

Project Report Appendices

The following section contains the appendices as listed in
the Eastern San Diego County, CA
QL2 2016 Project Report.

Appendix A

GPS/IMU Processing Statistics Flight Logs

There were 32 total lifts. Graph reports generated from processing software and flight logs are found on the following pages.

Graphics include:

Figure 1: # of Satellites, # of GLONASS Satellites, PDOP

Figure 2 North Position, East Position, and Down Position Error RMS (m)

Figure 3: Mission Trajectory

Figure 4: Processing Status

Figure 5: Roll (deg), Pitch (deg), True Heading (deg)

Figure 6+: Base Station(s)

Flight Log(s)

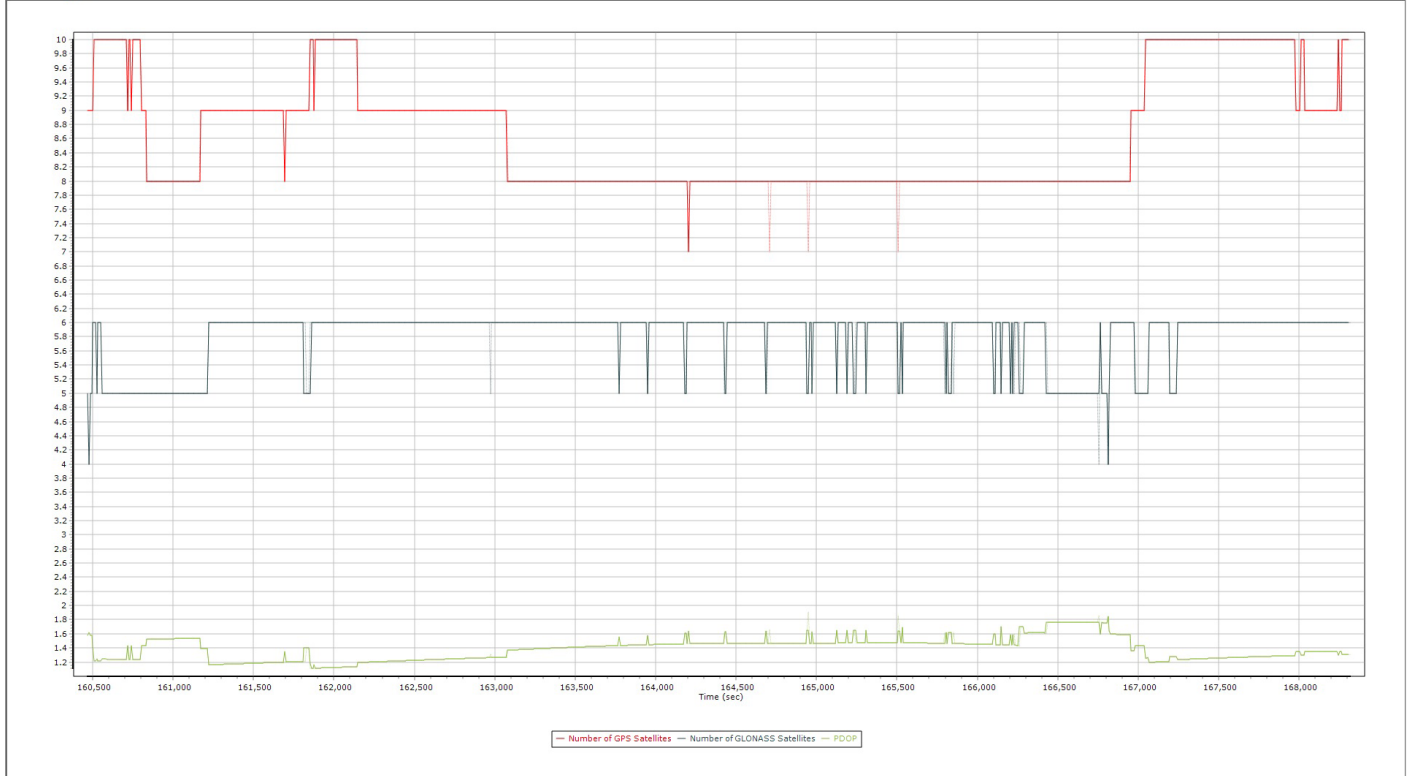
Lifts

Oct 31, 2016-A (N77DV, SN315)	3	Nov 26, 2016-A (N7269T, SN315)	128
Flight Log	7	Flight Log	132
Nov 1, 2016-A (N77DV, SN315)	8	Nov 29, 2016-A (N7269T, SN315)	133
Flight Log	12	Flight Log	137
Nov 3, 2016-A (N77DV, SN315)	13	Nov 29, 2016-B (N7269T, SN315)	138
Flight Log	17	Flight Log	142
Nov 4, 2016-A (N77DV, SN315)	19	Nov 30, 2016-A (N7269T, SN315)	144
Nov 5, 2016-A (N77DV, SN315)	23	Flight Log	148
Nov 13, 2016-A (N77DV, SN315)	27	Nov 30, 2016-B (N7269T, SN315)	150
Flight Log	31	Flight Log	154
Nov 14, 2016-A (N77DV, SN315)	35	Jan 14, 2017-A (N27DV, SN315)	155
Flight Log	39	Flight Log	159
Nov 14, 2016-B (N77DV, SN315)	42	Jan 26, 2017-A (N27DV, SN315)	160
Flight Log	46	Flight Log	164
Nov 15, 2016-A (N77DV, SN315)	47	Jan 28, 2017-A (N27DV, SN315)	166
Flight Log	51	Flight Log	170
Nov 15, 2016-B (N77DV, SN315)	53	Jan 28, 2017-B (N27DV, SN315)	172
Flight Log	57	Flight Log	176
Nov 16, 2016-A (N7269T, SN315)	59	Jan 31, 2017-A (N27DV, SN315)	178
Flight Log	63	Flight Log	182
Nov 17, 2016-A (N7269T, SN315)	64		
Flight Log	68		
Nov 18, 2016-A (N7269T, SN315)	70		
Flight Log	74		
Nov 18, 2016-B (N7269T, SN315)	77		
Flight Log	81		
Nov 19, 2016-A (N7269T, SN315)	83		
Flight Log	87		
Nov 19, 2016-B (N7269T, SN315)	89		
Flight Log	93		
Nov 20, 2016-A (N7269T, SN315)	95		
Flight Log	99		
Nov 22, 2016-A (N7269T, SN315)	101		
Flight Log	105		
Nov 23, 2016-A (N7269T, SN325)	106		
Flight Log	110		
Nov 24, 2016-A (N7269T, SN315)	112		
Flight Log	116		
Nov 24, 2016-B (N7269T, SN315)	117		
Flight Log	121		
Nov 25, 2016-A (N7269T, SN315)	122		
Flight Log	126		

Oct 31, 2016-A (N77DV, SN315)

Display - GW_10-31-16A_315_N77DV - Solution Status

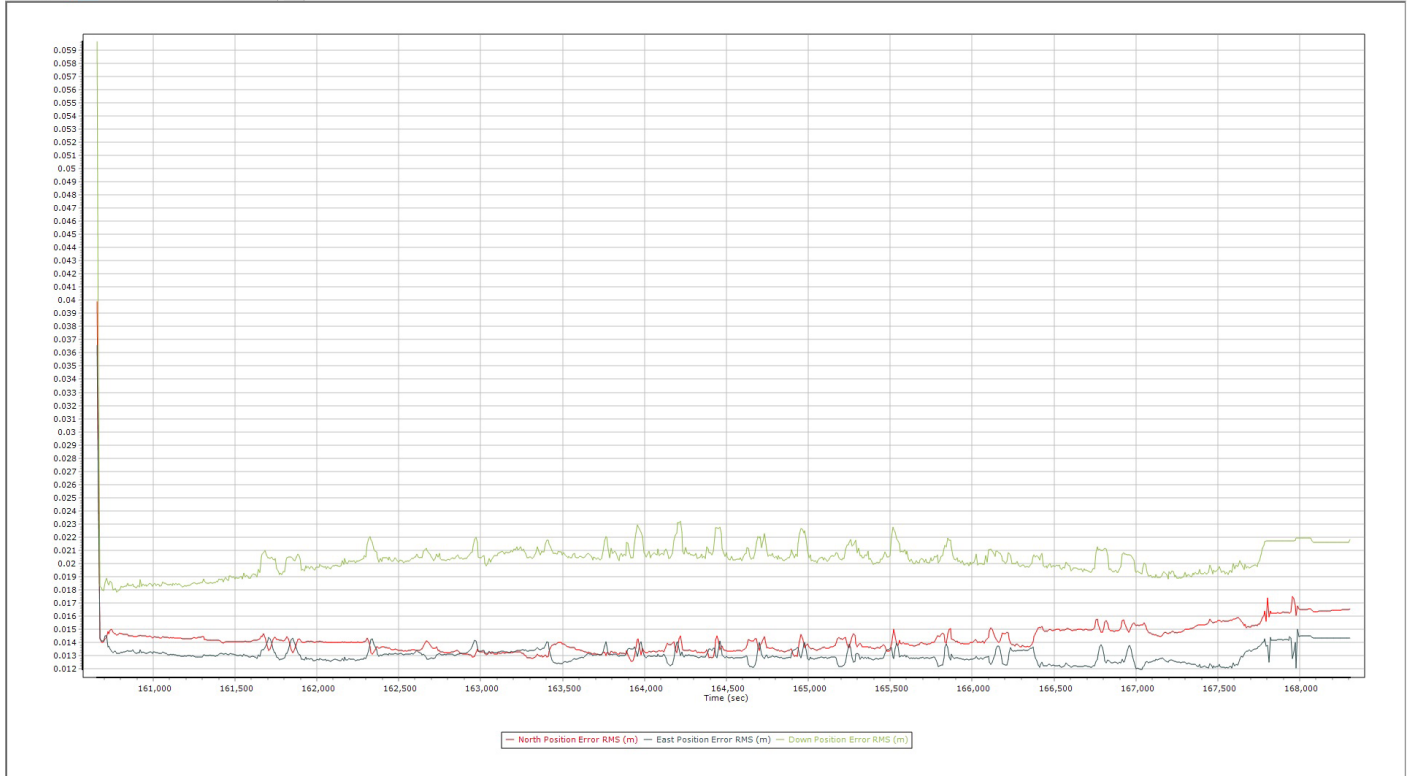
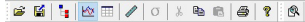
File Edit Tools View Help



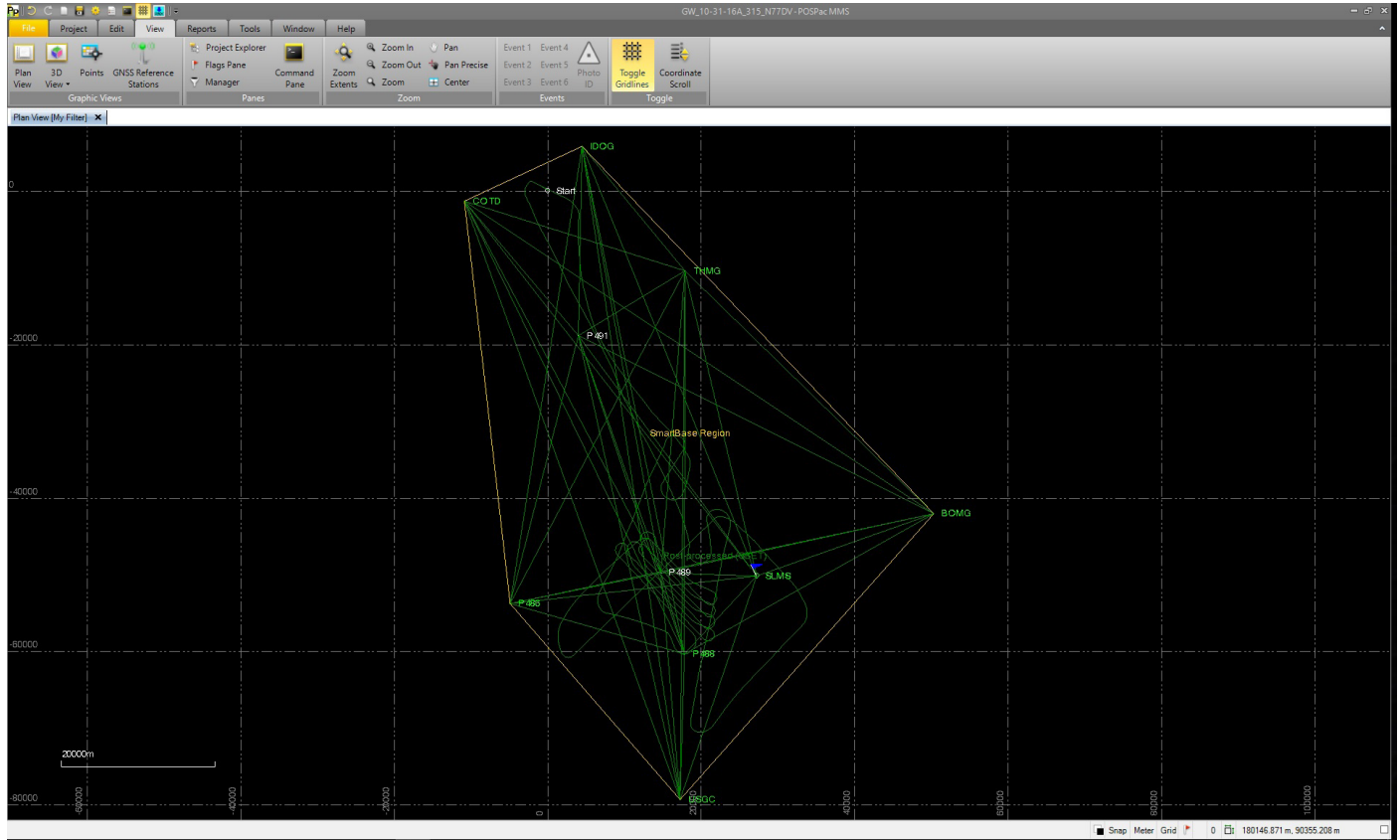
Ready

Display - GW_10-31-16A_315_N77DV - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

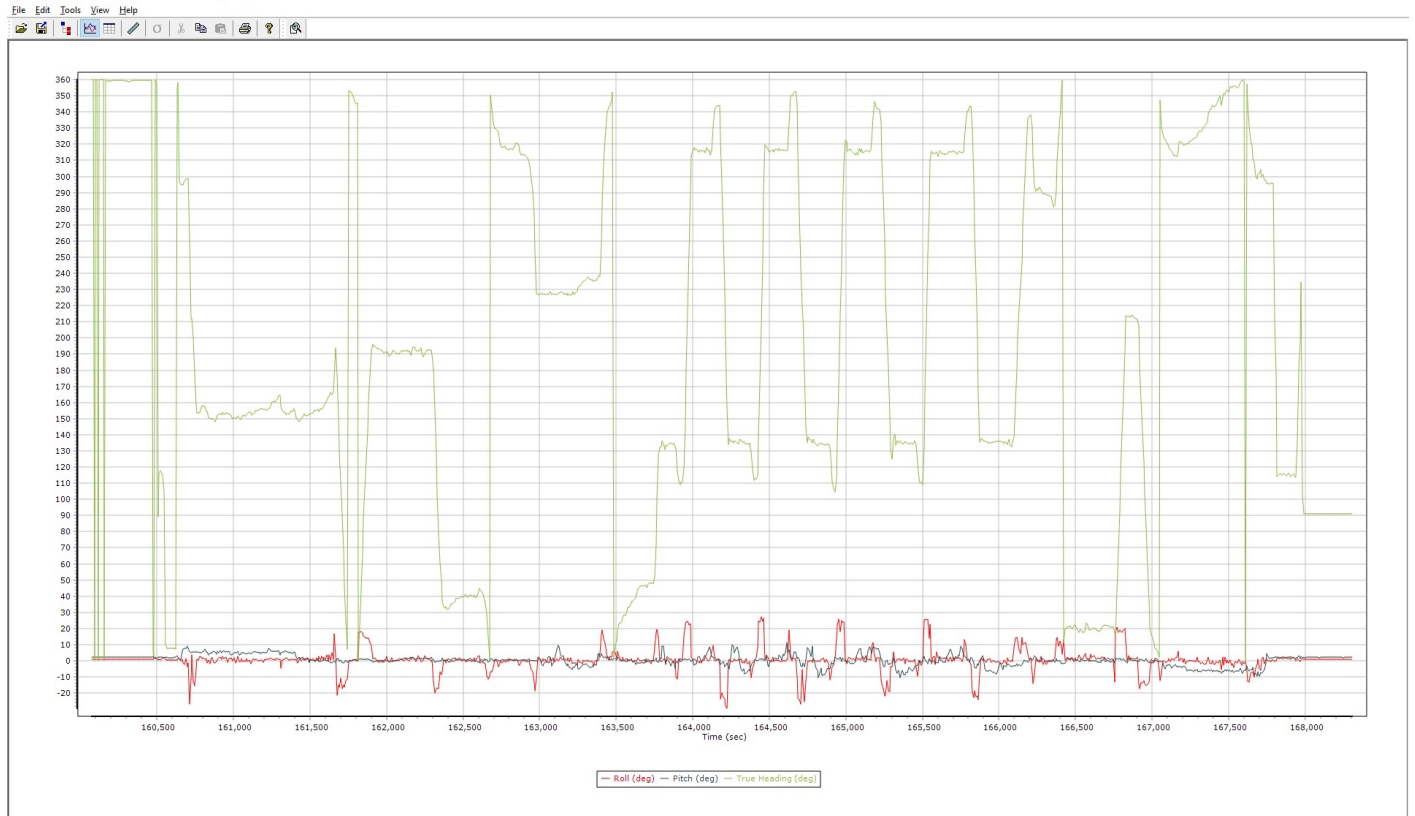


Ready



Ready

Display - GW_10-31-16A_315_N77DV - Real Time Trajectory, Vehicle Frame



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude:

Decimal Degrees

Antenna Frame

Height:

Method:

Manufacturer:

Type:

Offset from Measured Point to APC:

Ground Reference Point (GRP) coordinates

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
[Empty Table]								

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859-277-8700

Project Name		SAN DIEGO LIDAR	
Project Number		16189	
FCMS .fpd File/Nav File		3540_H360_3WD_BLUED - DESERT - XM1	

Pilot	Yeechen-Geal
Technician	Rosslyn
Aircraft	N270V

Date Flown	2016 10 23
Takeoff Time (Z)	1:27
Local	1:27
Airport	KUDD
Landing Time (Z)	3:43
Local	3:43
Airport	KUDD

Data Information	
LIDAR Unit	12 SEH 85
HD #	4
POSIPAS File #	20161031
from → to	319 → 330
FCMS File #	

Weather	
Ground	27
Begin Temp	15
Begin Dewpoint	29.95
End Temp	50
End Dewpoint	15
End Pressure	24.85

Project Scanning Requirements	
Field of View	28
Ground Speed (kts)	115
Scan Rate	41.8 HZ/Altitude AGL (ft): 5105
Pulse Rate Frequency	125 KHZ/MPIA or SPIA?
Laser Output Current	%

GPS Base Location(s)	8489					
PDOF Avoidance						
Static or Flyover?	→ if flyovers, times: 13:54 - 14:04, 15:14 - 15:19					

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
1	61	2:17	2:23	6100	SW		80	100 %	CROSS FLIGHT VARYING TERRAIN, ALT & SPEED
2	60	2:50	2:51	6800	S		106	100 %	
3	59	2:33	2:36	6400	N		123	100 %	
4	58	2:38	2:40	6700	S		96	100 %	
5	57	2:41	2:44	6400	N		120	100 %	
6	56	2:46	2:48	7400	S		90	100 %	
7	55	2:50	2:53	6300	N		128	100 %	
8	54	2:55	2:58	7800	S		130	100 %	
9	53	2:54	3:03	6200	N		121	100 %	
10	52	3:04	3:08	7500	S		130	100 %	
								%	
								%	
								%	
								%	
								%	

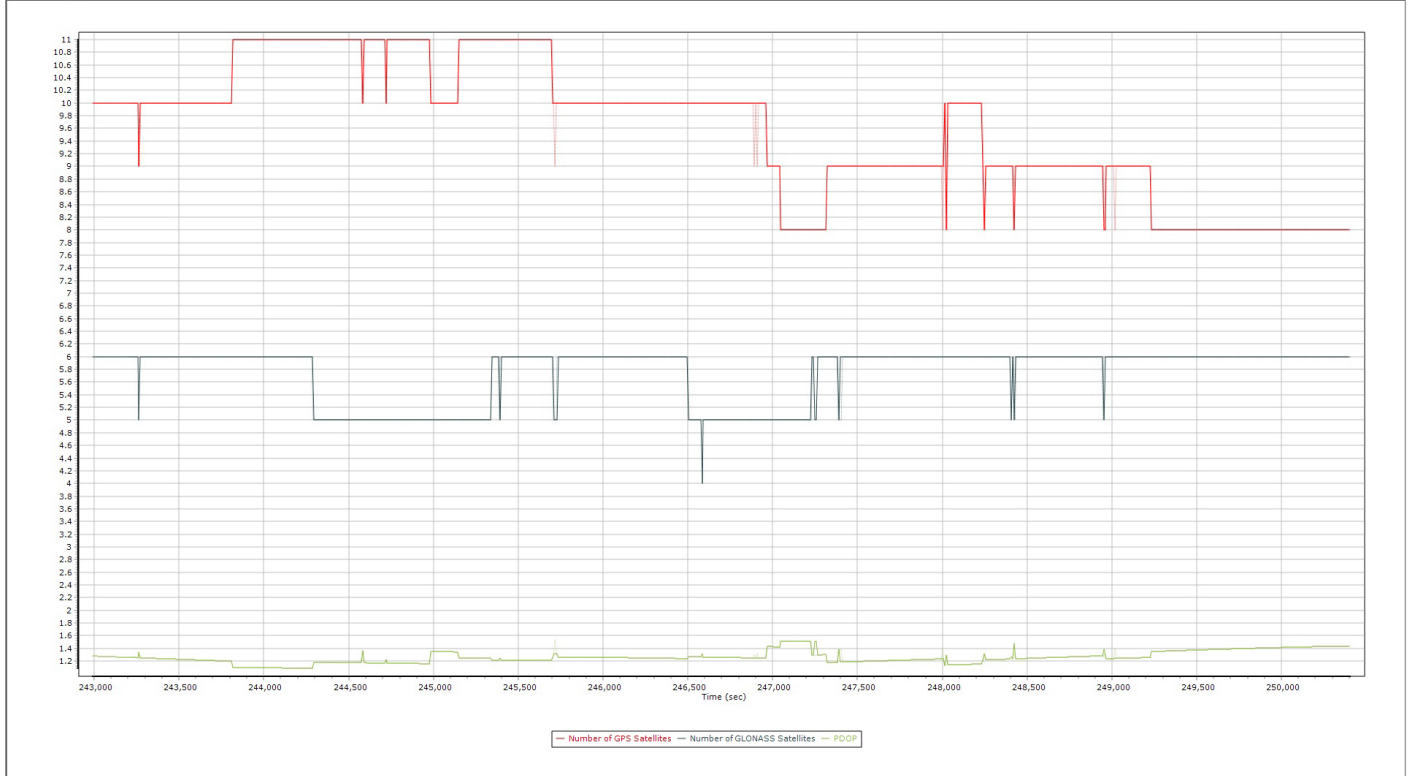
Mission Page 1 of 1

Additional Notes:

Nov 1, 2016-A (N77DV, SN315)

Display - GW_11-1-16A_315_N77DV - Solution Status

File Edit Tools View Help

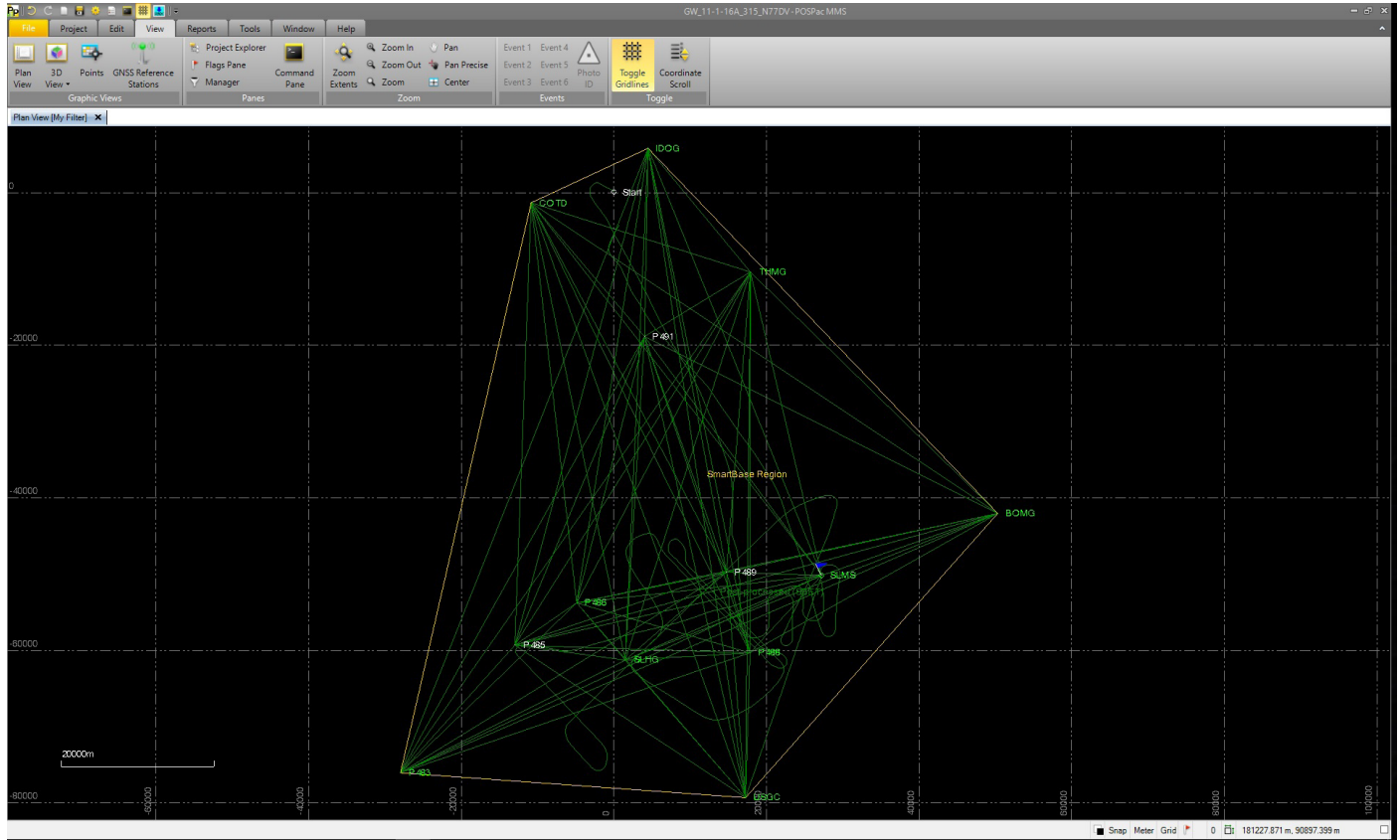


Ready
Display - GW_11-1-16A_315_N77DV - Smoothed Performance Metrics, Reference Frame

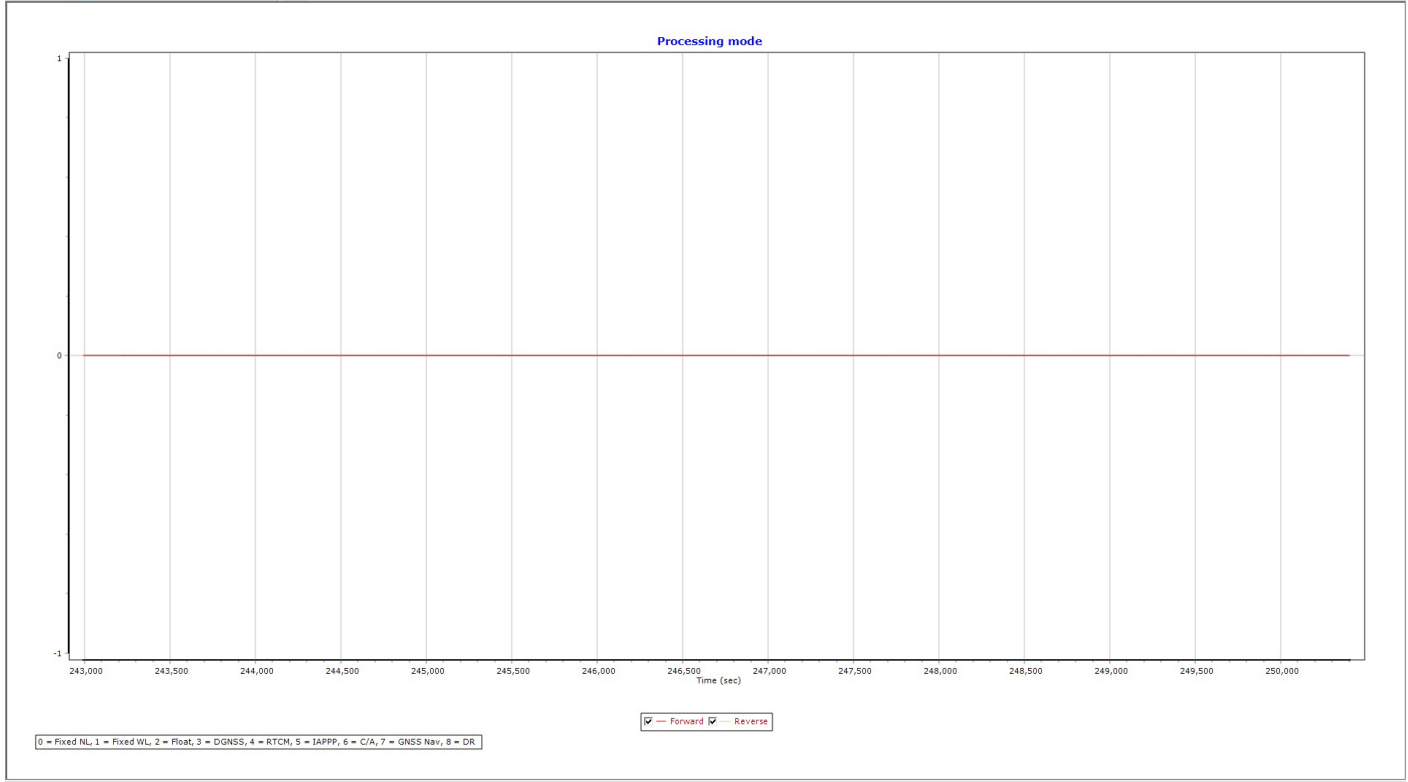
File Edit Tools View Help



Ready



Display - GW_11-1-16A_315_N77DV - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-1-16A_315_N77DV - 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

Station Database

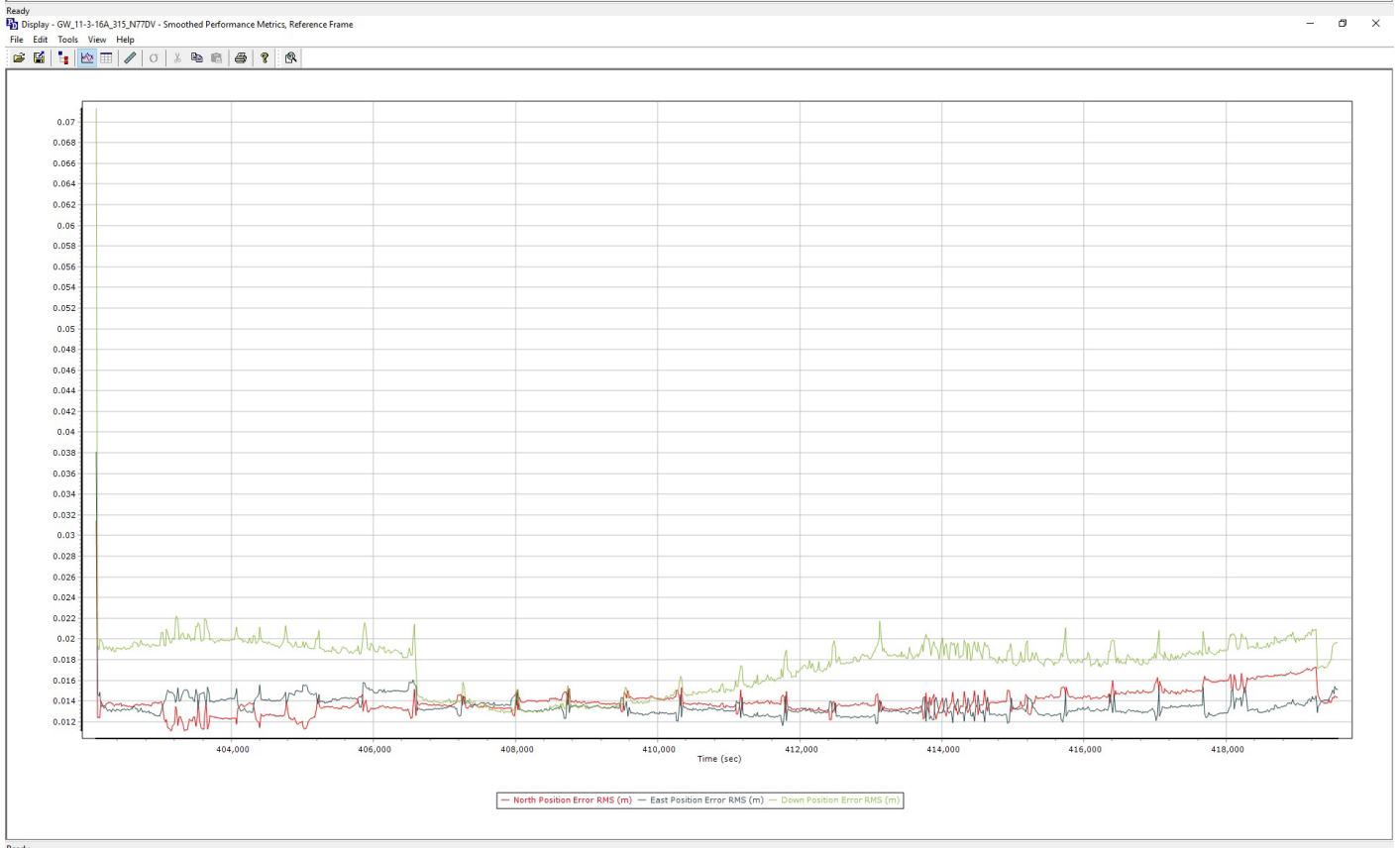
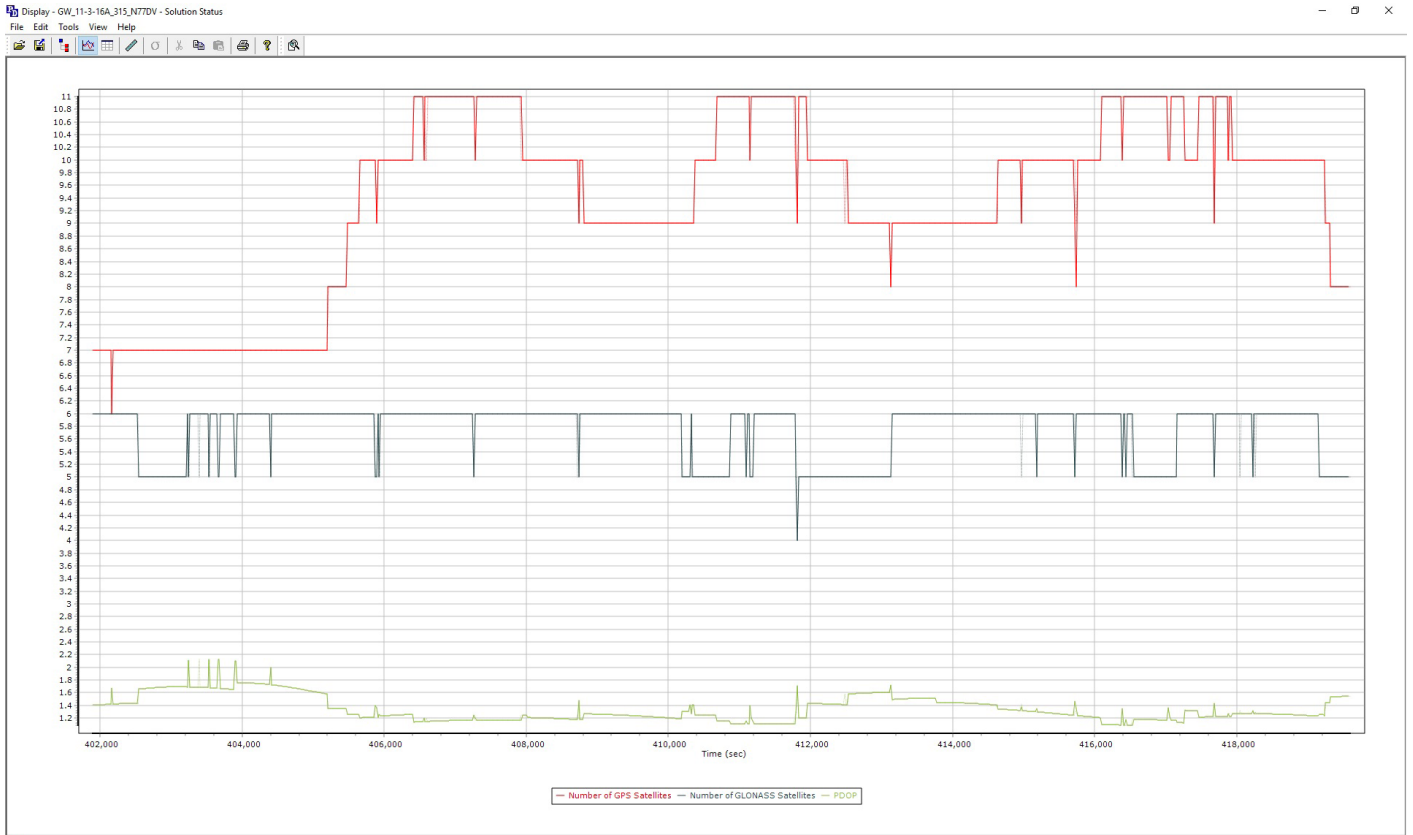
Station ID: Station Fullname:

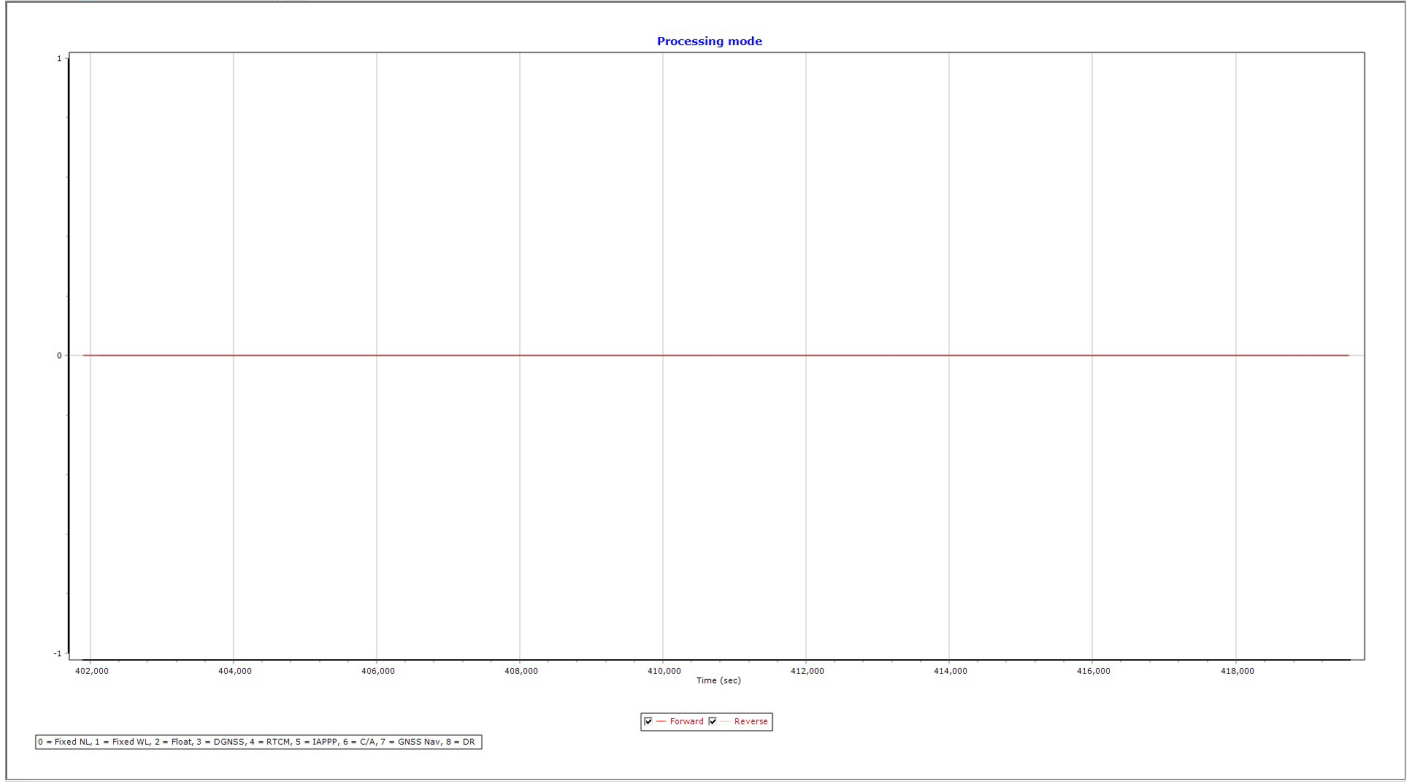
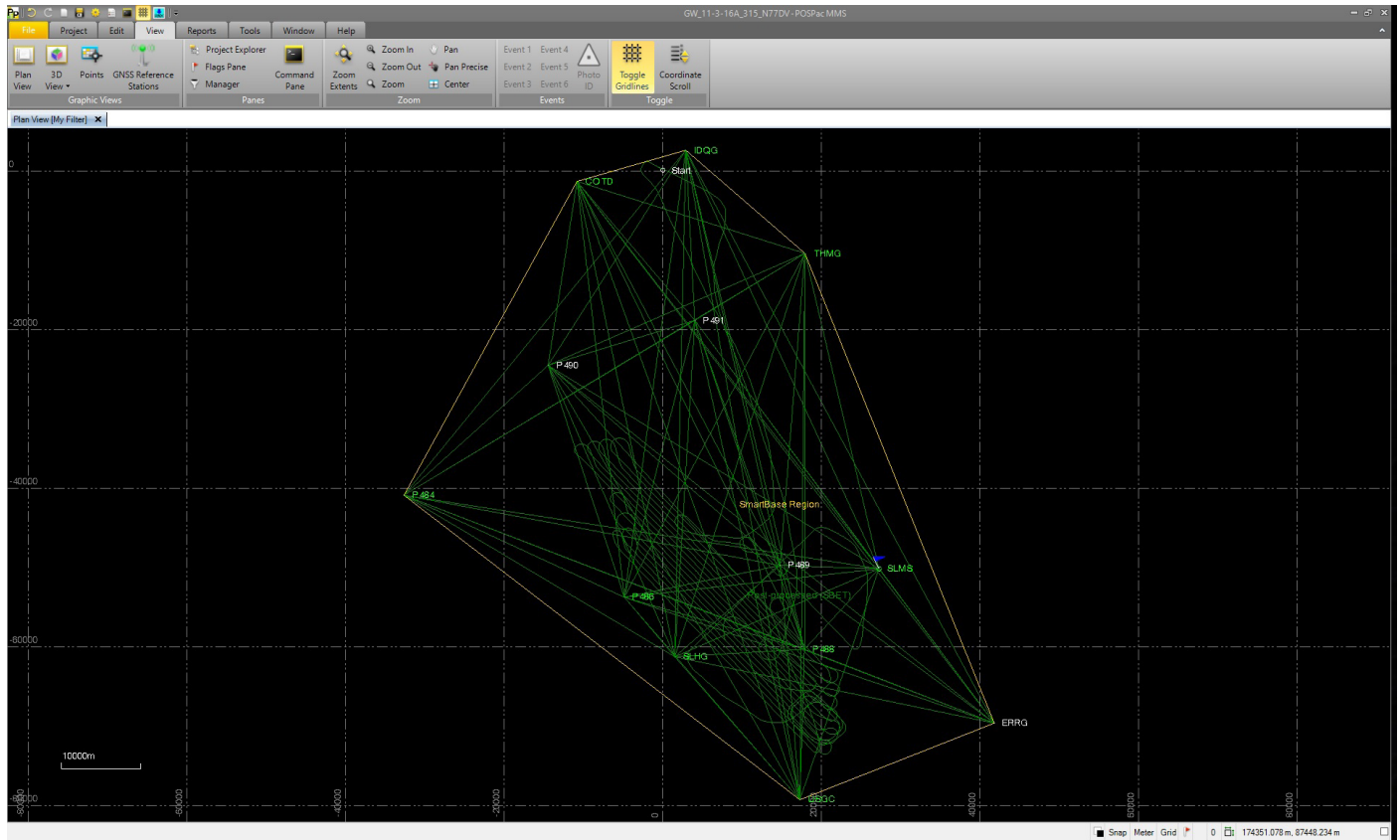
Primary Service ID: Coordinate Accuracy:

Secondary Service ID:

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

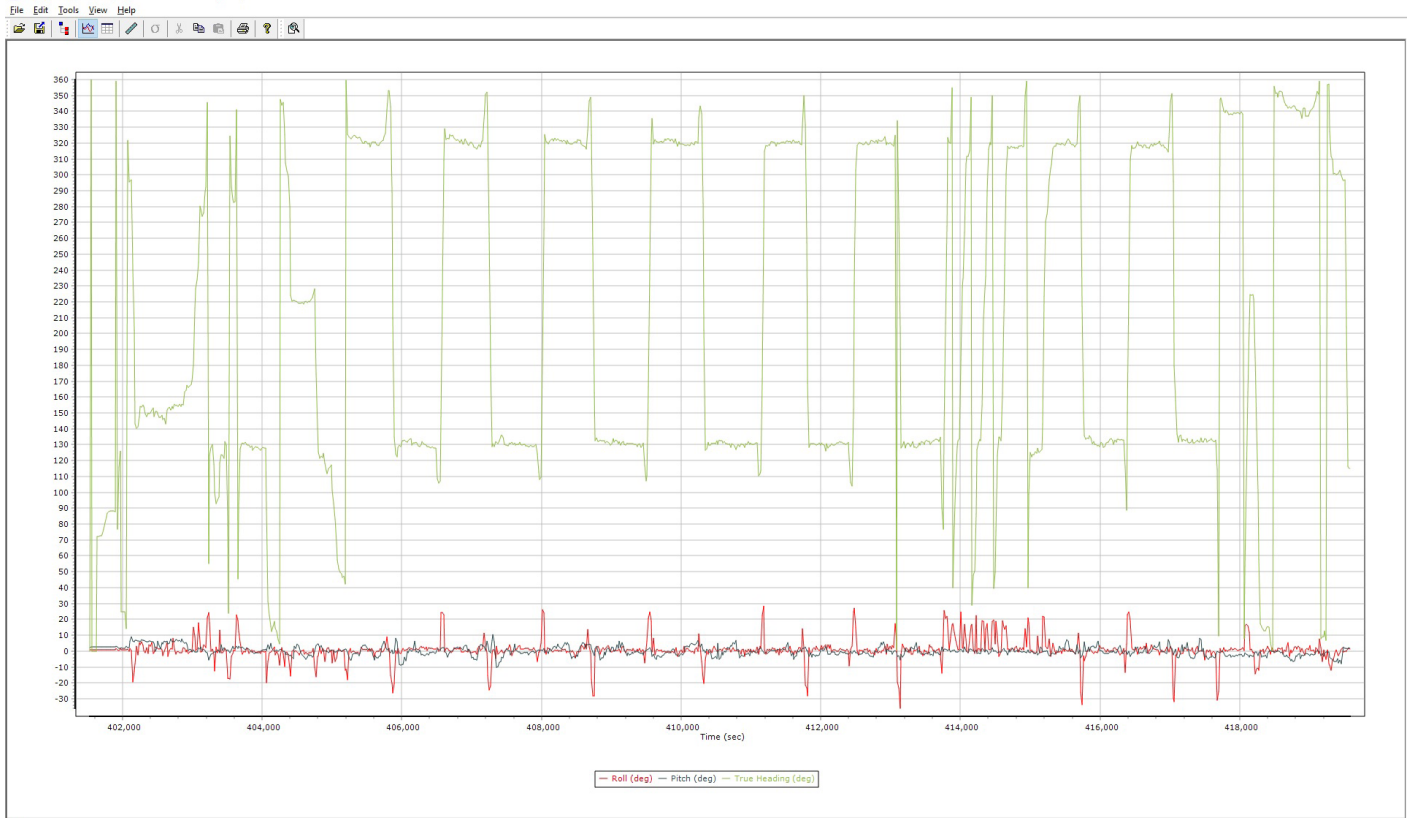
Nov 3, 2016-A (N77DV, SN315)





Ready

Display - GW_11-3-16A_315_N77DV - Real Time Trajectory, Vehicle Frame



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

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
[Empty Table]								

Flight Log

Quantum Spatial 523 Wellington Way -Lexington KY 40503 859.277.8700

Date Flown: 20161103		Pilot: VEGEENSON	
Takeoff Time (Z): 14:37		Technician: RUSON	
Landing Time (Z): 18:45		Aircraft: N27DV	
Airport: KUSD		Airport: KUSD	

Weather		Ground		Airport	
Begin Temp	26	Begin Temp	26	Begin Temp	KUSD
Begin Dewpoint	30.06	Begin Dewpoint	30.06	Begin Dewpoint	KUSD
Begin Pressure	30.06	Begin Pressure	30.06	Begin Pressure	KUSD
End Temp	30.06	End Temp	30.06	End Temp	KUSD
End Dewpoint	30.06	End Dewpoint	30.06	End Dewpoint	KUSD
End Pressure	30.06	End Pressure	30.06	End Pressure	KUSD

Data Information	
LIDAR Unit	12 SEAS 35
HD #	4
POSIPAS File #	20161103
from → to	344 → 370
FCMS File #	

Project Scanning Requirements	
Field of View	28
Scan Rate	418 Hz
Pulse Rate Frequency	125 kHz
Laser Output Current	

GPS Base Location(s)	P 489
PDOF Avoidance	
Static or Flyover?	

→ If flyovers, times: 9:09-9:14, 13:02, 13:07	
---	--

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
1	61	9:20	9:20	6700	SW		117	100	
2	48	9:34	9:43	6500	NW		130	100	
3	47	9:45	9:55	7400	SE		124	100	
4	46	9:57	10:06	6200	NW		132	100	
5	45	10:08	10:19	7500	SE		95	100	
6	44	10:21	10:31	6100	NW		130	100	
7	43	10:33	10:44	7300	SE		116	100	
8	42	10:46	10:57	6500	NW		131	100	
9	41	10:59	11:12	7300	SE		93	100	
10	40	11:13	11:22	6200	NW		135	100	
11	39	11:25	11:34	6700	SE		177	100	
12	38	11:35	11:44	6000	NW		132	100	
13	37	11:40	11:55	6300	SE		116	100	
14	36	12:11	12:16	6000	NW		133	100	ABANDONED LINE, JUMPERS IN AREA
15	36	12:22	12:28	6000	NW		110	100	
16	35	12:30	12:39	6200	SE		101	100	

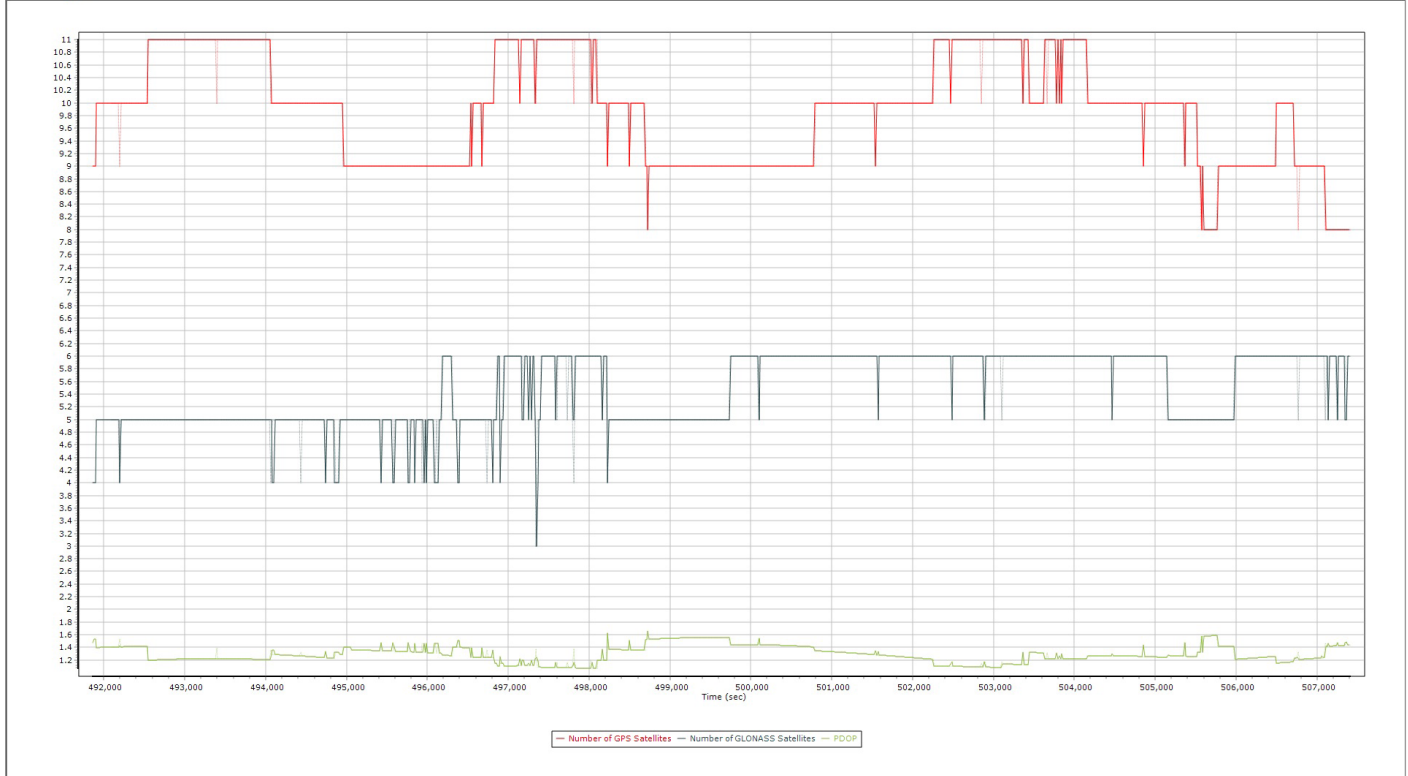
Additional Notes:

Mission Page 1 of 2

Nov 4, 2016-A (N77DV, SN315)

Display - GW_11-04-16A_315_N77DV - Solution Status

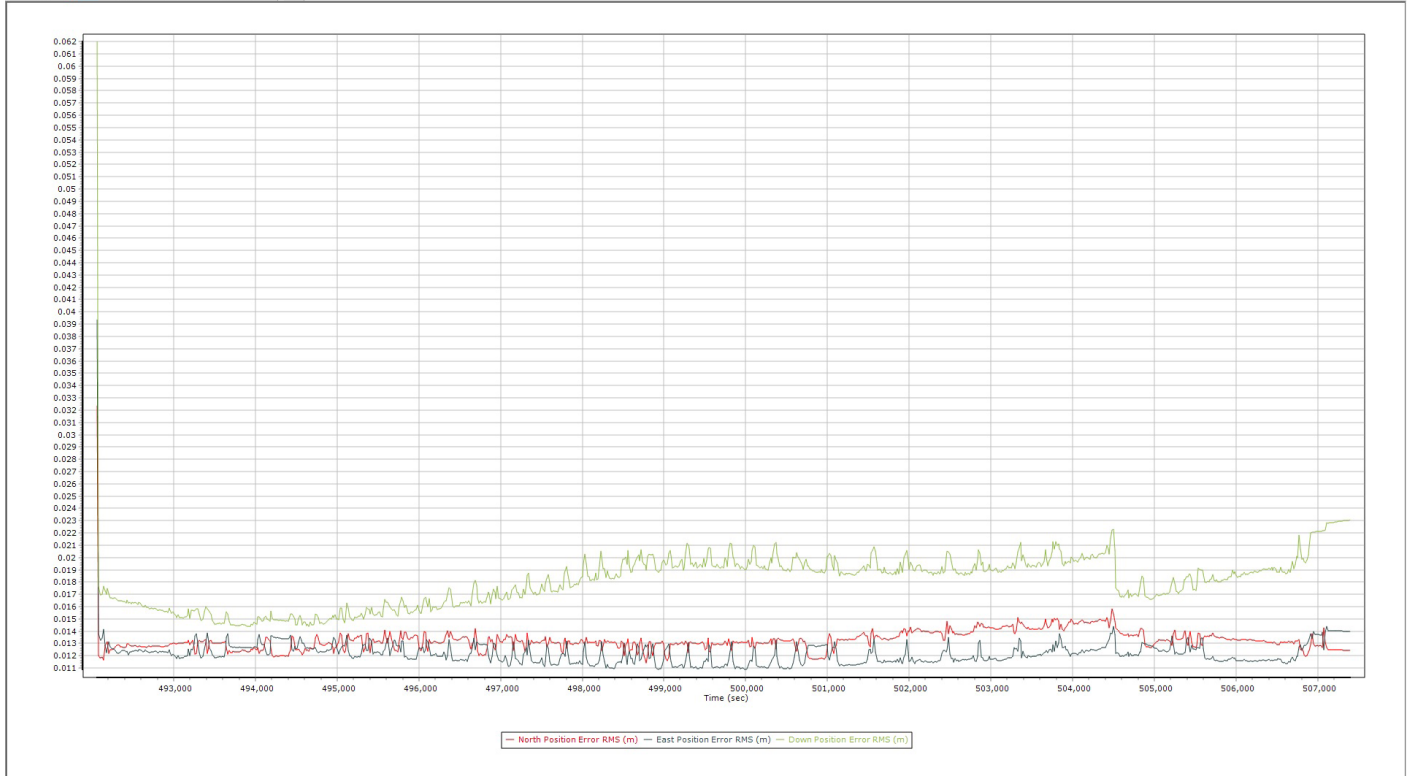
File Edit Tools View Help



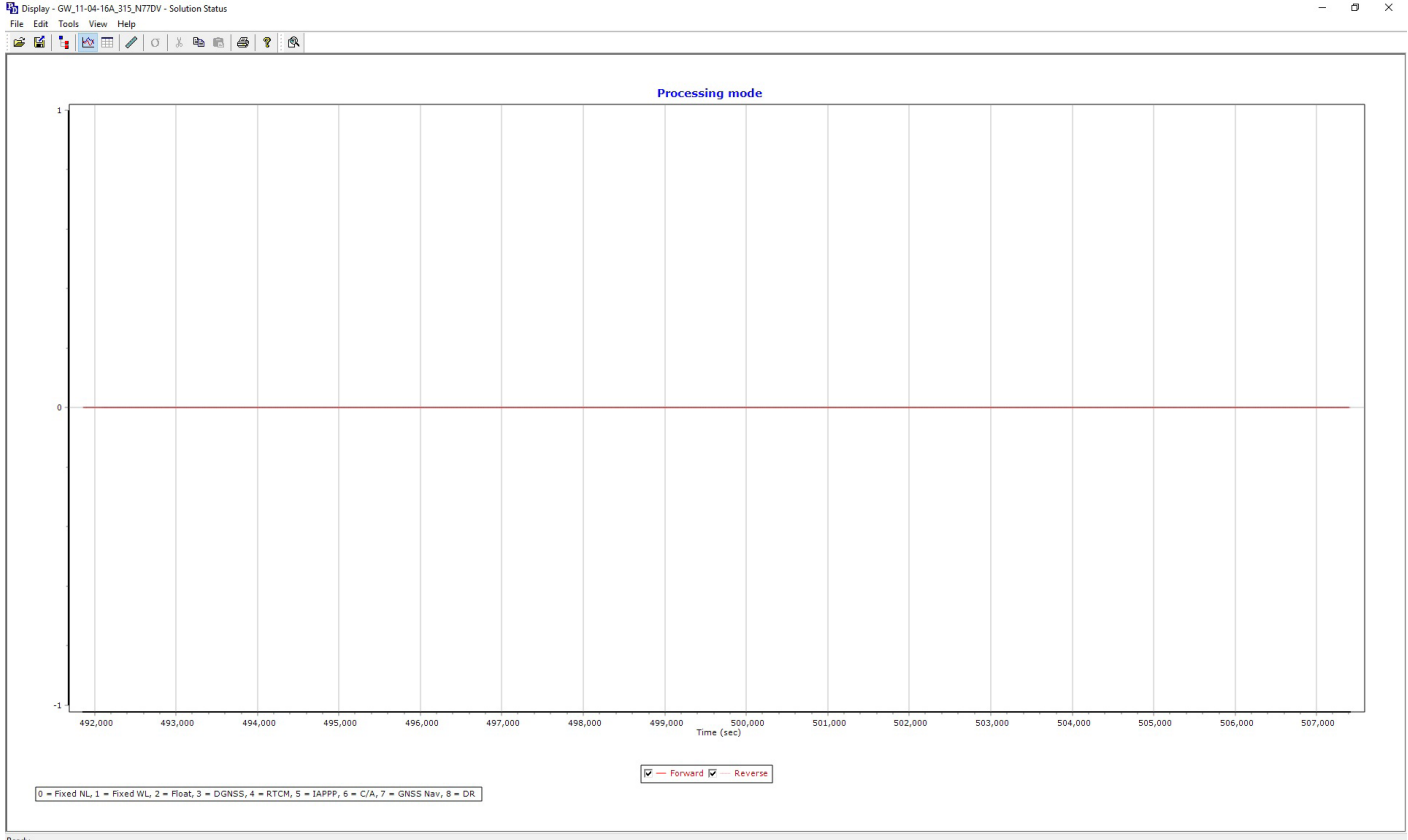
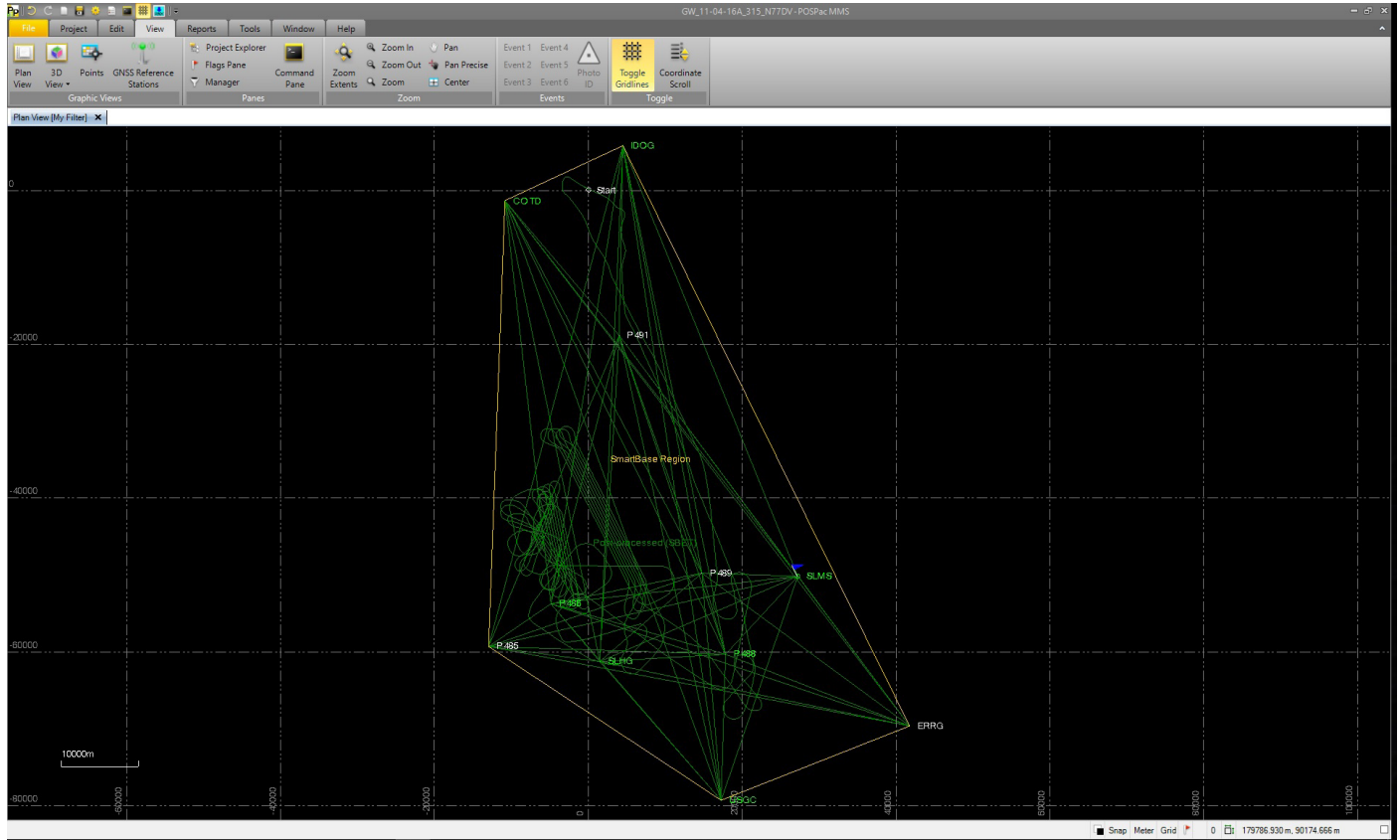
Ready

Display - GW_11-04-16A_315_N77DV - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



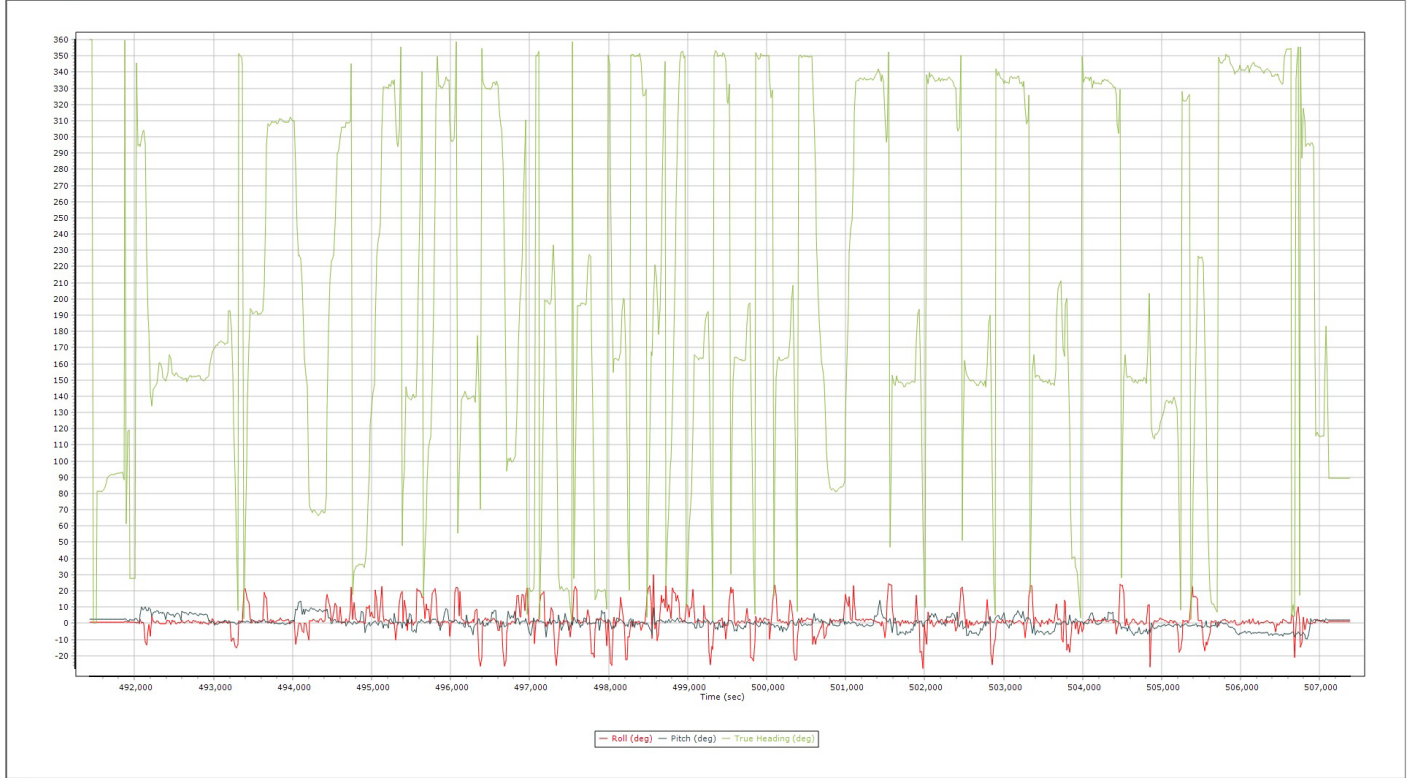
Ready



Ready

Display - GW_11-04-16A_315_N77DV - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: SLMS

Coordinates

Latitude: N 33 17 32.00589000

Longitude: W 115 58 40.18244000

Altitude: -45.1480 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: TRM59800-80 w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: SLMS Station Fullname: SLMS

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

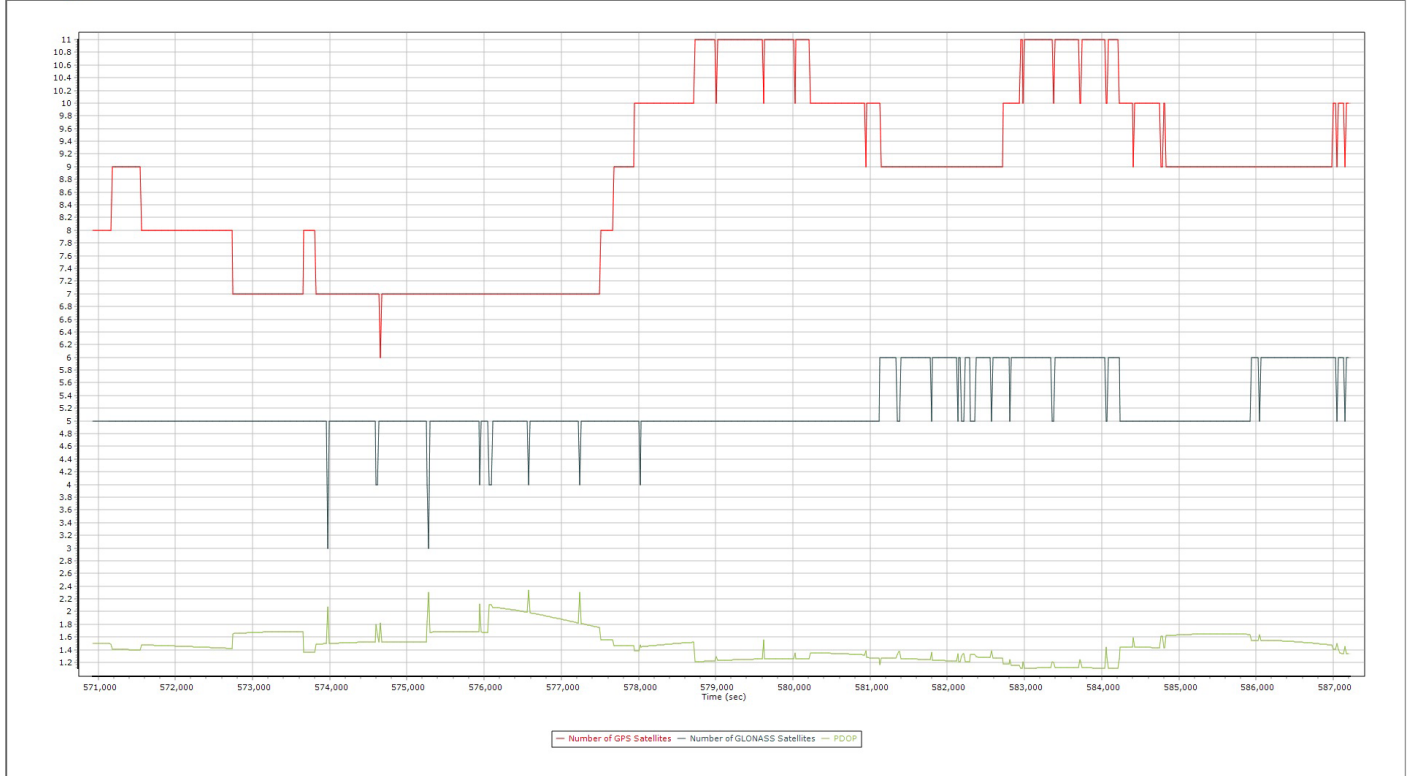
Import Coordinates
Export Coordinates

Close

Nov 5, 2016-A (N77DV, SN315)

Display - GW_11-05-16A_315_N77DV - Solution Status

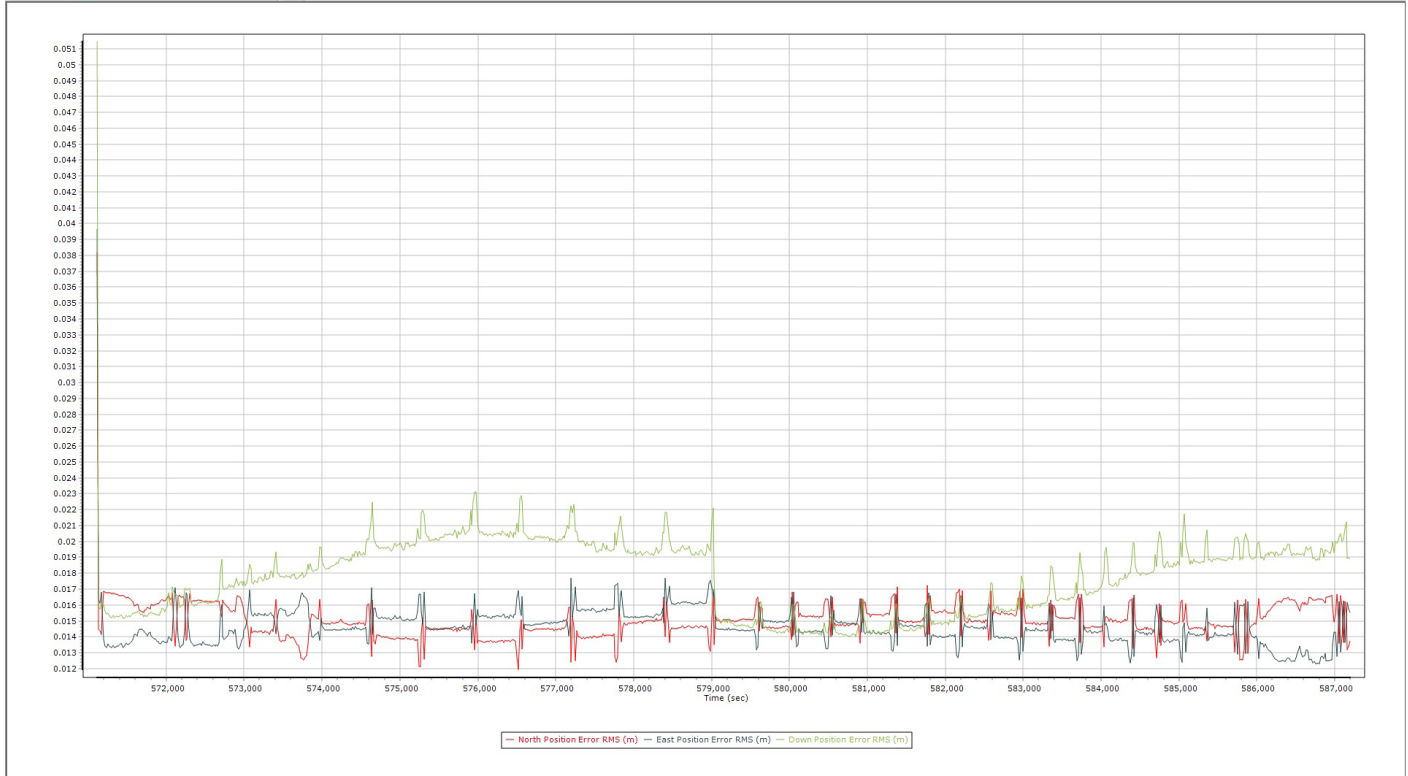
File Edit Tools View Help



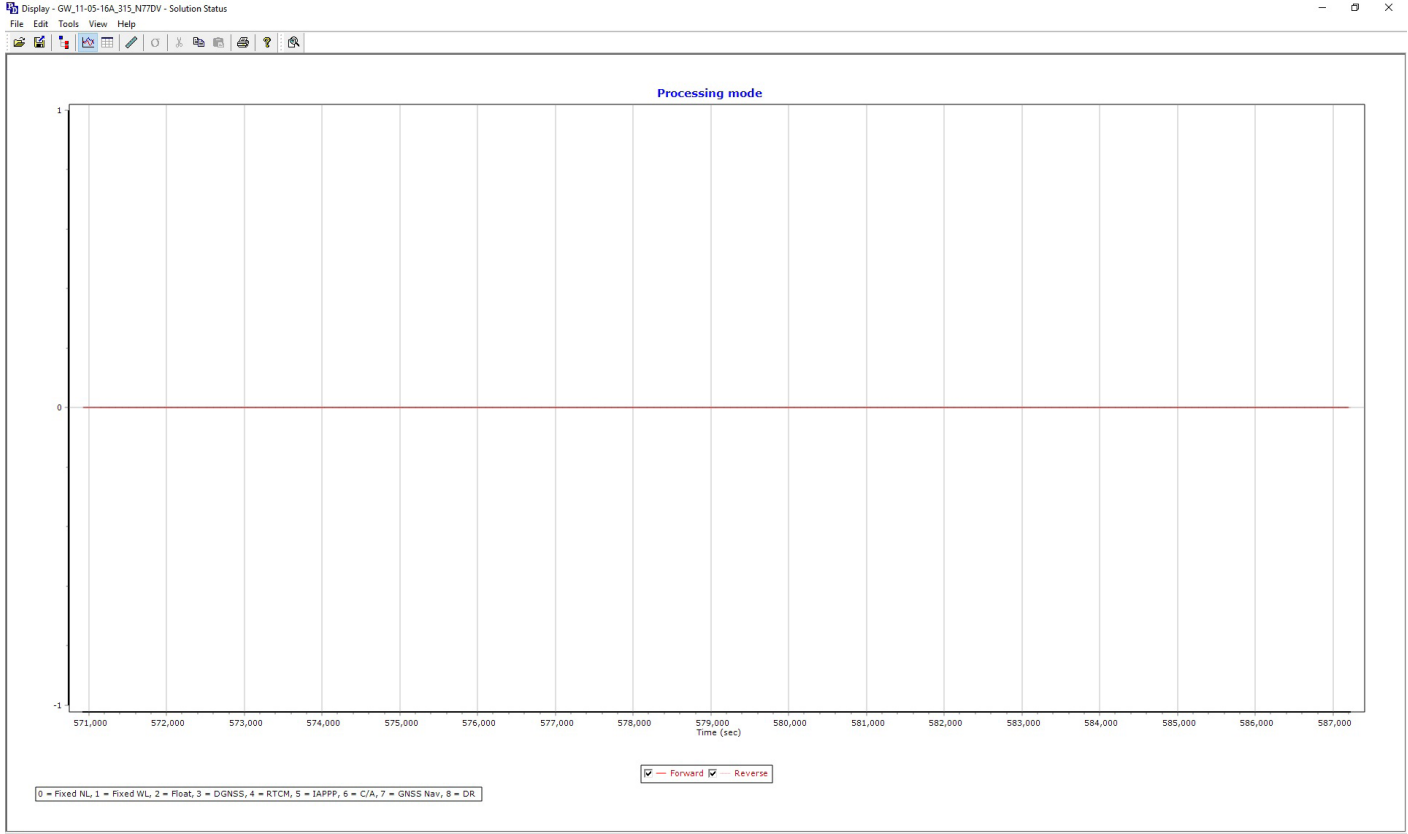
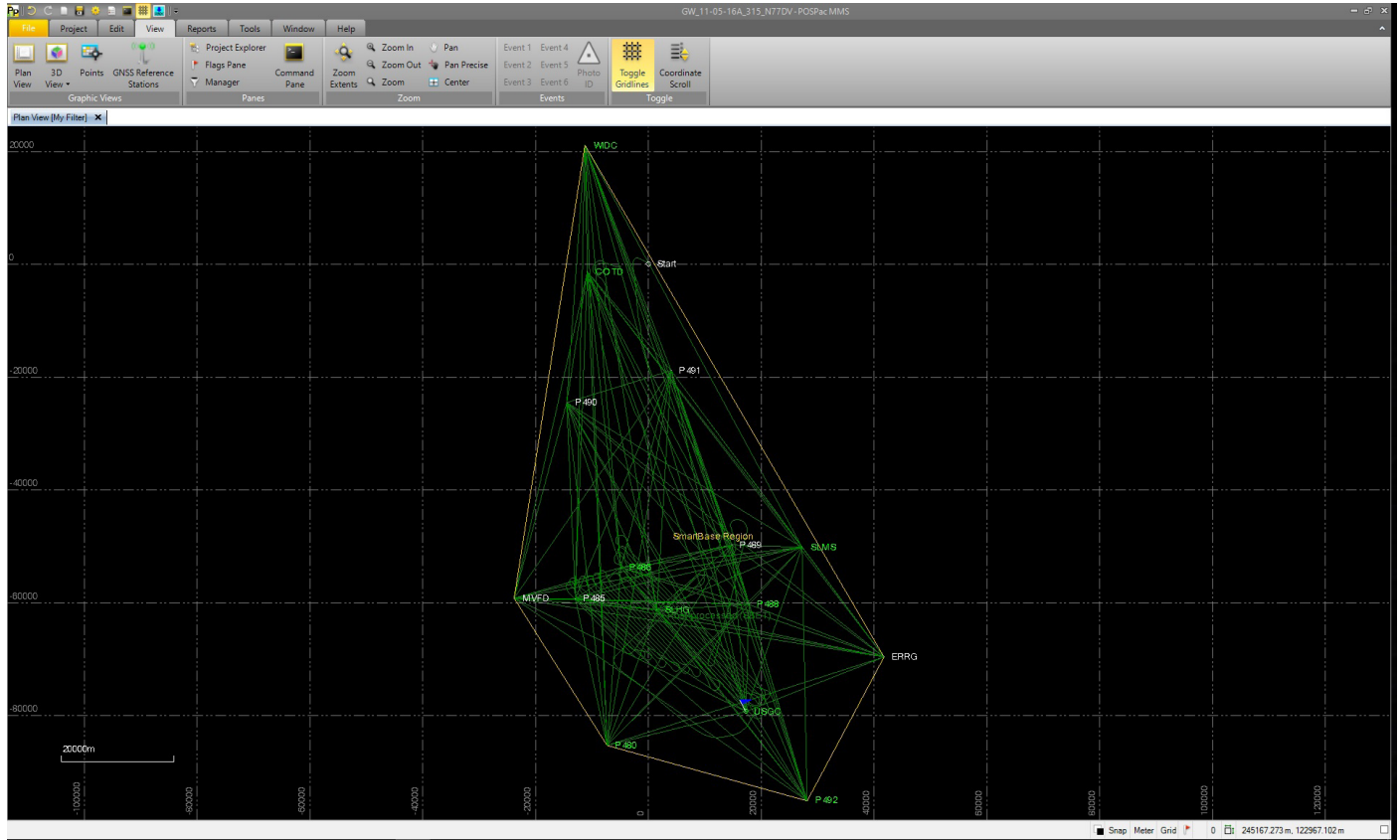
Ready

Display - GW_11-05-16A_315_N77DV - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

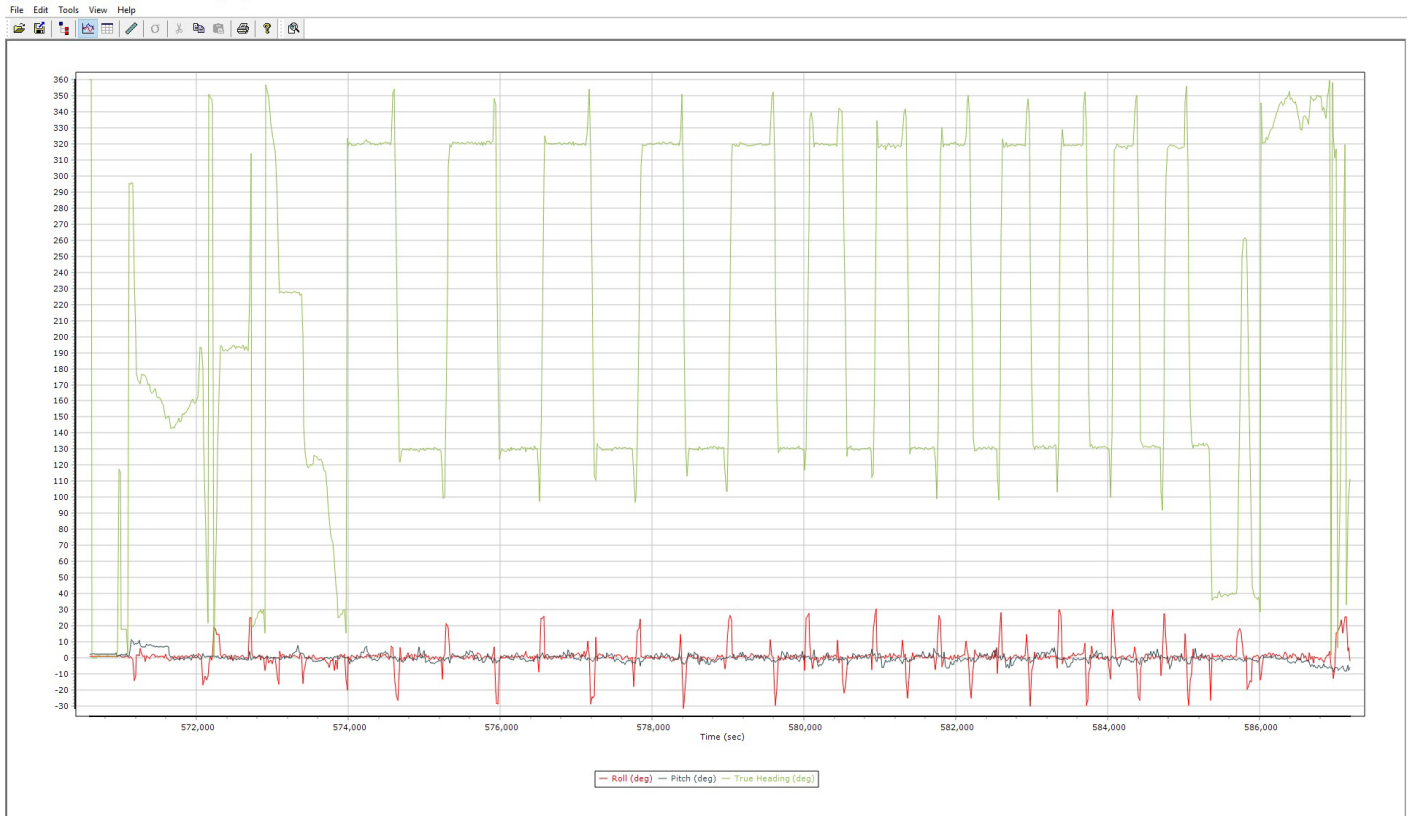


Ready



Ready

Display - GW_11-05-16A_315_N77DV - Real Time Trajectory, Vehicle Frame



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

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

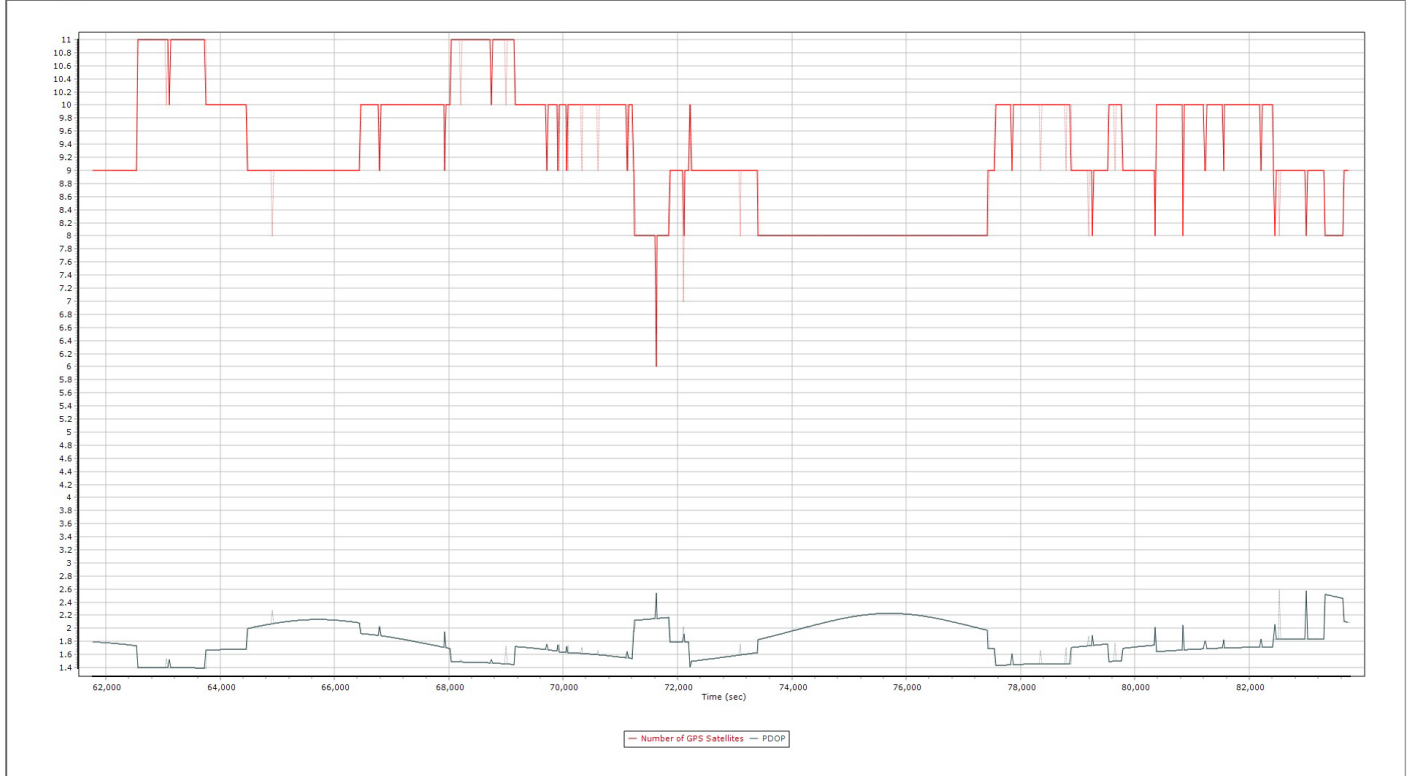
Secondary Service ID:

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

Nov 13, 2016-A (N77DV, SN315)

Display - GW_11-13-16A_315_N77DV - Solution Status

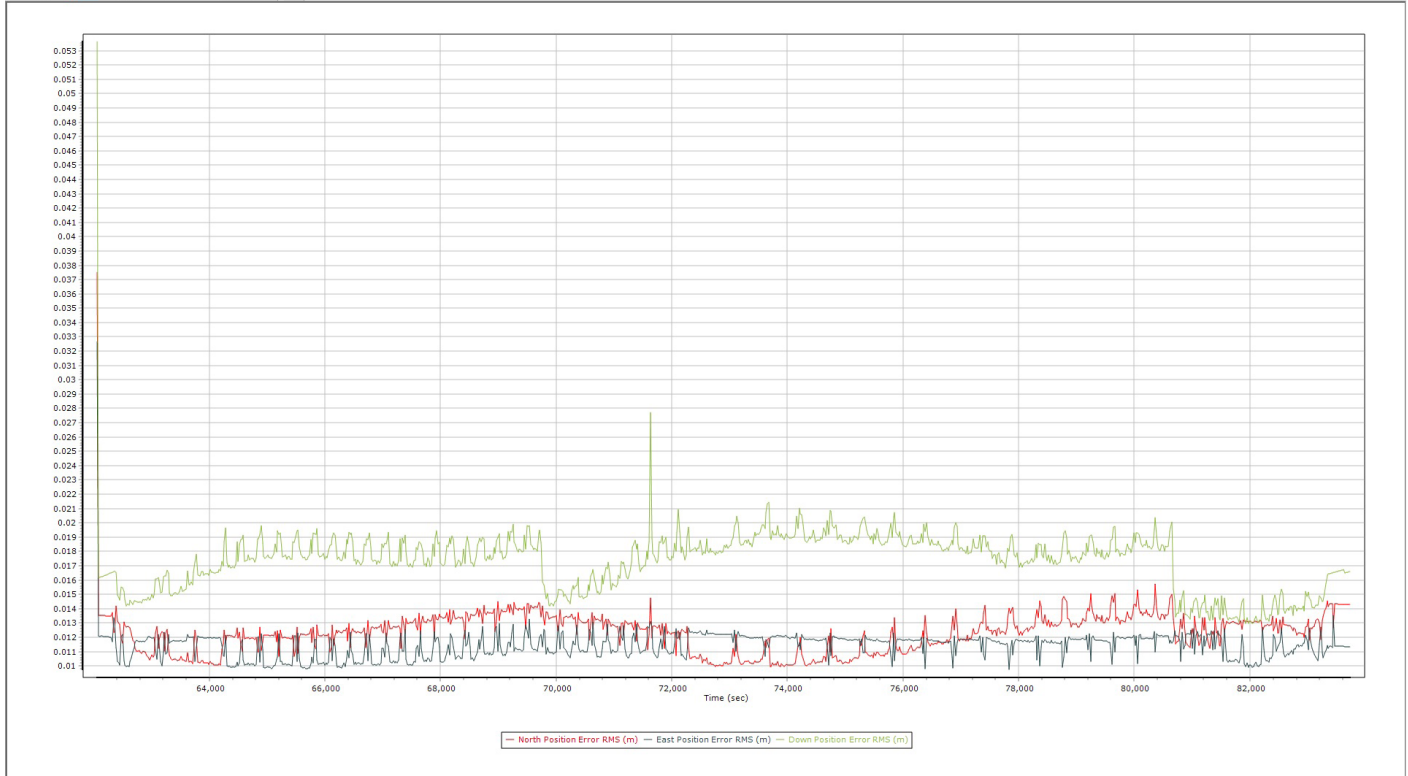
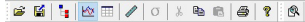
File Edit Tools View Help



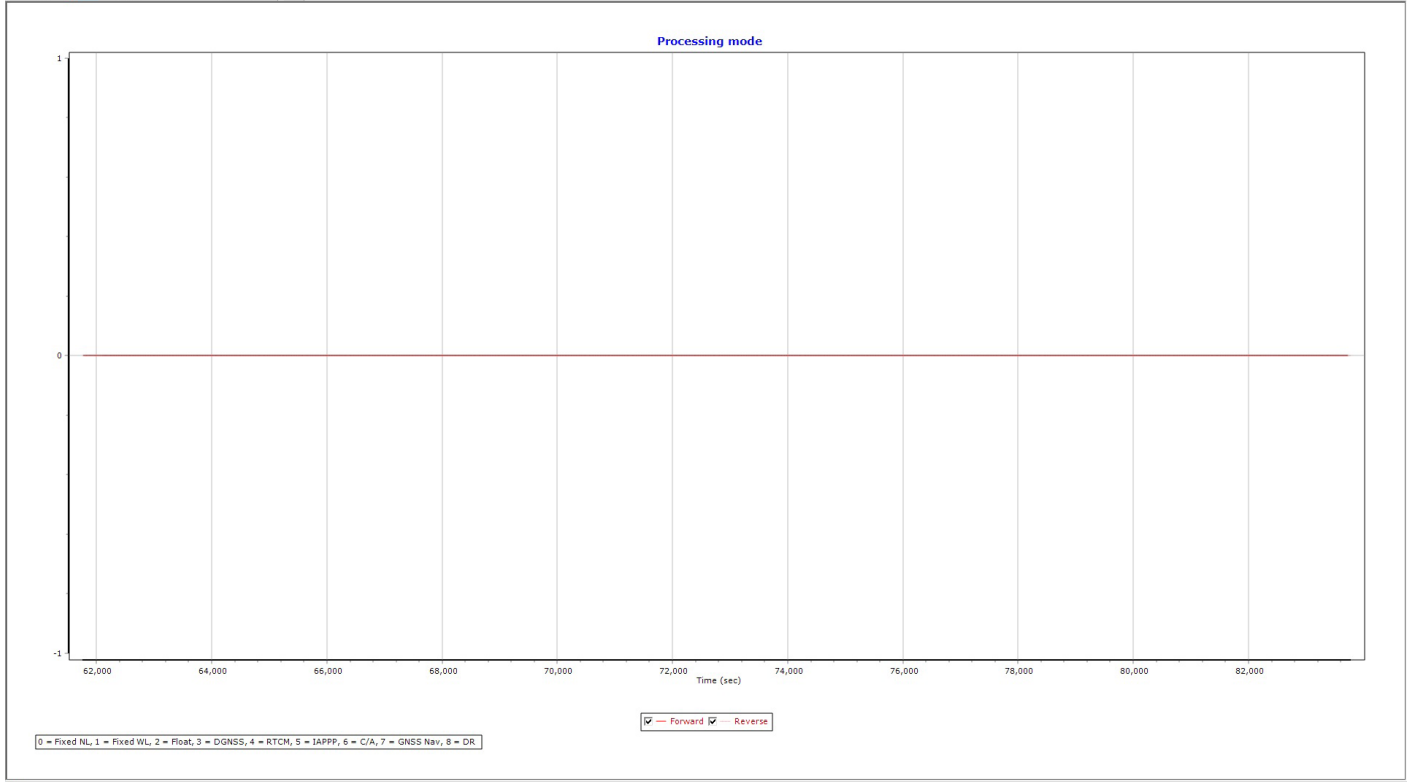
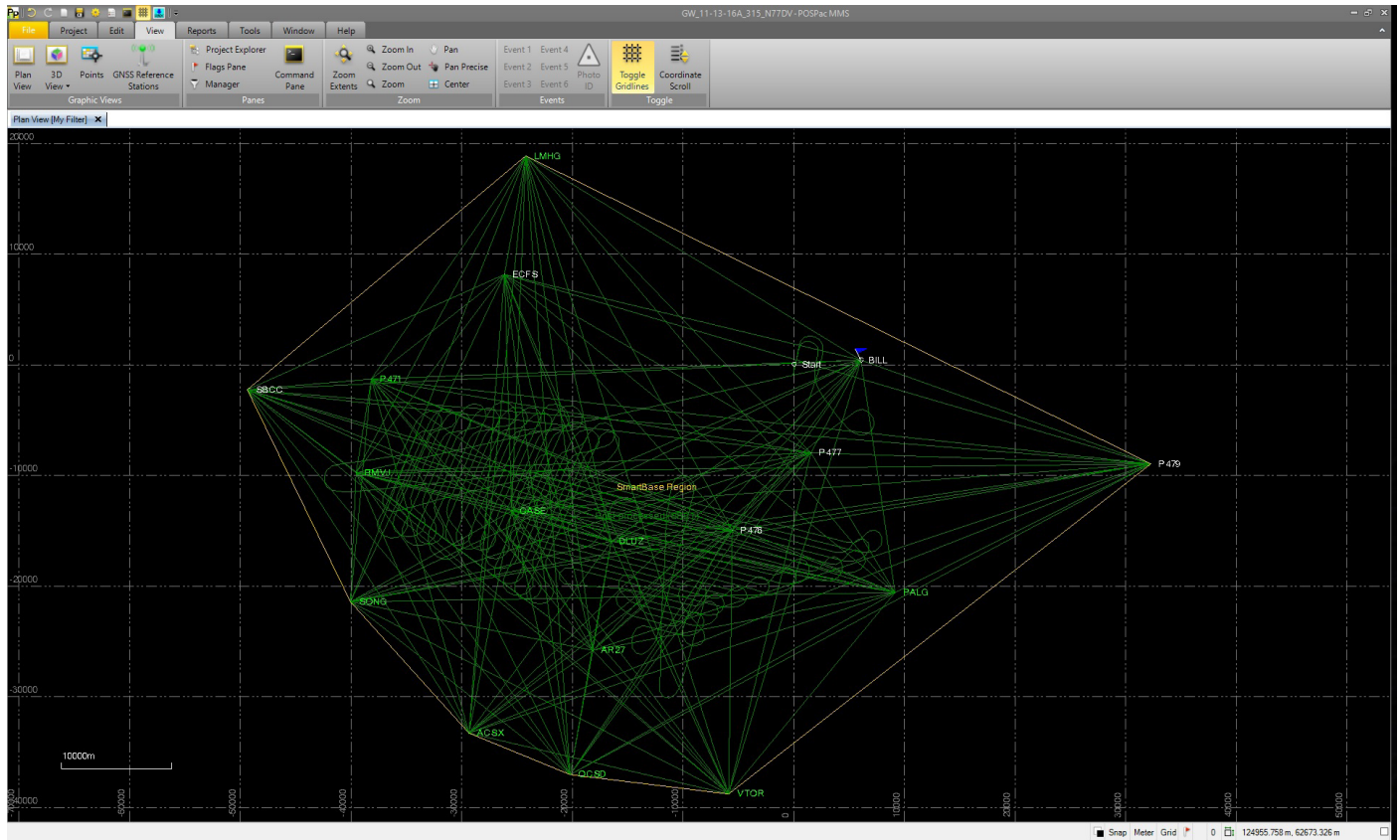
Ready

Display - GW_11-13-16A_315_N77DV - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



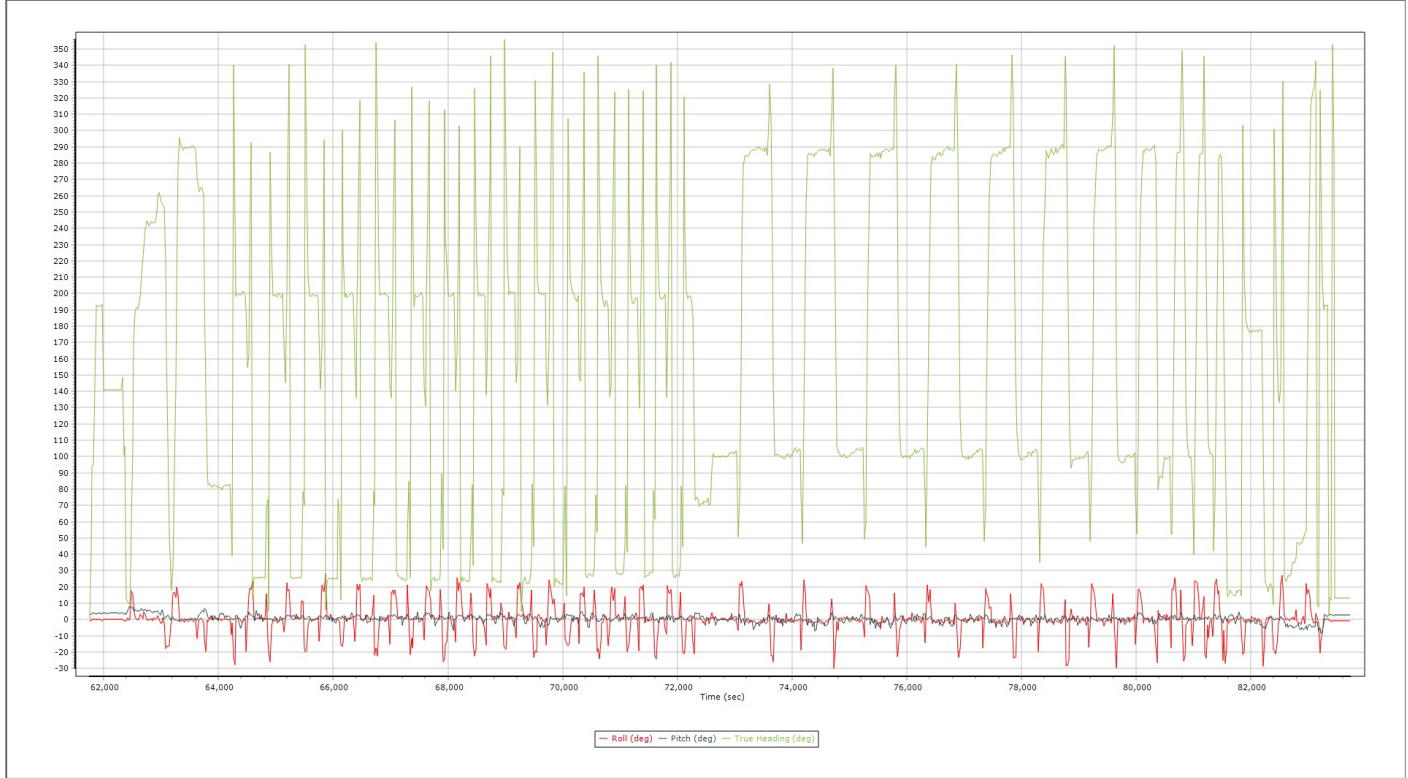
Ready



Ready

Display - GW_11-13-16A_315_N77DV - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: BILL

Coordinates

Latitude: N 33 34 41.66355000

Longitude: W 117 3 52.51376000

Altitude: 470.7890 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Ashtech

Type: 701945B_M w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: BILL Station Fullname: BILL

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

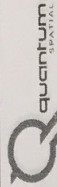
Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Pilot	DOMEN	Date Flown	2016 11 13	Altitude	F70
Technician	WAZER	Takeoff Time (Z)	Local: 9:00	Altitude	F70
Aircraft	206T	Landing Time (Z)	Local: 15:10	Altitude	F70

Weather	
Begin Temp	24
Begin Dewpoint	1
Begin Pressure	30.15
End Temp	30
End Dewpoint	-1
End Pressure	30.06

Data Information	
LIDAR Unit	1256385
HD #	2
POS/IPAS File #	20161113P040400
from -- to	509 -> 541
FCMS File #	



LIDAR MISSION RECORD SHEET

Project Name	EASTERN SAN DIEGO COUNTY LIDAR
Project Number	16159
FCMS .ipd File/Nav File	3450-H300-SLED-CAMPLD-v1.xml

Project Scanning Requirements	
Field of View	28
Scan Rate	41.8
Pulse Rate Frequency	125
Laser Output Current	
Ground Speed (kts)	115
Hz Altitude AGL (ft)	5900
kHz IMPIA or SPIA?	
%	

GPS Base Location(s)	F70
PDOOP Avoidance	N/A
State or Flyover?	both
→ if flyovers, times:	1040-1045 ; 1444-1449

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Tide, Etc.)
52	1	0943	0948	6900	E	0	115	99	CROSS FLIGHT SMOOTH AIR
29	2	0952	0955	6500	N	0	130	99	
28	3	0957	1000	6700	S	0	115	99	
27	4	1002	1005	6900	N	0	115	99	
26	5	1007	1010	7100	S	0	115	99	
25	6	1012	1015	8100	N	0	115	99	
24	7	1017	1020	8200	S	0	115	99	
23	8	1022	1025	8000	N	0	120	99	
22	9	1027	1030	8200	S	0	113	99	
21	10	1033	1035	7900	N	0	120	99	
20	11	1038	1040	8000	S	0	109	99	
19	12	1043	1045	8000	N	0	115	99	
18	13	1047	1050	7900	S	0	115	99	
17	14	1052	1054	7900	N	0	115	99	
16	15	1056	1059	7800	S	0	115	99	
15	16	1101	1103	7700	N	0	115	99	

Additional Notes: Mission Page 1 of 4

Pg. 2 11/13/16

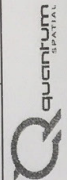
Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

Project Name	Date Flown:		Local:	Airport:
Project Number	Pilot	Takeoff Time (Z):	Local:	Airport:
FCMS .ipul File/Nav File	Technician	Landing Time (Z):	Local:	Airport:
	Aircraft			

Data Information	
LIDAR Unit	
HD #	
POSIPAS File #	
from → to	→
FCMS File #	

Project Scanning Requirements	
Field of View	Ground Speed (kts):
Scan Rate	Hz/Altitude AGL (ft):
Pulse Rate Frequency	KHz/MPIA or SPIA? :
Laser Output Current	%



Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
14	17	1105	1108	7600	N	0	120	99	
13	18	1110	1112	7400	S	0	130	99	
12	19	1114	1116	7400	N	0	115	99	
11	20	1119	1121	7400	S	0	115	99	
10	21	1123	1126	6750	N	0	115	99	
9	22	1128	1130	7000	S	0	115	99	
8	23	1132	1135	7300	N	0	115	99	
7	24	1137	1139	7300	S	0	115	99	
6	25	1141	1144	7100	N	0	115	99	
5	26	1146	1147	7100	S	0	115	99	
4	27	1150	1152	7100	N	0	115	99	
3	28	1154	1155	6900	S	0	115	99	
2	29	1158	1200	6800	N	0	110	99	
1	30	1202	1204	6700	S	0	130	99	
30	31	1209	1216	7400	E	0	115	99	
31	32	1218	1225	7300	W	0	115	99	

Additional Notes:

Mission Page 2 of 4

P6.3 11/13/16

LIDAR MISSION RECORD SHEET

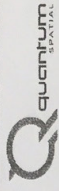
Quantum Spatial 523 Wellington Way -Lexington KY 40503 859.277.8700

Project Name	Date Flown	
Project Number	Pilot	Local: Airport:
FCMS .fpd File/Nav File	Technician Aircraft	Local: Airport:
		Landing Time (Z):
		Takeoff Time (Z):

Project Scanning Requirements	
Field of View	Ground Speed (fts):
Scan Rate	Hz Altitude AGL (ft):
Pulse Rate Frequency	KHz/MPIA or SPIA? %
Laser Output Current	

GPS Base Location(s)	
PDOP Avoidance	
Static or Flyover?	→ If flyovers, times:

Data Information	
LIDAR Unit	Weather
HD #	Begin Temp
POS/IPAS File #	Begin Dewpoint
from → to	Begin Pressure
FCMS File #	End Temp
	End Dewpoint
	End Pressure



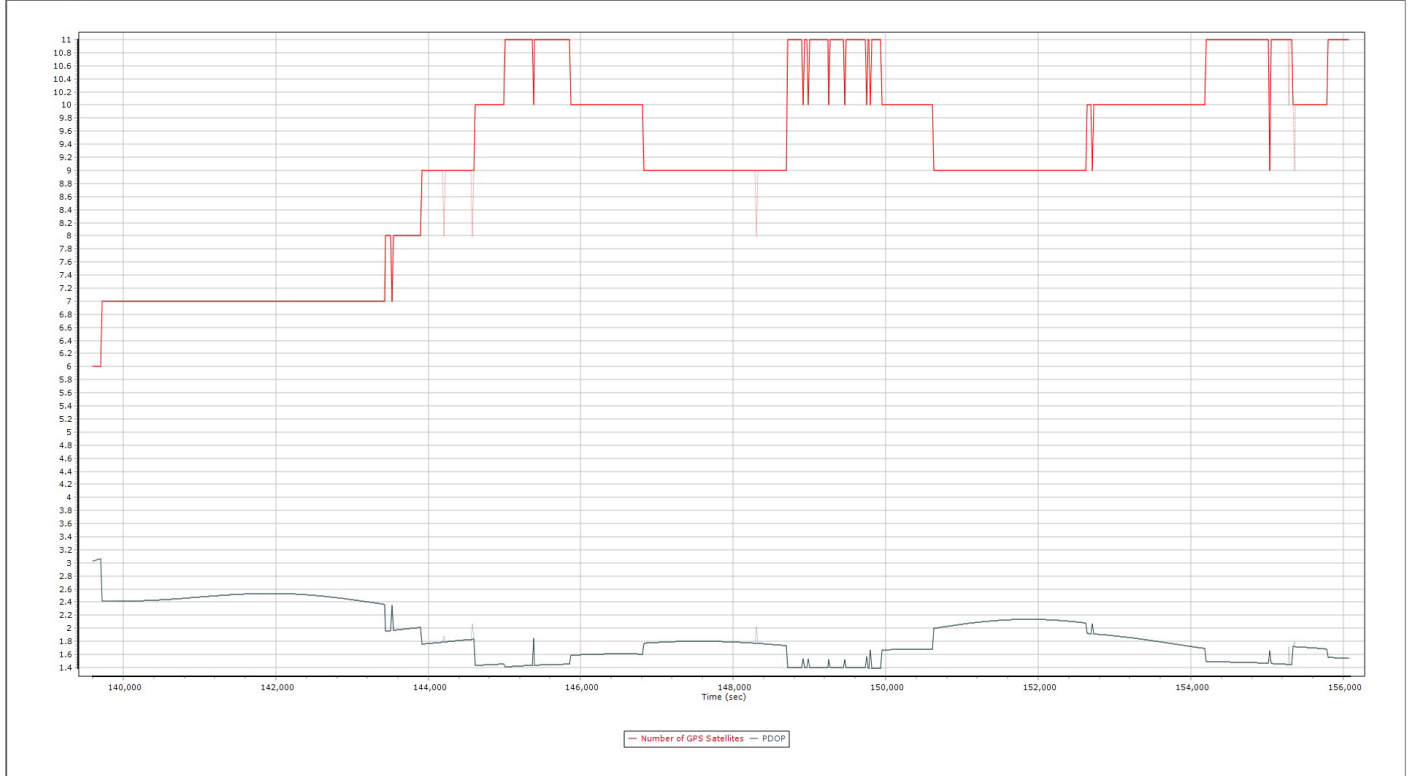
Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
32	33	1236	1243	6700	E	0	115	99	2 SMALL FIRES IN AREA
33	34	1246	1253	6900	W	0	115	99	
34	35	1255	1302	6900	E	0	115	99	
35	36	1304	1311	6900	W	0	115	99	
36	37	1314	1319	7000	E	0	115	99	
37	38	1322	1328	6800	W	0	120	99	
38	39	1330	1336	6700	E	0	120	99	
39	40	1339	1344	6700	W	0	115	99	
40	41	1346	1351	6700	E	0	115	99	
41	42	1353	1358	6700	W	0	120	99	
42	43	1400	1405	6700	E	0	115	99	
43	44	1407	1412	6700	W	0	115	99	
44	45	1414	1418	6700	E	0	115	99	
45	46	1421	1422	6700	W	0	115	99	
46	47	1424	1425	6700	E	0	115	99	
47	48	1427	1428	6700	W	0	115	99	

Additional Notes: Mission Page 3 of 4

Nov 14, 2016-A (N77DV, SN315)

Display - GW_11-14-16A_315_N7269T - Solution Status

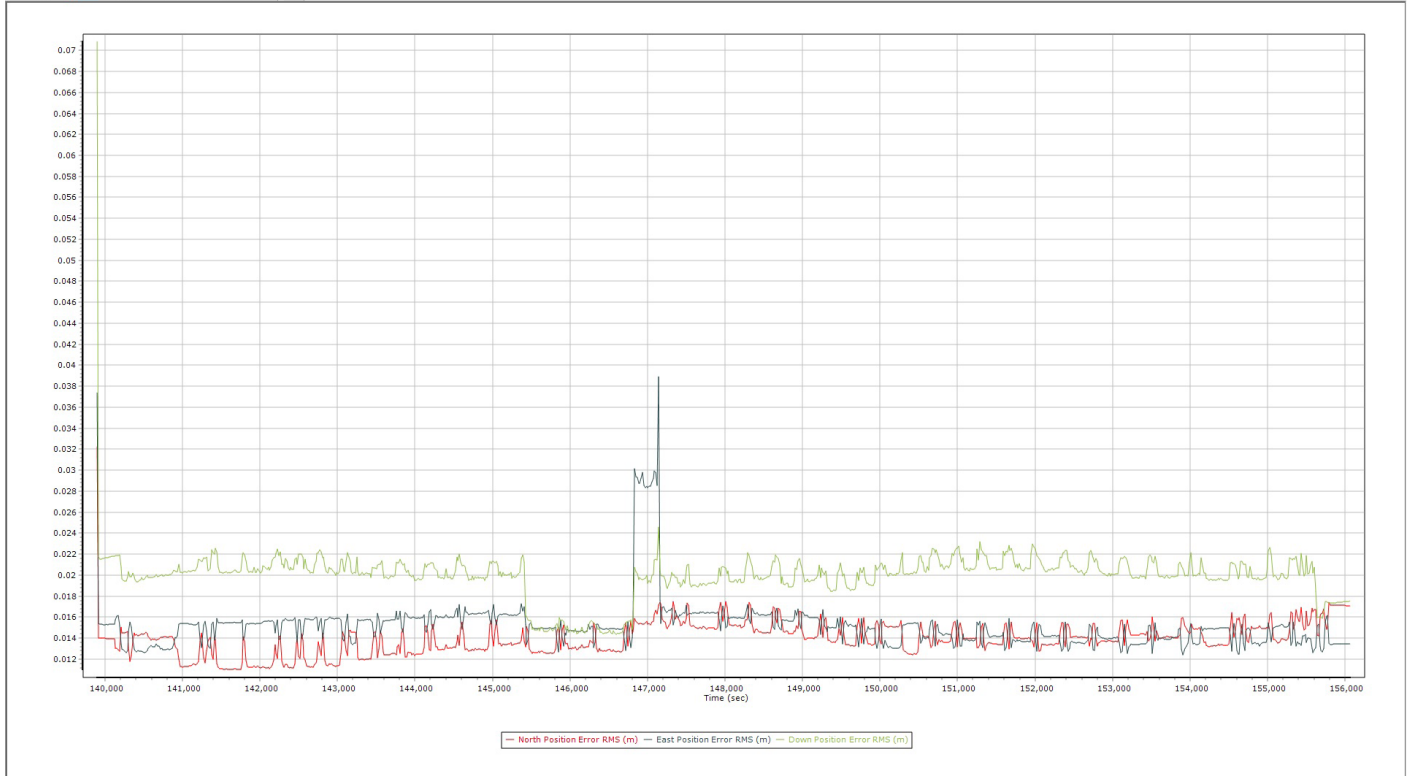
File Edit Tools View Help



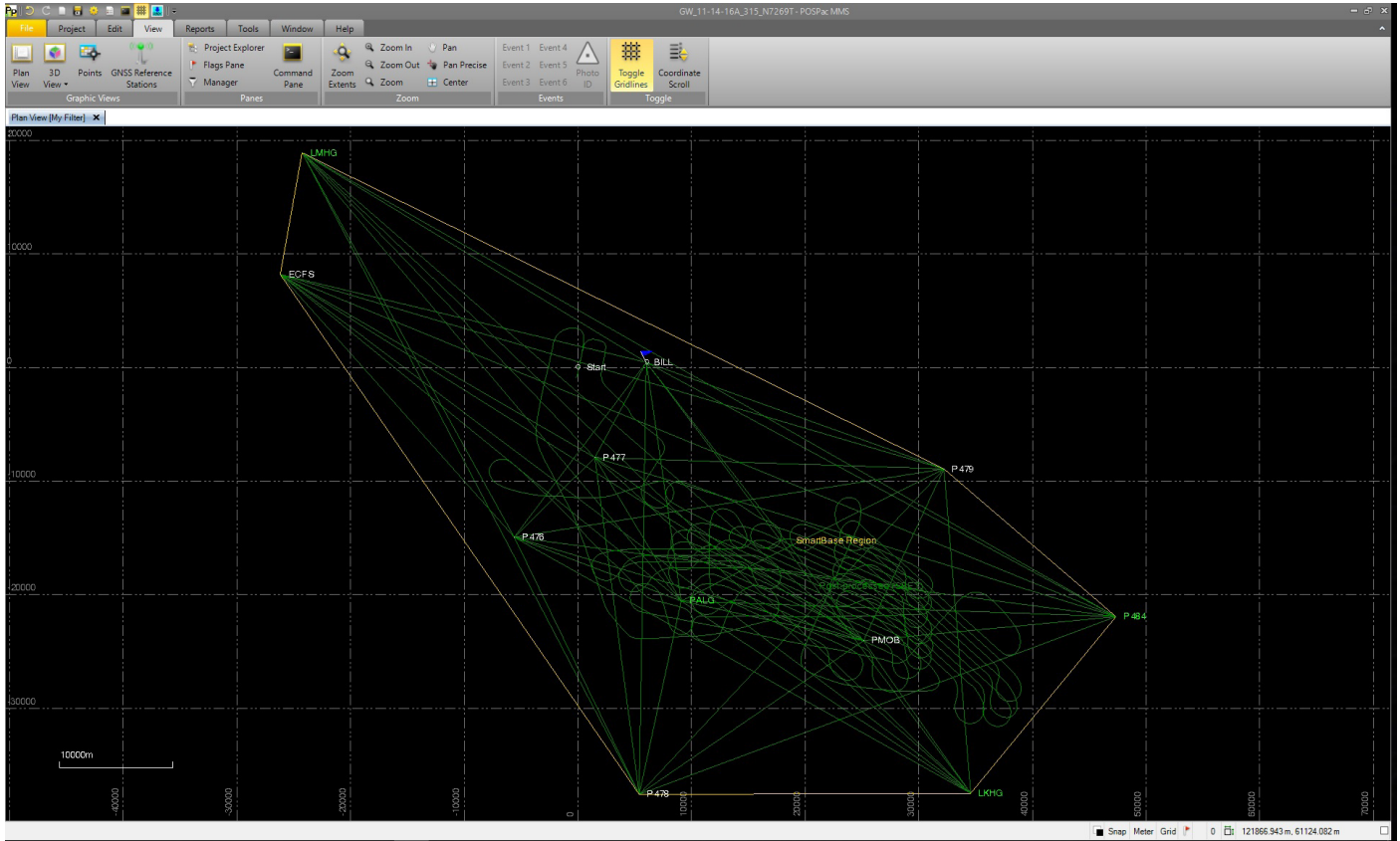
Ready

Display - GW_11-14-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

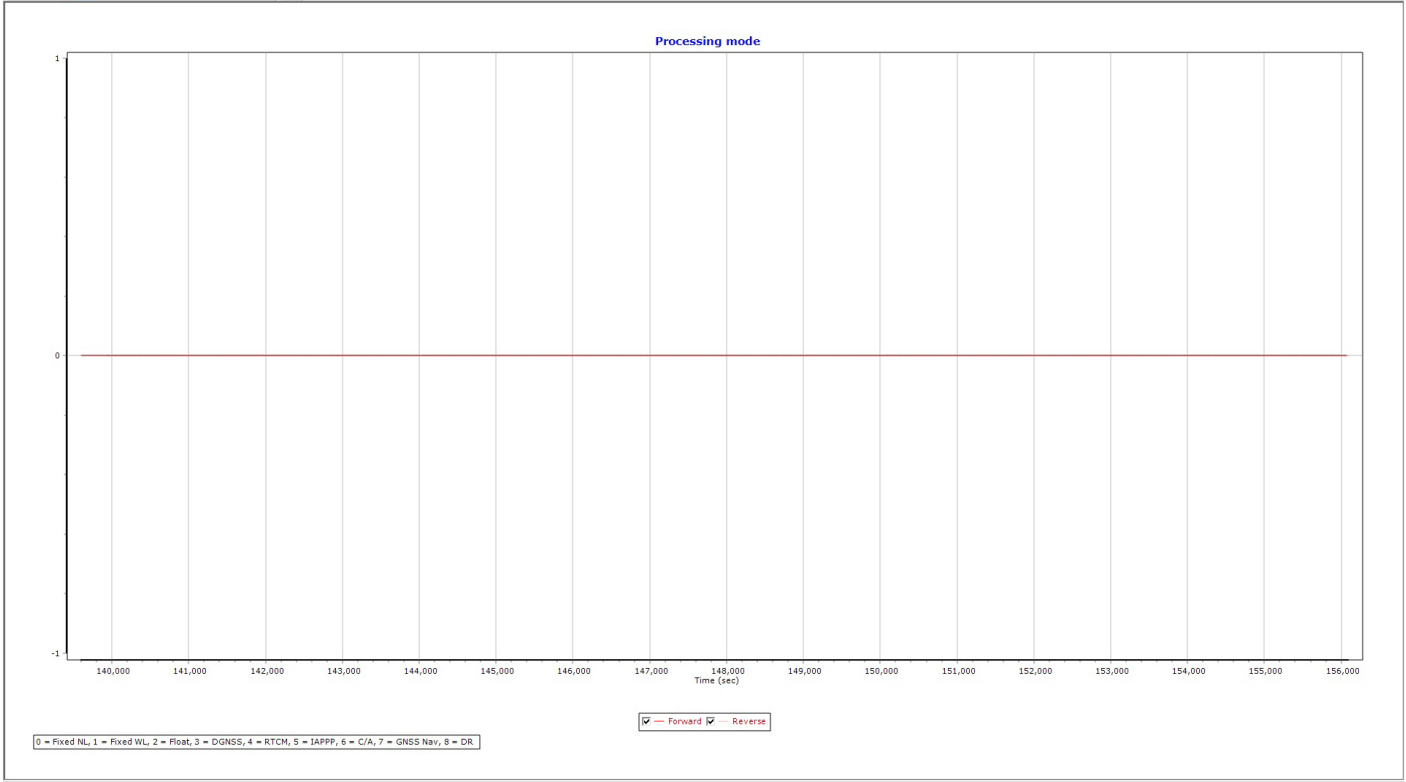
File Edit Tools View Help



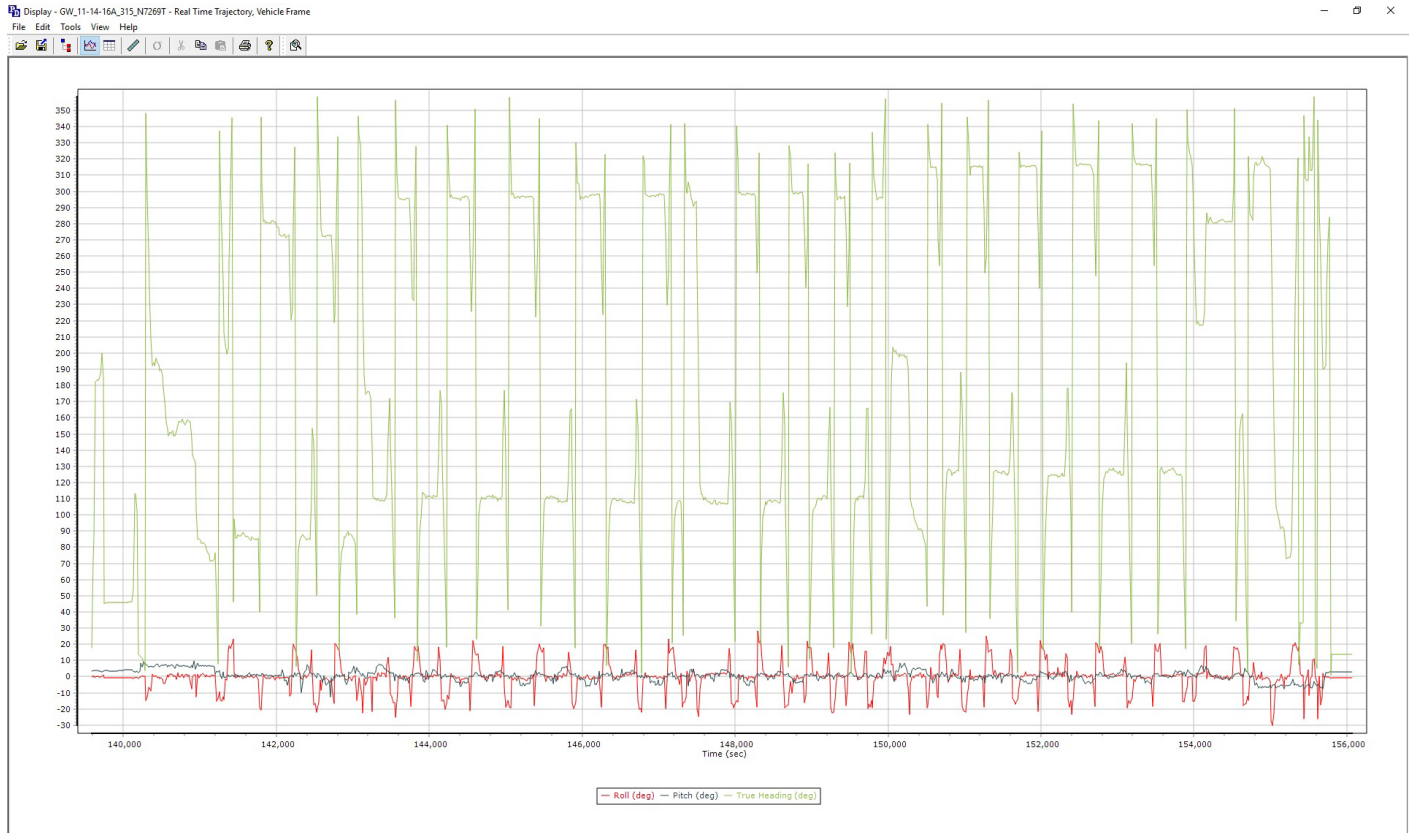
Ready



Display - GW_11-14-16A_315_N7269T - Solution Status
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

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

Project Name: **EASTERN SD COUNTY LIDAR**

Project Number: **16159**

FCMS .ipd File/Nav File: _____

Pilot: **DOXEY**

Technician: **KORZEP**

Aircraft: **N726RT**

Date Flown: **11/14/16**

Takeoff Time (Z): **0655** Airport: **F70**

Landing Time (Z): **1115** Airport: **F70**

Data Information

LIDAR Unit: **12SEN315**

HD #: **2**

POS/IPAS File #: **2016114 BACKKA**

from → to: **542 → 566**

FCMS File #: _____

Weather

Begin Temp: **11**

Begin Dewpoint: **0**

Begin Pressure: **30.16**

End Temp: **27**

End Dewpoint: **-1**

End Pressure: **30.14**

Airport: **F70**

Quantum SPATIAL

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
32	1	0727	0728	9700	W	0	115	~100	SMOOTH
31	2	0731	0733	9300	WVE	↘	120	%	↓
30	3	0735	0738	9700	W	↘	140	%	
29	4	0740	0743	8700	E	↘	110	%	
34	5	0745	0746	9000	S	↘	115	%	CROSSFLIGHT
28	6	0749	0750	10,000	ESE	↘	103	%	SMOOTH
27	7	0753	0755	10,000	WNW	↘	115	%	
26	8	0757	0801	10,500	ESE	↘	120	%	
25	9	0803	0807	10,000	WNW	↘	125	%	
24	10	0810	0815	9900	ESE	↘	115	%	
23	11	0817	0821	9700	WNW	↘	130	%	
22	12	0824	0829	10,000	ESE	↘	115	%	
21	13	0832	0836	10,000	WNW	↘	120	%	
20	14	0838	0844	9500	ESE	↘	115	%	
19	15	0846	0850	9700	WNW	↘	120	%	
18	16	0853	0854	8700	ESE	↘	115	%	CONTROLLER HAD US AVOID TRAFFIC

Mission Page 1 of _____

Additional Notes:

PAGE 2 11/14/16 LIFT 1
Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

Project Name: **EASTERN SD COUNTY LIDAR**
 Project Number: **16159**
 FCMS .fpd File/Nav File: _____

Pilot: **DOXEY**
 Technician: **KORZEP**
 Aircraft: **N7269T**

Date Flown: _____
 Takeoff Time (Z): _____ Local: _____ Airport: _____
 Landing Time (Z): _____ Local: _____ Airport: _____

Project Scanning Requirements

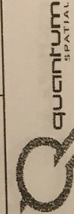
Field of View: _____ Ground Speed (kts): _____
 Scan Rate: _____ Hz Altitude AGL (ft): _____
 Pulse Rate Frequency: _____ kHz MP/A or SPIA?: _____
 Laser Output Current: _____ %

Data Information

LIDAR Unit: **12SEN315**
 HD #: _____
 POS/IPAS File #: _____
 from → to → _____
 FCMS File #: _____

Weather

Begin Temp: _____
 Begin Dewpoint: _____
 Begin Pressure: _____
 End Temp: _____
 End Dewpoint: _____
 End Pressure: _____



GPS Base Location(s): _____
 PDOP Avoidance: _____
 Static or Flyover?: _____
 → If flyovers, times: _____

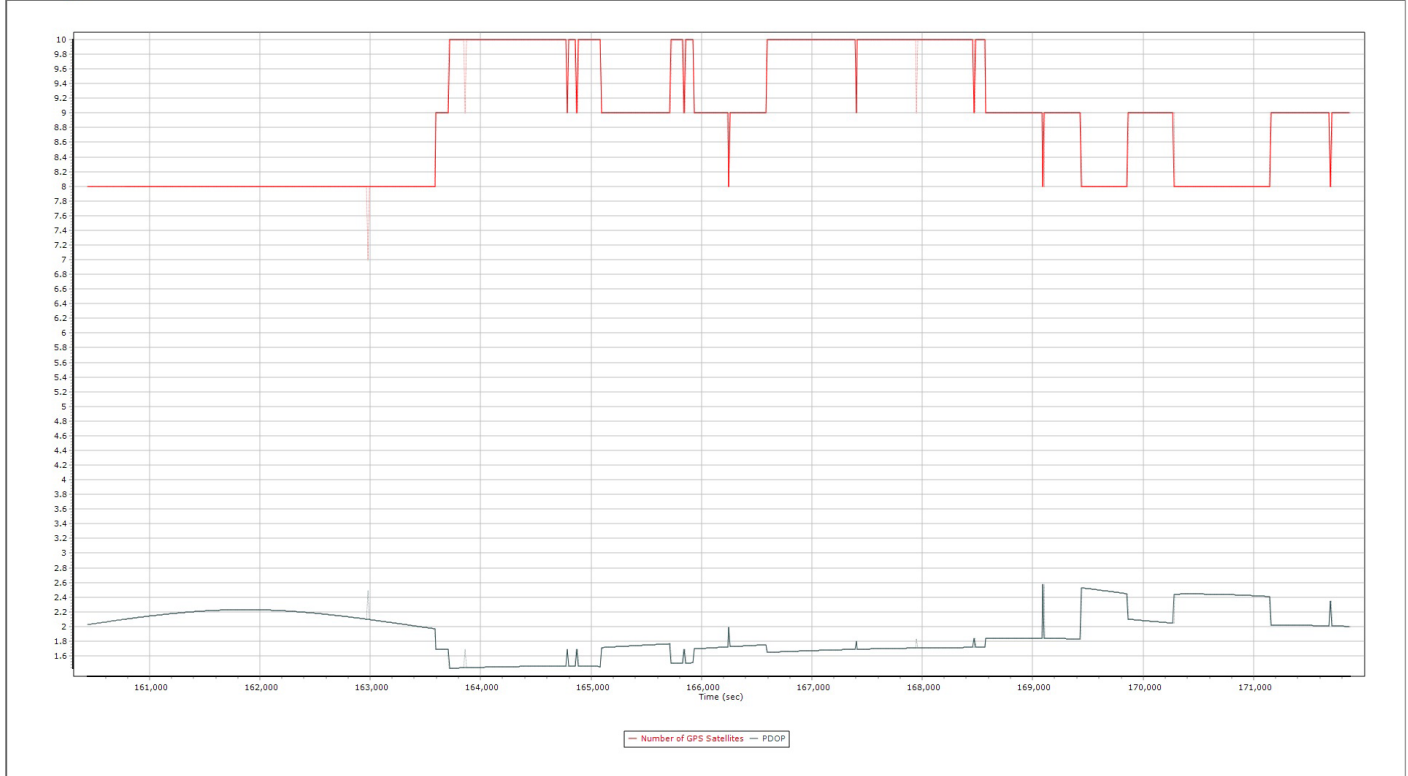
Flight Line #	Line #	Start Record	Slop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
18		0900	0904	8700	ESE	0	115	MID	
17		0906	0910	8700	WNW		125	%	SMOOTH
16		0913	0916	8600	ESE		115	%	
15		0918	0920	8400	WNW		125	%	
14		0922	0925	8100	ESE		120	%	
13		0928	0930	8000	WNW		120	%	
12		0932	0934	8000	ESE		120	%	
11		0936	0938	7900	WNW		118	%	
33		0940	0943	8400	SW		100	%	CROSS FLIGHT
10		0948	0949	10600	NW		190	%	SMOOTH
9		0951	0954	10500	SE		115	%	
8		0956	0959	10400	NW		120	%	
7		1002	1005	10200	SE		119	%	
6		1008	1011	9800	NW		120	%	
9		1020	1024	9400	SE		115	%	
4		1026	1030	9100	NW		125	%	

Additional Notes:

Nov 14, 2016-B (N77DV, SN315)

Display - GW_11-14-168_315_N7269T - Solution Status

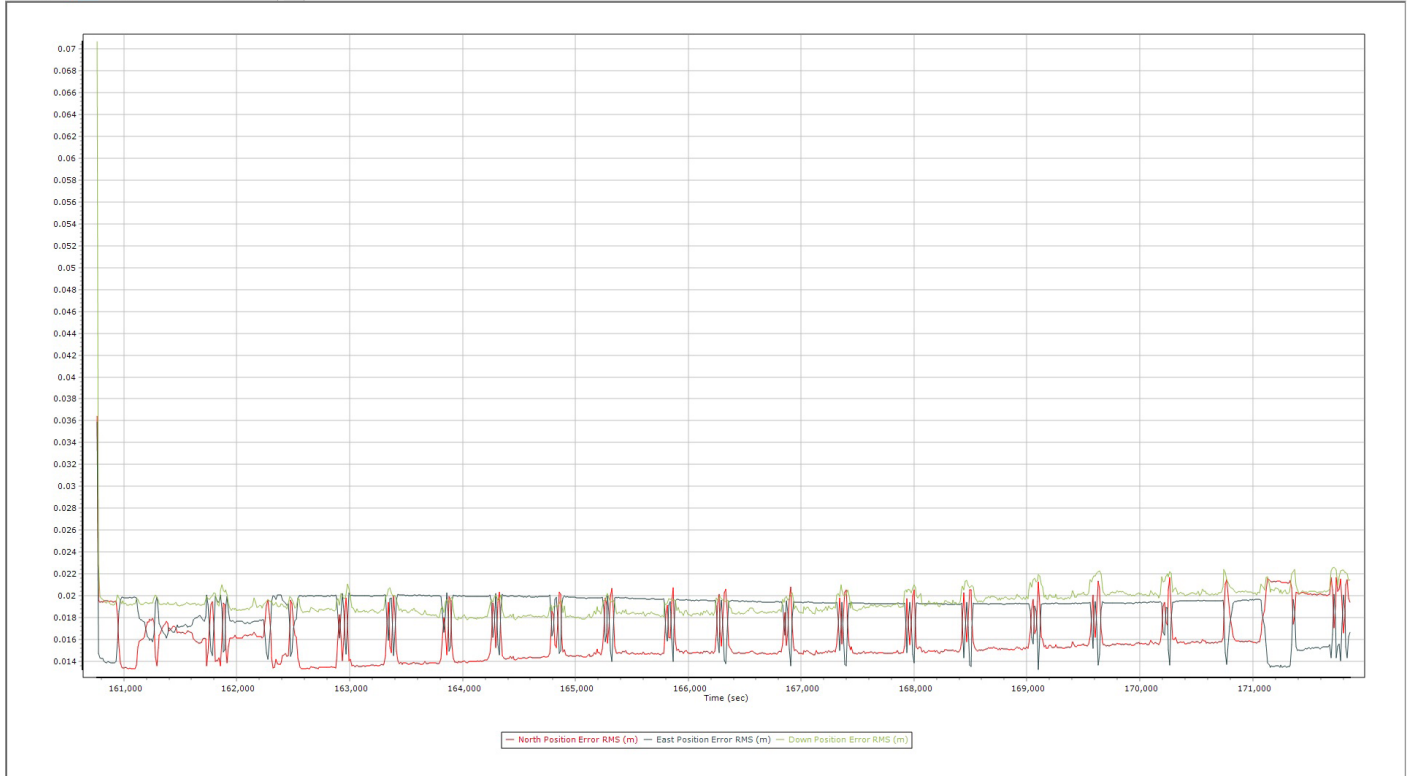
File Edit Tools View Help



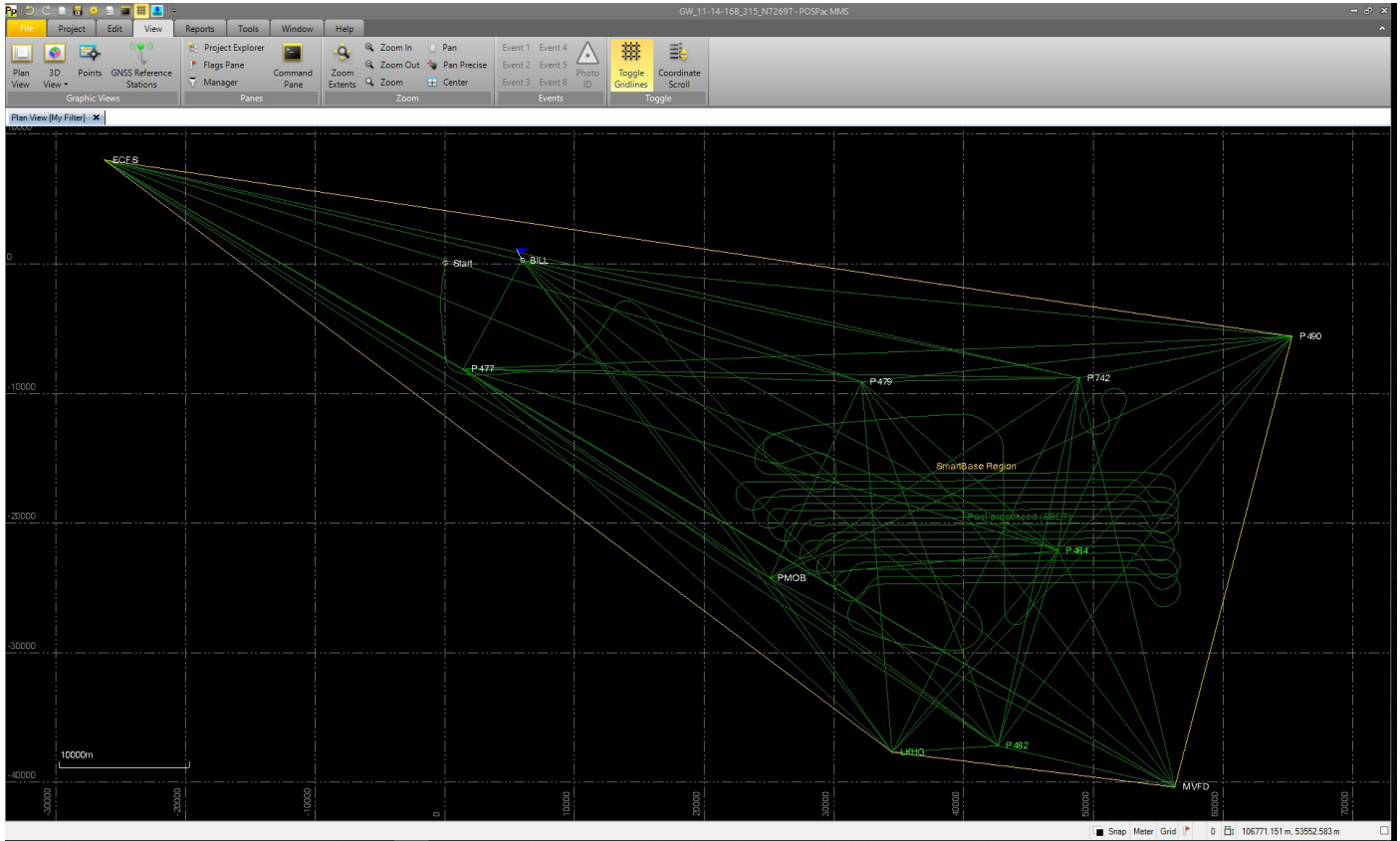
Ready

Display - GW_11-14-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

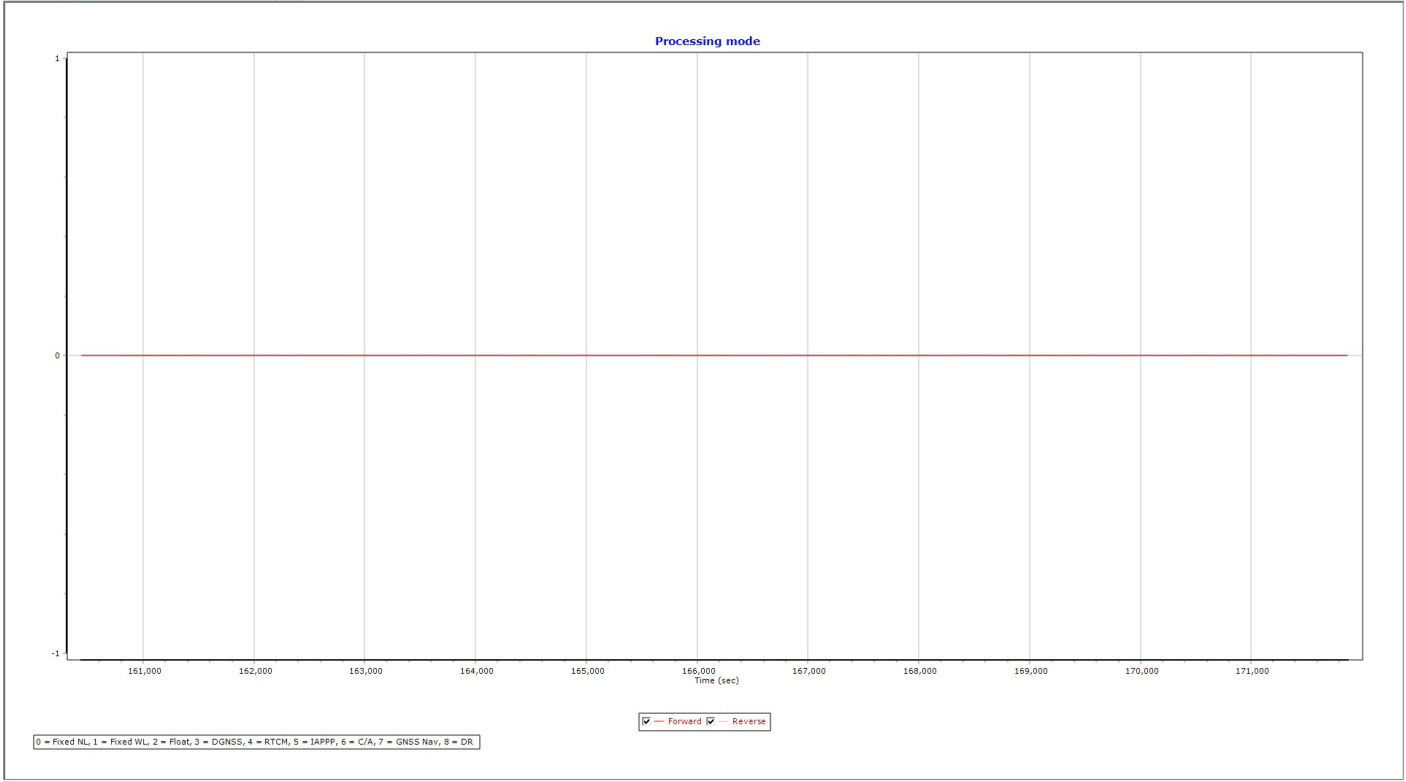
File Edit Tools View Help

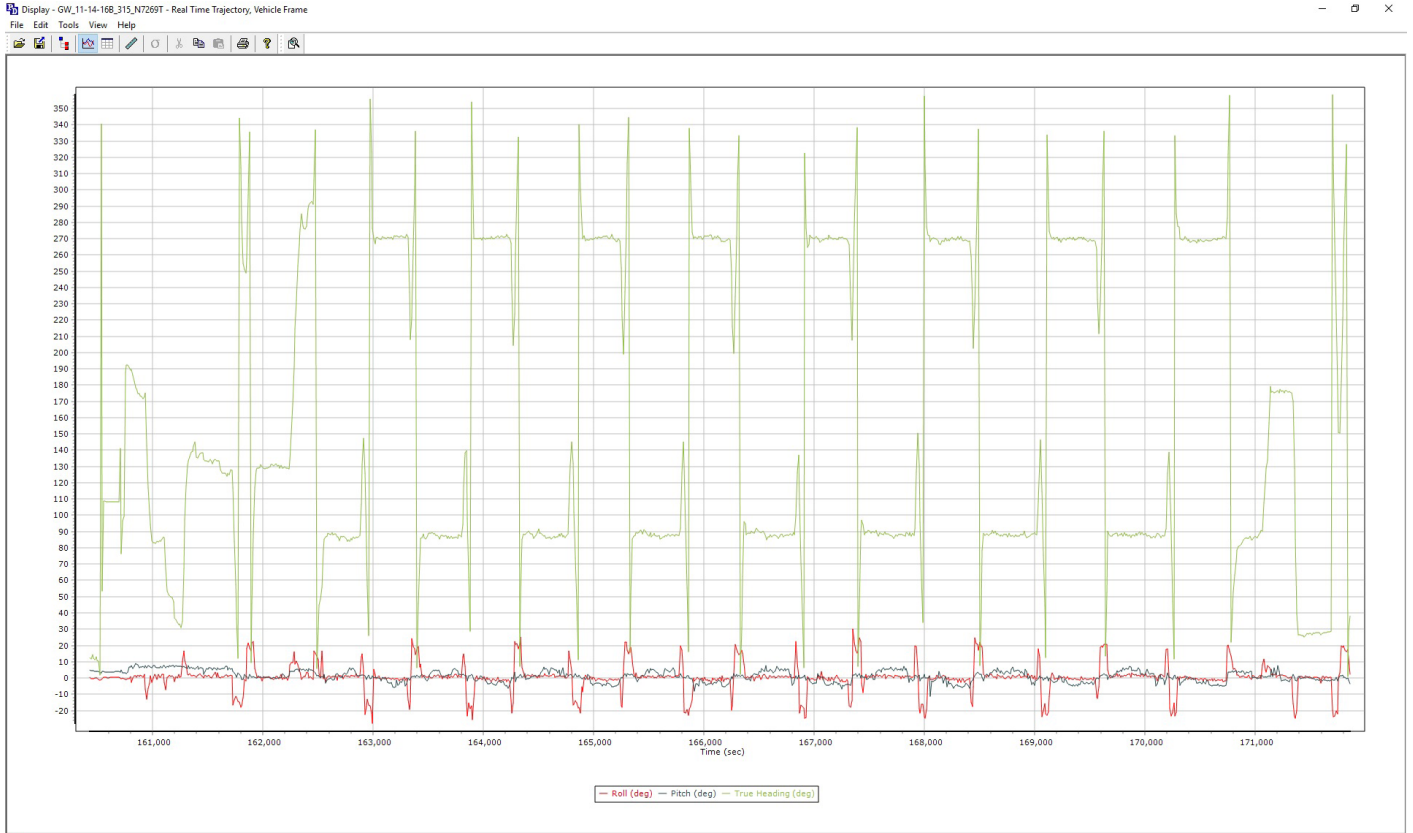


Ready



Display - GW_11-14-168_315_N7269T - Solution Status
File Edit Tools View Help





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

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET


Project Name	EASTERN SD COUNTY LIDAR	
Project Number	16159	
FCMS .ipd File/Nav File	3450-H300-RED_BLOCKEAST_V1.XML	

Pilot		DOXEY
Technician		KORZEP
Aircraft		N7269T

Date Flown	11/14/16
Takeoff Time (Z):	Local: 1240
Landing Time (Z):	Local: 1600

Ground	31	Airport	F70
Begin Temp	-2	Begin Dewpoint	F70
Begin Pressure	30.09	End Temp	30
End Temp	30	End Dewpoint	5
End Pressure	30.00	End Pressure	30.00

Data Information	
LIDAR Unit	12SEN315
HD #	2
POS/IPAS File #	201114AEAST
from → to	567 → 583
FCMS File #	

 **QUANTUM SPATIAL**

Project Scanning Requirements	
Field of View	78
Scan Rate	41.8
Pulse Rate Frequency	125
Laser Output Current	
Ground Speed (kts)	115
Hz Altitude AGL (ft)	5900
kHz/MPIA or SPIAT	

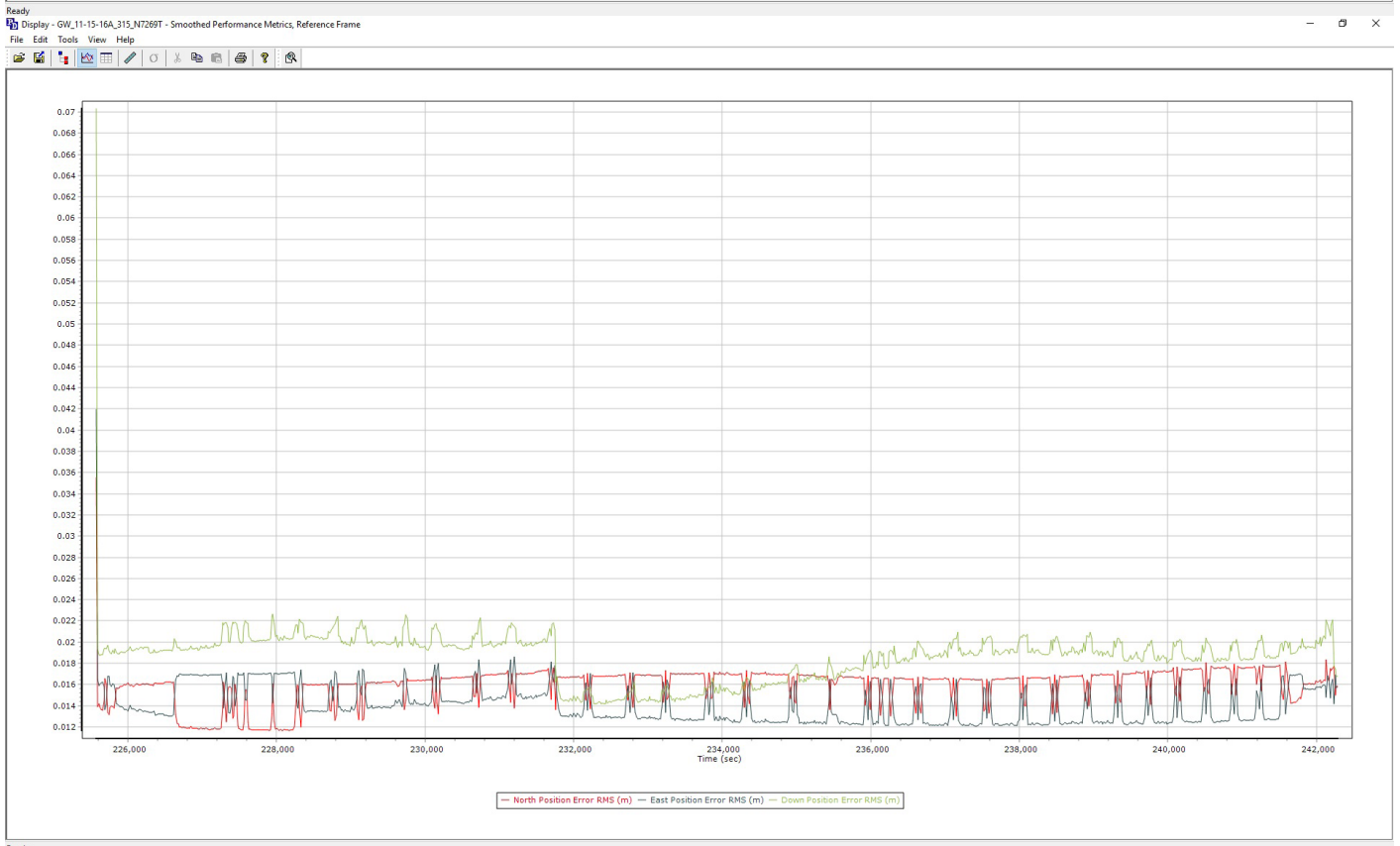
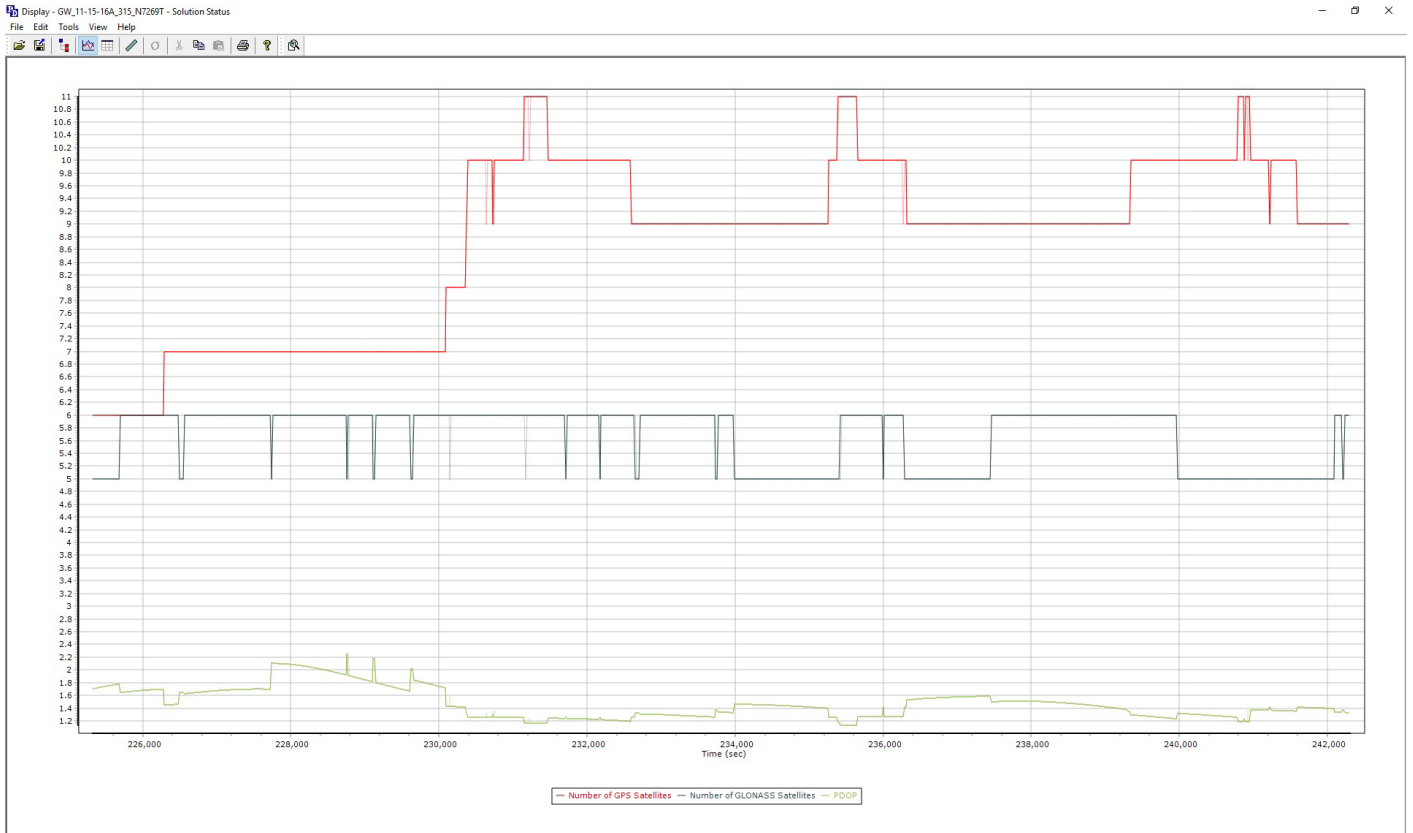
GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER

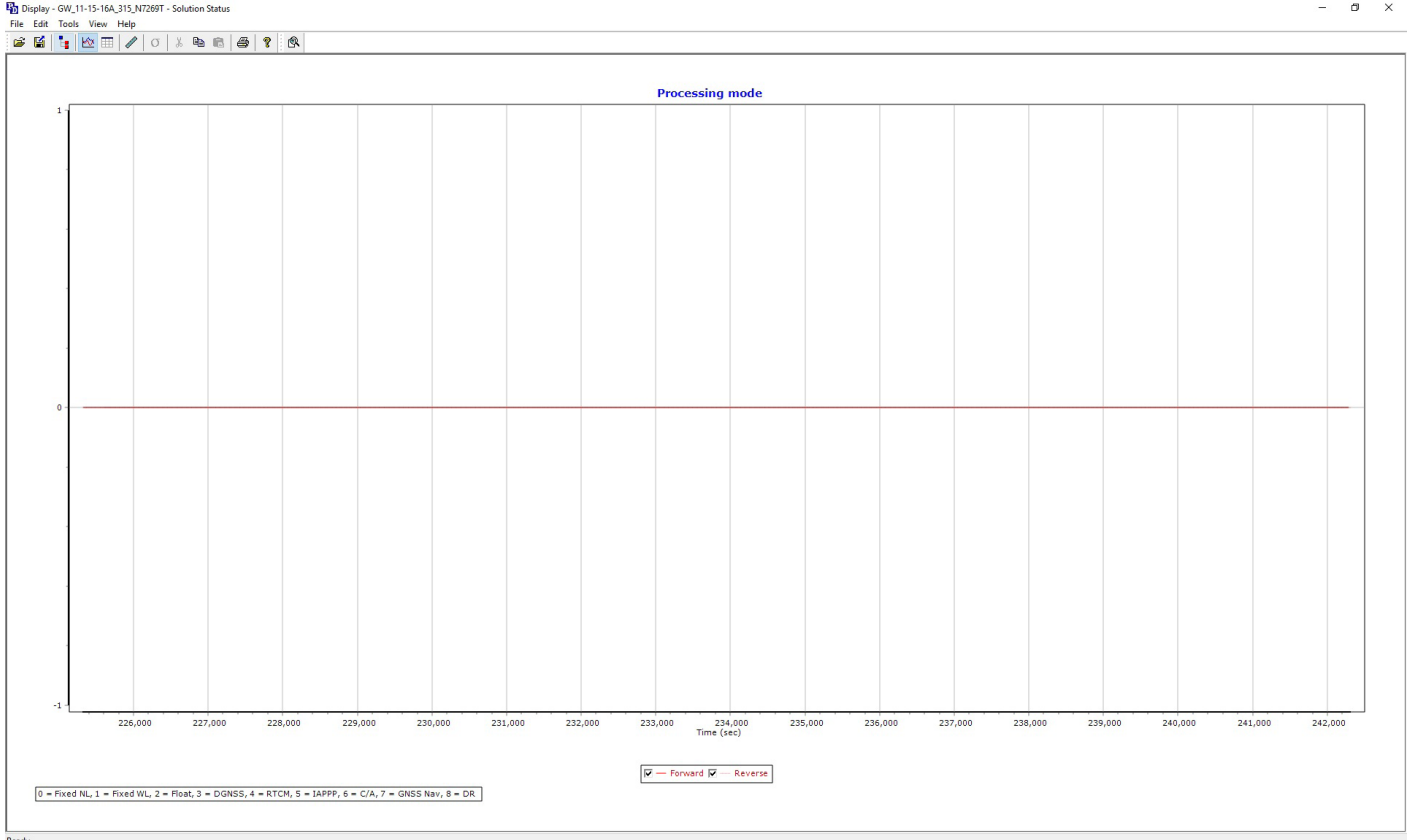
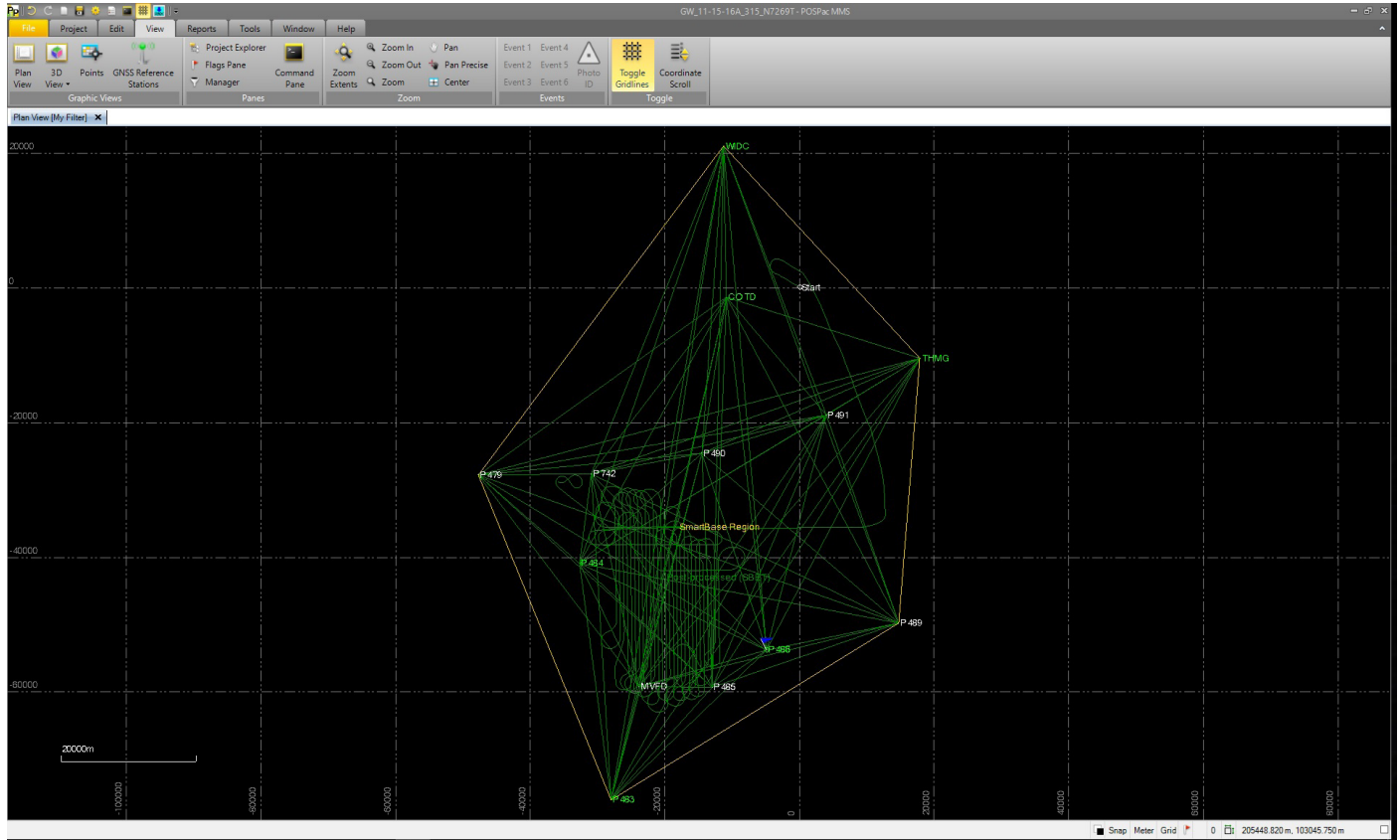
→ if flyovers, times: 1258-1303; 1535-1540

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
16	1	1308	1313	9900	E	0	110	~100%	SMOOTH
15	2	1316	1321	9900	W		125	%	
14	3	1323	1329	9700	E		115	%	
13	4	1331	1336	9300	W		130	%	
12	5	1338	1345	9700	E		100	%	
11	6	1347	1353	10400	W		123	%	
10	7	1355	1402	9900	E		115	%	
9	8	1404	1410	10000	W		130	%	
8	9	1412	1419	10000	E		100	%	
7	10	1421	1427	10000	W		125	%	
6	11	1430	1437	10100	E		100	%	
5	12	1439	1446	9900	W		125	%	
4	13	1448	1456	10100	E		100	%	
3	14	1458	1505	10100	W		125	%	
2	15	1507	1515	9300	E		115	%	
1	16	1517	1524	9500	W		125	%	
Additional Notes:	17	1531	1534	9700	S	6	115		

Mission Page 1 of 1
CASSFLIGHT LIFT 2

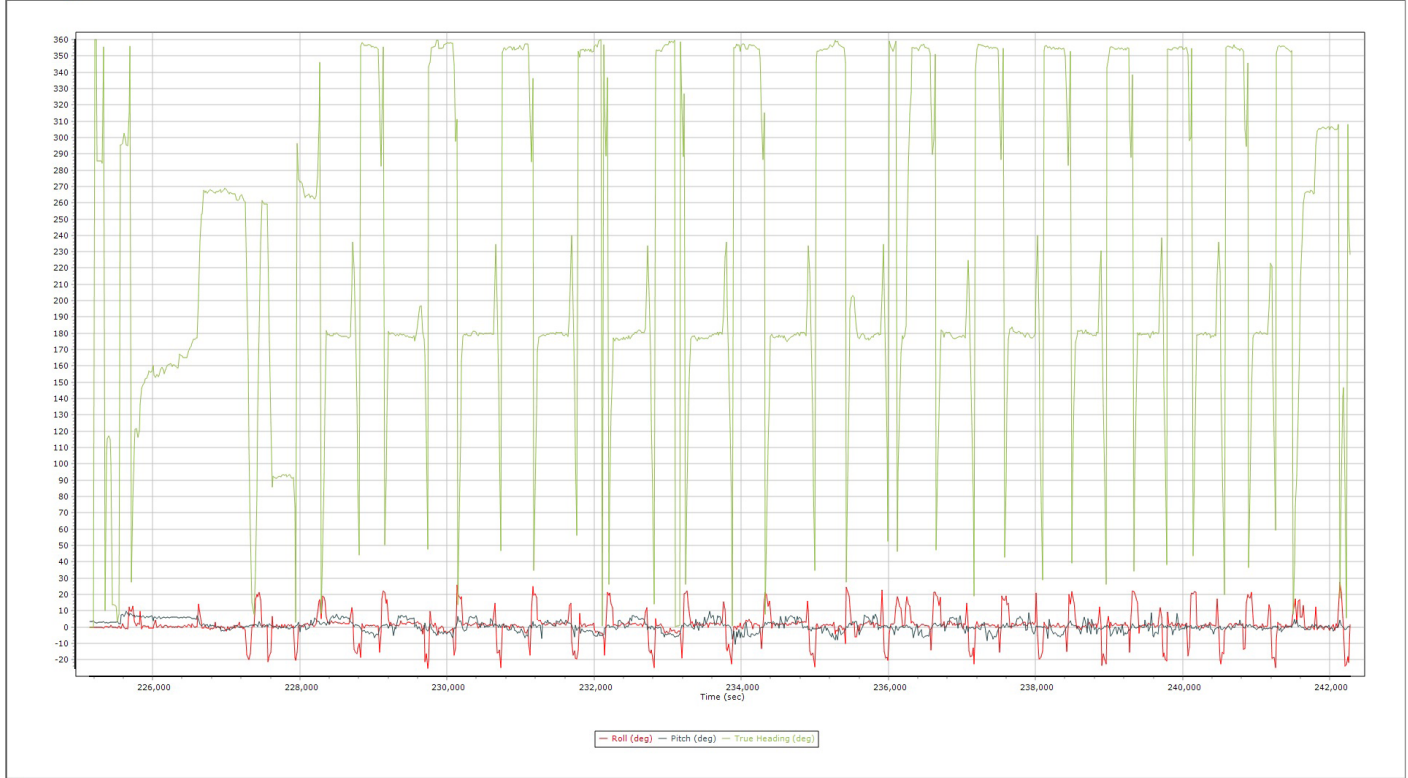
Nov 15, 2016-A (N77DV, SN315)





Display - GW_11-15-16A_315_N7269T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: P486

Coordinates

Latitude: N 33 15 36.67494000

Longitude: W 116 19 20.18099000

Altitude: 127.0510 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: TRM59800-80 w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P486 Station Fullname: P486

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown: 11/15/16
Takeoff Time (Z): Local: 0625 Airport: UDB
Landing Time (Z): Local: 1136 Airport: UDB

Pilot: DOXEY
Technician: KORZEP
Aircraft: N7269T

Weather
Begin Temp: 16 UDB
Begin Dewpoint: 0
Begin Pressure: 30.02
End Temp: 29 UDB
End Dewpoint: 2
End Pressure: 29.96

Data Information
LIDAR Unit: 12SEN315
HD #: 2
POSIPAS File #: 20161115_B2_MINS
from -> to: 534 -> 609
FCMS File #

QUANTUM SPATIAL

Project Scanning Requirements
Field of View: 28
Ground Speed (kts): 115
Scan Rate: 41.8
Hz Altitude AGL (ft): 5900
Pulse Rate Frequency: 125
kHz/MPIA or SPIA?:
Laser Output Current: %

GPS Base Location(s): N/A
PDOP Avoidance: N/A
Stall or Flyover?: FLYOVER -- If flyovers, times: 0713-0718; 1109-1114

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Rids, Etc.)
29	1	0720	0723	8900	W	0	11	100	SMOOTH
1	2	0725	0730	10,200	S		90	%	CROSSFLIGHT
2	3	0733	0737	10,900	N		140	%	
3	4	0739	0745	10,200	S		90	%	
4	5	0749	0754	10,200	N		135	%	
5	6	0756	0803	10,200	S		110	%	
6	7	0803	0811	10,400	N		170	%	
7	8	0813	0820	10,200	S		107	%	
8	9	0822	0828	10,200	N		135	%	
9	10	0830	0837	10,100	S		110	%	
10	11	0840	0845	10,100	N		140	%	
11	12	0848	0855	10,000	S		110	%	
12	13	0857	0903	9700	N		135	%	
13	14	0906	0914	9700	S		100	%	
14	15	0916	0922	9600	N		145	%	
15	16	0925	0931	9500	S		95	%	

Additional Notes:

Mission Page 2 of 2

PG.2 11/15/16 ~~11/15/16~~ ~~11/15/16~~ LIFT 1 ~~11/15/16~~

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown		Pilot		Weather	
Takeoff Time (Z):		DOXEY		Begin Temp	
Landing Time (Z):		KORZEP		Begin Dewpoint	
		Aircraft		Begin Pressure	
		N7269T		End Temp	
				End Dewpoint	
				End Pressure	

Data Information	
LIDAR Unit	12SEN315
HD #	
POS/PAS File #	
from → to	→
FCMS File #	

Project Scanning Requirements	
Field of View	Ground Speed (Kts):
Scan Rate	Hz/Altitude AGL (ft):
Pulse Rate Frequency	KHz/MPIA or SPIA*:
Laser Output Current	%

GPS Base Location(s)	
PDOP Avoidance	
Static or Flyover?	

→ If flyovers, times:

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
16	17	0933	0934	8930	N	0	140	0	BLIND ZONE / DON'T USE
16	18	0936	0942	9000	S		100	8100	SMOOTH
17	19	0944	0950	9000	N		140		
18	20	0952	0957	9000	S		100		
19	21	1000	1005	9000	N		140		
20	22	1008	1012	8900	S		110		
21	23	1015	1020	8700	N		135		
22	24	1022	1027	8600	S		115		
23	25	1030	1034	8400	N		120		
24	26	1036	1040	8000	S		120		
25	27	1042	1047	8000	N		118		
26	28	1049	1053	7500	S		115		
27	29	1055	1058	7000	N		119		
28	30	1100	1104	6970	W		115		CROSSFLIGHT
29	31	1107	1109						

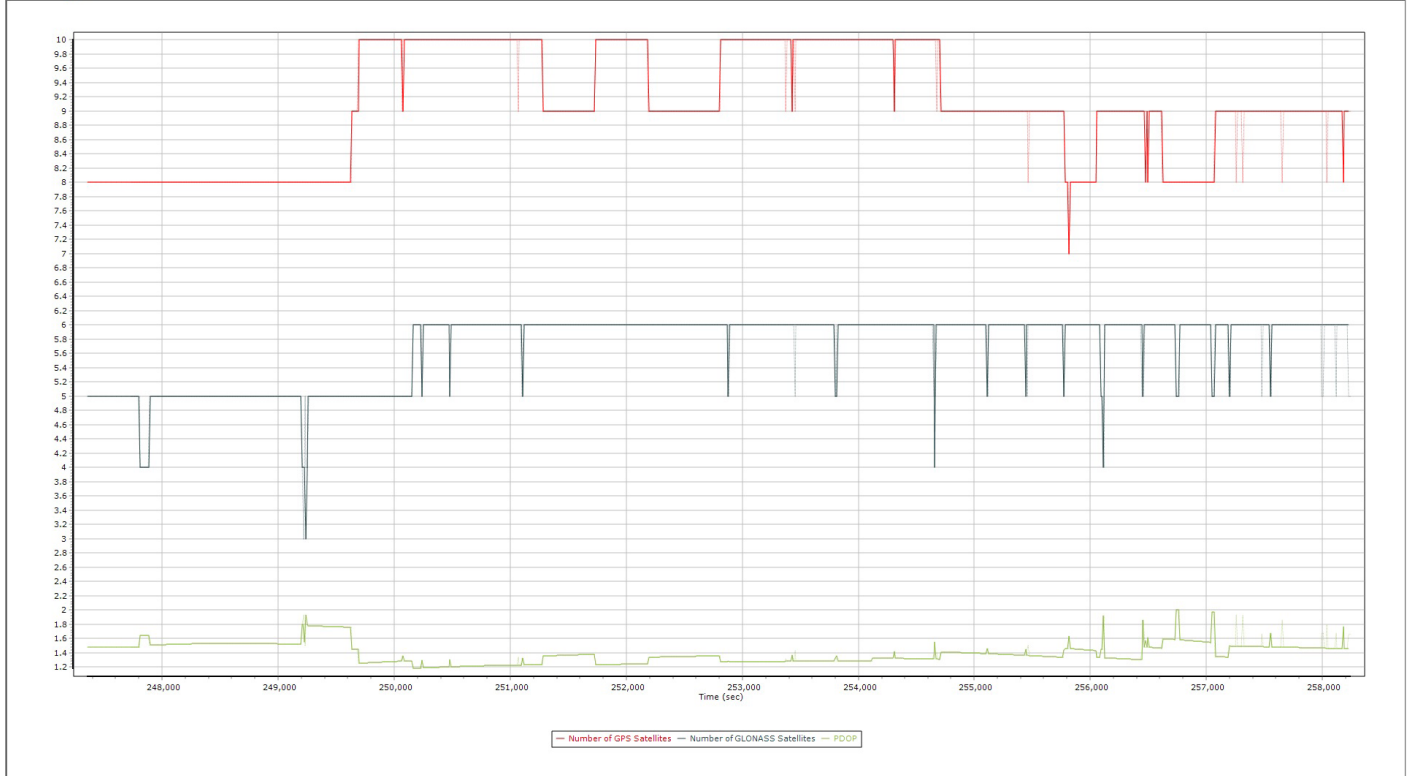
Additional Notes: ~~11/15/16~~

Mission Page 2 of 2

Nov 15, 2016-B (N77DV, SN315)

Display - GW_11-15-168_315_N7269T - Solution Status

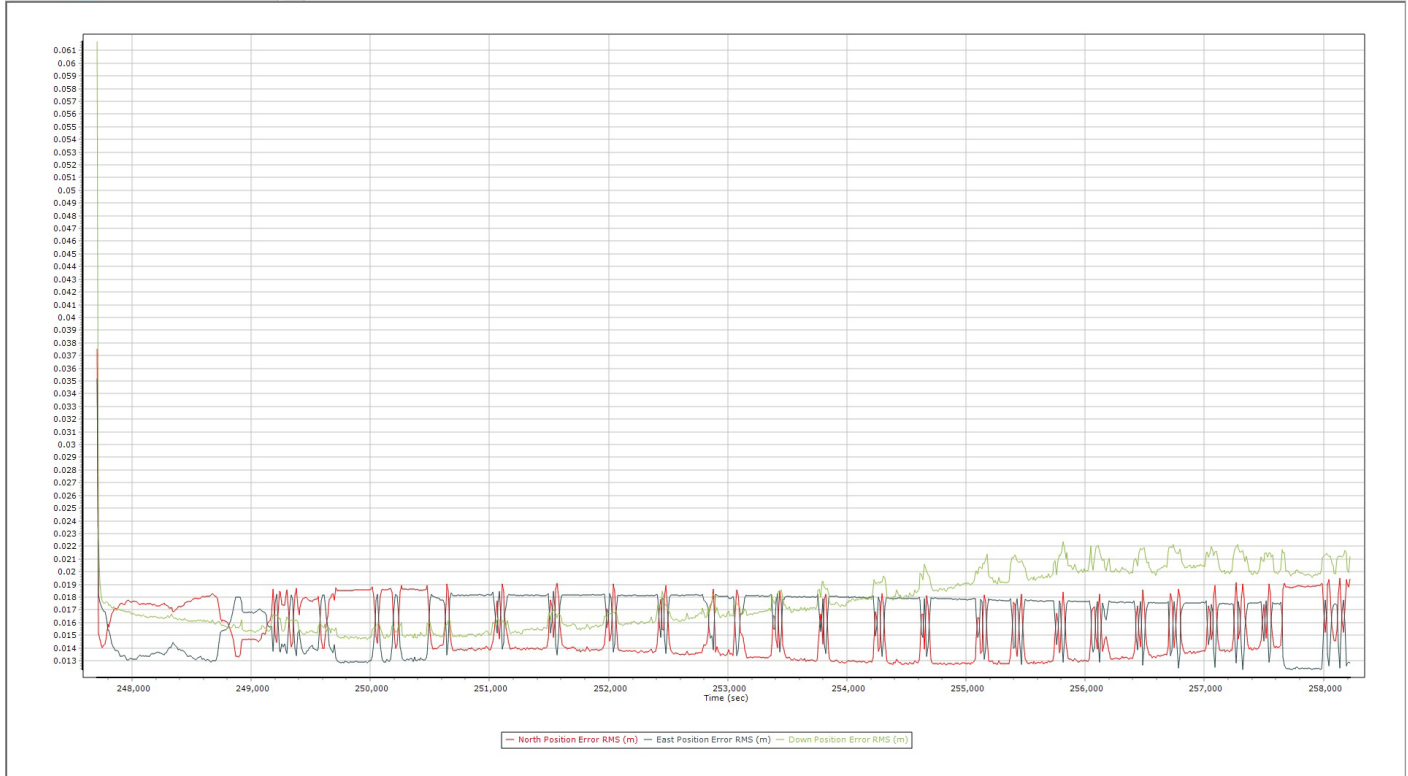
File Edit Tools View Help



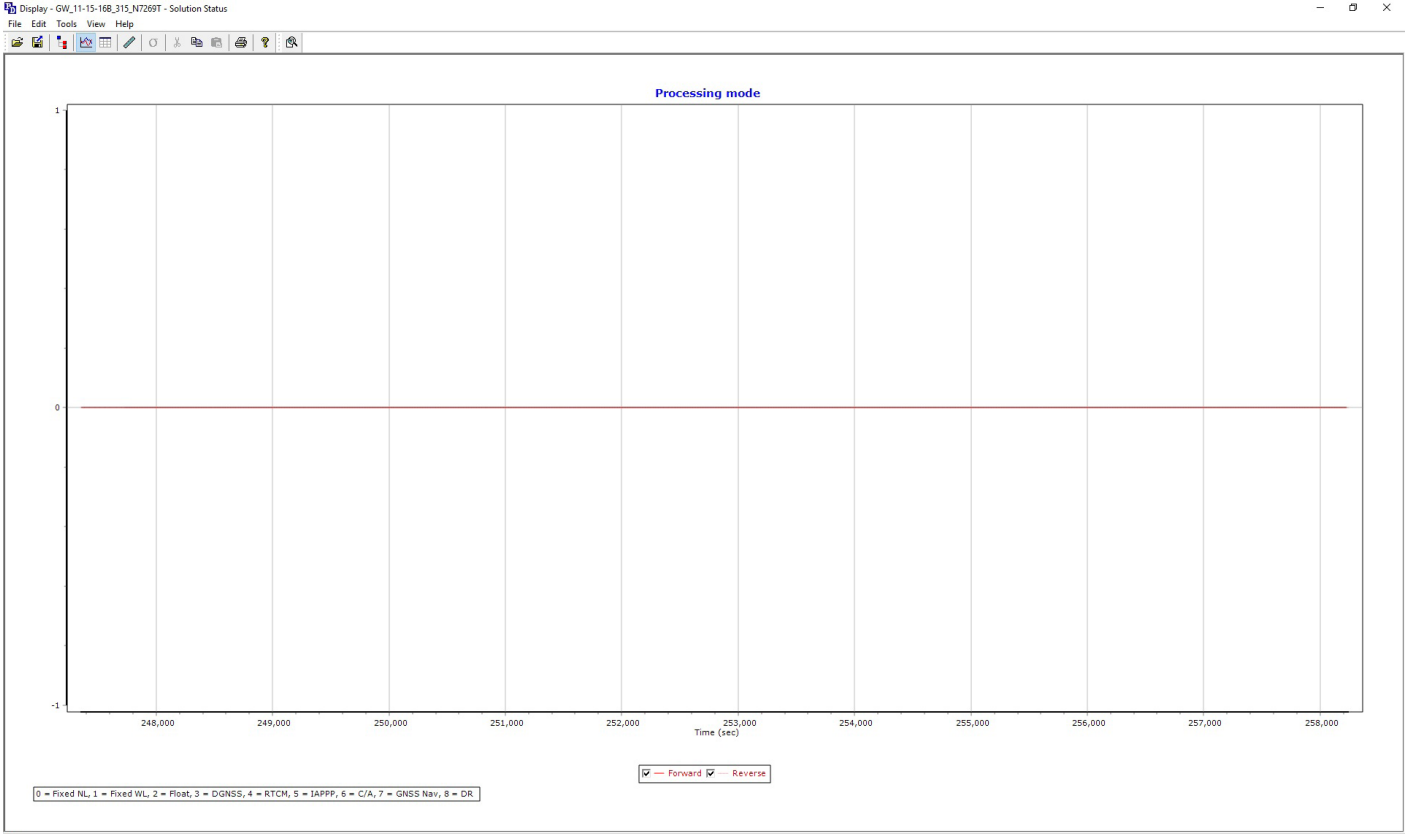
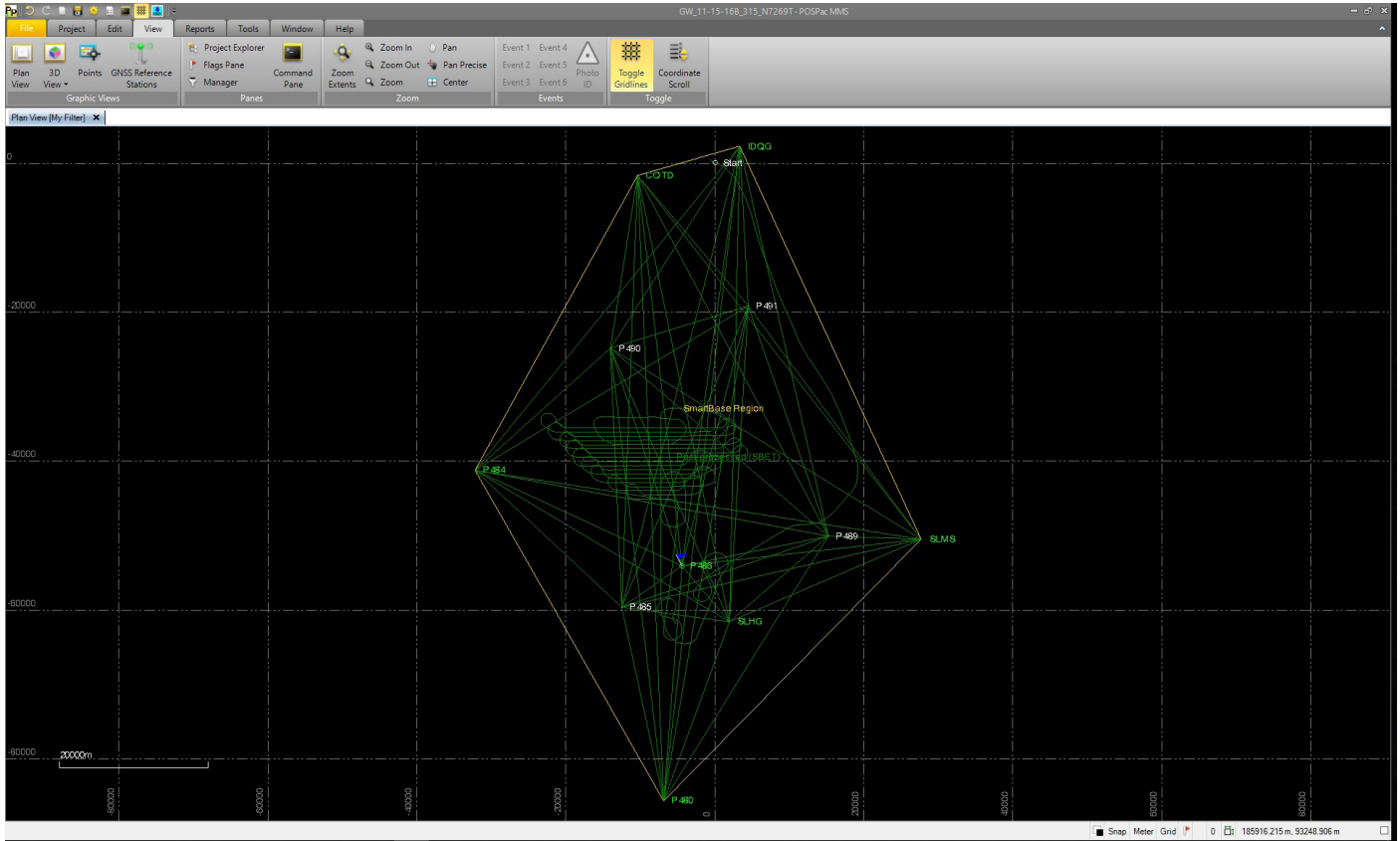
Ready

Display - GW_11-15-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready





Coordinate Manager

Station Information

Station ID: P486

Coordinates

Latitude: N 33 15 36.67494000

Longitude: W 116 19 20.18099000

Altitude: 127.0510 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: TRM59800-80 w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P486 Station Fullname: P486

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
[Empty Table]								

Import Coordinates Export Coordinates

Close

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8701

LIDAR MISSION RECORD SHEET

Project Name: **EASTERN SD COUNTY LIDAR**
 Project Number: **16159**
 FCMS -fpd File/Nav File: **3540 - 14700 - 5LED - BC - NORTH**

Pilot: **DOXEY**
 Technician: **KORZEP**
 Aircraft: **N7269T**

Date Flown: **11/15/16**
 Takeoff Time (Z): **Local: 1245** Airport: **58**
 Landing Time (Z): **Local: 1604** Airport: **100**

Weather: **Ground**
 Begin Temp: **30**
 Begin Dewpoint: **5** **upp**
 Begin Pressure: **29.96**
 End Temp: **28**
 End Dewpoint: **1** **upp**
 End Pressure: **29.87**

Data Information
 LIDAR Unit: **125EN715**
 HD #: **2**
 POSIPAS File #: **20161115/IMG OF THE NORTH**
 from -> to: **610 -> 626**
 FCMS File #

Project Scanning Requirements
 Field of View: **28** Ground Speed (kts): **115**
 Scan Rate: **41.8** Hz Altitude AGL (ft): **5900**
 Pulse Rate Frequency: **125** kHz/MPIA or SPIA?:
 Laser Output Current: %

GPS Base Location(s): **N/A**
 PDOP Avoidance: **N/A**
 Static or Flyover?: **FLYOVER**
 -- If flyovers, times: **1321-1326; 1934-1539**

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
1	1	1330	1373	7300	N	0	111	100	Crossflight
2	2	1337	1343	8500	W		115		SMOOTH
3	3	1345	1350	8400	E		115		
4	4	1352	1358	8200	W		111		
5	5	1400	1406	8300	E		120		
5	6	1408	1412	7300	W		119		ATC MADE US VECTOR FOR TRAFFIC.
6	7	1417	1422	7300	W		100		STARTED AGAIN BEFORE CROSSFLIGHT
7	8	1424	1428	7400	E		130		WINDS OUT OF THE WEST EAST
8	9	1430	1436	7200	W		93		
9	10	1438	1442	7400	E		170		
10	11	1444	1490	7400	W		100		
11	12	1452	1455	7400	E		170		
12	13	1458	1901	7200	W		110		
13	14	1903	1906	7000	E		130		
14	15	1909	1917	6900	W		109		
15	16	1914	1917	7000	E		125		

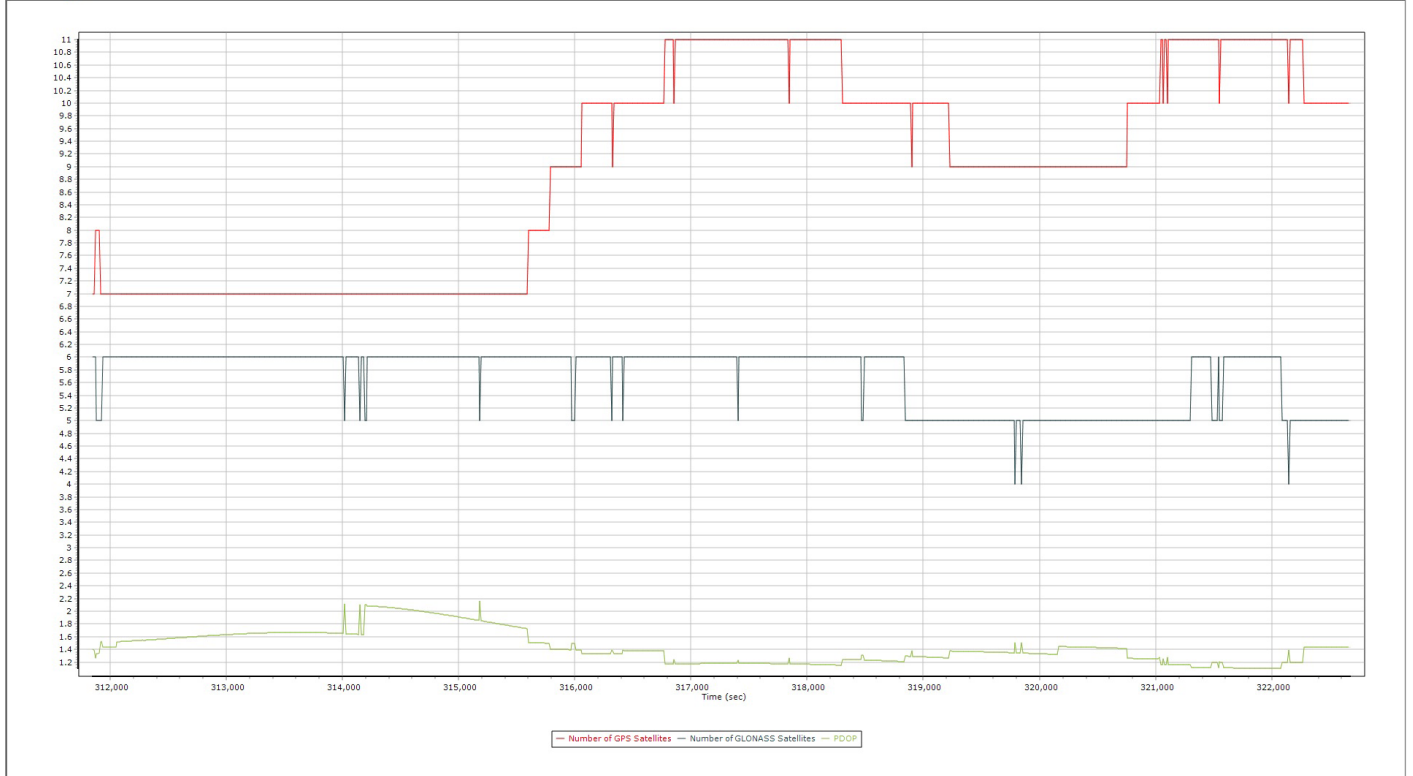
Additional Notes:

Mission Page **2** of **2**

Nov 16, 2016-A (N7269T, SN315)

Display - GW_11-16-16A_315_N7269T - Solution Status

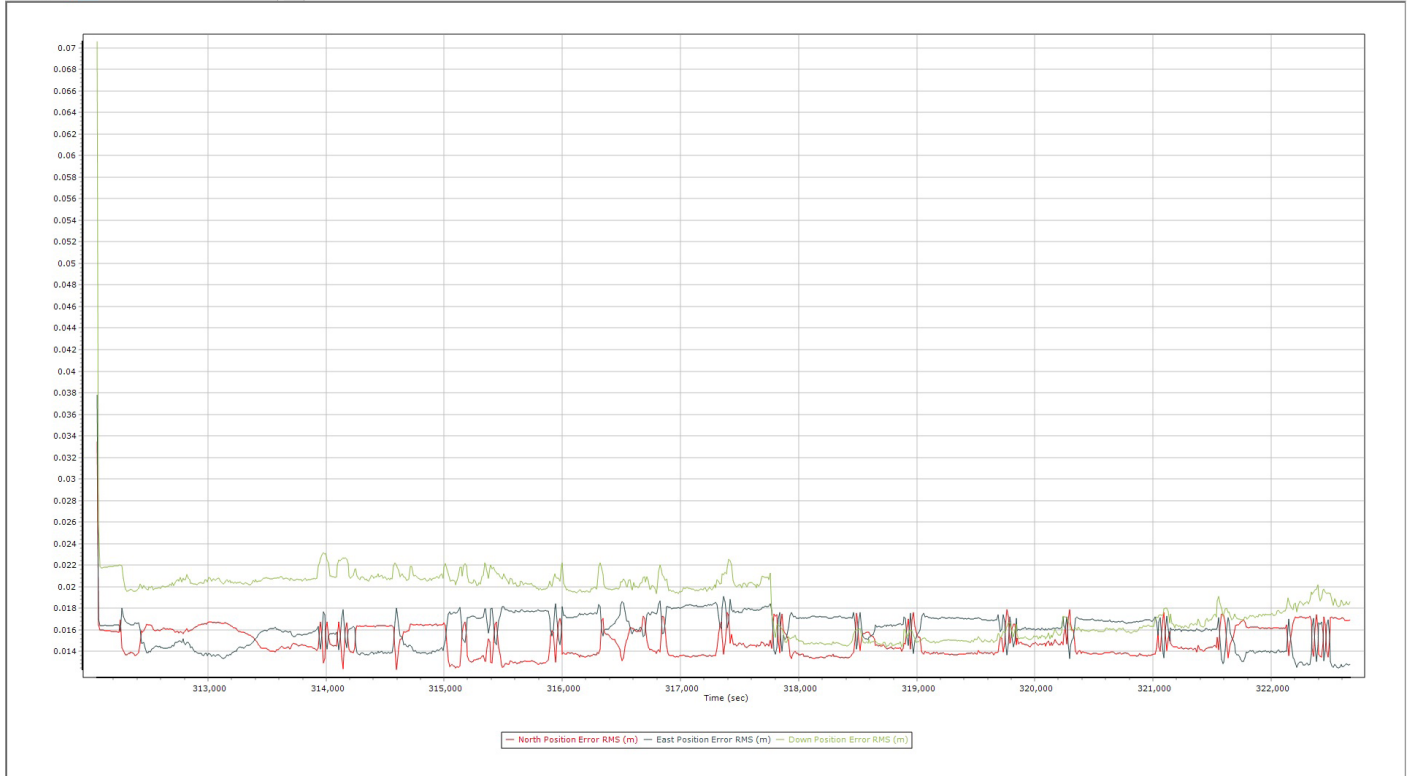
File Edit Tools View Help



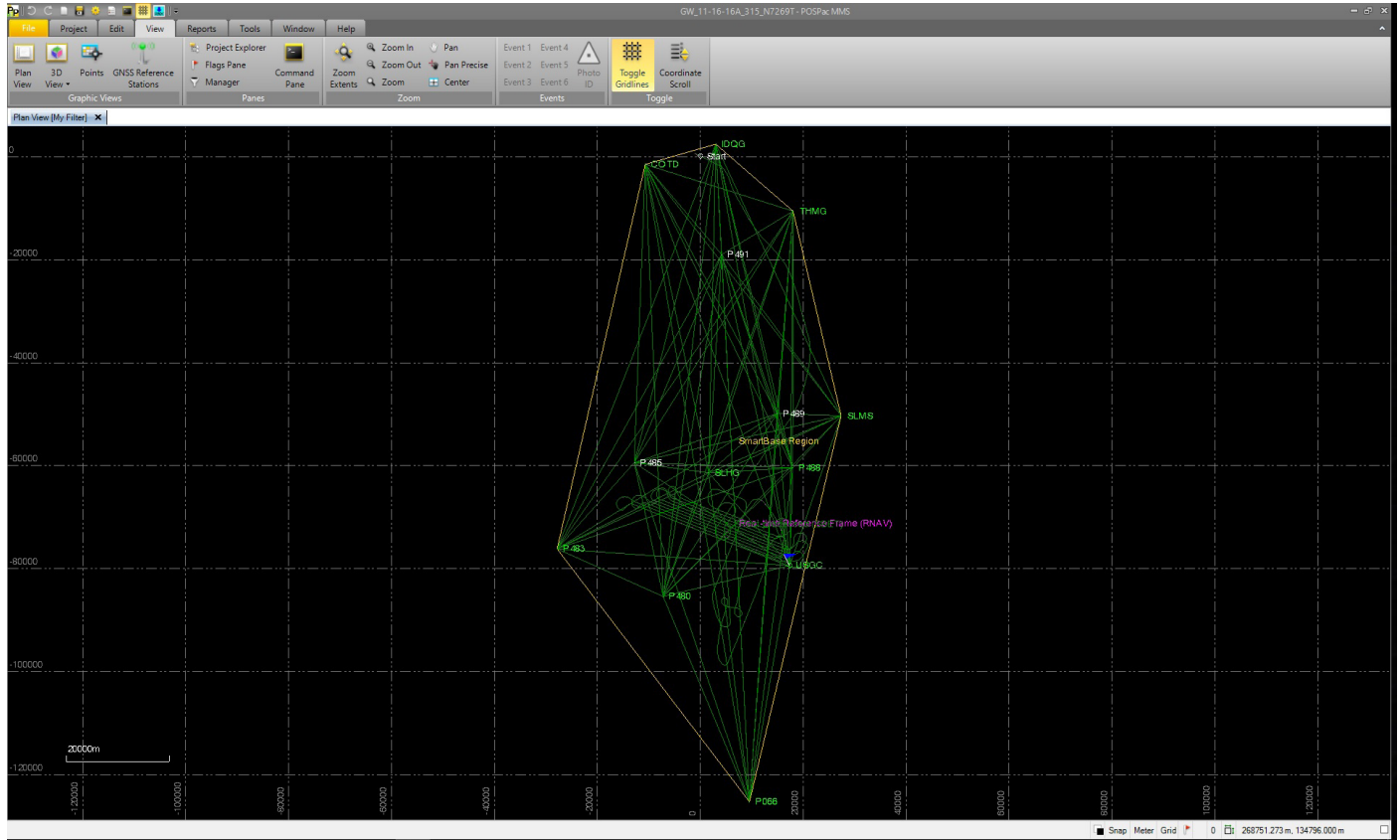
Ready

Display - GW_11-16-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

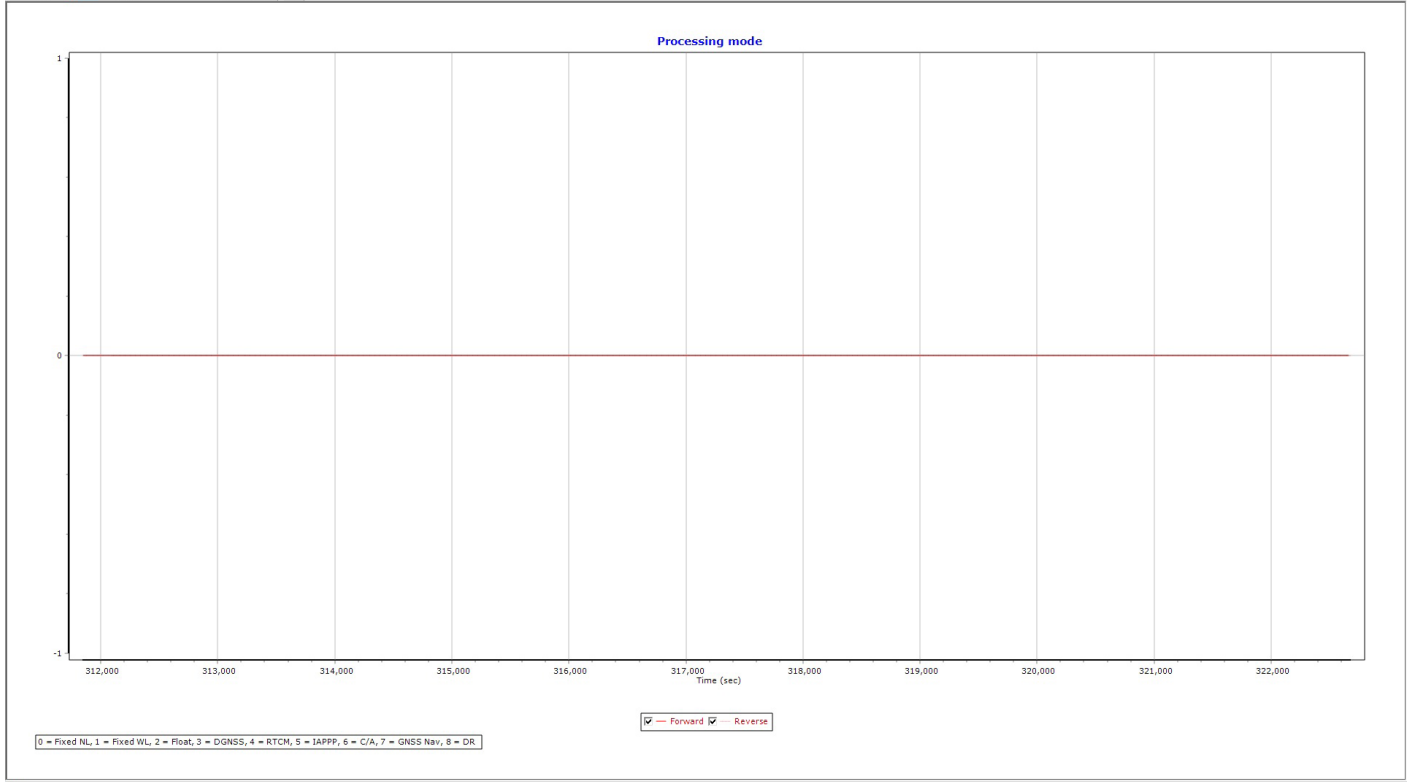
File Edit Tools View Help



Ready



Display - GW_11-16-16A_315_N7269T - Solution Status
File Edit Tools View Help



Ready



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

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown: 11/16/2014
 Takeoff Time (Z): Local: 0645 Airport: UD
 Landing Time (Z): Local: 0959 Airport: UD

Pilot: DOXEY
 Technician: KORZEP
 Aircraft: N729TT

Weather: Ground: UD
 Begin Temp: 18
 Begin Dewpoint: 2
 Begin Pressure: 29.83
 End Temp: 19
 End Dewpoint: 11
 End Pressure: 29.81

Data Information
 LIDAR Unit: 12SEN315
 HD #: 2
 POS/JPAS File #: 2016116_MID_EAST
 from → to: 627 → 642
 FCMS File #:

Quantum SPATIAL

LIDAR MISSION RECORD SHEET

Project Name: EASTERN SD COUNTY LIDAR
 Project Number: 16159
 FCMS .fpd File/Nav File: 3450_H300_SLED - MID_EAST_V1

Field of View: 23
 Scan Rate: 48.1
 Pulse Rate Frequency: 125
 Laser Output Current: %

Project Scanning Requirements
 Ground Speed (kts): 115
 Hz Altitude AGL (ft): 5900
 kHz/MPIA or SPIA?: %

GPS Base Location(s): N/A
 PDOP Avoidance: N/A
 Static or Flyover?: FLYOVER → If flyovers, times: 0117-0722; 0923-0928

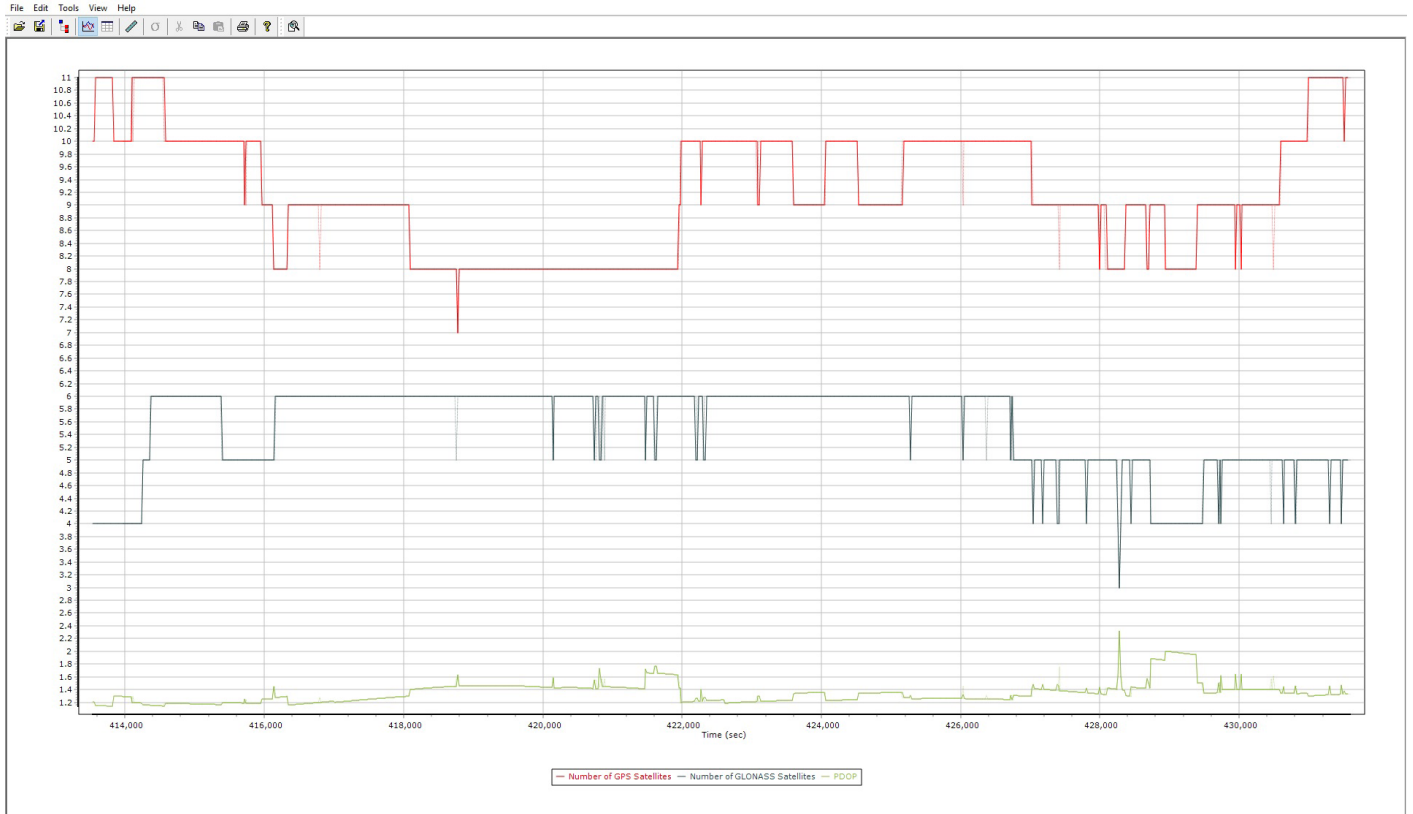
Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Rtds, Etc.)
22	1	0725	0729	8300	NE	3	125	95	HIT A BLIND ZONE @ END OF LINE; REFLW
1	2	0733	0735	6500	SE	0	170	~100	WIND OUT OF WEST (30 KTS)
2	3	0738	0744	7000	NW	0	98	%	
3	4	0746	0751	6600	SE	0	135	%	
22	5	0755	0757	7000	SE SW	3	115	%	
4	6	0800	0807	7900	NW	0	115	%	
5	7	0809	0816	7200	SE	0	159	<90	HIT A BLIND ZONE @ END; REFLW
6	8	0818	0825	7500	NW	0	89	~100	WIND OUT OF THE W (30 KTS)
5	9	0829	0834	7700	SE	0	150	%	
8	10	0834	0847	8300	NW	0	95	%	
7	11	0849	0856	8300	SE	0	145	%	
10	12	0858	0909	8200	NW	0	95	%	
9	13	0911	0918	8000	SE	0	165	<90	HIT A BLIND ZONE; END SORTIE

Additional Notes:

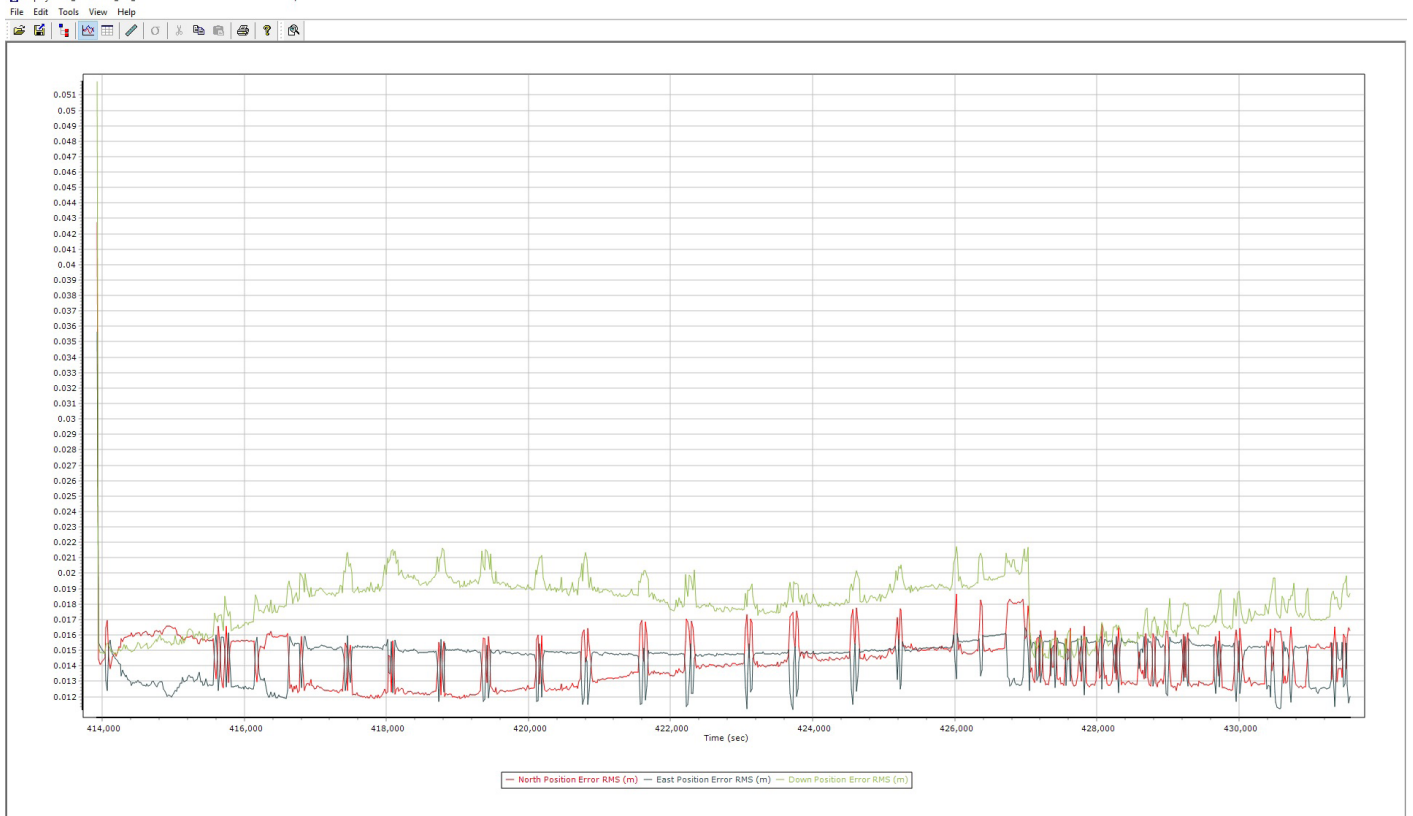
Mission Page 1 of 1

Nov 17, 2016-A (N7269T, SN315)

Display - GW_11-17-16A_315_N7269T - Solution Status



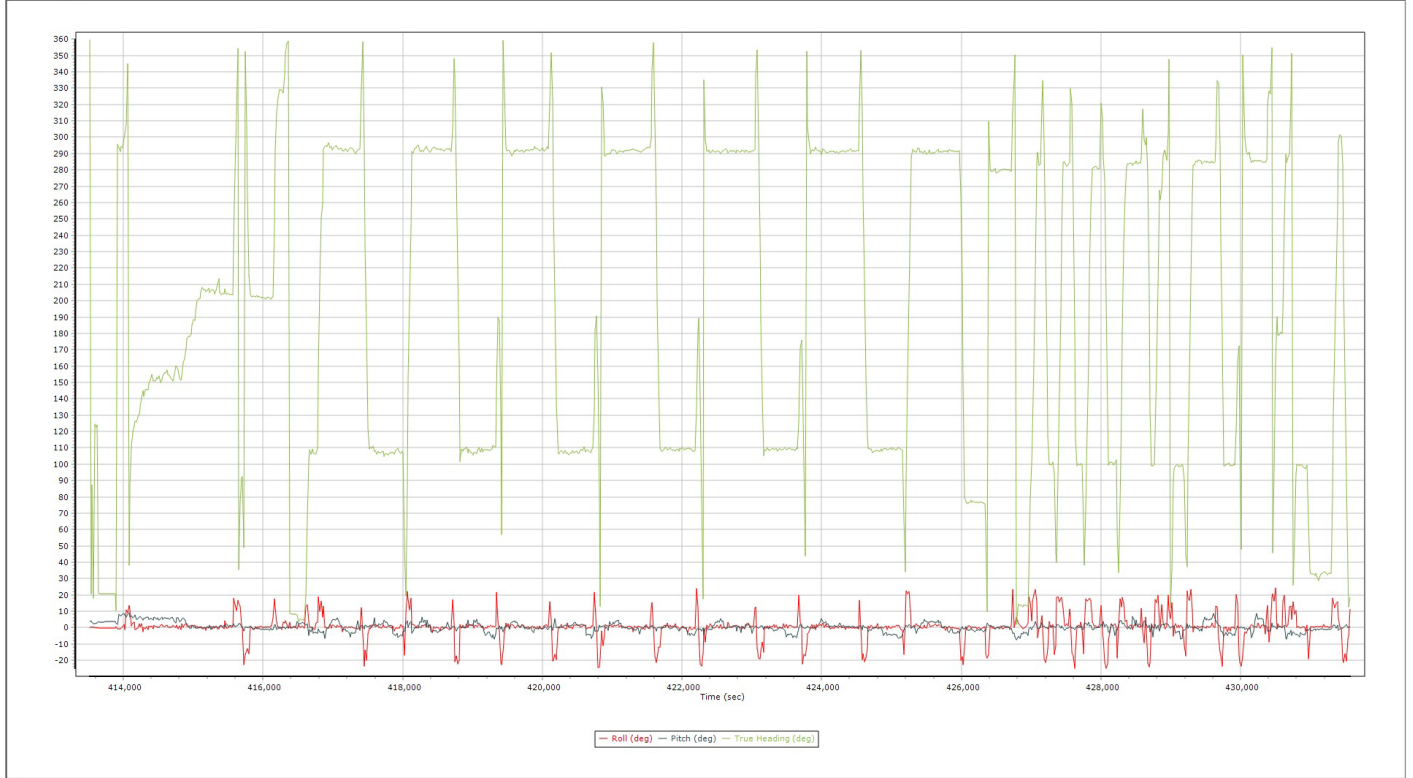
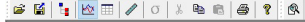
Ready
Display - GW_11-17-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame



Ready

Display - GW_11-17-16A_315_N7269T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: P486

Coordinates

Latitude: N 33 15 36.67494000

Longitude: W 116 19 20.18099000

Altitude: 127.0510 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: TRM59800-80 w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P486 Station Fullname: P486

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859-277-8701

Date Flown: ~~11/17/16~~ 11/17/16
 Takeoff Time (Z): Local: 1055 Airport: (U)
 Landing Time (Z): Local: 1616 Airport: (D)

Pilot: ~~DOXEY~~ DOXEY
 Technician: ~~KORTZ~~ KORTZ
 Aircraft: ~~N7269T~~ N7269T

Date Information
 LIDAR Unit: 12SEN315
 HD #: 2
 POS/IPAS File #: 201117 1111102222
 from → to: 643 → 669
 FCMS File #:

Quantum SPATIAL

LIDAR MISSION RECORD SHEET

Project Name: **EASTERN SD COUNTY LIDAR**
 Project Number: **16159**
 FCMS .fpd File/Nav File:

Project Scanning Requirements
 Field of View: 28 Ground Speed (kts): 115
 Scan Rate: 48.1 Hz Altitude AGL (ft): 5,900
 Pulse Rate Frequency: 125 kHz/MPIA or SPIA?:
 Laser Output Current: %

GPS Base Location(s): N/A
 PDPD Avoidance: N/A
 Static or Flyover? FLYOVER (9, 11, 12) → If flyovers, times: 1:30-1:35, 1:42-1:45, 1:42-1:47

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)	
22	1	1140	1143	8500	NE	~3°	115	~100%	CROSSFLIGHT WINDS OUT OF THE WEST AGAIN	
9	2	1146	1155	8000	NW	0	140	%		
10	3	1157	1204	8000	SE		130	%		
11	4	1208	1217	8100	NW		110	%		
12	5	1219	1228	8100	SE		125	%		
13	6	1230	1241	8200	NW		105	%		
14	7	1243	1251	8500	SE		140	%		
15	8	1254	1305	8500	NW		107	%		
16	9	1307	1316	8700	SE		136	%		
17	10	1318	1330	8600	NW		99	%		
18	11	1331	1340	8500	SE		135	%		
19	12	1342	1354	8600	NW		101	%		
20	13	1356	1405	8900	SE		130	%		
21	14	1407	1419	8500	NW		89	%		
36	15	1433	1435	6900	N		115	%		SMOOTHISH; CROSSFLIGHT
1	16	1437	1438	6600	W		130	%		SMOOTH

Additional Notes:

Mission Page 2 of 2

PG. 2 11/17/16

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

EASTERN SD COUNTY LIDAR
16159

Project Name: **EASTERN SD COUNTY LIDAR**
 Project Number: **16159**
 FCMS .fpd File/Nav File: _____

Pilot: **DOXEY**
 Technician: **KORZEP**
 Aircraft: **N7269T**

Date Flown: _____
 Takeoff Time (Z): _____ Local: _____ Airport: _____
 Landing Time (Z): _____ Local: _____ Airport: _____

Weather: _____ Ground: _____

Begin Temp: _____
 Begin Dewpoint: _____
 Begin Pressure: _____
 End Temp: _____
 End Dewpoint: _____
 End Pressure: _____

Data Information
 LIDAR Unit: **12SEN315**
 HD #: _____
 POS/IPAS File #: _____
 from → to →
 FCMS File #: _____

Project Scanning Requirements
 Field of View: _____ Ground Speed (kts): _____
 Scan Rate: _____ Hz Altitude AGL (ft): _____
 Pulse Rate Frequency: _____ kHz MPIA or SPIA?: _____
 Laser Output Current: _____ %

GPS Base Location(s): _____
 PDPD Avoidance: _____
 Static or Flyover?: _____

→ If flyovers, times:

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
2	17	1440	1441	6800	E	0	120	~180	WINDS SWIRLING
3	18	1443	1445	6900	W		111	%	
4	19	1436	1448	7100	E		120	%	
5	20	1490	1452	7300	W		115	%	
6	21	1454	1456	7600	E		120	%	
7	22	1458	1502	7900	W		95	%	
8	23	1504	1505	8500	E		160	0	BLIND ZONE, RESTARTED
8	24	1509	1512	8800	E		135	~100	
8	25	1515	1520	8500	W		88	~100	
8	26	1522	1524	9500	E		135	~90	HIS BLIND ZONE @ END; REFLEW
8	27	1529	1533	9000	W		90	~100	REFLEW REFUGHT OF PREVIOUS
8	28	1534	1535	9800	S		120	~100	CROSSFLIGHT
8	29	1539	1541	9500	E		140	~100	GINGOM
11								%	

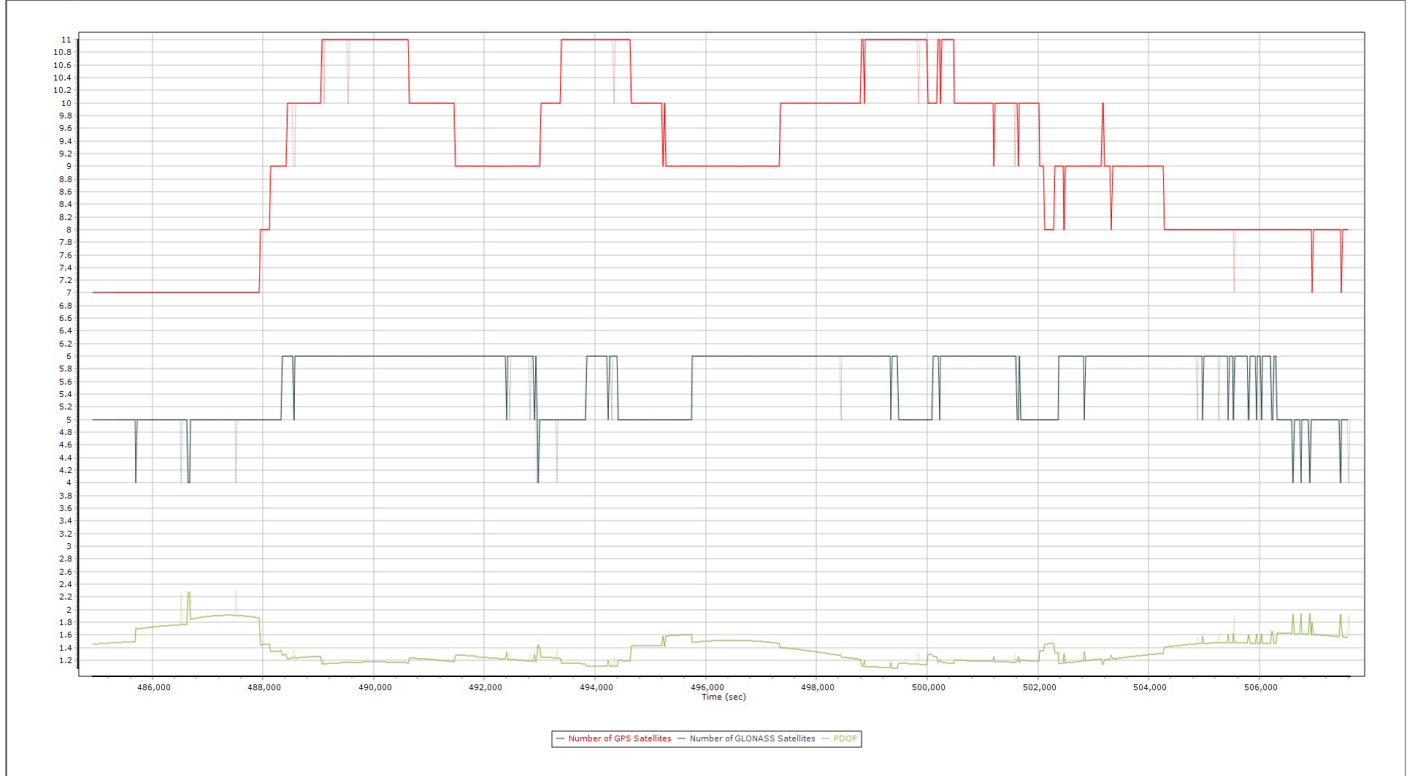
Additional Notes: _____

Mission Page **2** Of **2**

Nov 18, 2016-A (N7269T, SN315)

Display - GW_11-18-16A_315_N7269T - Solution Status

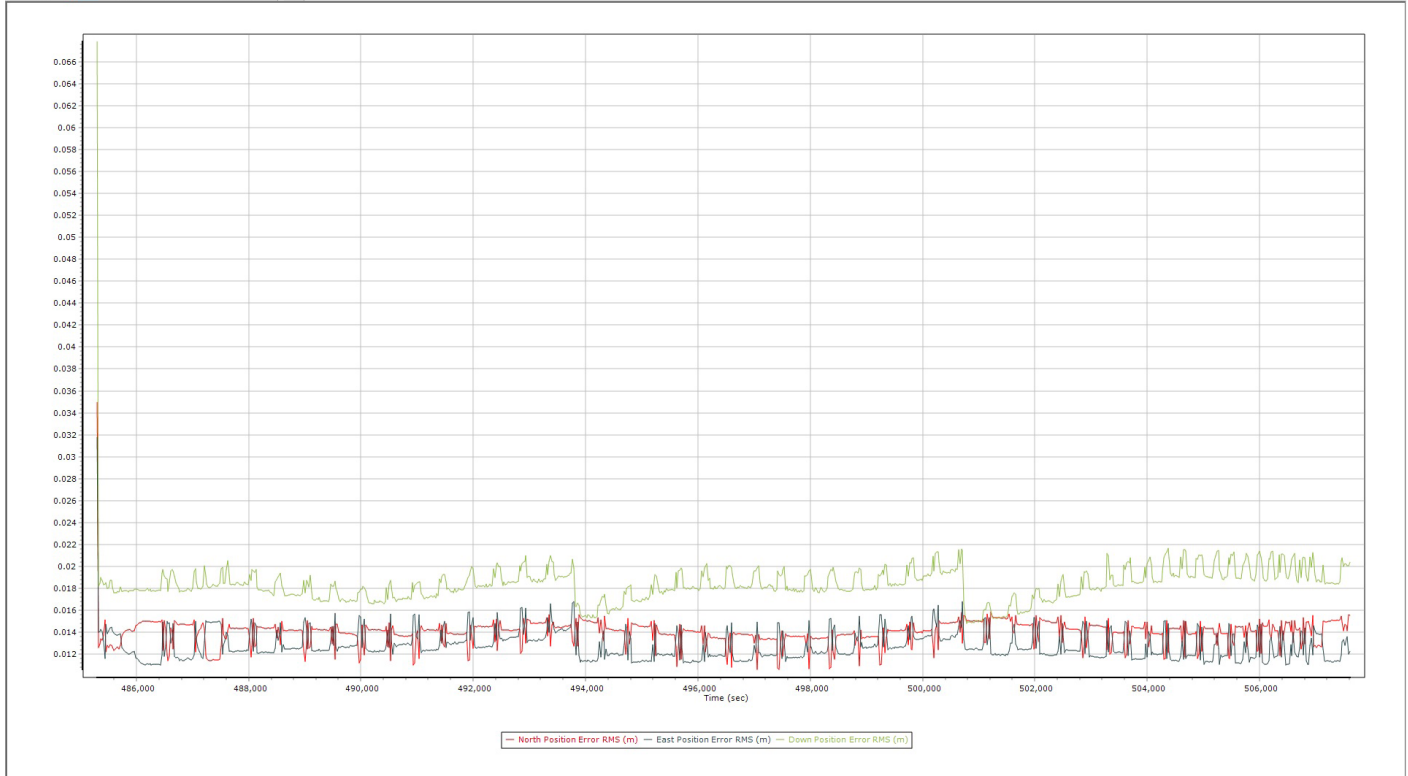
File Edit Tools View Help



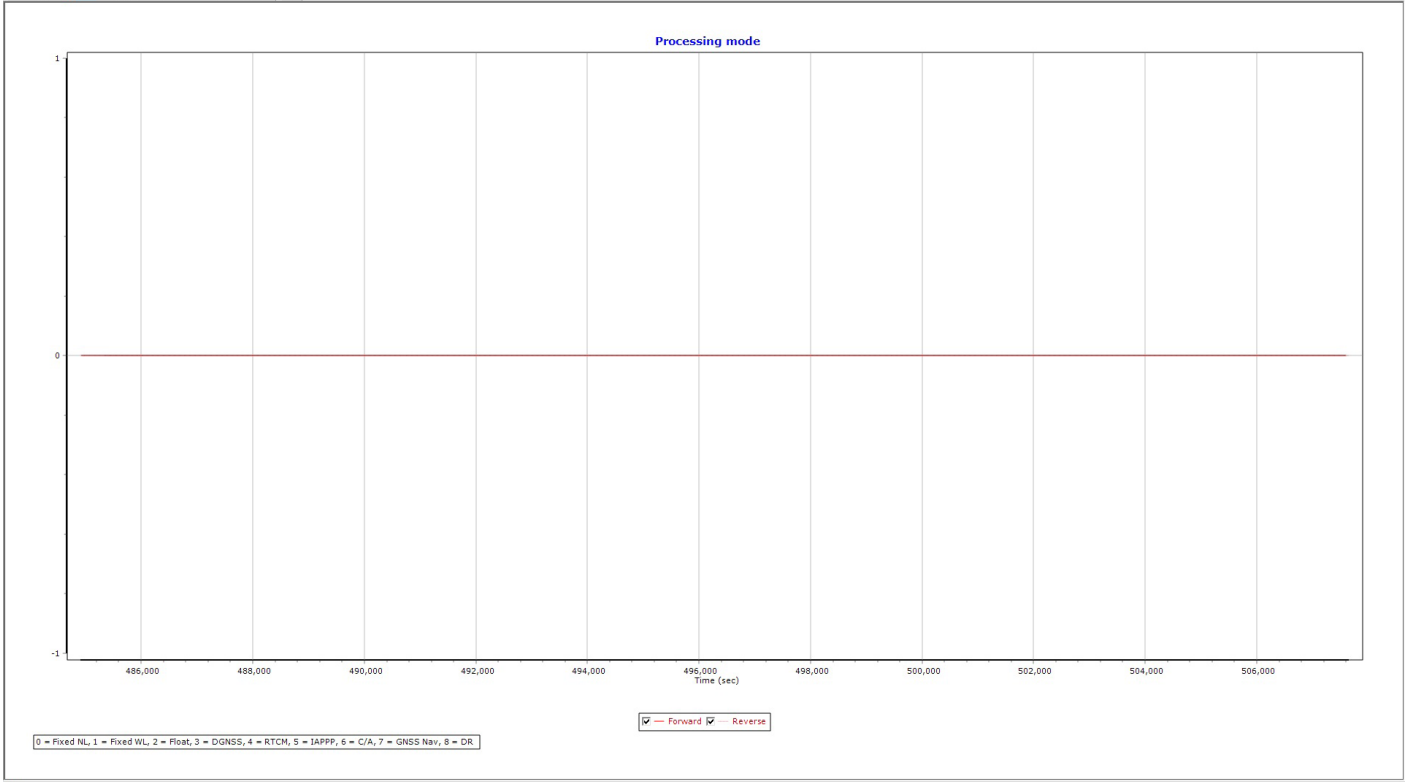
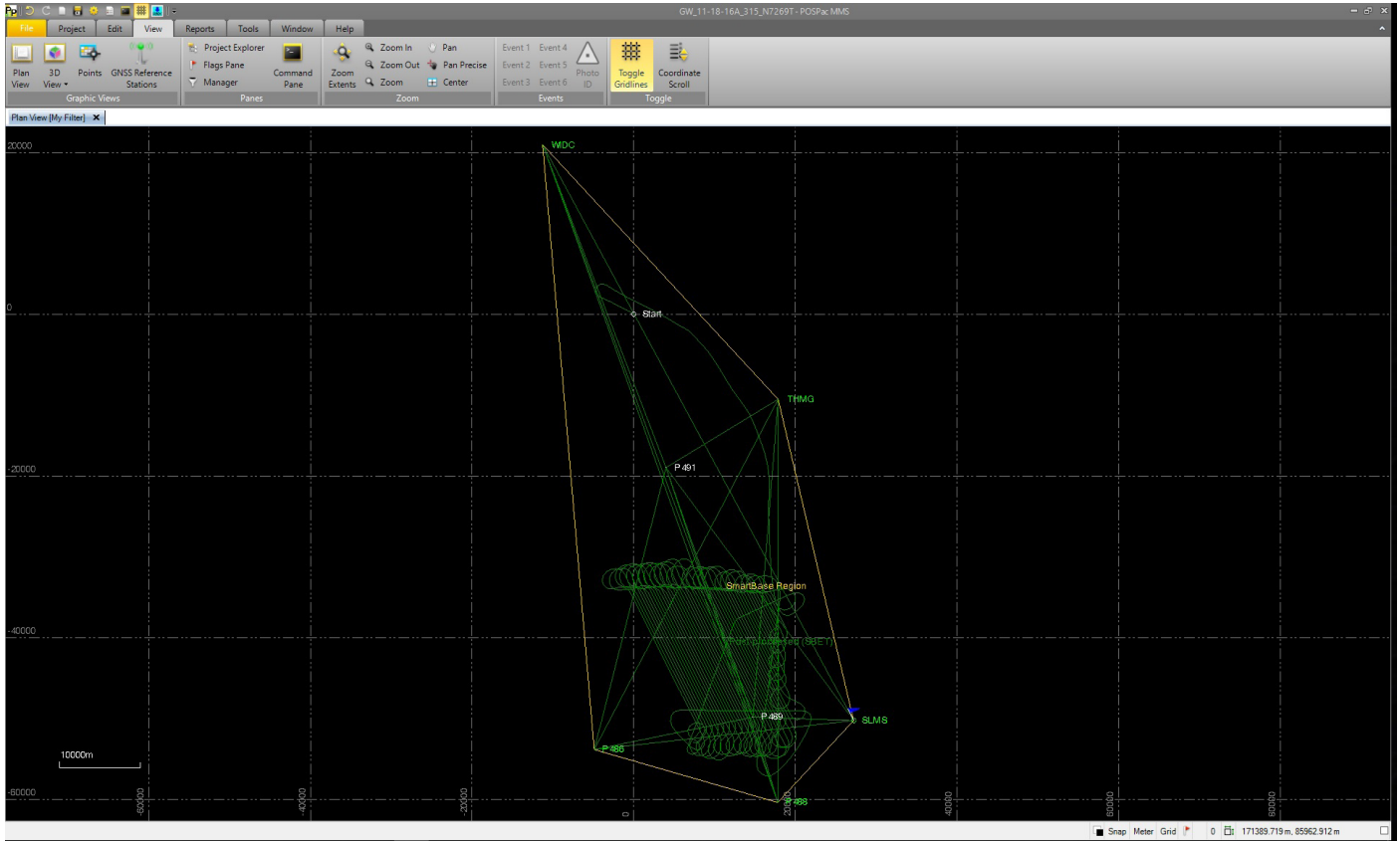
Ready

Display - GW_11-18-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

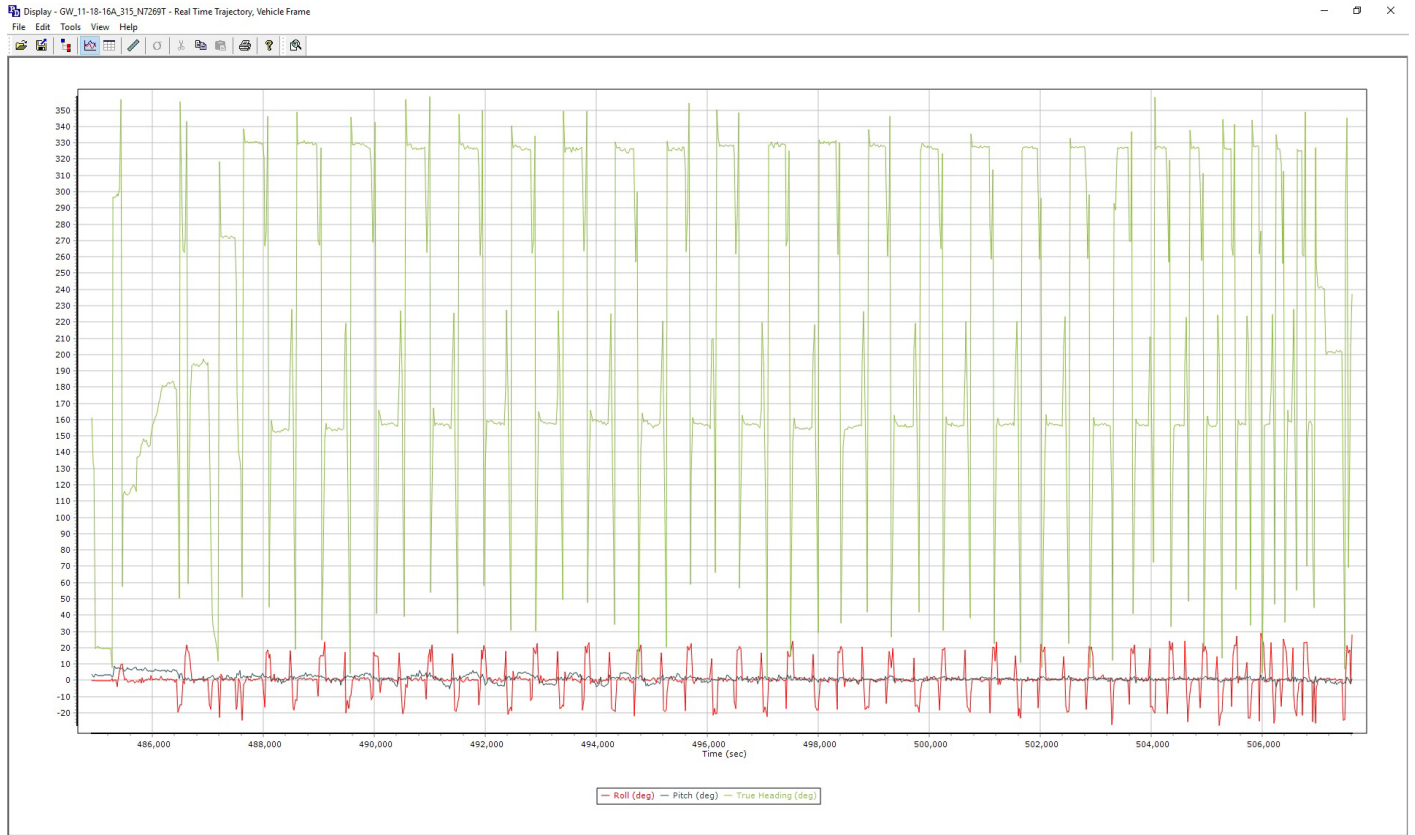
File Edit Tools View Help



Ready



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

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

Secondary Service ID:

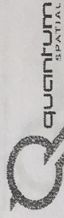
Station ID	Station Full...	Frame	Epoch	Ellipsoid	Latitude	Longitude	Altitude	Coord Acc

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	11/18/16	Local: 0648	Local: 1315	Local: 0648	Local: 1315	Local: 0648	Local: 1315
Takeoff Time (Z)							
Landing Time (Z)							
Pilot	DOXEY						
Technician	KORZEP						
Aircraft	N726RT						
Weather							
Begin Temp	11						
Begin Dewpoint	-10						
Begin Pressure	32.18						
End Temp	24						
End Dewpoint	-14						
End Pressure	30.10						

Data Information	
LIDAR Unit	12SEN715
HD #	2
POSIPAS File #	20161118 Mt Doorn
from → to	670 → 703
FCMS File #	



LIDAR MISSION RECORD SHEET

Project Name	EASTERN SD COUNTY LIDAR	
Project Number	16159	
FCMS .fpd File/Nav File	3540 - H300 - S1ED - MNBLOCK - V2	
Project Scanning Requirements		
Field of View	10	Ground Speed (kts): 115
Scan Rate	42	Hz Altitude AGL (ft): 9842
Pulse Rate Frequency	75	KHz/MPIA or SPIA?:
Laser Output Current		%

GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER

-- if flyovers, times: 0711-0716; 0751-1256

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
57	1	0719	0724	10,500	W	0	115	~100 %	CROSS FLIGHT SMOOTH
9	2	0727	0732	11,000	NW		107	%	
10	3	0735	0740	11,200	SE		119	%	
11	4	0743	0748	11,700	NW		109	%	
12	5	0751	0756	12,000	SE		120	%	
13	6	0759	0805	12,300	NW		105	%	
14	7	0807	0813	12,600	SE		125	%	
15	8	0815	0821	12,800	NW		105	%	
16	9	0823	0829	13,000	SE		123	%	
17	10	0831	0837	13,000	NW		109	%	
18	11	0840	0845	13,100	SE		121	%	
19	12	0847	0853	13,100	NW		111	%	
20	13	0855	0900	13,200	SE		102	%	
21	14	0903	0908	13,300	NW		118	%	
22	15	0911	0916	13,300	SE		128	%	
23	16	0918	0924	13,300	NW		109	%	

Additional Notes:

Mission Page 1 of 3

PG. 2 11/18/16 LIFT1

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

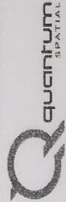
Date Flown	
Takeoff Time (Z):	Local: <input type="text"/>
Landing Time (Z):	Local: <input type="text"/>

Pilot	
Technician	
Aircraft	

Project Scanning Requirements	
Field of View	Ground Speed (kts):
Scan Rate	Hz Altitude AGL (ft):
Pulse Rate Frequency	KHz/MPIA or SPIA?:
Laser Output Current	%

GPS Base Location(s)	
PDOP Avoidance	
Static or Flyover?	-- if flyovers, times:

Data Information	
LIDAR Unit	
HD #	
POS/IPAS File #	
from → to	→
FCMS File #	



Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
24	17	0926	0932	13,200	SE	0	125	~100	%
25	18	0934	0939	13,100	NW		117		%
26	19	0941	0947	13,100	SE		128		%
27	20	0949	0954	13,000	NW		120		%
28	21	0956	1002	12,700	SE		117		%
29	22	1004	1009	12,400	NW		128		%
30	23	1012	1017	12,300	SE		121		%
31	24	1020	1024	12,000	NW		126		%
32	25	1027	1032	11800	SE		124		%
33	26	1034	1039	11500	NW		119		%
34	27	1042	1047	11400	SE		124		%
35	28	1050	1055	11,000	NW		121		%
36	29	1058	1103	11,000	SE		121		%
37	30	1109	1110	11,000	NW		119		%
38	31	1113	1118	11,100	SE		117		%
39	32	1120	1125	11,000	NW		124		%

Additional Notes:

Mission Page 2 Of 3

PG. 3 11/18/16 LIFT 1

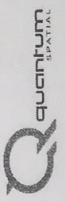
Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	
Takeoff Time (Z):	Local:
Landing Time (Z):	Local:
	Airport:
	Airport:

Pilot	
Technician	
Aircraft	

Data Information	
LIDAR Unit	
HD #	
POS/IPAS File #	
from → to	→
FCMS File #	

Project Scanning Requirements	
Field of View	Ground Speed (kts):
Scan Rate	Hz/Altitude AGL (ft):
Pulse Rate Frequency	kHz/MPIA or SPIA?:
Laser Output Current	%



Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
40	33	1127	1132	11,000	SE	0	121	~100	5/20/17
41	34	1135	1139	10,900	NW		125	%	
42	35	1142	1147	10,800	SE		119	%	
43	36	1148	1152	10,700	NW		125	%	
44	37	1155	1158	10,500	SE		125	%	
45	38	1201	1204	10,300	NW		121	%	
46	39	1206	1209	10,300	SE		125	%	
47	40	1211	1213	10,400	NW		117	%	
48	41	1216	1219	10,500	SE		122	%	
49	42	1221	1223	10,400	NW		117	%	
50	43	1225	1227	10,400	SE		125	%	
51	44	1229	1231	10,500	NW		117	%	
52	45	1233	1235	10,400	SE		126	%	
53	46	1237	1238	10,100	NW		122	%	
54	47	1240	1241	9900	SE		130	%	
55	48	1243	1244	9900	NW		119	%	
Additional Notes:									
56	49	1246	1247	9800	SE		125		
58	50	1249	1251	9600	W		105		

Mission Page 3 of 3

CROSSFLIGHT

Nov 18, 2016-B (N7269T, SN315)

Display - GW_11-18-168_315_N7269T - Solution Status

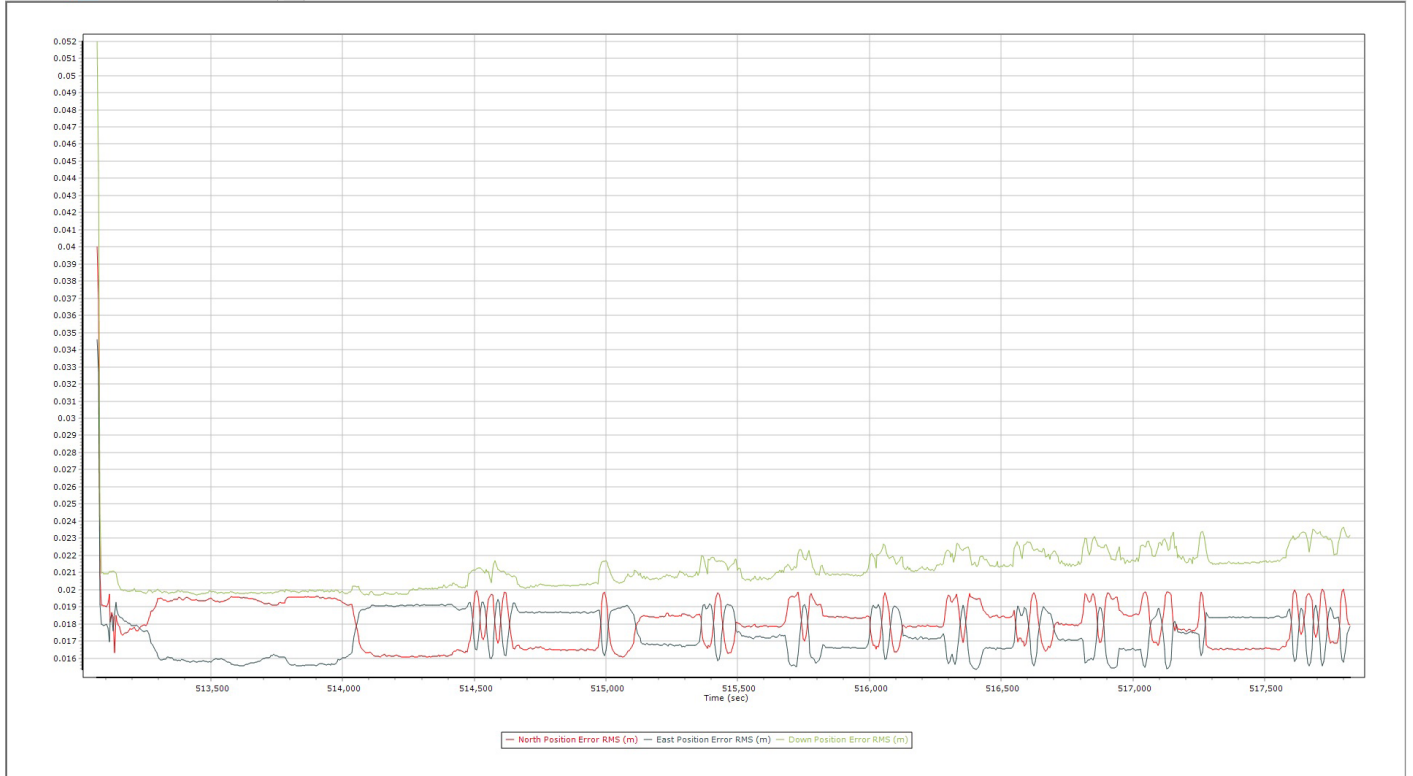
File Edit Tools View Help



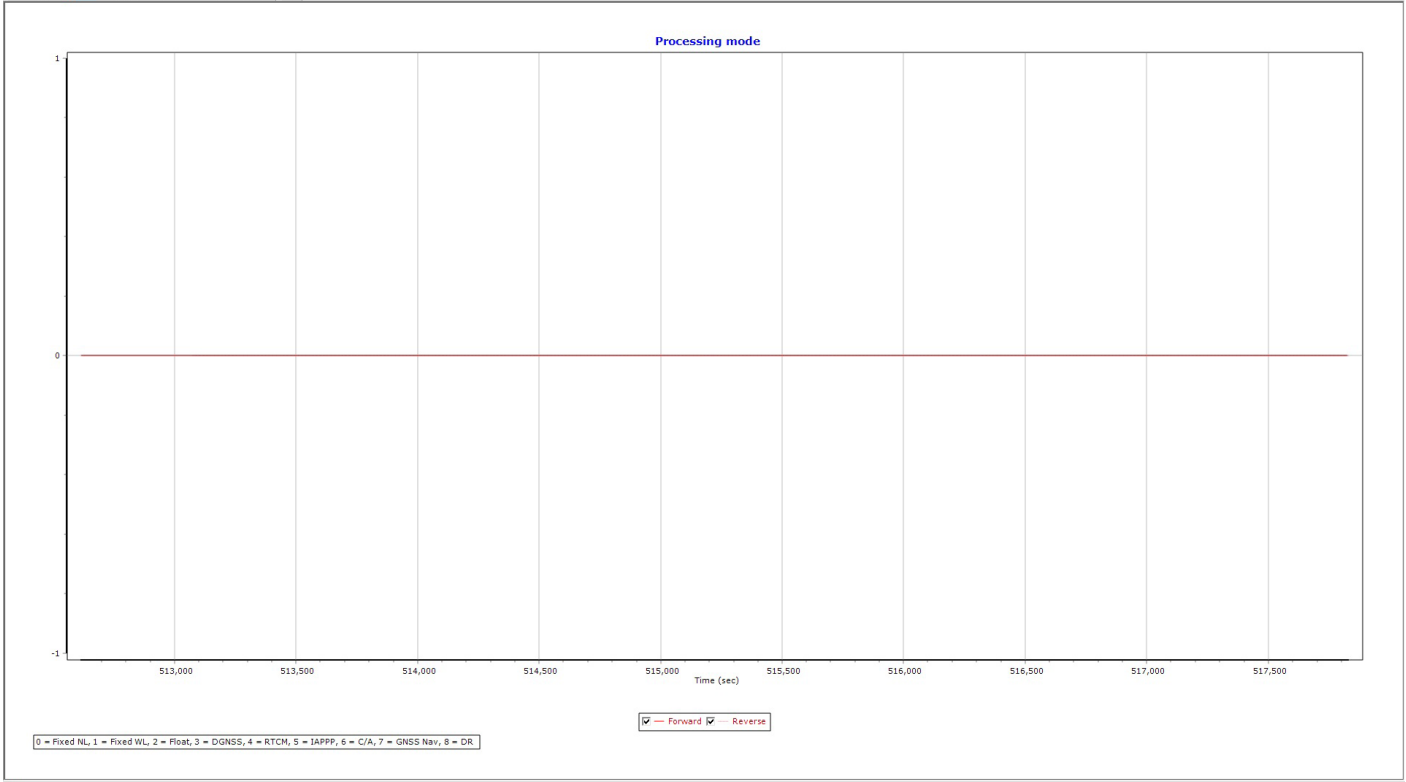
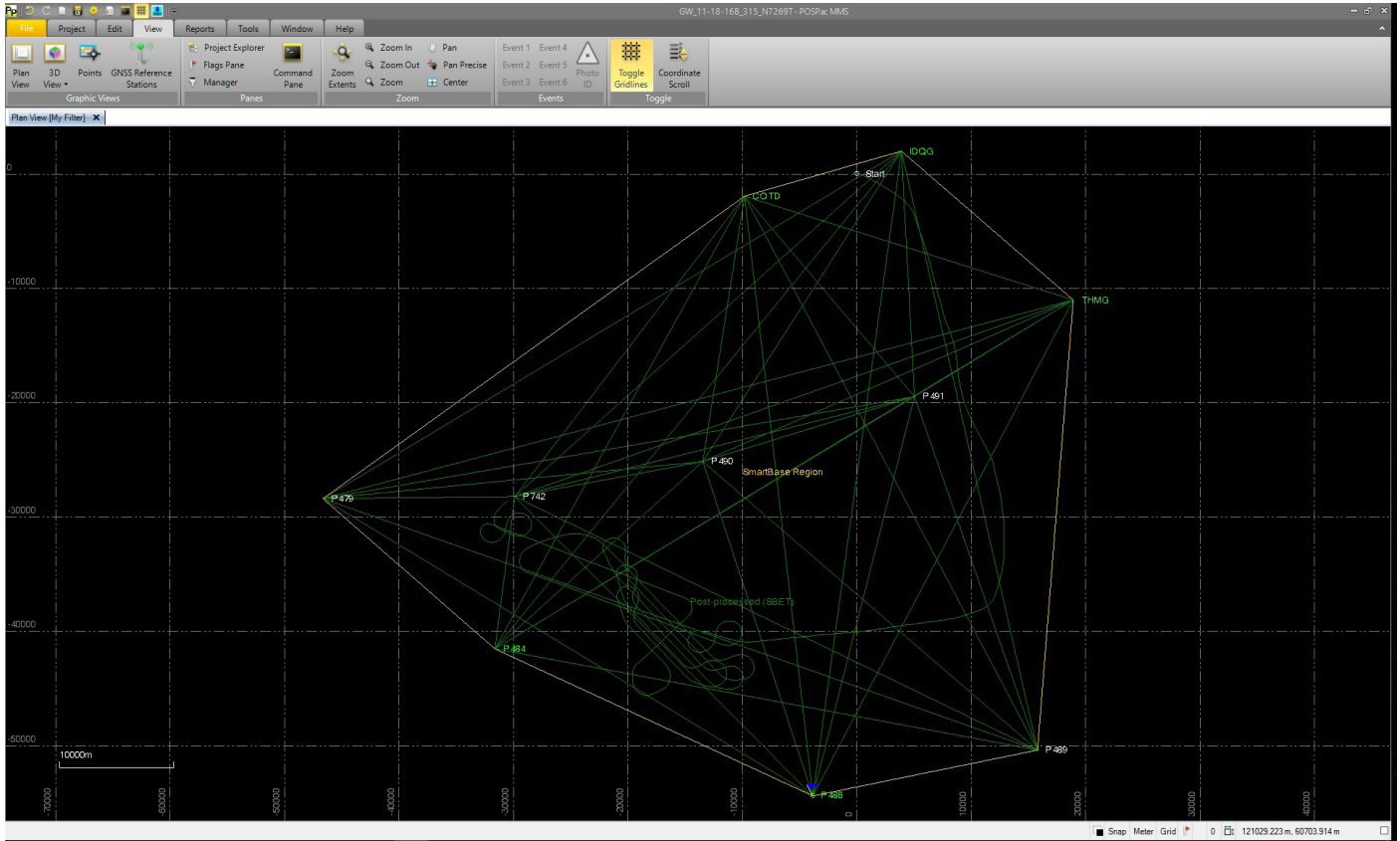
Ready

Display - GW_11-18-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready



Ready



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

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

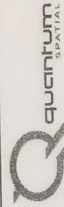
Flight Log

Quantum Spatial 523 Wellington Way -Lexington KY 40503 859.277.8700

Date Flown	11/19/16
Takeoff Time (Z):	Local: 0645
Landing Time (Z):	Local: 1105
Takeoff Time (Z):	Local: 0645
Landing Time (Z):	Local: 1105
Takeoff Time (Z):	Local: 0645
Landing Time (Z):	Local: 1105

Pilot	POKEY
Technician	KOZZER
Aircraft	N7269T

Data Information	
LIDAR Unit	125EN315
HD #	3
POS/PAS File #	20161118MUNES-1MEX
from → to	712 → 733
FCMS File #	



LIDAR MISSION RECORD SHEET	
Project Name	EASTERN SD COUNTY LIDAR
Project Number	16159
FCMS .ipd File/Nav File	3850-1700-4LED-MUNES-1
Field of View	28
Scan Rate	40.1
Pulse Rate Frequency	125
Laser Output Current	
Ground Speed (kts):	115
Hz Altitude AGL (ft):	5900
KHz MPJA or SPIA? %	

GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER
→ If flyovers, times: 0719-0724; 1072-1037	

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Tide, Etc.)
12	1	0725	0728	8800	W	0	97	~100	(REFLEW LATER IN LEFT (BLIND ZONE)) WIND OUT OF WEST ATC MADE US DESCEND FOR TRAFFIC, REFLEW WEST WIND REFUGIT (LINES) WEST WIND
13	2	0731	0734	9200	E		138	%	
14	3	0736	0741	8800	W		95	%	
15	4	0743	0747	9200	E		140	%	
16	5	0749	0755	8700	W		93	%	
17	6	0757	0801	9400	E		130	%	
18	7	0805	0812	9300	W		91	%	
19	8	0815	0822	9500	E		131	%	
20	9	0825	0834	9700	W		113	%	
21	10	0836	0844	9700	E		138	%	
22	11	0847	0856	8800	W		95	%	
23	12	0858	0904	8900	E		138	%	
24	13	0907	0913	7500	N		107	%	
25	14	0916	0920	8400	E		135	%	
26	15	0924	0928	8700	W		89	%	
27	16	0929	0933	9100	E		122	%	

Additional Notes:

Mission Page 1 of 2

LIDAR MISSION RECORD SHEET

PG. 2 11/19/16

LIFT 1

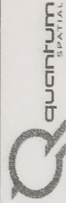
Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Project Name		Pilot	
Project Number		Technician	
FCMS .lod File/Nav File		Aircraft	

Date Flown	
Takeoff Time (Z):	Local:
Landing Time (Z):	Local:

Weather	Ground	Airport
Begin Temp		
Begin Dewpoint		
Begin Pressure		
End Temp		
End Dewpoint		
End Pressure		

Data Information	
LIDAR Unit	
HD #	
POS/IPAS File #	
from → to	→
FCMS File #	



Project Scanning Requirements

Field of View	Ground Speed (kts):
Scan Rate	Hz Altitude AGL (ft):
Pulse Rate Frequency	KHz/MPIA or SPIA?:
Laser Output Current	%

GPS Base Location(s)	
PDOP Avoidance	
Static or Flyover?	

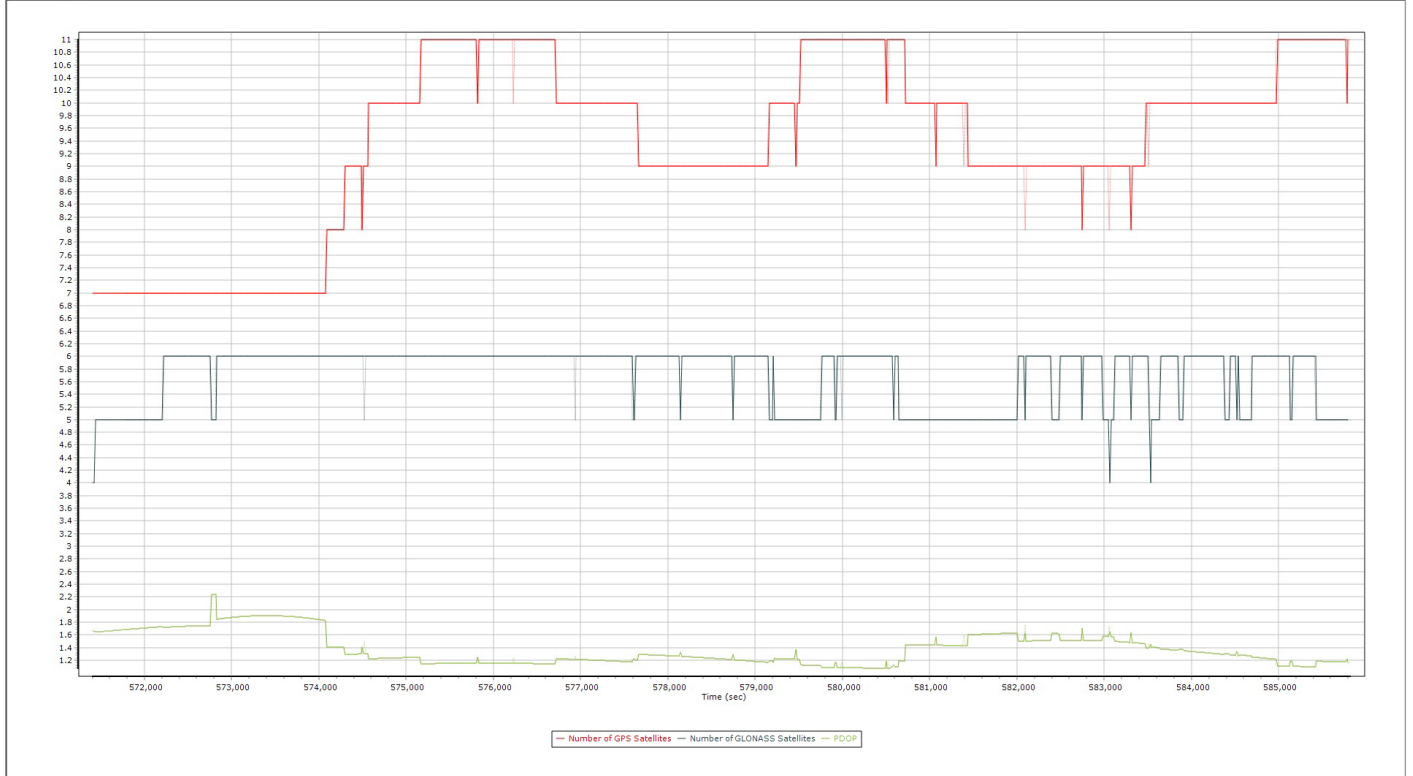
Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
28	17	0947	0951	8900	W	0	109	~100	WIND OUT OF WEST
31	18	0953	0955	9000	E		119	%	
30	19	0957	1000	9100	W		103	%	
33	20	1002	1003	8900	E		130	%	
34	21	1006	1007	8200	W		119	%	
32	22	1011	1013	8600	W		115	%	
35	23	1016	1021	9100	N		117	%	
12	24	1023	1026	8500	E	↓	145	%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	

Additional Notes: _____ Mission Page 2 of 2

Nov 19, 2016-A (N7269T, SN315)

Display - GW_11-19-16A_315_N7269T - Solution Status

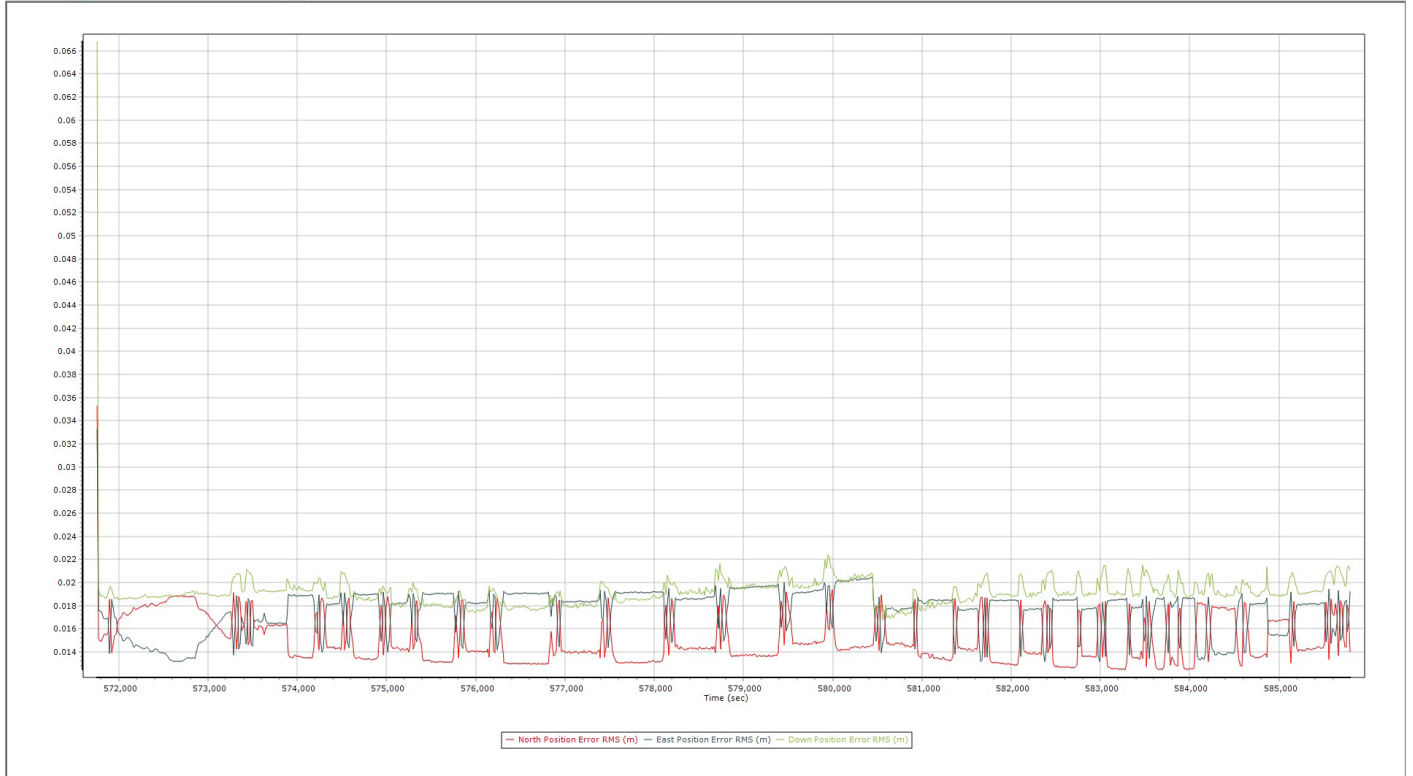
File Edit Tools View Help



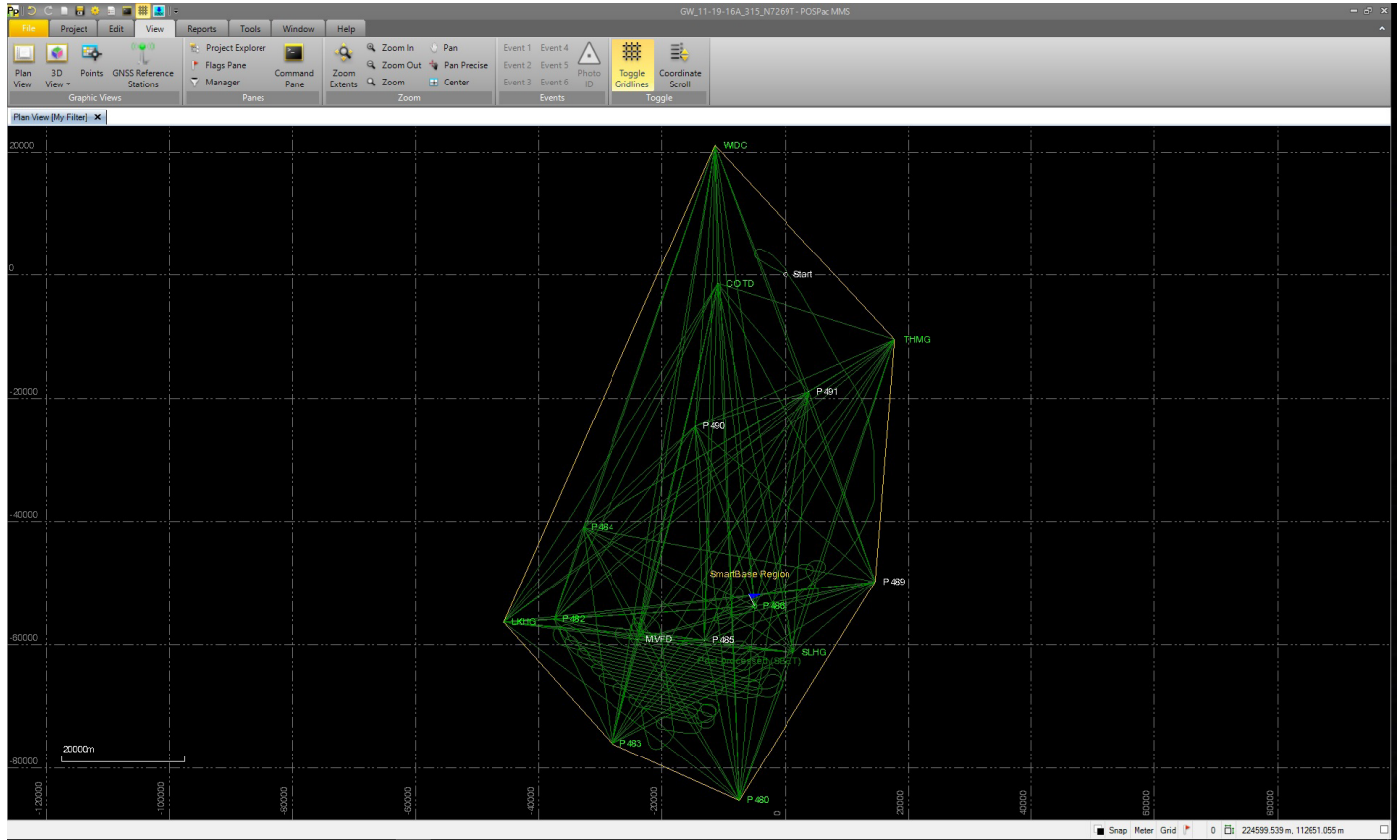
Ready

Display - GW_11-19-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

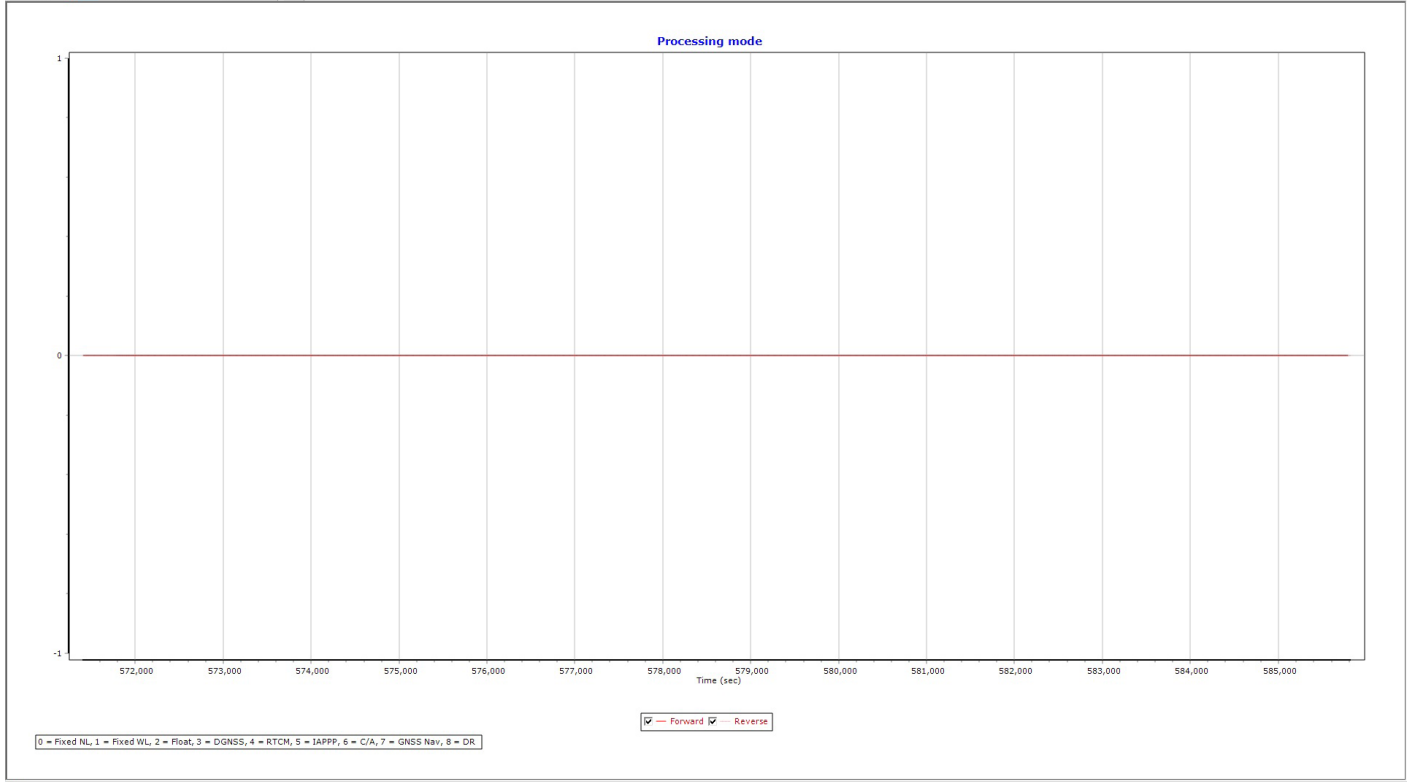
File Edit Tools View Help



Ready

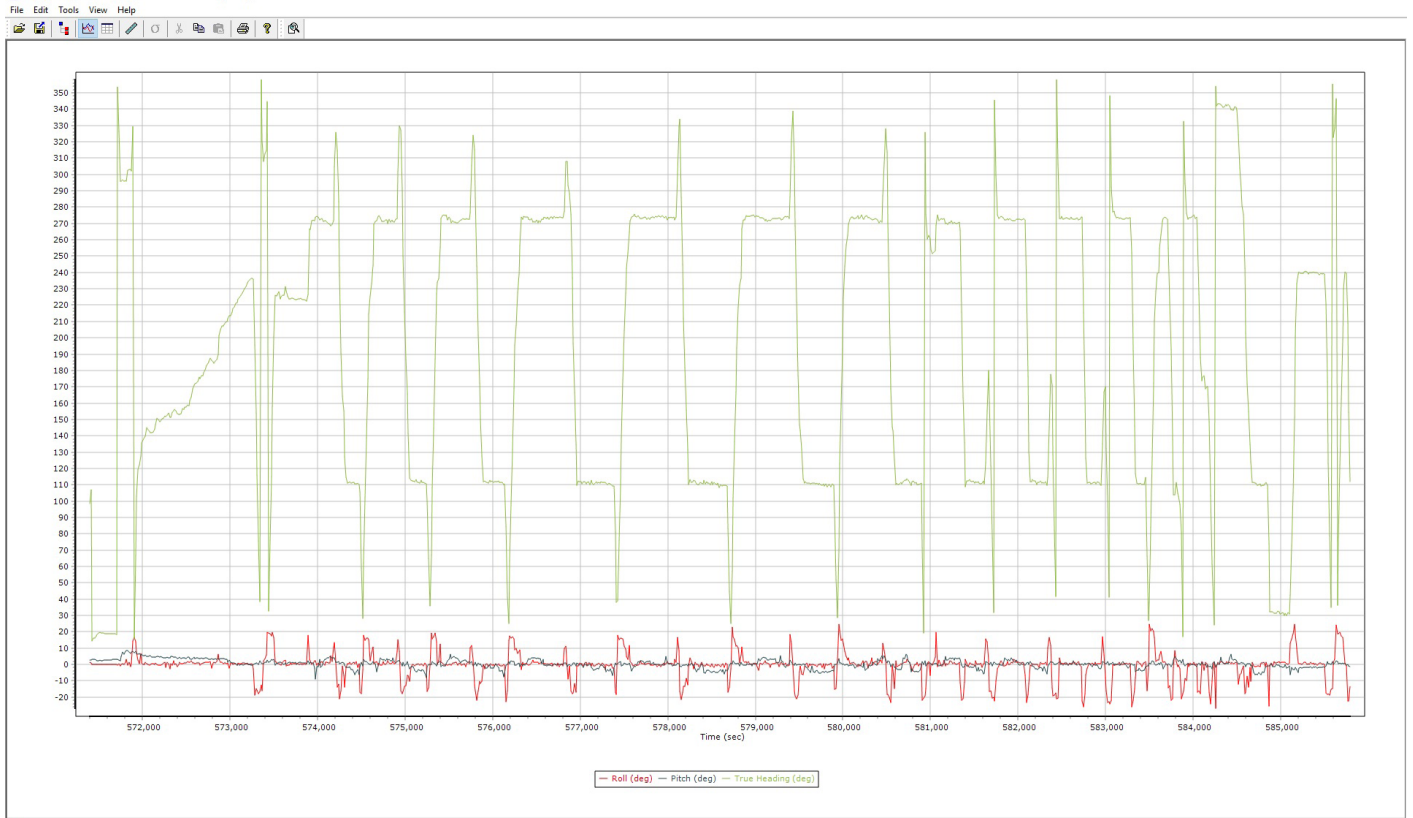


Display - GW_11-19-16A_315_N7269T - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-19-16A_315_N7269T - Real Time Trajectory, Vehicle Frame



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

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	11/19/16
Takeoff Time (Z):	Local: 0645
Landing Time (Z):	Local: 1105
Takeoff Time (Z):	Local: 0645
Landing Time (Z):	Local: 1105
Takeoff Time (Z):	Local: 0645
Landing Time (Z):	Local: 1105

Pilot	POKEY
Technician	KOZZER
Aircraft	N7269T

Data Information	
LIDAR Unit	125EN315
HD #	3
POS/PAS File #	20161118MUNES-1MEX
from → to	712 → 733
FCMS File #	



LIDAR MISSION RECORD SHEET	
Project Name	EASTERN SD COUNTY LIDAR
Project Number	16159
FCMS .ipd File/Nav File	3850-1700-4ED-MUNES-1
Field of View	28
Scan Rate	40.1
Pulse Rate Frequency	125
Laser Output Current	
Ground Speed (kts):	115
Hz Altitude AGL (ft):	5900
KHz MPA or SPIA? %	

GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER
→ If flyovers, times: 0719-0724, 1072-1037	

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
12	1	0725	0728	8800	W	0	97	~100	(REFLEW LATER IN LEFT (BLIND ZONE)) WIND OUT OF WEST ATC MADE US DESCEND FOR TRAFFIC, REFLEW WEST WIND REFUGIT (LINES) WEST WIND
13	2	0731	0734	9200	E		138	%	
14	3	0736	0741	8800	W		95	%	
15	4	0743	0747	9200	E		140	%	
16	5	0749	0755	8700	W		93	%	
17	6	0757	0801	9400	E		130	%	
18	7	0805	0812	9300	W		91	%	
19	8	0815	0822	9500	E		131	%	
20	9	0825	0834	9700	W		113	%	
21	10	0836	0844	9700	E		138	%	
22	11	0847	0856	8800	W		95	%	
23	12	0858	0904	8900	E		138	%	
24	13	0907	0913	7500	N		107	%	
25	14	0916	0920	8400	E		135	%	
26	15	0924	0928	8700	W		89	%	
27	16	0929	0933	9100	E		122	%	

Additional Notes: Mission Page 1 of 2

LIDAR MISSION RECORD SHEET

PG. 2 11/19/16

LIFT 1

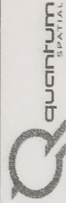
Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Project Name		Pilot	
Project Number		Technician	
FCMS .lod File/Nav File		Aircraft	

Date Flown	
Takeoff Time (Z):	Local:
Landing Time (Z):	Local:

Weather	Ground	Airport
Begin Temp		
Begin Dewpoint		
Begin Pressure		
End Temp		
End Dewpoint		
End Pressure		

Data Information	
LIDAR Unit	
HD #	
POS/IPAS File #	
from → to	→
FCMS File #	



Project Scanning Requirements

Field of View	Ground Speed (kts):
Scan Rate	Hz Altitude AGL (ft):
Pulse Rate Frequency	KHz/MPIA or SPIA?:
Laser Output Current	%

GPS Base Location(s)	
PDOP Avoidance	
Static or Flyover?	

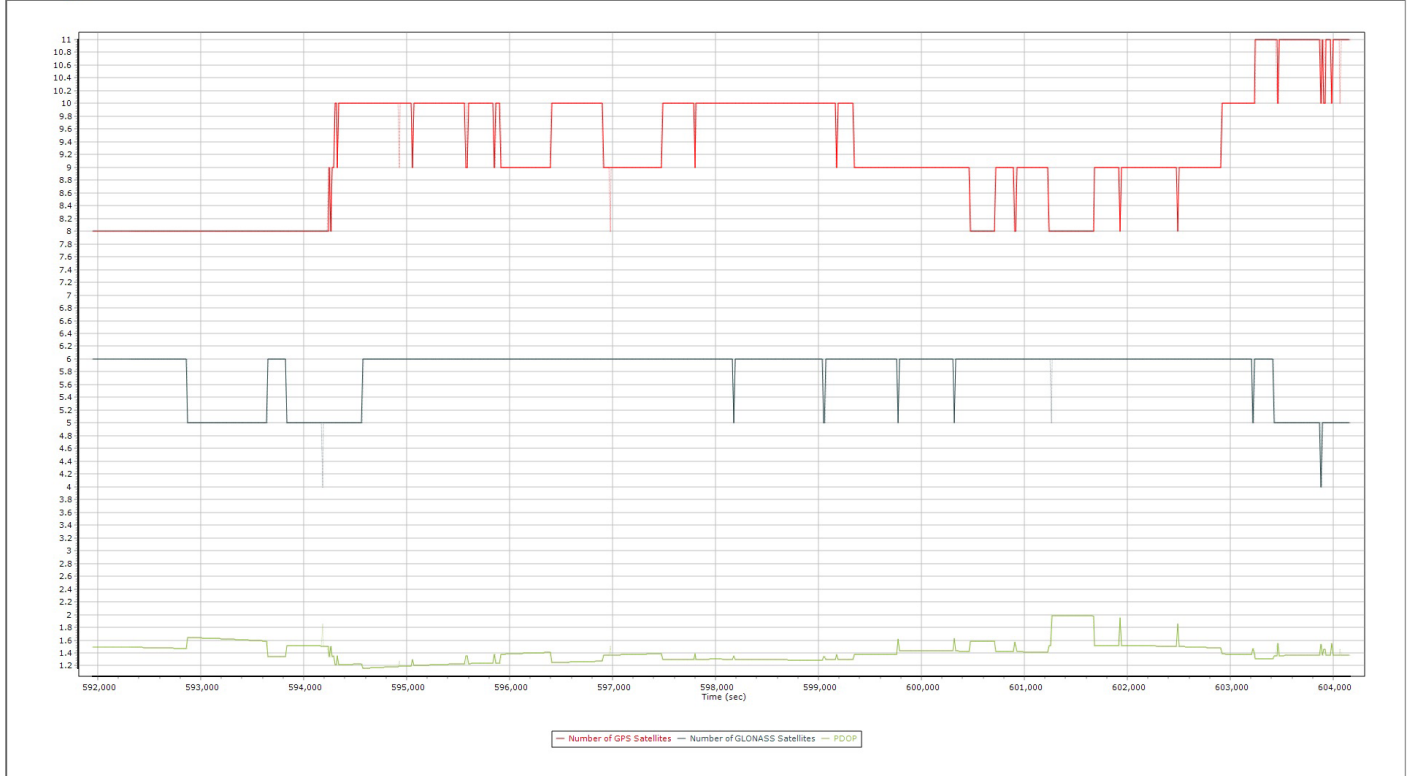
Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
28	17	0947	0951	8900	W	0	109	~100	WIND OUT OF WEST
31	18	0953	0955	9000	E		119		
30	19	0957	1000	9100	W		103		
33	20	1002	1003	8900	E		130		
34	21	1006	1007	8200	W		119		
32	22	1011	1013	8600	W		115		
35	23	1016	1021	9100	N		117		
12	24	1023	1026	8500	E	↓	145		
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	

Additional Notes: _____ Mission Page 2 of 2

Nov 19, 2016-B (N7269T, SN315)

Display - GW_11-19-168_315_N7269T - Solution Status

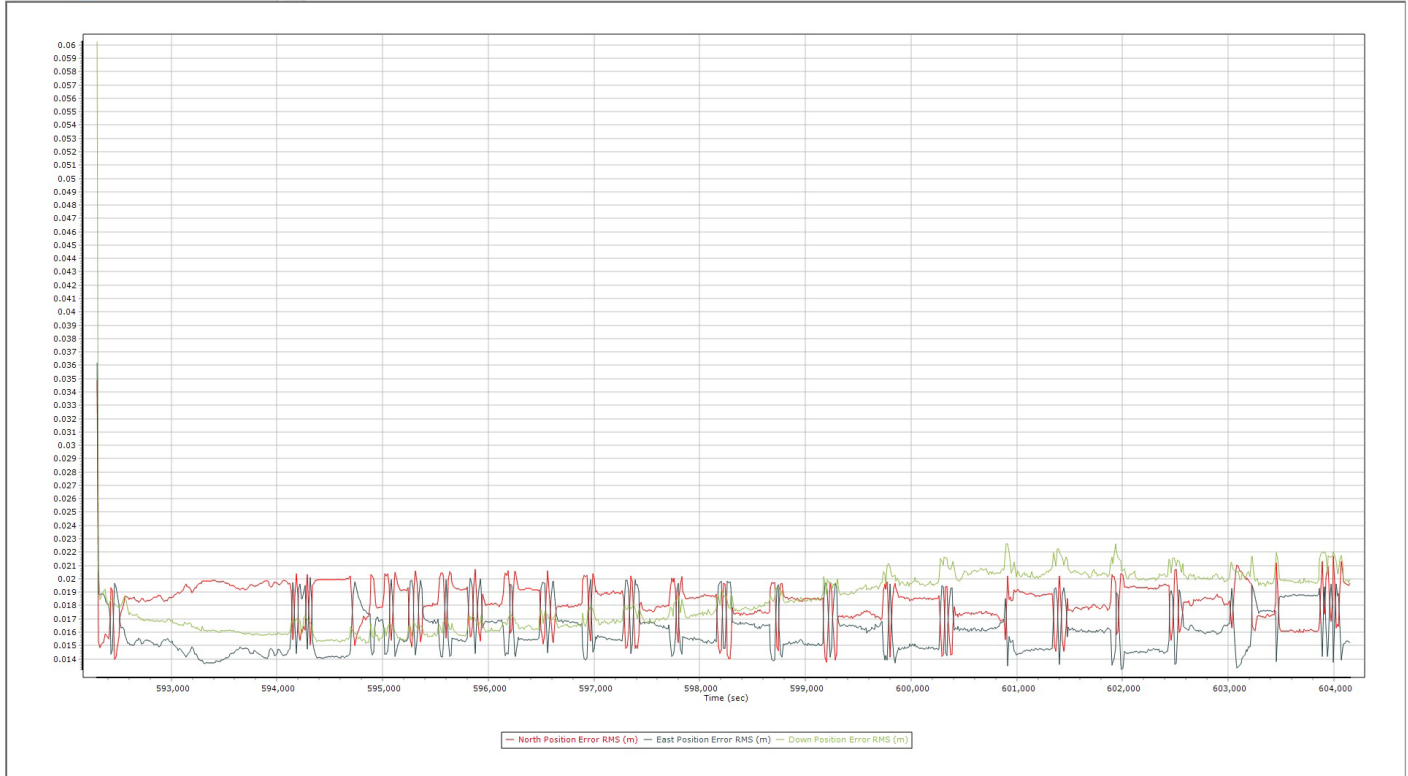
File Edit Tools View Help



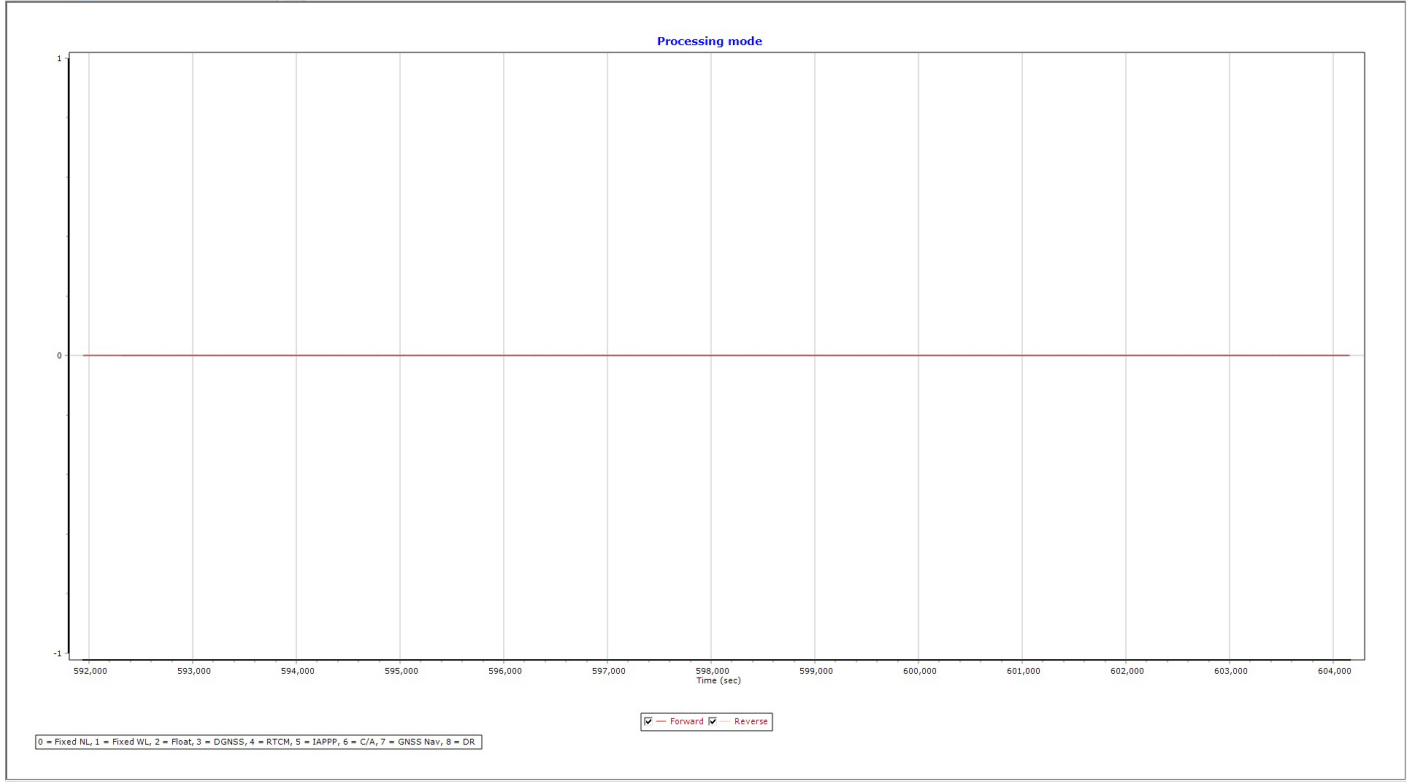
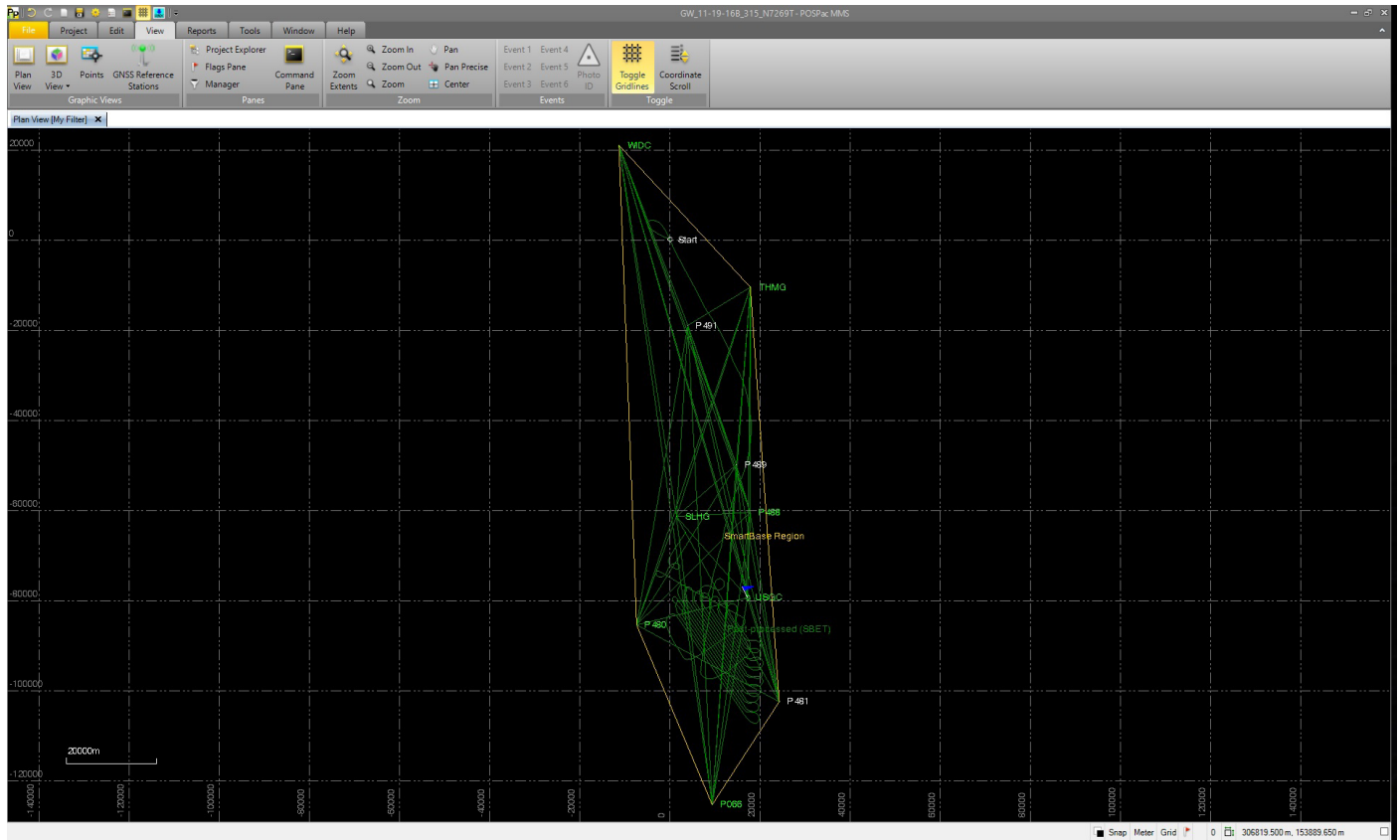
Ready

Display - GW_11-19-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

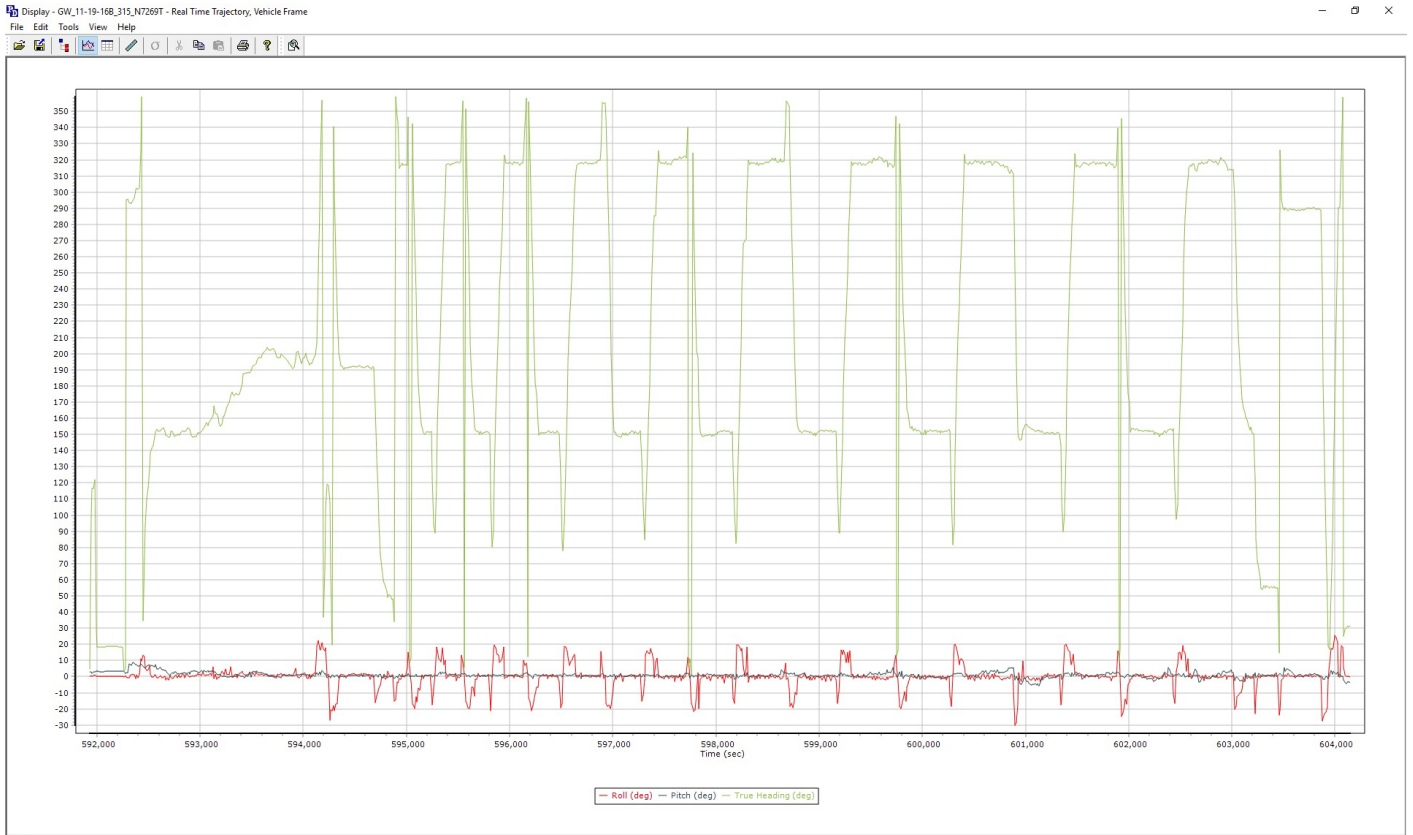
File Edit Tools View Help



Ready



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

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
[Empty Table]								

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	11/19/16	Local: 12:30	Airport: UDD
Takeoff Time (Z):		Local: 1607	Airport: UDD
Landing Time (Z):			

Pilot	DOKEY
Technician	KORZEP
Aircraft	N7269T

LIDAR Unit	125EN315
HD #	3
POSIPAS File #	201119 East Mex W
from → to	734 → 751
FCMS File #	



LIDAR MISSION RECORD SHEET

Project Name	EASTERN SD COUNTY LIDAR
Project Number	16159
FCMS .fpd File/Nav File	3450_11300_SLED_MEX_v1

Project Scanning Requirements	
Field of View	28
Scan Rate	418.1
Hz Rate Frequency	125
Laser Output Current	%
Ground Speed (kts)	115
Hz Altitude AGL (ft)	5900
Hz MPA or SPIA?	

GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER
→ If flyovers, times: 1305-1310, 1538-1543	

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
76	1	1315	1316	6500	NW	0	121	~100%	SMOOTH
75	2	1318	1320	6500	SE		117	%	
74	3	1322	1324	6600	NE		115	%	
73	4	1326	1329	6600	SW		122	%	
72	5	1331	1335	6500	NE		115	%	
71	6	1337	1340	6500	SW		117	%	
70	7	1343	1347	6600	NE		121	%	
69	8	1349	1353	6600	SW		117	%	
68	9	1356	1401	6700	NE		119	%	
67	10	1403	1408	6700	SW		117	%	
66	11	1411	1417	6600	NE		117	%	
65	12	1419	1425	6800	SW		115	%	
64	13	1427	1434	6700	NE		117	%	
63	14	1436	1444	6900	SW		122	%	
62	15	1445	1454	6700	NE		105	%	
61	16	1455	1501	7000	SW		123	%	

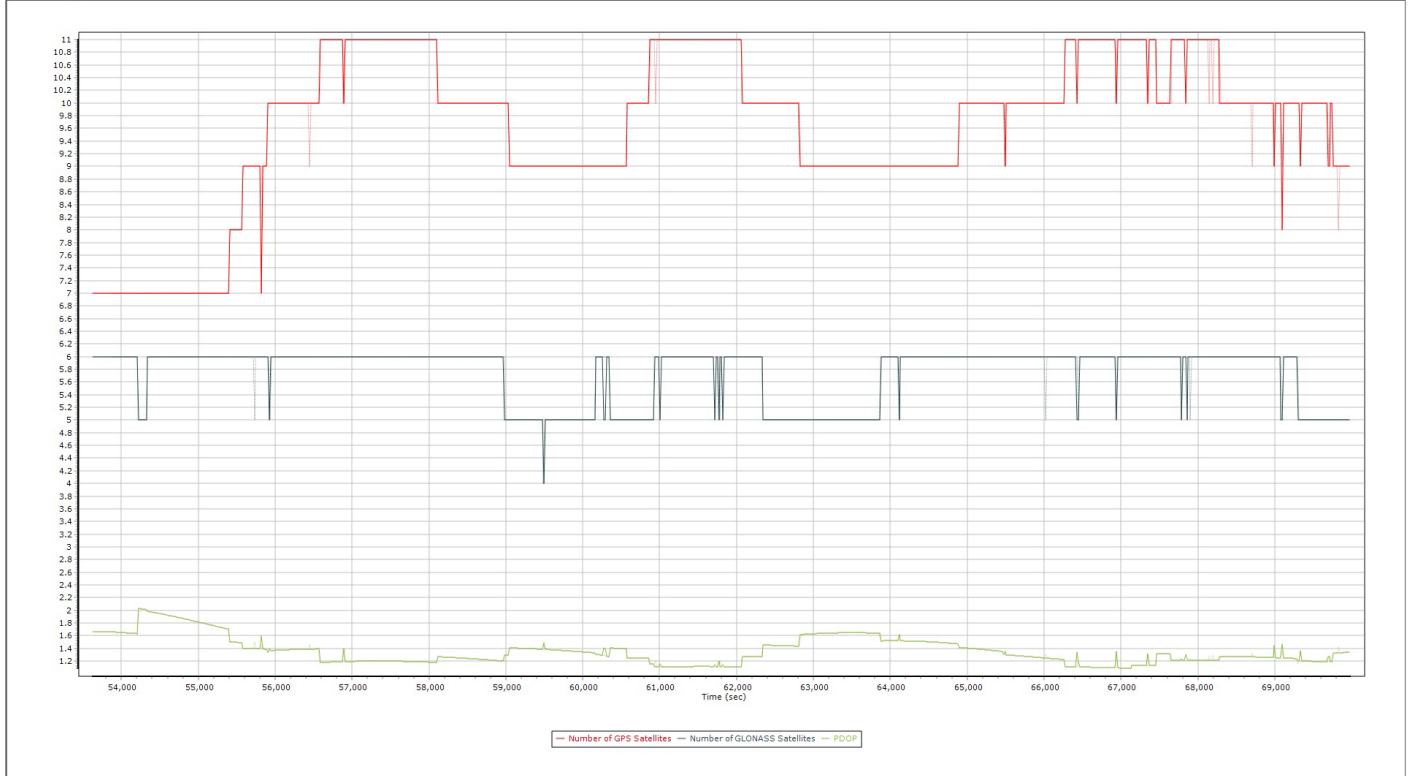
Additional Notes:

Mission Page 1 of 2

Nov 20, 2016-A (N7269T, SN315)

Display - GW_11-20-16A_315_N7269T - Solution Status

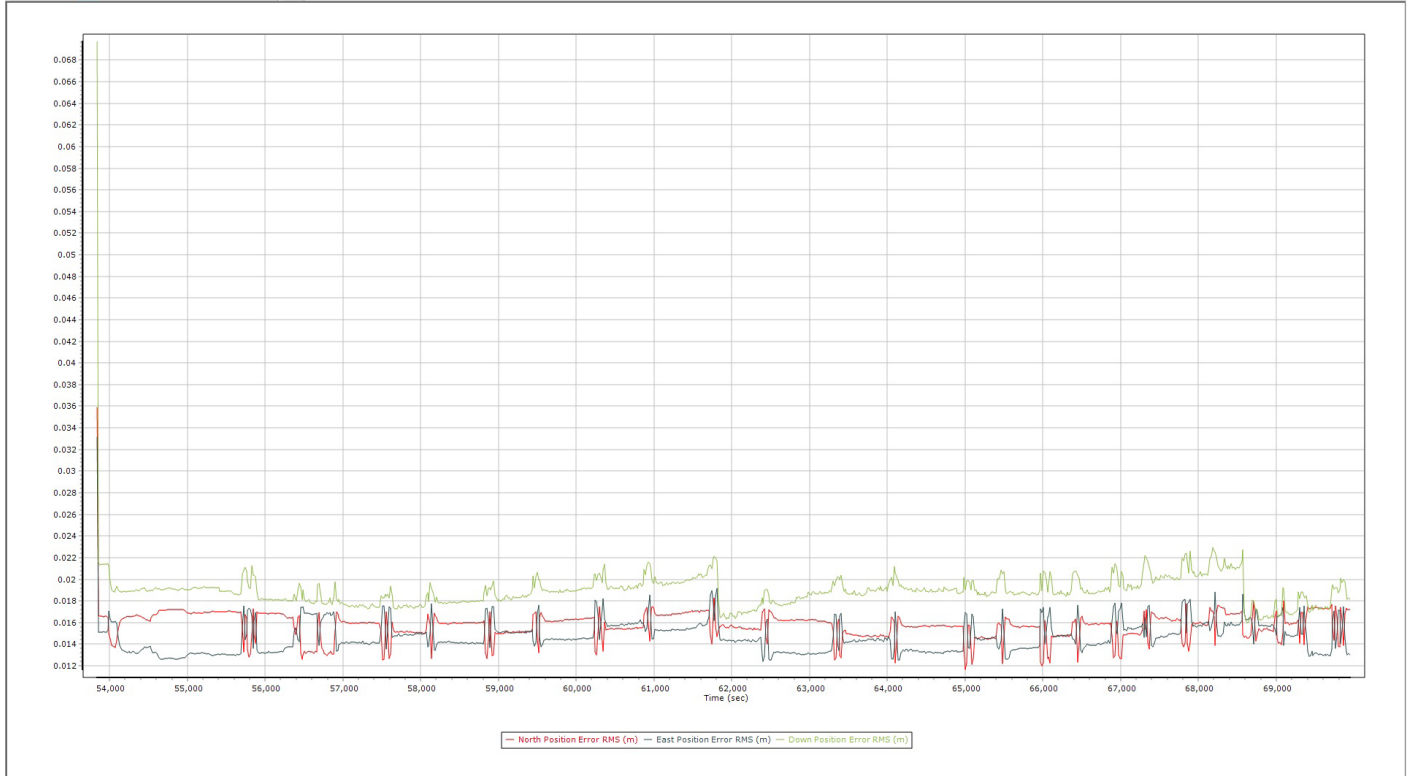
File Edit Tools View Help



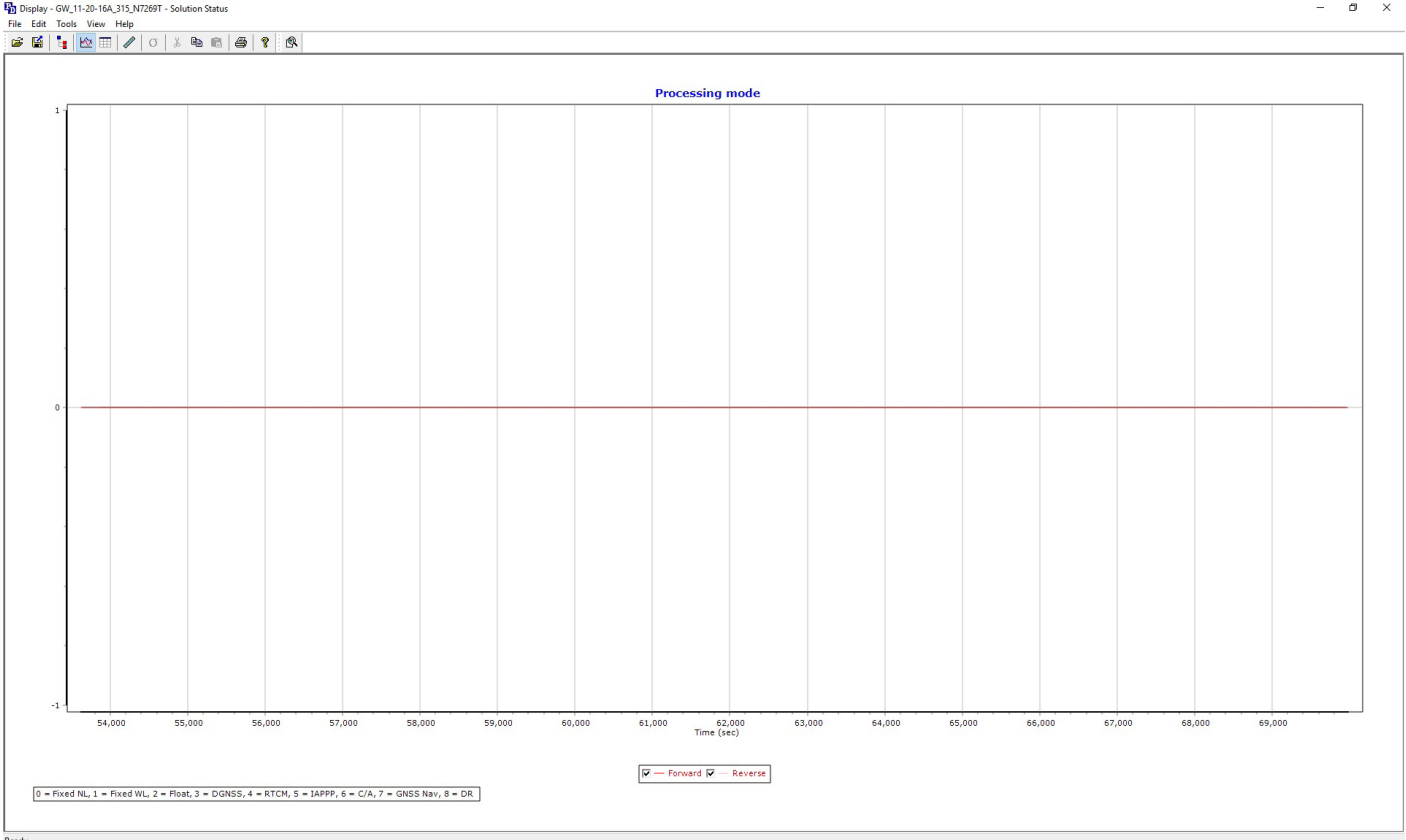
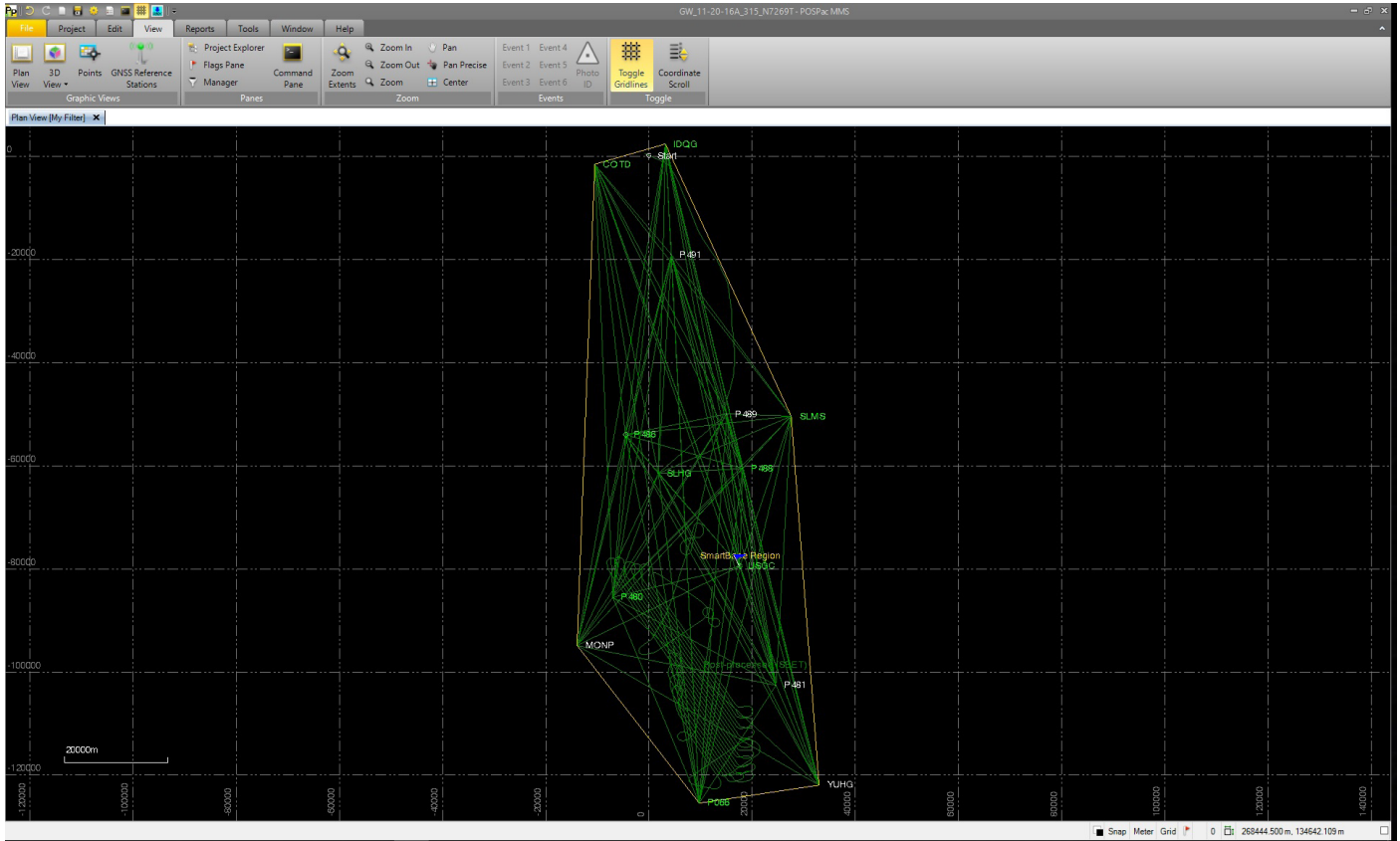
Ready

Display - GW_11-20-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help

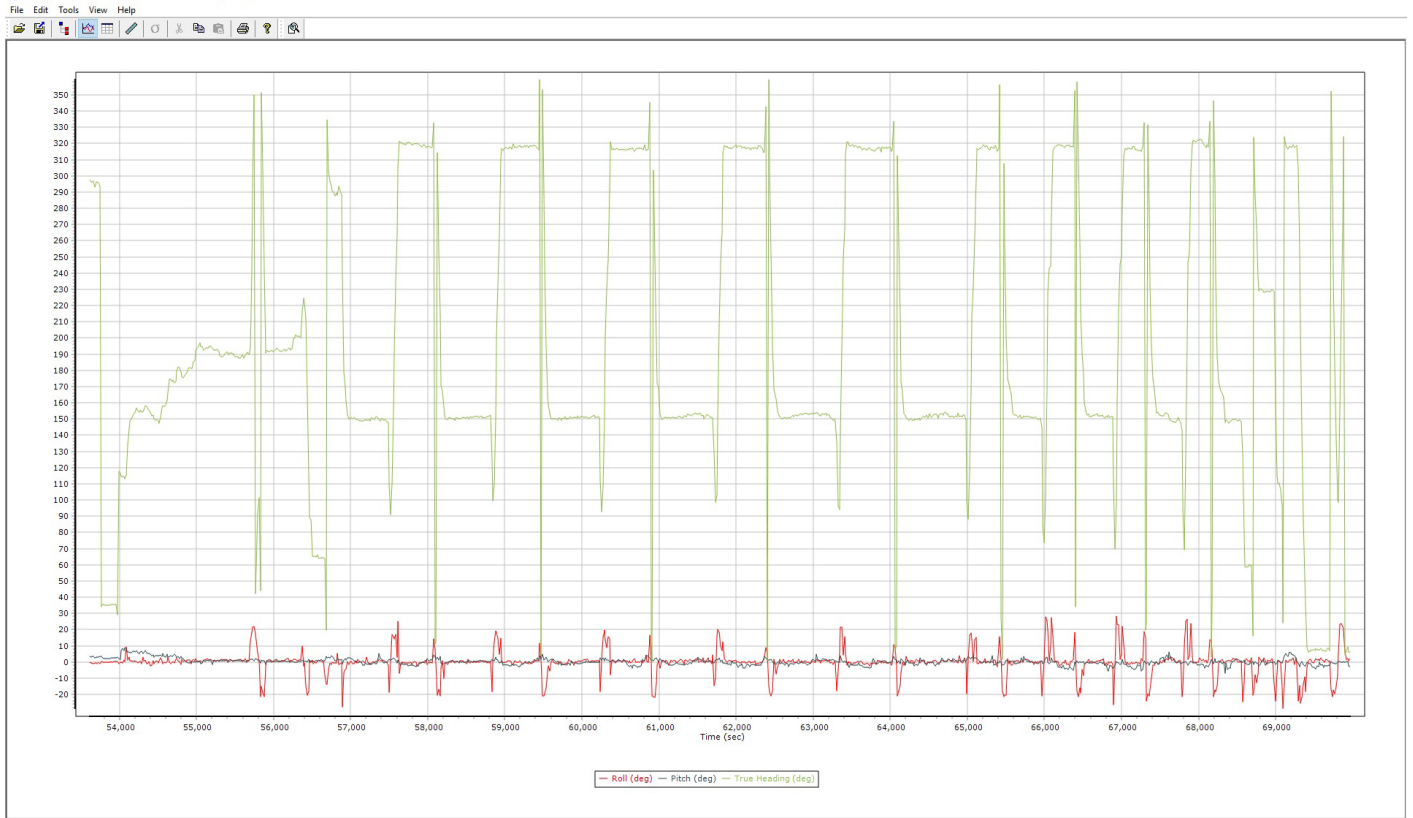


Ready



Ready

Display - GW_11-20-16A_315_N7269T - Real Time Trajectory, Vehicle Frame



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

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown: 11/20/19

Local: 0700

Local: 147

Takeoff Time (Z):

Landing Time (Z):

Local: 0700

Local: 147

Airport: UDD

Airport: UDD

Pilot: DOXEY

Technician: KORZEP

Aircraft: N7269T

Weather

Begin Temp: 15

Begin Dewpoint: -1

Begin Pressure: 29.93

End Temp: 23

End Dewpoint: -1

End Pressure: 29.93

Data Information

LIDAR Unit: 12 SEN 315

HD #: 3

POSIPAS File #: 2161120 NORTON MEX

from → to: 752 → 775

FCMS File #:

quantum SPATIAL

LIDAR MISSION RECORD SHEET

Project Name: EASTERN SD COUNTY LIDAR

Project Number: 16159

FCMS .fpd File/Nav File: 300_11300_5LED_MEX_V1

Project Scanning Requirements

Field of View: 28

Ground Speed (kts): 115

Scan Rate: 48.1

Hz Altitude AGL (ft): 5,900

Pulse Rate Frequency: 125

kHz MPA or SPIA?:

Laser Output Current: %

GPS Base Location(s): N/A

PDOP Avoidance: N/A

Static or Flyover?: FLYOVER

→ If flyovers, times: 0731-0736; 1116-1121

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
79	1	0740	743	6600	NE	0	126	~100	CROSSFLIGHT
57	2	0748	797	6600	SE		101	%	WIND OUT OF SOUTH
56	3	0759	807	6800	NW		132	%	
55	4	0809	819	6800	SE		103	%	
54	5	0821	830	6900	NW		126	%	
53	6	0832	843	7000	SE		105	%	
52	7	0845	853	7000	NW		132	%	
51	8	0856	907	6900	SE		113	%	
50	9	0909	918	7100	NW		135	%	
49	10	0921	934	7100	SE		113	%	
48	11	0936	946	7000	NW		135	%	
47	12	0948	1002	7200	SE		103	%	
46	13	1004	1009	7500	NW		130	%	
45	14	1012	1018	7500	SE		95	%	
44	15	1020	1025	8000	NW		135	%	
43	16	1028	1034	7900	SE		107	%	

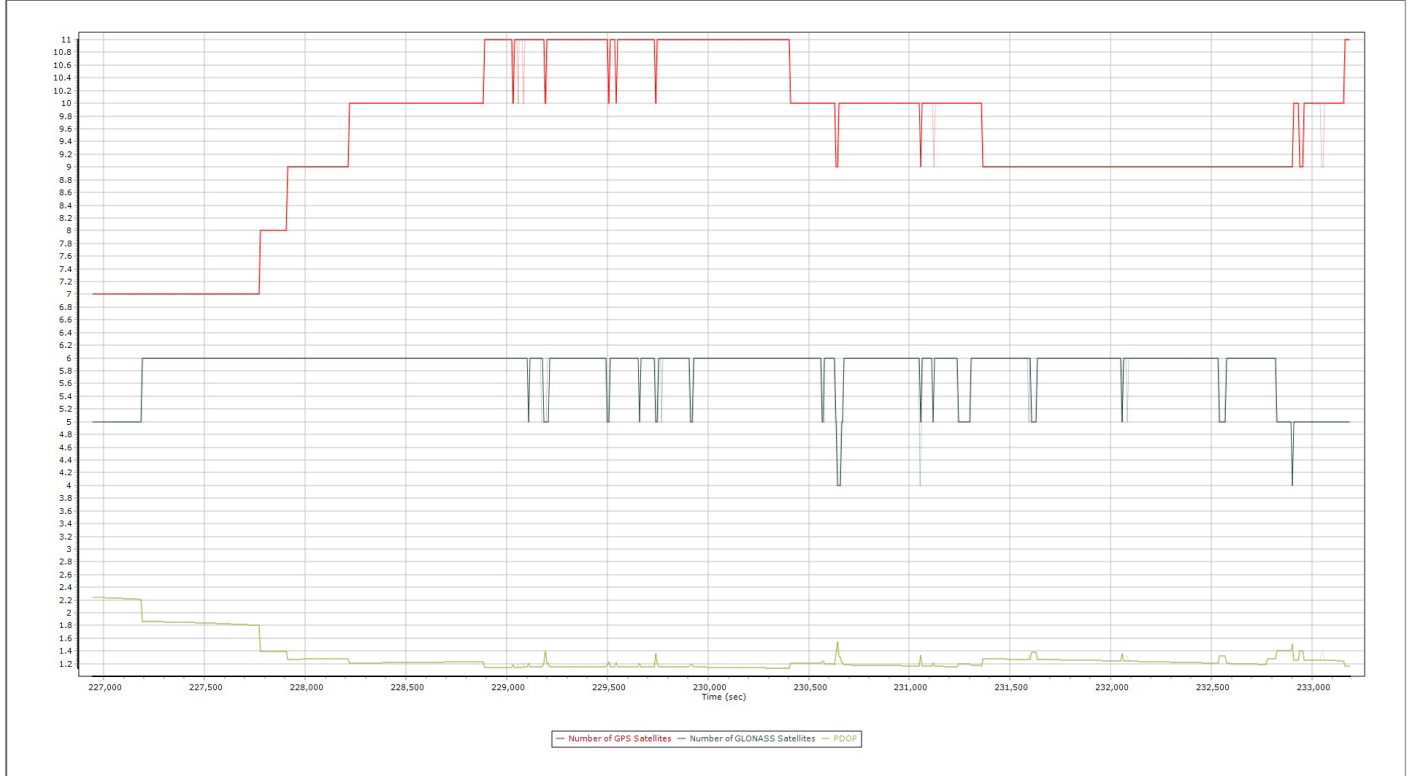
Additional Notes:

Mission Page 1 of 2

Nov 22, 2016-A (N7269T, SN315)

Display - GW_11-22-16A_315_N7269T - Solution Status

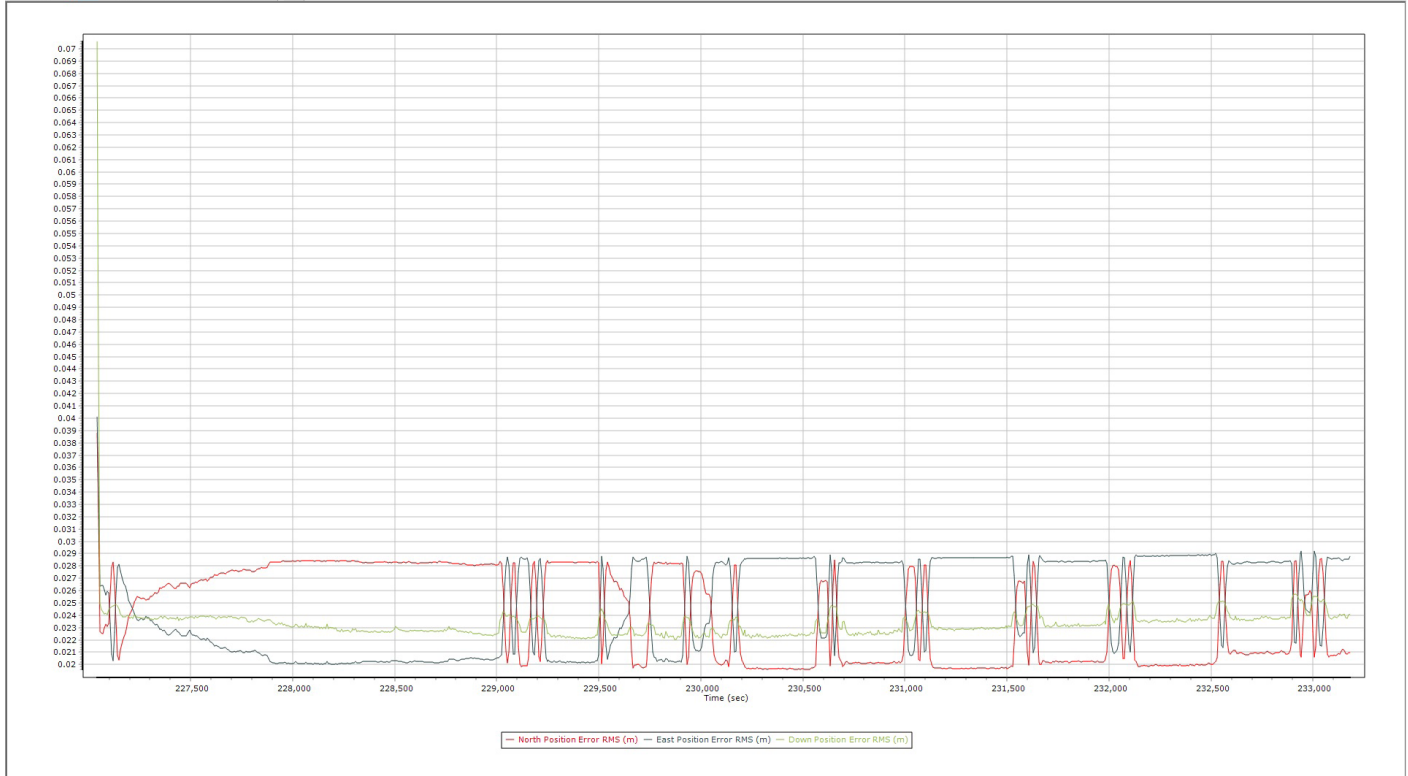
File Edit Tools View Help



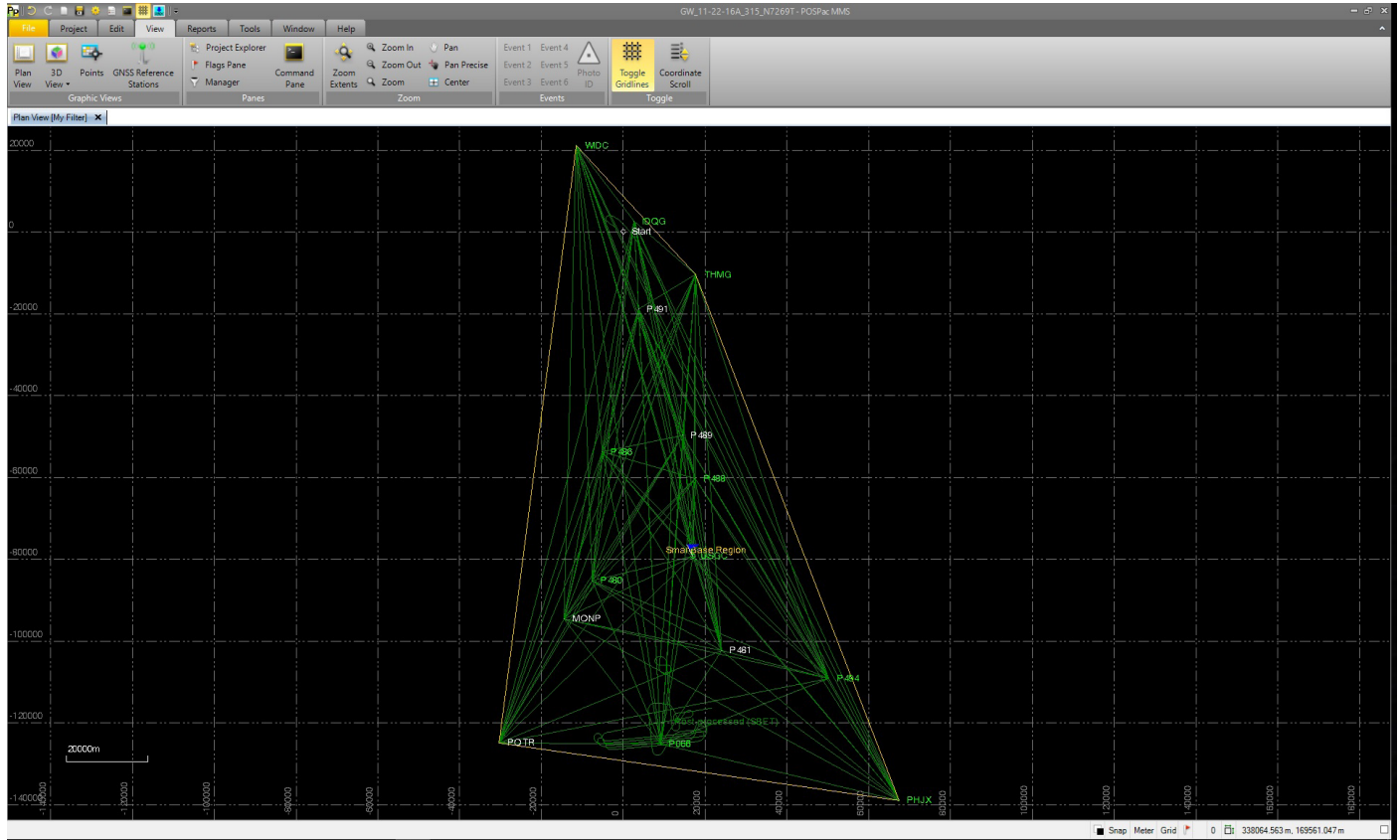
Ready

Display - GW_11-22-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

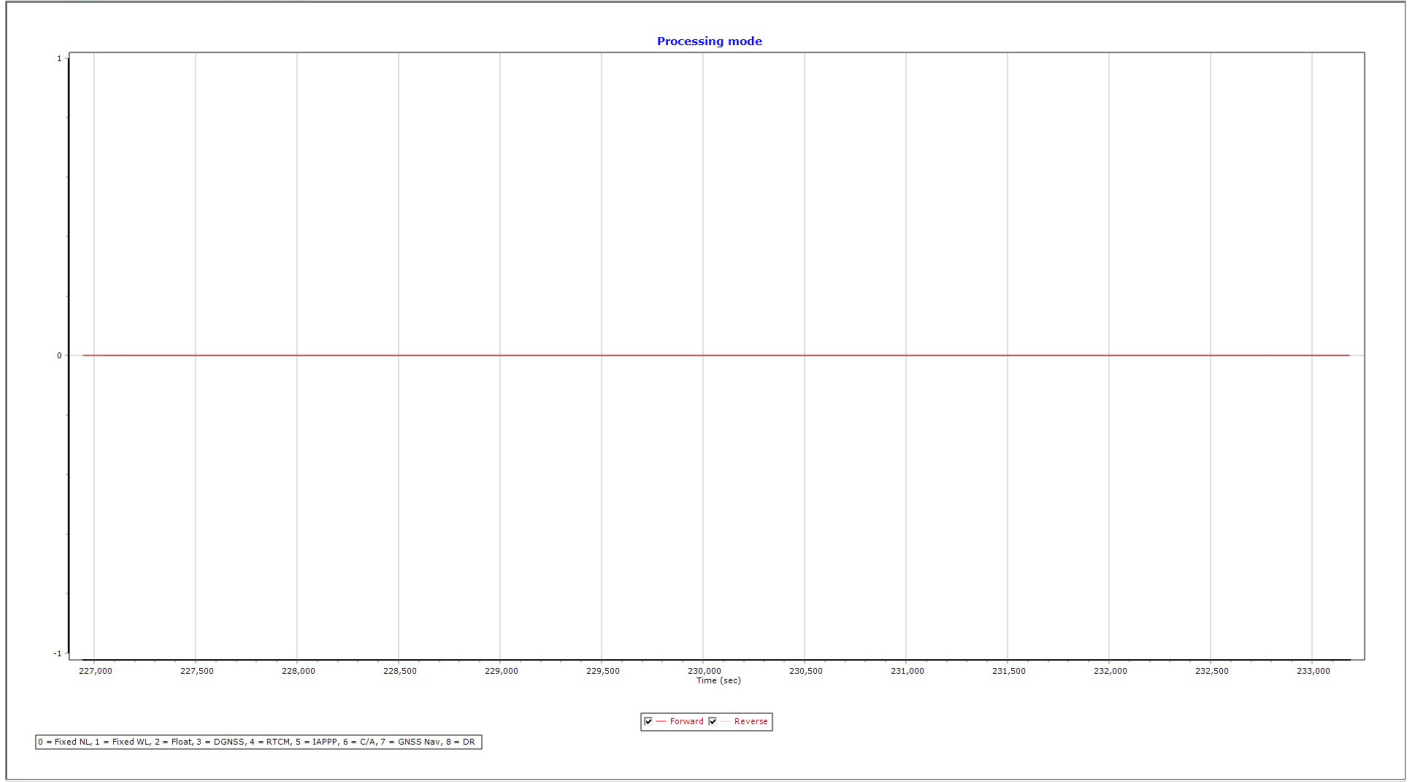
File Edit Tools View Help



Ready



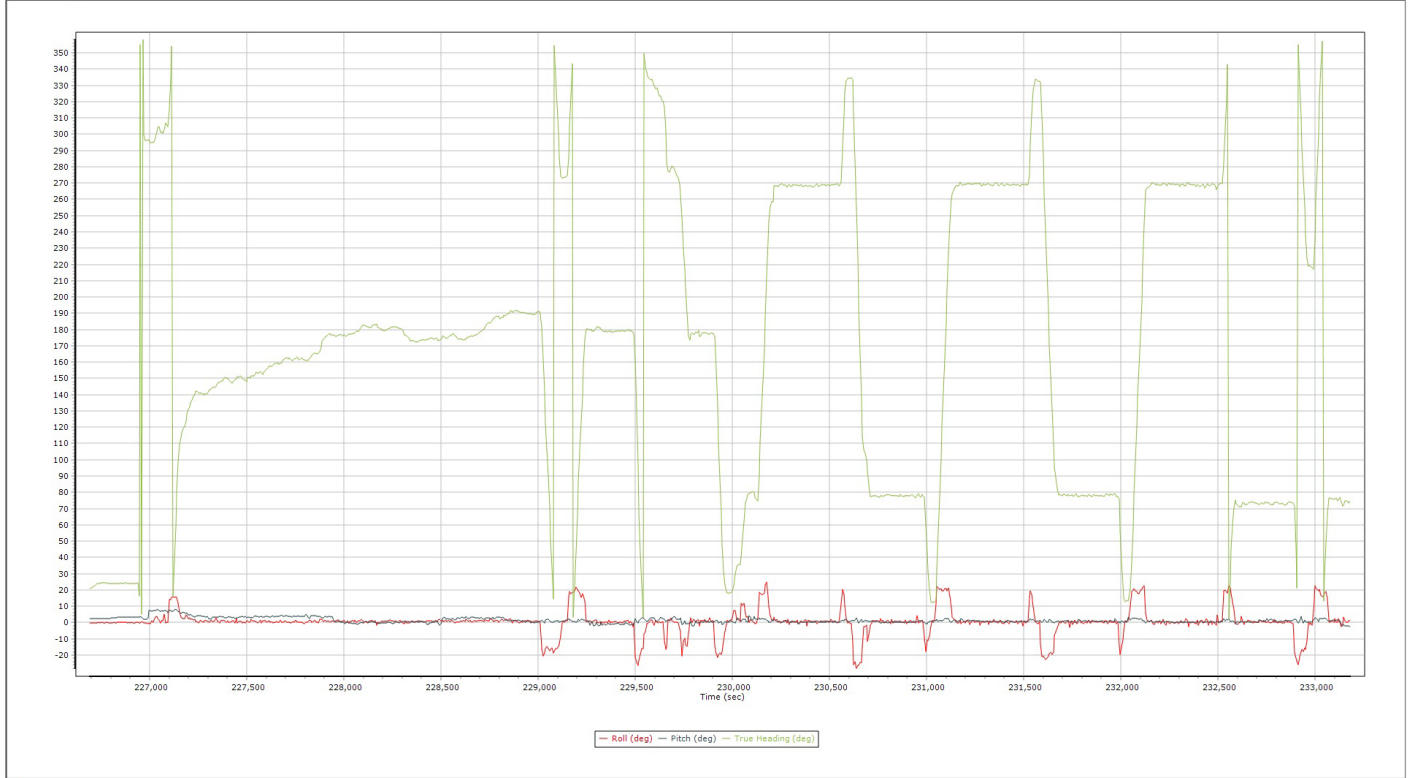
Display - GW_11-22-16A_315_N7269T - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-22-16A_315_N7269T - 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

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

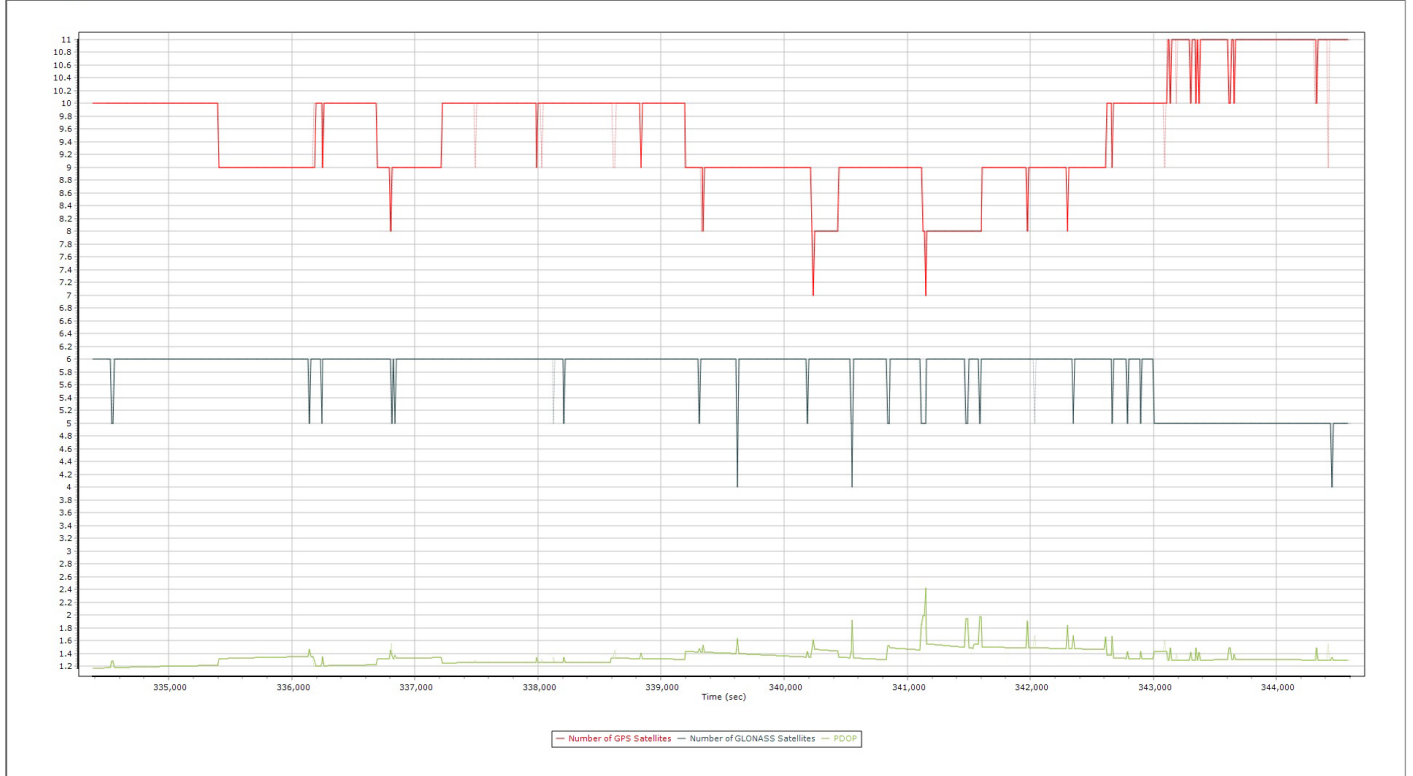
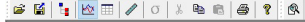
Secondary Service ID:

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

Nov 23, 2016-A (N7269T, SN325)

Display - GW_11-23-16A_315_N7269 - Solution Status

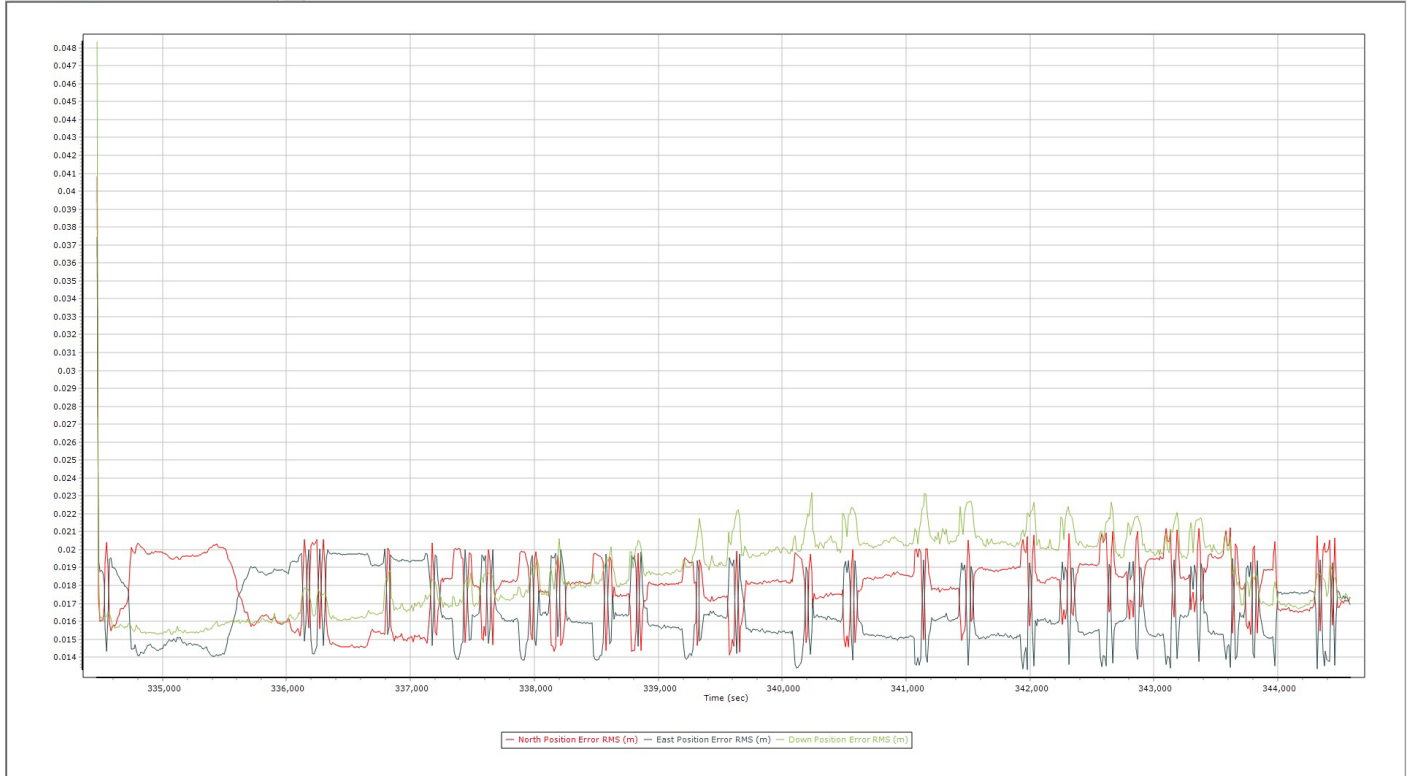
File Edit Tools View Help



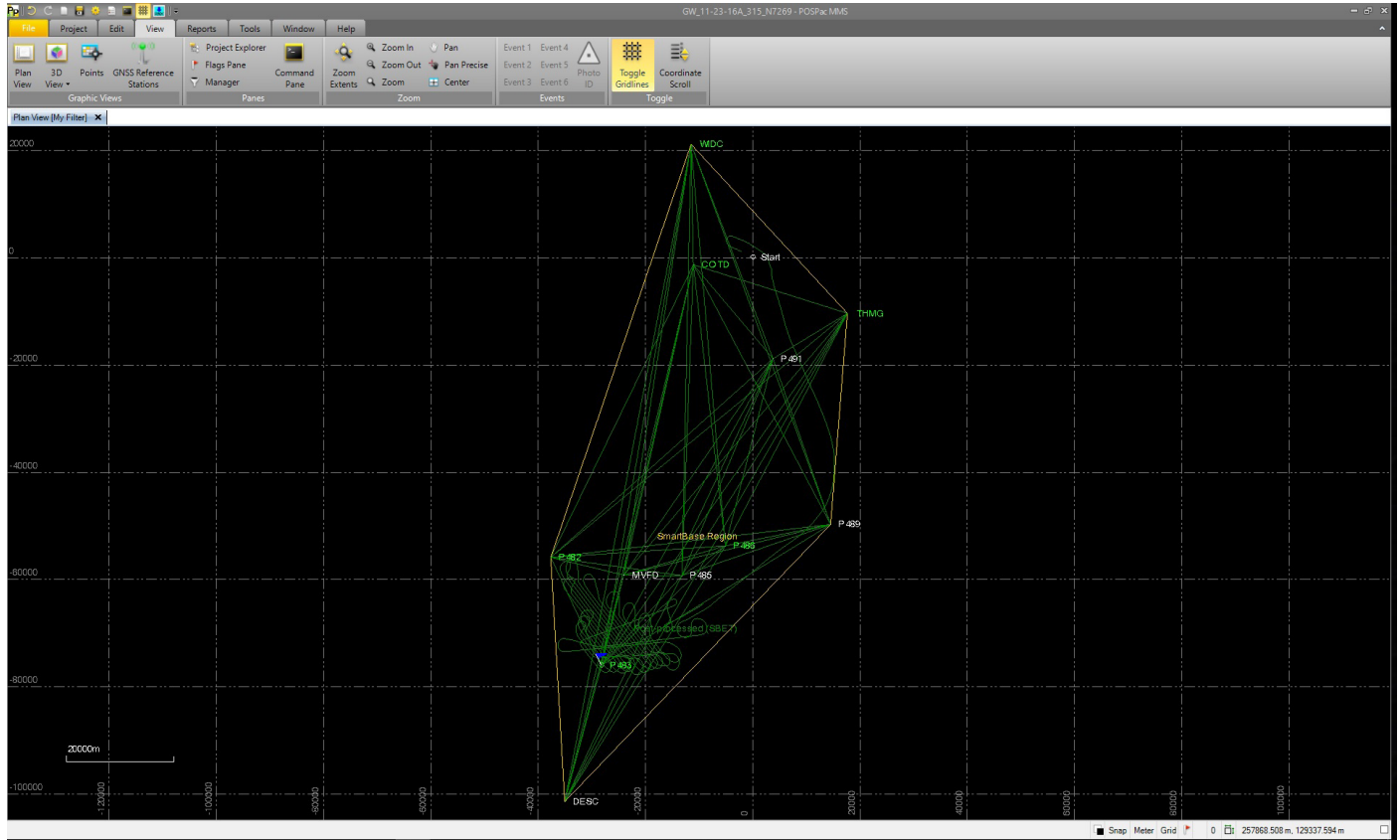
Ready

Display - GW_11-23-16A_315_N7269 - Smoothed Performance Metrics, Reference Frame

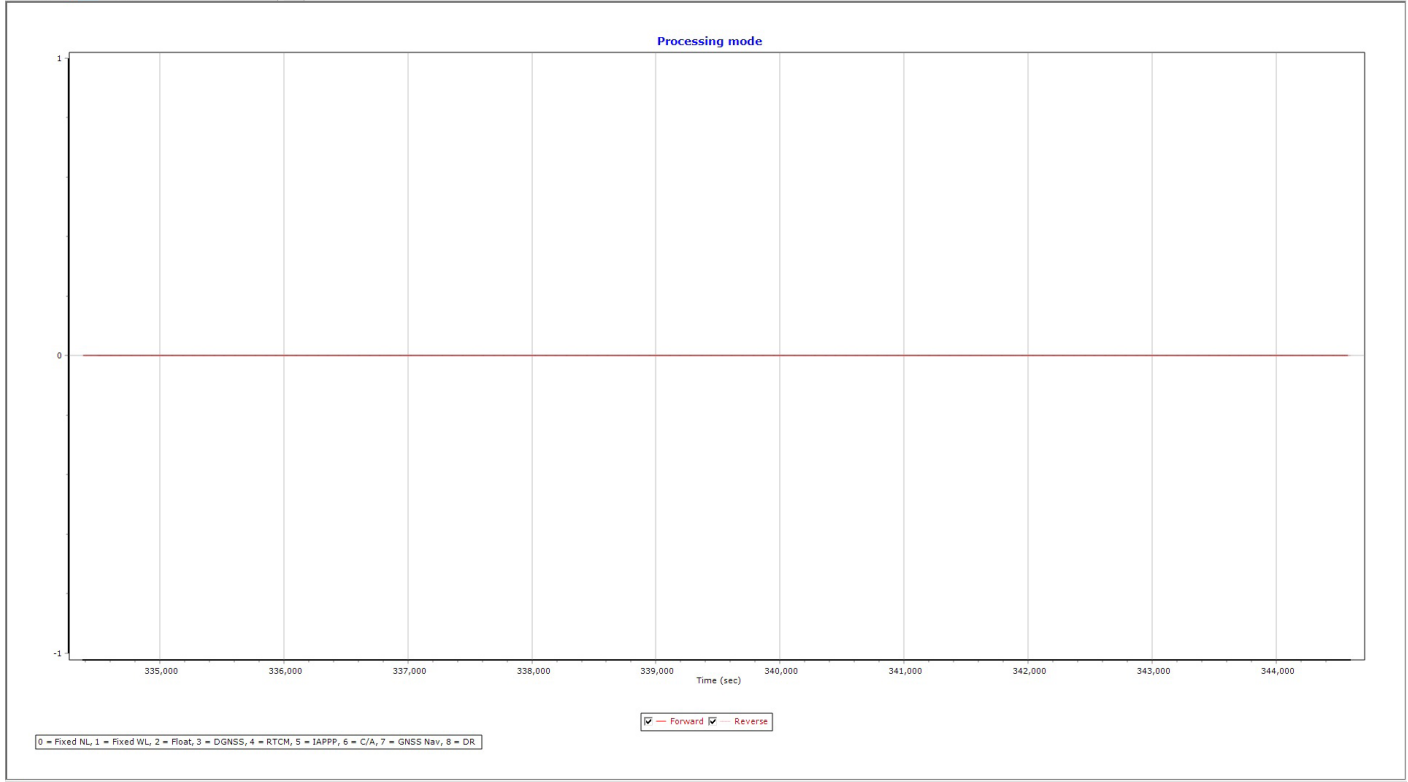
File Edit Tools View Help



Ready

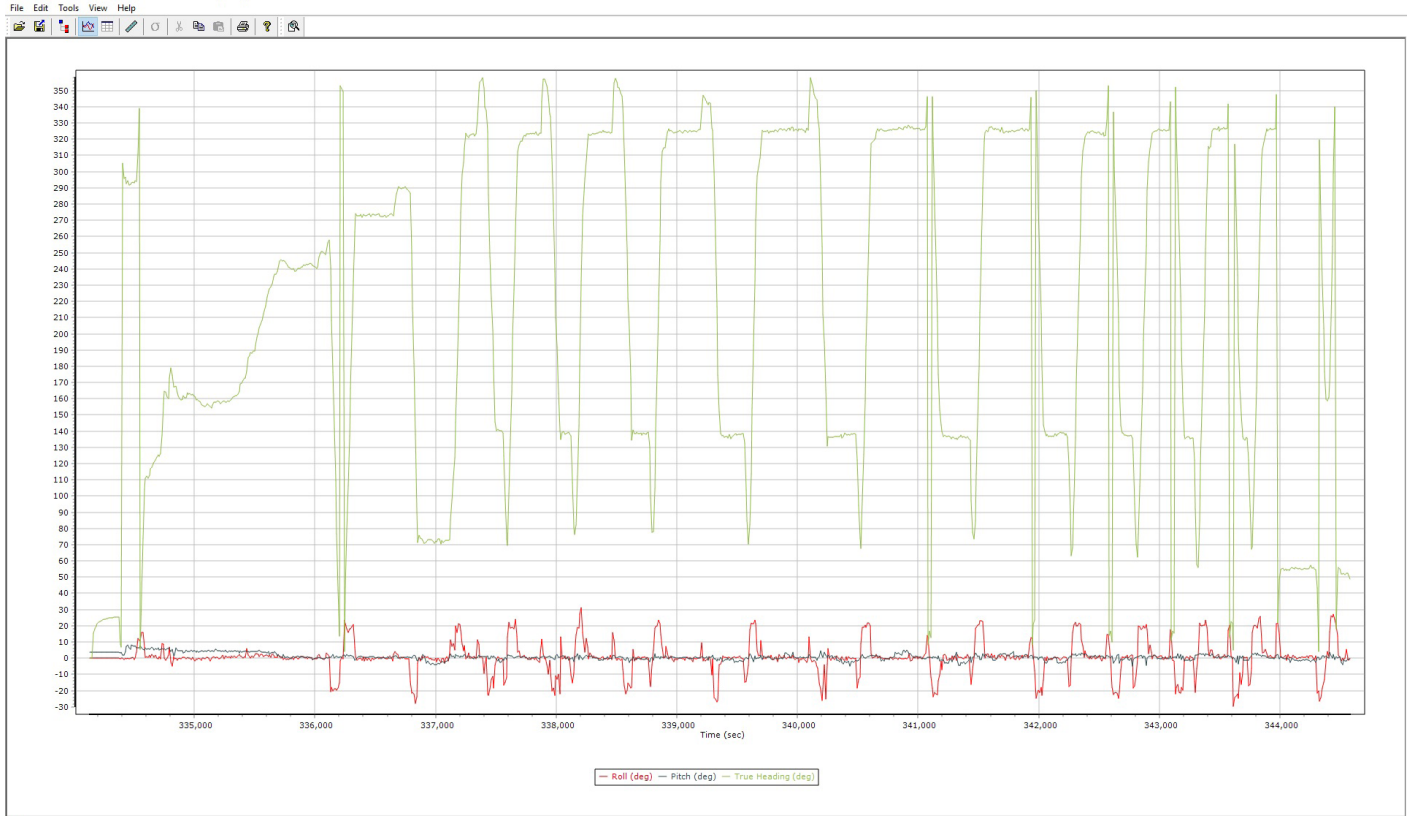


Display - GW_11-23-16A_315_N7269 - Solution Status
 File Edit Tools View Help



Ready

Display - GW_11-23-16A_315_N7269 - Real Time Trajectory, Vehicle Frame



Ready

Coordinate Manager

Station Information

Station ID: P483

Coordinates

Latitude: N 33 3 32.97633000

Longitude: W 116 34 9.52281000

Altitude: 1,376.3130 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: GNSS Choke w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P483 Station Fullname: P483

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
[Empty Table]								

Import Coordinates Export Coordinates

Close

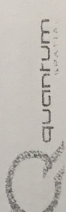
Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown: 11/23/16		Local: 1300		Airport: UDD	
Takeoff Time (Z):		Local: 1619		Airport: UDD	
Landing Time (Z):					

Pilot: DOXEY	Ground: 27
Technician: KORZEP	Begin Temp: 9
Aircraft: N7269T	Begin Dewpoint: 30.10
	Begin Pressure: 23
	End Temp: 9
	End Dewpoint: 30.03
	End Pressure:

Date Information	
LIDAR Unit: 12 SEN 315	
HD #: 3	
POS/PAS File #: 20161123_SuperCrew1	
from → to: 017 → 032	
FCMS File #:	

 quantum SPATIAL

Project Scanning Requirements	
Field of View: 2.8	Ground Speed (kts): 115
Scan Rate: 48.1	Hz Altitude AGL (ft): 5,900
Pulse Rate Frequency: 125	kHz MPA or SPIA?:
Laser Output Current:	%:

GPS Base Location(s): N/A
PDOP Avoidance: N/A
Static or Flyover?: FLYOVER

- If flyovers, times: 1325-1330; 1532-1537

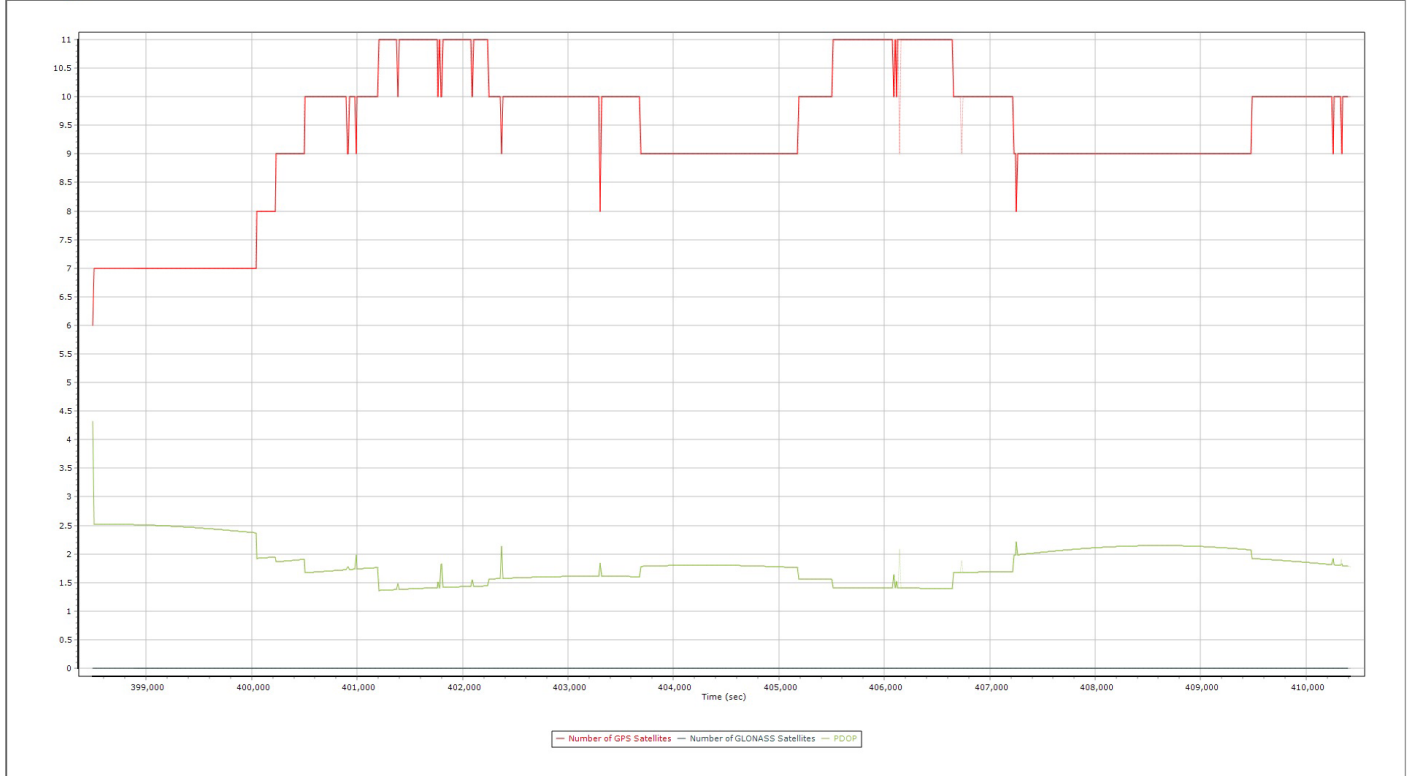
Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Tide, Etc.)
1	1	1333	1337	9000	E	0	125	100%	WIND OUT OF NORTH; HAZY
2	2	1340	1341	8700	NW		99	%	
21	3	1344	1345	8900	SE		140	%	
20	4	1348	1350	8800	NW		99	%	
19	5	1353	1354	8700	SE		142	%	
18	6	1357	1400	8800	NW		99	%	
17	7	1403	1405	8700	SE		138	%	
16	8	1408	1412	8800	NW		95	%	
15	9	1415	1418	9000	SE		145	%	
14	10	1421	1427	9000	NW		97	%	
13	11	1430	1434	9500	SE		135	%	
12	12	1437	1443	9500	NW		93	%	
11	13	1446	1449	9500	SE		145	%	
10	14	1452	1458	9800	NW		89	%	
9	15	1500	1503	10000	SE		140	%	
8	16	1506	1508	10600	NW		97	%	

Additional Notes:

Mission Page 1 of 2

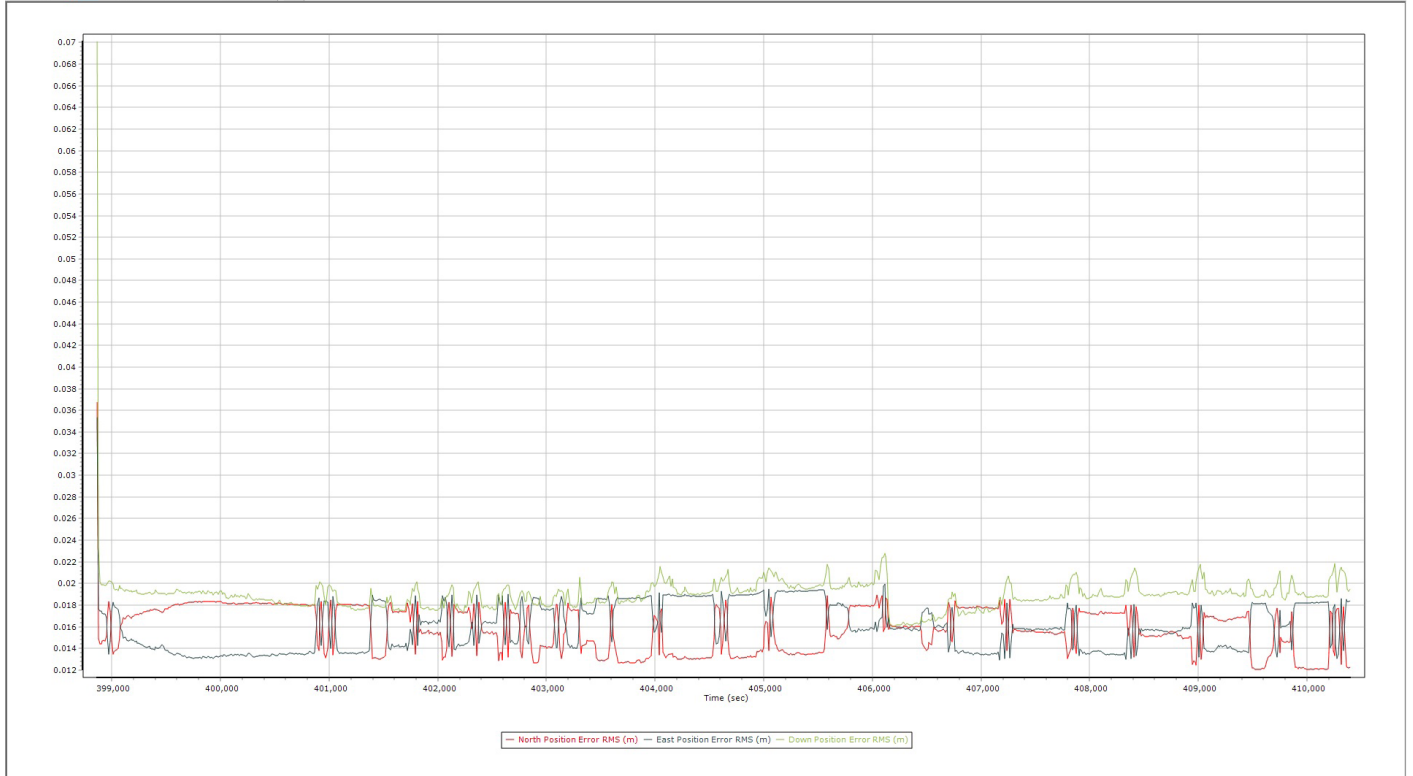
Nov 24, 2016-A (N7269T, SN315)

Display - GW_11-24-16A_315_N7269T - Solution Status

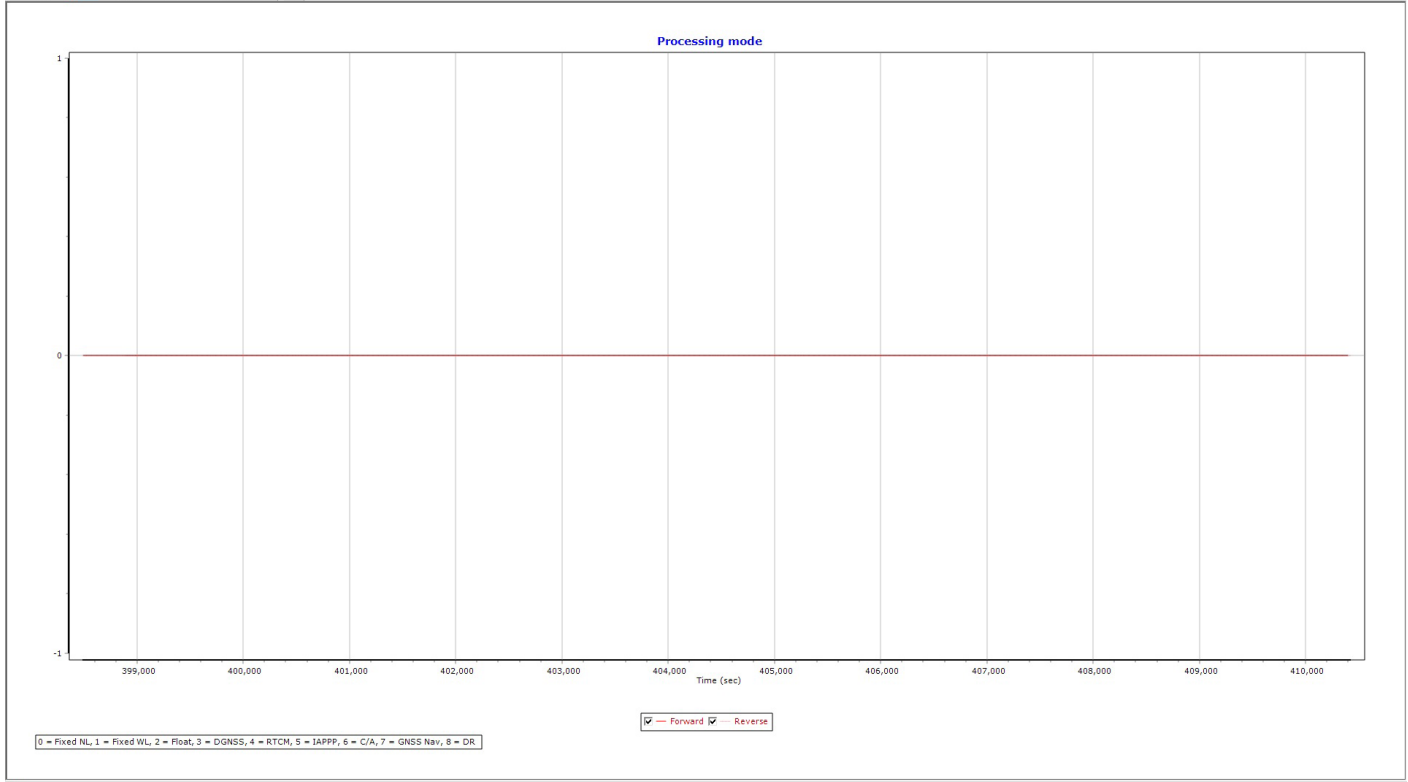
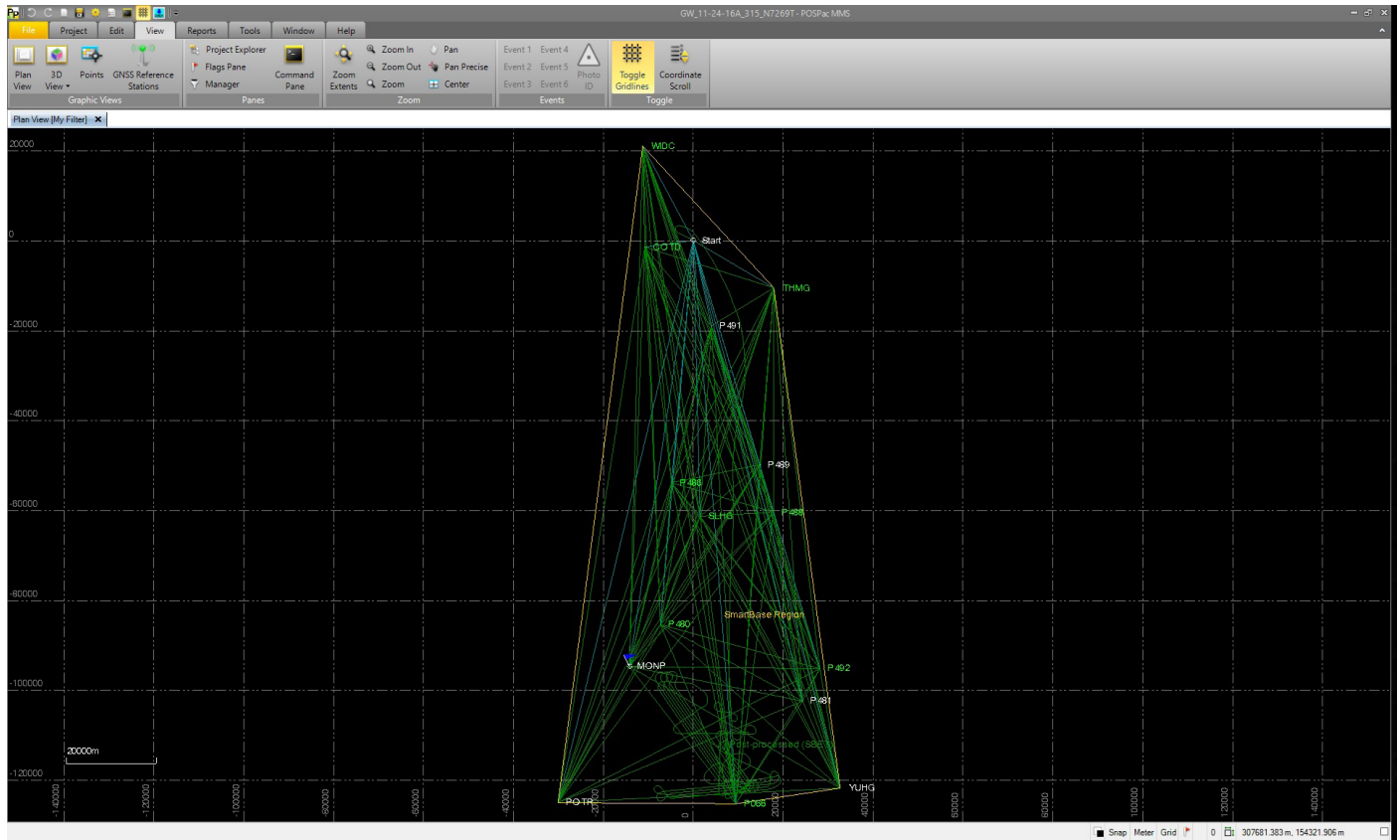


Ready

Display - GW_11-24-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

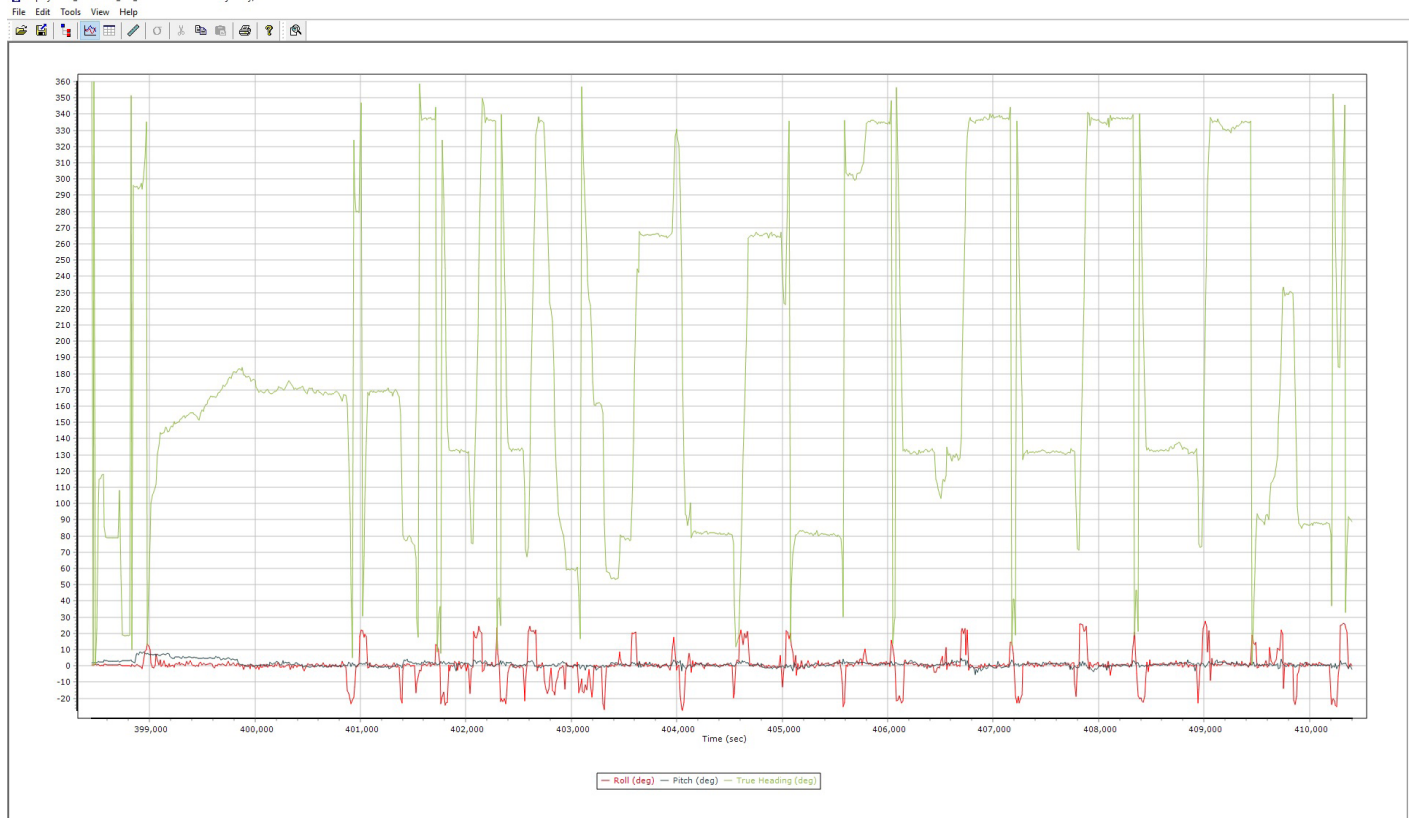


Ready



Ready

Display - GW_11-24-16A_315_N7269T - Real Time Trajectory, Vehicle Frame



Ready

Coordinate Manager

Station Information

Station ID: MONP

Coordinates

Latitude: N 32 53 30.97273000

Longitude: W 116 25 20.41161000

Altitude: 1,843.4400 m

Decimal Degrees

Antenna Frame

Height: 0.118 m

Method: Bottom of antenna mount

Manufacturer: Ashtech

Type: 701945B_M w/SCIS Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: MONP Station Fullname: MONP

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
(Table content is obscured)								

Import Coordinates Export Coordinates

Close

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

Project Name: EASTERN SD COUNTY LIDAR
 Project Number: 16159
 FCMS .fpd File/Nav File: 3492-4308-5LEP-MEX

Pilot: DOXEY
 Technician: KORZEP
 Aircraft: N7269T

Date Flown: 11/24/2016
 Takeoff Time (Z): Local 645
 Landing Time (Z): Local 1020
 Airport: WDD
 Airport: IPL

Data Information

LIDAR Unit: 12 SEN 315
 HD #: 3
 POSIPAS File #: 20161124MESHED-TARECS
 from → to: 037 → 054
 FCMS File #

Project Scanning Requirements

Field of View: 2.8
 Ground Speed (kts): 115
 Scan Rate: 48.1
 Hz Altitude AGL (ft): 5,900
 Pulse Rate Frequency: 125
 kHz MPIA or SPAZ:
 Laser Output Current: %

GPS Base Location(s): N/A
 PDDP Avoidance: N/A
 Static or Flyover?: FLYOVER

Notes: if flyovers, times: 723-728; 951-956

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
37	1	792	724	9600	NW	~2	121	~100	BUMPY; TURB AIRMAZ
76	2	737	739	9500	SE		117	%	
35	3	742	744	9200	NW		119	%	
34	4	747	748	9300	SE		113	%	
33	5	750	751	9300	NW		130	%	
82	6	754	756	9300	NE		101	%	CROSSFLIGHT
80	7	759	801	8900	S		130	%	CROSSFLIGHT
7	8	806	812	8900	W		134	%	BUMPY; TURB AIRMAZ
6	9	814	821	9200	E		93	%	
5	10	824	829	9200	W		128	%	
4	11	831	838	8900	F		105	%	
78	12	843	846	9100	NW		125	%	
77	13	848	853	9300	SE		97	%	
32	14	858	905	9200	NW		113	%	
31	15	907	915	9400	SE		107	%	
30	16	917	924	9300	NW		115	%	
29	17	927	935	9500	SE		109	%	
78	18	936	943	9500	NW		122	%	
81	19	948	950	9500	SW		148	%	CROSSFLIGHT

Additional Notes:
 29
 78
 81

Mission Page 1 of 1

Nov 24, 2016-B (N7269T, SN315)

Display - GW_11-24-168_315_N7269T - Solution Status

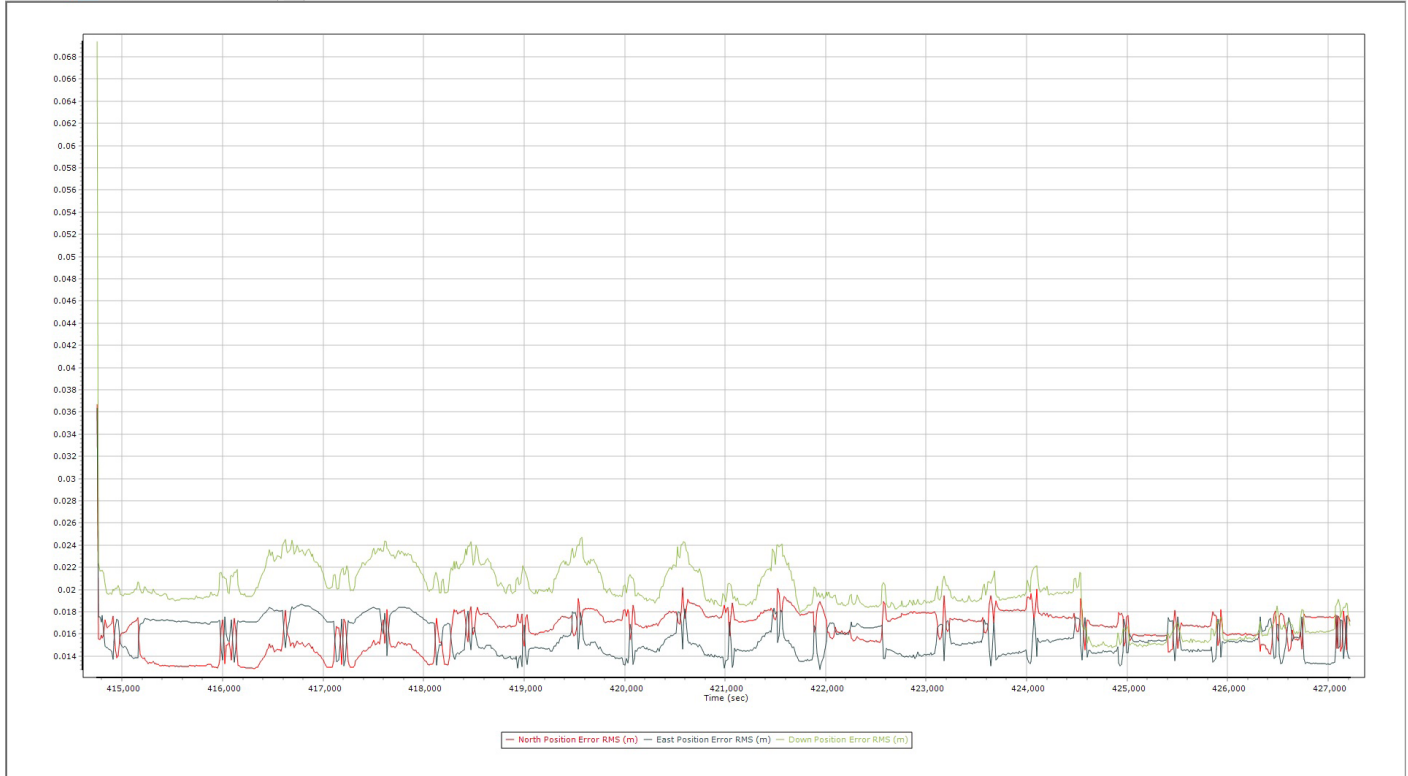
File Edit Tools View Help



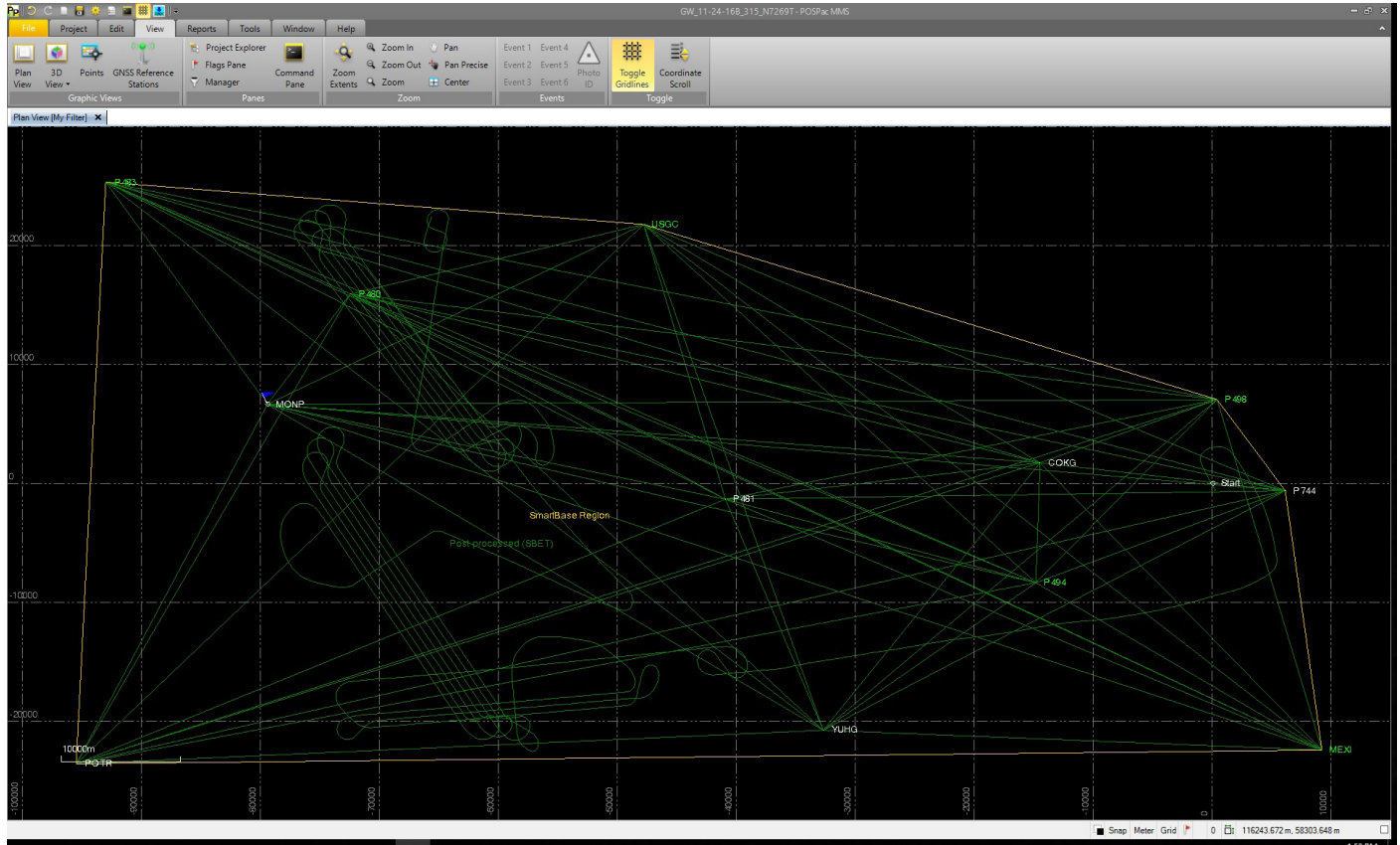
Ready

Display - GW_11-24-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

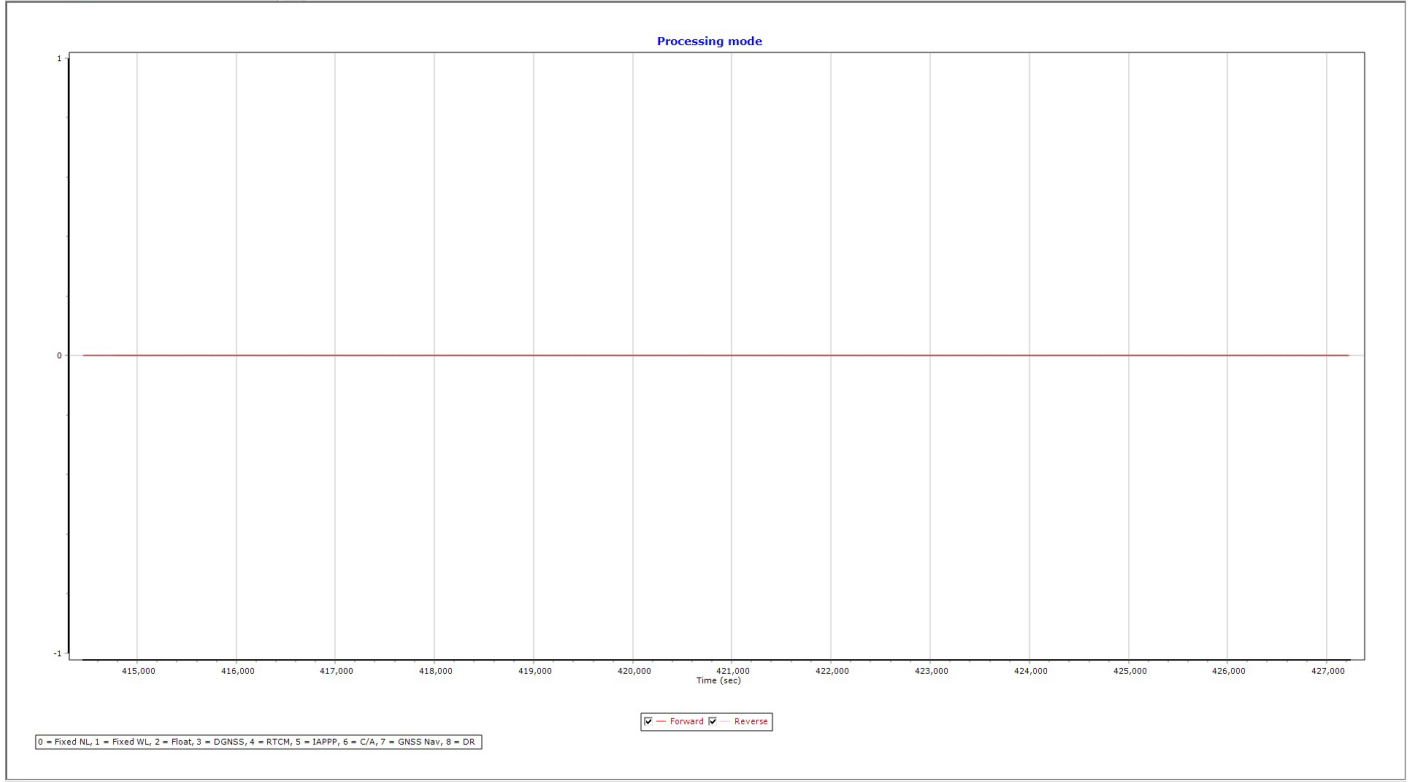
File Edit Tools View Help



Ready

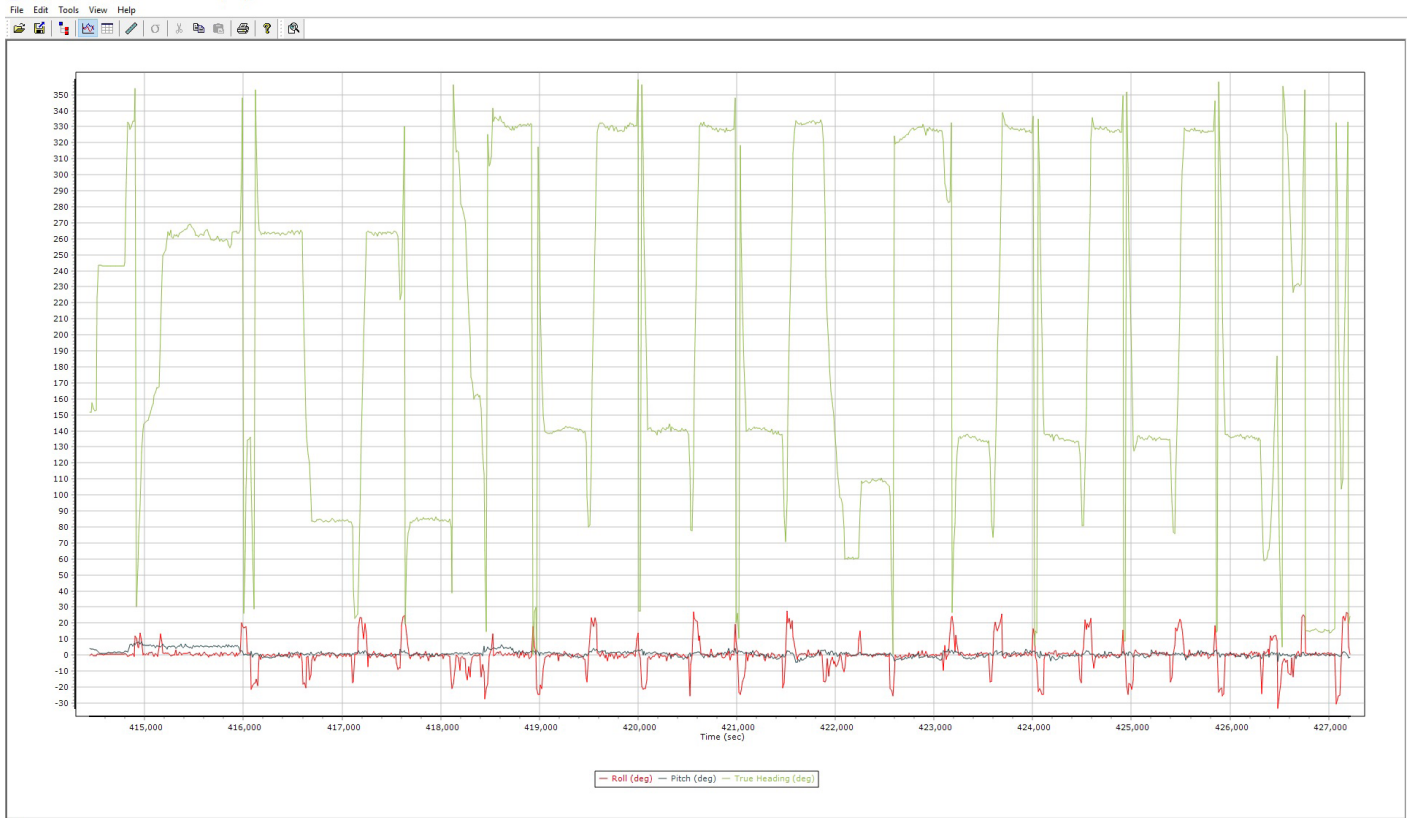


Display - GW_11-24-168_315_N7269T - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-24-168_315_N7269T - Real Time Trajectory, Vehicle Frame



Ready

Coordinate Manager

Station Information

Station ID:

Coordinates

Latitude:

Longitude:

Altitude:

Decimal Degrees

Antenna Frame

Height:

Method:

Manufacturer:

Type:

Offset from Measured Point to APC:

Ground Reference Point (GRP) coordinates

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

LIFT 2

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Project Name: EASTERN SD COUNTY LIDAR		Pilot: DOXEY	Date Flown: 11/24/2016
Project Number: 16159		Technician: KORTLEP	Takeoff Time (Z): Local 1115 Airport: 1PL
FCMS Job File/Nav File: 3450-11300-SLED-NEK + 7450-11300-SLED-800004		Aircraft: N7269T	Landing Time (Z): Local 1505 Airport: 0DD

Field of View: 28		Ground Speed (kts): 115
Scan Rate: 48.1	Hz Altitude AGL (ft): 5,900	
Pulse Rate Frequency: 125	Hz N/A or SPIA? :	
Laser Output Current: %		

GPS Base Location(s): N/A
PDOP Avoidance: N/A
Static or Flyover?: FLYOVER
* If flyovers, times: 1155-1140, 1317-1323, 1325-1330, 1432-1437

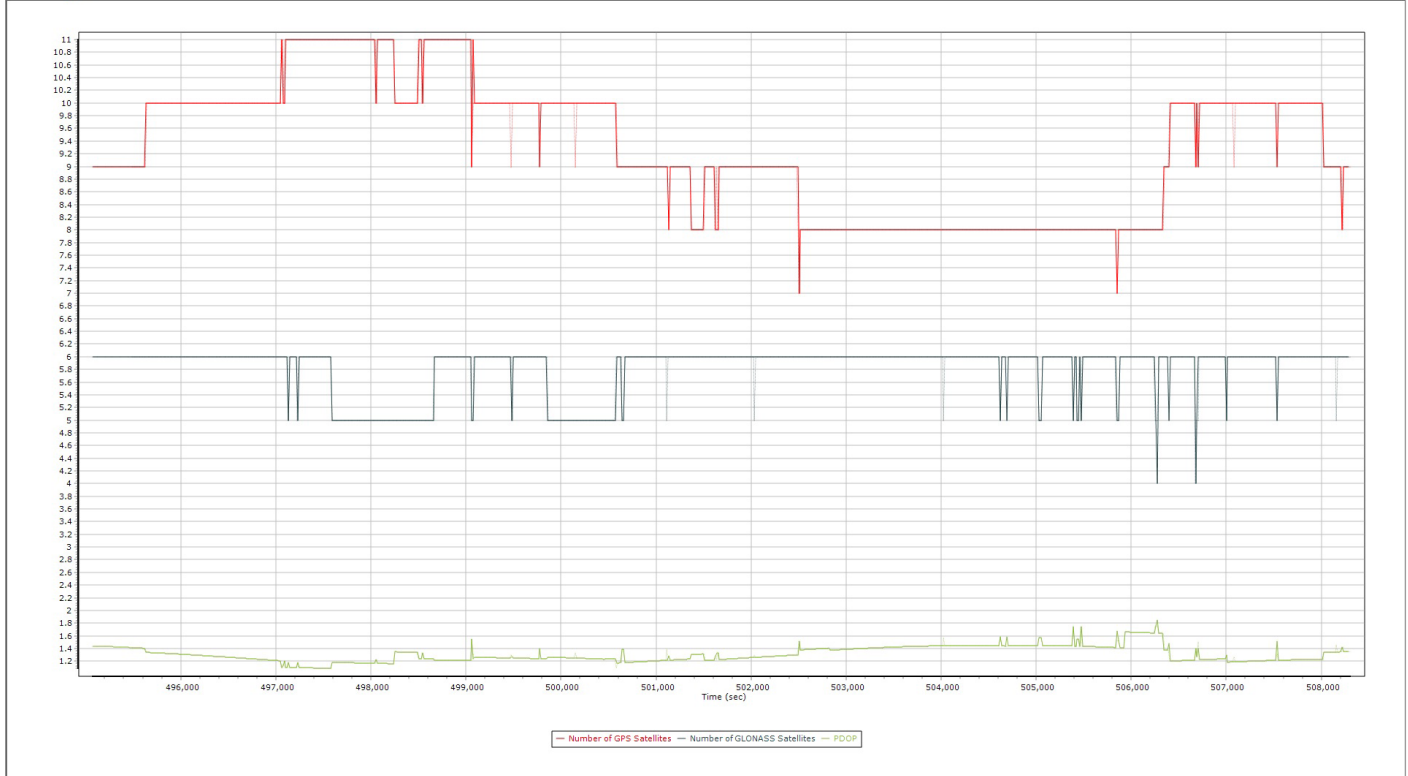
Flight Line #	Line #	Start Record	Stop Record	Air. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Rtd, Etc.)
3	1	1144	1151	9300	E	0	97	~100	LESS BUMPT THAN MORNING
2	2	1153	1158	9100	W		130		
1	3	1200	1207	9300	E		101		
80	4	1211	1212	9000	S		115		CROSSFLIGHT
27	5	1214	1221	9700	NW		111		BUMPY
26	6	1223	1230	10000	SE		121		
25	7	1232	1239	10,100	NW		122		
24	8	1241	1247	10,100	SE		121		
23	9	1249	1255	10,100	NW		132		
22	10	1257	1303	10,200	NE SE		126		AFC RESURFACED US TO 9,000 AFTER THIS LINE
21	11	1305	1310	9,000	NW		125		TRAFFIC / BOUNDZONE Cuz ATC < 9000 MAL
81	12	1313	1315	9,000	NE		117		CROSSFLIGHT
29	13	1332	1338	7,700	SE		125		LESS BUMPT
28	14	1341	1346	7,800	NW		121		
27	15	1348	1353	7,700	SE		122		
26	16	1356	1401	7,900	NW		126		
Additional Notes:	17	1403	1409	7,800	SE		111		
	18	1411	1416	8,000	NW		122		
	19	1418	1424	8,300	SE		113		
	20	1430	1431	7,900	SW		144		CROSSFLIGHT

Mission Page 1 of 1

Nov 25, 2016-A (N7269T, SN315)

Display - GW_11-25-16A_315_N7269T - Solution Status

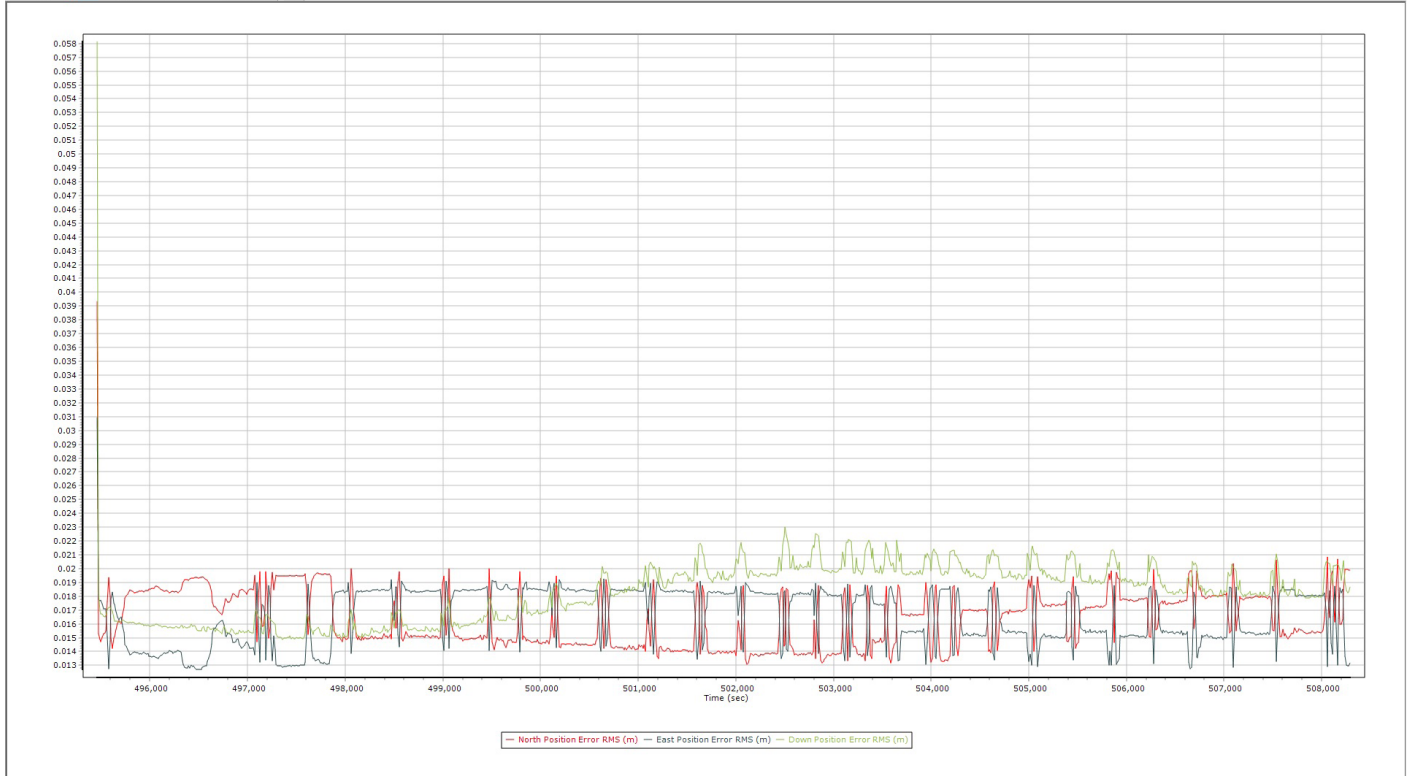
File Edit Tools View Help



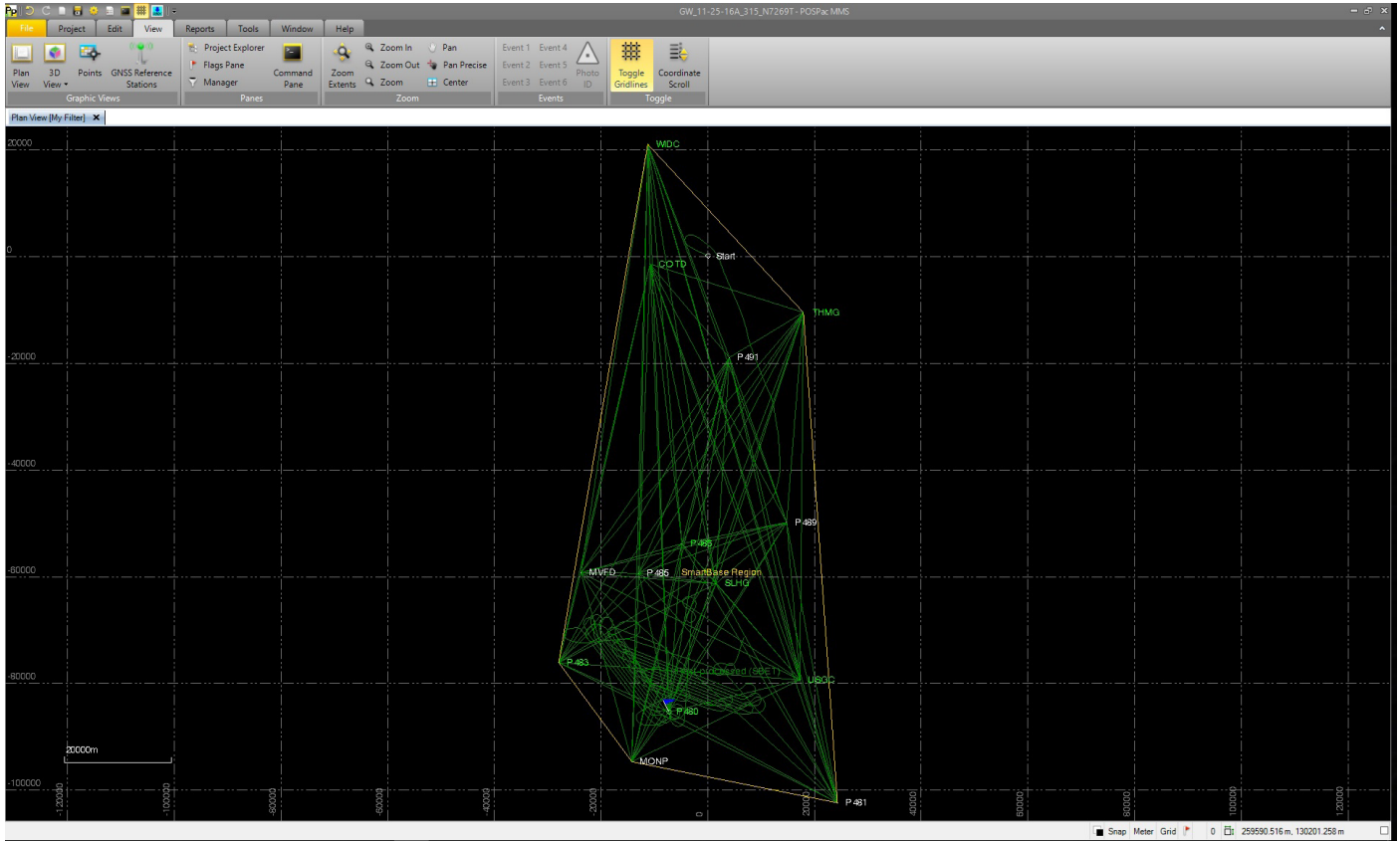
Ready

Display - GW_11-25-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

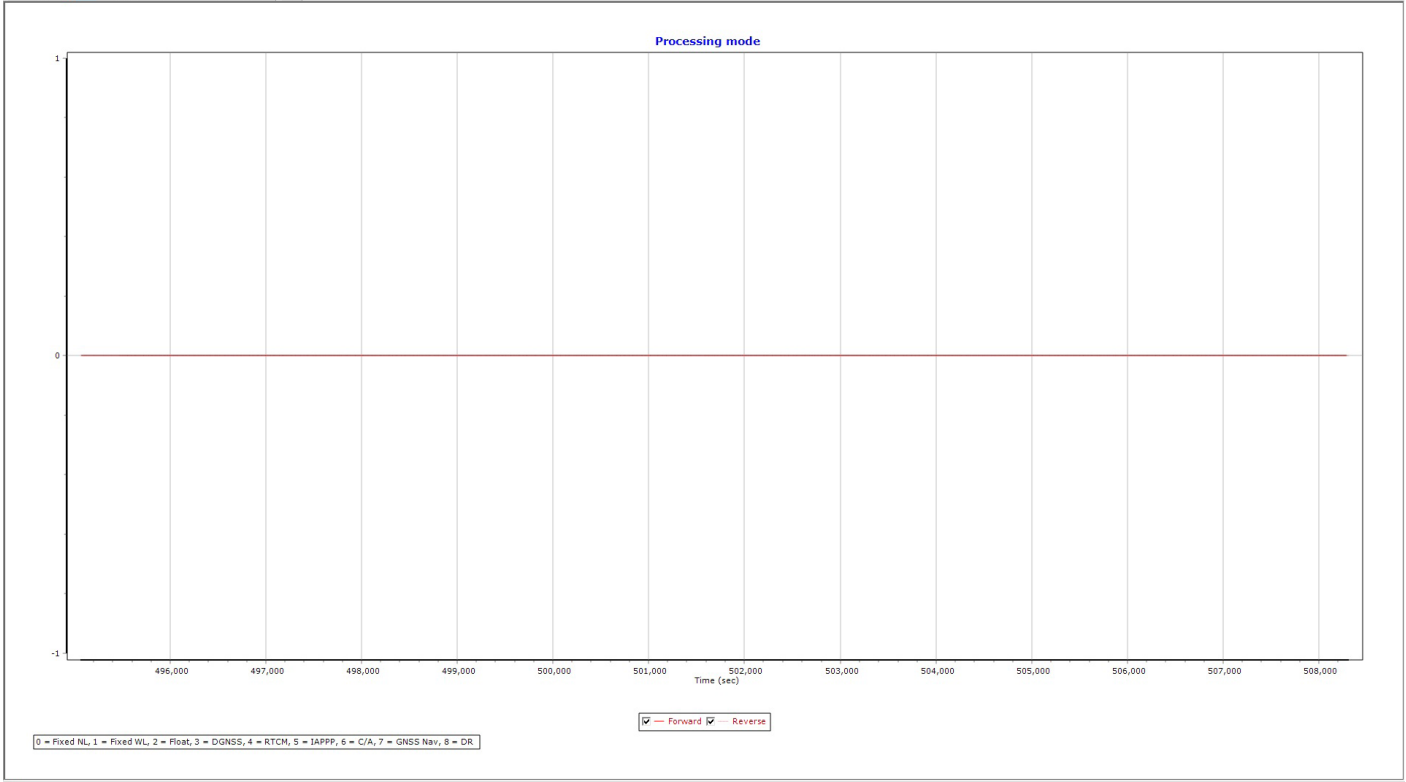
File Edit Tools View Help



Ready



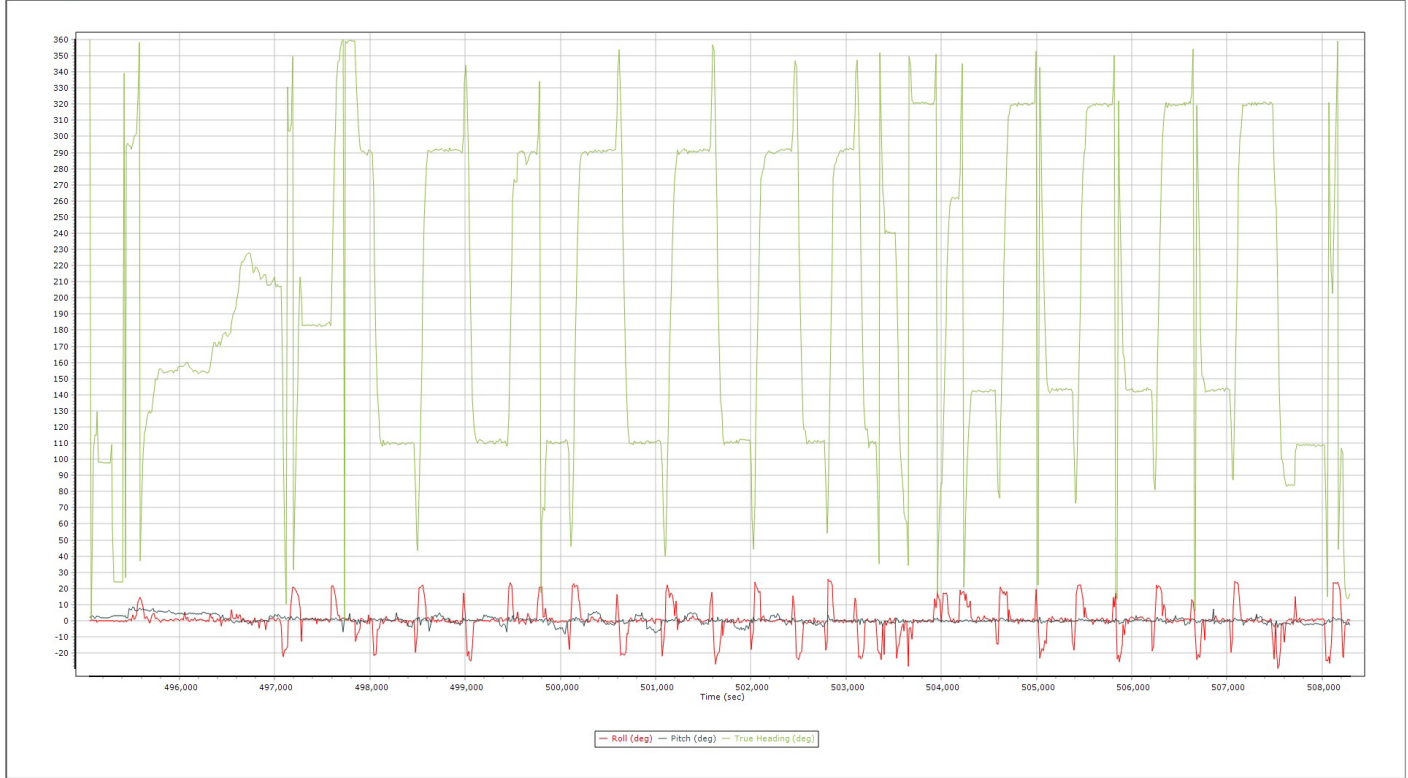
Display - GW_11-25-16A_315_N7269T - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-25-16A_315_N7269T - 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

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

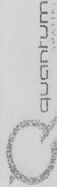
Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	11/25/16	Local	0937	Airport	UDD
Takeoff Time (Z)		Local	1332	Airport	UDD
Landing Time (Z)					

Pilot	DOXEY
Technician	KORZEP
Aircraft	N726PT

LDAR Unit	12 SEN 315
HD #	3
POSSIPAS File #	2016125LIFED
from → to	074 → 093
FCMS File #	



LIDAR MISSION RECORD SHEET

Project Name	EASTERN SD COUNTY LIDAR
Project Number	16159
FCMS .fpd/Nav File	3450-11300-SLEP-RABOCK-02 + 3452-11300-SLEP-RABOCK-03

Field of View	2.8	Ground Speed (Kts)	115
Scan Rate	48.1	Ht. Altitude AGL (ft)	5,900
Pulse Rate Frequency	125	KHz MP/A or SPIA?	
Laser Output Current		%	

GPS Base Location(s)	N/A
PDCP Avoidance	N/A
Static or Flyover?	FLYOVER

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Viability, Winds, Ride, Etc.)
12	1	1014	1016	9400	N	0	119	~100	GROSS FLIGHT
1	2	1020	1027	9400	E		125		SMOOTH
2	3	1029	1035	9400	W		107		u
3	4	1038	1043	9800	E		123	~70	HIT A BLIND ZONE, REFUELED THRU CROSS FLIGHT
3	5	1050	1054	9600	E		135	~100	REFUELED
4	6	1056	1102	9700	W		125		SMOOTH
5	7	1105	1110	9800	E		124		
6	8	1113	1119	9400	W		108		
7	9	1021	1125	9200	E		136		
8	10	1128	1133	9000	W		107		
9	11	1135	1139	8900	E		120		
10	12	1141	1144	8800	W		124		
11	13	1146	1147	8800	E		121		
28	14	1150	1151	8400	SW		119		CROSS FLIGHT
27	15	1154	1158	8400	NW		115		SMOOTH
1	16	1200	1202	8400	W		130		CROSS FLIGHT

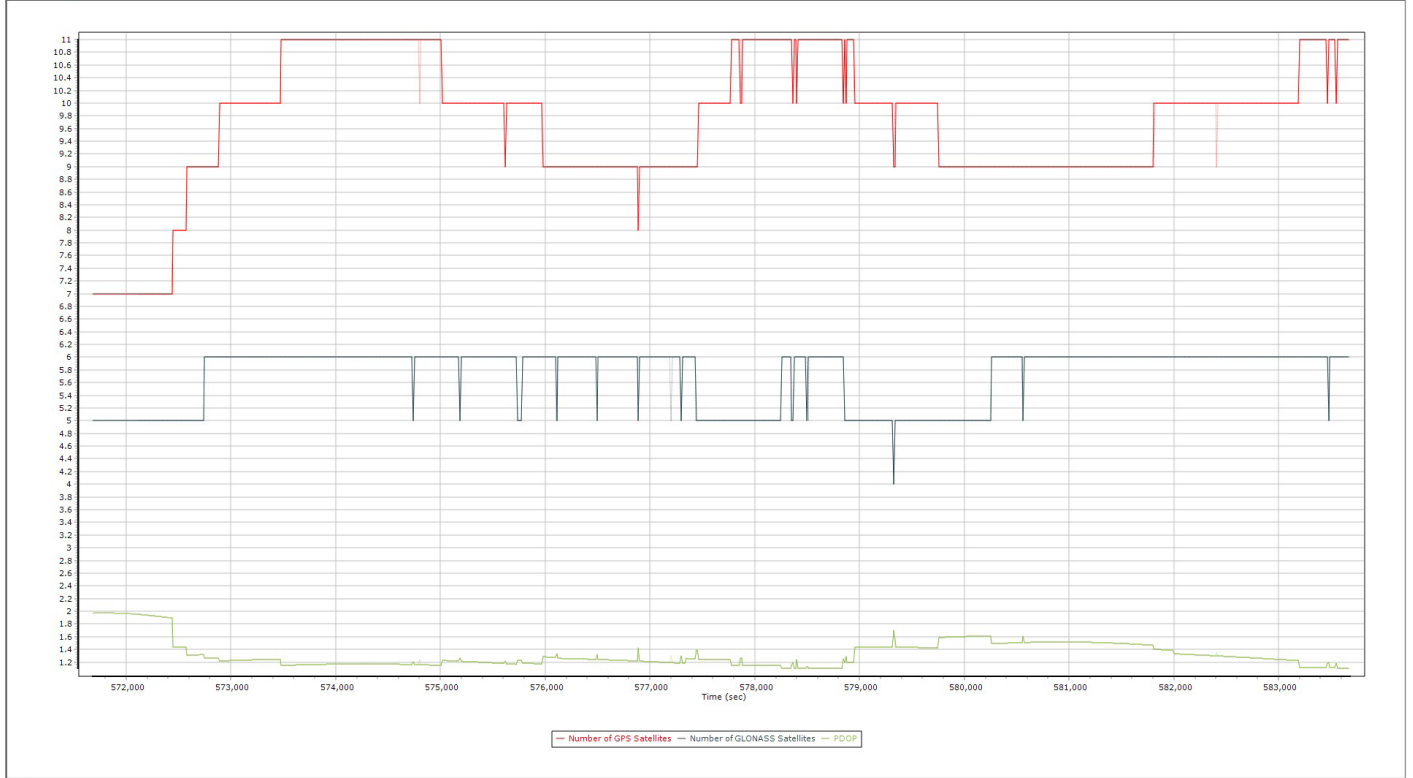
Additional Notes:

Mission Page 1 of 2

Nov 26, 2016-A (N7269T, SN315)

Display - GW_11-26-16A_315_N7269T - Solution Status

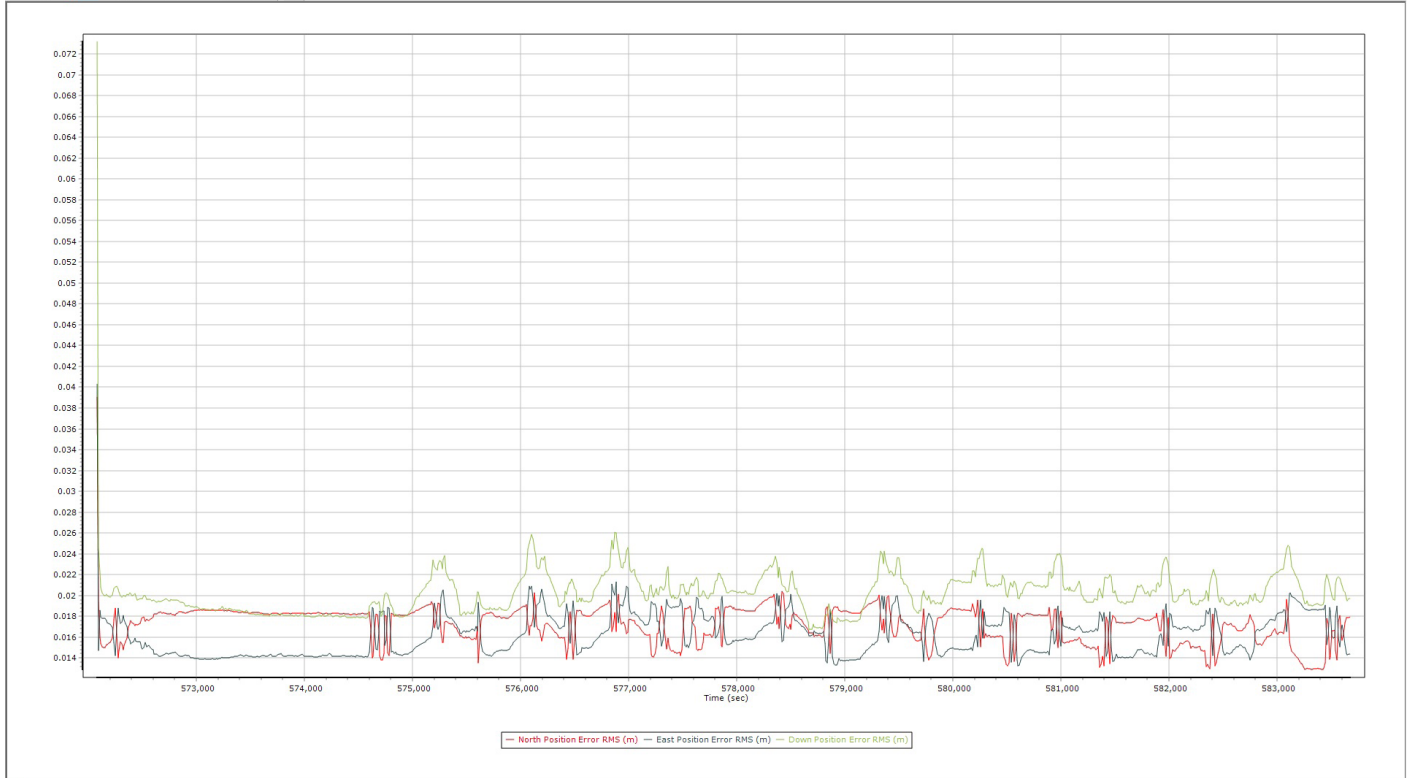
File Edit Tools View Help



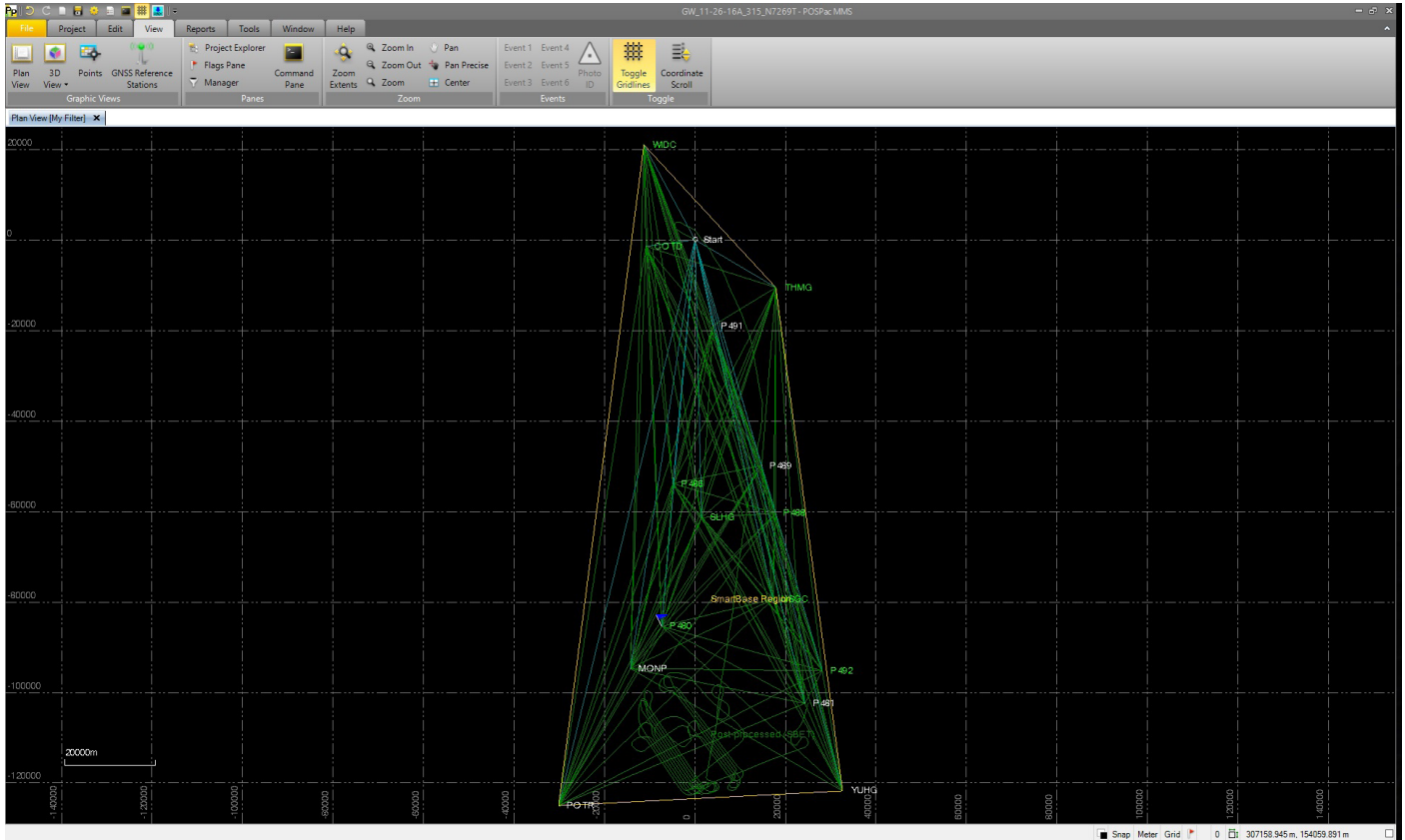
Ready

Display - GW_11-26-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

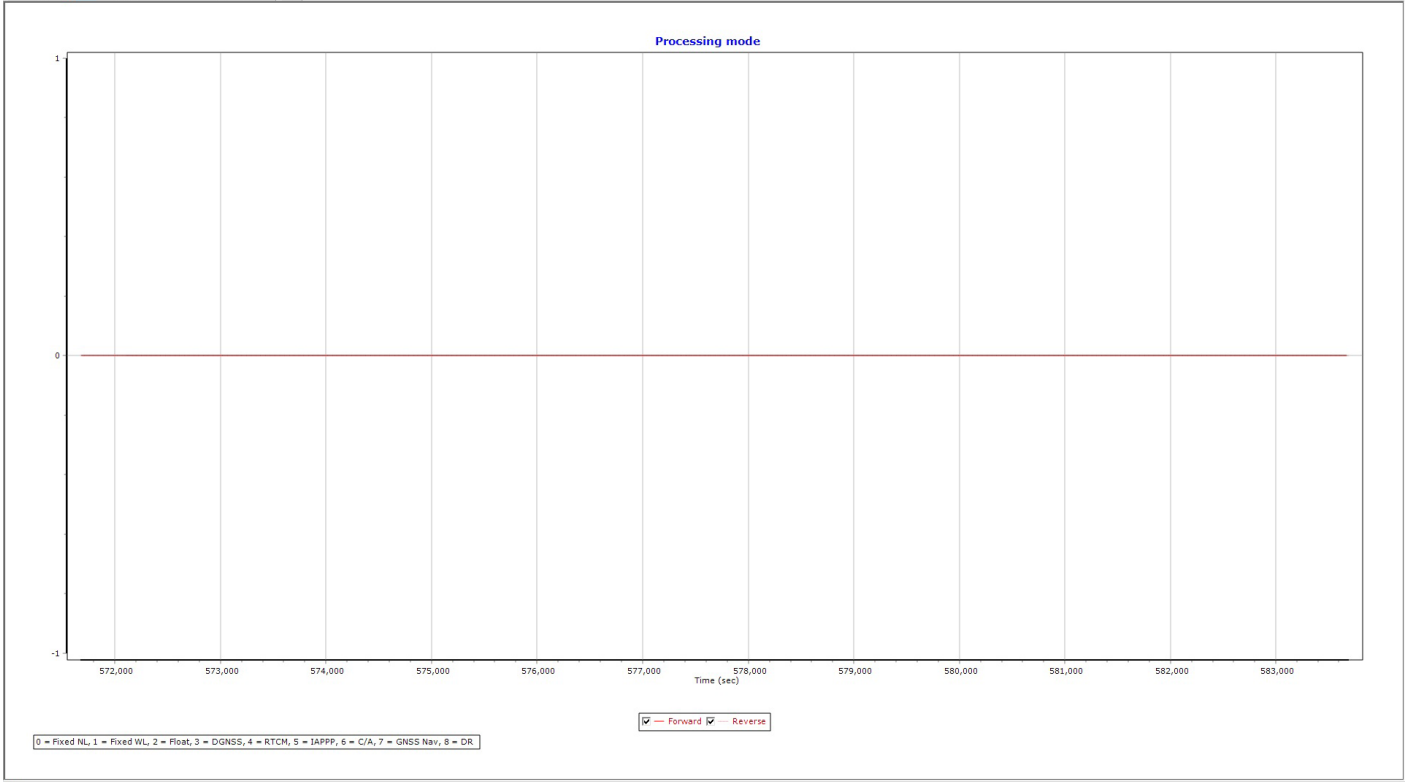
File Edit Tools View Help



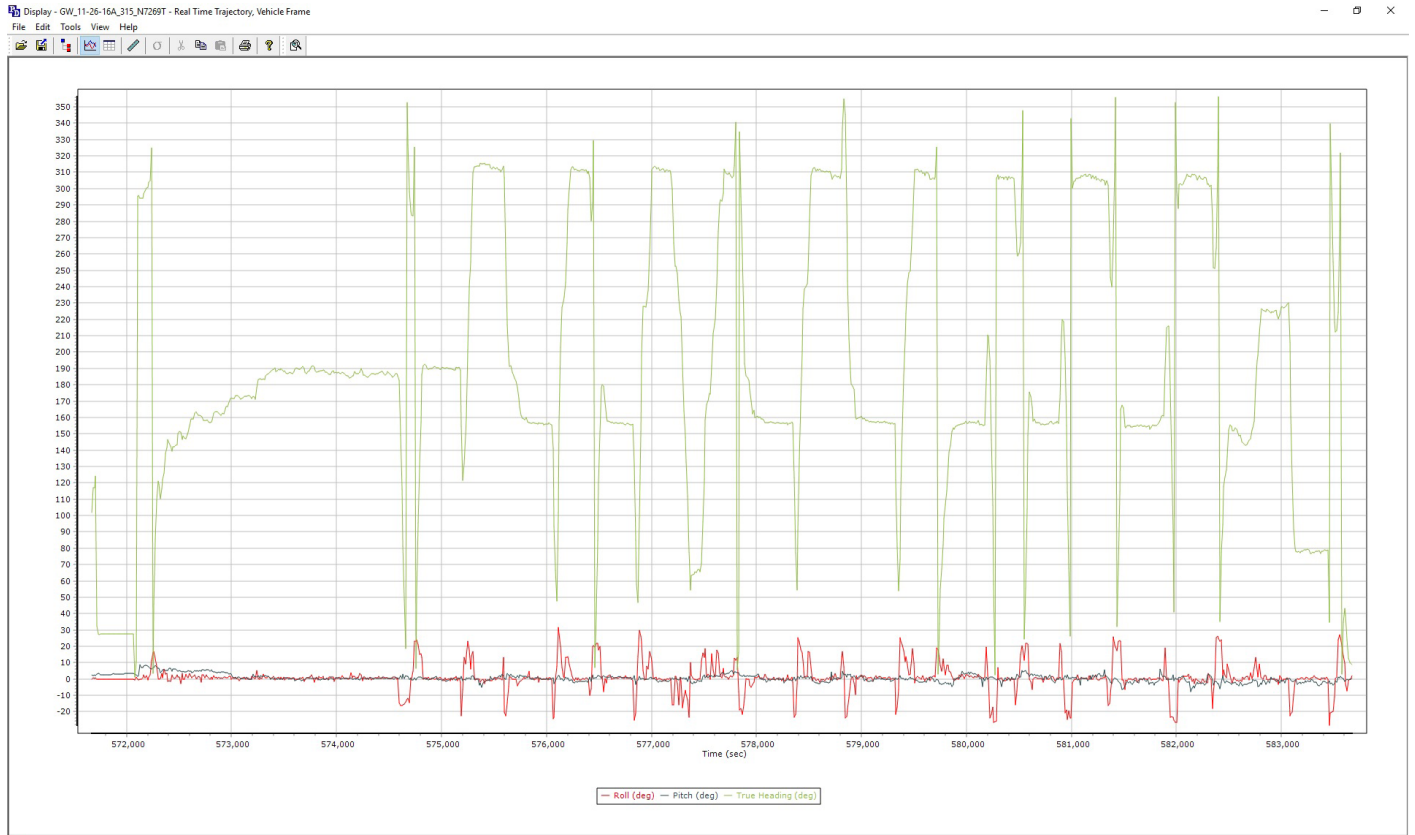
Ready



Display - GW_11-26-16A_315_N7269T - Solution Status
 File Edit Tools View Help



Ready



Ready

Coordinate Manager

Station Information

Station ID: P480

Coordinates

Latitude: N 32 58 33.57113000

Longitude: W 116 20 54.67946000

Altitude: 436.7970 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: GNSS Choke w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P480 Station Fullname: P480

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

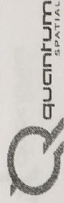
Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	11/26/2016	Local: 0650	Airport: VDD
Takeoff Time (Z):		Local: 1035	Airport: VDD
Landing Time (Z):			

Pilot	DOXEY
Technician	KORZEP
Aircraft	7269T

LIDAR Unit	12SEN315
HD #	3
POSIPAS File #	Zel1128-11-24-16-045
from → to	094 → 111
FCMS File #	



LIDAR MISSION RECORD SHEET

Project Name	EASTERN SD COUNTY LIDAR	
Project Number	16159	
FCMS .fpd File/Nav File	3430-H300-5LED_MEX + 3440-H300-5LED_RBLOCK-05	
Project Scanning Requirements		
Field of View	28	Ground Speed (kts): 115
Scan Rate	49.1	Hz Altitude AGL (ft): 5,900
Pulse Rate Frequency	125	KHz MPA or SPIA? %
Laser Output Current		

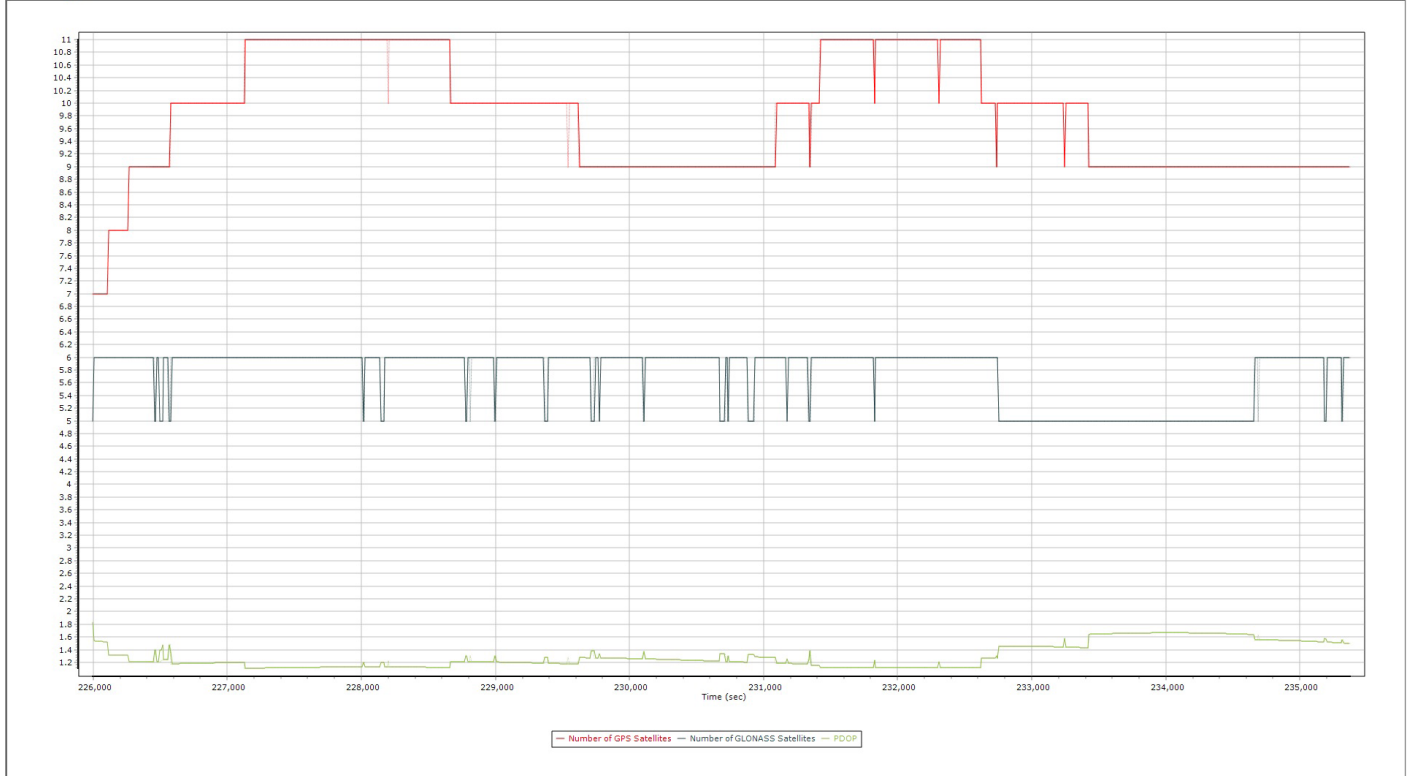
GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER
	→ If flyovers, times: 0740-0745; 0958-1003

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
21	1	747	752	9500	NW	2.5	140	99	<p>ATC WAS BEING A DOUCHE AND LIMITED US TO STRONG WINDS OUT OF SOUTH</p> <p>CROSSFLIGHT</p> <p>REFLIGHT IN CASE WE CLIPPED A BLIND ZONE</p> <p>STRONG WINDS OUT OF SOUTH</p> <p>MISSION PAGE 1 OF 1</p> <p>CROSSFLIGHTS</p>
14	2	756	800	9500	SE		109	~100	
13	3	802	806	9500	NW		132		
16	4	808	813	9500	SE		99		
15	5	816	819	9500	NW		132		
81	6	821	823	9500	NE		150		
21	7	826	829	10,000	NW		128		
20	8	832	838	10,200	SE		99		
19	9	841	846	10,100	NW		136		
18	10	848	854	10,200	SE		107		
17	11	857	901	10,100	NW		136		
1	12	904	909	9100	SE		89		
2	13	910	913	9000	NW		130		
3	14	916	920	8900	SE		84		
4	15	922	928	9000	NW		132		
5	16	931	937	8700	SE		122		
Additional Notes:	6	939	944	8900	NW		130		
	22	952	954	9000	SW		109		

Nov 29, 2016-A (N7269T, SN315)

Display - GW_11-29-16A_315_N7269T - Solution Status

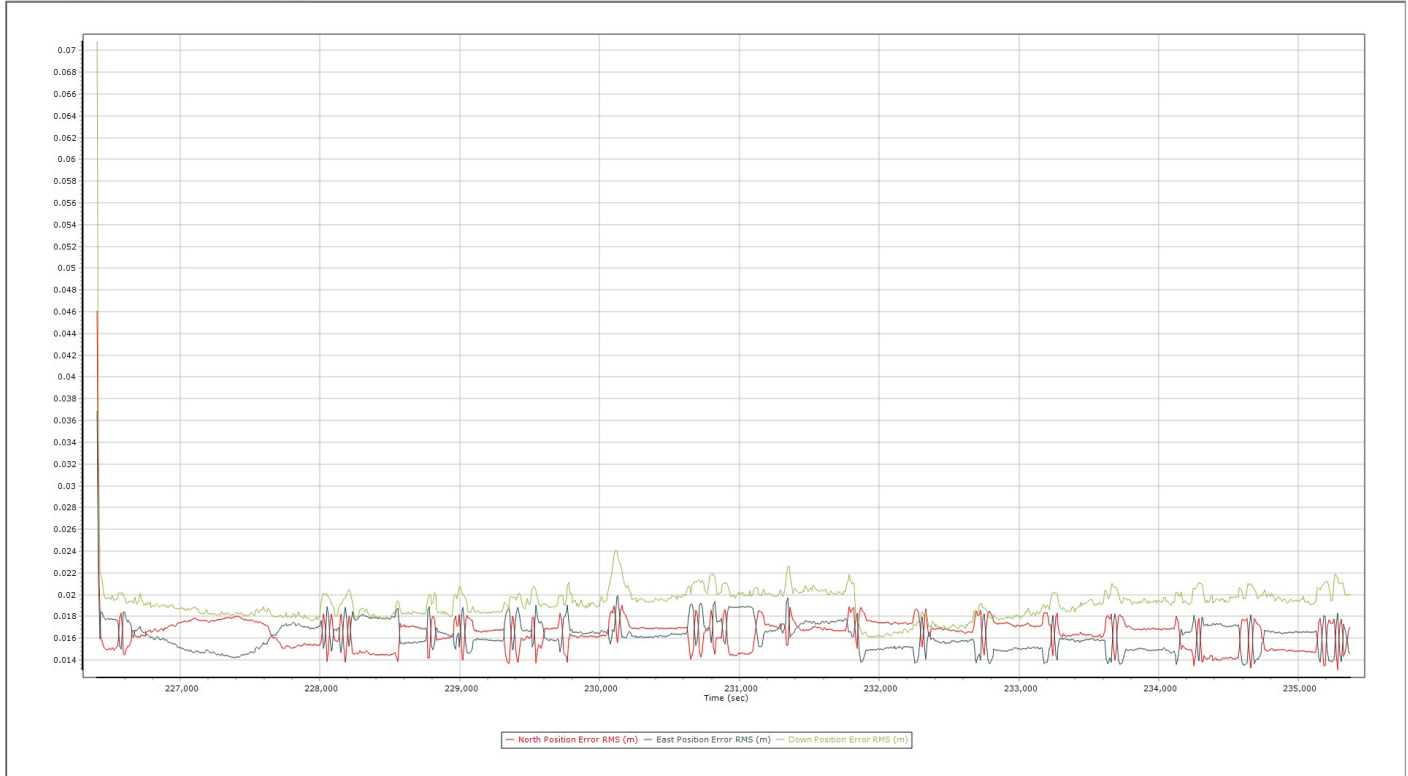
File Edit Tools View Help



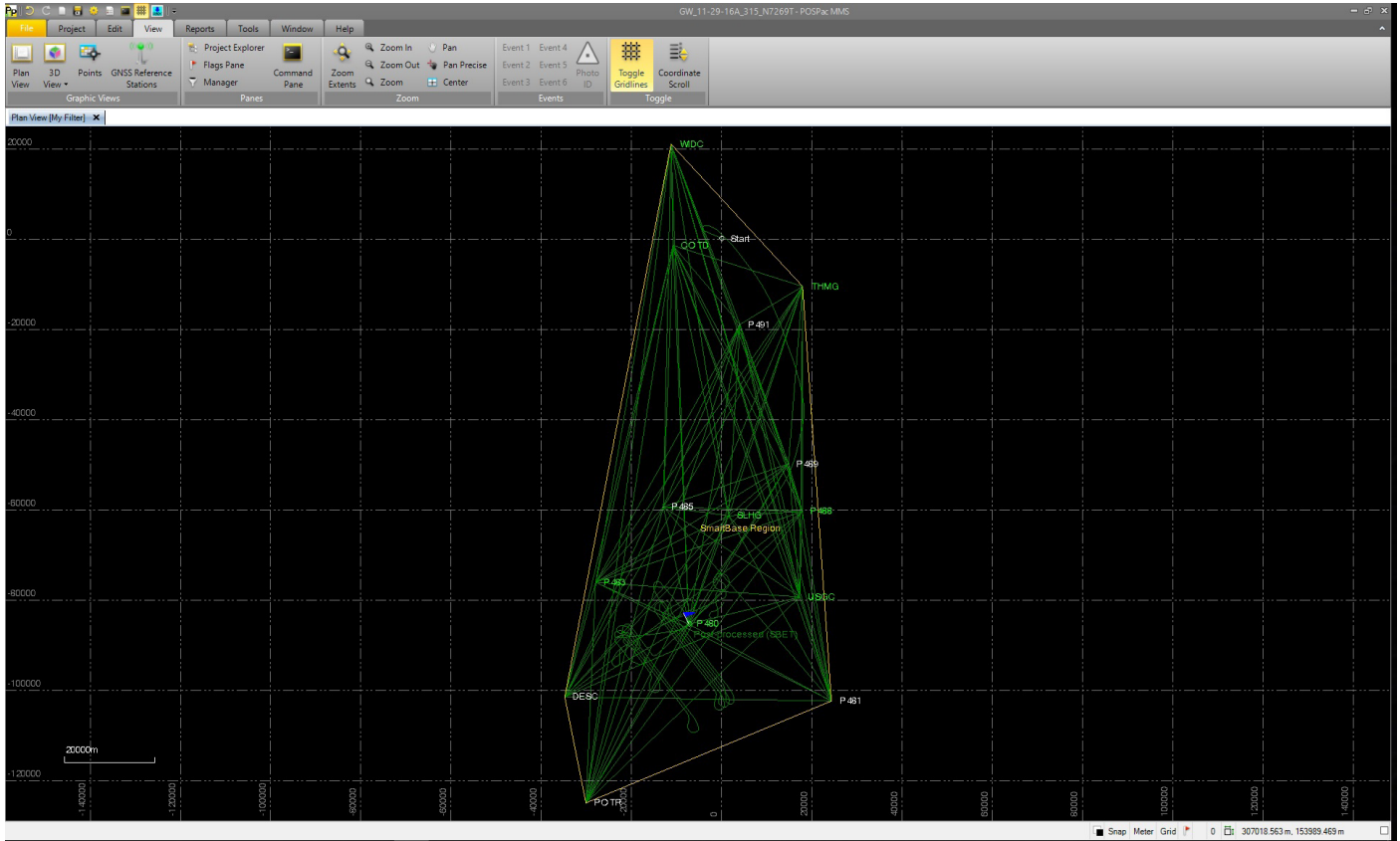
Ready

Display - GW_11-29-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

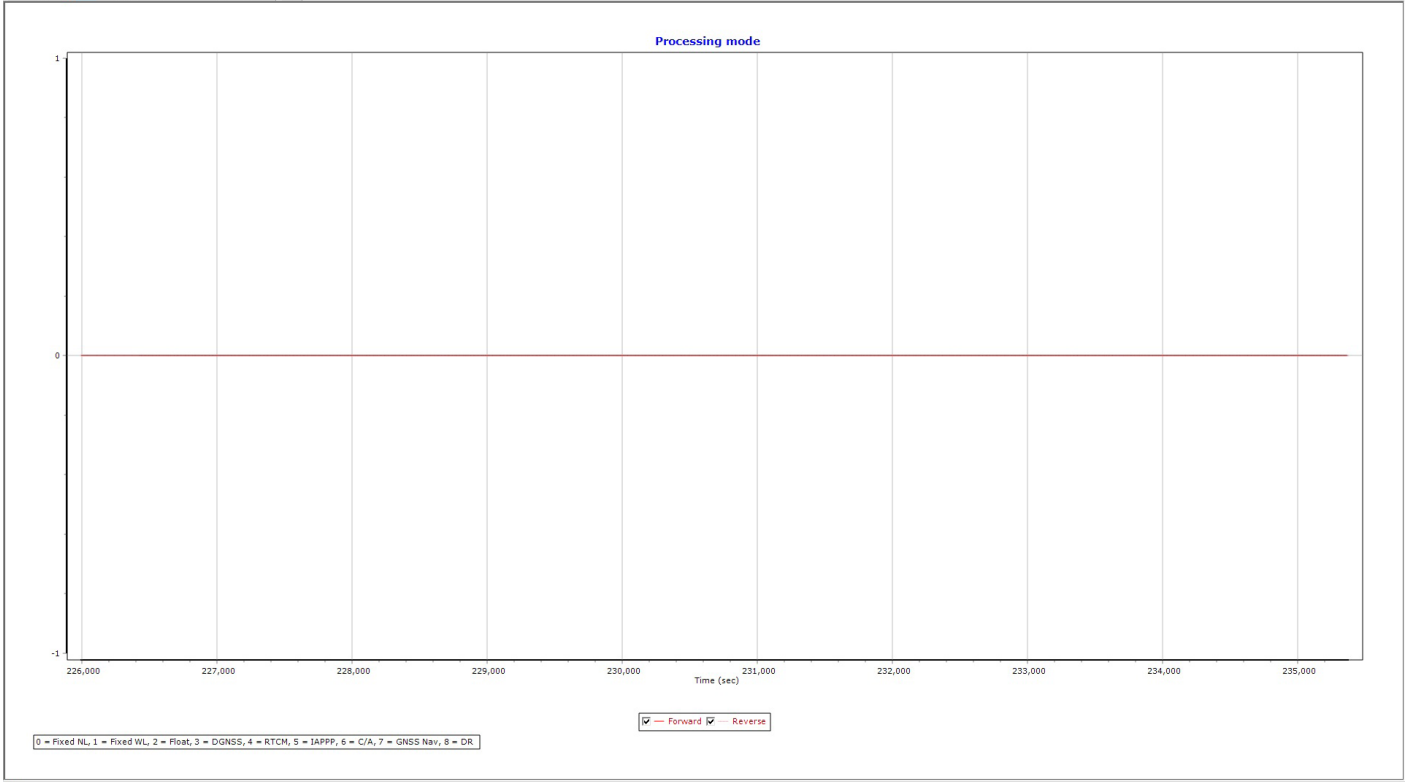
File Edit Tools View Help



Ready



Display - GW_11-29-16A_315_N7269T - Solution Status
 File Edit Tools View Help



Ready

Display - GW_11-29-16A_315_N7269T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: P480

Coordinates

Latitude: N 32 58 33.57113000

Longitude: W 116 20 54.67946000

Altitude: 436.7970 m

Decimal Degrees

Antenna **Frame**

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: GNSS Choke w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P480 Station Fullname: P480

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

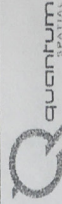
Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown	11/29/2016	Airport	UPD
Takeoff Time (Z)	Local: 0650	Airport	UPD
Landing Time (Z)	Local: 0945	Airport	UPD

Pilot	DOXEY
Technician	KORZEP
Aircraft	7269T

Weather		Ground		Airport	
Begin Temp		Begin Temp	14		
Begin Dewpoint		Begin Dewpoint	-9		UPD
Begin Pressure		Begin Pressure	30.02		
End Temp		End Temp	22		UPD
End Dewpoint		End Dewpoint	-9		
End Pressure		End Pressure	30.07		

Data Information	
LIDAR Unit	12SEN315
HD #	3
POSIPAS File #	20161129LIFT1
from → to	112 → 125
FCMS File #	



LIFT 1

LIDAR MISSION RECORD SHEET

Project Name	EASTERN SD COUNTY LIDAR	
Project Number	16159	
FCMS .fpd File/Nav File	7490_11900_5LED_840007.xml	
Project Scanning Requirements		
Field of View	Ground Speed (kts):	115
Scan Rate	Hz Altitude AGL (ft):	5,900
Pulse Rate Frequency	kHZ/MPIA or SPIA?:	125
Laser Output Current	%	

GPS Base Location(s)	N/A
PDOP Avoidance	N/A
Static or Flyover?	FLYOVER
→. If flyovers, times: 0723-0728; 0913-0918	

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
1	1	0733	0735	11,500	SE	1	145	~100%	WIND OUT OF N
2	2	0737	0741	11,400	NW		101		"
3	3	0743	0744	11,500	SE		160		RESTRS. TDH HIGH + FAST
3	4	0750	0753	11,300	SE		140		WIND OUT OF N
4	5	0756	0803	11,400	NW		101		HIF BLINDZONE; AIC RESTRICTED ALT.
5	6	0805	0806	11,400	SE		2		"
6	7	0815	0821	8,500	SE		119		WIND OUT OF N
7	8	0824	0830	8,400	NW		121		
8	9	0832	0837	8,300	SE		126		
9	10	0839	0845	8,400	NW		119		
10	11	0847	0853	8,500	SE		121		
11	12	0855	0901	8,400	NW		115		
12	13	0904	0909	9,000	SW		130		CROSSFLIGHT; HIF BLIND ZONE
13	14	0911	0913	10,900	NE		130		CROSSFLIGHT

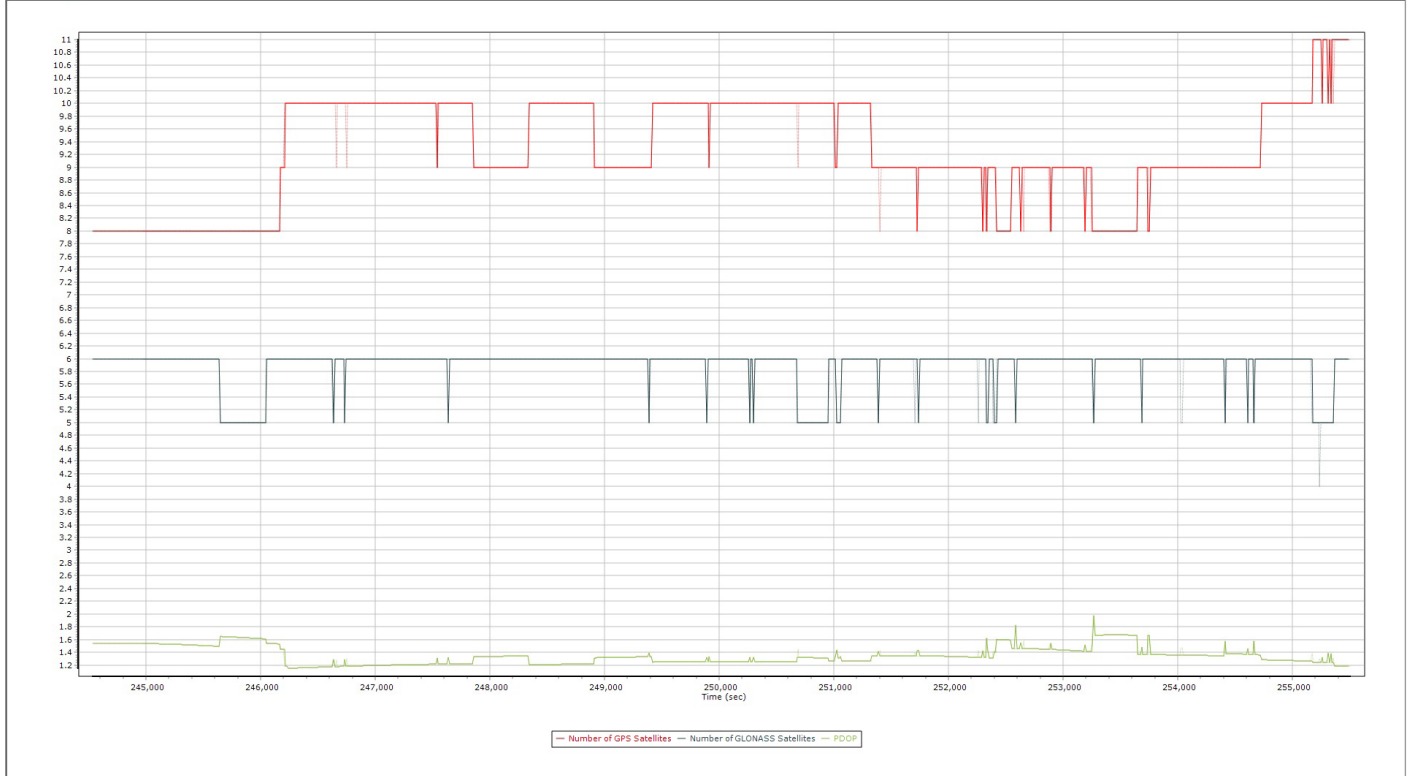
Additional Notes:

Mission Page ____ Of ____

Nov 29, 2016-B (N7269T, SN315)

Display - GW_11-29-168_315_N7269T - Solution Status

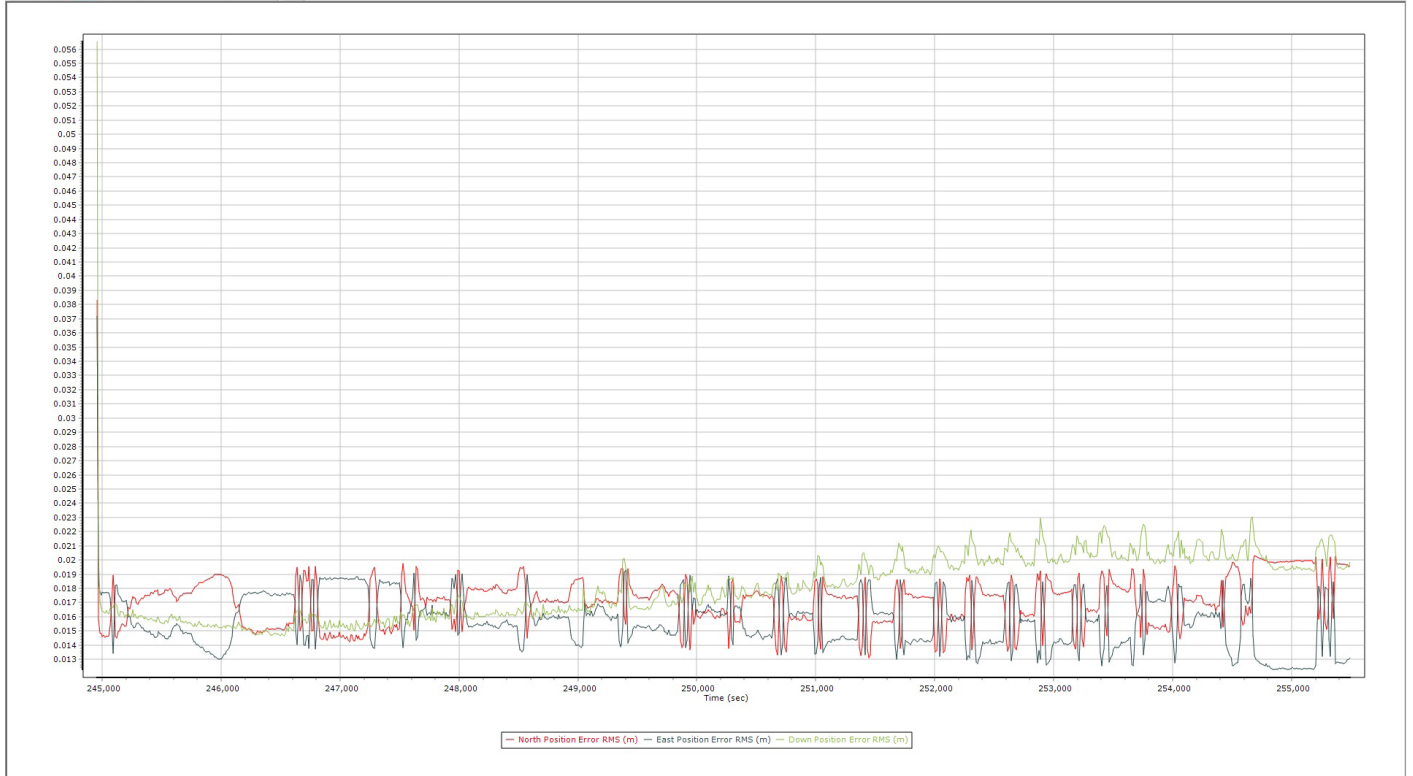
File Edit Tools View Help



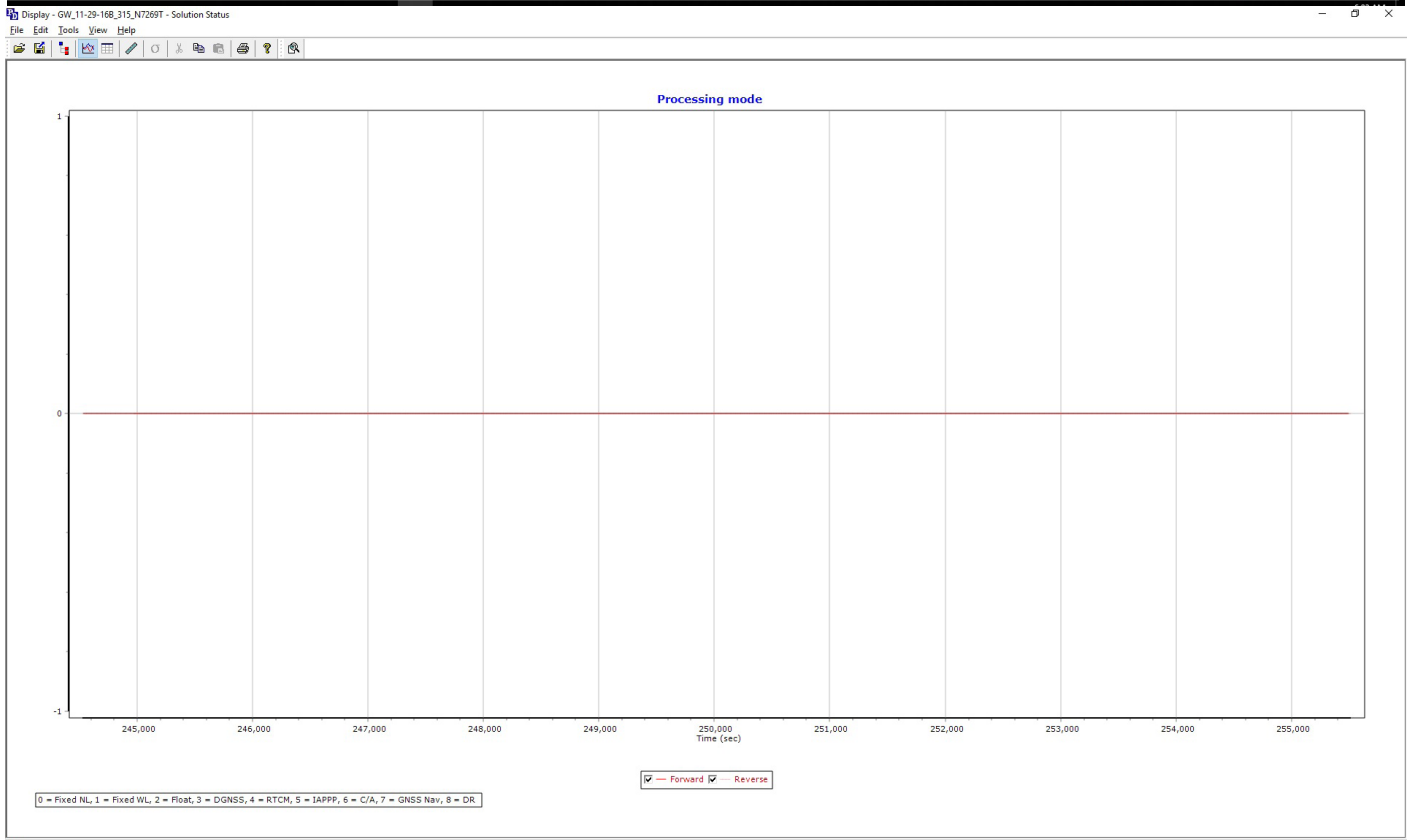
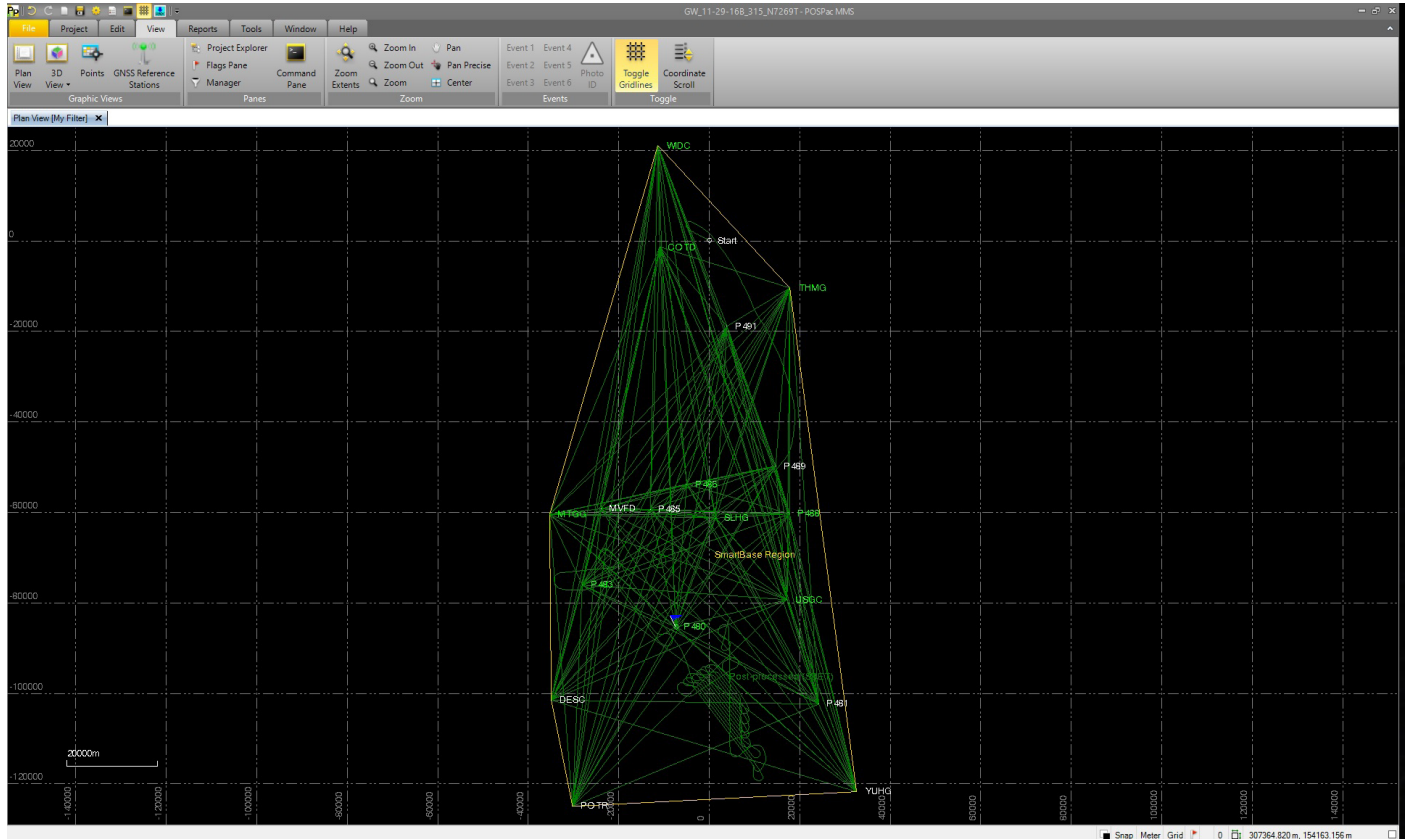
Ready

Display - GW_11-29-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready



Ready

Display - GW_11-29-168_315_N7269T - 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

Station Database

Station ID: Station Fullname:

Primary Service ID: Coordinate Accuracy:

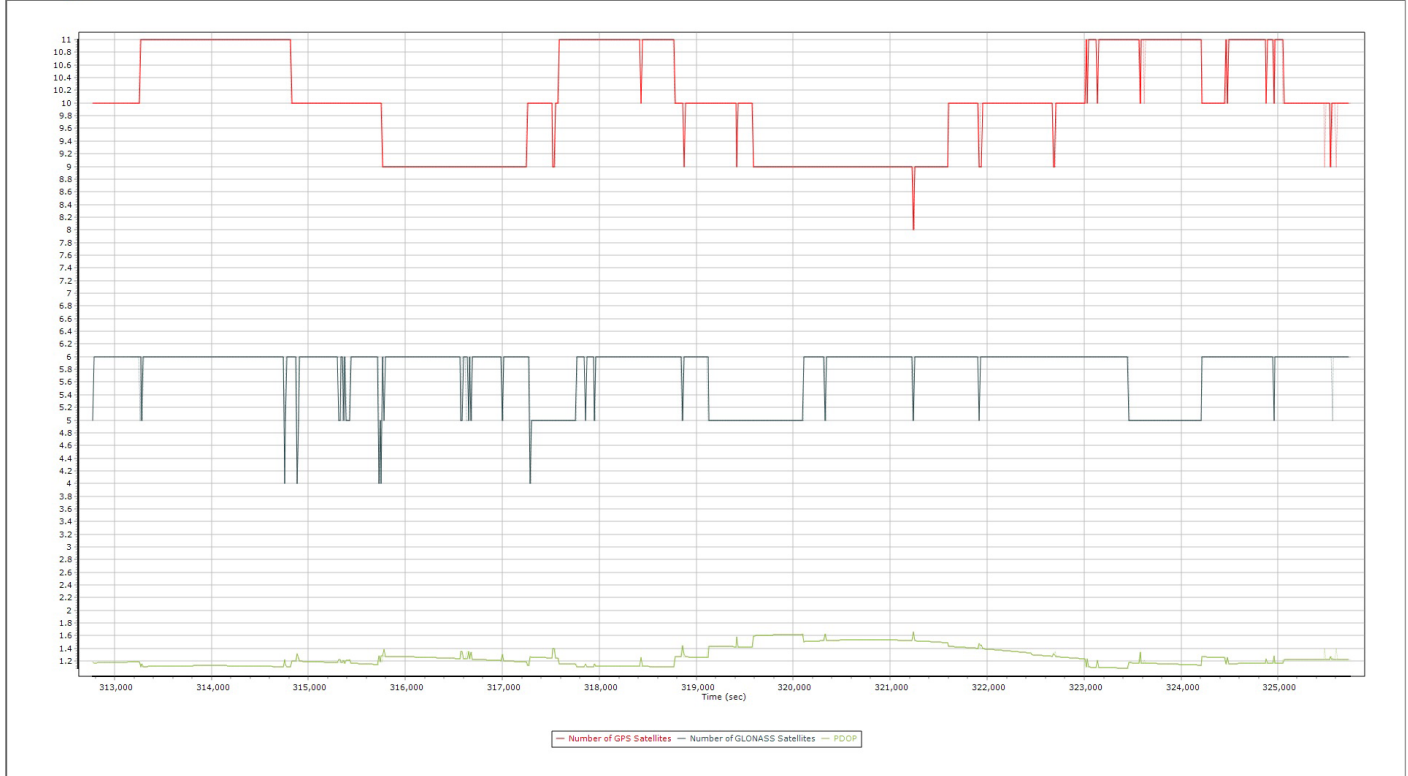
Secondary Service ID:

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

Nov 30, 2016-A (N7269T, SN315)

Display - GW_11-30-16A_315_N7269T - Solution Status

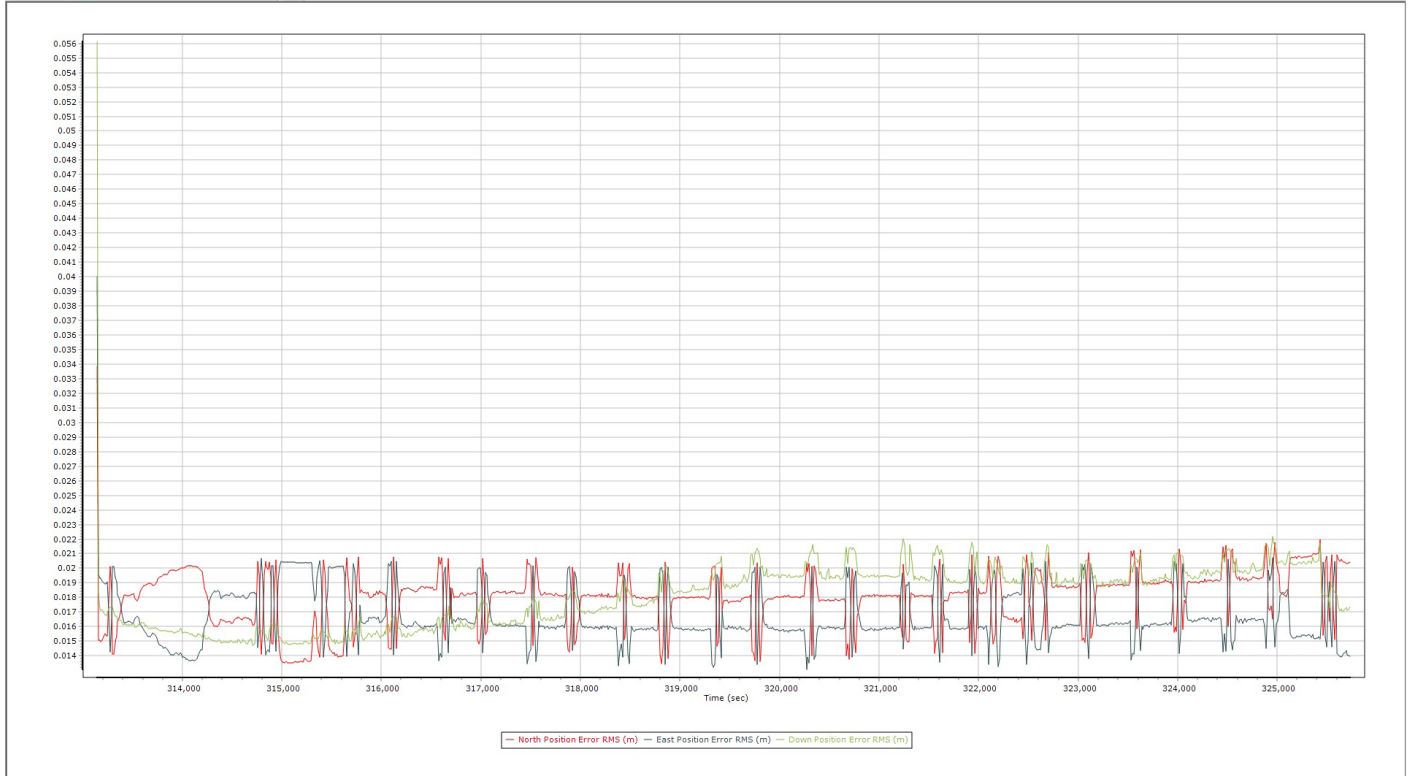
File Edit Tools View Help



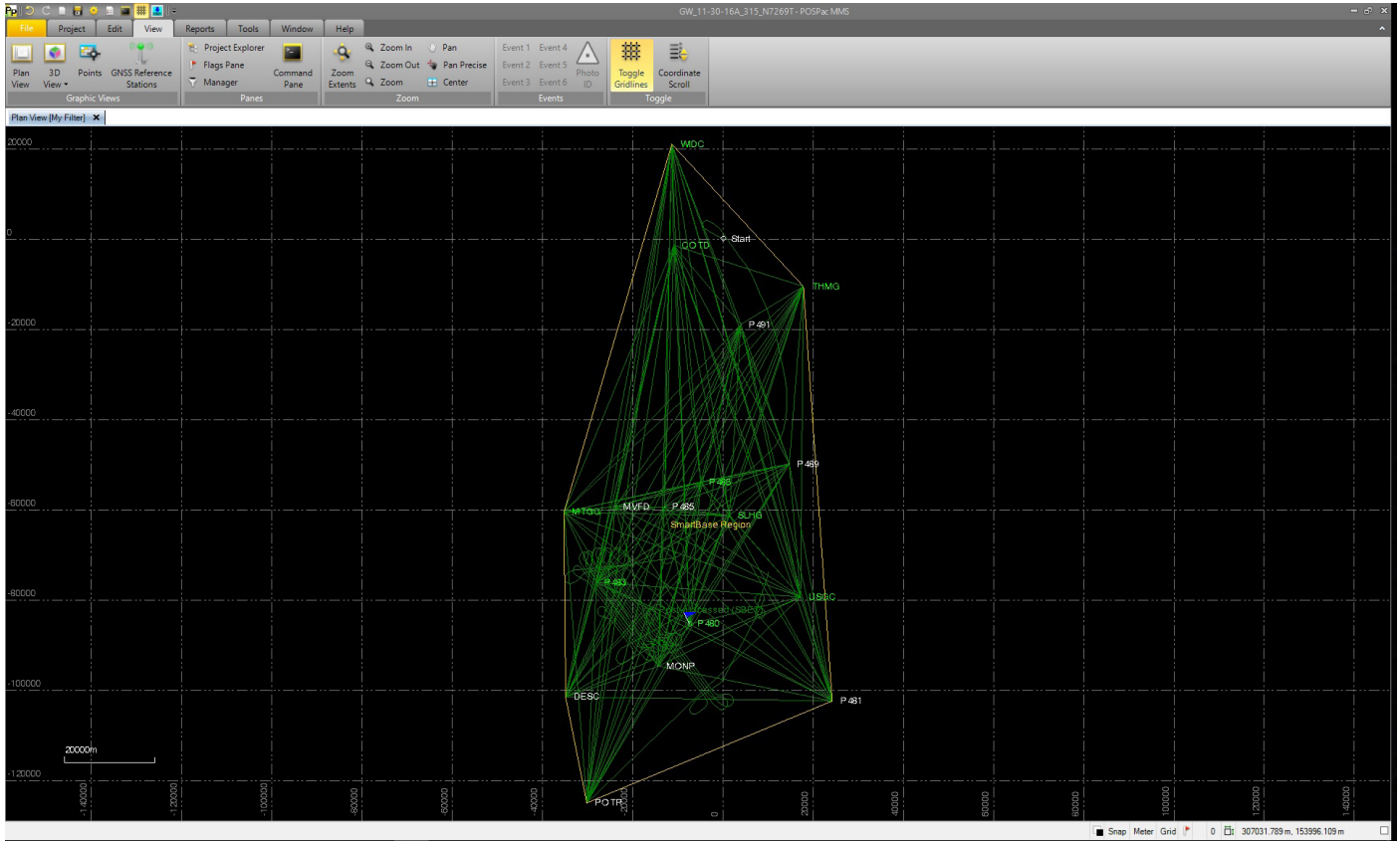
Ready

Display - GW_11-30-16A_315_N7269T - Smoothed Performance Metrics, Reference Frame

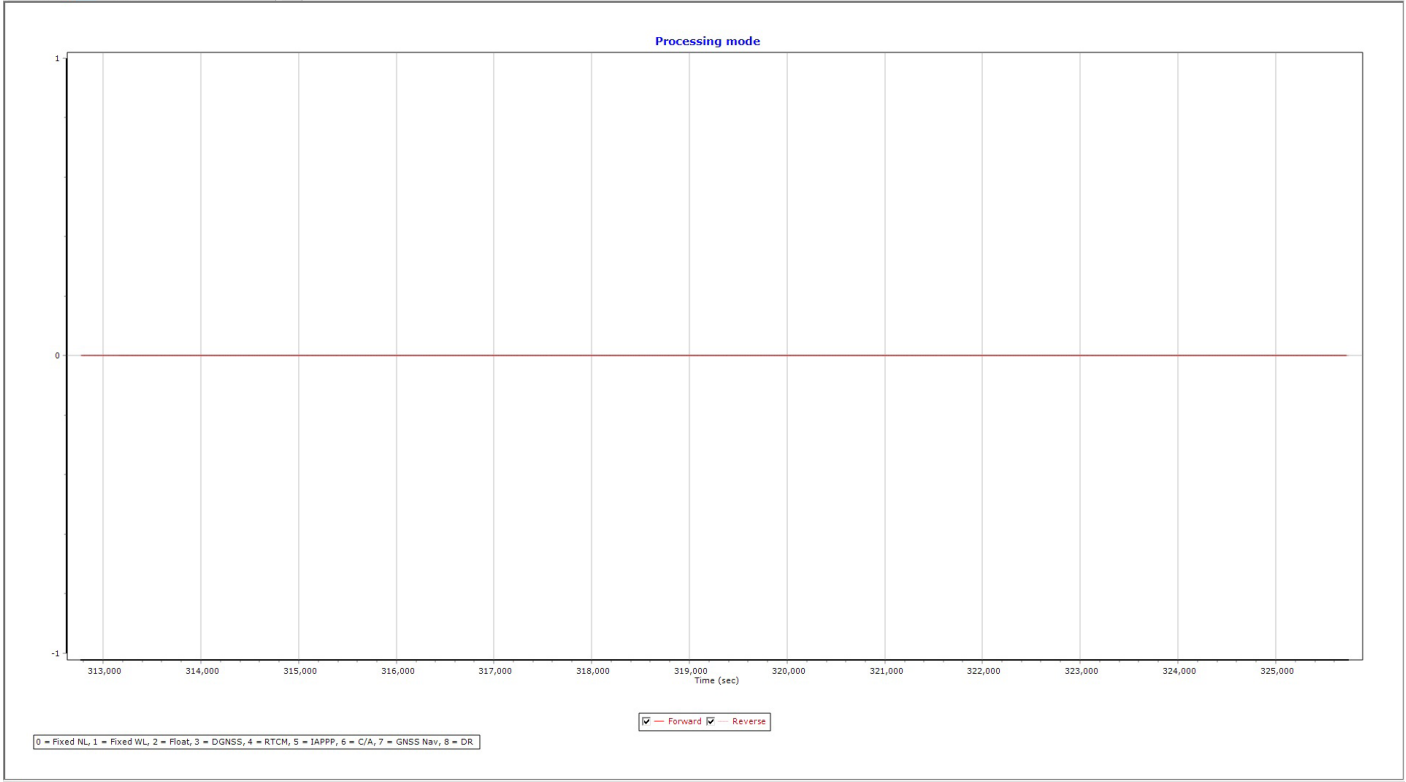
File Edit Tools View Help



Ready



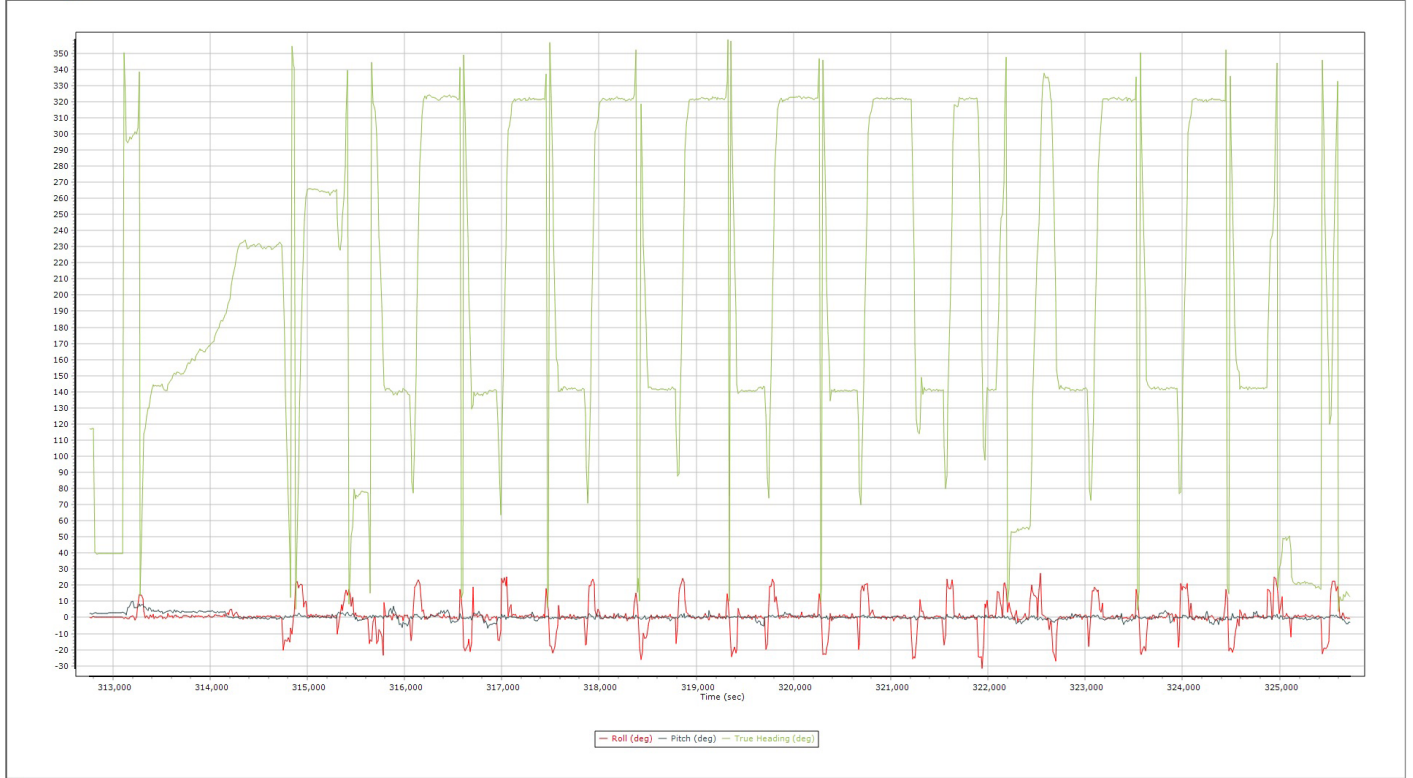
Display - GW_11-30-16A_315_N7269T - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-30-16A_315_N7269T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: P480

Coordinates

Latitude: N 32 58 33.57113000

Longitude: W 116 20 54.67946000

Altitude: 436.7970 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: GNSS Choke w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P480 Station Fullname: P480

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
[Empty Table]								

Import Coordinates Export Coordinates

Close

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

Date Flown: 11/30/2016
Local: 0700 Airport: VDD
Takeoff Time (Z): Local: 1045 Airport: VDD
Landing Time (Z):

Pilot: DOXEY
Technician: KORZEP
Aircraft: 7269T

Data Information
LIDAR Unit: 125EN315
HD #: 4
POSSIPAS File #: 20161130M-ESAB-BOCKUS-SEA
from -- to: 143 → 161
FCMS File #:

Weather
Begin Temp: 7
Begin Dewpoint: -8
Begin Pressure: 30.14
End Temp: 18
End Dewpoint: -8
End Pressure: 30.12

Project Scanning Requirements
Field of View: 28
Ground Speed (kts): 115
Scan Rate: 48.1
Hz Altitude AGL (ft): 5,900
Pulse Rate Frequency: 125
KHz MPA or SPIA?:
Laser Output Current: %

LIDAR MISSION RECORD SHEET
Pg. 1 LIFT 1 11/30/2016
Project Name: EASTERN SD COUNTY LIDAR
Project Number: 16159
FCMS (pu) File/Nav File: 7470_11300-5ED-4812803 + 4912804

GPS Base Location(s): N/A
POOP Avoidance: N/A
Static or Flyover?: FLYOVER

-- If flyovers, times: 0729-0734; 1018-1023

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crb	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Tide, Etc.)
1	1	736	739	9200	E	0	140	~100	CROSSFLIGHT WIND OUT OF N
16	2	742	747	9400	SE		140	%	
15	3	749	755	9100	NW		101	%	
14	4	757	802	9100	SE		138	%	
13	5	804	810	9300	NW		103	%	
12	6	812	816	9500	SE		140	%	
11	7	819	825	9500	NW		109	%	
10	8	827	832	9500	SE		140	%	
9	9	835	841	9800	NW		109	%	
8	10	843	847	10,000	SE		140	%	
7	11	850	857	10,100	NW		107	%	
6	12	858	903	10,100	SE		140	%	
5	13	906	912	10,000	NW		105	%	
4	14	914	918	10,000	SE		140	%	
3	15	920	924	10,000	NW		109	%	
2	16	925	927	10,000	SE		140	%	

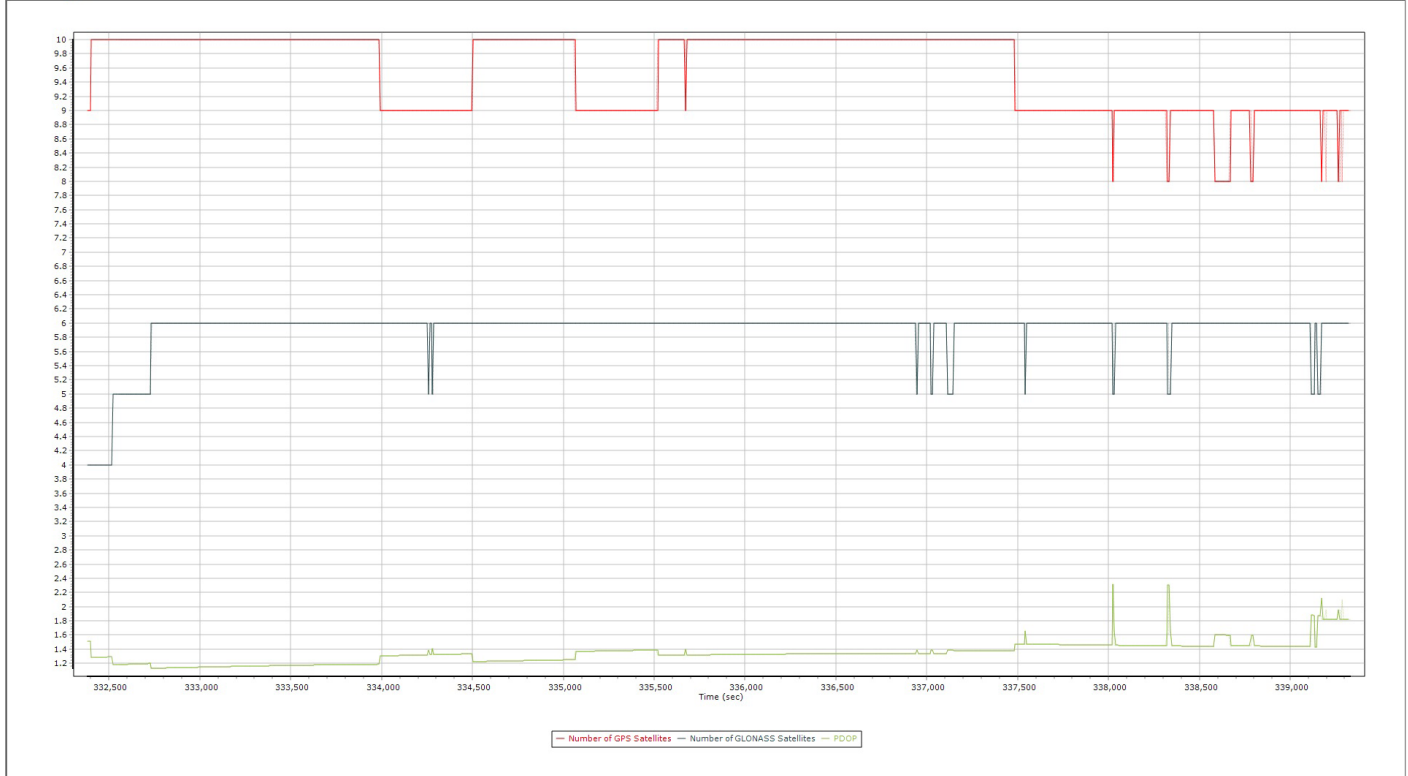
Mission Page 1 of 2

Additional Notes:

Nov 30, 2016-B (N7269T, SN315)

Display - GW_11-30-168_315_N7269T - Solution Status

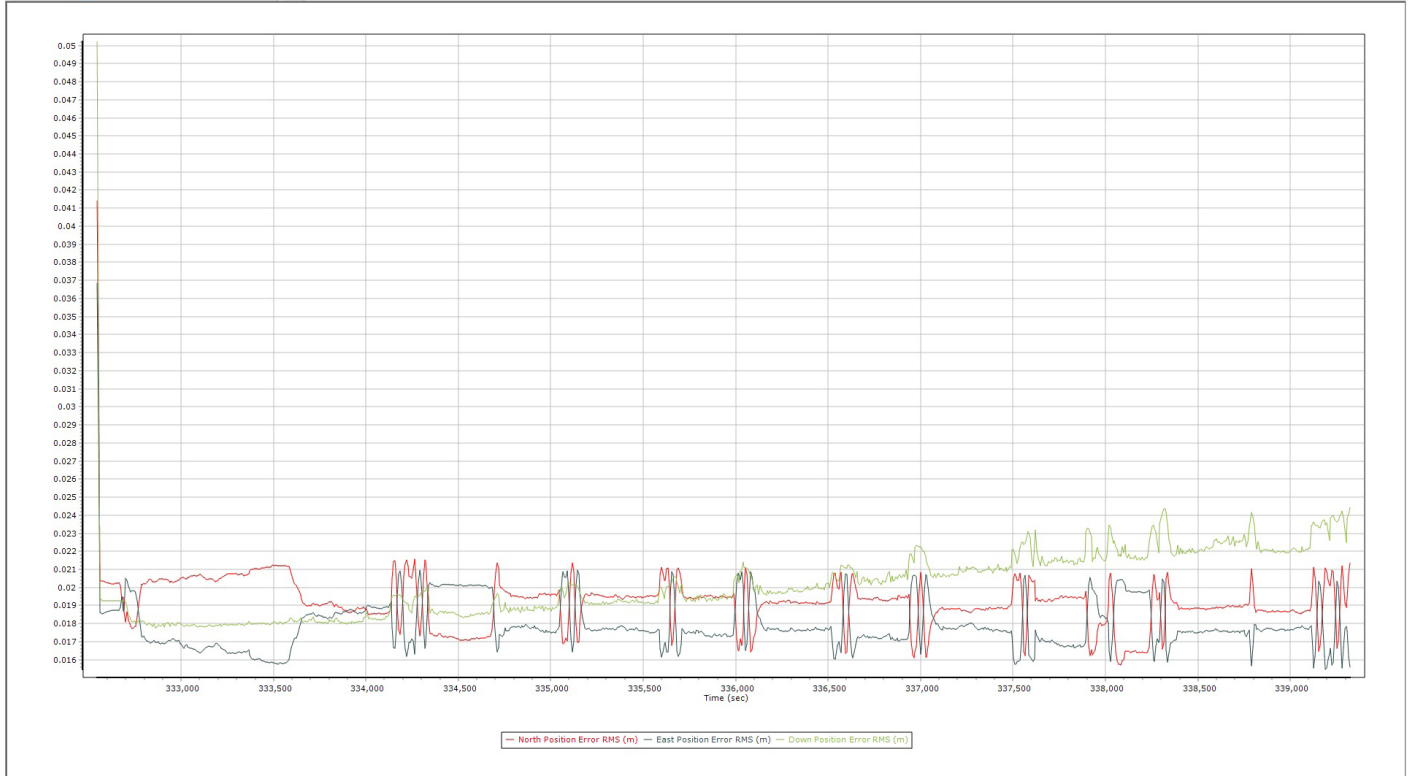
File Edit Tools View Help



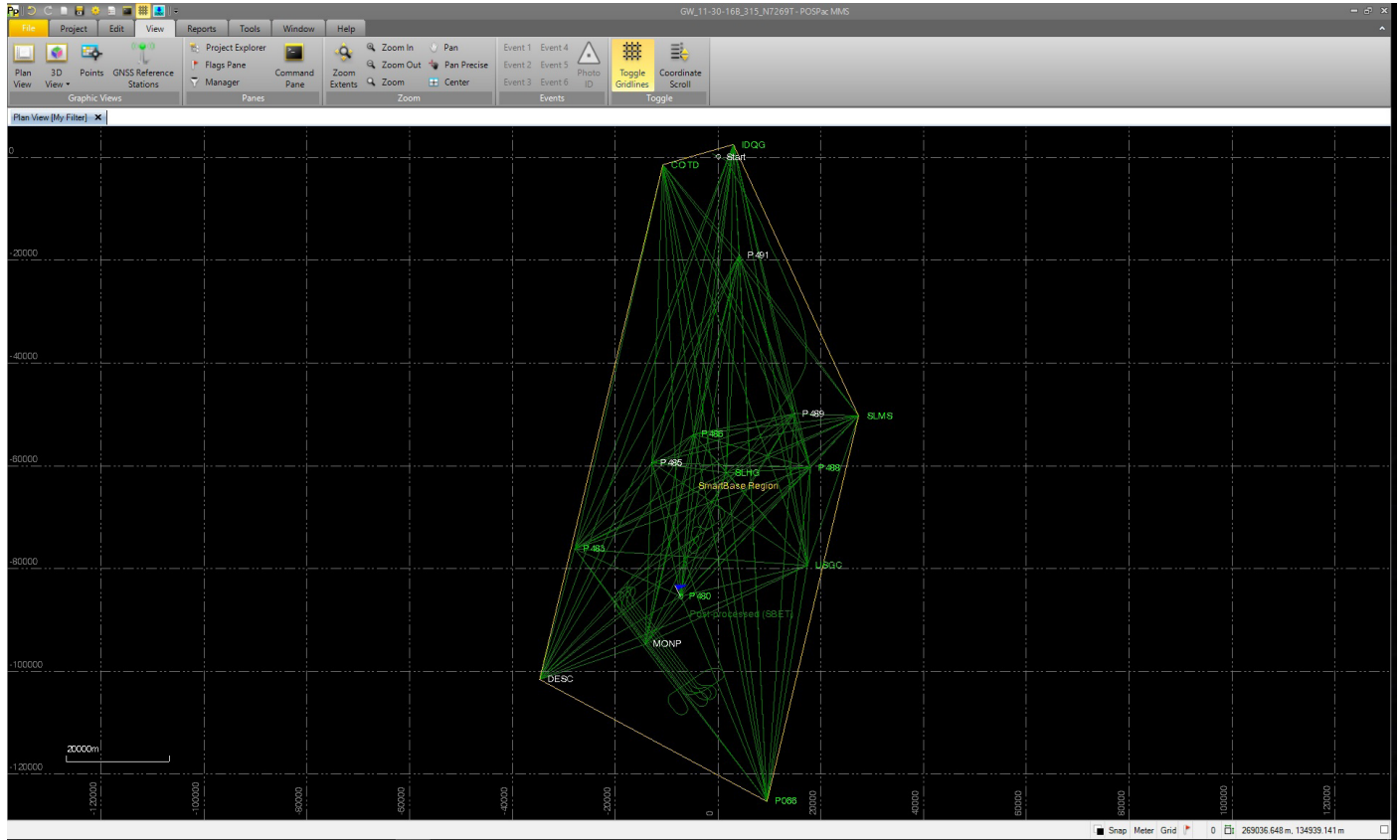
Ready

Display - GW_11-30-168_315_N7269T - Smoothed Performance Metrics, Reference Frame

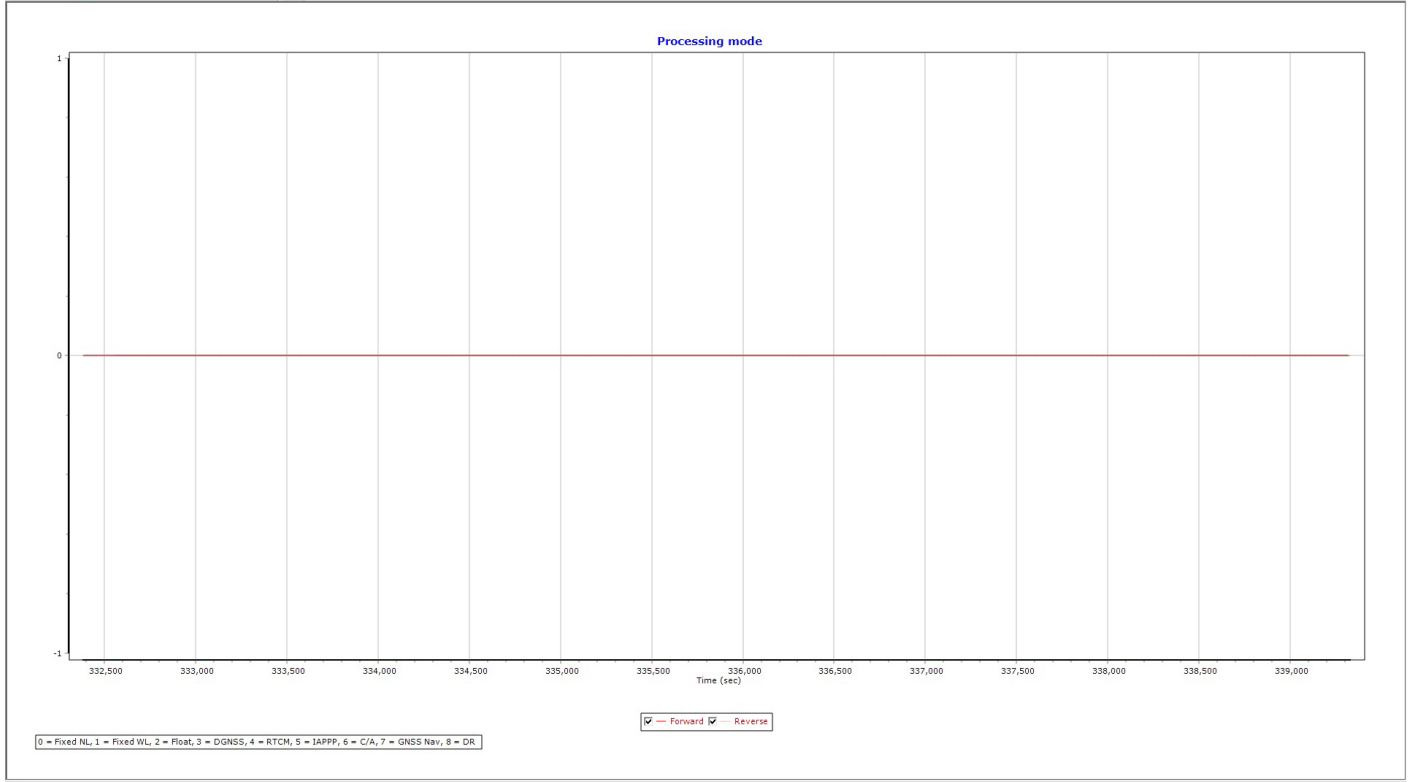
File Edit Tools View Help



Ready



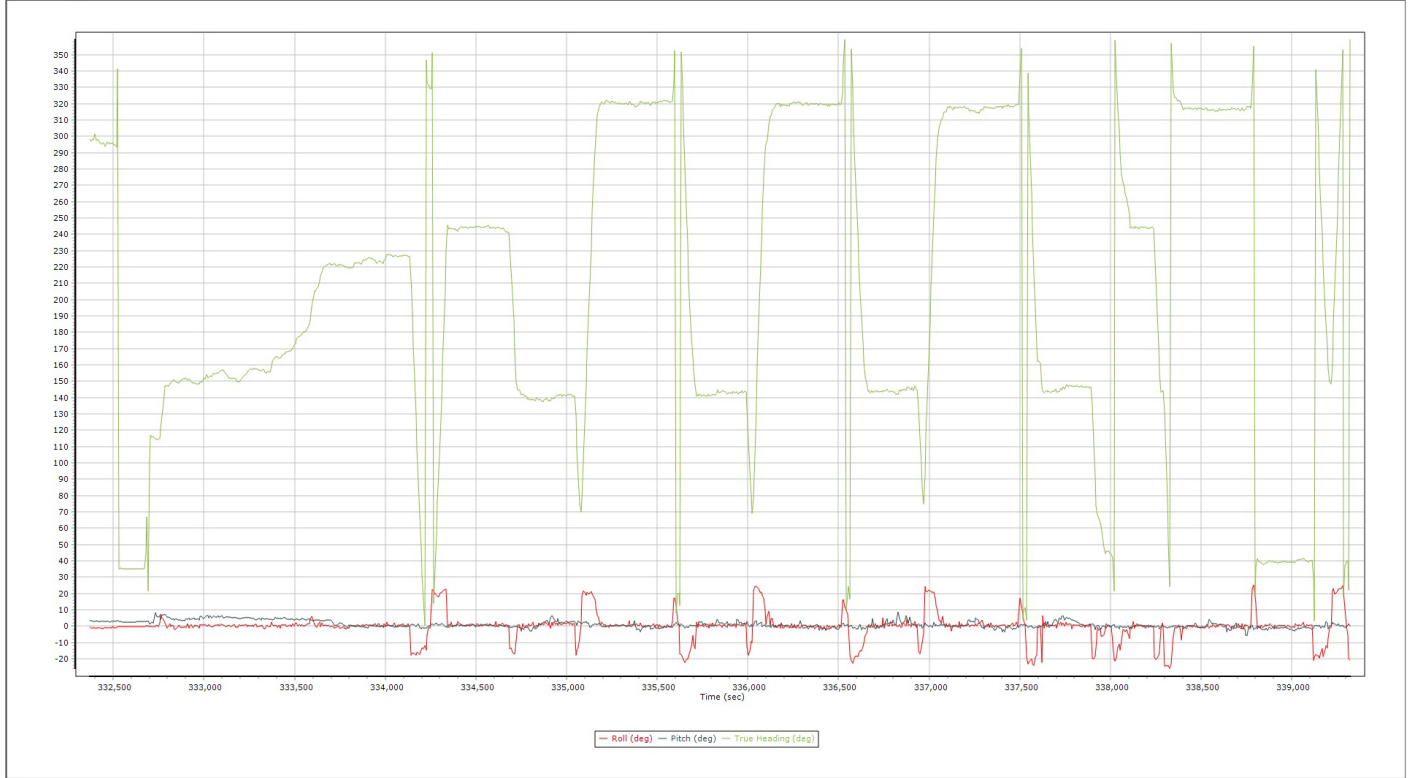
Display - GW_11-30-168_315_N7269T - Solution Status
File Edit Tools View Help



Ready

Display - GW_11-30-168_315_N7269T - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: P480

Coordinates

Latitude: N 32 58 33.57113000

Longitude: W 116 20 54.67946000

Altitude: 436.7970 m

Decimal Degrees

Ground Reference Point (GRP) coordinates Apply Changes

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: GNSS Choke w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Station Database

Station ID: P480 Station Fullname: P480

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

Jan 14, 2017-A (N27DV, SN315)

Display - GW_1-14-17A_315_N27DV - Solution Status

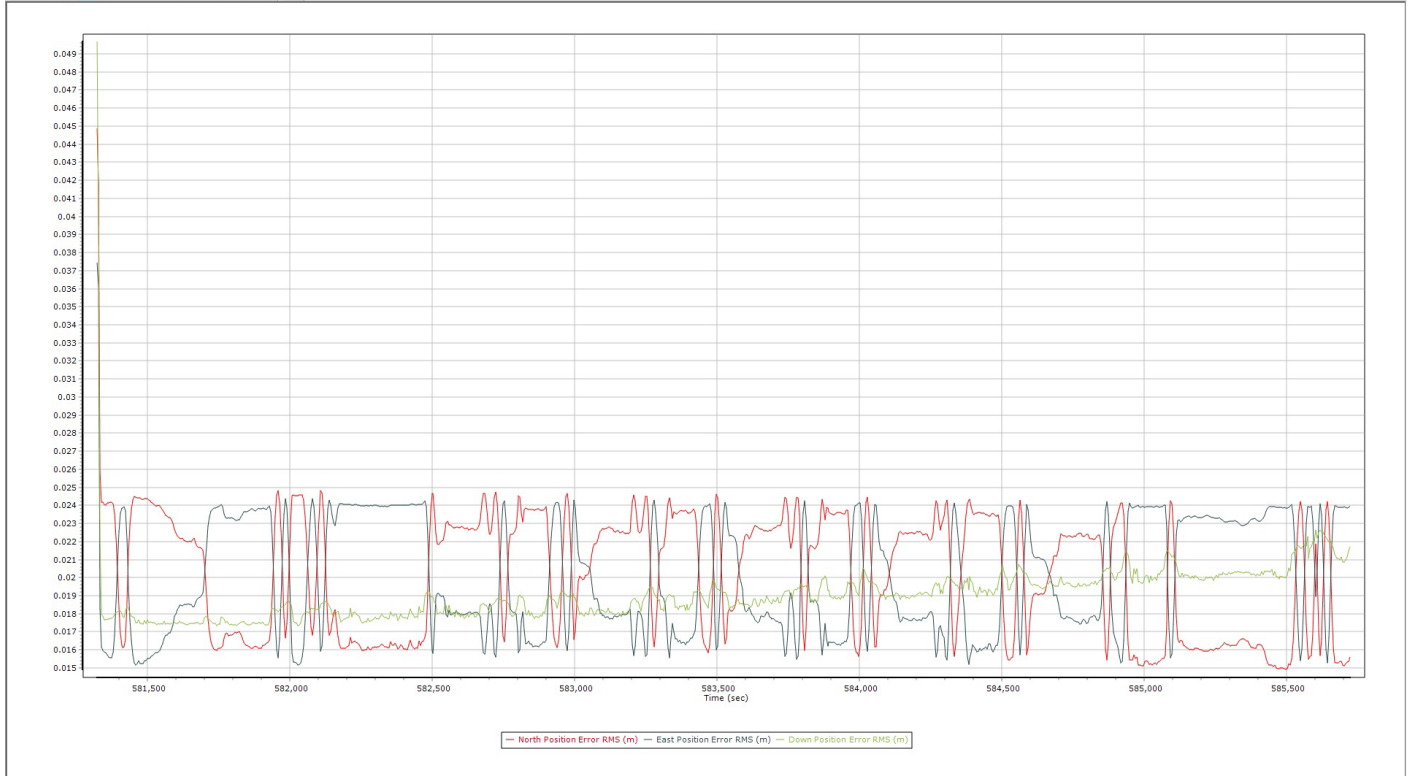
File Edit Tools View Help



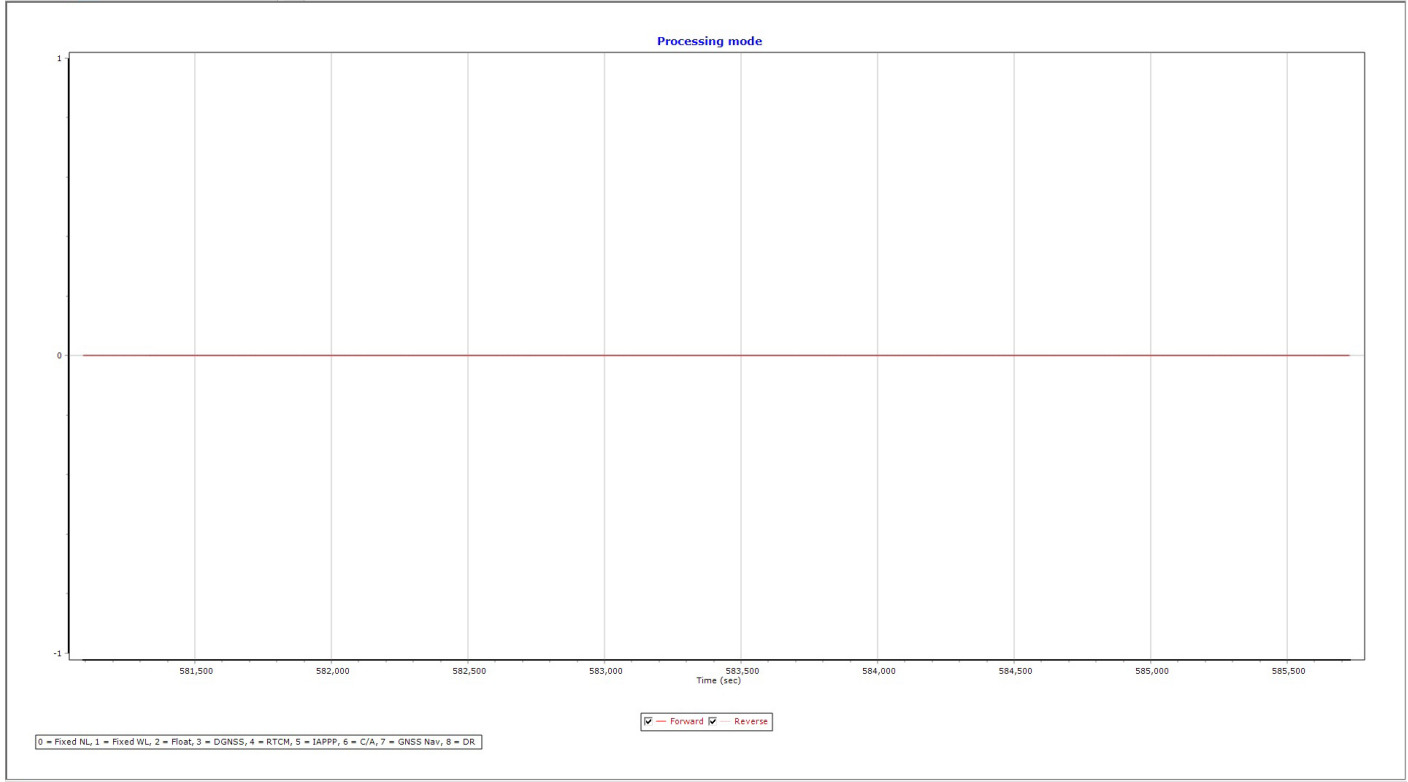
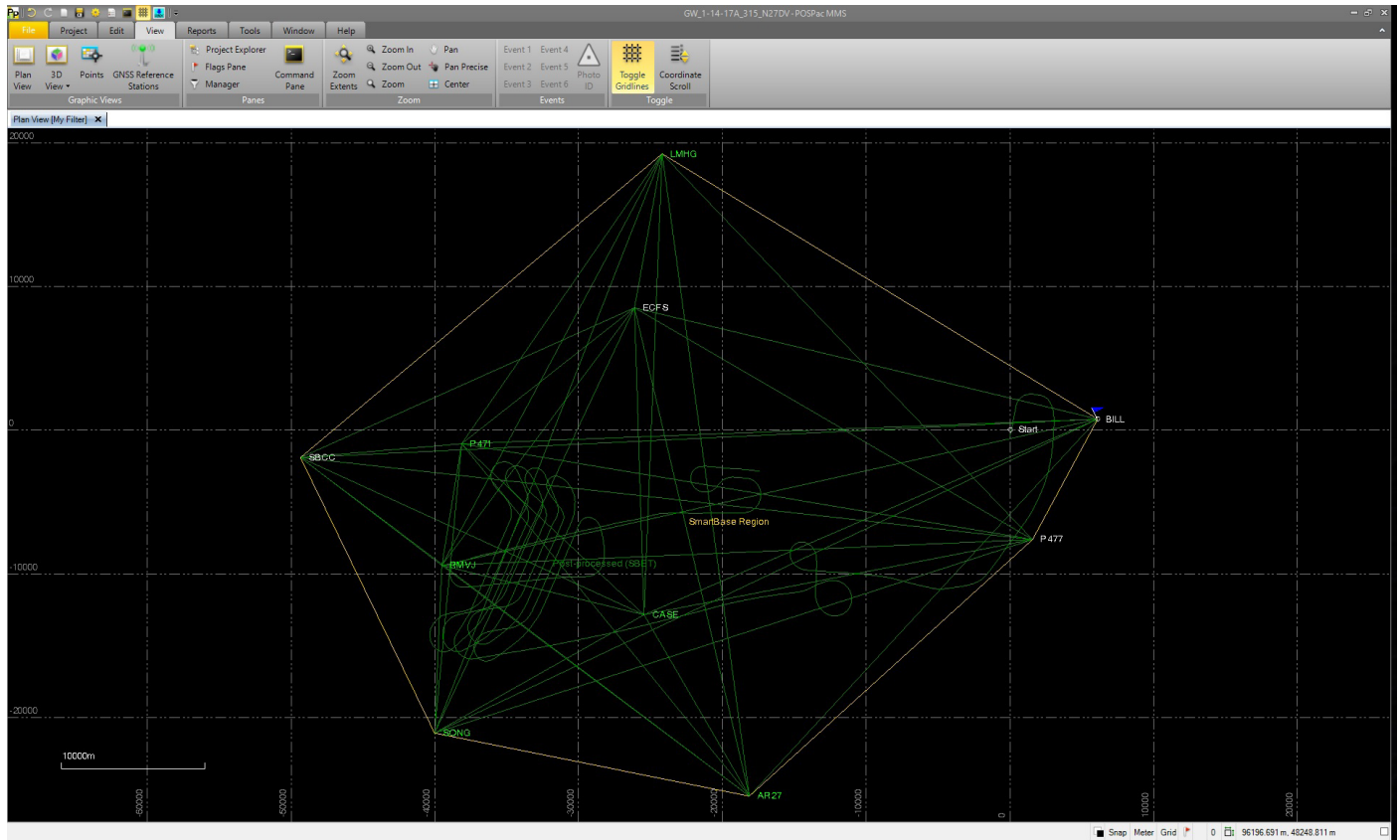
Ready

Display - GW_1-14-17A_315_N27DV - Smoothed Performance Metrics, Reference Frame

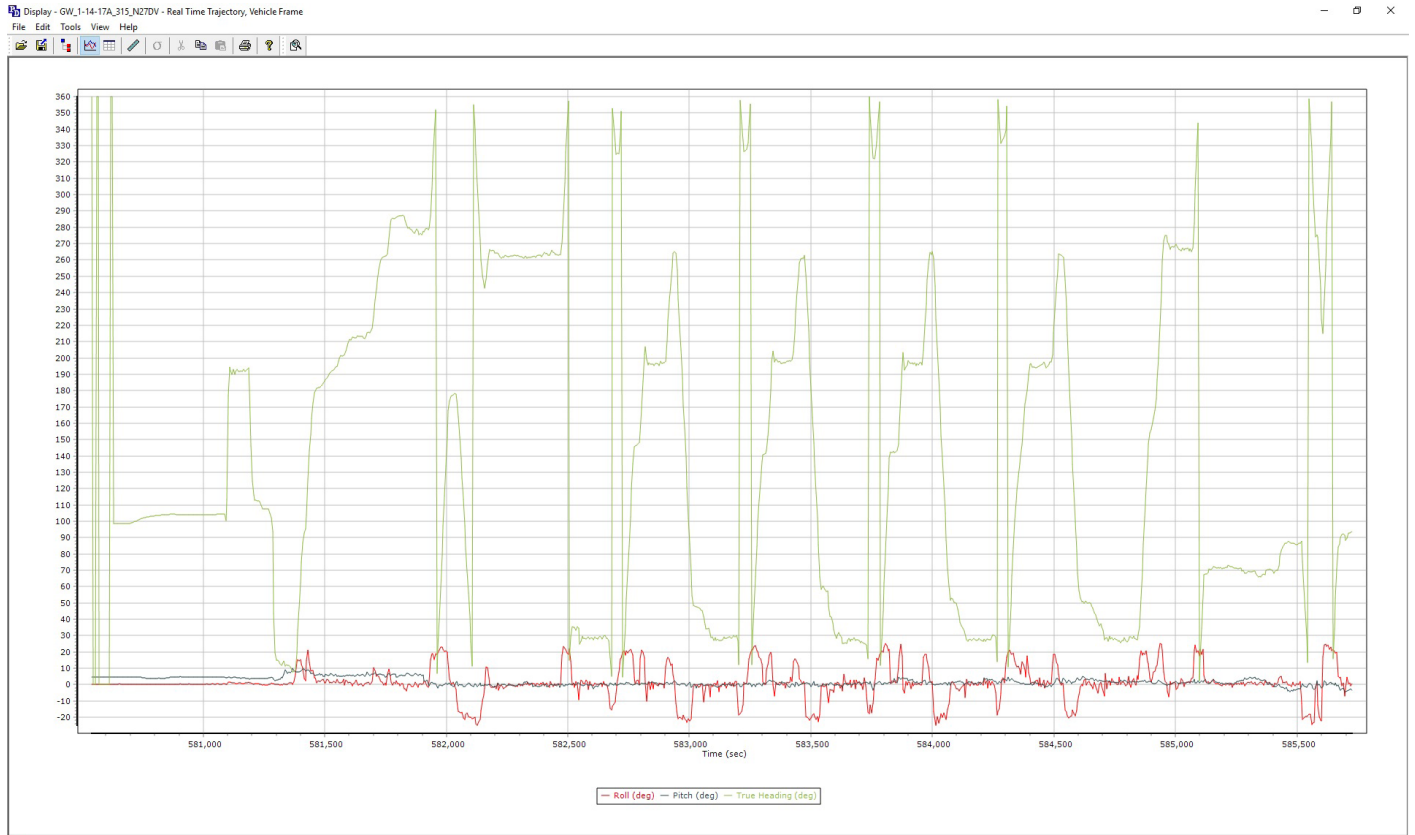
File Edit Tools View Help



Ready



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

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

Project Name		Pilot: <u>DOUG</u>	
Project Number		Technician: <u>MICHAEL</u>	
FCMS .fpd File/Nav File		Aircraft: <u>206C-DV</u>	
Date Flown: <u>01-17-2017</u>		Airport: <u>F70</u>	
Takeoff Time (Z): <u>10:27</u>		Local: <u>10:27</u>	
Landing Time (Z): <u>11:54</u>		Local: <u>11:54</u>	

Data Information		Weather	
LIDAR Unit		Begin Temp	<u>10c</u>
HD #		Begin Dewpoint	<u>7</u>
POS/IPAS File #		Begin Pressure	<u>30.03</u>
From -> to		End Temp	<u>10c</u>
FCMS File #		End Dewpoint	<u>7</u>
		End Pressure	<u>30.02</u>

Project Scanning Requirements	
Field of View	Ground Speed (kts):
Scan Rate	Hz Altitude AGL (ft):
Pulse Rate Frequency	kHz MP/A or SPIA?:
Laser Output Current	%

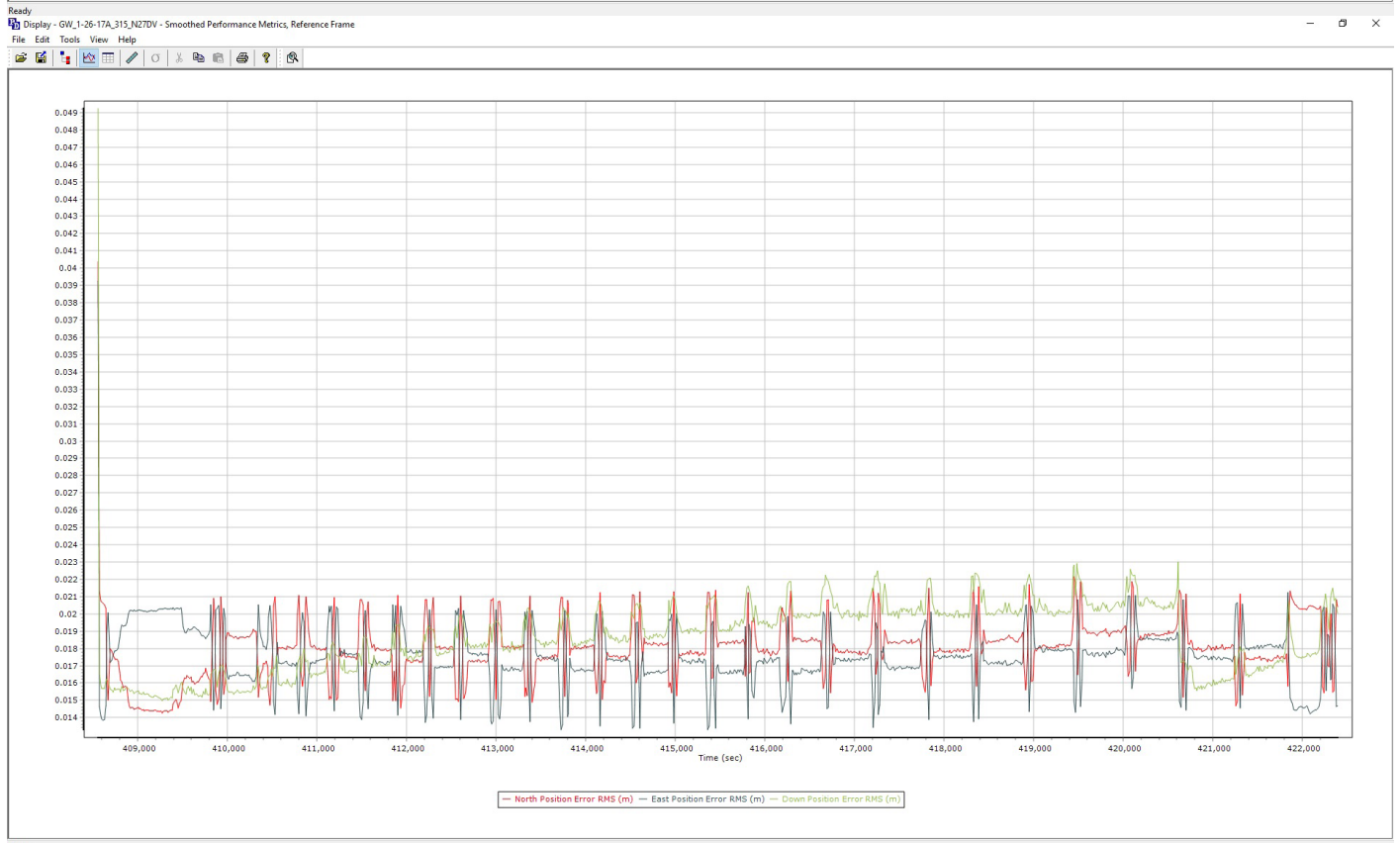
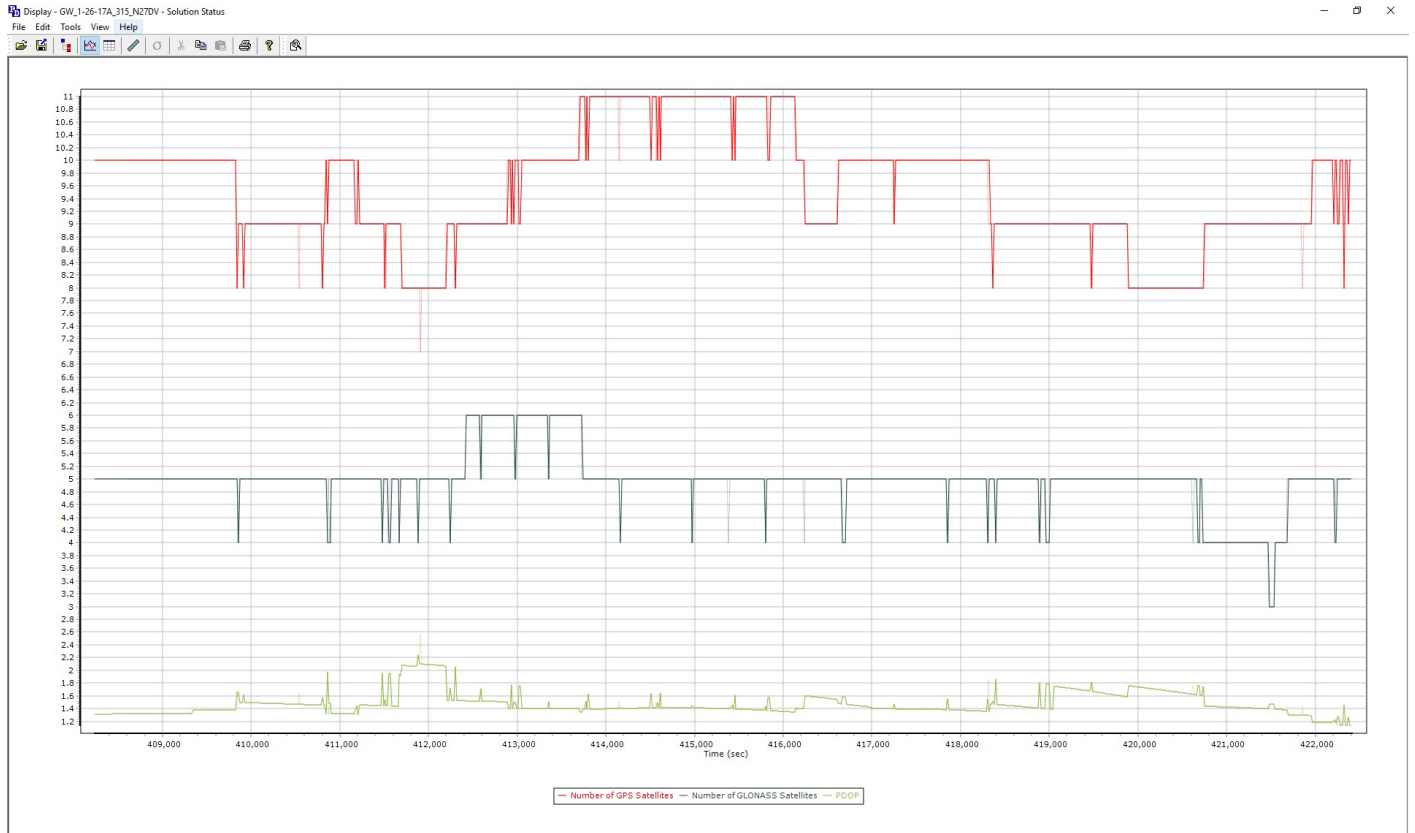
GPS Base Location(s)	
PDOOP Avoidance	
State or Flyover?	<u>10:42 11:24</u> → If flyovers, times:

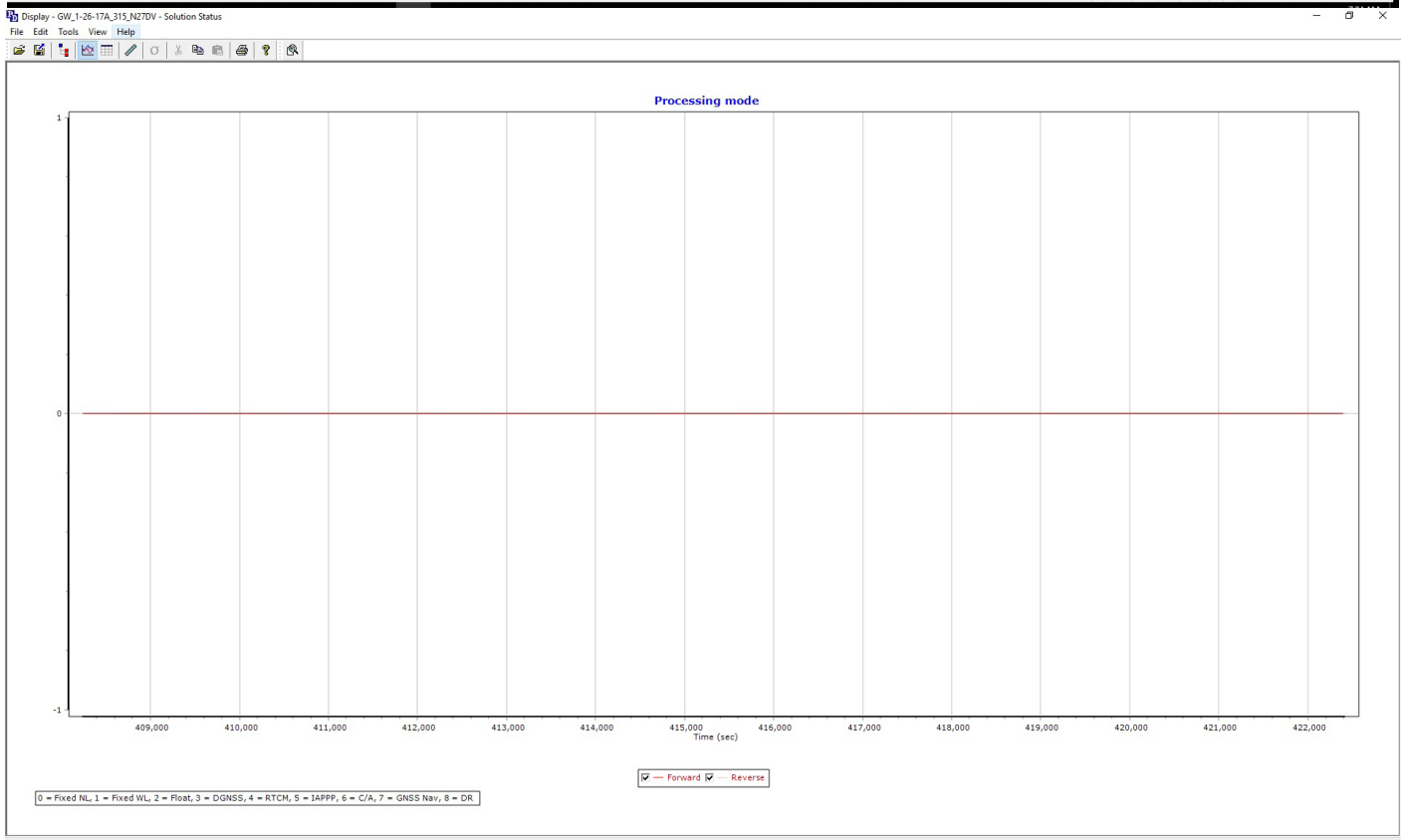
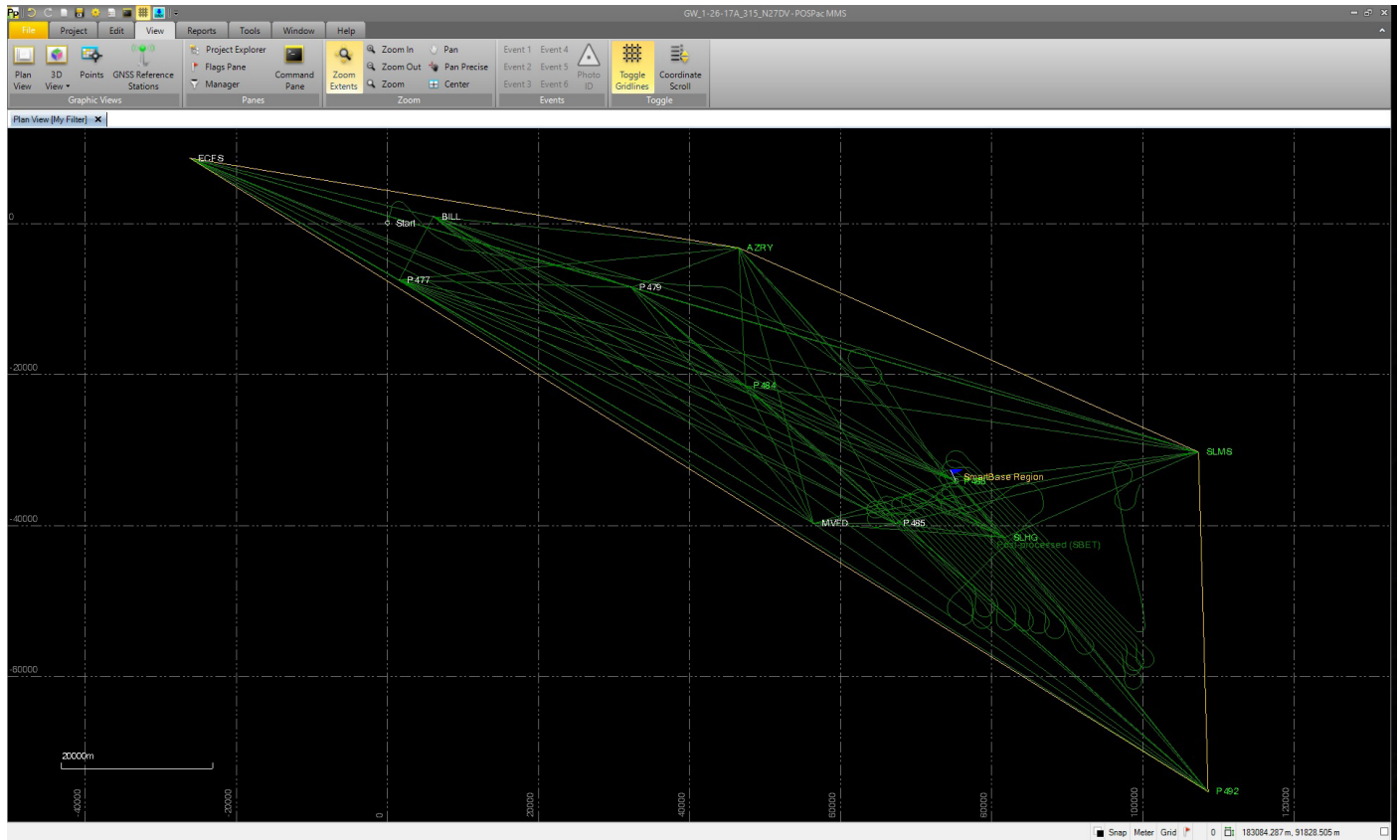


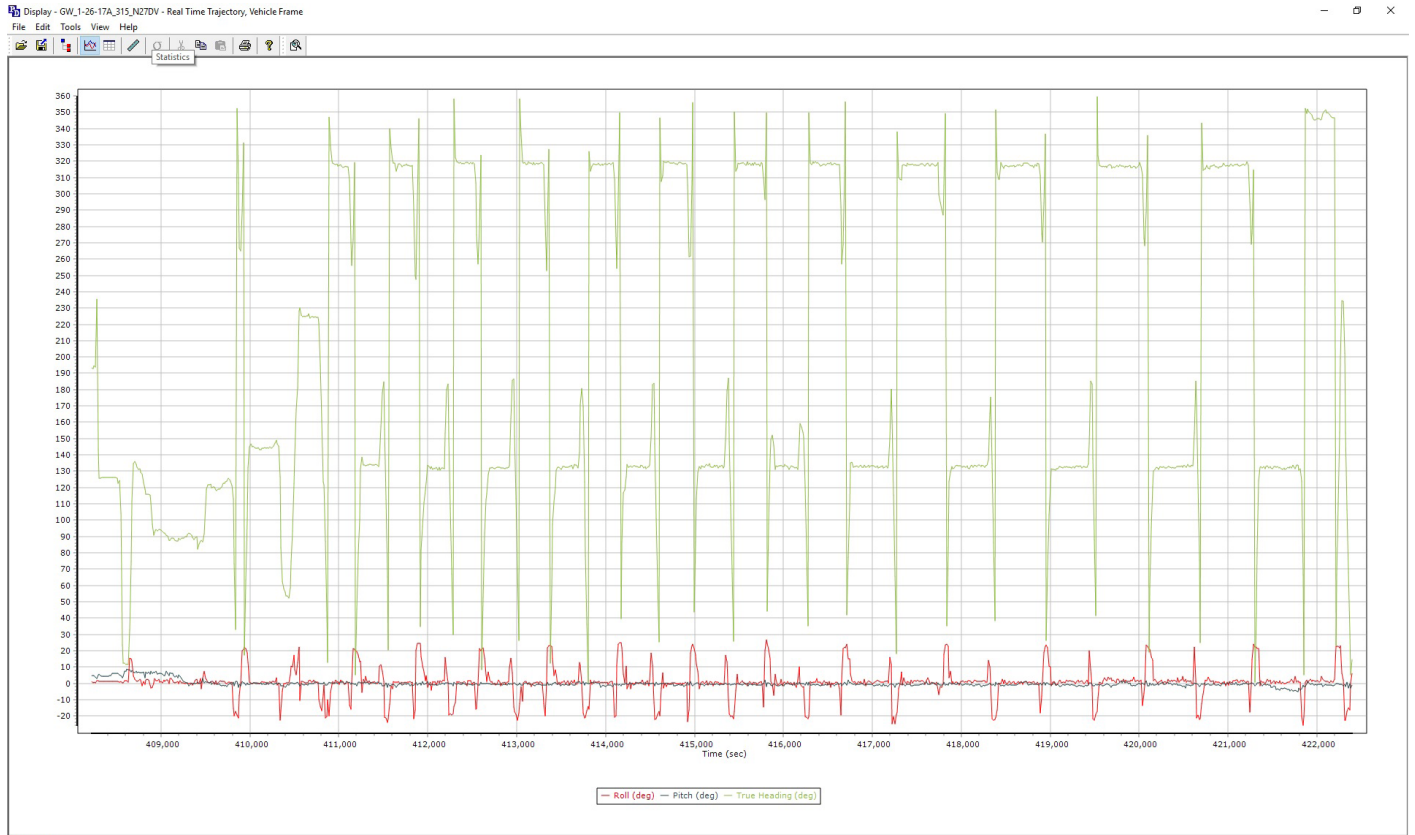
Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
1	1	1049	1050	710	010	0	104	99	CLEAR, SMOOTH
2	2	1053	1054	710	183	0	130	99	
3	3	1057	1059	710	016	0	114	99	
4	4	1072	1103	722	185	0	135	99	
5	5	1116	1108	712	016	0	114	99	
6	6	1111	1112	710	181	0	125	99	
7	7	1114	1117	713	023	0	104	99	
8	8	1119	1121	719	184	0	137	99	
9	9	1115	1128	712	018	0	90	99	
10	10							%	
11	11							%	
12	12							%	
13	13							%	
14	14							%	
15	15							%	
16	16							%	

Additional Notes: _____ Mission Page _____ Of _____

Jan 26, 2017-A (N27DV, SN315)







Coordinate Manager

Station Information

Station ID: P486

Coordinates

Latitude: N 33 15 36.67494000

Longitude: W 116 19 20.18099000

Altitude: 127.0510 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Trimble

Type: TRM59800-80 w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: P486 Station Fullname: P486

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
[Empty Table]								

Import Coordinates Export Coordinates

Close

Flight Log

Quantum Spatial 523 Wellington Way -Lexington KY 40503 859.277.8700

P.I. 1/26/17

LIDAR MISSION RECORD SHEET

Project Name	E. SAN DIEGO CO. LIDAR	
Project Number	16159	
FCMS (pid File/Nav File)	3450 - H300 - SLED - REFLIGHTS	

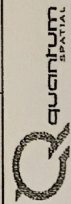
Pilot	DOXEY
Technician	KORZEP
Aircraft	NZ7DV

Date Flown	20170126	Ground	7	Airport	F70
Takeoff Time (Z):	Local: 20170126	Begin Temp	2	Local: Airport:	
Landing Time (Z):	Local: 20170126	Begin Dewpoint	30.33	Local: Airport:	
		Begin Pressure	17		
		End Temp	-6		VDD
		End Dewpoint	30.29		
		End Pressure			

Data Information	
LIDAR Unit	12-SEN 315
HD #	3
POS/IPAS File #	20170126.DESERS
from → to	047 → 067
FCMS File #	

Project Scanning Requirements	
Field of View	28
Scan Rate	41.8
Pulse Rate Frequency	125
Laser Output Current	
Ground Speed (kts):	115
Ht. Altitude AGL (ft):	5900
kHz MP/A or SP/A?:	
%	

GPS Base Location(s)	N/A
PDOF Avoidance	N/A
Static or Flyover?	FLYOVER
→ If flyovers, lines:	0953-0958; 1311-1316



Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
84	78	1002	1005	7,300	SW(226)	0	140	~99	CROSS FLIGHT SLOWLY
54	2	1008	1011	7,700	NW(316)		120	%	
55	3	1013	1017	7,700	SE(136)		132	%	
56	4	1020	1023	7,600	NW		132	%	
57	5	1025	1029	7,400	SE		132	%	
58	6	1031	1035	7,300	NW		130	%	
59	7	1037	1041	7,200	SE		132	%	
60	8	1043	1047	7,200	NW		134	%	
61	9	1050	1054	7,100	SE		134	%	
62	10	1056	1101	7,200	NW		128	%	
63	11	1103	108	7,000	SE		120	%	
64	12	1110	1114	7,100	NW		134	%	
65	13	1117	1121	7,000	SE		132	%	
66	14	1124	1128	7,000	NW		132	%	
67	15	1131	1135	6,900	SE		130	%	
68	16	1138	1143	6,900	NW		130	%	

Additional Notes:

Mission Page 1 of 2

LIDAR MISSION RECORD SHEET

Quantum Spatial 523 Wellington Way -Lexington KY 40503 859.277.8700

P.2 1/26/17

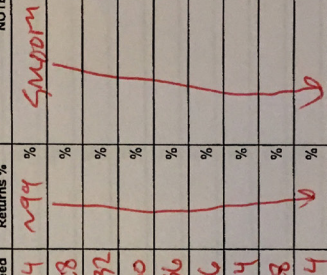
Project Name		Date Flown	
Project Number		Takeoff Time (Z):	
FCMS .ipd File/Nav File		Landing Time (Z):	
		Local: Airport:	
		Local: Airport:	

Pilot		Weather	
Technician		Begin Temp	
Aircraft		Begin Dewpoint	
		Begin Pressure	
		End Temp	
		End Dewpoint	
		End Pressure	

Data Information	
LIDAR Unit	
HD #	
POS/IPAS File #	
from → to	→
FCMS File #	

Project Scanning Requirements	
Field of View	Ground Speed (kts):
Scan Rate	Hz Altitude AGL (ft):
Pulse Rate Frequency	KHz MPA or SPIA? %
Laser Output Current	

GPS Base Location(s)	
PDOP Avoidance	
Slatic or Flyover?	
→ if flyovers, times:	

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
69	17	1145	1152	6,800	SE	0	134	79%	SMOOTH 
70	18	1154	1201	6,600	NW		128	%	
71	19	1204	1211	6,700	SE		132	%	
72	20	1213	1220	6,700	NW		130	%	
73	21	1223	1230	6,800	SE		136	%	
74	22	1232	1240	6,500	NW		126	%	
75	23	1242	1249	6,600	SE		134	%	
76	24	1252	1300	6,600	NW		128	%	
77	25	1302	1309	6,800	SE		134	%	
								%	
								%	
								%	
								%	
								%	
								%	
								%	

Additional Notes: _____

Mission Page 2 Of 2

Jan 28, 2017-A (N27DV, SN315)

Display - GW_1-28-17A_315_N27DV - Solution Status

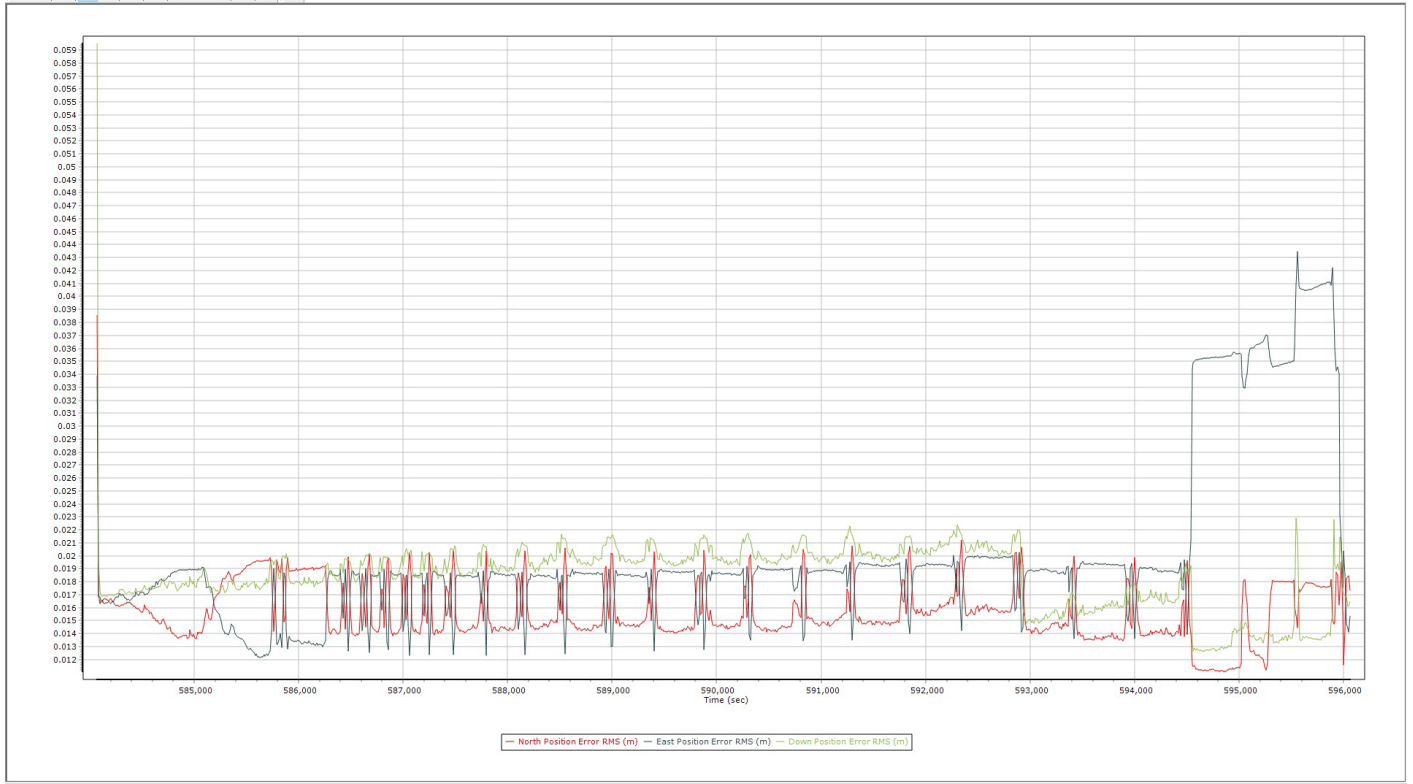
File Edit Tools View Help



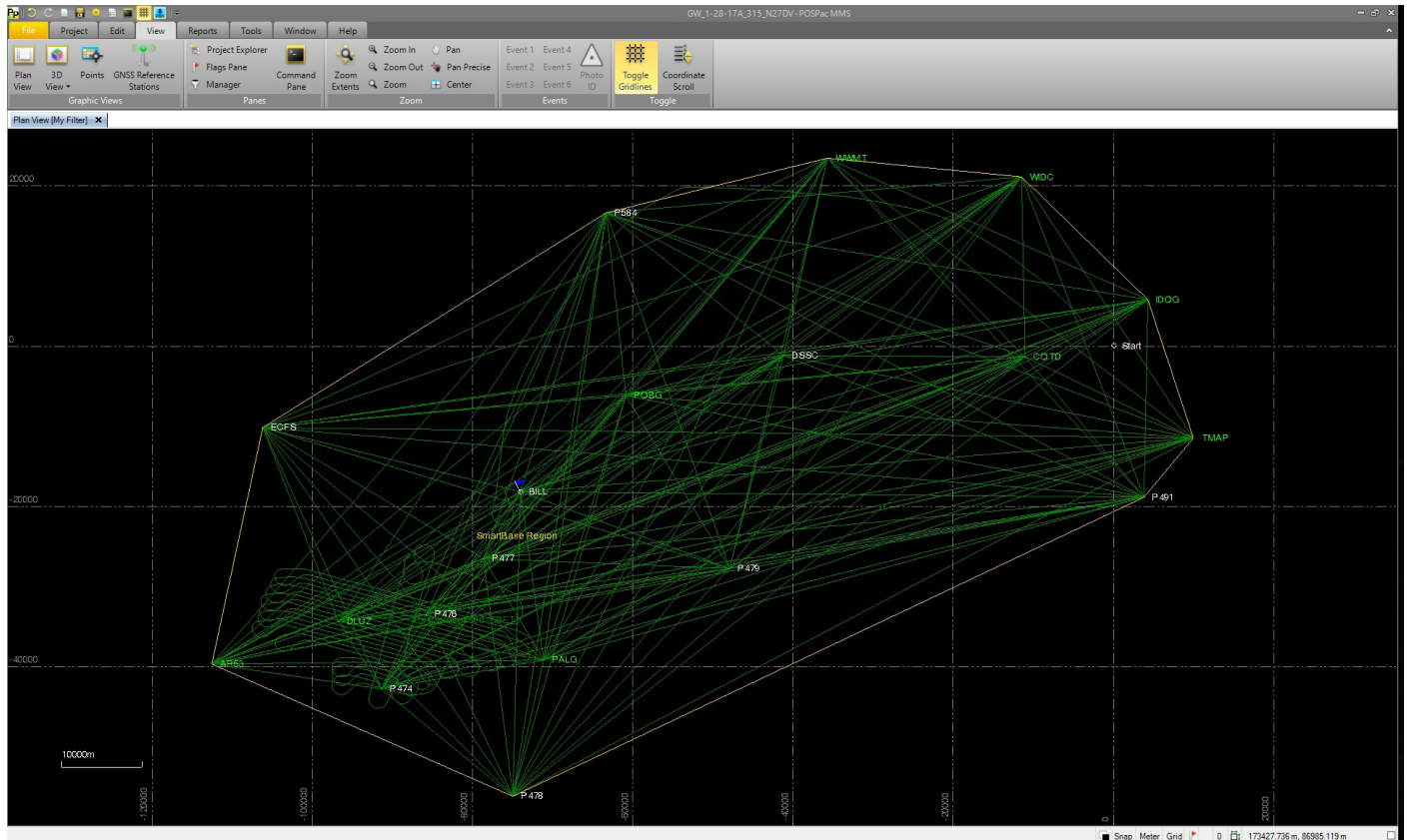
Ready

Display - GW_1-28-17A_315_N27DV - Smoothed Performance Metrics, Reference Frame

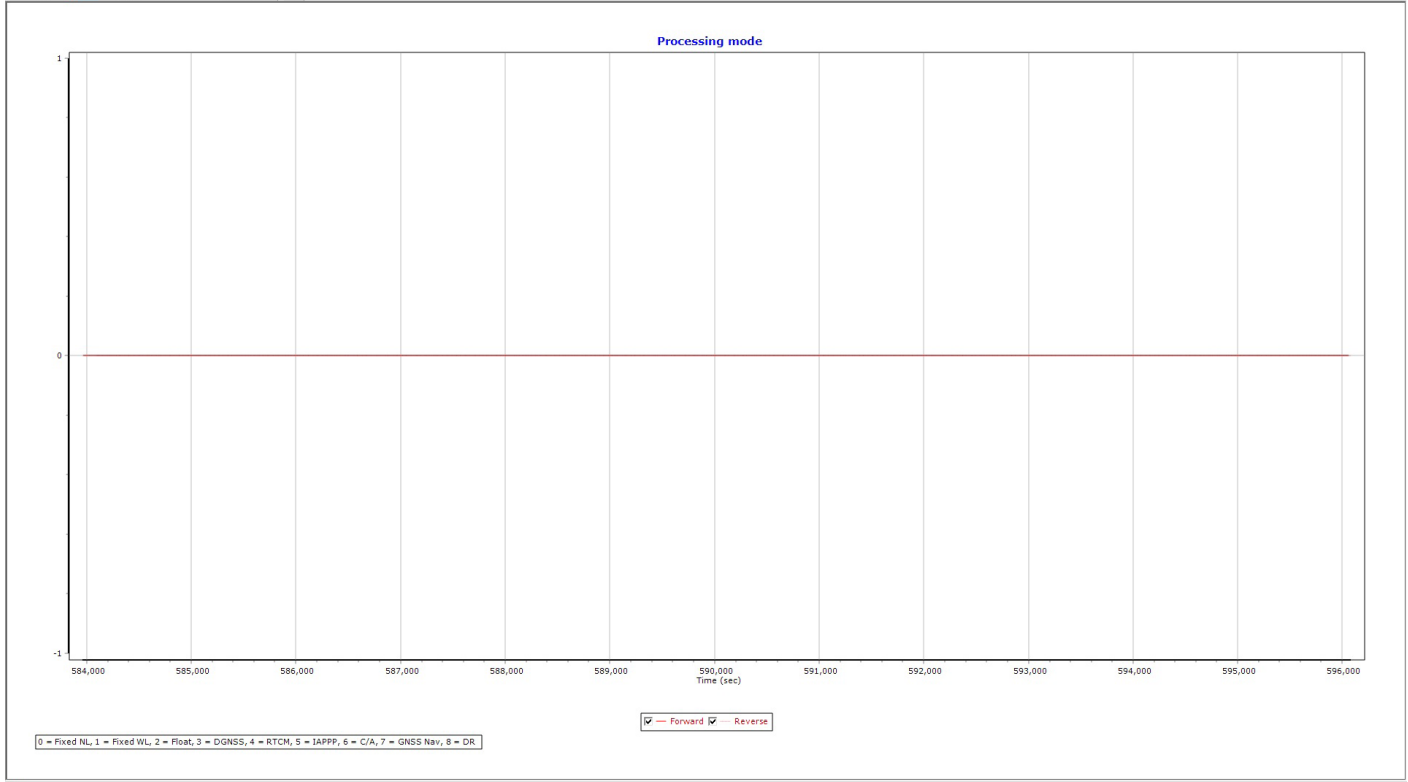
File Edit Tools View Help



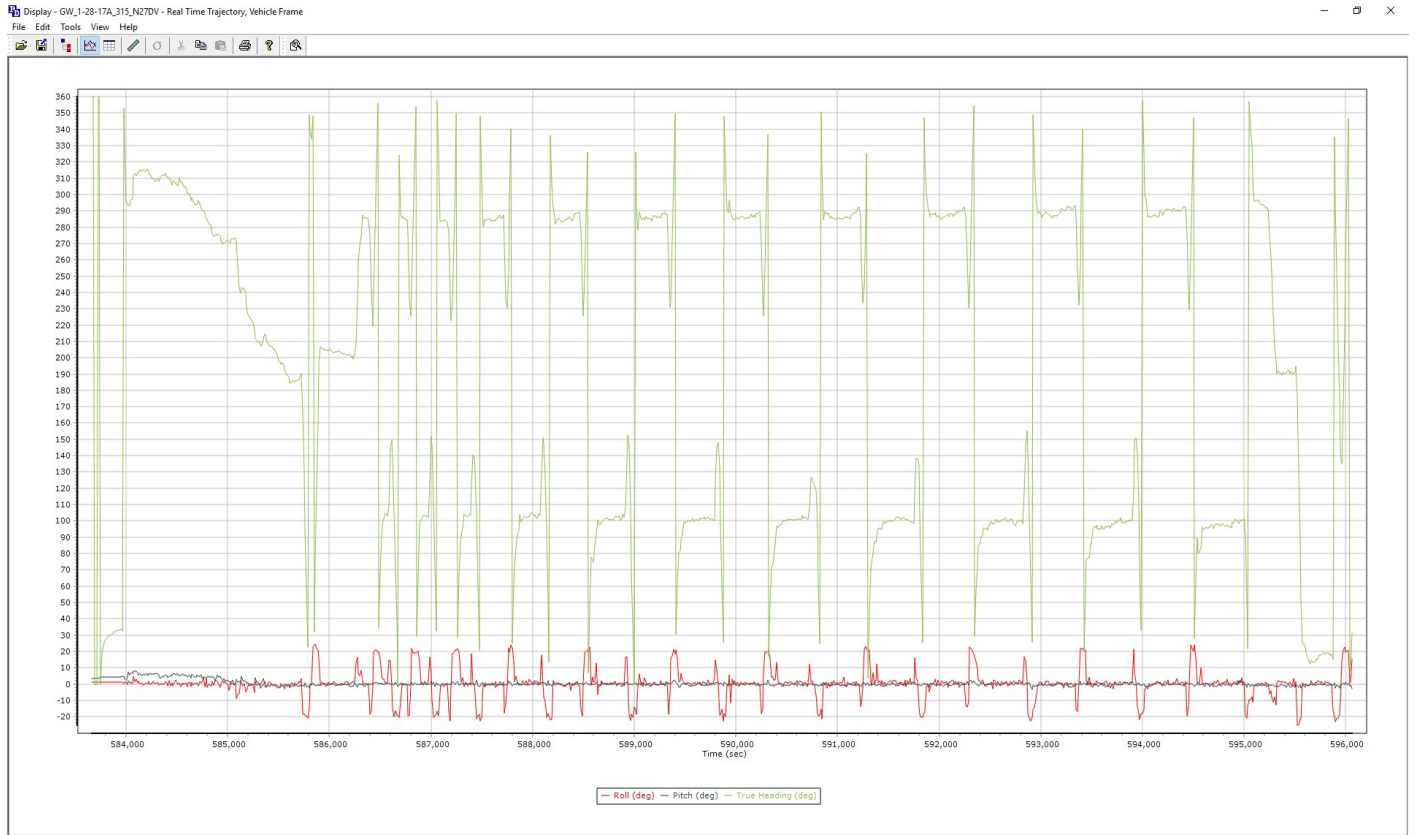
Ready



Display - GW_1-28-17A_315_N27DV - Solution Status
File Edit Tools View Help



Ready



Coordinate Manager

Station Information

Station ID: **BILL**

Coordinates

Latitude: N 33 34 41.66355000

Longitude: W 117 3 52.51376000

Altitude: 470.7890 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Ashtech

Type: 701945B_M w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: **BILL** Station Fullname: **BILL**

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
[Empty Table]								

Import Coordinates Export Coordinates Close

Flight Log

1/28/17 LIFT 1 PAGE 1

Quantum Spatial 523 Wellington Way -Lexington KY 40503 859.277.8700

LIDAR MISSION RECORD SHEET

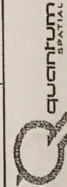
Project Name	E. SAN DIEGO GM LIDAR		
Project Number	16159		
FCMS .ipd File/Nav File	3450-H900-SLED-BEFL1415		
Project Scanning Requirements			
Field of View	2.8	Ground Speed (fts)	115
Scan Rate	41.8	Hz Altitude AGL (ft)	5900
Pulse Rate Frequency	125	KHz/MPIA or SPIA?	
Laser Output Current		%	

Pilot	DIXEY
Technician	KOZEP
Aircraft	N270V

Data Information	
LIDAR Unit	125EM315
HD #	3
POSIFAS File #	20170128 FEN FOUR
from → to	068 → 086
FCMS File #	

Date Flown	2017-01-28	Local	1003	Altitude	UDD
Takeoff Time (Z)		Local	1945	Altitude	F70
Landing Time (Z)					

Weather		Ground		Airport	
Begin Temp		Begin Temp	21	Begin Temp	UDD
Begin Dewpoint		Begin Dewpoint	-9	Begin Dewpoint	30.54
Begin Pressure		Begin Pressure	21	Begin Pressure	F70
End Temp		End Temp	-9	End Temp	30.35
End Dewpoint		End Dewpoint		End Dewpoint	
End Pressure		End Pressure		End Pressure	



GPS Base Location(s)	N/A
PDP Avoidance	N/A
Static or Flyover?	FLYOVER
→ If flyovers, lines: 1044-1049; 1325-1330	

Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
51	1	1052	1053	6900	W(284)	0	126	299	LIGHT CHOP
50	2	1055	1056	6900	E(104)		126		
49	3	1058	1059	6900	W		134		
48	4	1101	1102	6800	E		128		
47	5	1104	1105	6800	W		134		
46	6	1108	1109	6800	E		126		
45	7	1111	1114	6800	W		132		
44	8	1117	1120	6700	E		121		
43	9	1122	1127	6800	W		128		
42	10	1129	1134	6806	E		126		
41	11	1137	1141	7000	W		128		
40	12	1144	1149	7000	E		126		
39	13	1151	1157	7000	W		132		
38	14	1159	1204	7100	E		126		
37	15	1207	1213	7200	W		132		
36	16	1215	1222	7000	E	6	124		

Additional Notes:

Mission Page 1 of 2

Jan 28, 2017-B (N27DV, SN315)

Display - GW_1-28-17B_315_N27DV - Solution Status

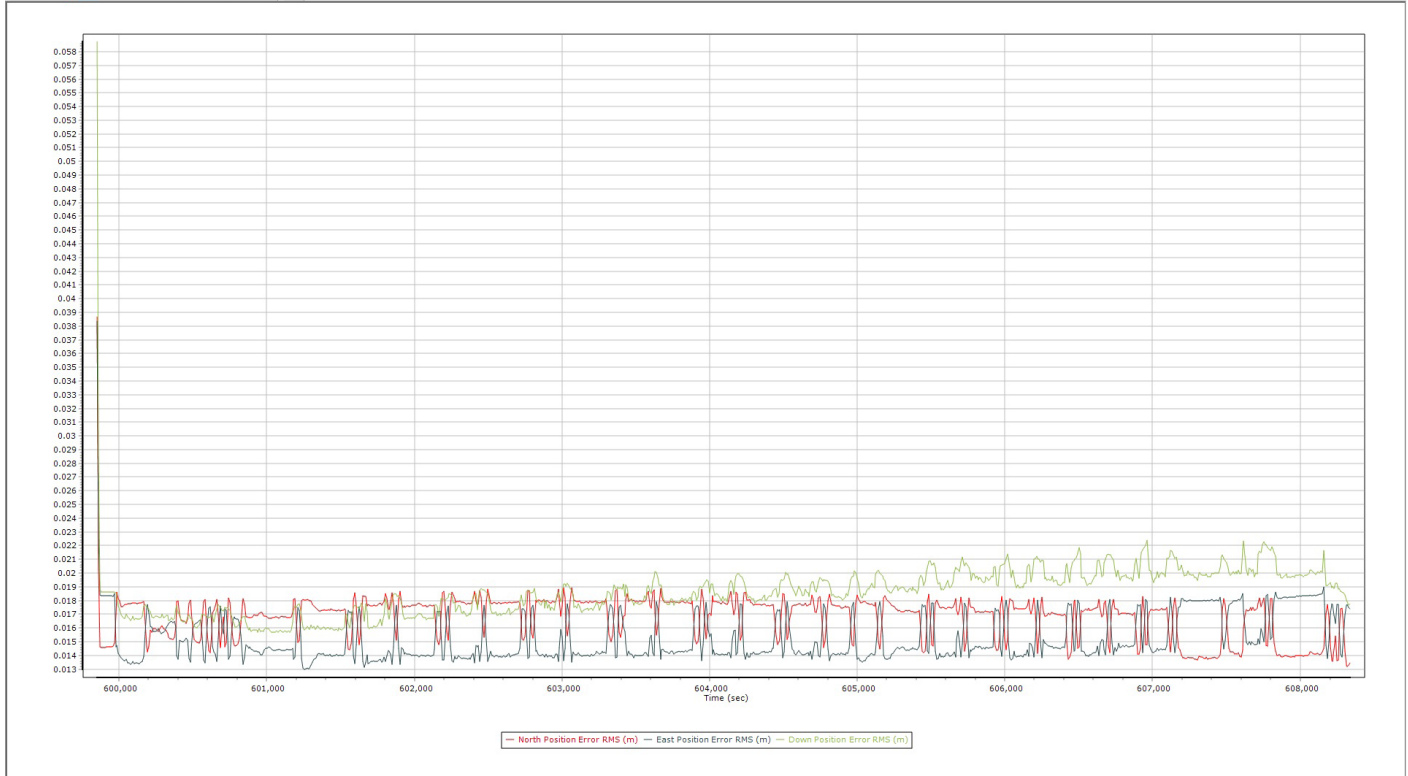
File Edit Tools View Help



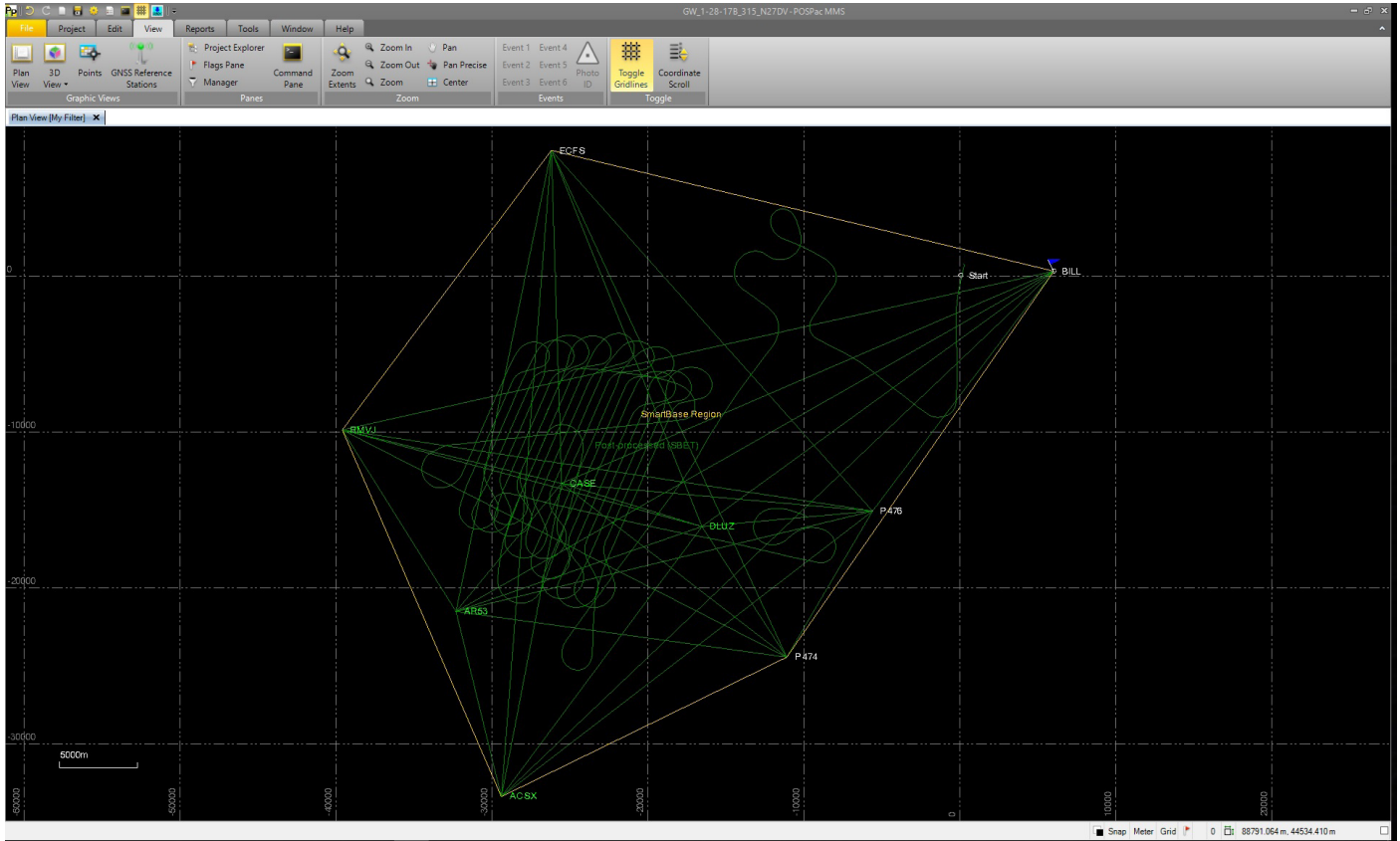
Ready

Display - GW_1-28-17B_315_N27DV - Smoothed Performance Metrics, Reference Frame

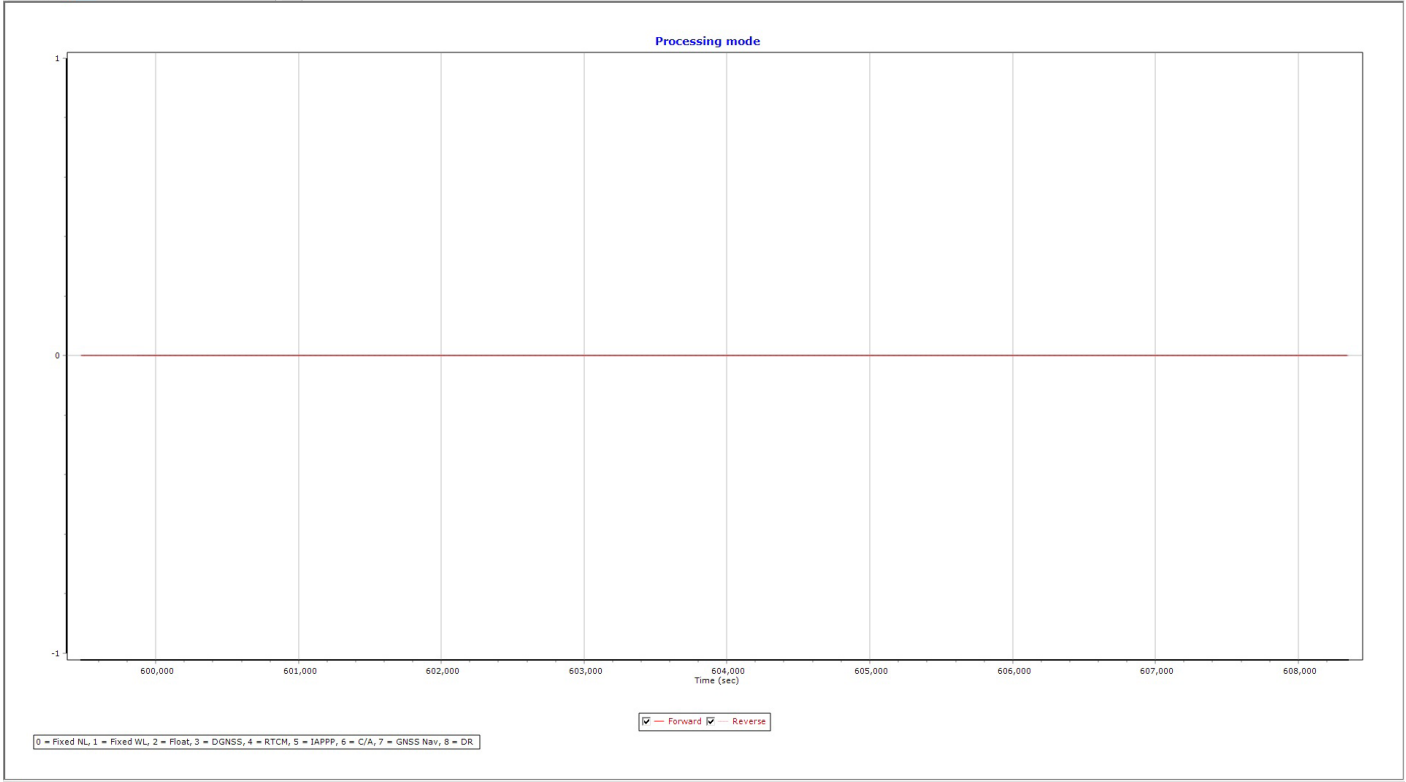
File Edit Tools View Help



Ready



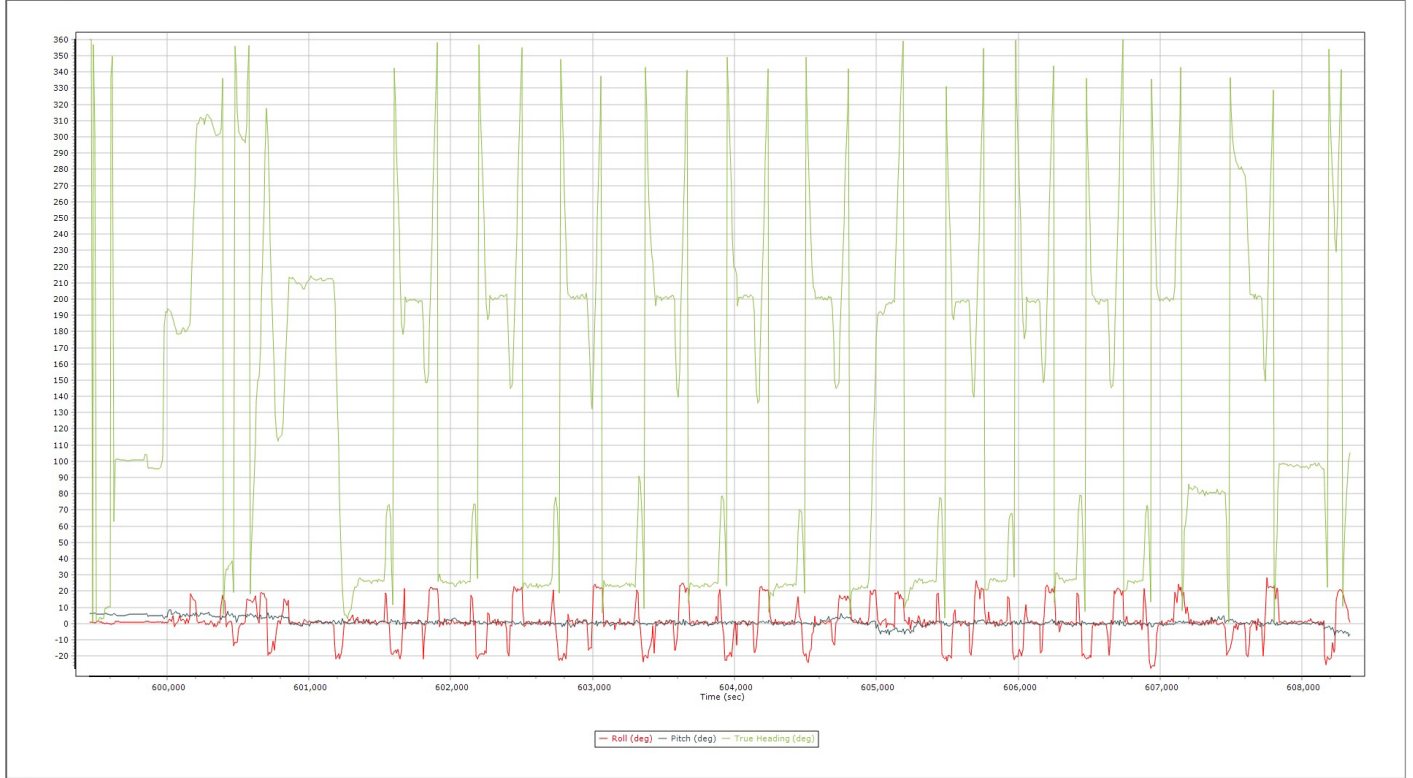
Display - GW_1-28-17B_315_N27DV - Solution Status
File Edit Tools View Help



Ready

Display - GW_1-28-17B_315_N27DV - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: BILL

Coordinates

Latitude: N 33 34 41.66355000

Longitude: W 117 3 52.51376000

Altitude: 470.7890 m

Decimal Degrees

Antenna Frame

Height: 0.008 m

Method: Bottom of antenna mount

Manufacturer: Ashtech

Type: 701945B_M w/SCIT Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: BILL Station Fullname: BILL

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
[Empty Table]								

Import Coordinates Export Coordinates

Close

Flight Log

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

1/28/17 LIFT 2 PAGE 1

LIDAR MISSION RECORD SHEET

Project Name	E. SAN DIEGO CITY, LIDAR		
Project Number	16154		
FCMS .fpd File/Nav File	3450-H200-SVED-REFLIGHTS		

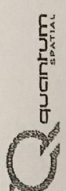
Project Scanning Requirements	
Field of View	03
Ground Speed (kts)	114
Scan Rate	41.3
Altitude AGL (ft)	5700
Pulse Rate Frequency	125
Laser Output Current	%

GPS Base Location(s)	N/A	
PDOP Avoidance	N/A	
Static or Flyover?	FLYOVER	
→ If flyovers, lines: 1440-1445; 1630-1655		

Date Flown	2017-01-28	
Takeoff Time (Z):	Local: 1440	Airport: F70
Landing Time (Z):	Local: 1715	Airport: CRQ

Data Information	
LIDAR Unit	125E2315
HD #	3
POSIPAS File #	20170128BEMERLINIST
from -- to	87 -> 99
FCMS File #	

Weather	
Begin Temp	22
Begin Dewpoint	-8
Begin Pressure	30.33
End Temp	16
End Dewpoint	7
End Pressure	30.32



Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
29	1	1501	1505	7600	N(23)	0	115	~99	WIND OUT OF NORTHEAST ATC RESTRICTIONS; BLIND ZONE ATC RESTRICTIONS
28	2	1507	1509	7800	S(203)	1	140	%	
27	3	1511	1515	8000	N	1	100	%	
26	4	1517	1519	8100	S	1	140	%	
25	5	1521	1524	8200	N	1	111	%	
24	6	1526	1528	8300	S	1	140	%	
23	7	1531	1534	8300	N	1	113	%	
22	8	1536	1539	8200	S	1	140	%	
21	9	1541	1544	8300	N	1	115	%	
20	10	1546	1548	8200	S	1	136	%	
19	11	1551	1553	8200	N	1	115	%	
18	12	1555	1557	8100	S	1	124	%	
17	13	1600	1602	9,000	N	1	—	%	
17	14	1607	1609	7,000	N	1	119	%	
16	15	1611	1613	7,000	S	1	136	%	
15	16	1616	1618	7,000	N	1	115	%	

Additional Notes: _____ Mission Page 1 Of 2

ONE ATC EMPLOYEE CAME ON THE RADIO AND SAID TO PICK EITHER 7,000' MSL OR 9,000' MSL ON LINE 17 AND THE REST OF THE LINES. A \$10 WE REFUELED LINE AFTER THE NEXT CONTROLLER CAME ON FREQ. + HE GAVE US A BLOCK ALTITUDE FROM 7 TO 9. @

Jan 31, 2017-A (N27DV, SN315)

Display - GW_1-31-17A_315_N27DV - Solution Status

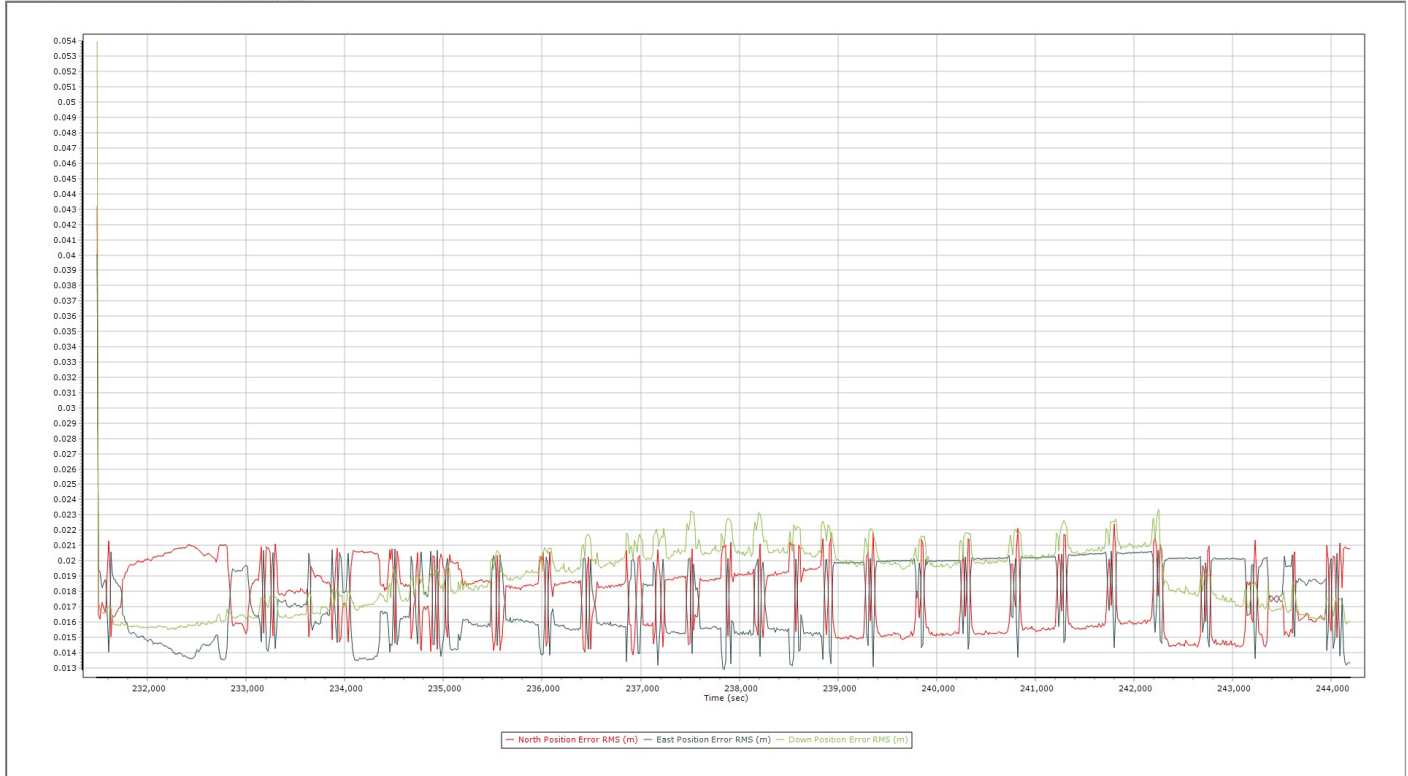
File Edit Tools View Help



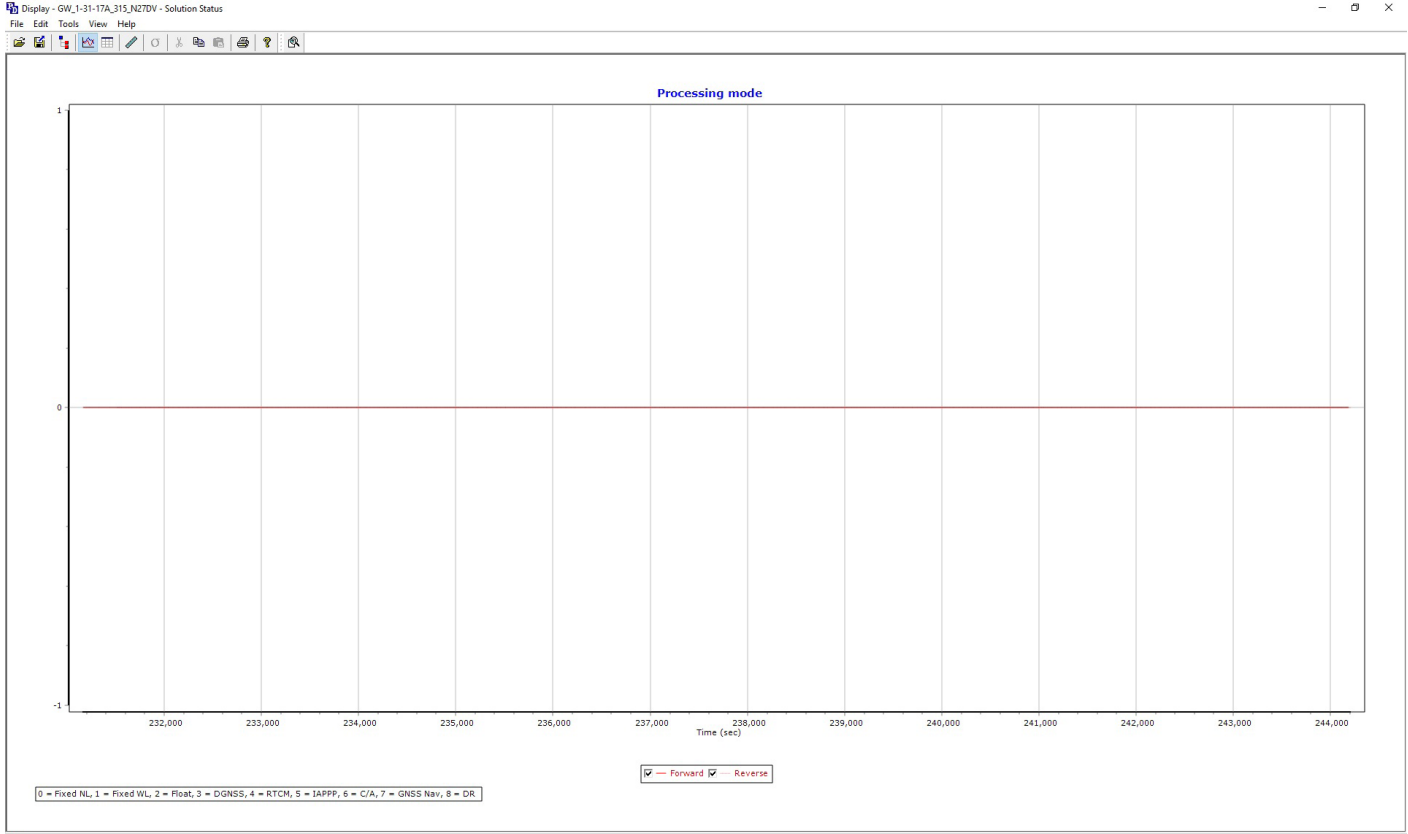
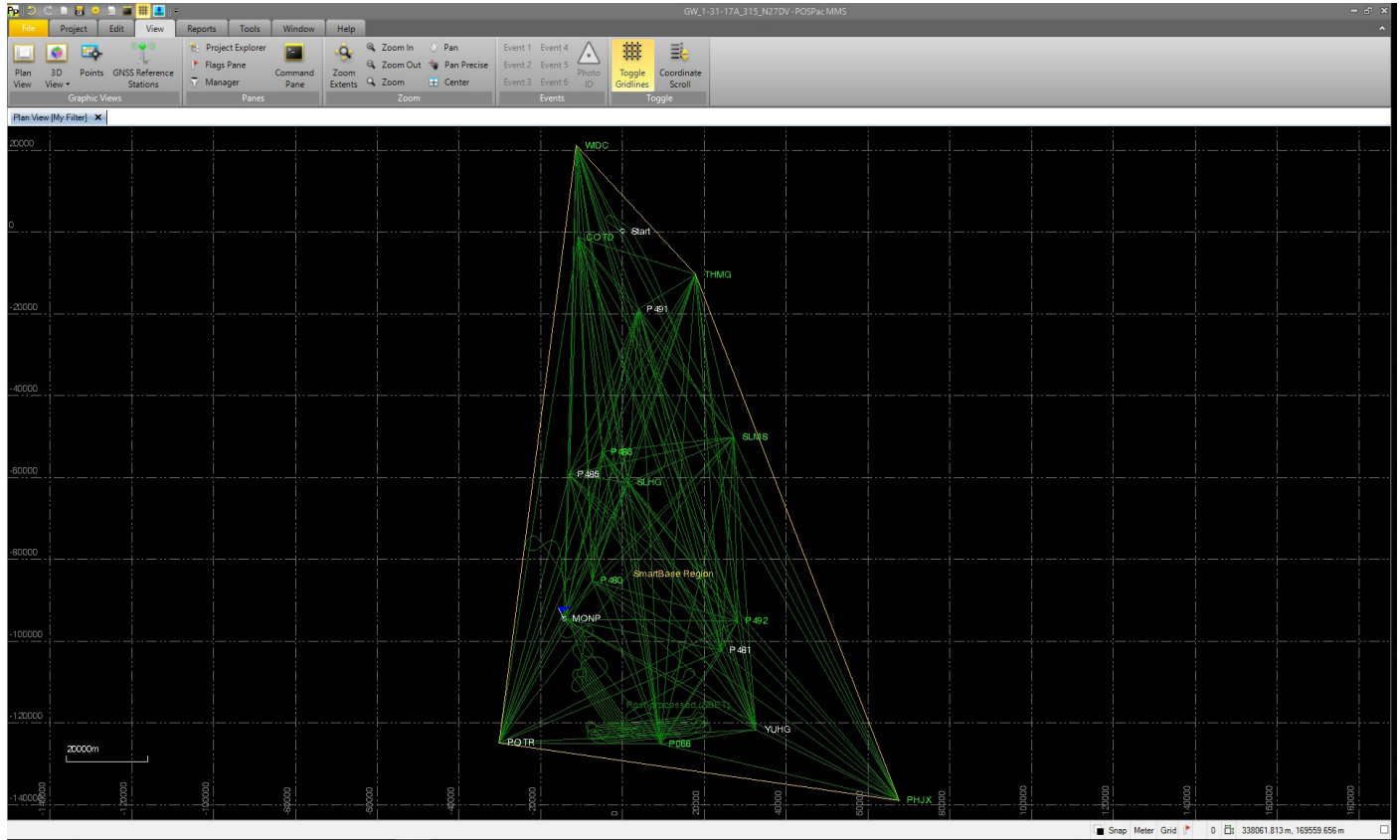
Ready

Display - GW_1-31-17A_315_N27DV - Smoothed Performance Metrics, Reference Frame

File Edit Tools View Help



Ready



Ready

Display - GW_1-31-17A_315_N27DV - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

Coordinate Manager

Station Information

Station ID: MONP

Coordinates

Latitude: N 32 53 30.97273000

Longitude: W 116 25 20.41161000

Altitude: 1,843.4400 m

Decimal Degrees

Antenna Frame

Height: 0.118 m

Method: Bottom of antenna mount

Manufacturer: Ashtech

Type: 701945B_M w/SCIS Dome

Offset from Measured Point to APC: 0.110 m

Ground Reference Point (GRP) coordinates Apply Changes

Station Database

Station ID: MONP Station Fullname: MONP

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

Quantum Spatial 523 Wellington Way - Lexington KY 40503 859.277.8700

1/31/17 PG. 1

LIDAR MISSION RECORD SHEET

Project Name	EASTEN SANDIEGO COY LIDAR		
Project Number	16159		
FCMS - .fpd File/Nav File	3450 - H300 - SEED - PEFU4145		

Project Scanning Requirements	
Field of View	Ground Speed (kts): 115
Scan Rate	Hz Altitude AGL (ft): 5900
Pulse Rate Frequency	KHz/MPIA or SPIAT: 125
Laser Output Current	%

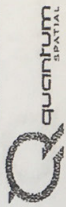
GPS Base Location(s)	N/A	
PDPD Avoidance	N/A	
Static or Flyover?	FLYOVER	

Pilot	DOMEY	
Technician	KATSEF	
Aircraft	N77DV	

Date Flown	2017-01-31	
Takeoff Time (Z):	Local: 0817	Airport: UDD
Landing Time (Z):	Local: 1215	Airport: UDD

Data Information	
LIDAR Unit	125EN 315
HD #	3
POS/IPAS File #	20170131090406 TIME
from → to	125 → 144
FCMS File #	

Weather	
Begin Temp	15
Begin Dewpoint	-1
Begin Pressure	30.13
End Temp	21
End Dewpoint	1
End Pressure	30.12



Flight Line #	Line #	Start Record	Stop Record	Alt. (AMSL)	Heading	Crab	Speed	Returns %	NOTES: (Weather, Visibility, Winds, Ride, Etc.)
99	1	855	857	9700	NW (322)	0	117	~100	SMOOTH
100	2	859	859	9700	NE (92)		126		CROSSFLIGHT
101	3	905	906	10,700	SE (142)		128		SMOOTH
102	4	909	910	10,700	NW		124		"
103	5	912	913	10,700	NE		144		CROSSFLIGHT
96	6	919	924	10,400	NW SE		117		SMOOTH
95	7	926	932	10,300	NW		134		"
94	8	934	939	10,100	SE		120		"
93	9	941	947	10,300	NW		128		"
98	10	949	951	10,100	SW (235)		132		CROSSFLIGHT
92	11	953	957	10,000	SE		117		SMOOTH
91	12	959	1003	10,000	NW		132		"
90	13	1005	1008	9900	SE		130		"
89	14	1010	1014	10,000	NW		117		"
88	15	1016	1020	9900	SE		128		"
79	16	1023	1027	9,300	E (84)		128		"

Additional Notes: _____

Mission Page 1 of 2

Appendix B

Survey Report



Geodetic Survey Report

CDI Project: 5080 San Diego County

CDI POC: Blaine Horner
blaineh@compassdatainc.com

Location of Survey: San Diego County, California

Date of Survey: October 2016

Customer: QUANTUM SPATIAL

POC: Joel Burroughs

QUANTUM SPATIAL Name: San Diego 2017

QUANTUM SPATIAL Purchase Order # 1411

QUANTUM SPATIAL Project # 28793

QUANTUM SPATIAL Phase# /Task# 1301 / 2

QUANTUM SPATIAL Account # 63230

Other Documents: Purchase_Order_1411_CompassData.pdf
SanDiego_Ground_Survey_SOW.pdf

Survey Report prepared by Philipp Hummel, PLS, CFedS, CP
phummel@compassdatainc.com

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Post-Processing Procedure in the Tectonically Active Region 3

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Datum Requirements

Contractual requirements for the survey by the client:

Horizontal: CA SPCS Zone VI, NAD83(2011), US Feet

Vertical: US Feet; NAVD88(Geoid 12B),

The NAD83 (2011) datum is a geodetic datum with the Epoch of 2010.0.

Surveying Methods

The combination of static Global Navigation Satellite System (GNSS) observations and UNAVCO (University NAVSTAR Consortium) network result in the highest accuracy of the coordinates. Static GNSS observations were performed at a minimum of 45 minutes long sessions. The UNAVCO GNSS observations were based on base stations established by UNAVCO, these are in some cases incorporated into the NGS CORS network, and in other cases GNSS base stations for scientific research with public access. CompassData used multi-hour, usually 24 hour static GNSS observations to predetermine coordinates that than were used in the network adjustment.

These are constrained to continuously operating reference stations (CORS) operated by the National Geodetic Survey (NGS) and UNAVCO. The field procedures for RTK provided two 90 second collects within each point visit. Between the two observations the GNSS unit was rotated by 180 degrees and re-setup.

Trimble R8 GNSS equipment was used.

Post-Processing Procedure in the Tectonically Active Region

The static data collected in the field was combined with static GNSS available from CORS and UNAVCO GNSS stations. Coordinates for the control points were established by a constrained network adjustment (Method of the Least Squares) and checked against Online Positioning User Service (OPUS) solutions for multi-hour observations.

The project AOI is situated in a tectonically active region between the major San Andreas Fault and other fault lines that mostly run parallel from northwest to southeast.

Tectonic movements constantly effect the ground as well the embedded passive NGS monuments in the ground and the active GNSS stations attached to buildings. Tectonic changes effect directly the coordinated positions, so the NAD83(2011) datum, based on the epoch of 2010.0, is distorted considering the large area of the AOI as movements of the last 6 years are not accounted.

CompassData has experience in processing highly accurate GNSS data in California and uses instead of the NAD83(2011) datum the more useful dynamic ITRF2008 datum. For this geodetic datum the best base coordinates are calculated by the Scripps Orbit and Permanent Array Center (SOPAC) located in San Diego, CA. SOPAC's primary scientific role is to support high precision geodetic and geophysical measurements

CompassData

using Global Positioning System (GPS) satellites, particularly for the study of earthquake hazards, tectonic plate motion, plate boundary deformation, and meteorological processes.

After the successful network adjustments in the ITRF datum are completed a transformation to the NAD83 (2011) datum was conducted with the NGS service of the Horizontal Time-dependent positioning (HTDP). Finally, the latest NGS Geoid12B was applied to create orthometric NAVD88 elevations.

Trimble Business Center 3.70 was used for data processing.

Network and Base Stations

The Network Map shows the adjustment of NGS CORS and UNAVCO CORS as well static observation taken at least for 45 minutes on surveyed points.

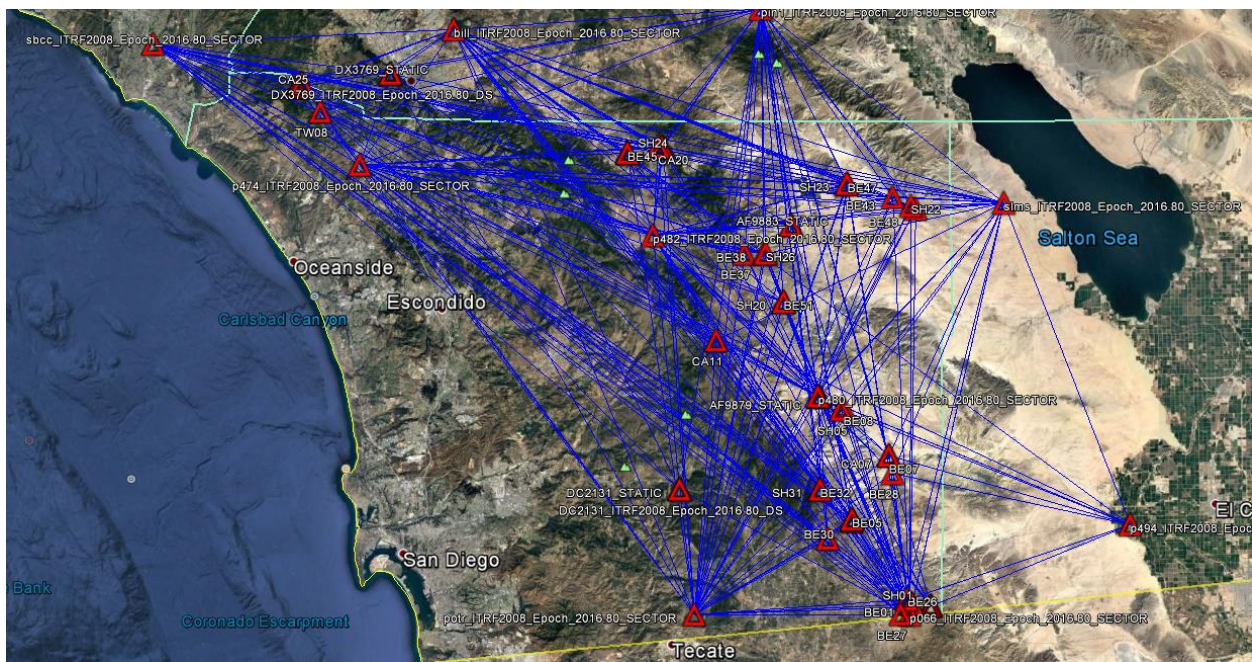


Figure 1: Network Map

First a free network adjustment was calculated, meaning without introduced coordinate constrains. The free network approach offers two advantages. First, to install an optimized geometry of measurements, and secondly it indicates potential issues in the coordinates that later are used as constrains. The free network also gives an assessment of all used baselines and RTK- vectors.

Network Adjustment Results including Checks on ITRF08 [Epoch 2016.80]

As described previously, special care was applied for the network base stations. Some NGS and UNAVCO CORS distributed over the AOI were constrained as fixed coordinates while other CORS were left unconstrained demonstrating accuracy and high confidence in using SOPAC Sector derived base coordinates for the undistorted Network in the dynamic ITRF2008 datum. The constrains are fixed with a software related and neglectable tolerance of 0.000001m.

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	Δ Easting (Meter)	Δ Northing (Meter)	Δ Height (Meter)
bill_ITRF2008_Epoch_2016.80_SECTOR	0.000	-0.002	-0.008
p066_ITRF2008_Epoch_2016.80_SECTOR	-0.002	-0.003	0.005
p474_ITRF2008_Epoch_2016.80_SECTOR	0.002	-0.002	0.001
p480_ITRF2008_Epoch_2016.80_SECTOR	-0.001	0.000	0.017
slms_ITRF2008_Epoch_2016.80_SECTOR	-0.001	0.001	0.030

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)
p482_ITRF2008_Epoch_2016.80_SECTOR	Global	Fixed	Fixed	Fixed
p494_ITRF2008_Epoch_2016.80_SECTOR	Global	Fixed	Fixed	Fixed
pin1_ITRF2008_Epoch_2016.80_SECTOR	Global	Fixed	Fixed	Fixed
potr_ITRF2008_Epoch_2016.80_SECTOR	Global	Fixed	Fixed	Fixed
sbcc_ITRF2008_Epoch_2016.80_SECTOR	Global	Fixed	Fixed	Fixed
Fixed = 0.000001(Meter)				

Figure 2: Published SOPAC coordinates compared with calculates coordinates in a constrained network adjustment.

Establishing the NAD83 (2011) Epoch 2010.0 Datum and conversion from ITRF08 [Epoch 2016.80]

The geodetic network is based on available CORS stations. In a prior quality assessment of the base stations, a network adjustment was calculated with RINEX data of the October 19th 2016. The date was chosen to have access to final orbit data that optimizes the base line calculations.

The coordinates based on October 19th 2016 are considered free of tension from tectonic movements since it is the same time as the field survey was performed. After the first calculation, the network results were converted to coordinates in NAD83 (2011) Epoch 2010.0 with the Horizontal Time Dependent Positioning tool (HTDP) by the NGS. The so converted coordinates are establishing the NAD83(2010) datum.

Comparison of NAD83(2010) NGS Datasheet coordinates for CORS with calculated positions

The above described approach of establishing the NAD83(2010) datum is compared with actual NGS Datasheet (DS) coordinates. Without the exception of CORS P494 the inverse results of the base coordinates reflect good matching results considering the challenge due to tectonic movements.

Inverse Results

From	To	Grid Azimuth	Grid Distance (Meter)	Δ Elevation (Meter)
P066_NAD83(2011)_Epoch_2010_SECTOR_RTK	P066_NAD83(2011)_Epoch_2010_DS	273°06'51"	0.037	-0.014
P066_NAD83(2011)_Epoch_2010_DS	p066_NAD83(2011)_Epoch_2010_SECTOR_Static	87°58'27"	0.037	0.009
P474_NAD83(2011)_Epoch_2010_DS	p474_NAD83(2011)_Epoch_2010_SECTOR_Static	235°57'31"	0.007	-0.007
P474_NAD83(2011)_Epoch_2010_DS	p474_NAD83(2011)_Epoch_2010_SECTOR_RTK	229°07'55"	0.008	-0.005
p474_NAD83(2011)_Epoch_2010_SECTOR_RTK	p474_NAD83(2011)_Epoch_2010_SECTOR_Static	0°32'56"	0.001	-0.002
P480_NAD83(2011)_Epoch_2010_DS	p480_NAD83(2011)_Epoch_2010_SECTOR_Static	203°39'56"	0.006	-0.017
P482_NAD83(2011)_Epoch_2010_DS	p482_NAD83(2011)_Epoch_2010_SECTOR_Static	183°12'21"	0.008	-0.003
P482_NAD83(2011)_Epoch_2010_DS	p482_NAD83(2011)_Epoch_2010_SECTOR_RTK	215°17'07"	0.017	-0.005
P494_NAD83(2011)_Epoch_2010_DS	p494_NAD83(2011)_Epoch_2010_SECTOR_Static	353°04'14"	0.164	-0.019
POTR_NAD83(2011)_Epoch_2010_DS	potr_NAD83(2011)_Epoch_2010_SECTOR_Static	142°52'31"	0.015	-0.006
SBCC_NAD83(2011)_Epoch_2010_DS	sbcc_NAD83(2011)_Epoch_2010_SECTOR_Static	101°50'24"	0.003	-0.007

Independent OPUS Comparison in NAD83(2011) Epoch 2010 with the NGS Monuments and the final adjusted and converted positions

CompassData field crews further surveyed checks on passive NGS monuments. The table shows that static observations, RTK observations and the independent OPUS results agree within a small tolerance, while NGS datasheet values disagree. For monument AF9879 and AF9883 the OPUS service returned insufficient accuracy. On monument AF9879 the CompassData static and RTK measurements agree within 0.5 cm, while the datasheet agrees vertically, but appears to be 5 cm off horizontally. On monument AF9883 AF9879 the CompassData static and RTK measurements agree within 1.2 cm, while the datasheet is

CompassData

vertically off by about 10cm, and agrees horizontally within 2.6cm. For monument DC2131 the OPUS result shows a difference within 4 cm to the published datasheet, while the OPUS result confirms the 2 RTK observations within 2.1 cm.

Inverse Results

From	To	Grid Azimuth	Grid Distance (Meter)	Δ Elevation (Meter)
AF9879_NAD83(2011)_Epoch_2010_DS	AF9879_RTK	287°21'28"	0.049	-0.007
AF9879_NAD83(2011)_Epoch_2010_DS	AF9879_STATIC	283°00'42"	0.045	-0.007
AF9879_STATIC	AF9879_RTK	327°45'12"	0.005	0.000
AF9883_NAD83(2011)_Epoch_2010_DS	AF9883_RTK	175°01'34"	0.026	-0.098
AF9883_NAD83(2011)_Epoch_2010_DS	AF9883_STATIC	199°33'06"	0.024	-0.110
AF9883_STATIC	AF9883_RTK	108°03'58"	0.011	0.012
DC2131_NAD83(2011)_Epoch_2010_DS	DC2131_NAD83(2011)_Epoch_2010_Opus	254°18'44"	0.039	-0.035
DC2131_NAD83(2011)_Epoch_2010_Opus	DC2131_RTK_11_01	219°59'54"	0.020	-0.016
DC2131_NAD83(2011)_Epoch_2010_Opus	DC2131_RTK_11_02	326°11'35"	0.021	-0.008

Figure 3: OPUS compared with calculates coordinates in a constrained network adjustment.

Surveyed Features and Point Selection

CompassData field crews surveyed Lidar features for which the location was preselected by the customer. Field crews tried their best to position the GNSS measurement right at the selected location. For expected reasons like flatness of terrain, accessibility and GNSS signal strength changes were made within a given tolerance.

The overviews show 28 Calibration Points (red triangles), 64 NVA Points (blues squares) and 52 VVA Points (green circles):

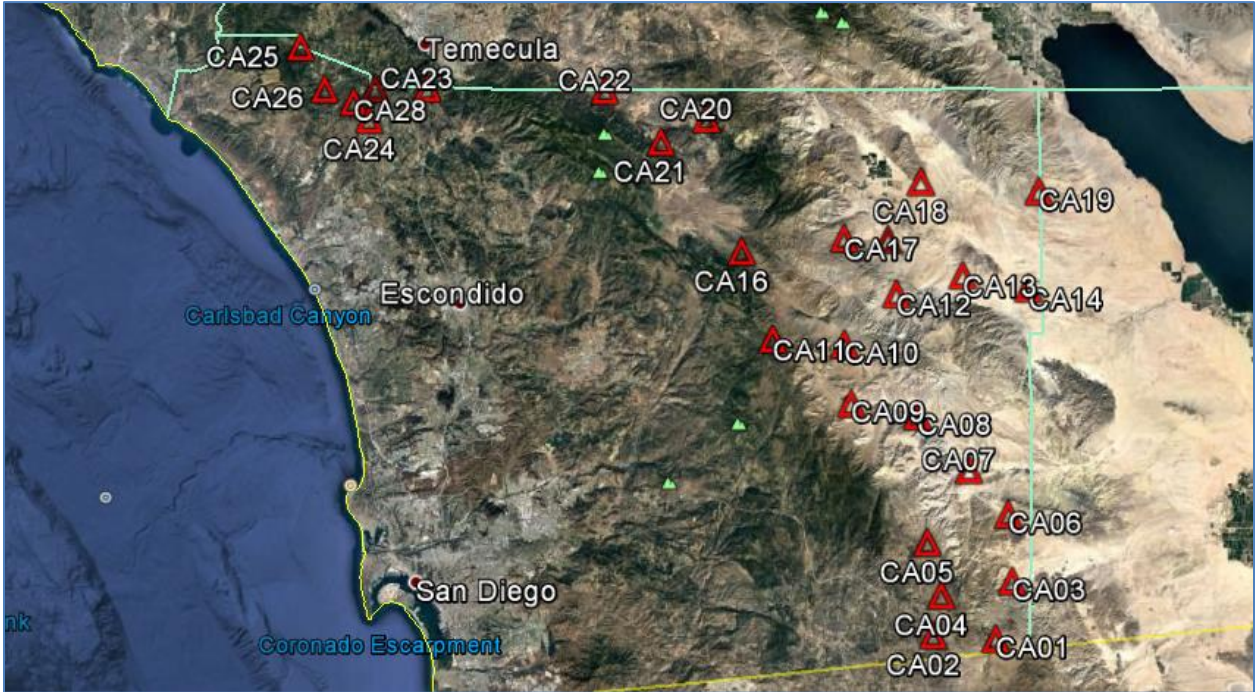


Figure 4: Surveyed Calibration Points

Calibration Points were selected to be on hard and flat surfaces that produces only a single Lidar signal return like asphalt, concrete, and gravel on roads, parking lots and turn outs. When possible points got marked with PK-nails or 60D-nails.

NVA Points were selected also to be on hard and flat surfaces that produces only a single Lidar signal return like gravel and dirt without vegetation. When possible points got marked with PK-nails or 60D-nails and in softer ground with wooden hubs.

VVA Points were selected on flat surfaces with vegetation. The vegetation in the AOI contains mostly grass, weeds, shrubs, cacti and very few forested areas. Points got marked mostly with wooden hubs, but also PK-nails or 60D-nails and in harder ground.

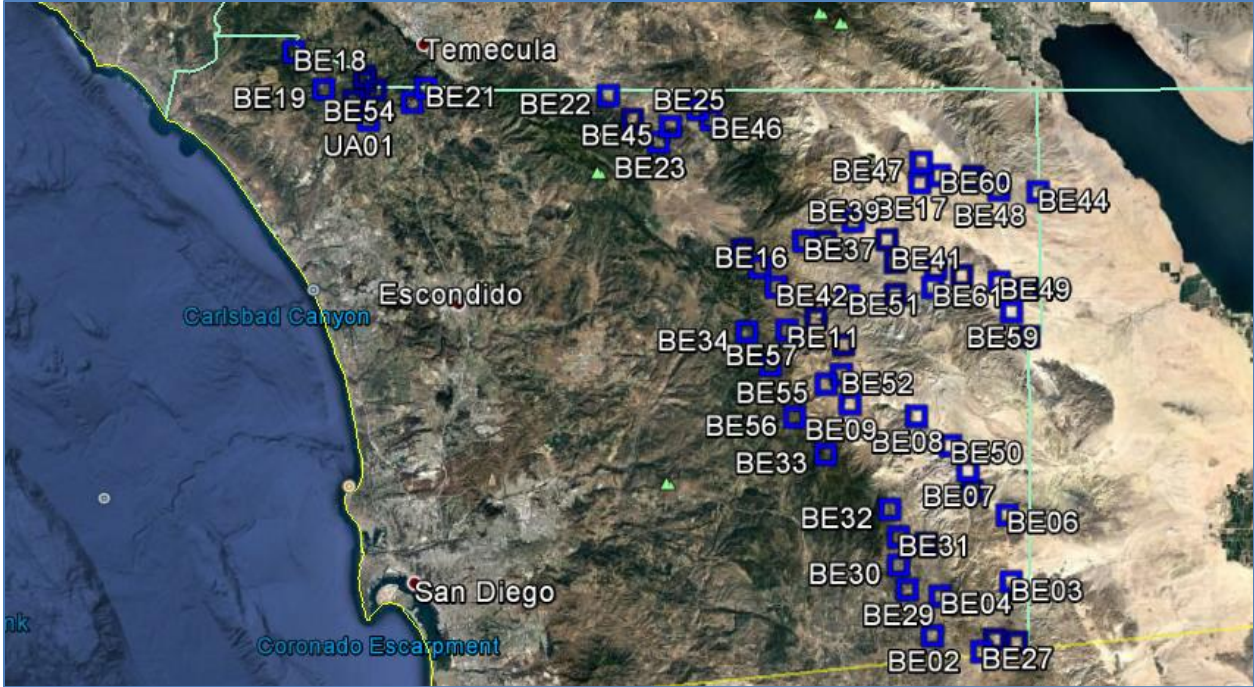


Figure 5: Surveyed NVA Points

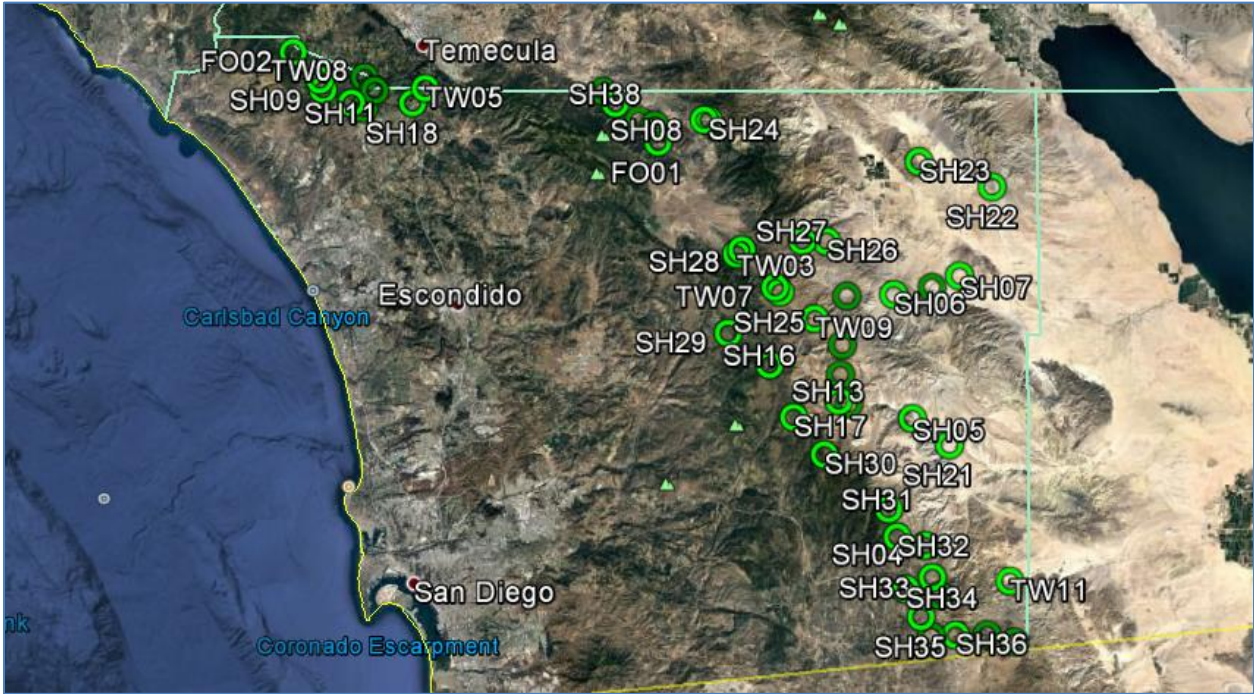









Figure 6: Surveyed VVA Points

Delivered Data

CompassData delivered Calibration Points, NVA Checkpoints, and VVA Checkpoints in separate folders.

Name	Date modified	Type
 Calibration_Points	11/21/2016 4:51 PM	File folder
 NVA_Checkpoints	11/21/2016 4:52 PM	File folder
 VVA_Checkpoints	11/21/2016 4:52 PM	File folder

Each folder contains coordinate lists (csv and xls), photos, shapefiles, and kml-files.

Name	Date modified	Type
 01_Final_Coordinates	11/21/2016 4:54 PM	File folder
 02_Final_Pictures	11/21/2016 4:55 PM	File folder
 03_Final_SHP	11/30/2016 11:28 ...	File folder
 04_Final_KML	11/21/2016 4:58 PM	File folder

The coordinate lists contain:

- Point ID
- Easting
- Northing
- Elevation
- Latitude
- Longitude
- Ellipsoid Height
- Horizontal Precision
- Vertical Precision
- Collection date
-

Philipp Hummel, PLS, CFedS, CP

Technical Director
303.627.4058 Office
12353 E. Easter Avenue
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