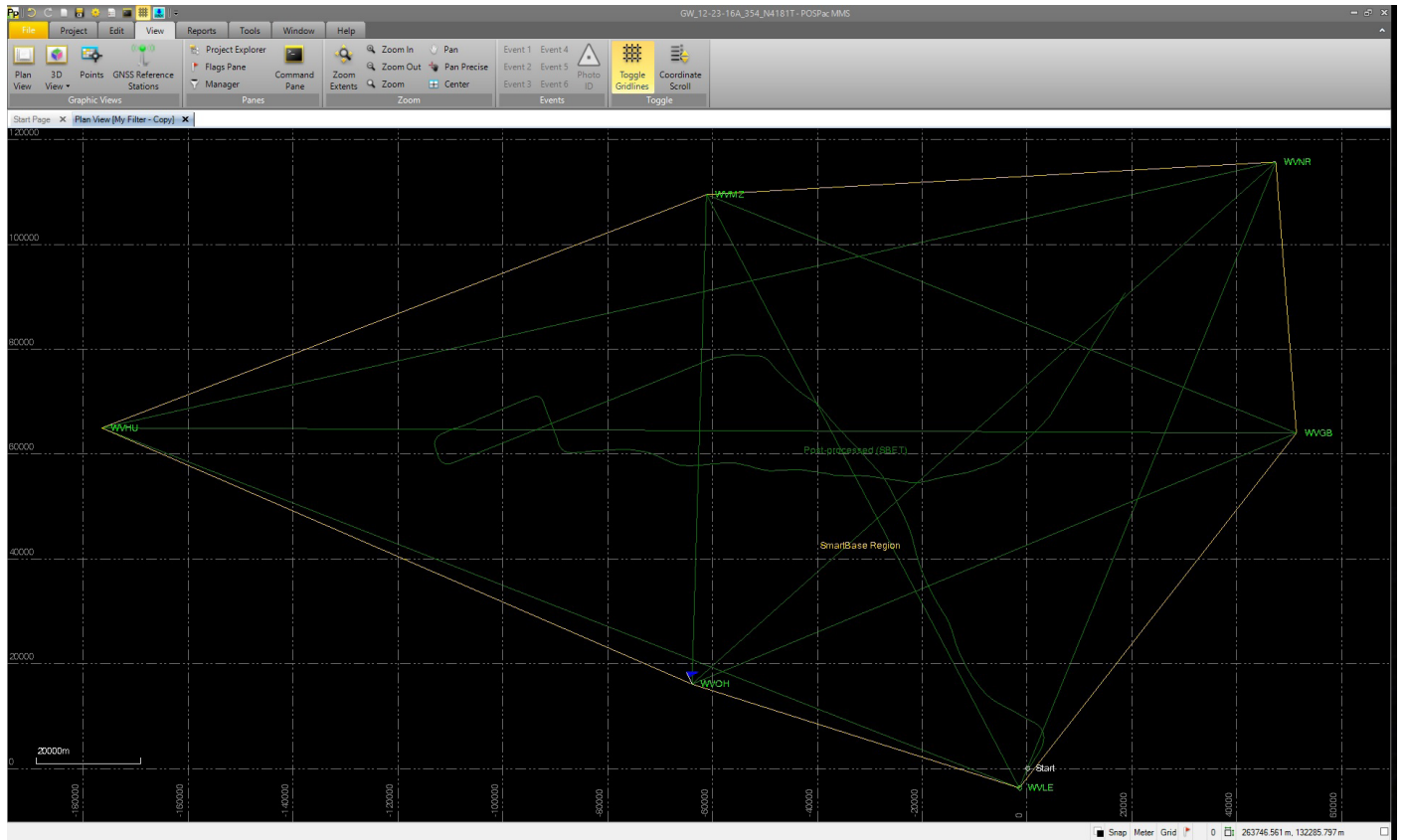
Ready

Display - GW_12-23-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

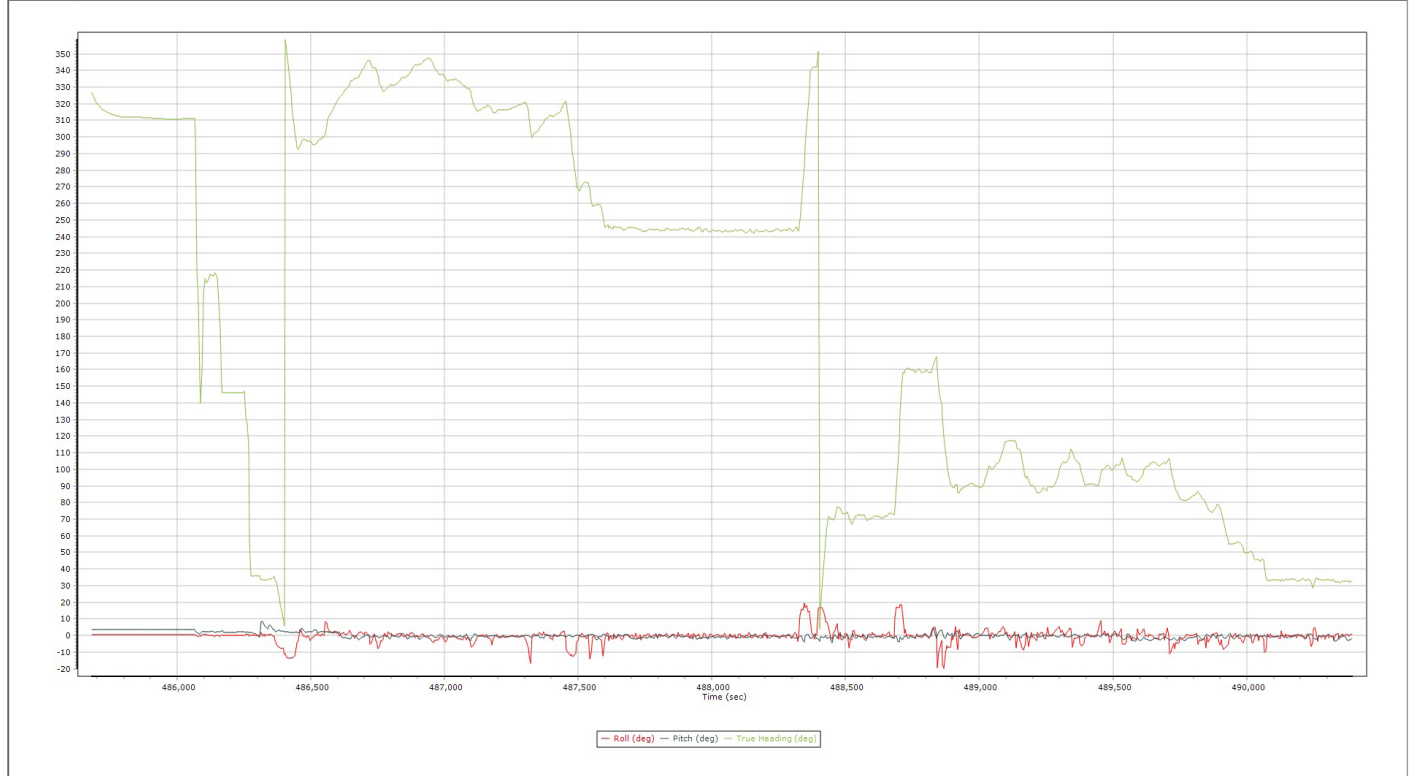


Ready



Display - GW_12-23-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - V1.2



Date: 12 / 23 / 2016 Pilot: AC
Project: 16PR-816 NW Operator: EF
Aircraft: NW181T
Sensor: 5060354 HD: B

POS/AV Filename: Dec23

Flight Plan		Weather
Roll Comp:	On or Off	Pressure (gnd):
Multipulse:	On or Off	Temperature (gnd):
Beam Divergence:	Wide or Narrow	Temperature (air):
Scan Rate:	52	Dew Point:
Pulse Rate:	250	Turbulence:
Scan Angle:	1/2°	Visibility:
Desired Range:	1550	
Planned GPS:		

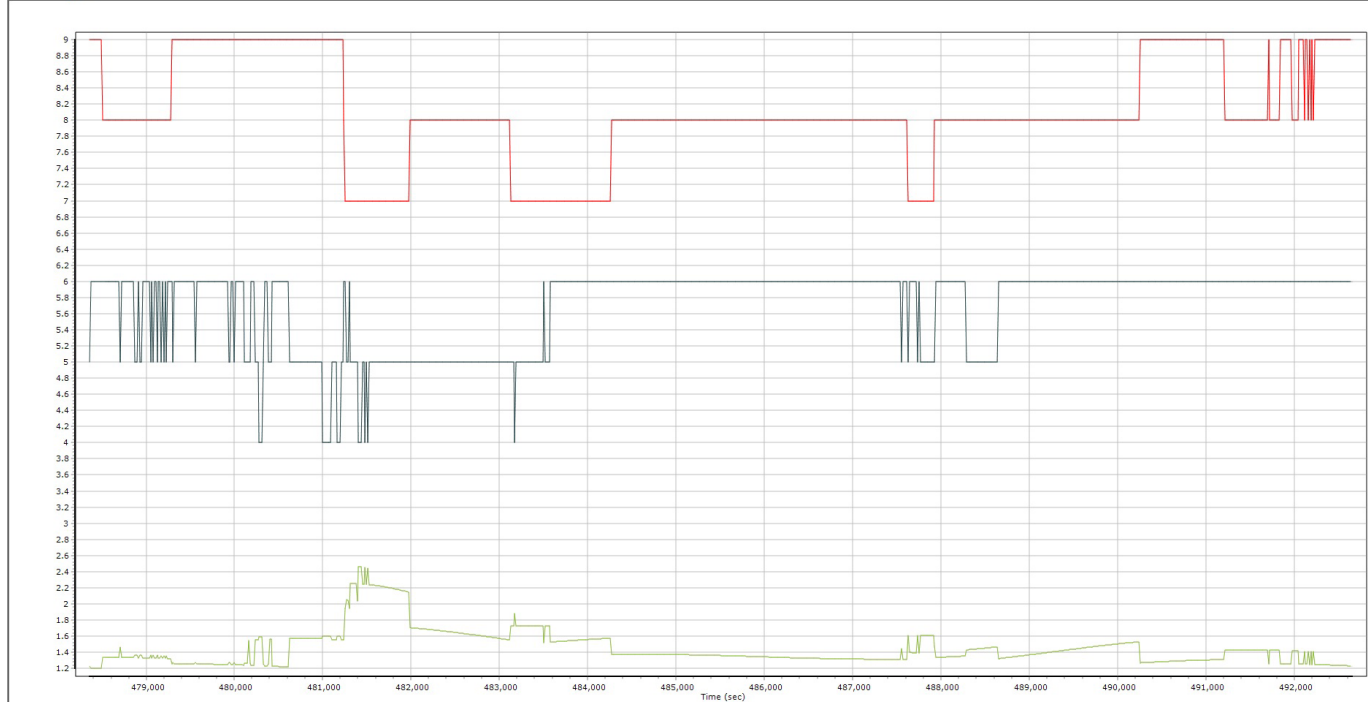
[illegible]

Base Station Point ID: _____ Position Type: <u>Known / Autonomous</u> Antenna Height: _____ Meters Latitude: _____ Longitude: _____	Location: _____ Time On (UTC): _____ Time Off (UTC): _____ POOP: _____ SV's: _____
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Dec 23, 2016-A (N812TB, SN356)

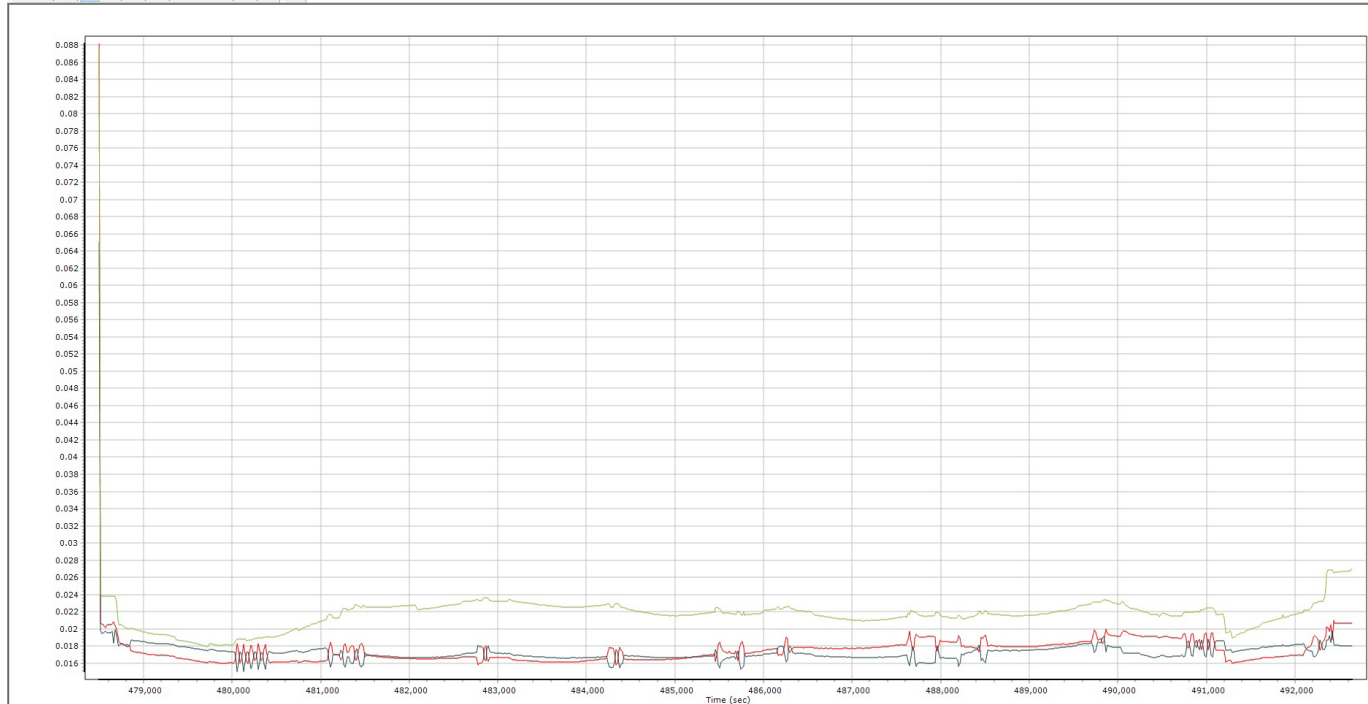
Display - GW_12-23-16A_356_N812TB - Solution Status

File Edit Tools View Help

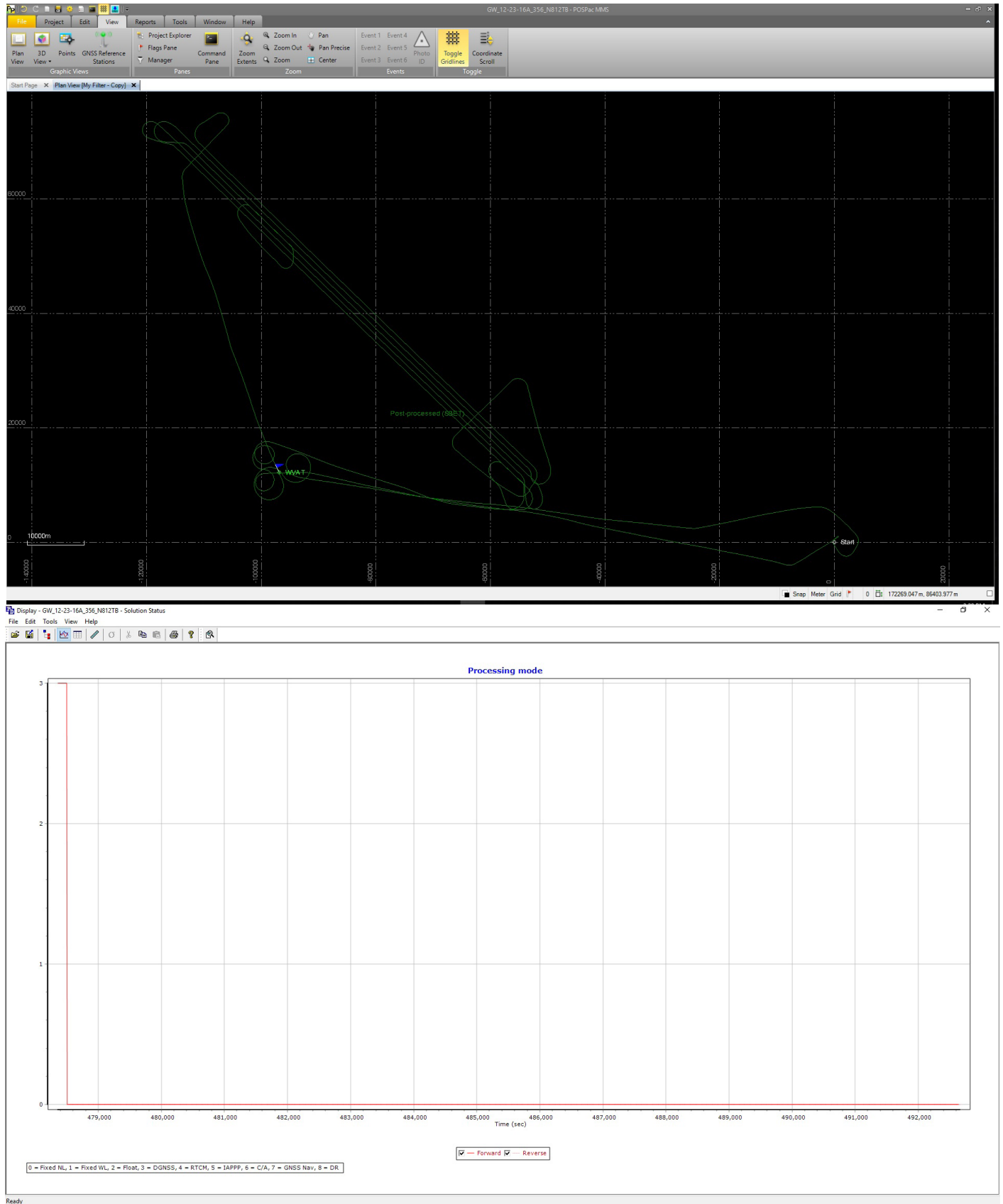


Ready
Display - GW_12-23-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

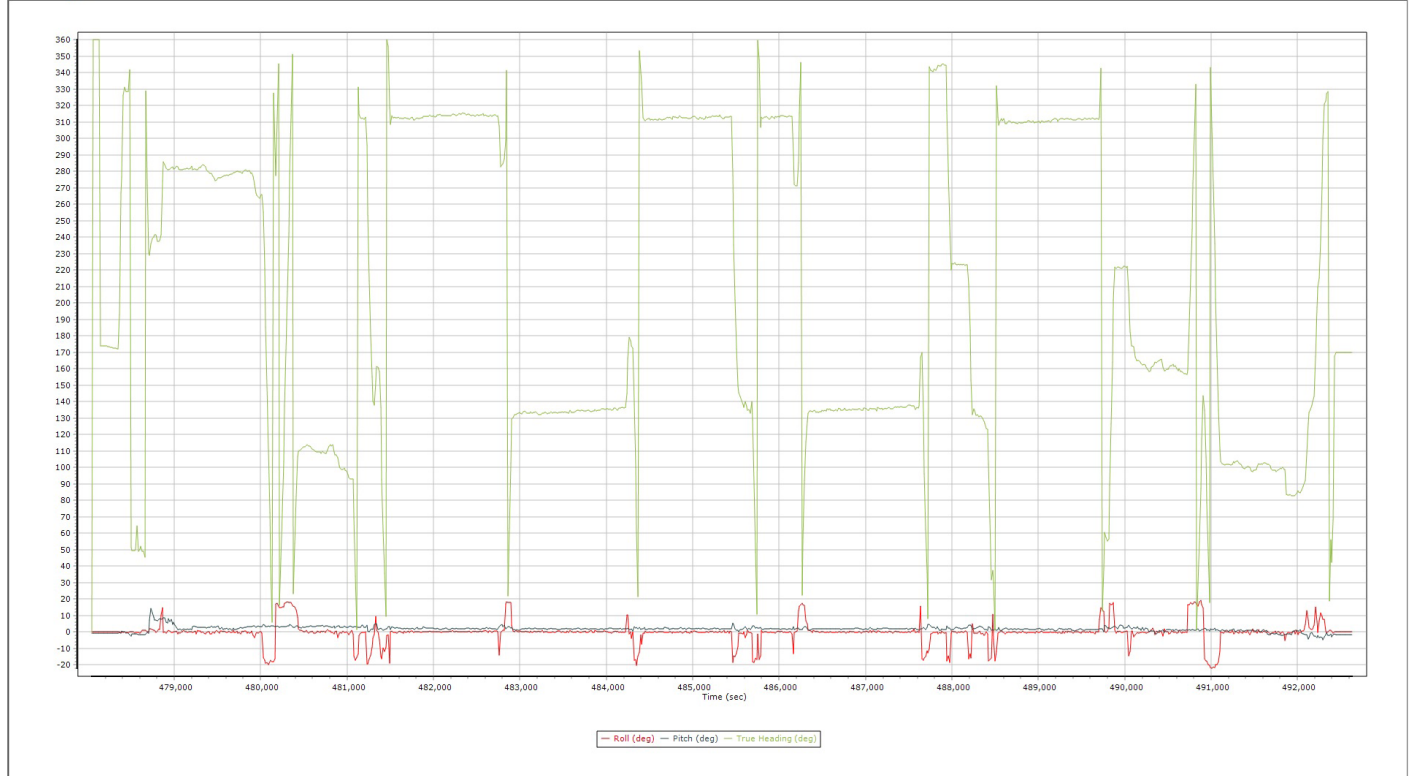


Ready



Display - GW_12-23-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID **WVAT**

Coordinates

Latitude **N** 37 25 42.65110000

Longitude **W** 81 4 4.37831000

Altitude 705.9800 m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna Frame

Height 0.000 m

Method Bottom of antenna mount

Manufacturer Trimble

Type Zephyr Geodetic 2 RoHS

Offset from Measured Point to APC 0.085 m

Apply Changes

Station Database

Station ID WVAT

Station Fullname WVAT

Primary Service ID **Edit**

Coordinate Accuracy UNKNOWN_ACC

Secondary Service ID **Edit**

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log

Project: W. VIRGINIA FEMA 2016

Project #: 29331

Flight Mgmt File: 29331_FEMA-WV-Galaxy-1550m-S.xml

Alt: N812TB

Begin Hobbs: 4222.1

End Hobbs: 4225.9

Total: 3.8

Pilot: C. STEVENSON

Co-Pilot: -

Tech: P. HRABAK

Dep Apt: KROA

Dep Time (Lcl): 12:58Z

Arr Apt: KROA

Arr Time (Local): 11:45Z

Tot Time Aloft: 3:47

CORS: (Y) N

Sta 1: WVAT CORS

Sta 2: -

GPS Unit: Y (N)

Sta 1: -

Sta 2: -

Gd Temp beg: 60 °C

End: 66 °C

OAT beg: 60 °C

End: 62 °C

Altimeter begin: 30.48"

End: 30.52"

Date: DEC 23rd, 2016

UTC: 20161223A-GALAXY-356

Page: 1 of 1

Line #	Hdg	Start UTC	End UTC	Gd Spd	POD/Sat	GPS Altitude	Crab	Turb (0-3)	Alt AMSL	Alt AGL	Max Gndsp	Avg Pt Spacing	Power	Pulse 3/ In Air	Pulse Rate	PPSM	Mag CB	Storage Name
25	NW	13:39	13:40	~145 kts	1.3/18	7320'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	180.5	1050gb
25	NW	13:45	14:05	~130 kts	1.1/19	7320'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	236.4	5/4
26	SE	14:09	14:30	~130 kts	1.1/17	7300'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8
27	NW	14:34	14:49	~130 kts	1.0/18	7300'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8
27	NW	14:56	15:02	~130 kts	1.1/17	7300'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8
28	SE	15:06	15:26	~130 kts	1.0/17	7350'	2°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8
74	SW	15:34	15:36	~135 kts	0.9/20	7320'	3°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8
29	NW	15:42	16:01	~135 kts	1.1/18	7320'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8
73	SW	16:05	16:07	~125 kts	1.0/19	7400'	1°	0	1550m	1550m	VARIES	141 kts	N0.63 m	2500 Hz	1-HIGH	3.06	162.813	4619.8

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. (FIG B @ 13:20 → 13:25)

high over above, clear below, smooth, hz, light winds (VOID - TOO FAST)

high over above, clear below, smooth, hz, light winds (REENGAGEMENT OF ABOVE)

high over above, clear below, smooth, hz, light winds (SPONTANEOUS LASER SHOT OFF - EYE SAFETY?)

high over above, clear below, smooth, hz, light winds (CONTINUATION OF ABOVE)

high over above, clear below, smooth, hz, light winds (PARTIAL PLANNED CROSS-TIE LINE)

high over above, clear below, smooth, hz, light winds (IMPROVED CROSS-TIE LINE)

(FIG B @ 16:19 → 16:25)

[UNABLED FOR FUEL & TO ENSURE PILOT CAN CATCH AIRLINER HOME FOR HOLIDAY]

Total Proj Lines: 74

Lines Flown: 5

Lines Remain: 5

Online Time: 2:20

Job Time: 1:19

Notes: 20161223A-GALAXY-356

Dec 23, 2016-B (N4181T, SN354)

Display - GW_11-23-168_354_N4181T - Solution Status

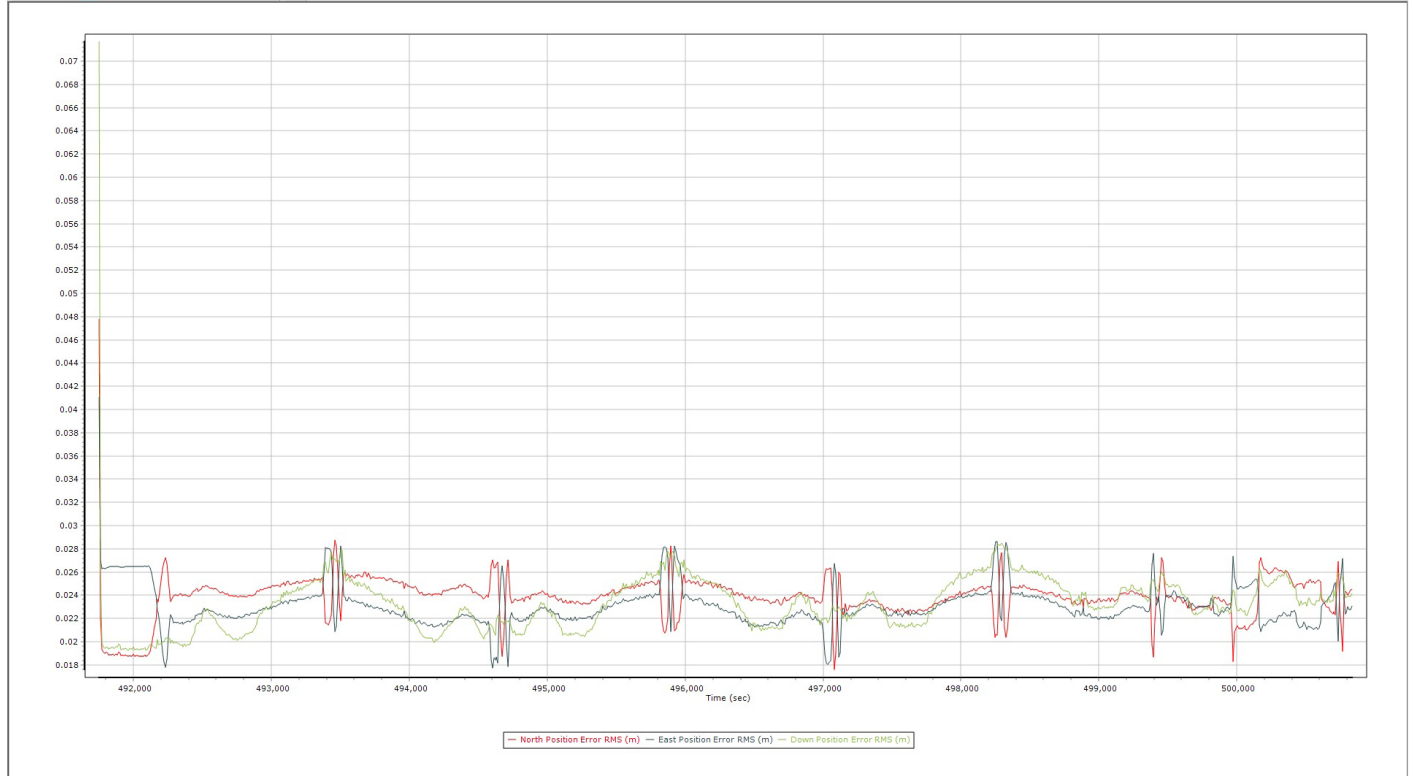
File Edit Tools View Help



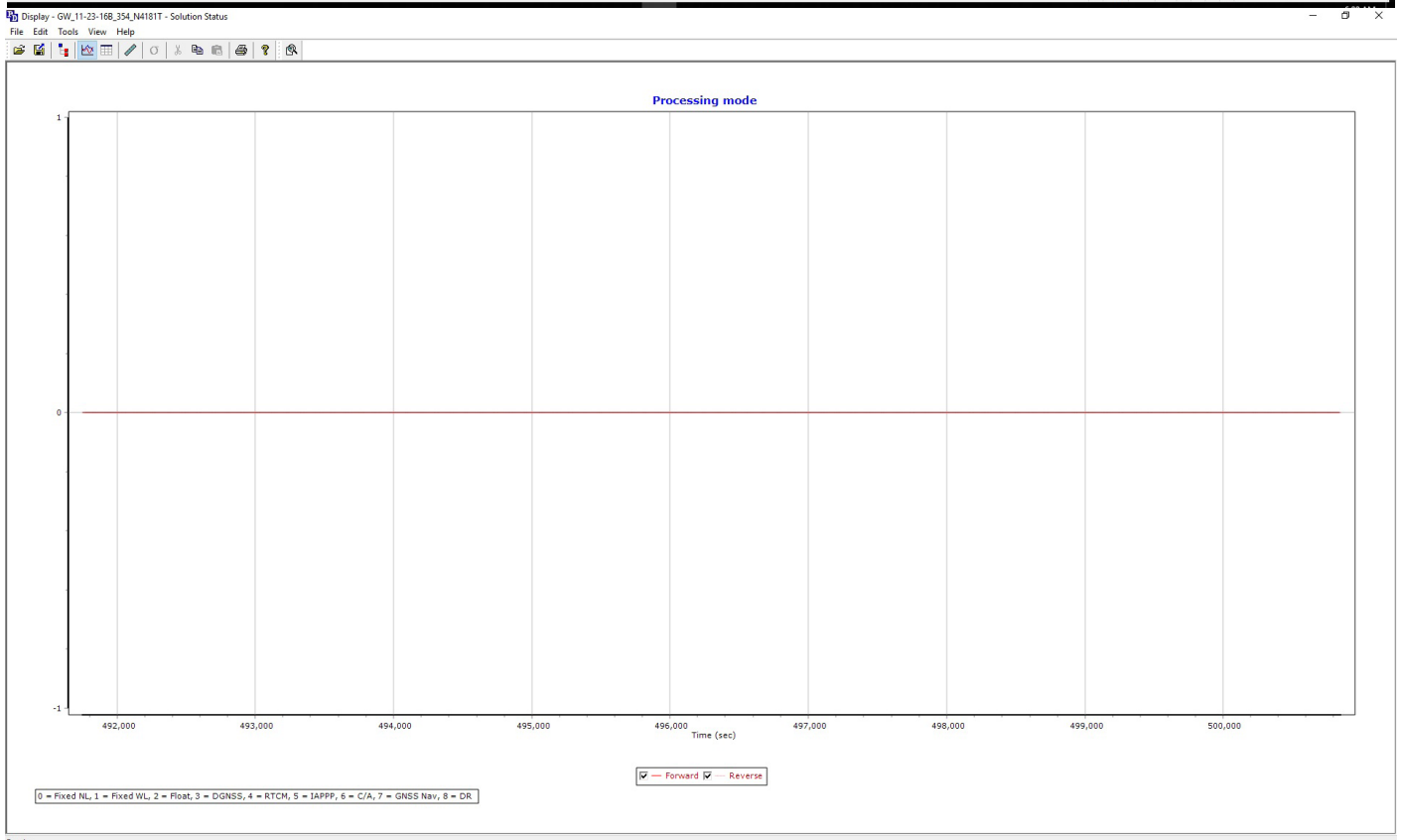
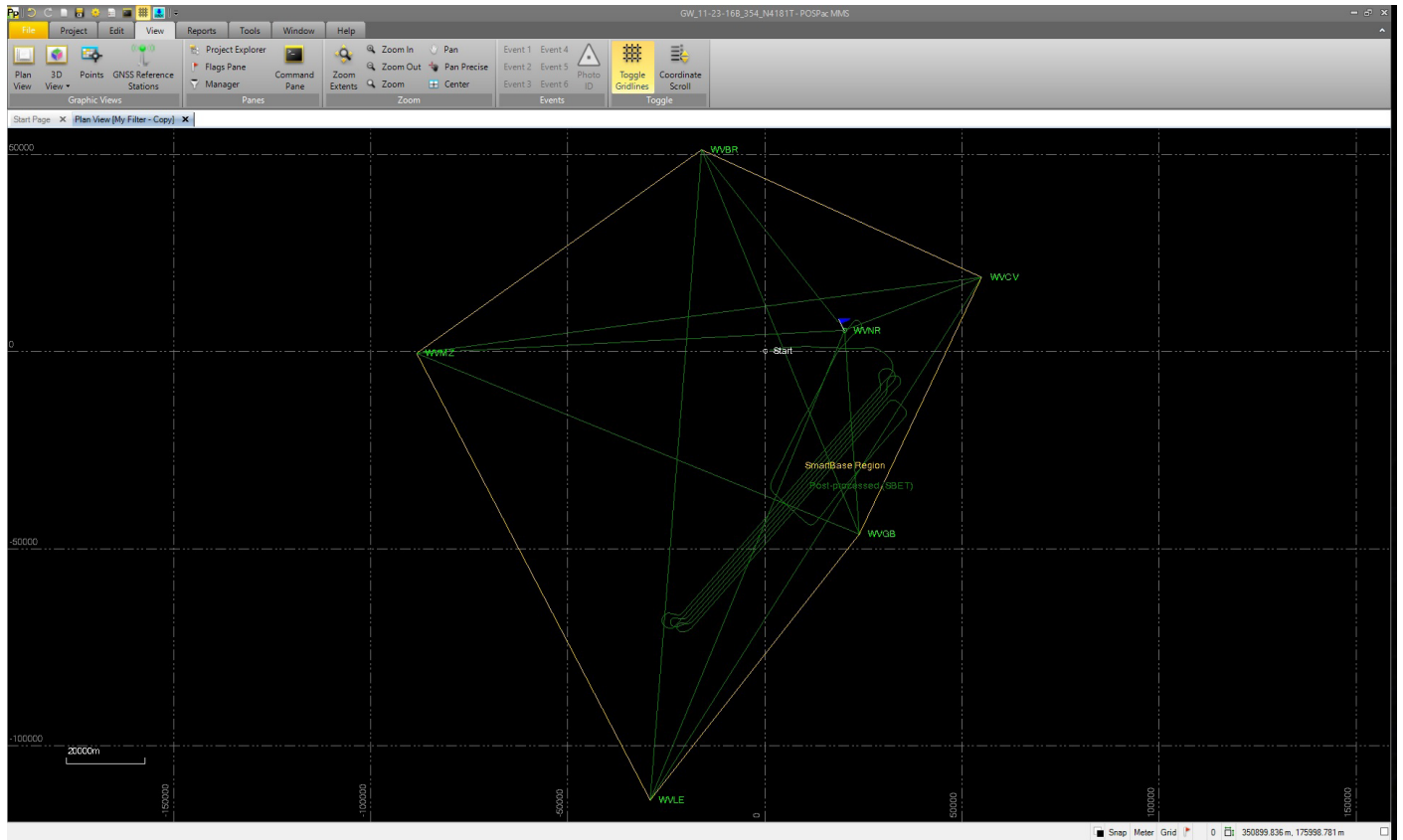
Ready

Display - GW_11-23-168_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

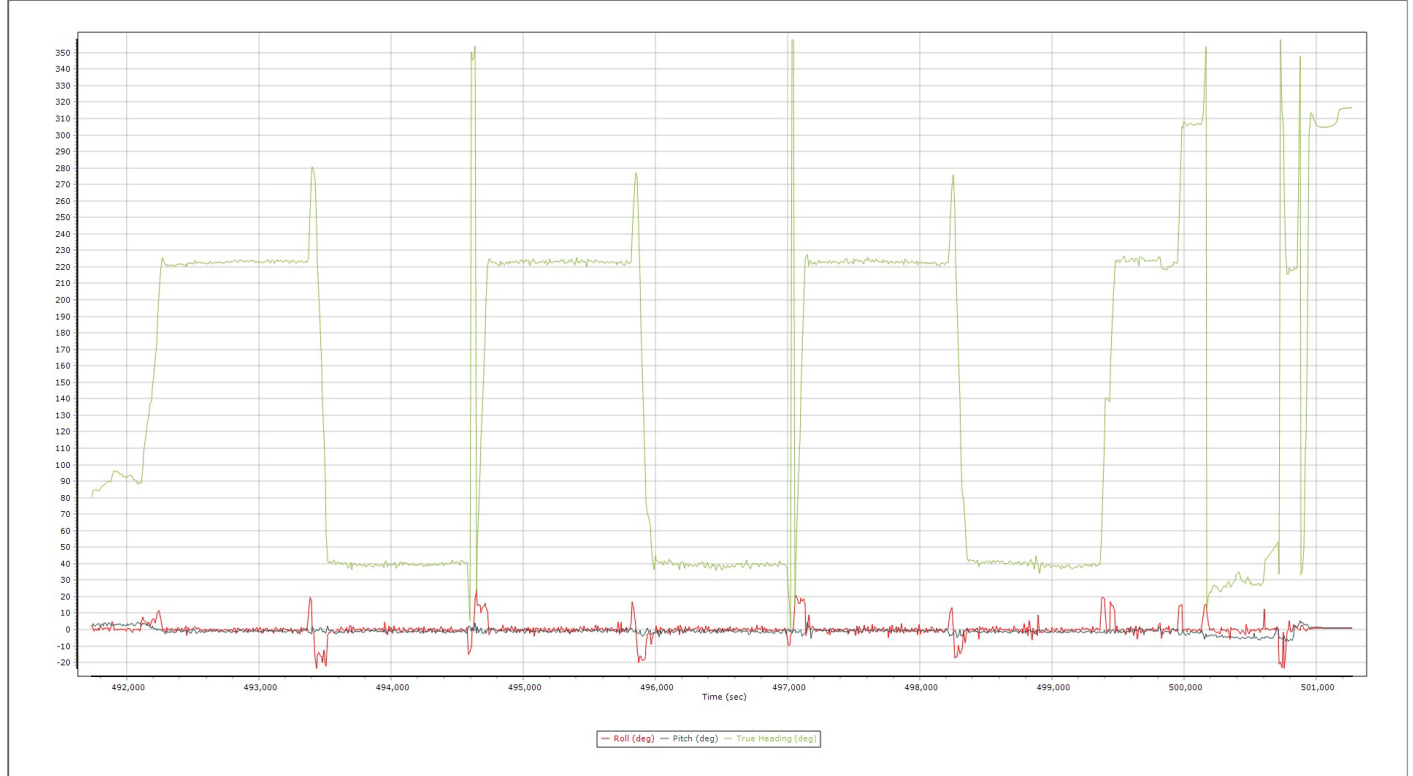


Ready



Display - GW_11-23-168_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude: m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna:

Height: m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC: m

Apply Changes

Station Database

Station ID: Station Fullname:

Primary Service ID: Edit

Coordinate Accuracy:

Secondary Service ID: Edit

Add Delete Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates Export Coordinates

Close

Flight Log

Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2



Date: 12 / 25 / 2016 Pilot: AC
 Project: 1604316 NE Operator: EF
 Aircraft: N4181T
 Sensor: S60354 HD: D

POS/AV Filename: Dec23

Flight Plan		Weather
Roll Comp:	On or Off	Pressure (gnd):
Multipulse:	On or Off	Temperature (gnd):
Beam Divergence:	Wide or Narrow	Temperature (air):
Scan Rate:	52	Dew Point:
Pulse Rate:	250	Turbulence:
Scan Angle: $1/2^\circ$	21.5	Visibility:
Desired Range:	1550	
Planned GPS:		

[illegible]

Base Station

Point ID: _____

Position Type: Known / Autonomous

Antenna Height: _____ Meters

Latitude: _____

Longitude: _____

Location: _____

Time On(UTC): _____

Time Off(UTC): _____

PDP: _____

SV's _____

Airborne Station
Time On: 14:34 UTC 14:55
Kinematic On: 15:01 UTC
Kinematic Off: 14:09 UTC
Time Off: 14:14 UTC

Engine Start(24HR LCL): 09:27 Hobbs Start: _____

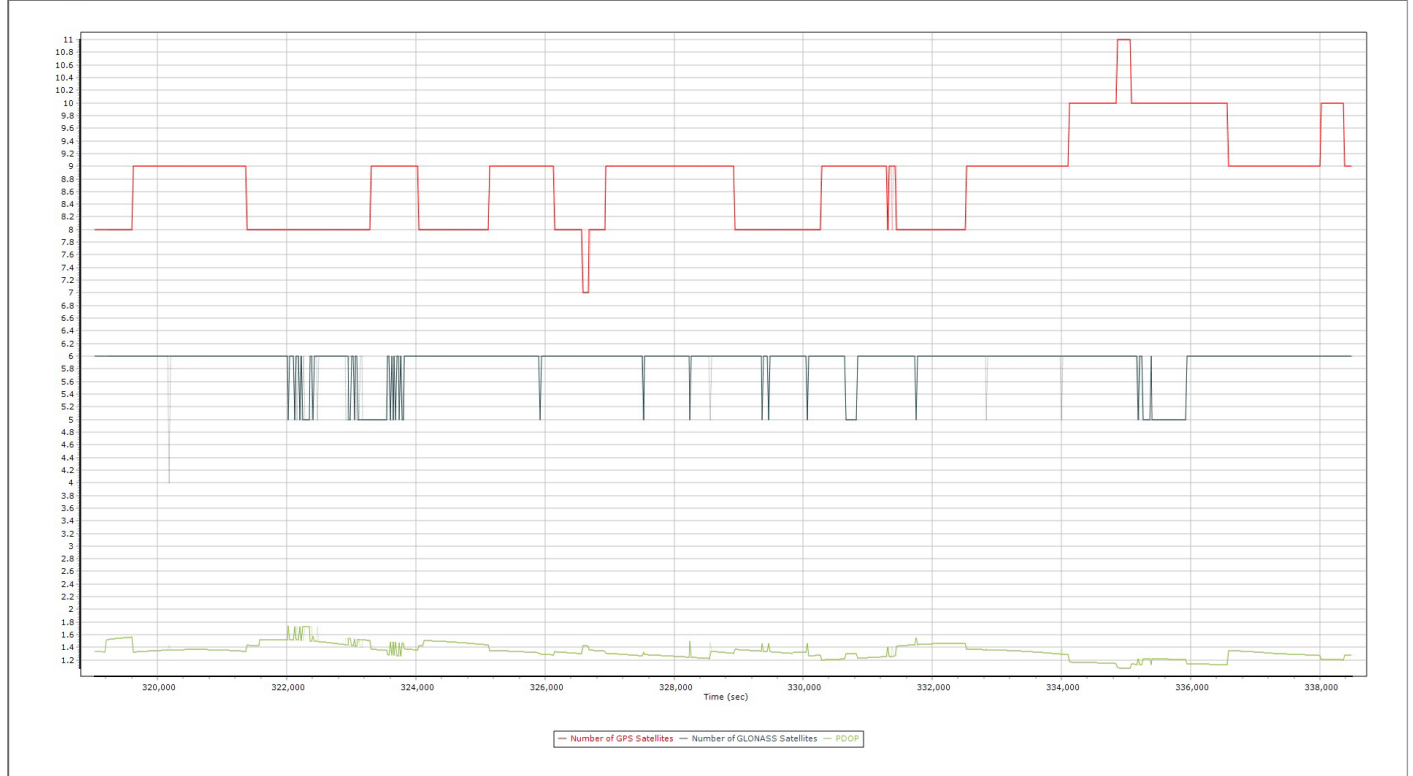
Engine Stop(24HR LCL): 14:17 Hobbs Stop: _____

Page of _____

Dec 28, 2016-A (N4181T, SN354)

Display - GW_12-28-16A_354_N4181T - Solution Status

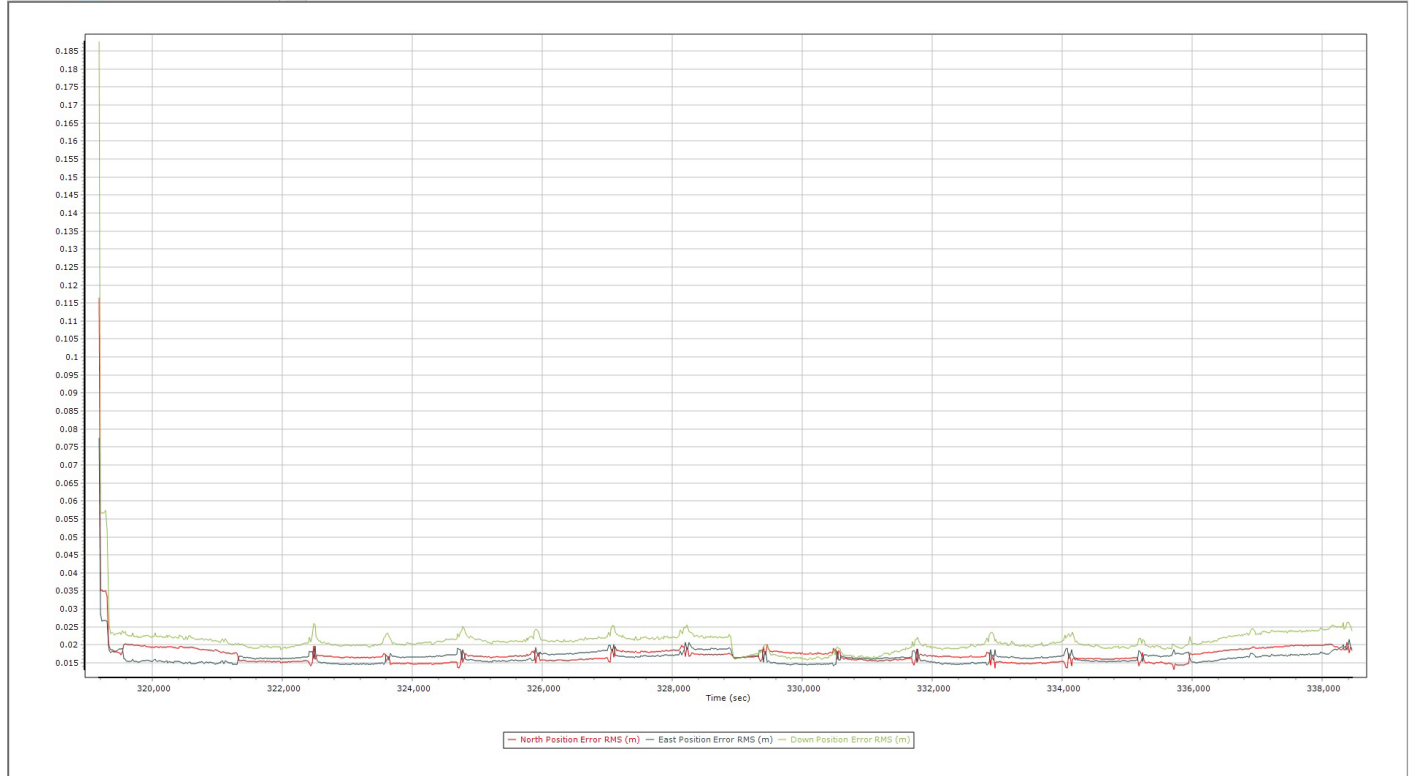
File Edit Tools View Help



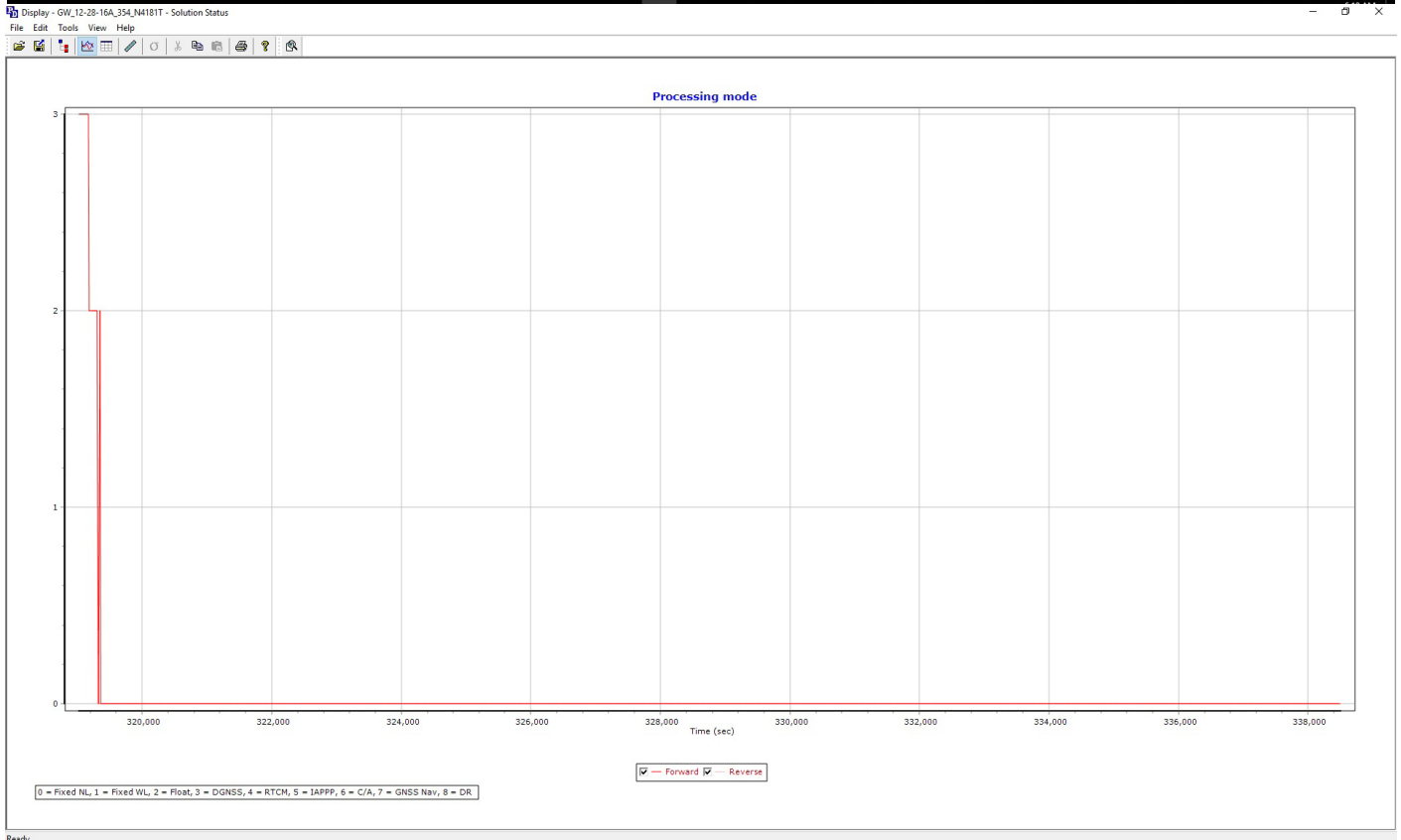
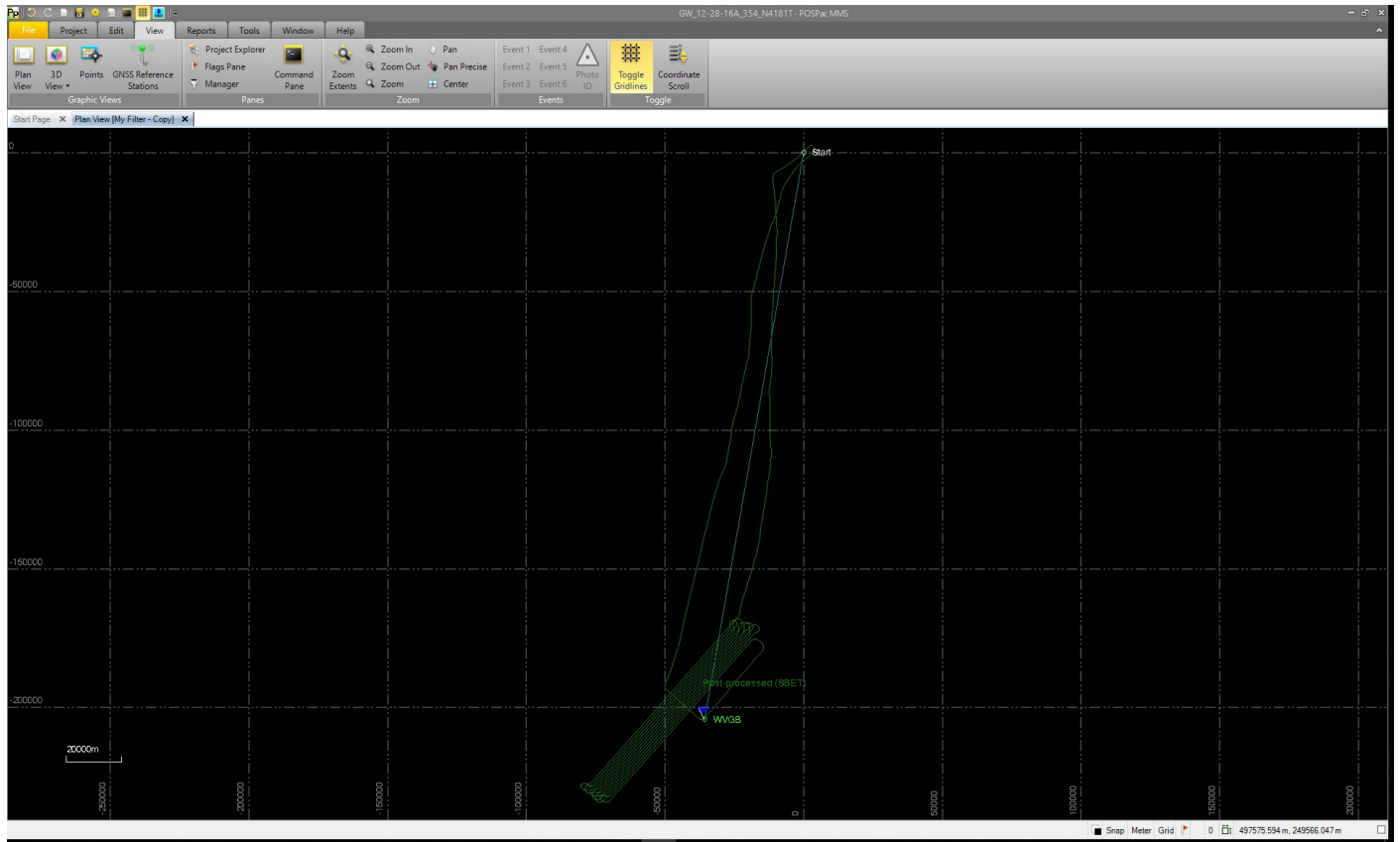
Ready

Display - GW_12-28-16A_354_N4181T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

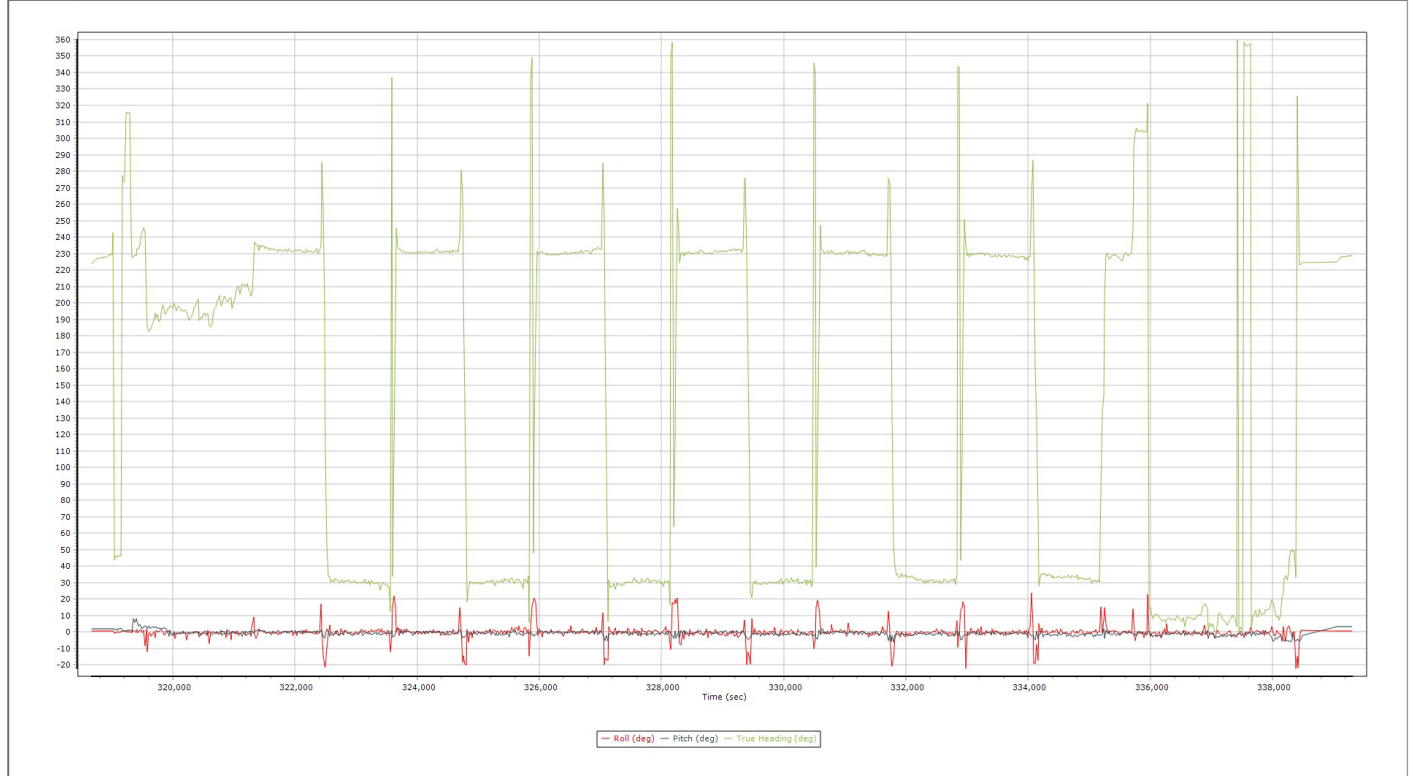


Ready



Display - GW_12-28-16A_354_N4181T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID **WVGB**

Coordinates

Latitude **N** 38 25 48.42536000

Longitude **W** 79 49 1.29517000

Altitude 812.4690 m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna Frame

Height 0.000 m

Method Bottom of antenna mount

Manufacturer Trimble

Type Zephyr Geodetic 2 RoHS

Offset from Measured Point to APC 0.085 m

Apply Changes

Station Database

Station ID WVGB

Station Fullname WVGB

Primary Service ID **Edit**

Coordinate Accuracy UNKNOWN_ACC

Secondary Service ID **Edit**

Add

Delete

Update

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Import Coordinates

Export Coordinates

Close

Flight Log



KEYSTONE AERIAL SURVEYS

Date: 12 / 28 / 2016

Project: 800-06 NE

Aircraft: N4181T

Sensor: S660354

KeyStone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.2

Pilot: AC

Operator: EF

HD: 0

POS/AV Filename: 04028

Roll Comp: (On) or Off

Multipulse: (On) or Off

Beam Divergence: Wide or Narrow

Scan Rate: 52

Pulse Rate: 350

Scan Angle: 1/2

Desired Range: 1550

Planned GPS:

Weather

Pressure (gnd):

Temperature (gnd):

Temperature (air):

Dew Point:

Turbulence: Moderate

Visibility:

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
Test Line								
41	17:12	17:33	221.4	1700	1.07	18	146	Test 1720
40	17:36	17:52	41.4	1600	1.30	16	142	
39	18:05	18:11	221.4	1650	1.12	18	144	
38	18:14	18:30	41.4	1550	1.10	18	146	
37	18:35	18:50	221.4	1680	1.11	17	146	
36	18:52	19:06	41.4	1570	1.12	17	146	
35	19:12	19:28	221.4	1640	1.04	17	147	Range went down to 1300
34	19:31	19:43	41.4	1710	1.10	16	146	
33	19:51	20:02	221.4	1560	1.05	17	134	
32	20:10	20:22	41.4	1500	1.10	17	146	
31	20:30	20:43	221.4	1820	1.15	16	146	
30	20:49	21:06	41.4	1600	1.12	16	144	
Test Line	21:16	21:19	311.2	1700	1.07	17	140	Not planned for line

Base Station

Point ID: _____

Position Type: Known / Autonomous

Antenna Height: _____ Meters

Latitude: _____

Longitude: _____

Airborne Station

Time On: 16:31 UTC

Kinematic On: 16:37 UTC

Kinematic Off: _____ UTC

Time Off: 22:15 UTC

Engine Start(24HR LCU): 11:23

Engine Stop(24HR LCU): 17:15

Hobbs Start: _____

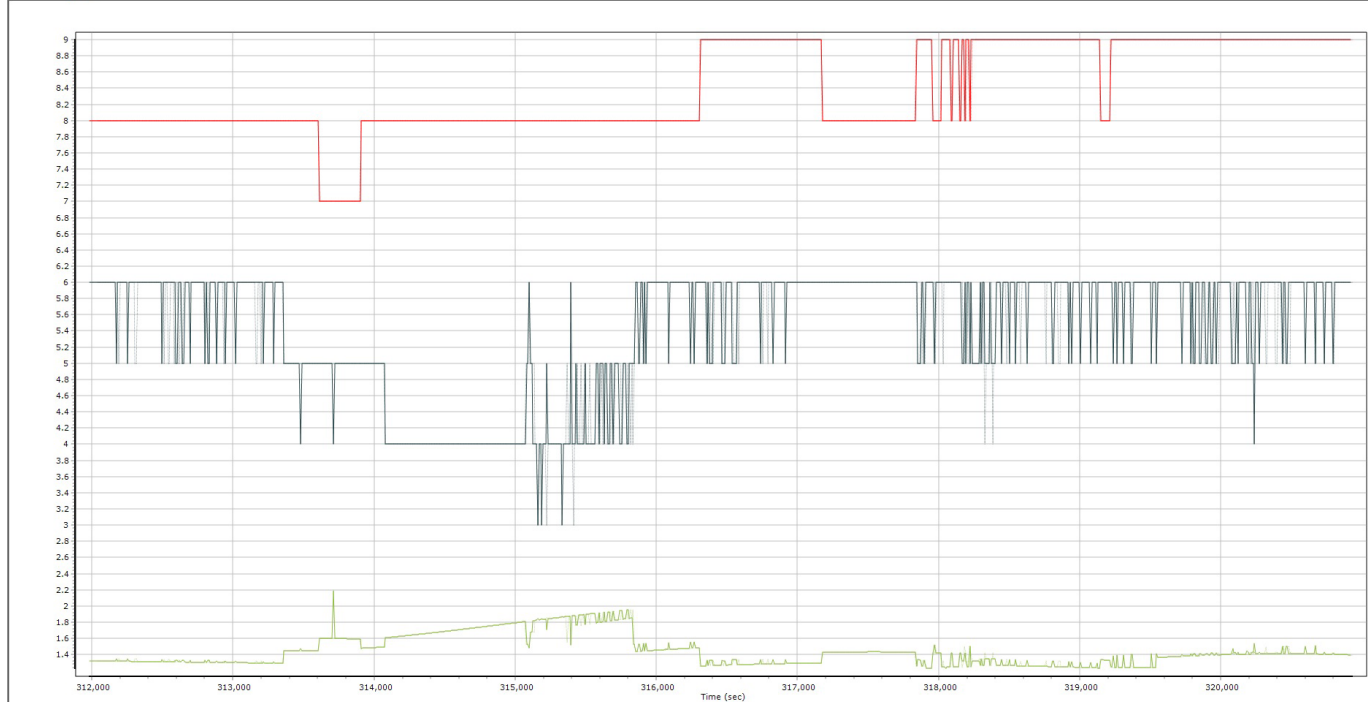
Hobbs Stop: _____

Page 1 of 1

Dec 28, 2016-A (N812TB, SN356)

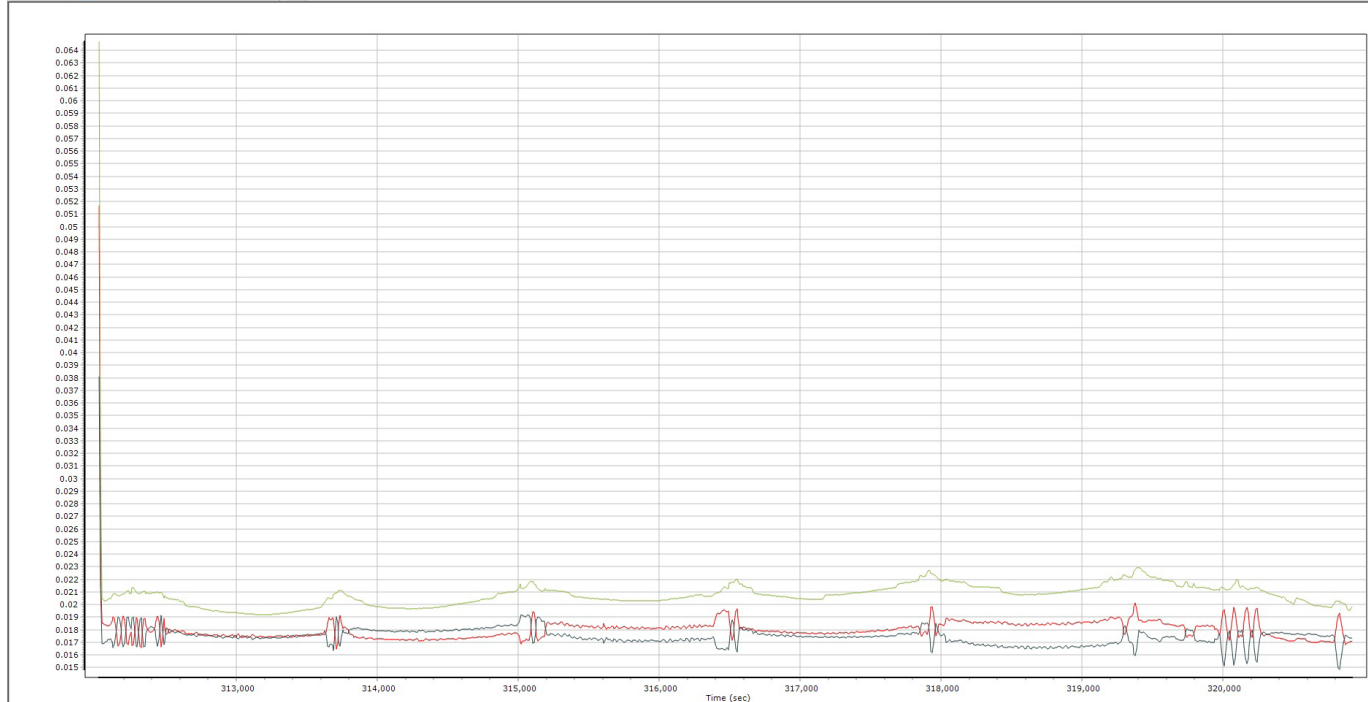
Display - GW_12-28-16A_356_N812TB - Solution Status

File Edit Tools View Help

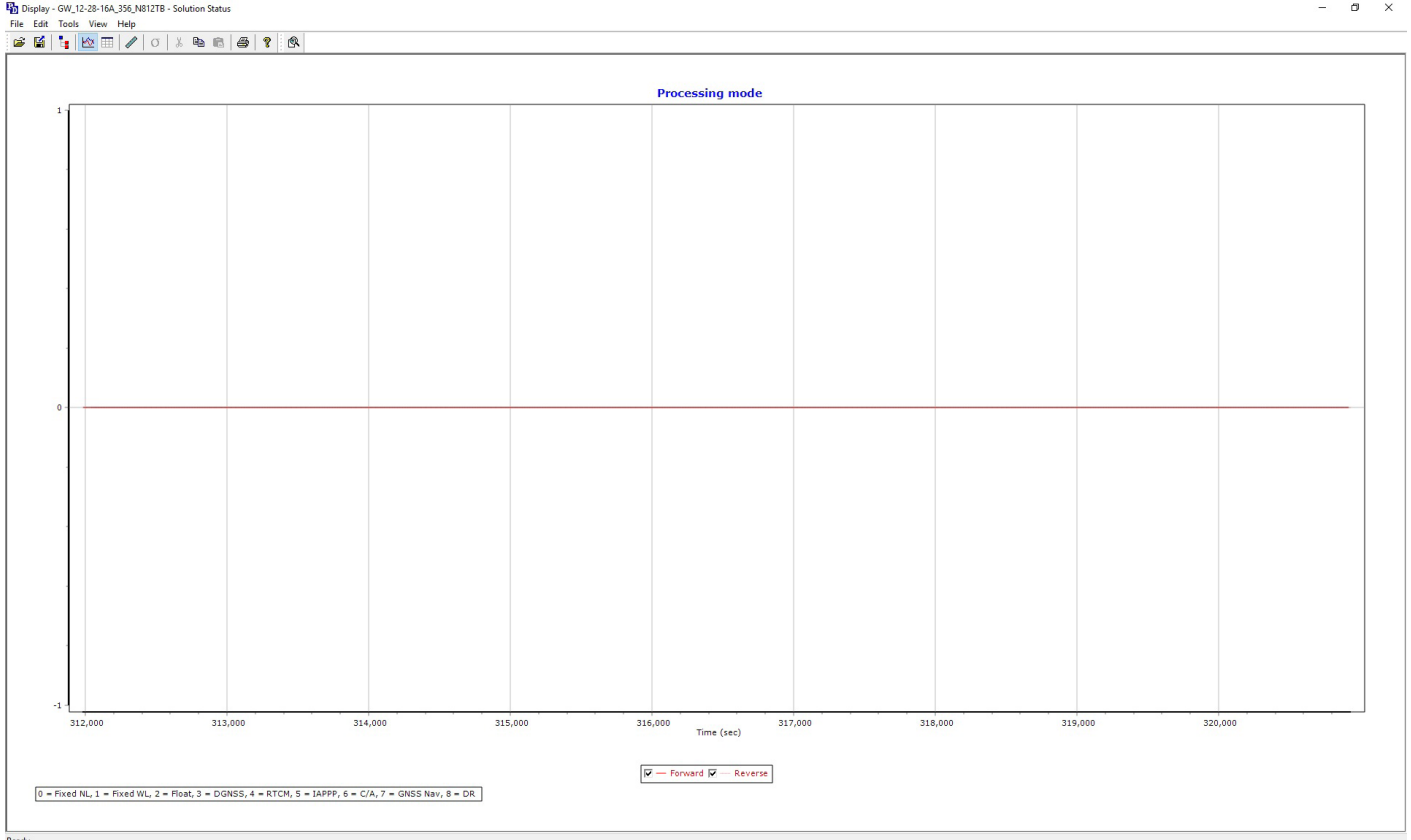
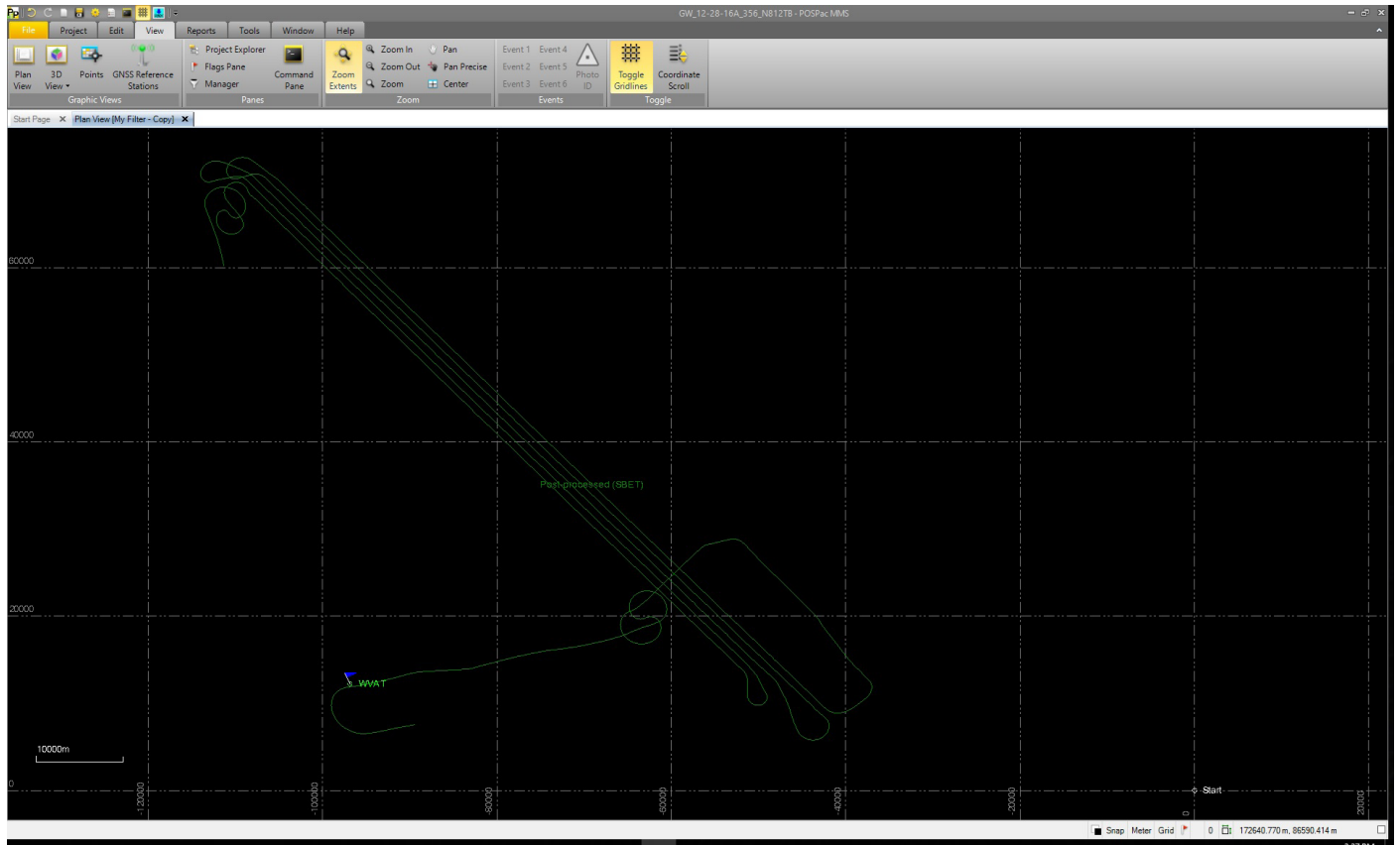


Ready
Display - GW_12-28-16A_356_N812TB - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

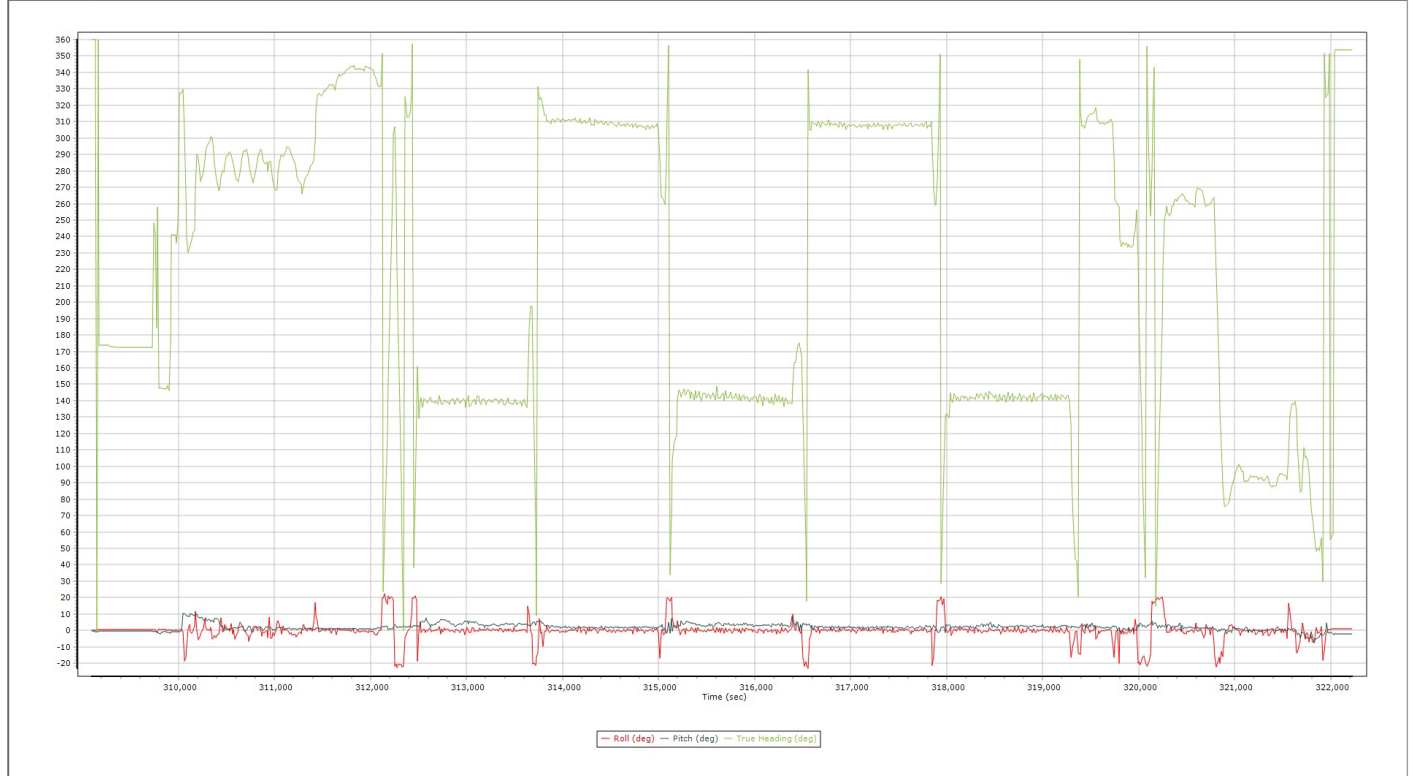


Ready



Display - GW_12-28-16A_356_N812TB - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID

Coordinates

Latitude

Longitude

Altitude m

☐ Decimal Degrees

Antenna Reference Point (ARP) coordinates

Antenna Frame

Height

Method

Manufacturer

Type

Offset from Measured Point to APC

Apply Changes

Station Database

Station ID

Station Fullname

Primary Service ID

Coordinate Accuracy

Secondary Service ID

Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Flight Log

Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc

Date: DEC 28th, 2016

Pg 1 of 1

(email log daily to flight_log_distribution_list@quantumspace.com) 2d\6122BA-GALAXY-356

LIFE: A B C D E

Project: W,VIRGINIA FEMA 2016

Proj #: 29331

Flight Mgmt File: 29331-FEMA-W_Virginia-1550pm-S.xml

Altcraft: N812JB Begin Hobbs: 4225.9 End Hobbs: 4229.1 Total: 3.2 Pilot: D.WAGNER Co-Pilot: - Tech: P.HABAK-

Dep Apt: KROA Dep Time (ldt): 09:07 [Z]: 14:07 Z Arr Apt: KROA Arr Time (local): 12:26 [Z]: 17:26 Z Tot Time Aloft: 3:19

CORS: Y/N Sta 1: WHAT CORS Sta 2: -

Flyovers: Y/N If Y, times: Sta1) 14:30 & 17:06 z Sta2) -

GPS Unit: Y/(N)

Sta 1: - Sta 2: -

Gd Temp beg:	+05 °c	End: +08 °c	OAT beg:	+09 °c	End: +05 °c	Altimeter begin:	308.19 "	end:	308.20 "
Type ODTECH GALAXY	Serial # 5060356	Alt AGL 1550 m	Alt ANSL VARS ES	Avg Terr Hc VARS ES	Max Gdpad	Avg Pt Spacing ~0.63 m			
LIDAR FOV 43° / 21.5°	Scan Freq 52.0 Hz	MPIA(Y)/N	Pulses In Air	Pulses Rate	Power HIGH	RPM ~3.06			
		GPS Altitude	Turb (0-+)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc. (Fig B @ 14:41 → 14:46 z)					

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POD#size	GPS Altitude	Crab	Turb (0-+)	Flyover Notes	Storage Name
30	SE	14:48	15:07	~135 kts	1.2/15	7200'	6°	Ø	few thin high above clear below, smooth, -h-z, NW winds ~30kts. INDICATES FULL COVERAGE	1050g6 SW 162813- 4619A8
31	NW	15:10	15:29	~130 kts	1.2/16	7160'	4°	Ø	few thin high above, clear below, smooth, -h-z, NW winds ~30kts.	
32	SE	15:33	15:52	~135 kts	1.0/16	7140'	10°	Ø	few thin high above, clear below, smooth, -h-z, NW winds ~30 kts.	
33	NW	15:56	16:17	~130 kts	0.9/19	7300'	5°	Ø	few thin high above, clear below, smooth, -h-z, NW winds ~25 kts.	
34	SE	16:20	16:41	~135 kts	1.1/17	7400'	8°	Ø	few thin high above, clear below, smooth, -h-z, NW winds ~25 kts.	
71	SW	16:50	16:52	~125 kts	1.1/18	7300'	10°	Ø	sfc above, clear below, smooth, -h-z, NW winds ~25 kts. (PRACTICAL PLANNED CROSS THE LINE) (Fig B @ 16:53 → 16:58 z)	

[LANDS FOR FUEL & TO ASSESS SUBOPTIMUM SITUATION]

Total Proj Lines: 24

Lines Flown: 5

Lines Remain: Ø

Online Time: 2:04

Mob Time: 1:15

Notes: 2d\6122BA-GALAXY-356