

## Project Report Appendices

The following section contains the appendices as listed in the Umbagog, NH/ME 2016 LiDAR Project Report.

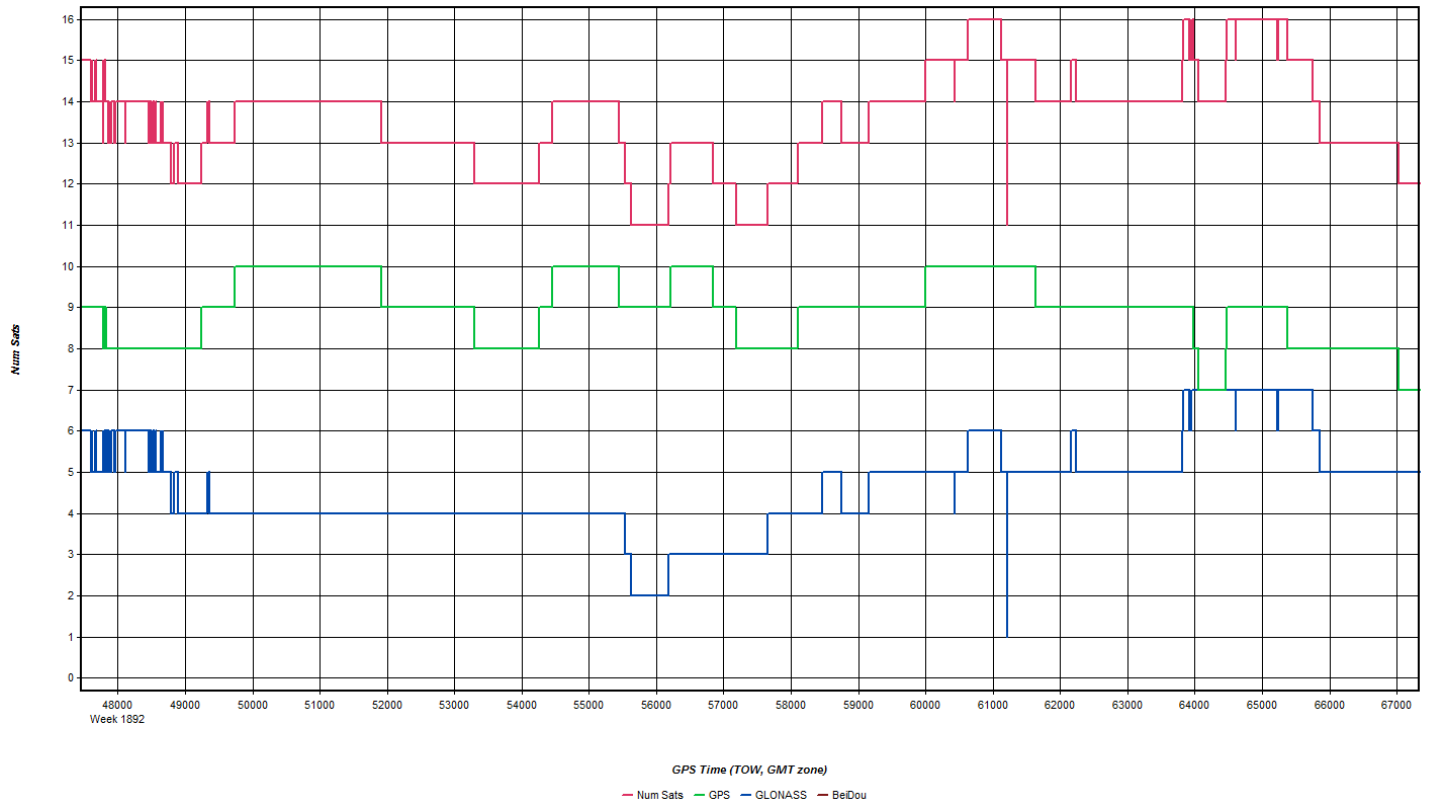
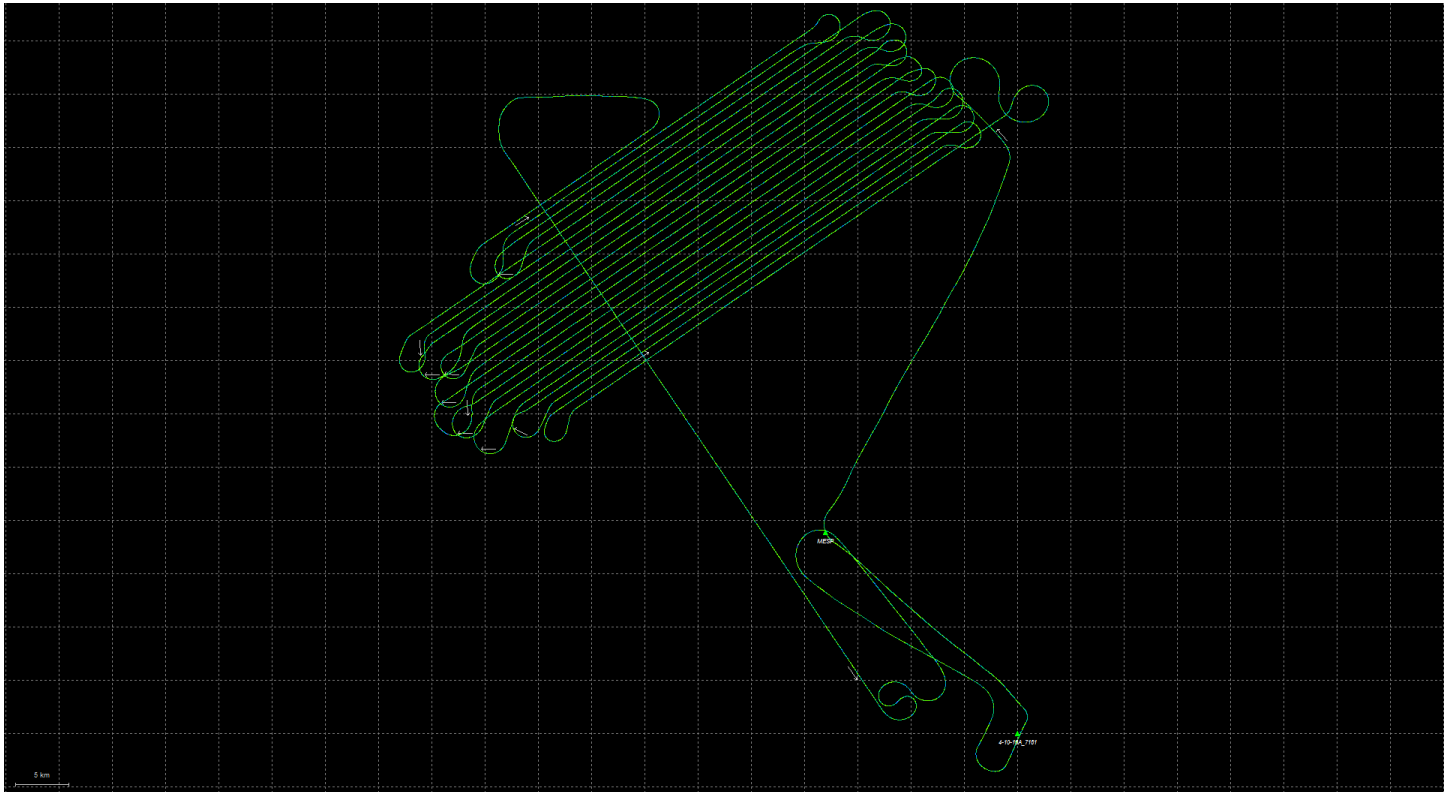
## Appendix A

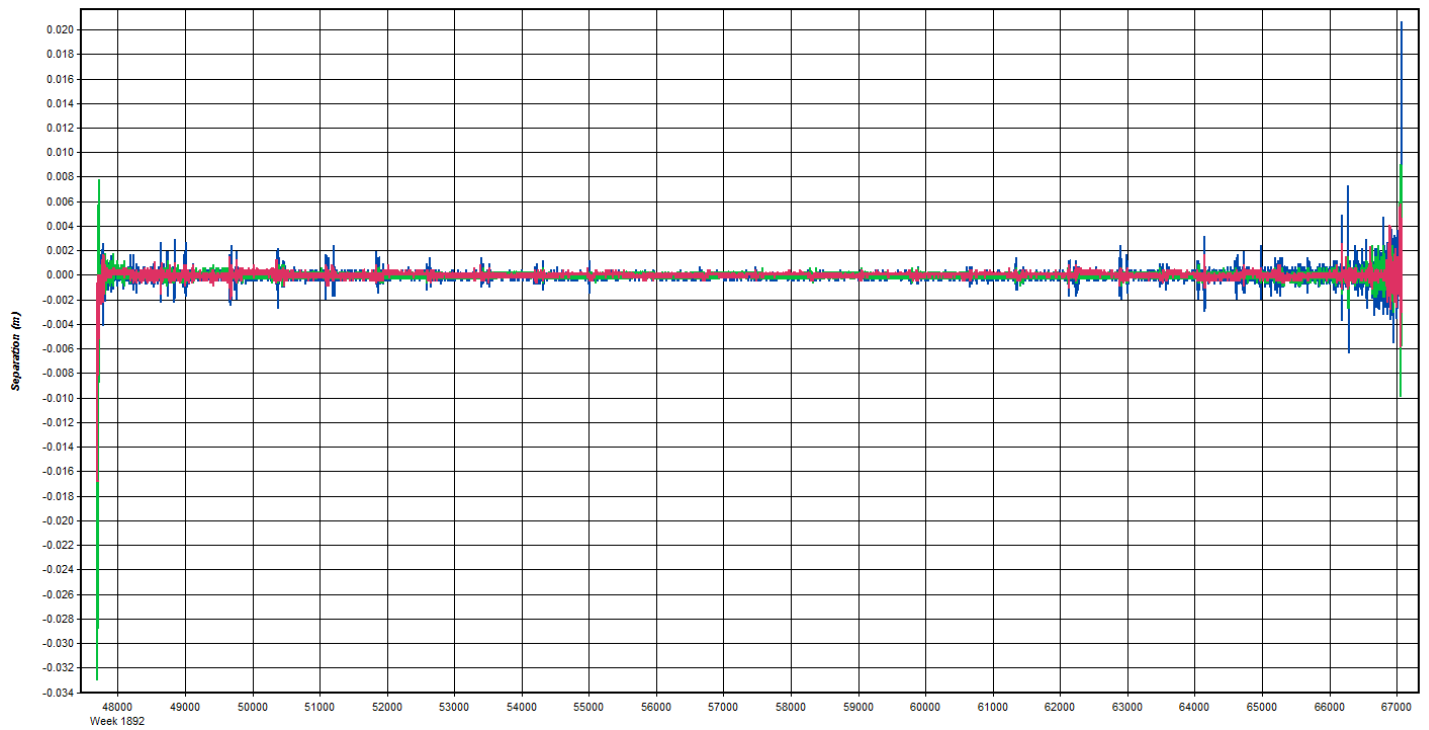
# GPS/IMU Processing Statistics Flight Logs Base Station Logs

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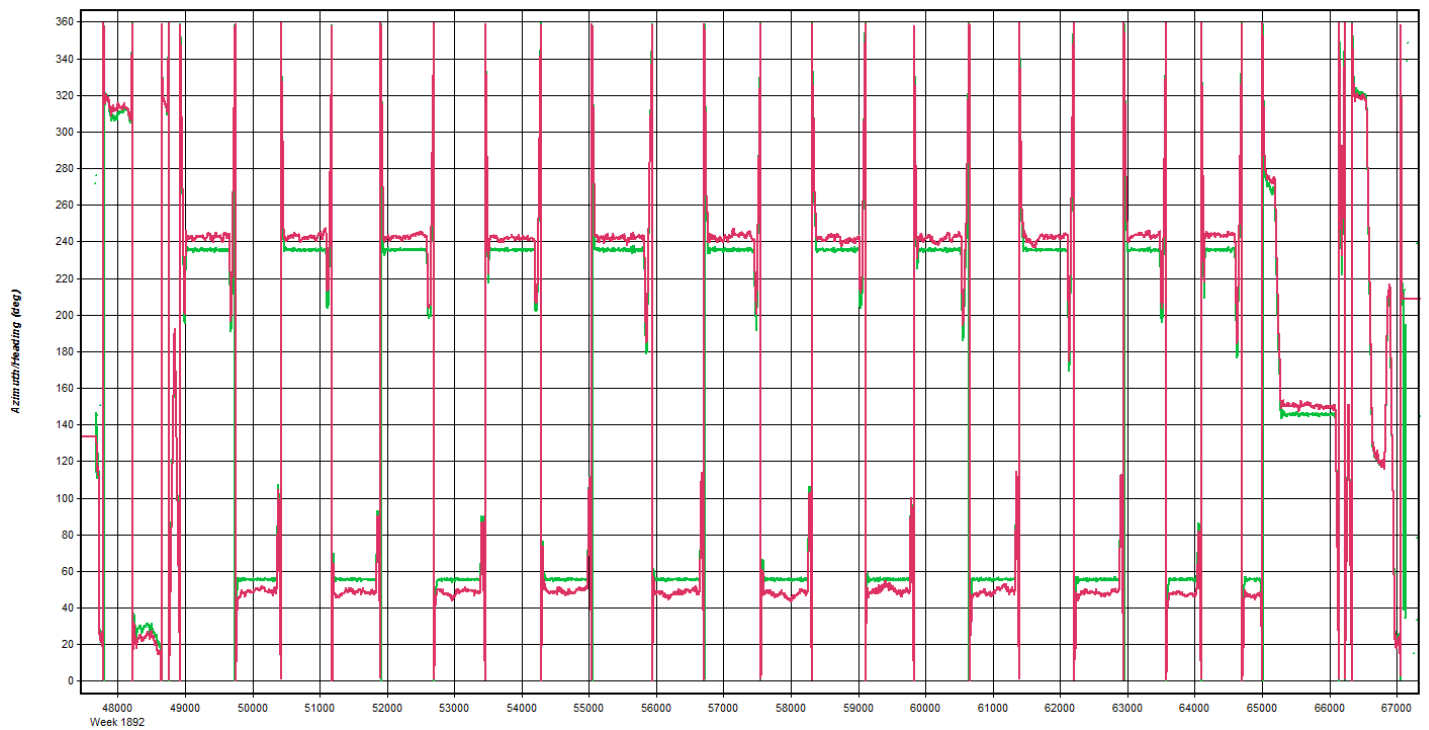
# 20160410-B (N812TB, SN7161)





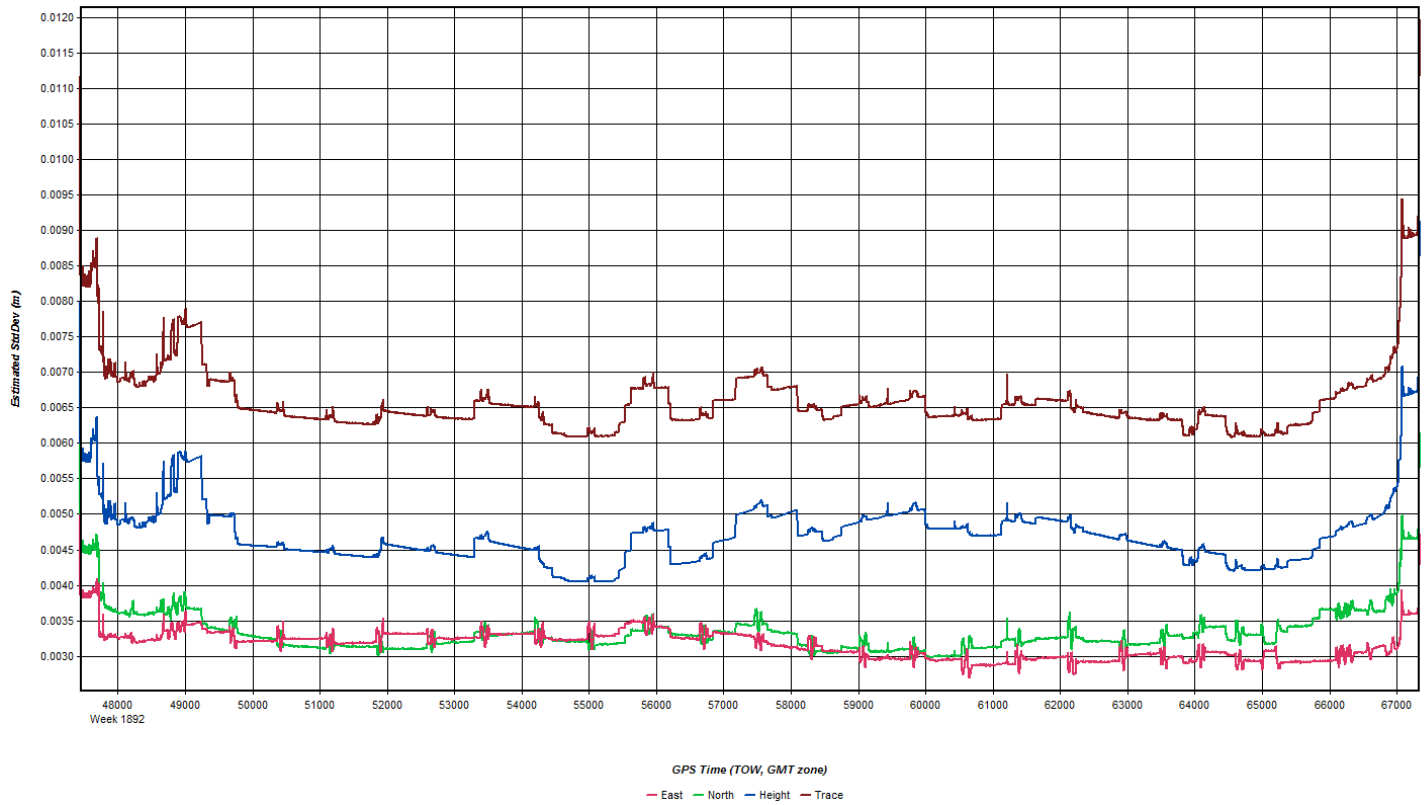
GPS Time (TOW, GMT zone)

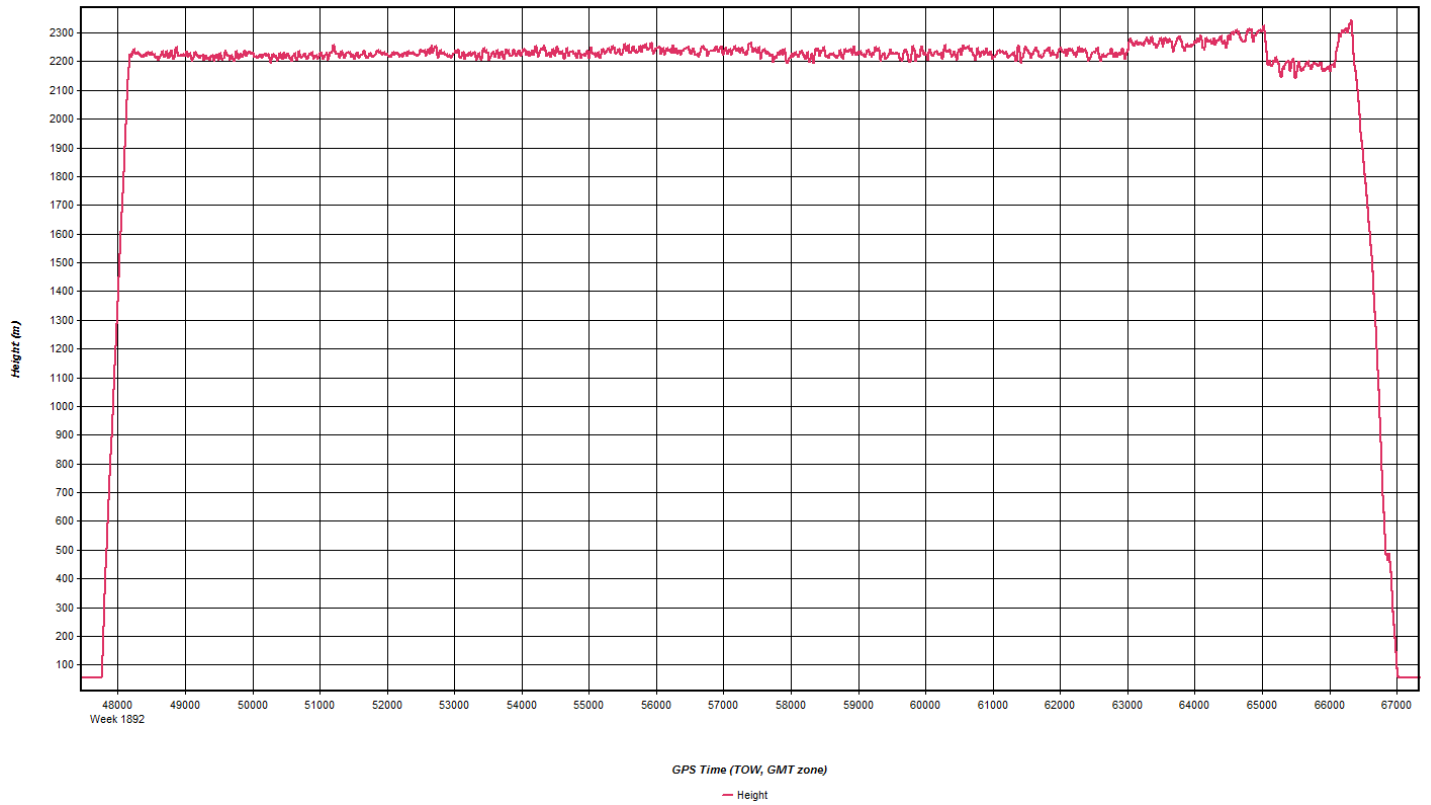
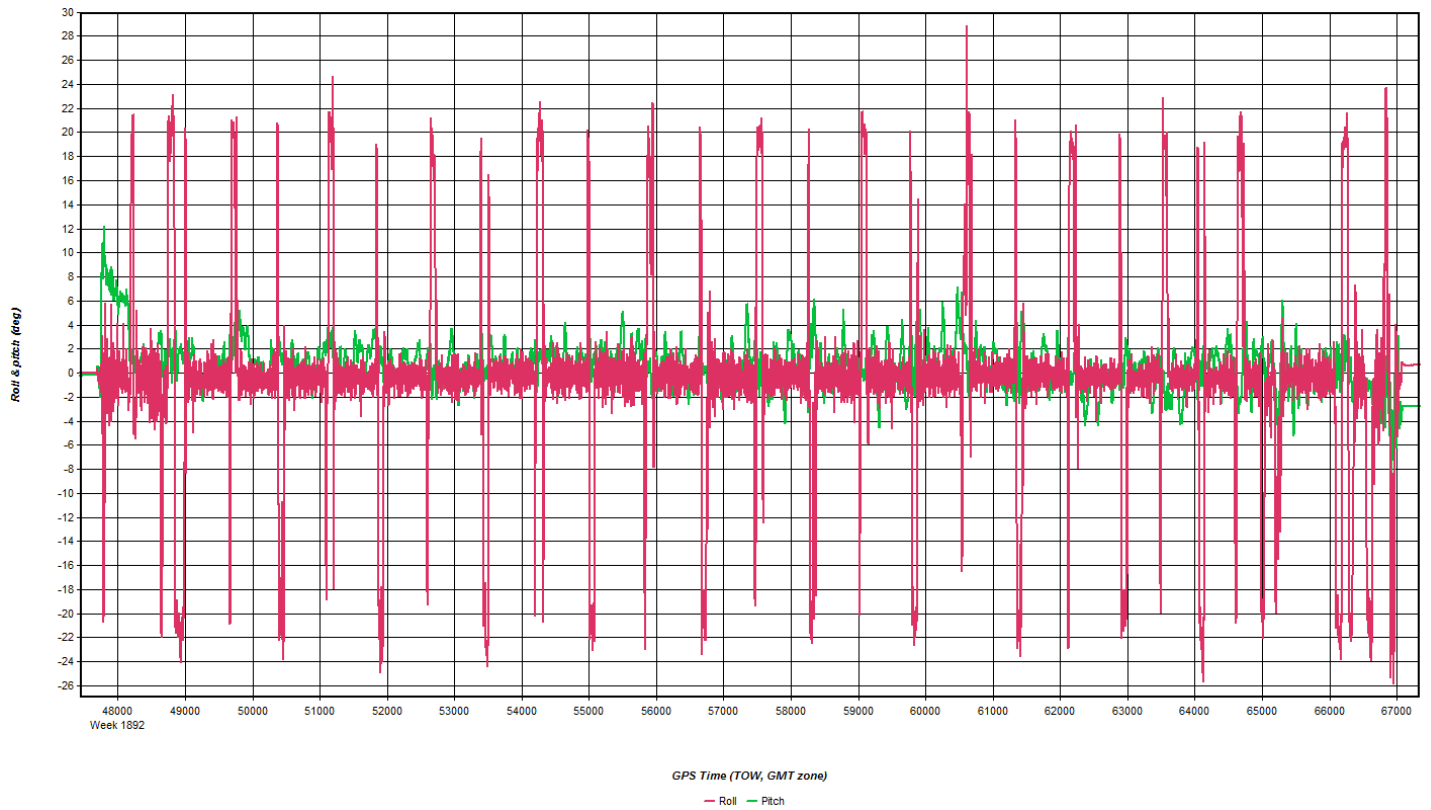
— East — North — Up



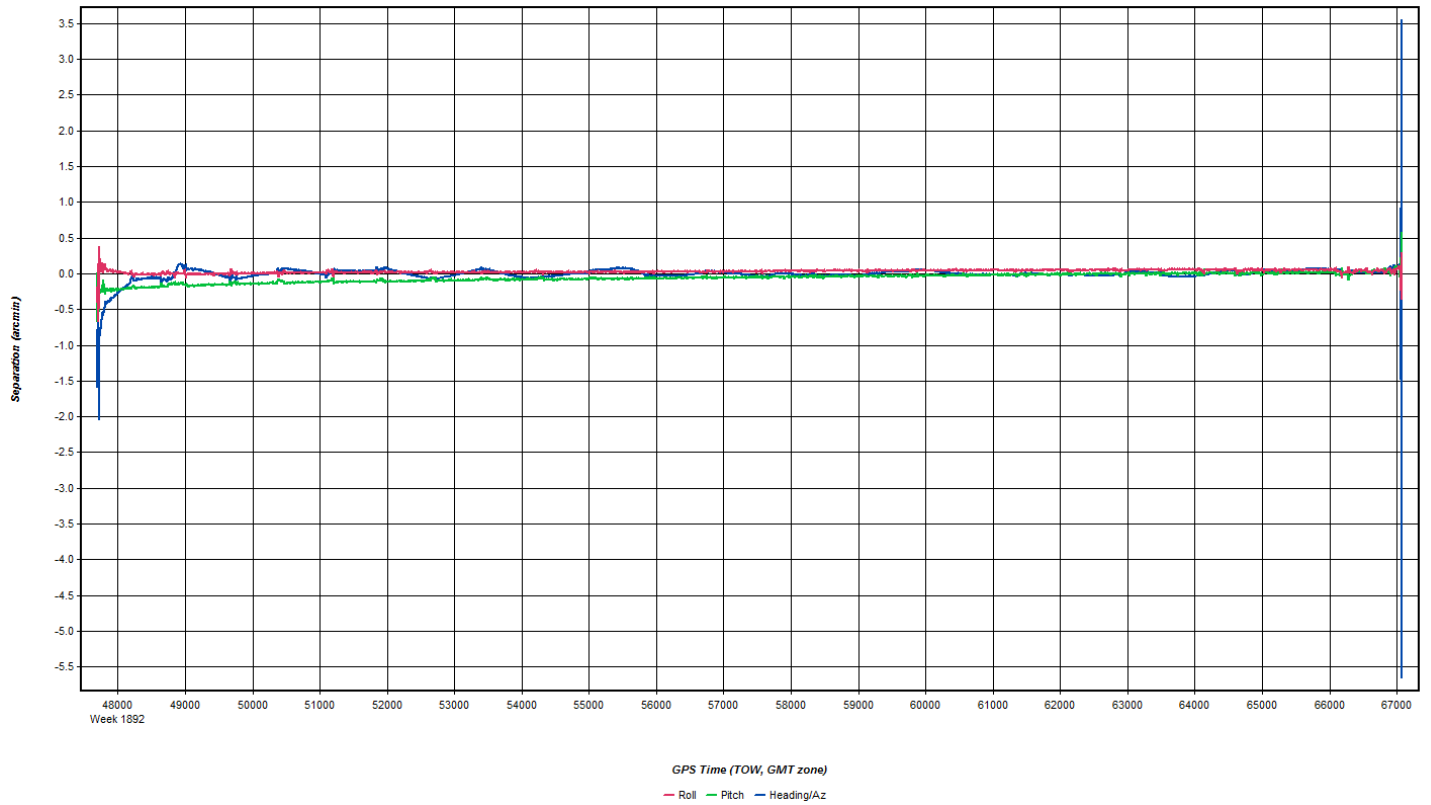
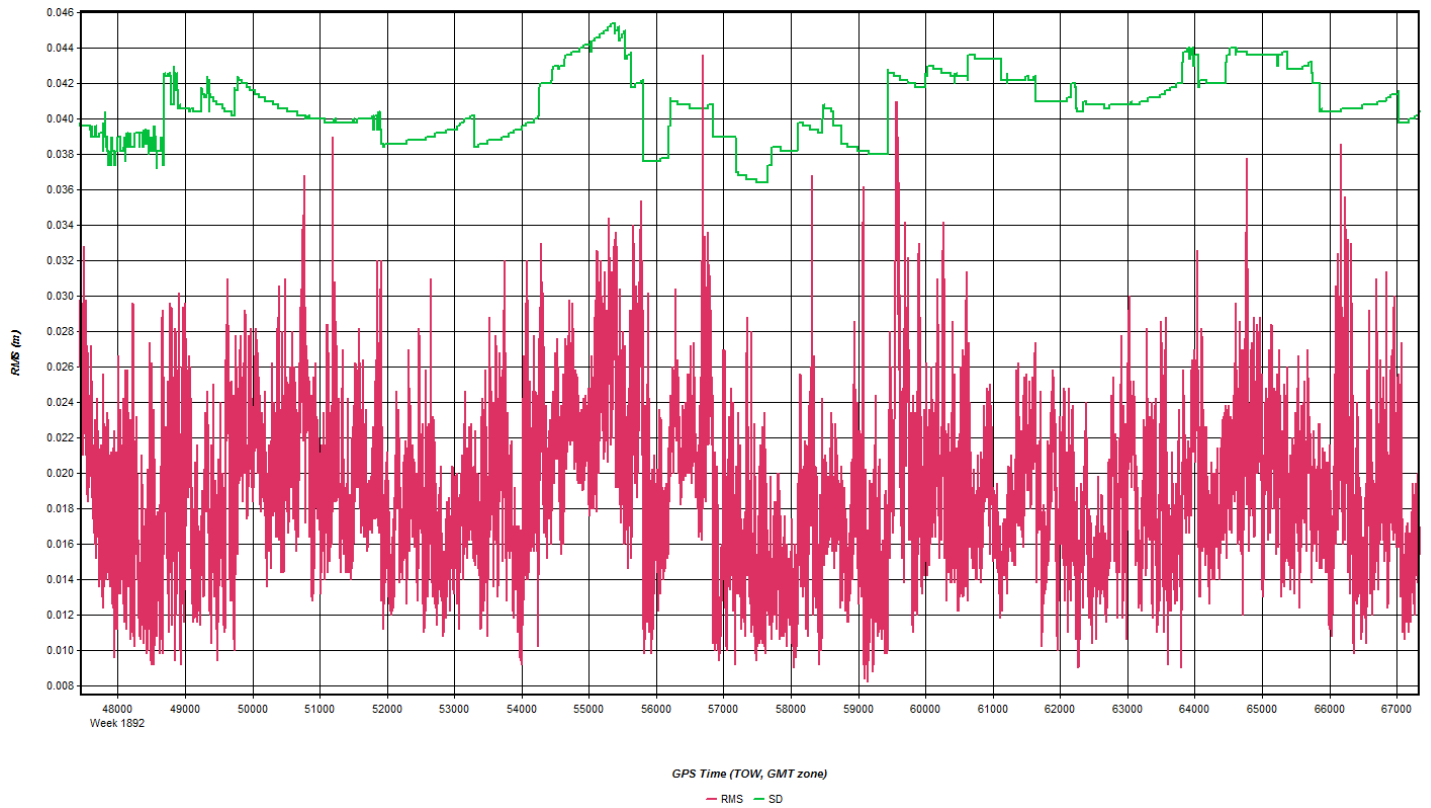
GPS Time (TOW, GMT zone)

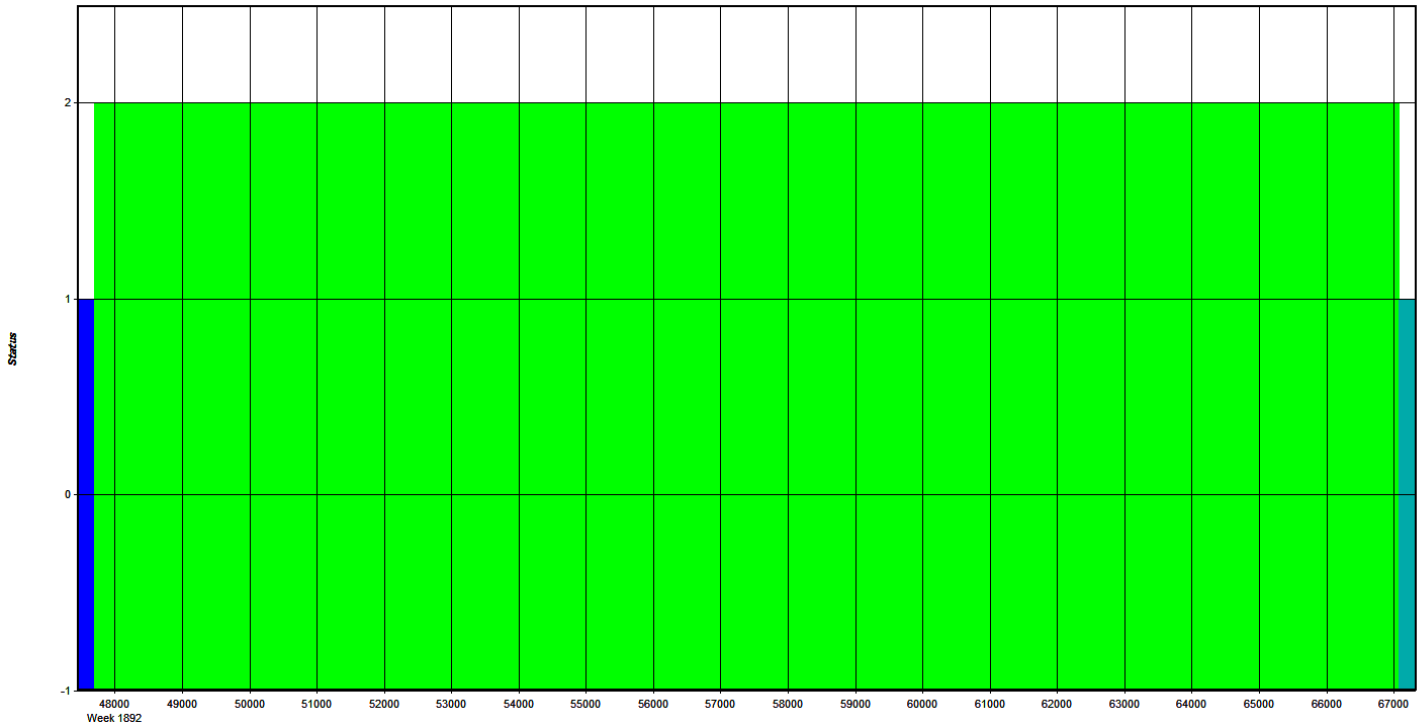
— Heading/Azimuth — GPS-COG











GPS Time (TOW, GMT zone)

— Float   
 — Forward Fixed   
 — Reverse Fixed   
 — Fixed (2 or more)

**Coordinate/Antenna Settings** ? X

Master Remote

Base Station  
 1: 4-10-16A\_7161 Name: 4-10-16A\_7161  Disabled  
 File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160410\_SN7161\_

Coordinates  
 Latitude: North 44 02 56.74648 Compute from PPP  
 Longitude: West 70 17 12.20047 Enter Grid Values  
 Ellipsoidal height: 51.351 m Enter MSL Height  
 Datum: WGS84 Datum Options  
 Select From Favorites Add To Favorites Use Average Position

Antenna Height  
 From station file: TRM55971.00 View STA File  
 Antenna profile: TRM55971.00 Info  
 Measured height: 1.219 m  
 ARP to L1 offset: 0.067 m  
 Applied height: 1.286 m  
 Measured to:  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

Coordinate/Antenna Settings

Master Remote

Base Station  
2: MESP Name: MESP  Disabled  
File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160410\_SN7161\_

Coordinates  
Latitude: North 44 13 06.19617 Compute from PPP  
Longitude: West 70 30 47.10740 Enter Grid Values  
Ellipsoidal height: 105.463 m Enter MSL Height  
Datum: WGS84 Datum Options  
Select From Favorites Add To Favorites Use Average Position

Antenna Height  
From station file: TRM55971.00, NONE View STA File  
Antenna profile: TRM55971.00 Info  
Measured height: 0.000 m  
ARP to L1 offset: 0.067 m  
Applied height: 0.067 m  
Measured to:  
 ARP  
 L1 Phase Centre  
Compute From Slant

OK Cancel

# Flight Log

**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(email log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: 4-10-16  
 UIC: A B C D E Pg. 1 of 2

Project: USGS Maine MESP Proj #: 27146 Flight Mgmt File: 20160410-130626 Tech: Dynesgn

Aircraft: N812TB Begin Hobbs: 3406.4 Total: 5.6 Pilot: Jackson Co-Pilot: Dynesgn

Dep Apt: KLEW Dep Time (Lcl): 09:15 (Z): 13:15 Arr Apt: KLEW Arr Time (Local): 14:36 (Z): 18:36 Tot Time Aloft: 5.6

CORS: (Y) N Sta 1: MESP Sta 2: Flyovers: (Y) N IF Y, times: Sta 1) 13:23 Sta 2) 18:24

GPS Units: (Y) N Sta 1: LEW 1 Sta 2: Flyovers: Y (N) IF Y, times: Sta 1) 8-13:30 Sta 2) 18-18:21

Gd Temp beg: -2 °C End: °C OAT beg: -15 °C End: -16 °C Altimeter begin: 30.12 end: 30.16

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdsp	Avg Ft Spacing	Power	PPSM	Storage Name/No
1063	235	13:38	13:47	144	1.1/14	7270	7200ft	150	150	100	100	222
1062	55	13:50	13:59	141	1.1/18	7276						290
1061	235	14:01	14:11	146	1.2/17	7276						68
1060	55	14:13	14:23	154	1.2/16	7274						
1059	235	14:26	14:36	151	1.3/15	7275						
1058	55	14:39	14:49	147	1.4/14	7278						
1057	235	14:52	15:02	140	1.2/15	7277						
1056	55	15:05	15:15	154	1.1/16	7243						
1055	235	15:18	15:29	136	1.1/15	7302						
1054	55	15:33	15:43	147	0.9/18	7302						
1053	235	15:46	15:57	139	1.0/16	7303						
1052	55	16:00	16:10	151	1.1/16	7303						
1051	235	16:13	16:23	151	1.2/15	7310						
1050	55	16:25	16:35	149	1.3/17	7323						
1049	235	16:38	16:48	130	1.2/18	7332						
1048	55	16:51	17:01	147	1.2/18	7329						
1047	235	17:04	17:14	152	1.1/18	7329						
1046	55	17:17	17:27	153	1.3/17	7339						

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.

Total Proj Lines: 142 Lines Flown: 23 Lines Remain: 73 Online Time: 4.7 Mob Time: 0.4 Notes: Continued on next page

**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(email log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: 4-10-16  
 Uf: B C D E Pg 2 of 2

Project: USGS Maine MESP Proj #: 27146 Flight Mgmt File: 20160410\_130626  
 Aircraft: N812TB Begin Hobbs: 390.3 End Hobbs: 390.9 Total: 0.6 Pilot: Jacobson Co-Pilot: Dyreson  
 Dep Apt: KLEW Dep Time (Local): 15:15 (Z): 13:15 Arr Apt: KLEW Arr Time (Local): 14:36 (Z): 18:36 Tot Time Aloft: 016  
 CORS: Y/N Sta 1: MESP Sta 2: Flyovers: Y/N IF Y, times: Sta 1 13:23 Sta 2 18:29  
 GPS Unit: Y/N Sta 1: LEW1 Sta 2: Flyovers: Y/N IF Y, times: Sta 1 13:30 Sta 2 18:21  
 Gd Temp beg: -2 °C End: °C OAT beg: -15 °C End: -16 °C Altimeter begin: 30.12 end: 30.16  
 Max Gdspd 150 Avg Ft Spacing 290  
 Power 100 PPSM 68

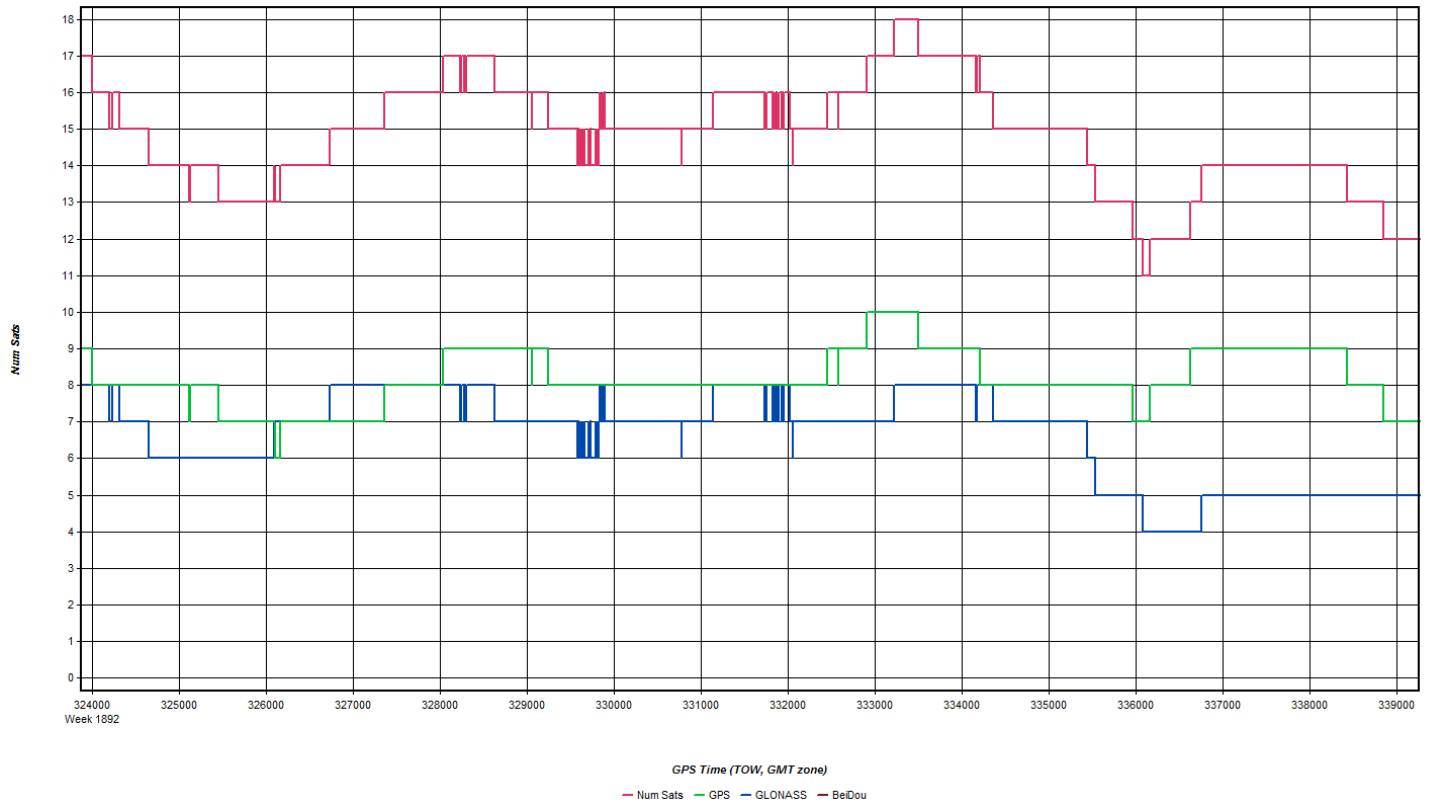
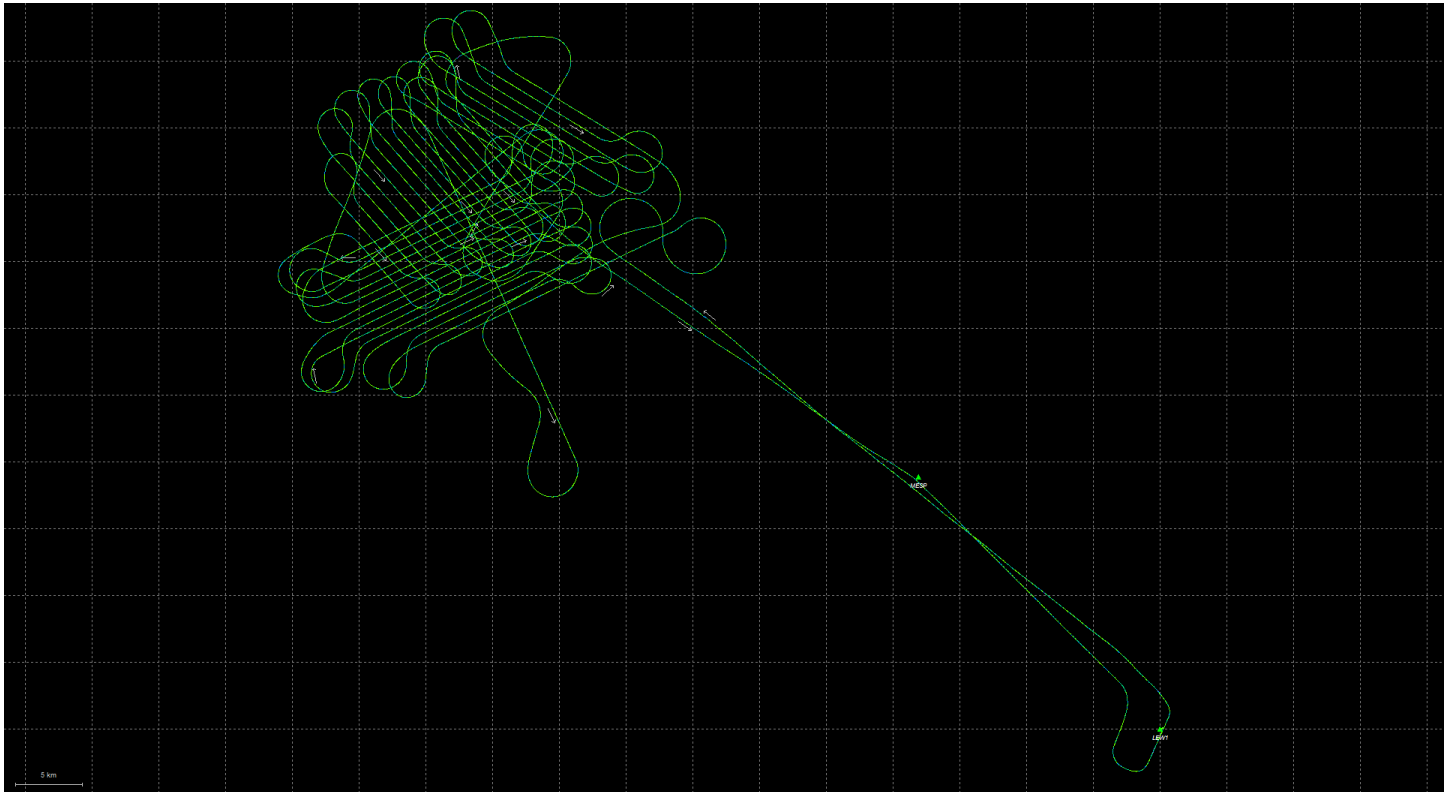
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POB/Start	GPS Altitude	Crab	Turb (0-1)
1045	235	17:30	17:37	150	12/17	7422		
1044	55	17:40	17:46	152	12/17	7431		
1043	235	17:51	17:56	155	11/19	7503		
1042	55	17:59	18:02	149	11/18	7549		
111	145	18:08	18:21	151	12/17	7192		

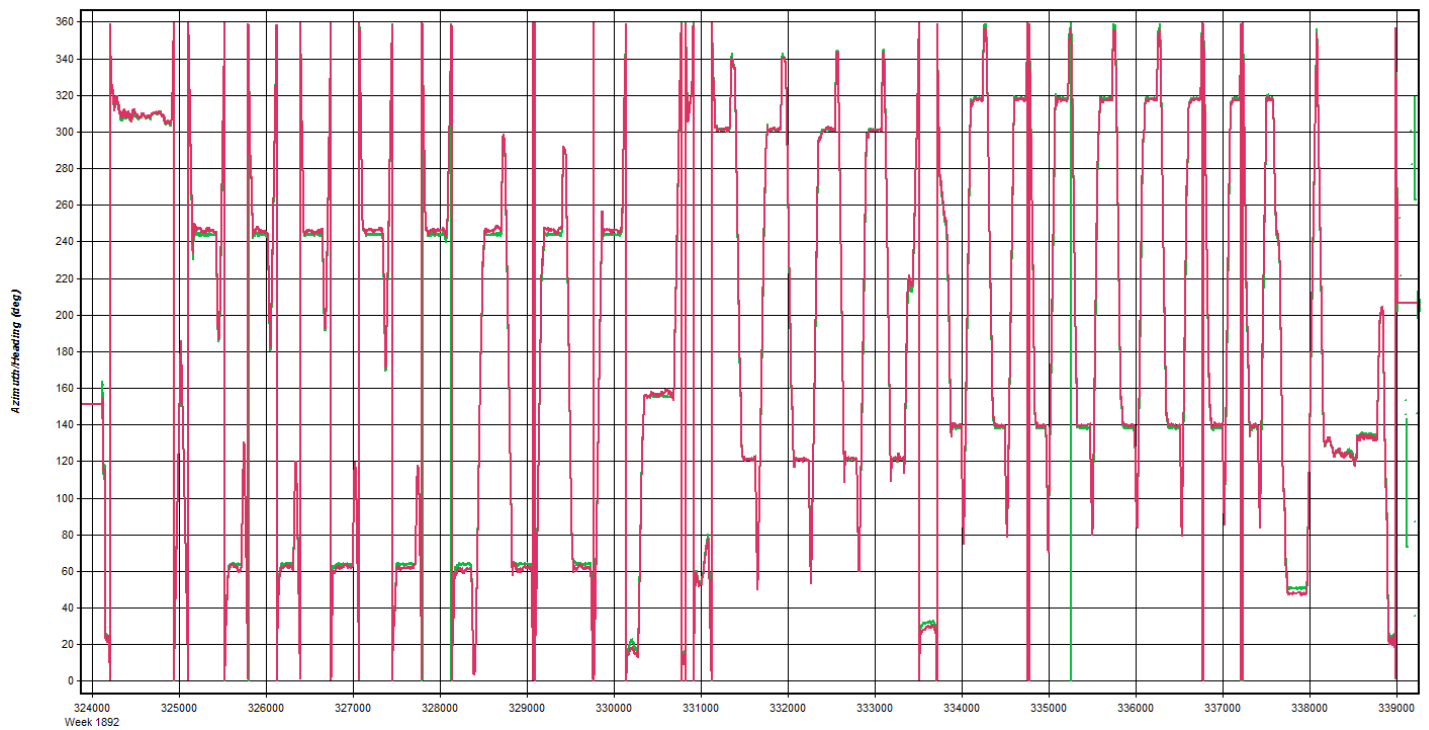
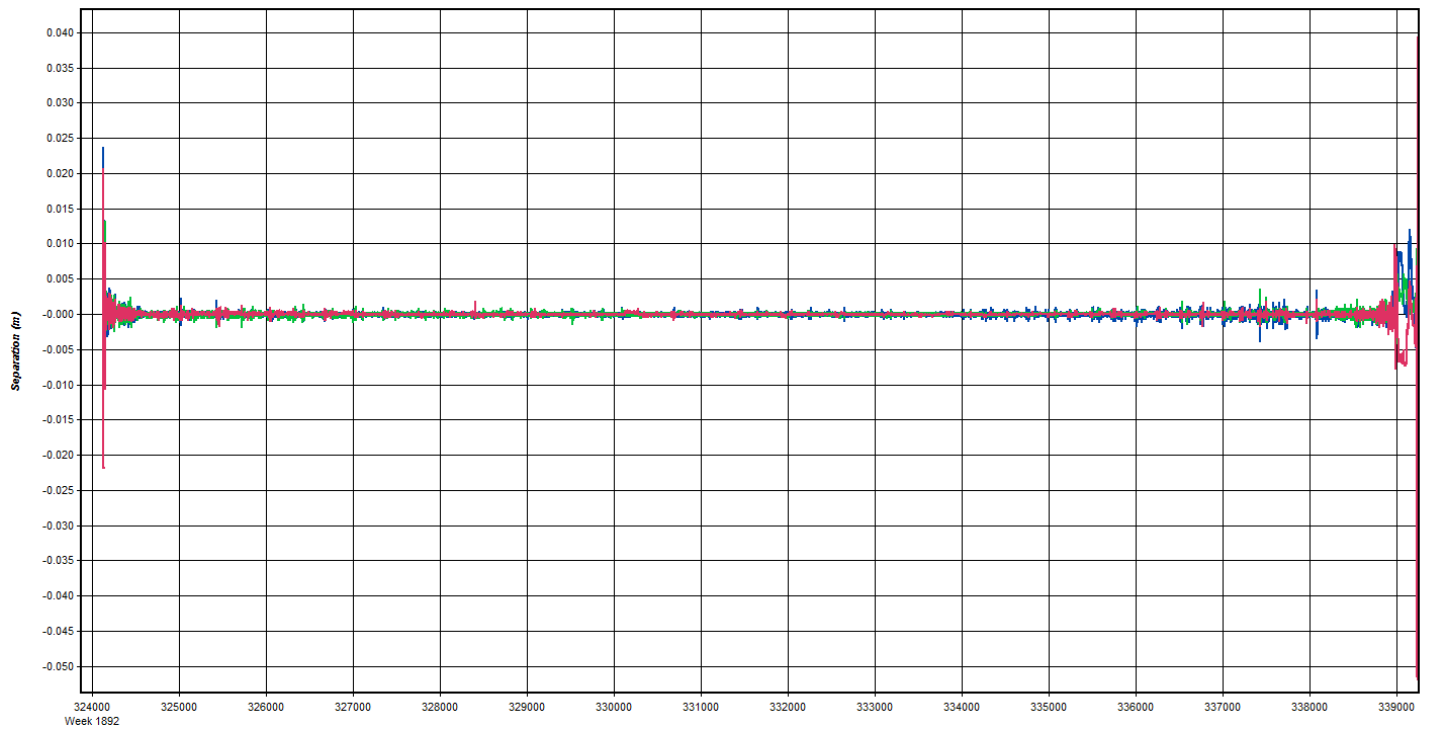
FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.

Total Proj Lines: 142 Lines Flown: 23 Lines Remain: 73  
 Online Time: 4.7 Mob Time: 0.9 Notes:

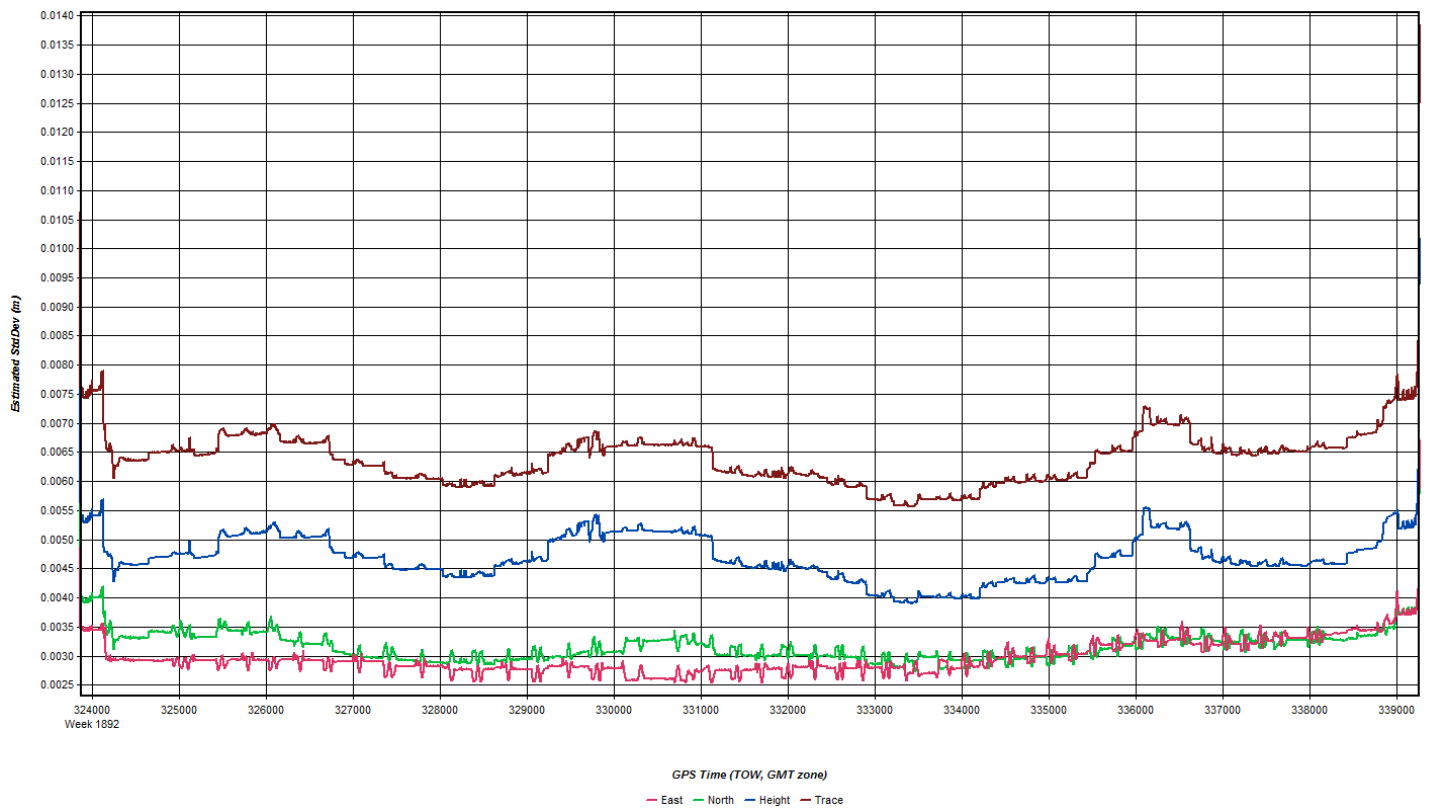
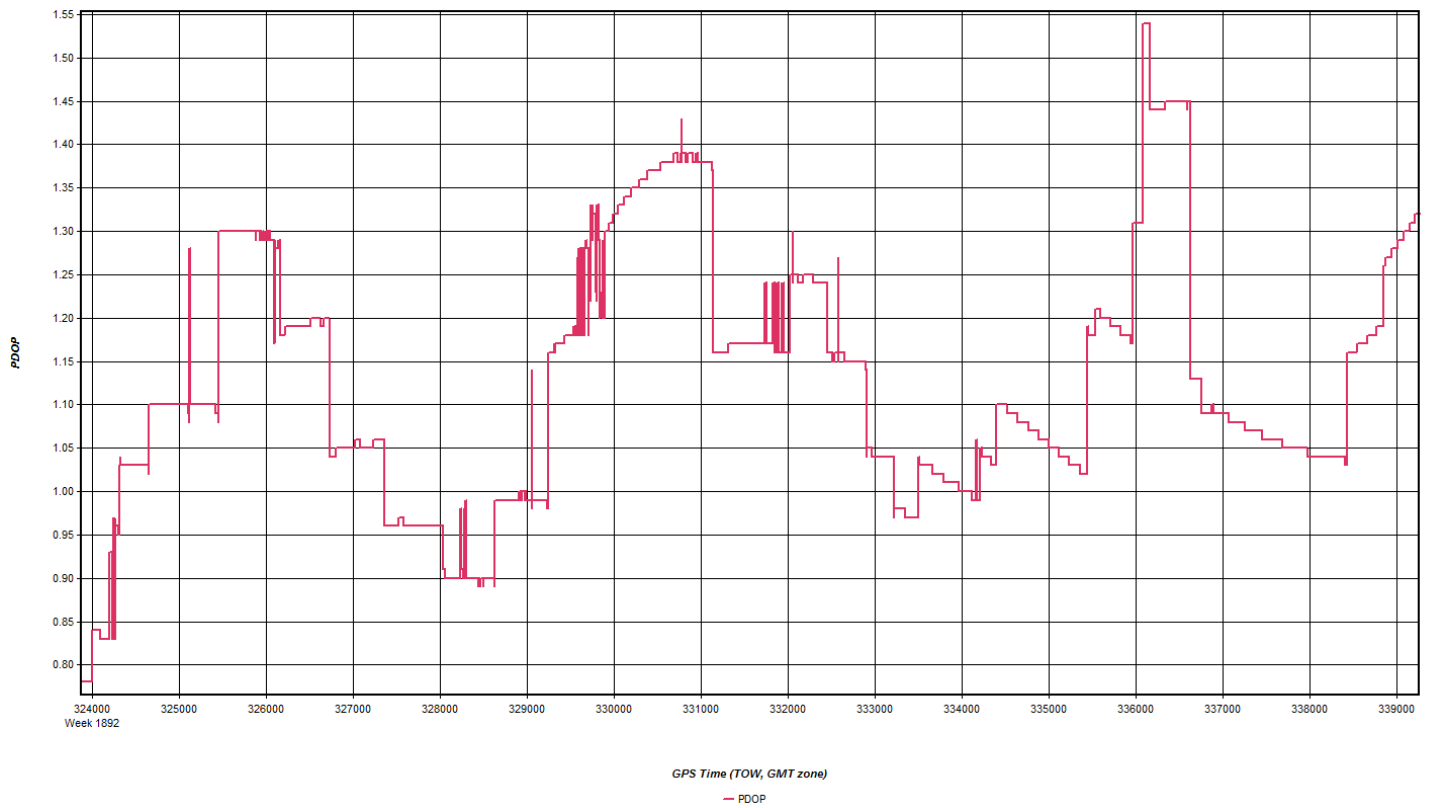
Generated by CamScanner

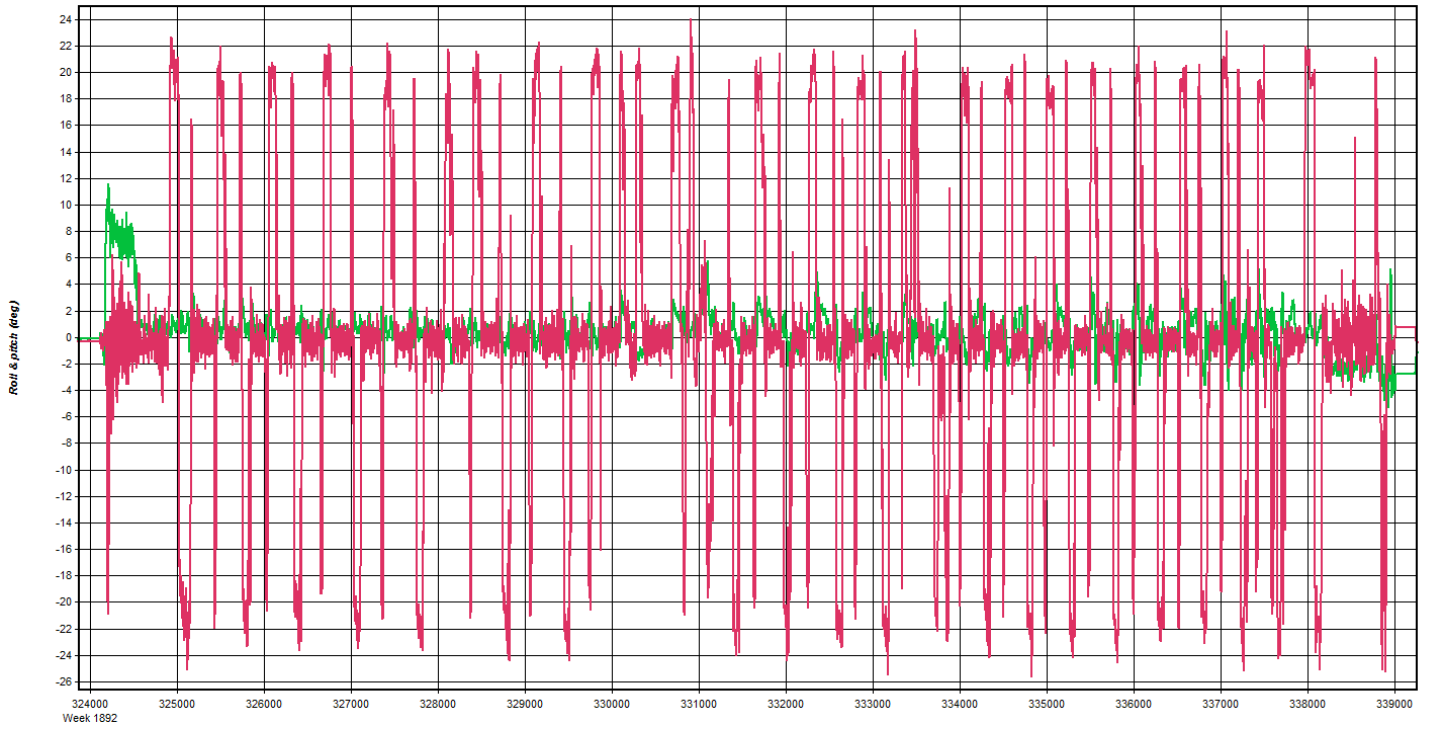
# 20160413-A (N812TB, SN7161)



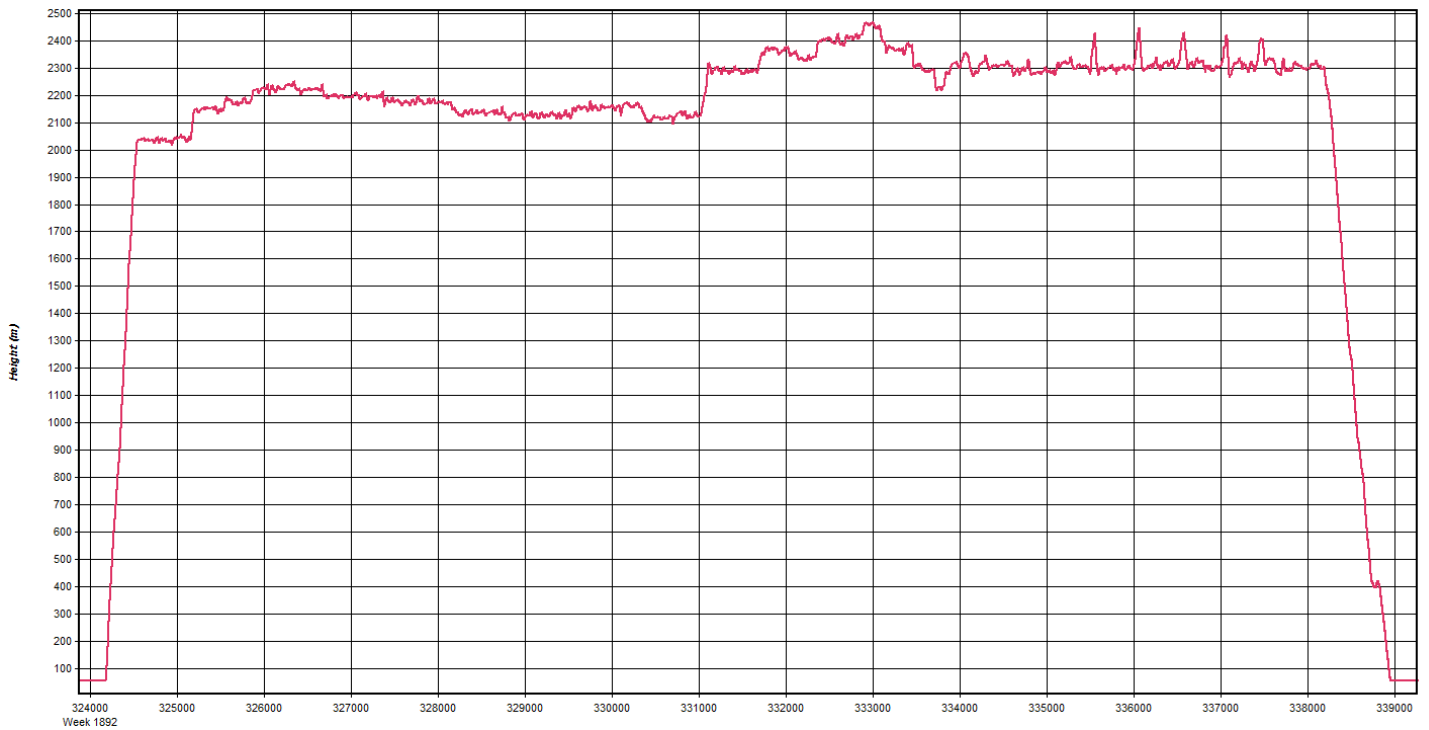




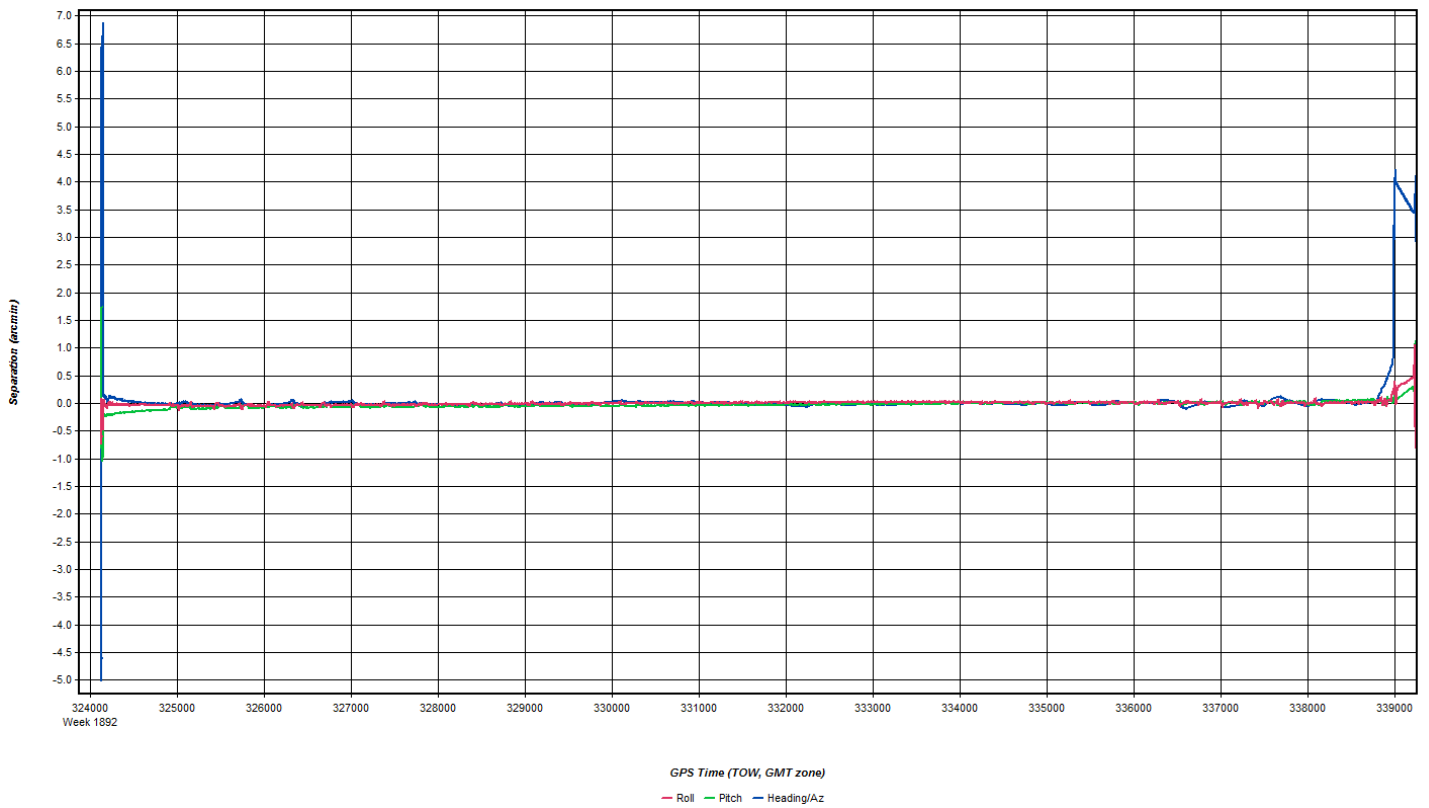
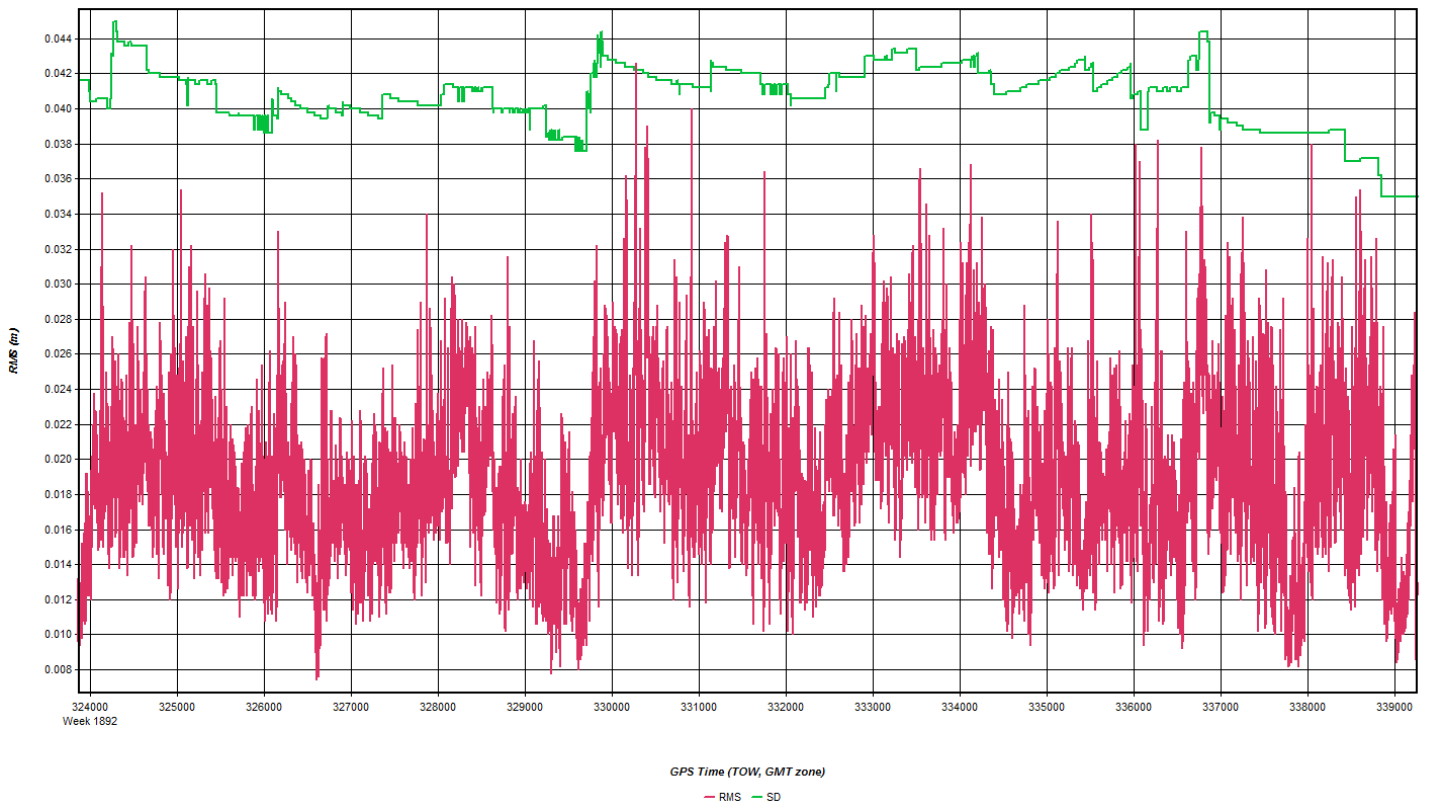


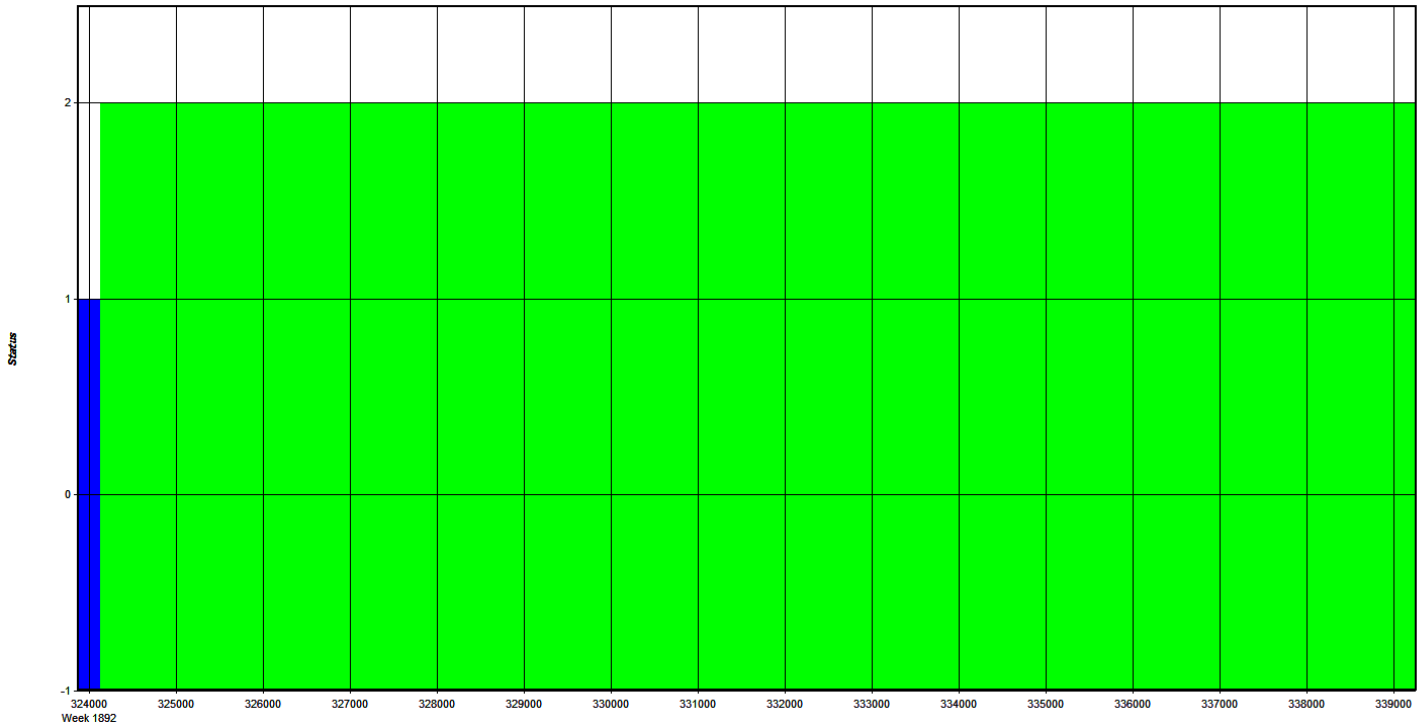


GPS Time (TOW, GMT zone)  
— Roll — Pitch



GPS Time (TOW, GMT zone)  
— Height





GPS Time (TOW, GMT zone)  
 - Float - Forward Fixed - Reverse Fixed - Fixed (2 or more)

Coordinate/Antenna Settings

Master Remote

Base Station  
 1: LEW1 Name: LEW1  Disabled  
 File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160413\_SN7161\_

Coordinates  
 Latitude: North 44 02 56.74648 Compute from PPP  
 Longitude: West 70 17 12.20047 Enter Grid Values  
 Ellipsoidal height: 51.351 m Enter MSL Height  
 Datum: WGS84 Datum Options  
 Select From Favorites Add To Favorites Use Average Position

Antenna Height  
 From station file: TRM55971.00 View STA File  
 Antenna profile: TRM55971.00 Info  
 Measured height: 1.219 m  
 ARP to L1 offset: 0.067 m  
 Applied height: 1.286 m  
 Measured to:  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

Coordinate/Antenna Settings

Master Remote

Base Station  
 2: MESP Name: MESP  Disabled  
 File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160413\_SN7161\_

Coordinates  
 Latitude: North 44 13 06.19617 Compute from PPP  
 Longitude: West 70 30 47.10740 Enter Grid Values  
 Ellipsoidal height: 105.463 m Enter MSL Height  
 Datum: WGS84 Datum Options  
 Select From Favorites Add To Favorites Use Average Position

Antenna Height  
 From station file: TRM55971.00, NONE View STA File  
 Antenna profile: TRM55971.00 Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.067 m  
 Applied height: 0.067 m  
 Measured to:  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

# Flight Log

**Quantum** Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc  
(email log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: 4-13-16 Pg 1 of 3  
 UIC: 0 B C D E

Project: USGS Maine MESP Flight Mgmt File: 20160413-175153  
 Proj #: 27146

Aircraft: N812TB End Hobbs: 3913.4 Total: 4.1 Pilot: Jacobson Co-Pilot: Dy  
 Tech: Dy

Dep Apt: KLEW Dep Time (Local): 18:04 (Z): 22:09 Tot Time Aloft: 4.1  
 CORS:  N  S Sta 1: MESP Sta 2: Start: 22:02  
 GPS Unit:  N  S Sta 1: LEW1 Sta 2: Flyovers:  N  S Flyovers: Y  N If Y, times: Sta1) 18:04 If Y, times: Sta2) 18:15 Sta2) 18:08-21:53

Gd Temp beg: 26 °C End: 10 °C OAT beg: 7 °C End: 7 °C Altimeter begin: 30.38 end: 30.51 Max Gdspd 150 Avg Pt Spacing 150 Power 100 Pulse Rate 288 Pulse Rate 288 Alt AMSL 7000ft Alt AGL 7003 GPS Altitude 7003 Gd Spd 148 End (UTC) 18:23 End (Local) 22:02 Mag CB 248 Storage Name/No 016

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	Foot/Sec	GPS Altitude	Crab	Turb (0-2)	Alt AMSL	Alt AGL	MPIA	Y	N	Pulse Rate	Pulse Rate	Avg Pt Spacing	Power	Max Gdspd	Mag CB	Storage Name/No
1515	244	18:21	18:23	148	1.3/15	7003			7000ft	7003										
1514	64	18:20	18:28	147	1.2/16	7112														
1513	244	18:31	18:33	135	1.1/18	7254														
1512	64	18:36	18:38	147	1.0/18	7380														
1511	244	18:41	18:43	145	1.2/17	7236														
1510	64	18:47	18:49	150	1.1/17	7213														
1509	244	18:52	18:55	145	1.1/17	7194														
1508	64	18:58	19:01	148	1.1/17	7122														
1507	244	19:04	19:07	147	1.2/17	7106														
1501	64	19:10	19:12	149	1.2/17	6957														
1502	244	19:15	19:17	146	1.2/17	6958														
1503	64	19:21	19:23	151	1.1/17	6962														
1504	244	19:27	19:29	147	1.1/18	6940														
1505	64	19:32	19:35	146	1.2/17	7001														
1506	244	19:38	19:41	144	1.2/17	7036														
1548	155	19:46	19:51	153	1.6/16	6917														
1001	301	20:00	20:01	150	1.3/16	7523														
1002	121	20:05	20:06	148	1.2/17	7542														

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.

Total Prof Lines: 142 Lines Flown: 42 Lines Remain: 18 Online Time: 3.5 Mob Time: 0.6 Notes:

Generated by CamScanner

**Quantum** **Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(email Log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: **4-13-16** pg 2 of 3  
 Lit: **A B C D E**

Project: **USGS Maine MESP** Flight Mgmt File: **20160413\_175153**  
 Aircraft: **N812TB** Begin Hobbs: **349.3** End Hobbs: **393.4** Total: **4.1** Pilot: **Jacobson** Co-Pilot: **Tech: Dyrce 01**  
 Dep Apt: **KLEW** Dep Time (Local): **18:09** (Z): **22:04** Tot Time Aloft: **4.1**  
 CORS: **01N** Sta 1: **MESP** Sta 2: **01N** Flyovers: **01N** If Y, times: **Sta1 (18:09 -Stat2) 22:02**  
 GPS Unit: **01N** Sta 1: **LEW1** Flyovers: **Y 01N** If Y, times: **Sta1 (18:09 -Stat2) 22:02**

Gd Temp beg: **6** °C End: **10** °C OAT beg: **-7** °C End: **-7** °C Altimeter beg: **30.33** end: **30.31** Mag Start End Mag Storage Name  
**5** **17:59** **18:01** **248**  
**A** **T** **C**  
**1** **1** **1**  
**C** **C** **C**

Line #	Hdg	Stare (UTC)	End (UTC)	Gd Spd	POBH*Sea	GPS Altitude	Crab	Turb (0-1)	Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Power	Pulse Rate	Alt AGL	Alt APL	Pulses In Air	Alt AGL	Alt APL	Pulses In Air
1003	301	20:09	20:11	148	1.2/18	7740			7500ft	150	100	260							
1004	121	20:15	20:16	147	1.0/19	7654													
1005	301	20:20	20:21	148	1.0/19	7862													
1006	121	20:24	20:26	144	1.0/19	7431													
1007	301	20:29	20:30	148	1.1/18	8024													
1008	121	20:33	20:35	149	1.1/18	7743													
1109	32	20:39	20:41	153	1.1/18	7572													
1024	138	20:45	20:46	145	1.1/18	7628													
1023	318	20:49	20:50	147	1.0/18	7564													
1022	138	20:53	20:54	149	1.0/18	7534													
1021	318	20:57	20:58	141	1.0/18	7531													
1020	138	21:01	21:02	146	1.0/18	7567													
1019	318	21:05	21:06	147	1.1/16	7608													
1018	138	21:09	21:10	147	1.1/16	7530													
1017	318	21:13	21:15	148	1.0/17	7531													
1016	138	21:17	21:19	149	1.0/17	7550													
1015	318	21:22	21:23	150	1.0/17	7550													
1014	138	21:26	21:28	150	1.1/17	7551													

Total Proj Lines: **142** Lines Flown: **172** Lines Remain: **18** Online Time: **3.5** Mob Time: **0.6** Notes:

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.

Generated by CamScanner

**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(email Log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: 4/13/16  
 Utc: A B C D E Pg. 3 of 3

Project: USGS Maine MESP  
 Flight Mgmt File: 20160413-175153

Aircraft: N812TB Begin Hobbs: 3909.3 End Hobbs: 3913.4 Total: 4.1 Pilot: Jicebson Co-Pilot: Tedi Dyrneson

Dep Apt: KLEW Dep Time (Ldt): 18:02 (Z): 18:02 Arr Apt: KLEW Arr Time (Local): 19:09 (Z): 22:09 Tot Time Aloft: 4.1

CORS: Y/N Sta 1: MESP Sta 2: Flyovers: Y/N If Y, times: Sta1 18:09 -Sta2 22:02

GPS Unit: Y/N Sta 1: LEW1 Sta 2: Flyovers: Y/N If Y, times: Sta1 18:09 -Sta2 22:02

Gd Temp beg: 6 °C End: 10 °C OAT beg: -7 °C End: -7 °C Altimeter begin: 30.33 end: 30.31

Max Gddpd 150 Avg Pt Spacing 150

Pulse Rate 260 Power 100

Start/End GB 17:58/18:01

Start/End GB 22:10/22:13

Tot GB 280

For GB 32

Storage Name 016

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POOP#-sats	GPS Altitude	Crab	Turb
1013	318	21:30	21:32	150	10/17	7572		
1012	138	21:34	21:36	152	12/15	7572		
1011	318	21:38	21:39	153	12/15	7572		
1010	138	21:42	21:43	151	14/14	7572		
1009	318	21:45	21:45	150	14/14	7721		
1110	50	21:49	21:52	150	13/14	7550		

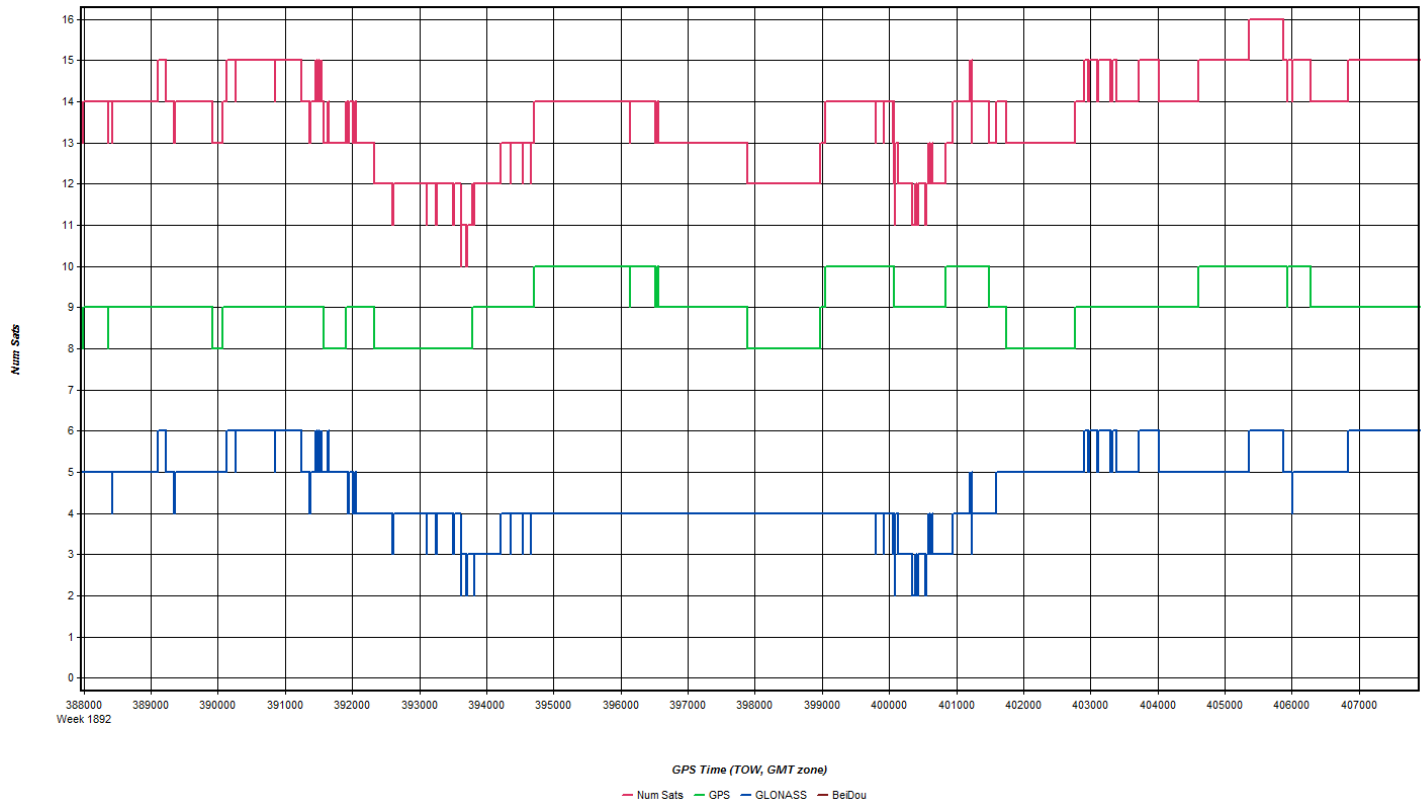
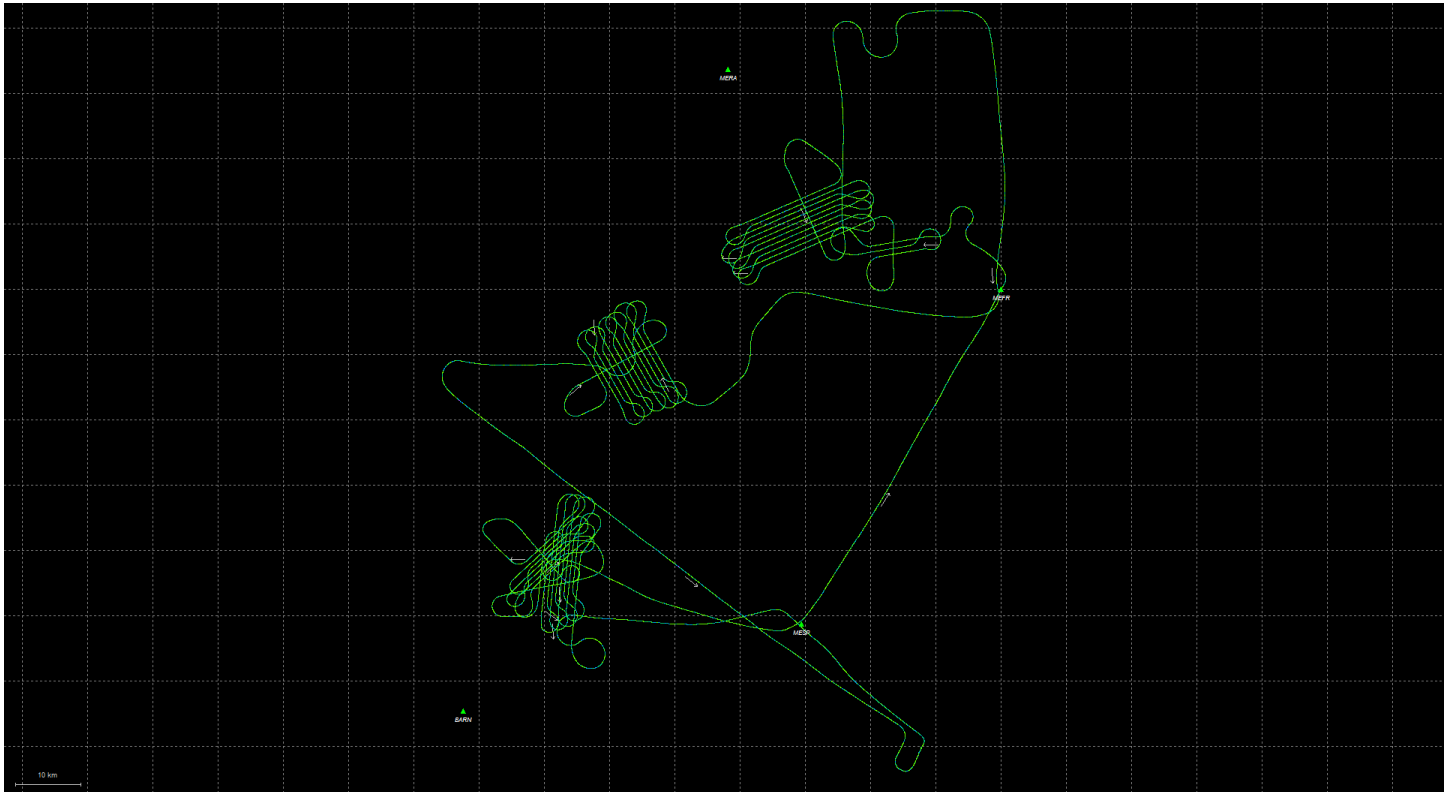
FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.

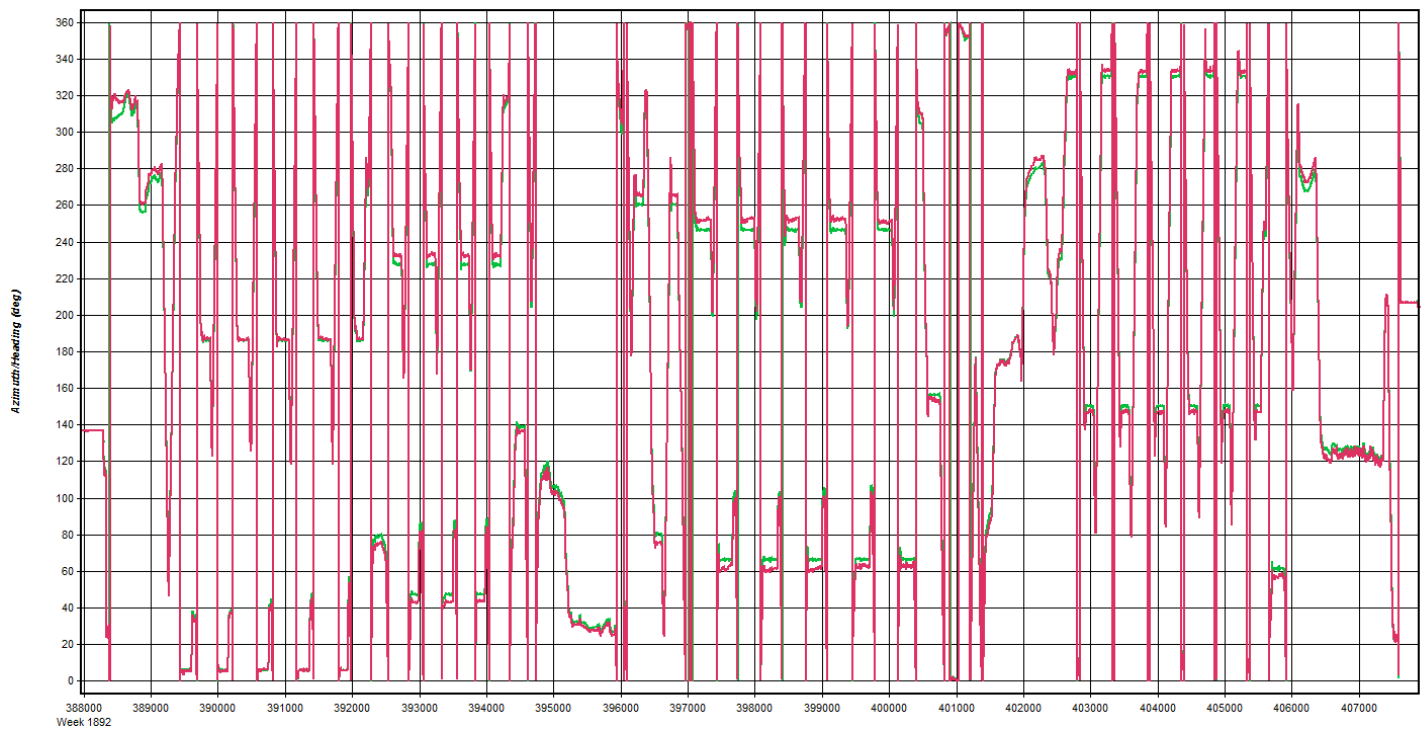
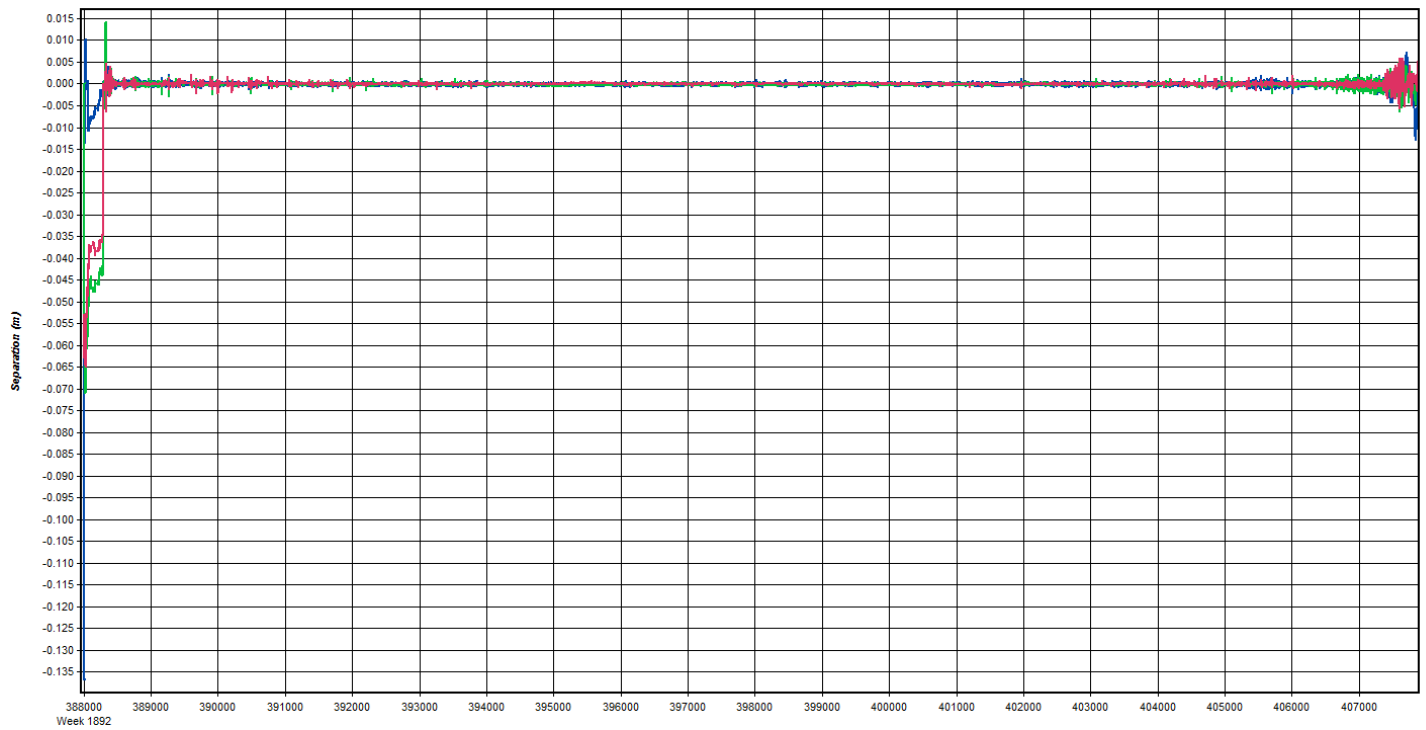
Total Proj Lines: 142 Lines Flown: 42 Lines Remain: 18 Online Time: 3.5 Mob Time: 0.6 Notes:

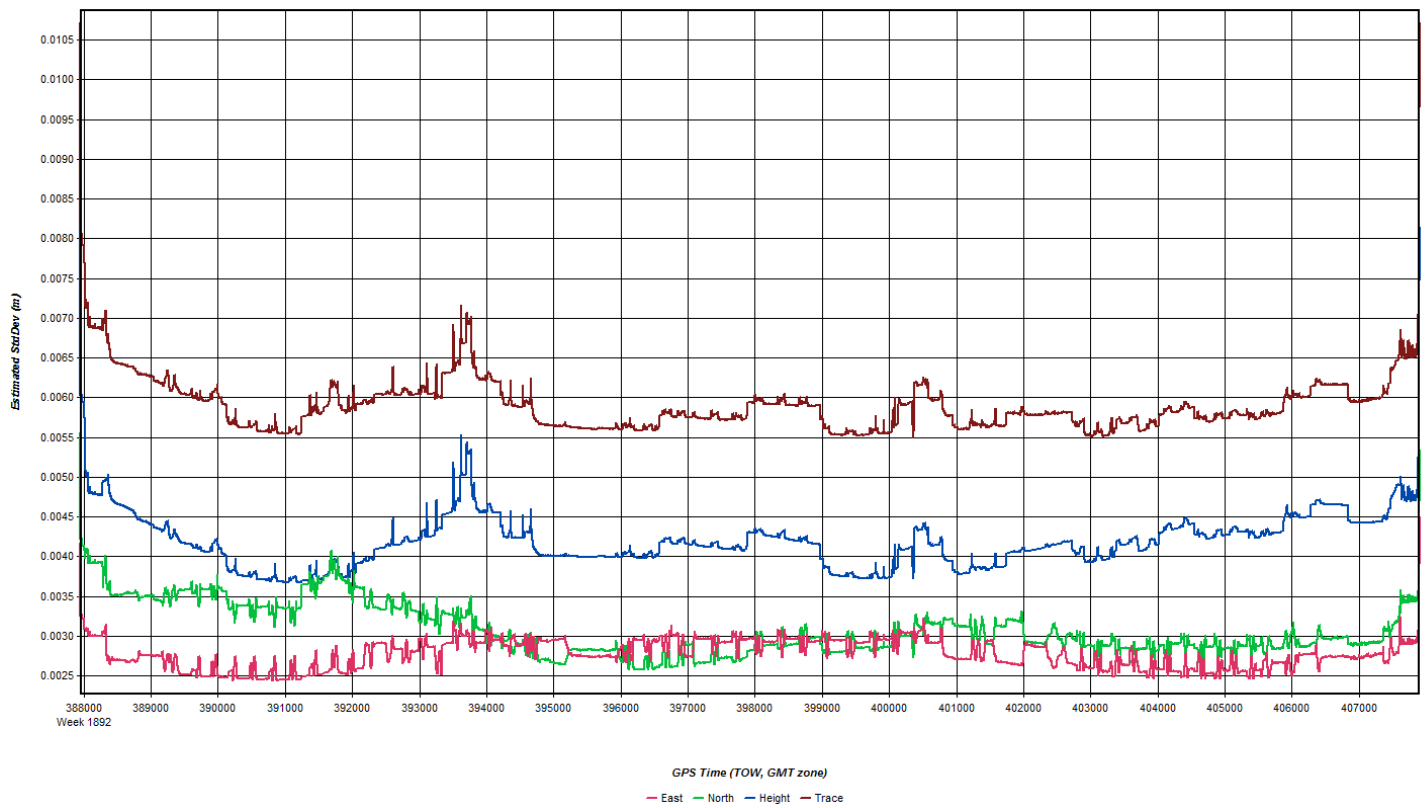
Generated by CamScanner

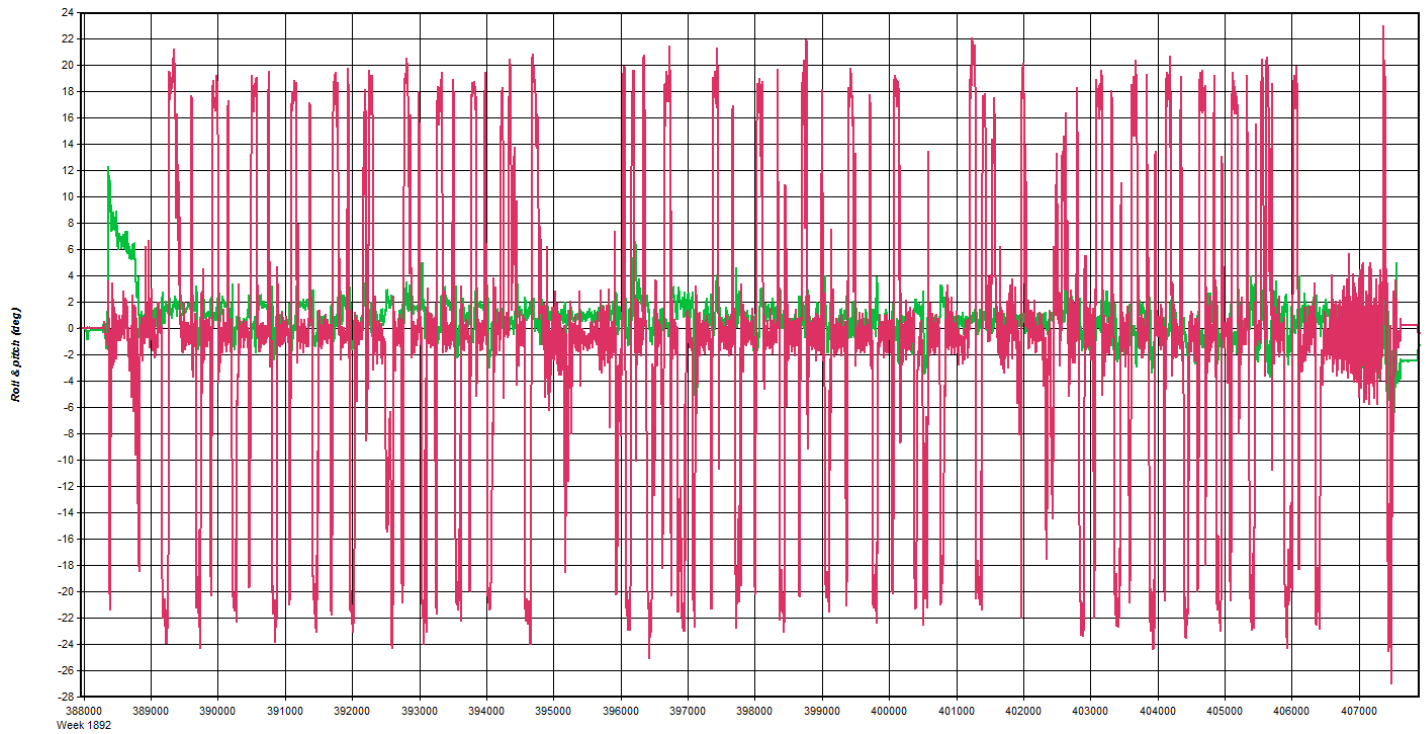


# 20160414-A (N812TB, SN7161)



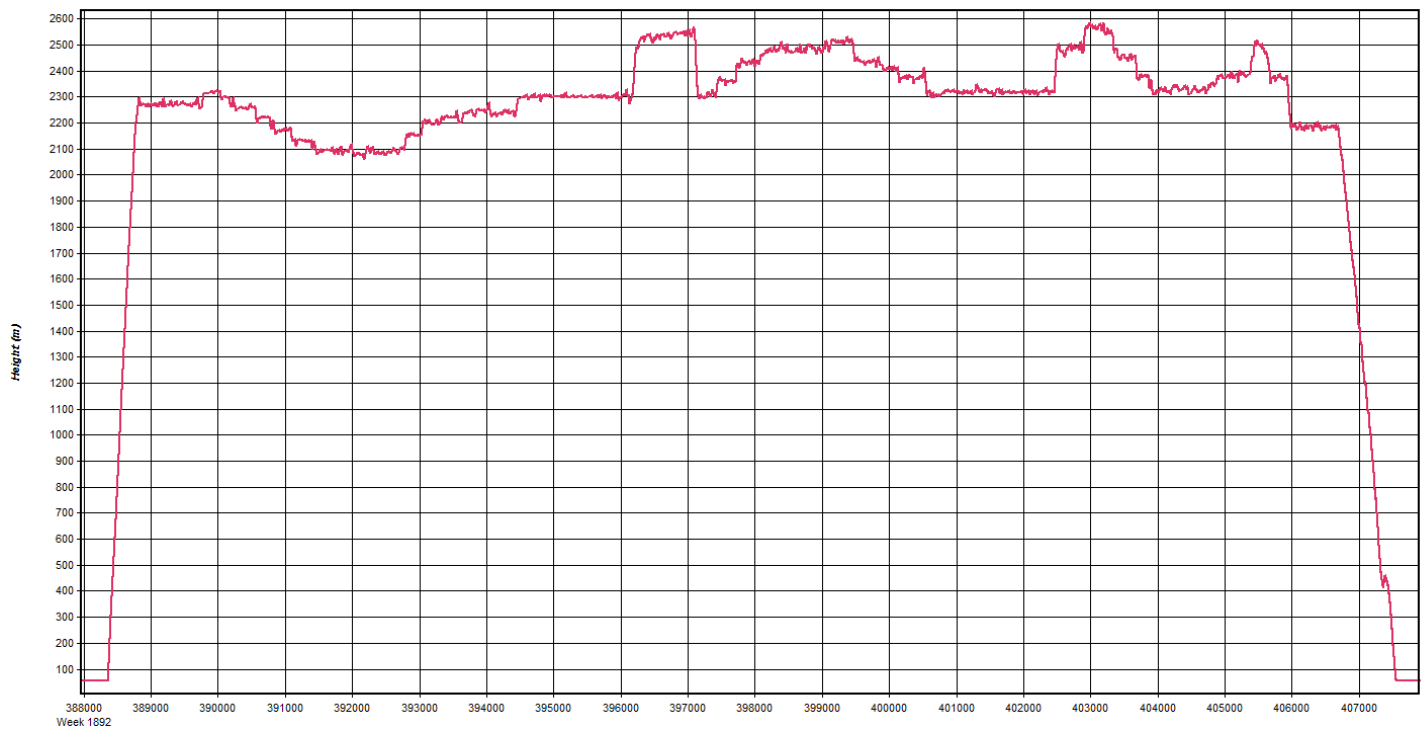






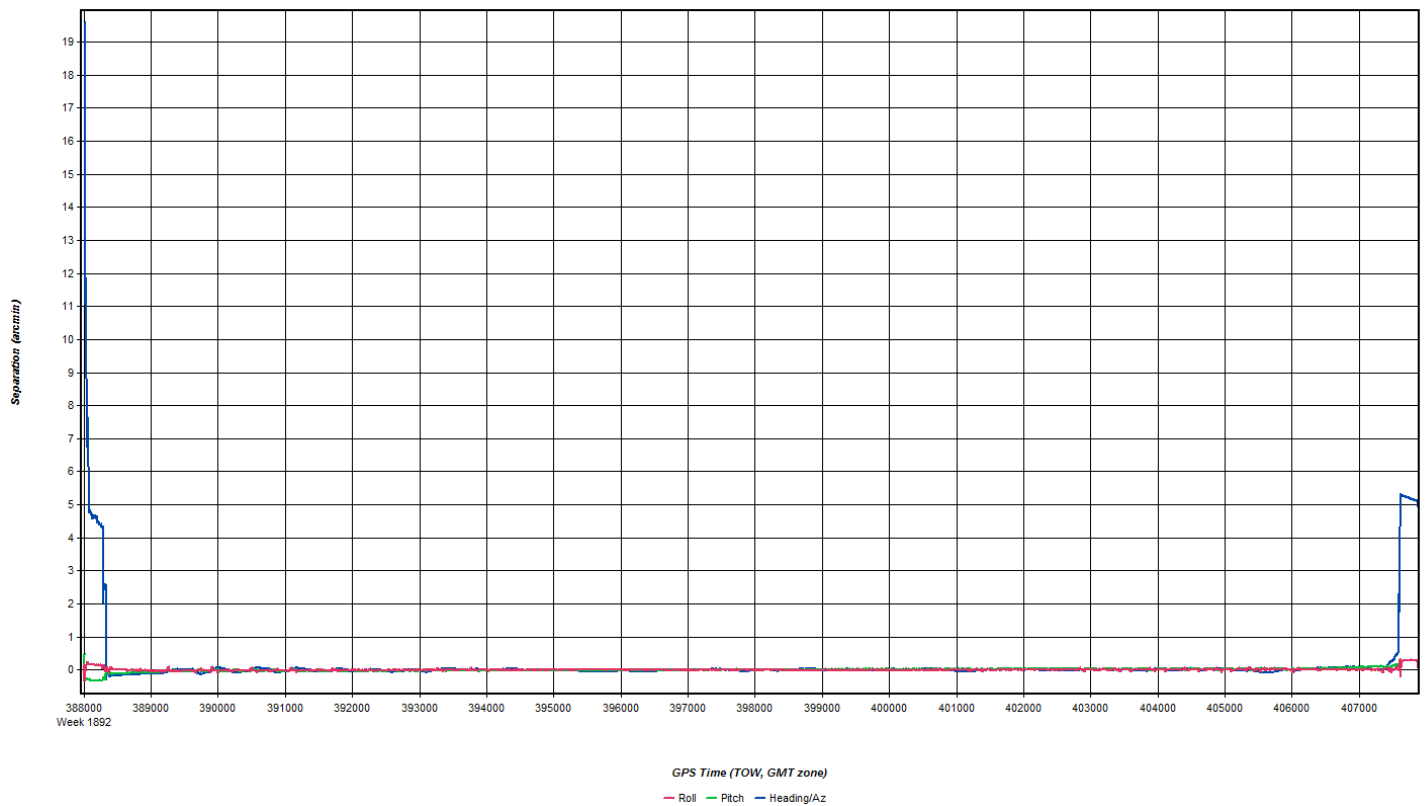
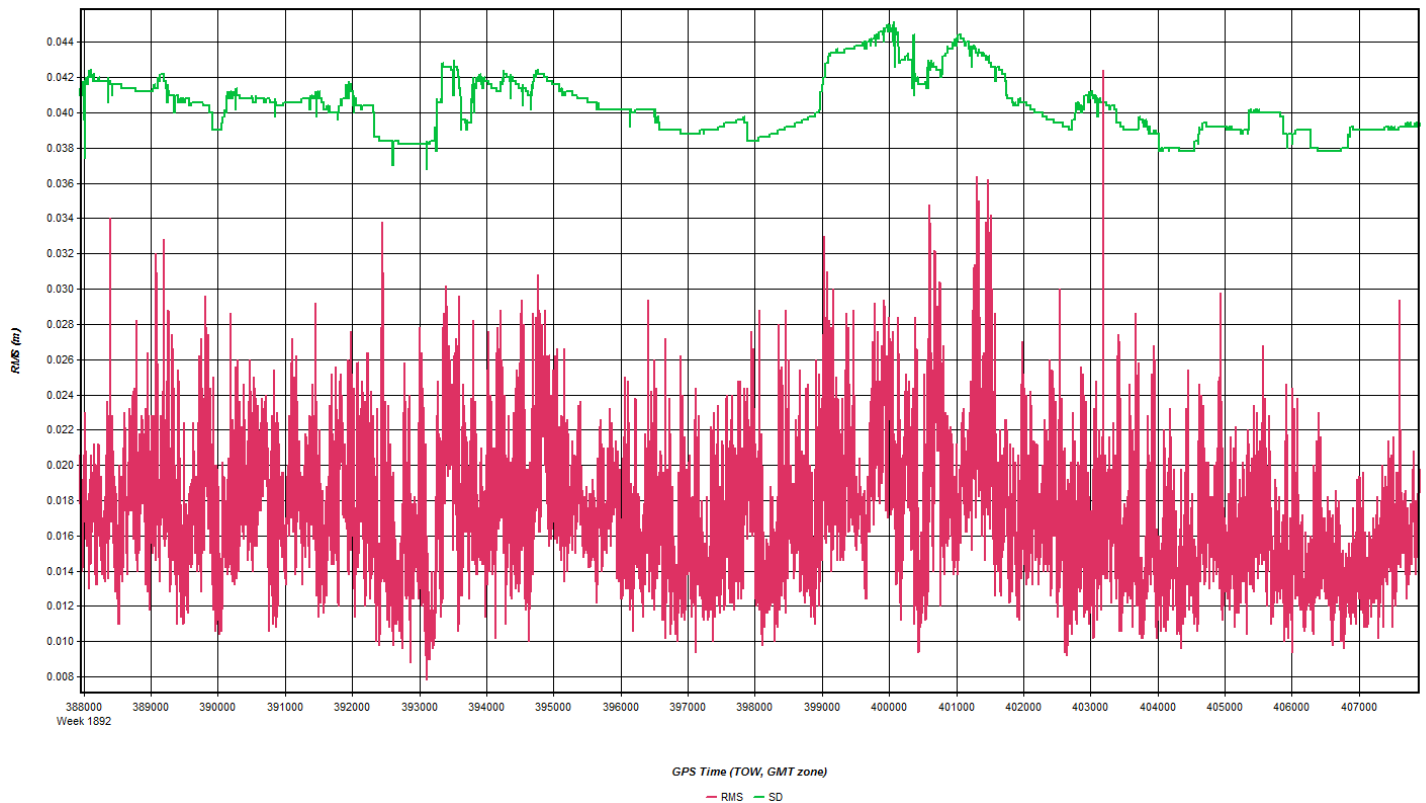
GPS Time (TOW, GMT zone)

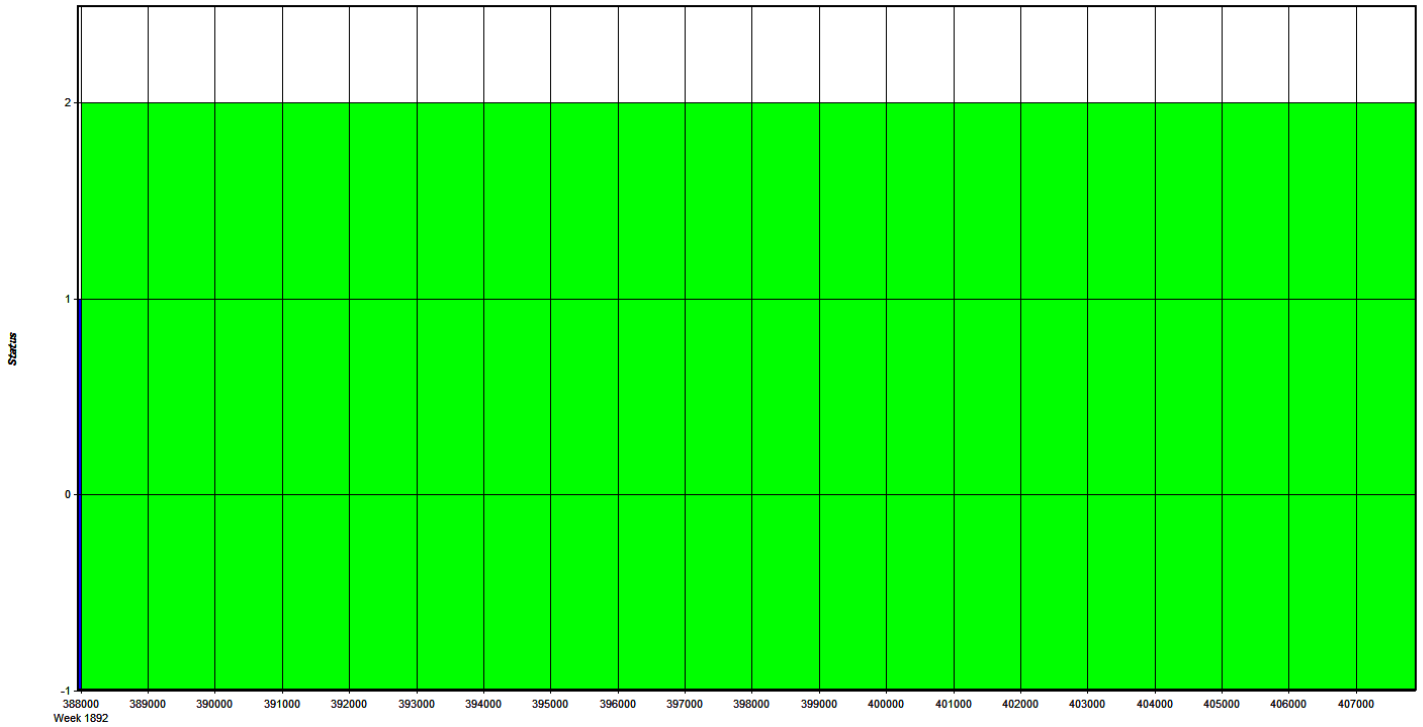
— Roll — Pitch



GPS Time (TOW, GMT zone)

— Height





GPS Time (TOW, GMT zone)  
 - Float - Forward Fixed - Reverse Fixed - Fixed (2 or more)

Coordinate/Antenna Settings

Master Remote

Base Station  
 2: BARN Name: BARN  Disabled  
 File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160414\_SN7161\_

Coordinates  
 Latitude: North 44 05 56.68362 Compute from PPP  
 Longitude: West 71 09 34.39925 Enter Grid Values  
 Ellipsoidal height: 140.793 m Enter MSL Height  
 Datum: WGS84 Datum Options  
 Select From Favorites Add To Favorites Use Average Position

Antenna Height  
 From station file: TRM57971.00, NONE View STA File  
 Antenna profile: TRM57971.00 Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.067 m  
 Applied height: 0.067 m  
 Measured to:  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

Coordinate/Antenna Settings
? X

Master
Remote

Base Station
1: MEFR
Name: MEFR
 Disabled

File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160414\_SN7161\_/\_

Coordinates
Compute from PPP

Latitude: North
44
40
28.97450
Enter Grid Values

Longitude: West
70
07
54.54215
Enter MSL Height

Ellipsoidal height:
131.643
m
Datum Options

Datum:
WGS84
Select From Favorites
Add To Favorites
Use Average Position

Antenna Height
View STA File

From station file:
TRM57971.00, NONE
Info

Antenna profile:
TRM57971.00

Measured height:
0.000
m

Measured to  
 ARP  
 L1 Phase Centre  
Compute From Slant

ARP to L1 offset:
0.067
m

Applied height:
0.067
m

OK
Cancel

Coordinate/Antenna Settings
? X

Master
Remote

Base Station
3: MERA
Name: MERA
 Disabled

File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160414\_SN7161\_/\_

Coordinates
Compute from PPP

Latitude: North
44
58
25.33352
Enter Grid Values

Longitude: West
70
39
10.58376
Enter MSL Height

Ellipsoidal height:
489.568
m
Datum Options

Datum:
WGS84
Select From Favorites
Add To Favorites
Use Average Position

Antenna Height
View STA File

From station file:
TRM55971.00, NONE
Info

Antenna profile:
TRM55971.00

Measured height:
0.000
m

Measured to  
 ARP  
 L1 Phase Centre  
Compute From Slant

ARP to L1 offset:
0.067
m

Applied height:
0.067
m

OK
Cancel



Coordinate/Antenna Settings ? X

Master Remote

Base Station  
 4: MESP Name: MESP  Disabled  
 File: E:\Proc\27146\_ME\_2016\_BAA\_GPSC\ASH7\160414\_SN7161\_/\_f

Coordinates  
 Latitude: North 44 13 06.19617 Compute from PPP  
 Longitude: West 70 30 47.10740 Enter Grid Values  
 Ellipsoidal height: 105.463 m Enter MSL Height  
 Datum: WGS84 Datum Options  
 Select From Favorites Add To Favorites Use Average Position

Antenna Height  
 From station file: TRM55971.00, NONE View STA File  
 Antenna profile: TRM55971.00 Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.067 m  
 Applied height: 0.067 m  
 Measured to:  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

# Flight Log

**Quantum Spatial**  
**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(Email log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: 4-14-16  
 Lift: (A) B C D E Pg 1 of 3

Project: USGS Maire MESP  
 Proj #: 21146  
 Flight Mgmt File: 20160414-114211

Aircraft: N812TB  
 Begin Hobbs: 3913.4  
 End Hobbs: 3918.7  
 Total: 5.3  
 Pilot: Jacobson  
 Co-Pilot: Dyreson

Dep Apt: KLEW  
 Dep Time (Local): 01:52 (Z): 11:52  
 Arr Apt: KLEW  
 Arr Time (Local): 13:12 (Z): 17:12  
 Tot Time Aloft: 5.3

CORS: (Y) N Sta 1: MESP  
 Sta 2:  
 GPS Unit: (Y) N Sta 1: LEW1  
 Sta 2:  
 Flyovers: (Y) N IF Y, times: Sta 1: 13.4, 13.44 (Sta 2)  
 Flyovers: (Y) N IF Y, times: Sta 1: 8.12, 8.16, 13.36 (Sta 2)

Gd Temp beg: 3 °C End: 10 °C OAT beg: -6 °C End: -7 °C  
 Altimeter begin: 30.43 end: 30.38

Type	Serial #	Alt AGL	Alt AMSL	Avg Terr Ht	Max Glpd	Avg Ft Spacing	Power	Pulse Rate	PPSM	Start	End	Storage Name
LIDAR	ALS70	1161	7400ft	150	150	100	289	100	100	11:46	17:19	28376
FOV	34	57	MPIA (Y) N							17:13	17:16	305
												29

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PPSM/Scan	GPS Altitude	Crsb	Turb (0..3)	Notes
1540	006	12:12	12:13	150	1.1/18	7487			
1539	186	12:16	12:17	141	1.1/18	7611			
1538	006	12:20	12:22	148	1.1/18	7524			
1537	186	12:25	12:27	148	1.2/17	7421			
1536	006	12:30	12:32	145	1.2/17	7280			
1535	186	12:35	12:37	152	1.2/16	7154			
1534	006	12:40	12:42	143	1.1/17	6931			
1533	186	12:45	12:47	151	1.1/16	6863			
1532	006	12:50	12:51	145	1.0/17	6850			
1531	186	12:54	12:55	148	1.0/17	6850			
1530	79	12:59	13:01	147	1.0/17	6850			
1547	227	13:04	13:05	149	1.0/17	6962			Cross the for lines 1540-1531
1546	47	13:08	13:09	147	1.0/17	7034			
1545	227	13:12	13:13	149	1.0/17	7197			
1544	47	13:16	13:17	146	1.1/16	7388			
1543	227	13:20	13:21	147	1.1/17	7371			
1542	47	13:24	13:25	147	1.1/18	7386			
1541	227	13:28	13:29	149	1.0/18	7587			
1540	134	13:34	13:35	144	1.1/18	7545			

Total Proj Lines: 142  
 Lines Flow: 8  
 Lines Remain: 8  
 Online Time: 1.4  
 Mob Time: 0.3  
 Notes: Continued on next page

Generated by CamScanner

**Quantum Spatial**  
Airborne LiDAR Data Collection Log Sheet :: Quantum Spatial, Inc  
(email log daily to flight\_log\_distribution\_list@quantumspatial.com)

Date: 4-14-16  
Lit: (A) B C D E Pg 2 of 3

Project: USGS Maine MEFF Proj #: 27146 Flight Mgmt File: 20160414\_114211

Aircraft: N812TB Begin Hobbs: 3913.4 End Hobbs: 3918.7 Total: 5.3 Pilot: Jacobsen Co-Pilot: Dyrnesen  
Dep Apt: KLEW Dep Time (Local): 07:52 Arr Apt: KLEW Arr Time (Local): 13:12 (Z): 17:12 Tot Time Aloft: 5.3

CORS: (Y) N Sta 1: MEFR Flyovers: (Y) N IF Y, times: Sta1) Sta2) 13:58, 15:34  
GPS Unit: (N) Sta 1: OAT beg: -6 °C End: -7 °C Altimeter begin: 30:43 end: 30:38  
Gd Temp beg: 3 °C End: 10 °C OAT beg: -6 °C End: -7 °C

Type	FOV	Serial #	Scan Freq	Alt AGL	Alt AMSL	Max Gdspd	Avg Pt Spacing	Pulse Rate	Power	Storage Name
LIDAR	40	7161	53	MPIA (Y) N	1800ft	150	100	261	100	016

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	GPS Altitude	Crab	Turb (0-1)	Notes
3069	260	14:04	14:05	147	1.2/16	8287		
3070	80	14:09	14:09	148	1.2/16	8333		
3071	260	14:12	14:13	149	1.3/15	8303		
3068	246	14:19	14:22	152	1.2/15	8324		
3067	66	14:24	14:27	146	1.4/14	7720		
3066	246	14:30	14:33	151	1.3/14	7420		
3065	66	14:35	14:38	141	1.2/15	8146		
3064	246	14:41	14:43	153	1.0/17	8182		
3063	66	14:46	14:49	151	1.1/16	8182		
3062	246	14:52	14:55	149	1.1/16	8241		
3061	66	14:58	15:01	152	1.1/16	8035		
3060	246	15:04	15:07	150	0.9/18	7874		
3059	66	15:09	15:12	149	0.9/18	7745		
3144	156	15:16	15:18	152	0.9/19	7526		
		15:25	15:45					

FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.

Cross the for lines 3069-3071

too much snow?

still a little snow in lines 3061-3059 / 3144?

snow recon on MEFF black → moving to Berth black

Total Proj Lines: 145 Lines Flown: 14 Lines Remain: 13 Online Time: 1.2 Mob Time: 1.0 Notes:

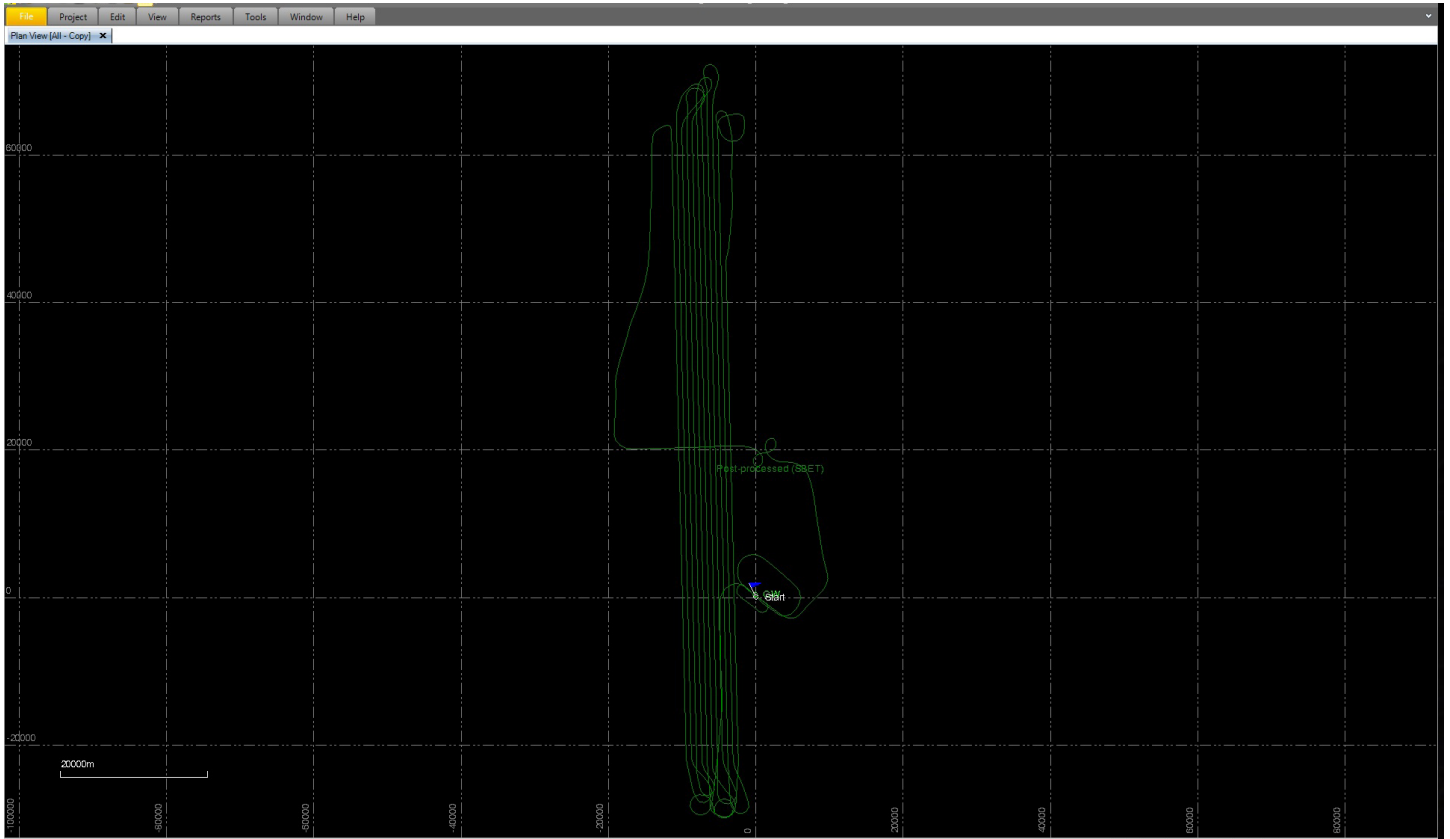
Continued on next page

0.5  
6.5

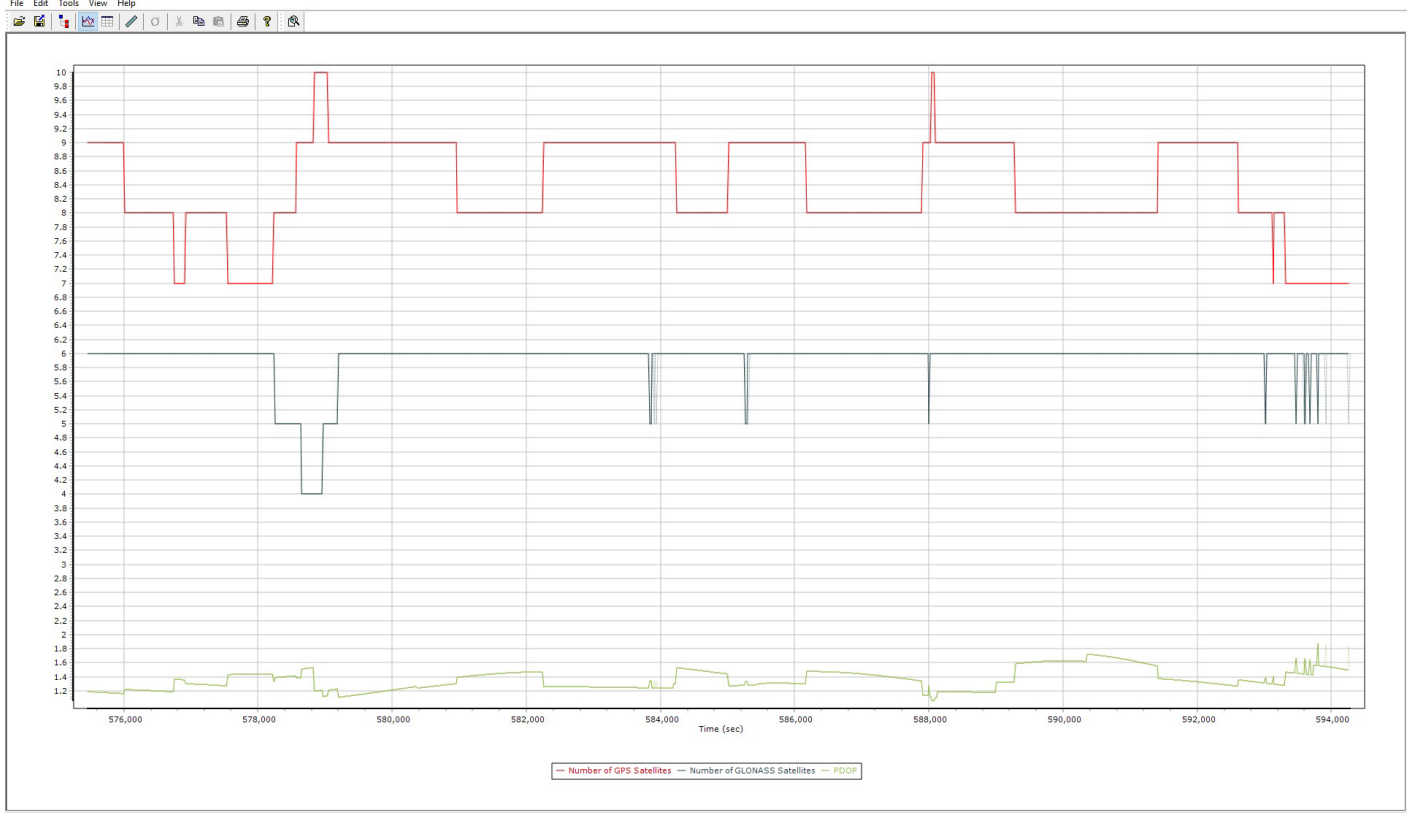
Generated by CamScanner



# 20161112-A (N69WA, SN354)



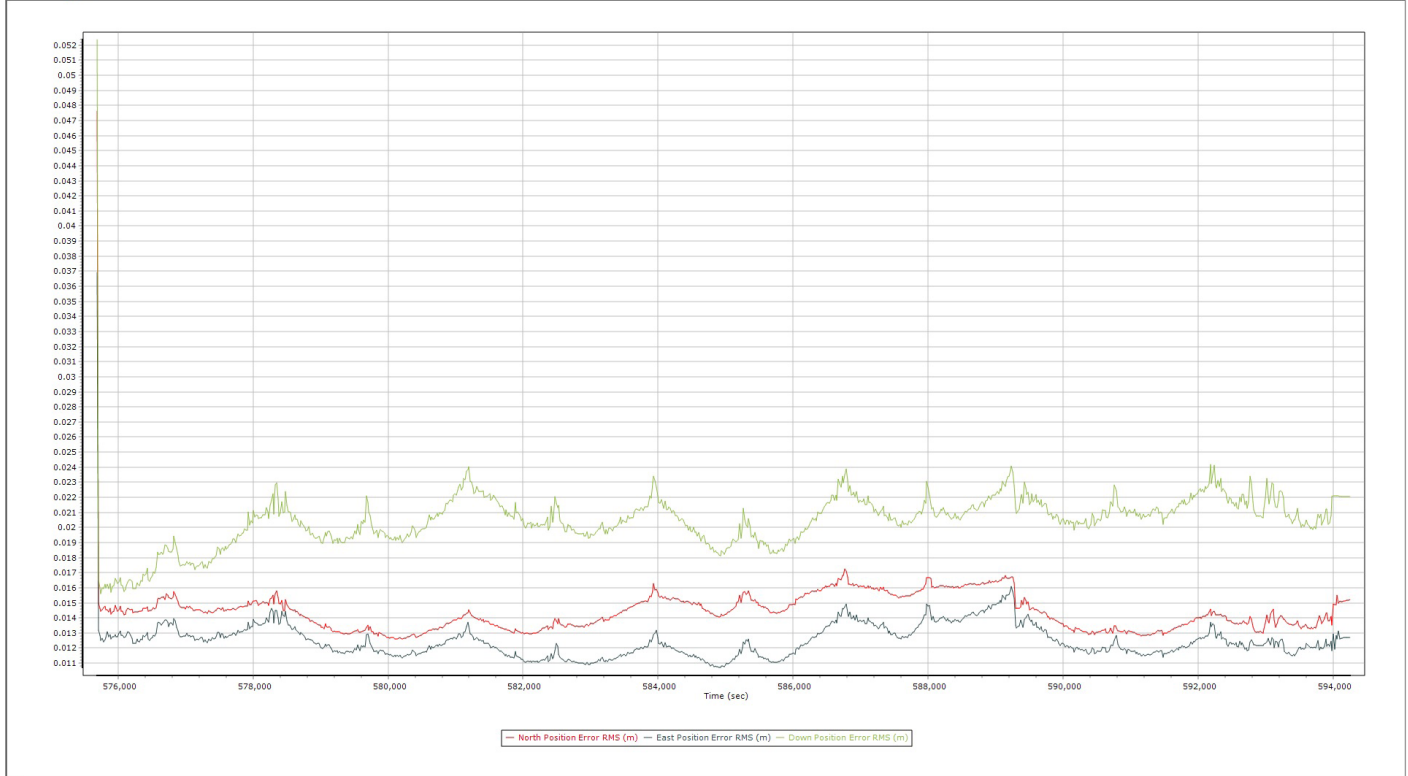
Display - GW\_11-12-16A\_354GXY\_N69WA - Smoothed Performance Metrics, Reference Frame



Ready

Display - GW\_11-12-16A\_354GXY\_N69WA - Smoothed Performance Metrics, Reference Frame

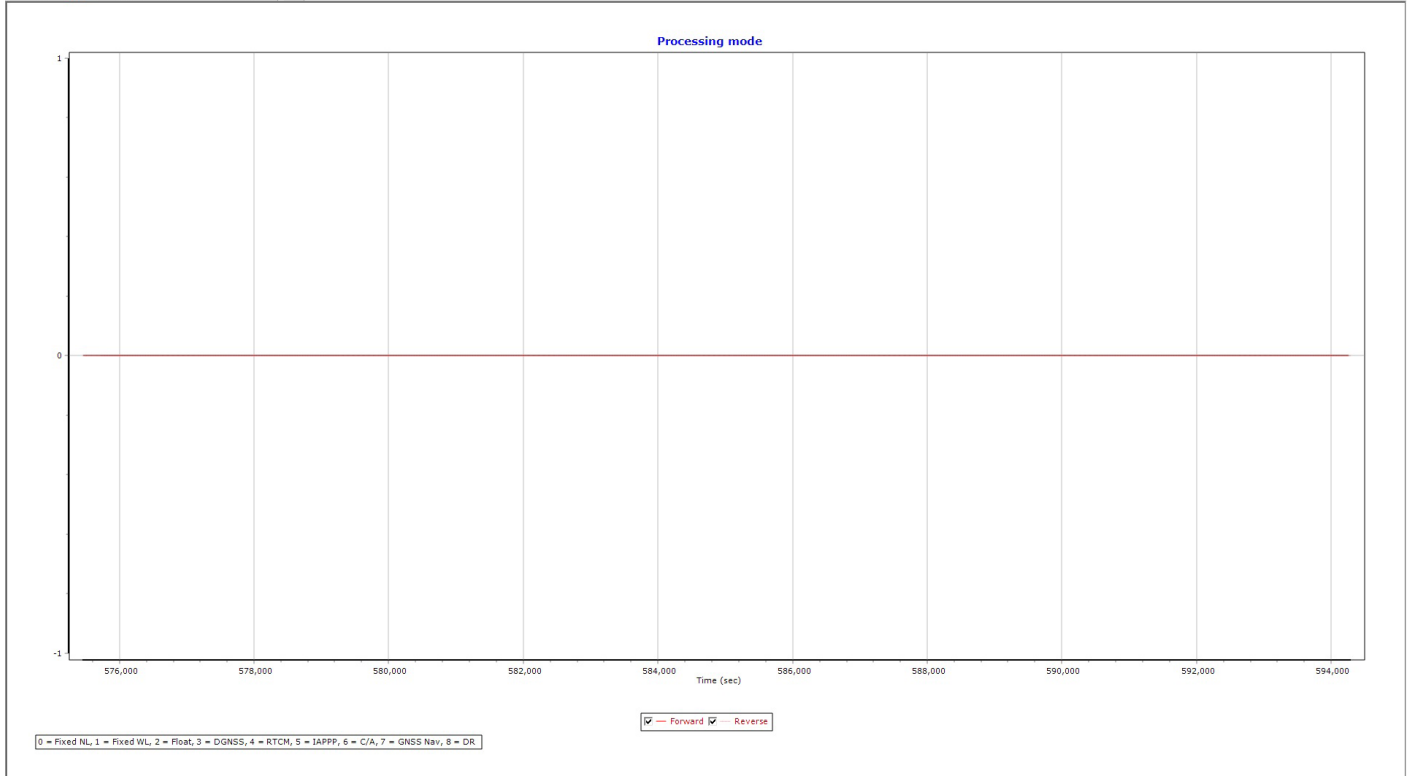
File Edit Tools View Help



Ready

Display - GW\_11-12-16A\_354GXY\_N69WA - Smoothed Performance Metrics, Reference Frame

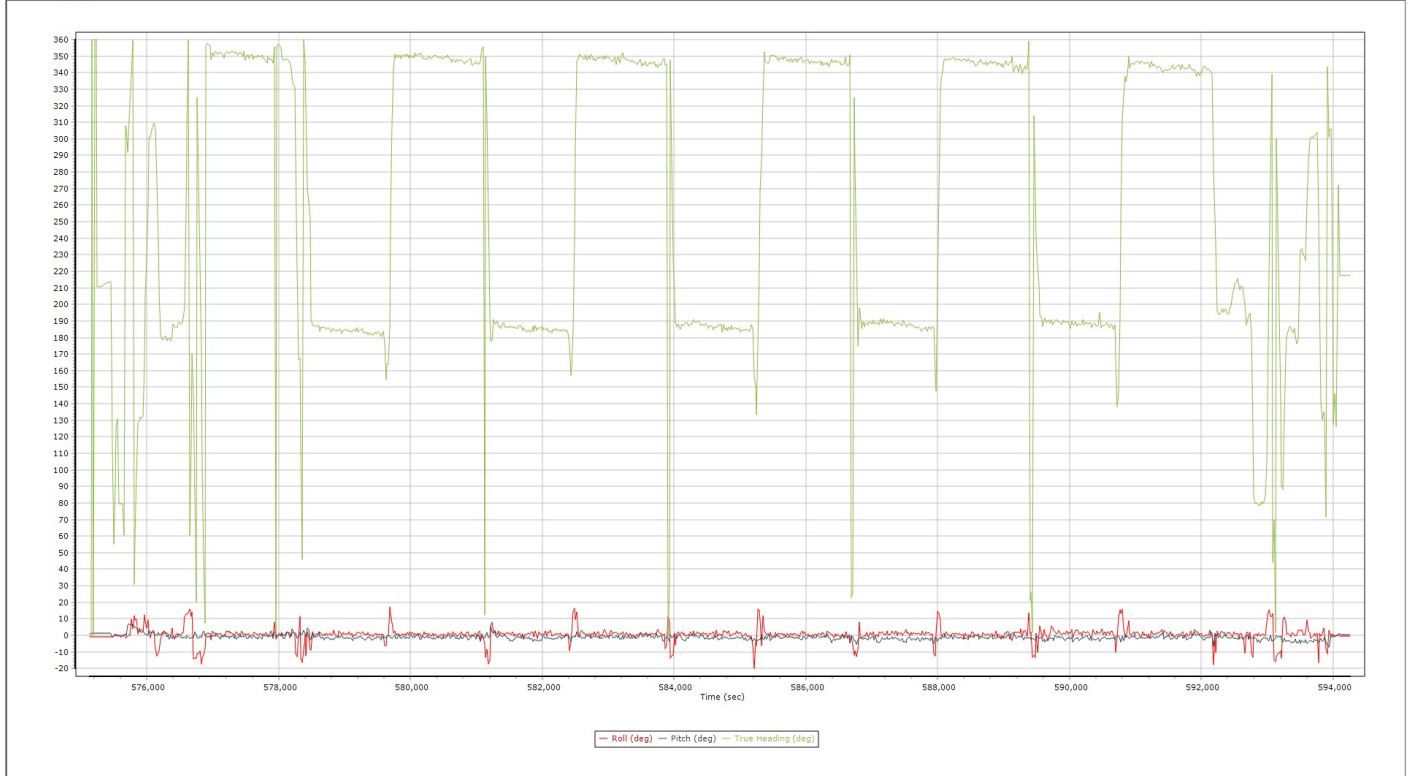
File Edit Tools View Help



Ready

Display - GW\_11-12-16A\_354GXY\_N69WA - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready





# Base Station Log

Coordinate Manager
— □ ×

**Station Information**

Station ID: GW

Coordinates

Latitude: N 43 59 30.27896000

Longitude: W 70 56 57.48408000

Altitude: 107.4610 m

Decimal Degrees

Antenna Frame

Height: 2.000 m

Method: Bottom of antenna mount

Manufacturer: NovAtel

Type: 702GG

Offset from Measured Point to APC: 0.086 m

Ground Reference Point (GRP) coordinates Apply Changes

---

**Station Database**

Station ID: GW

Primary Service ID:  Edit

Secondary Service IDs:  Edit

Station Fullname: GW

Coordinate Accuracy: UNKNOWN\_ACC

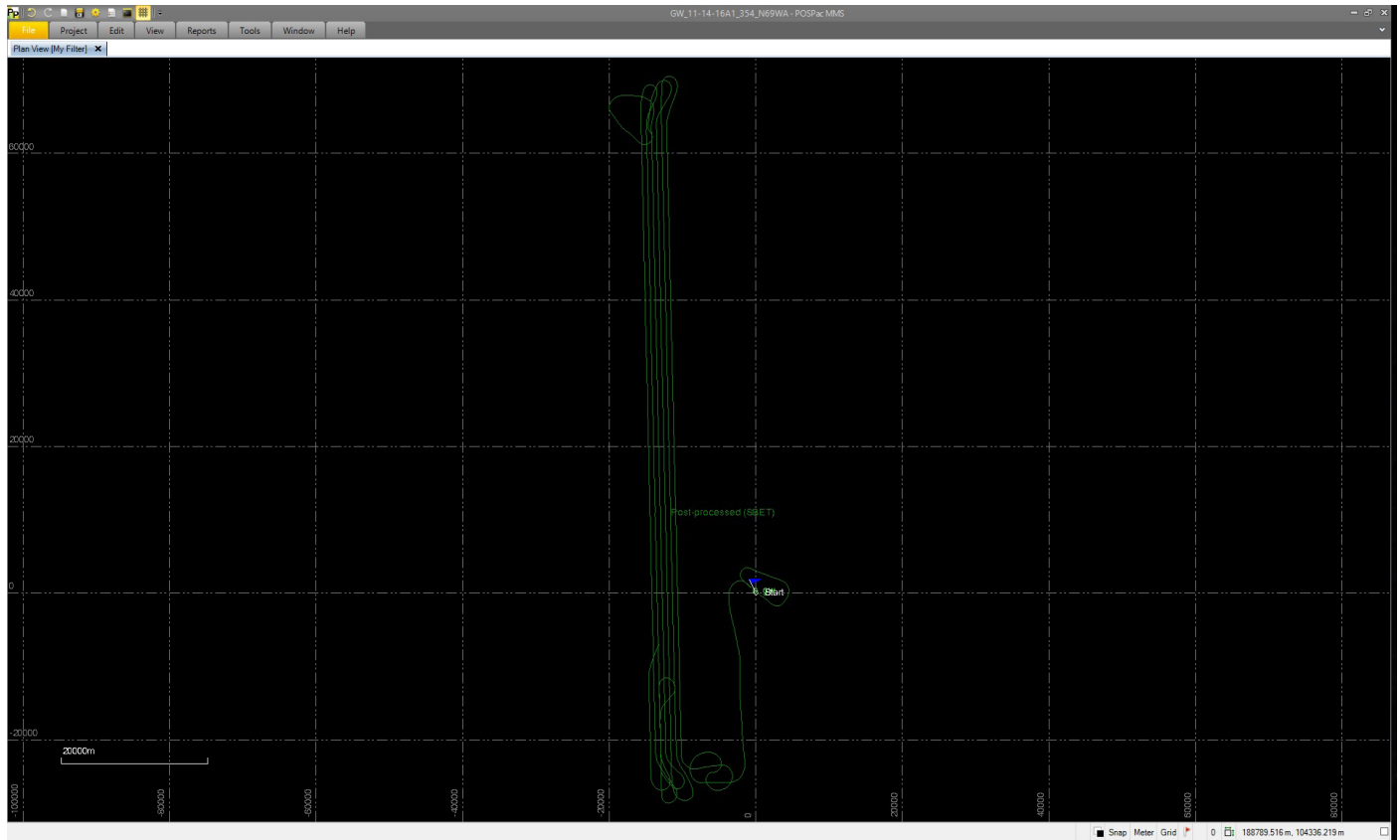
Add Delete Update

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

Import Coordinates Export Coordinates

Close

# 20161114-A1 (N69WA, SN354)



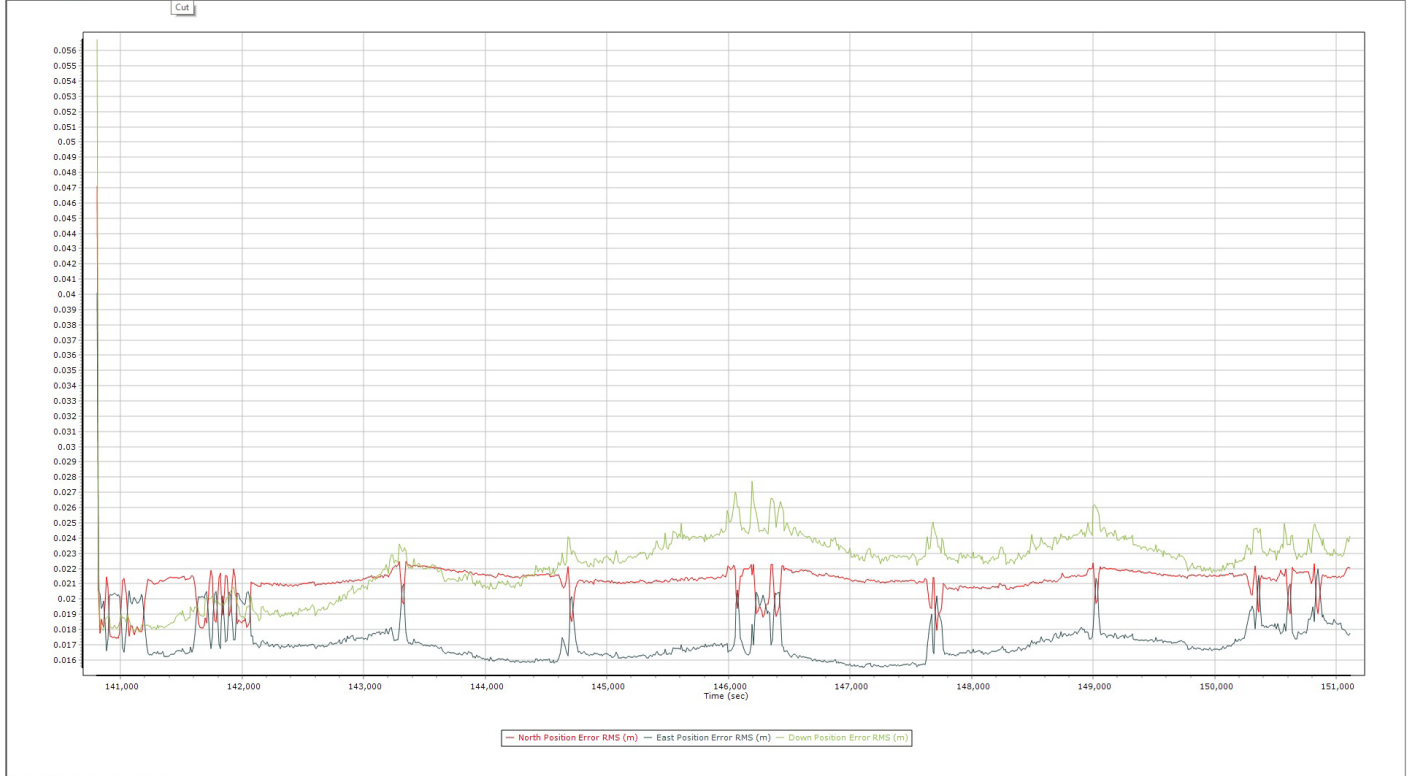
Display - GW\_11-14-16A1\_354\_N69WA - Smoothed Performance Metrics, Reference Frame



Cut the selection and put it on the Clipboard

Display - GW\_11-14-16A1\_354\_N69WA - Smoothed Performance Metrics, Reference Frame

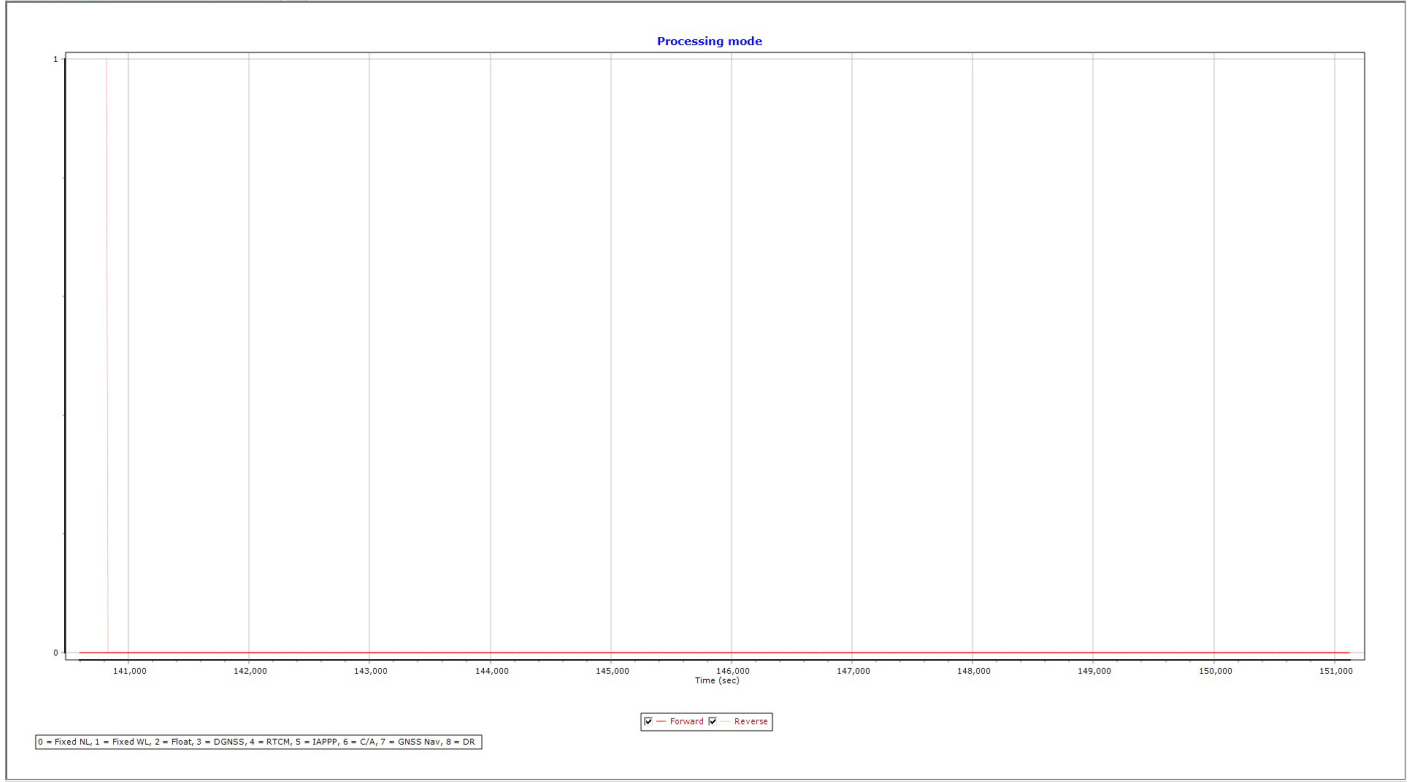
File Edit Tools View Help



Cut the selection and put it on the Clipboard

Display - GW\_11-14-16A1\_354\_N69WA - Smoothed Performance Metrics, Reference Frame

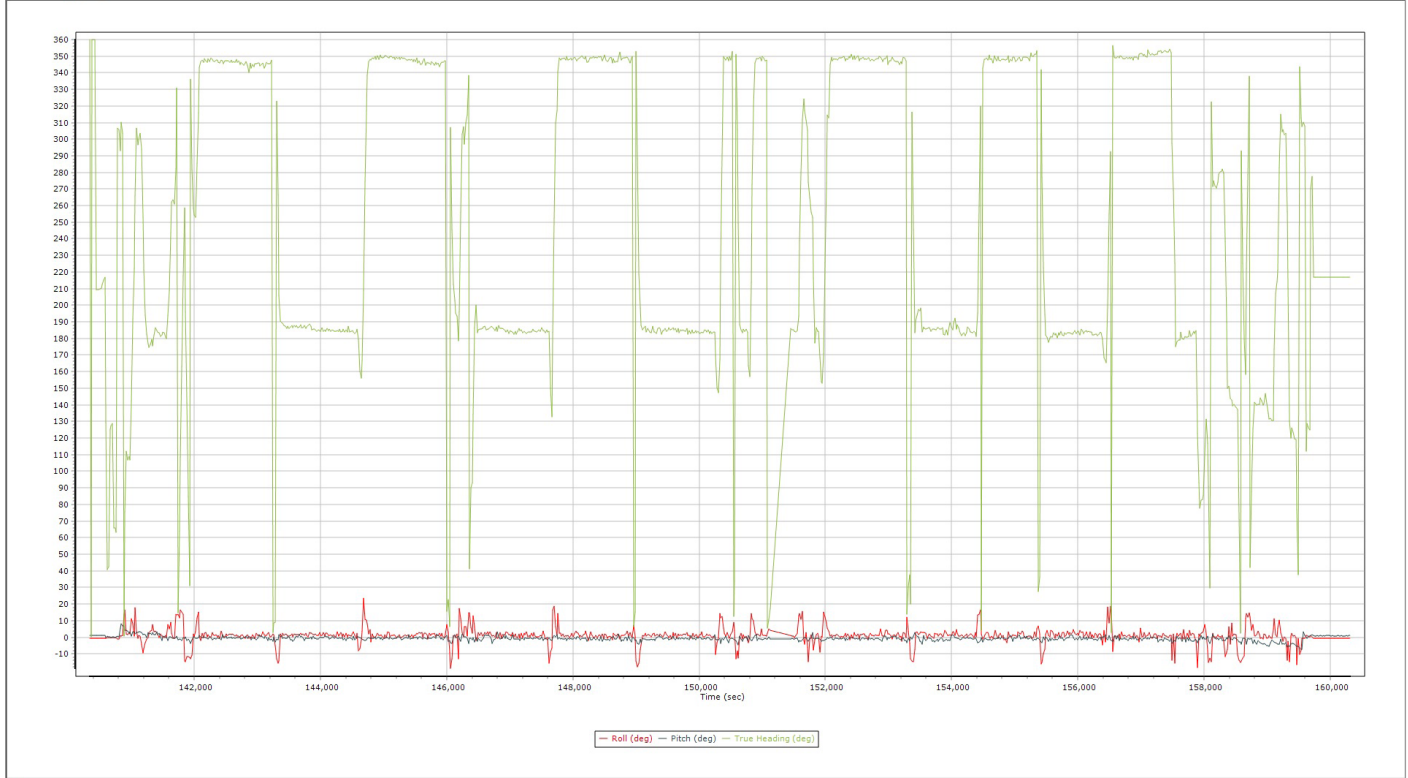
File Edit Tools View Help



Ready

Display - GW\_11-14-16A1\_354\_N69WA - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

# Base Station Log

Coordinate Manager
— □ ×

**Station Information**

Station ID: gw

**Coordinates**

Latitude: N 43 59 30.27905000

Longitude: W 70 56 57.48363000

Altitude: 107.4690 m

Decimal Degrees

**Antenna** **Frame**

Height: 2.000 m

Method: Antenna Phase Center

Manufacturer: NovAtel

Type: 701-GG 1.03

Offset from Measured Point to APC: 0.000 m

---

**Station Database**

Station ID: gw

Primary Service ID:

Secondary Service IDs:

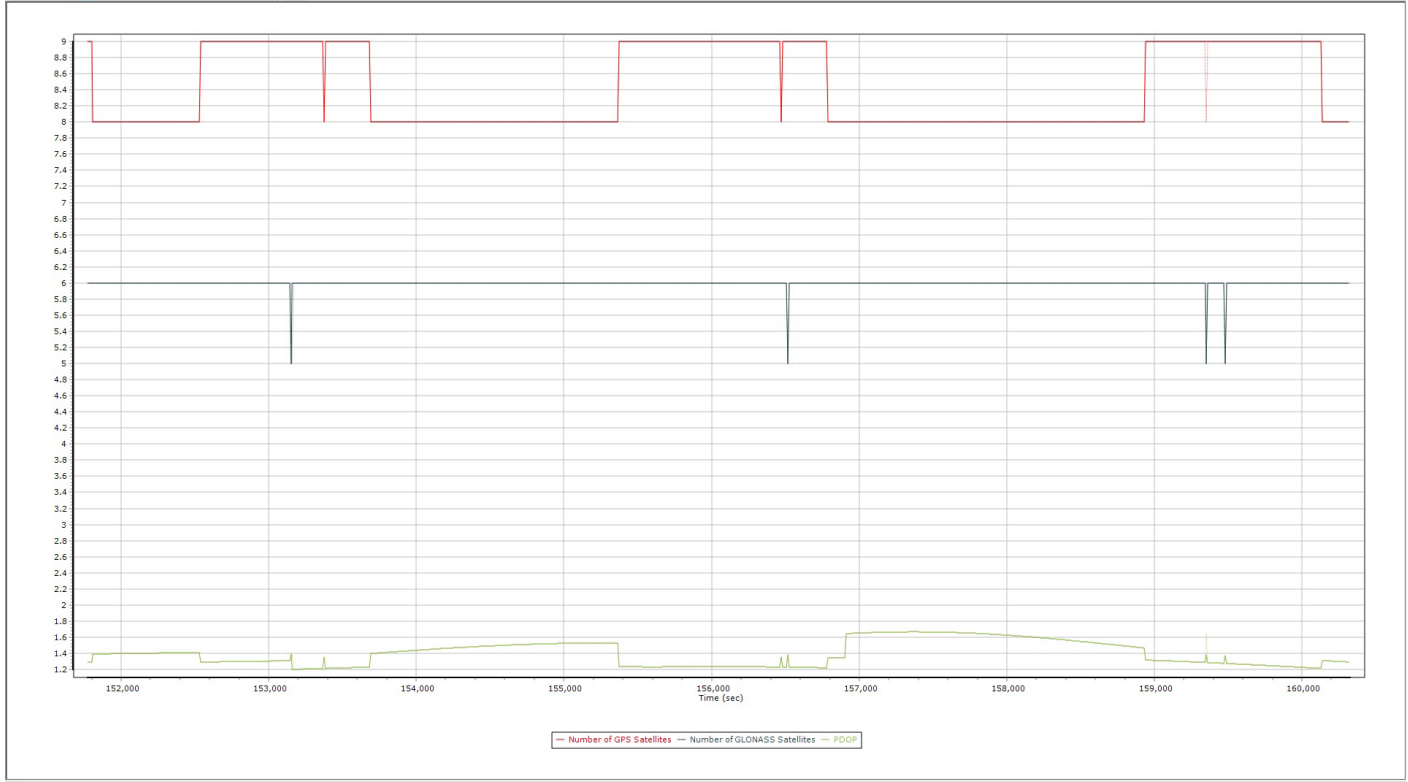
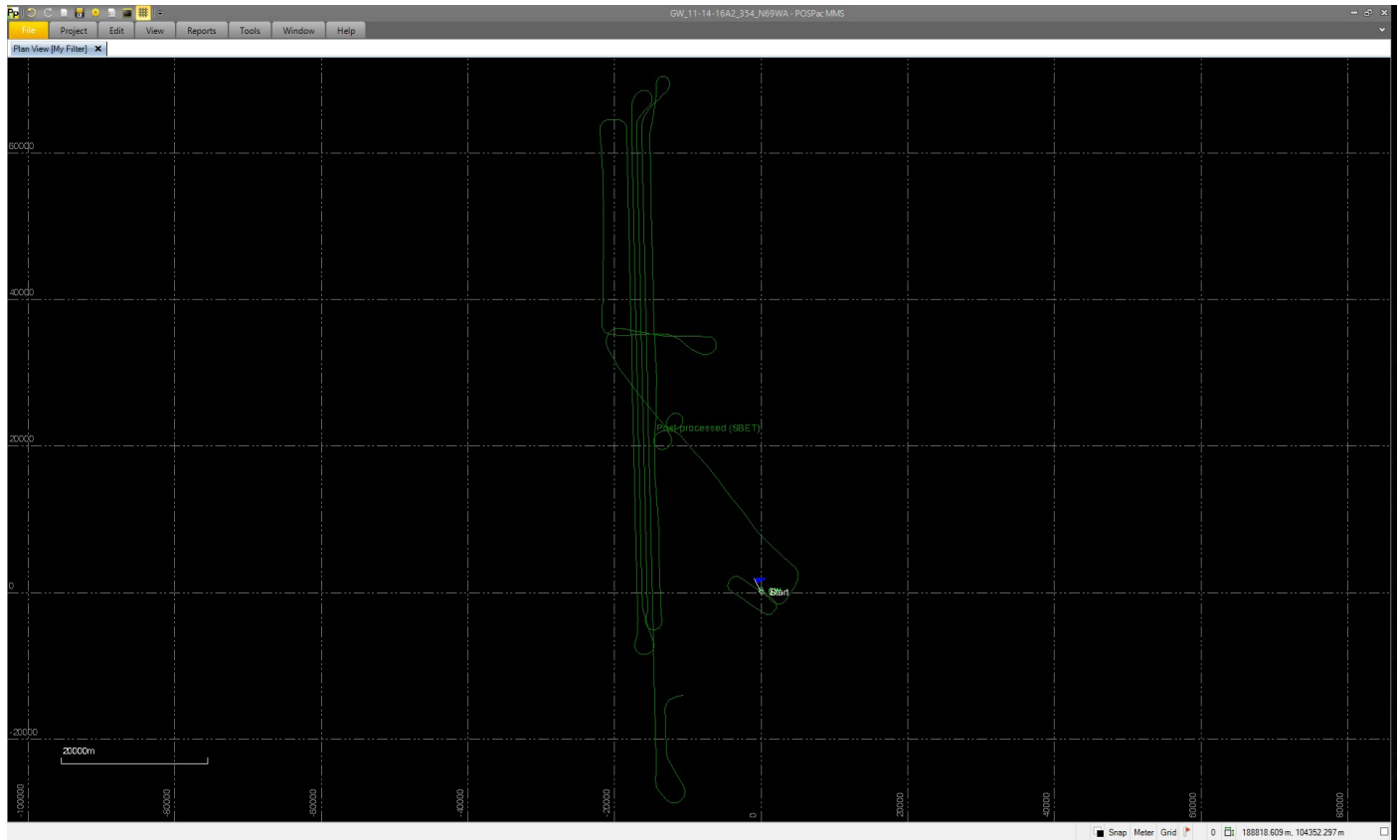
Station Fullname: gw

Coordinate Accuracy: UNKNOWN\_ACC

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

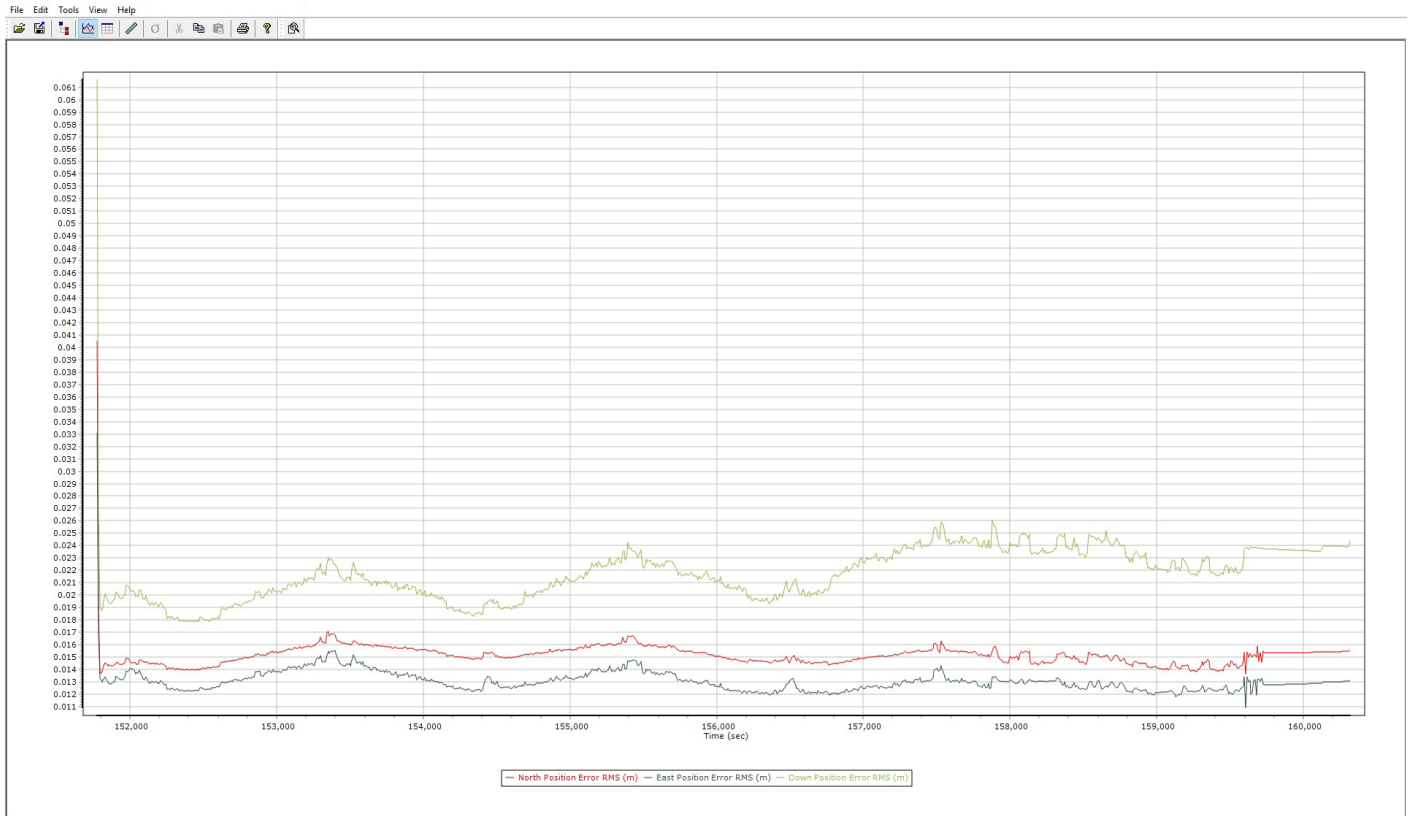
# 20161114-A2 (N69WA, SN354)



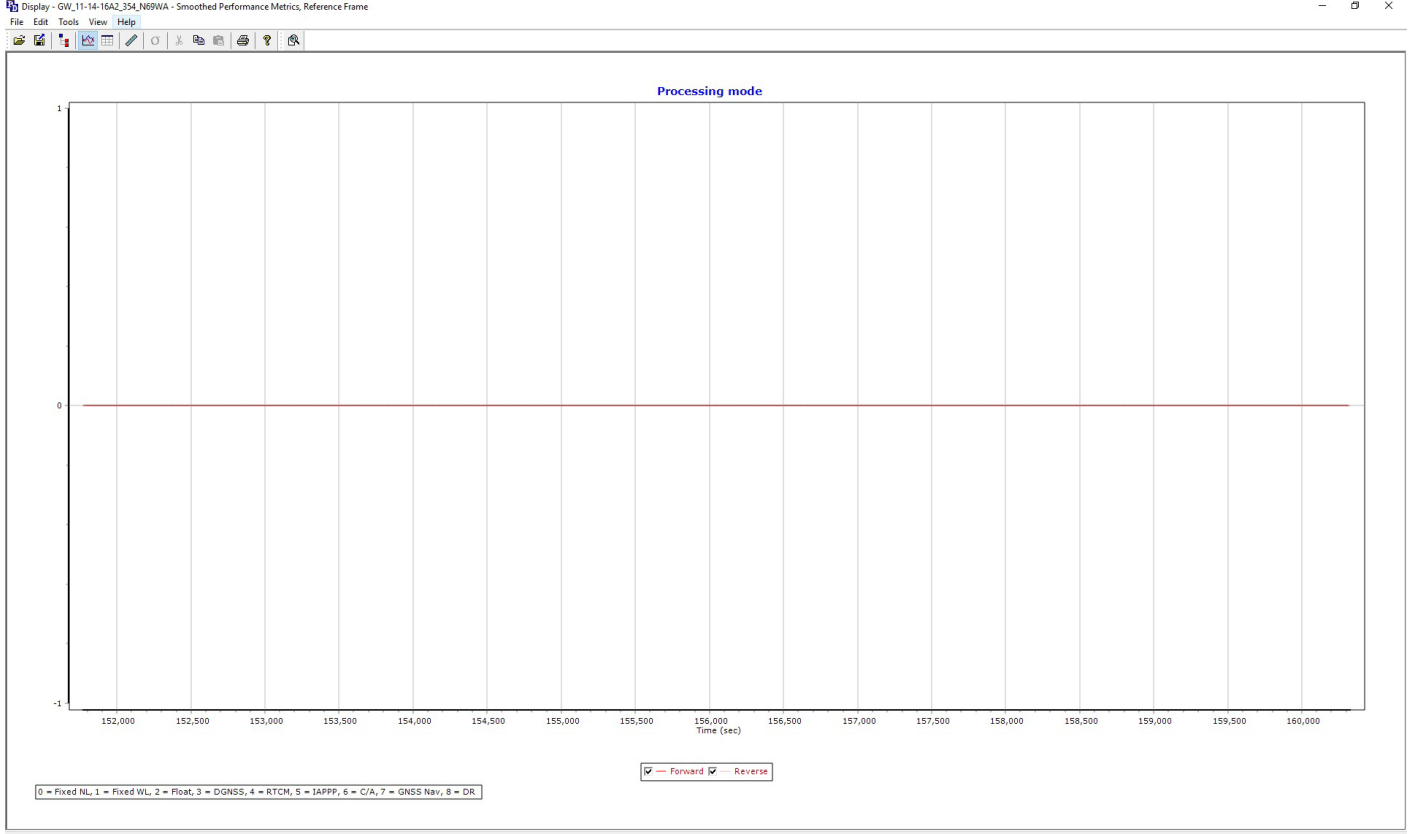


Ready

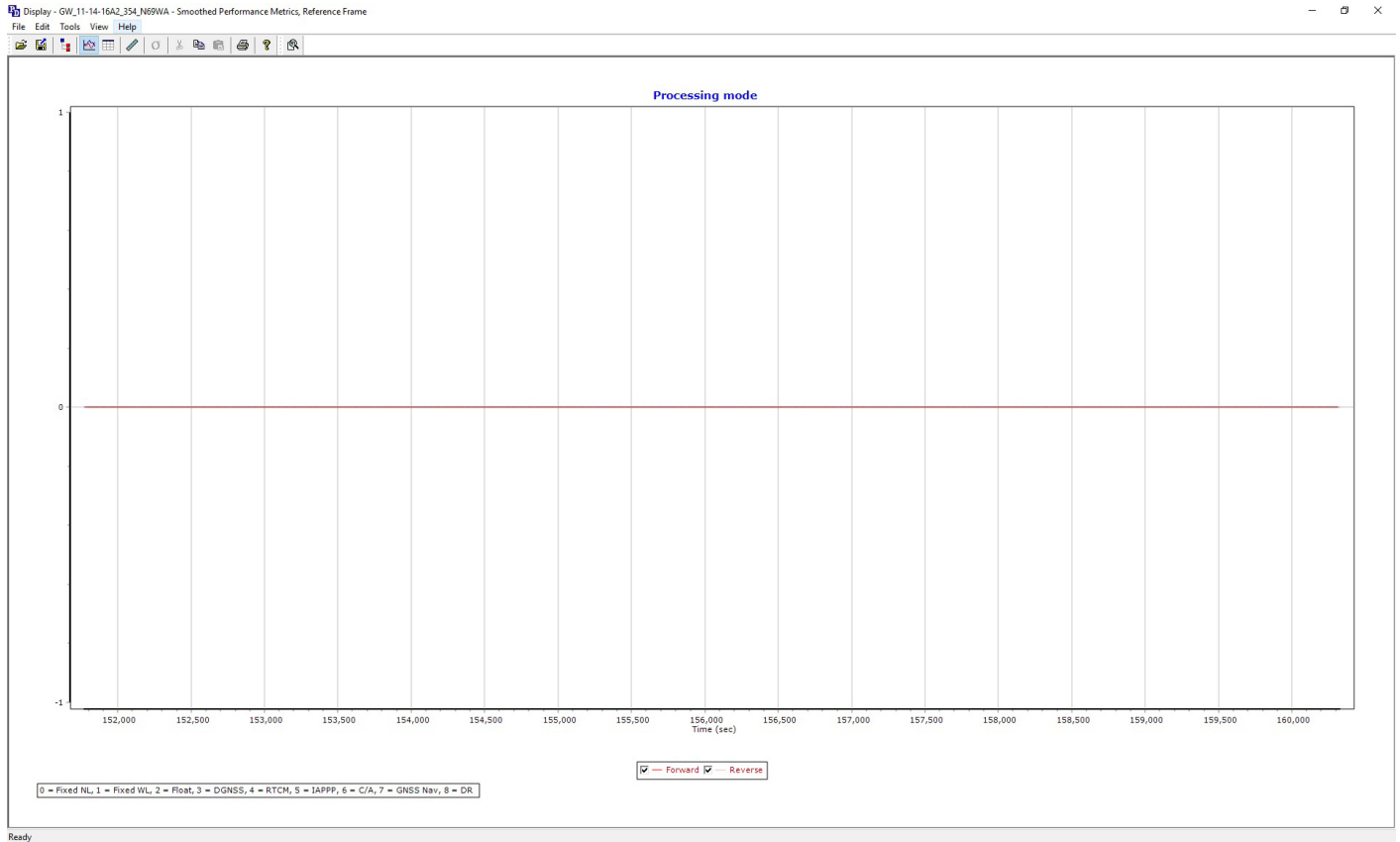
Display - GW\_11-14-16A2\_354\_N69WA - Smoothed Performance Metrics, Reference Frame



Ready  
Display - GW\_11-14-16A2\_354\_N69WA - Smoothed Performance Metrics, Reference Frame



Ready



# Base Station Log

Coordinate Manager

Station Information

Station ID: gw

Coordinates

Latitude: N 43 59 30.27905000

Longitude: W 70 56 57.48363000

Altitude: 107.4690 m

Decimal Degrees

Ground Reference Point (GRP) coordinates Apply Changes

Antenna Frame

Height: 2.000 m

Method: Antenna Phase Center

Manufacturer: NovAtel

Type: 701-GG 1.03

Offset from Measured Point to APC: 0.000 m

Station Database

Station ID: gw Station Fullname: gw

Primary Service ID:  Edit

Secondary Service IDs:  Edit

Coordinate Accuracy: UNKNOWN\_ACC

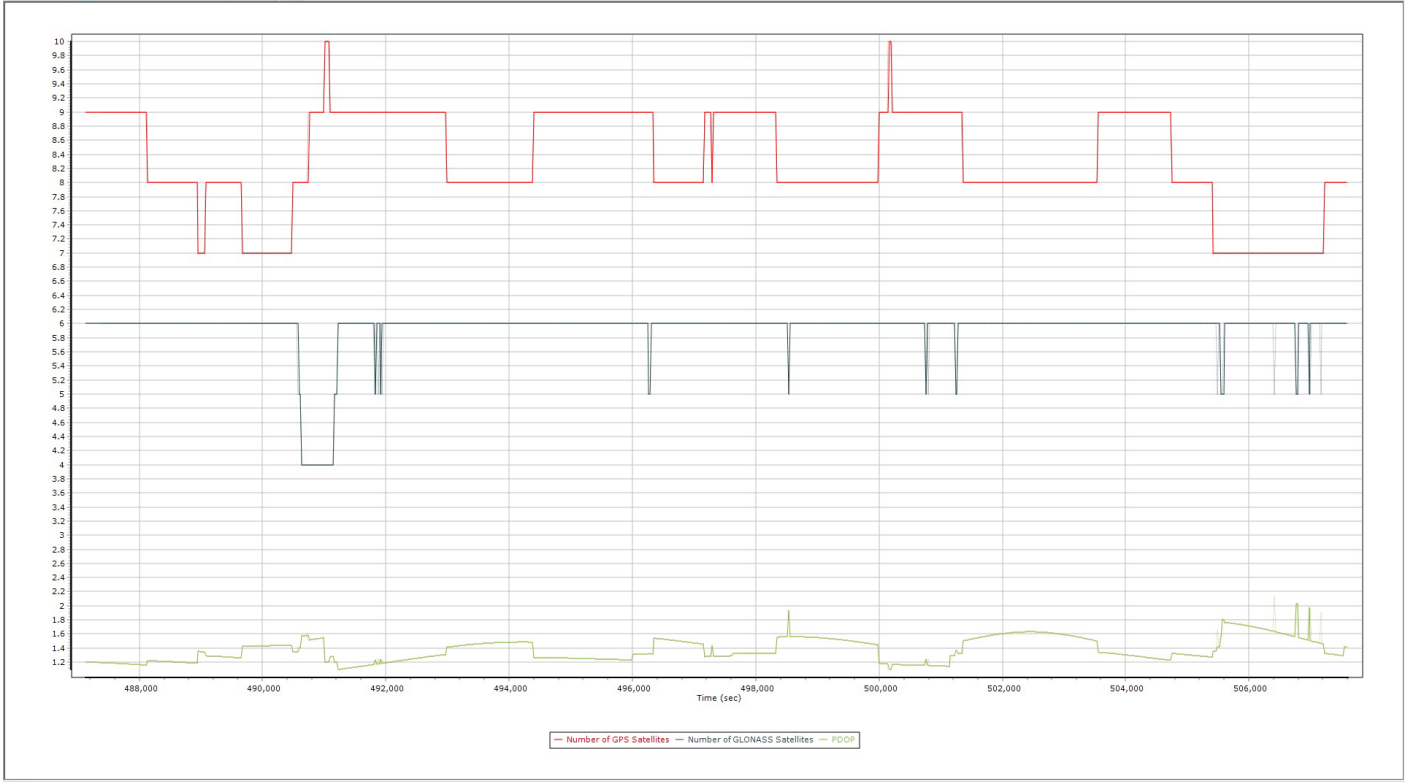
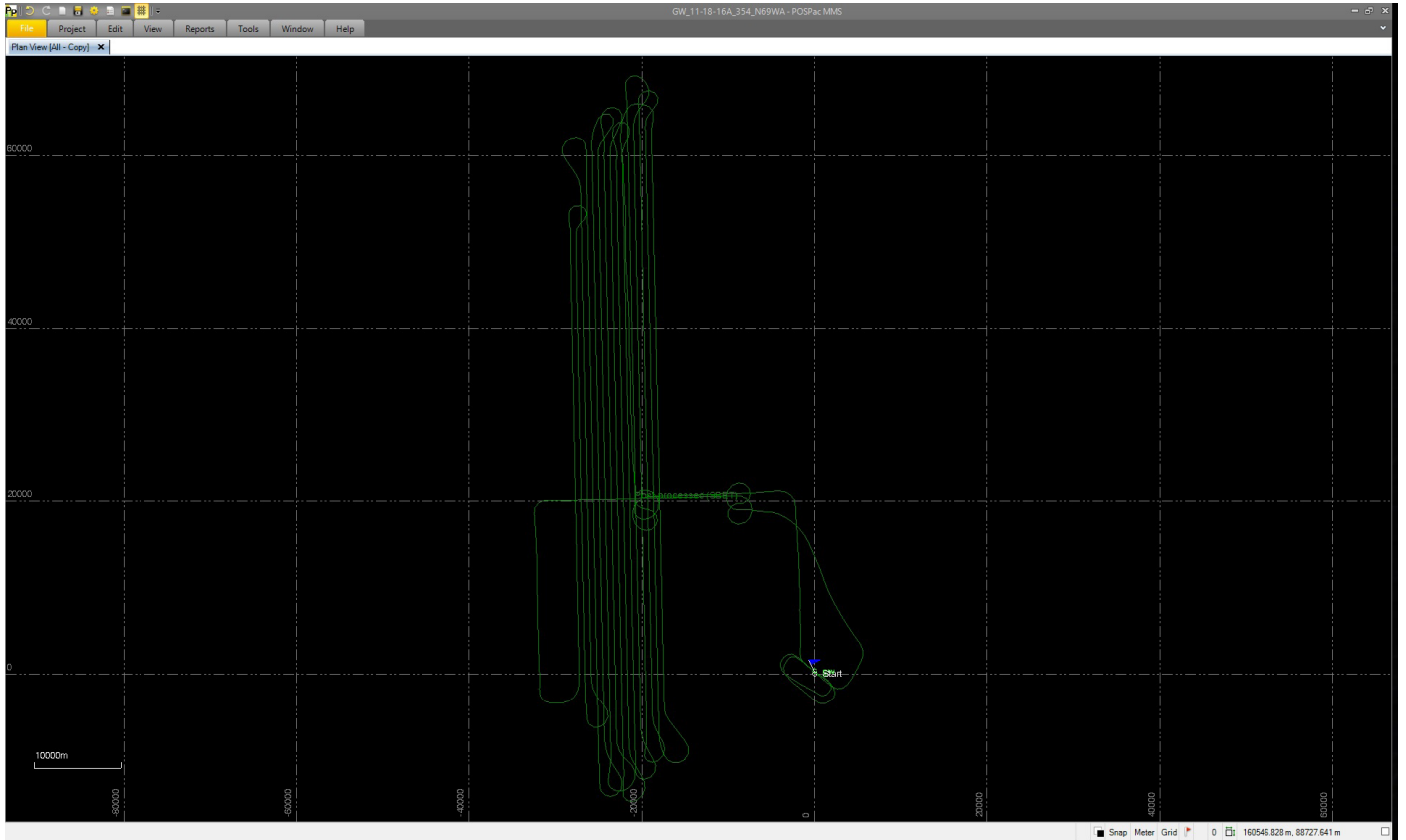
Add Delete Update

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

Import Coordinates Export Coordinates

Close

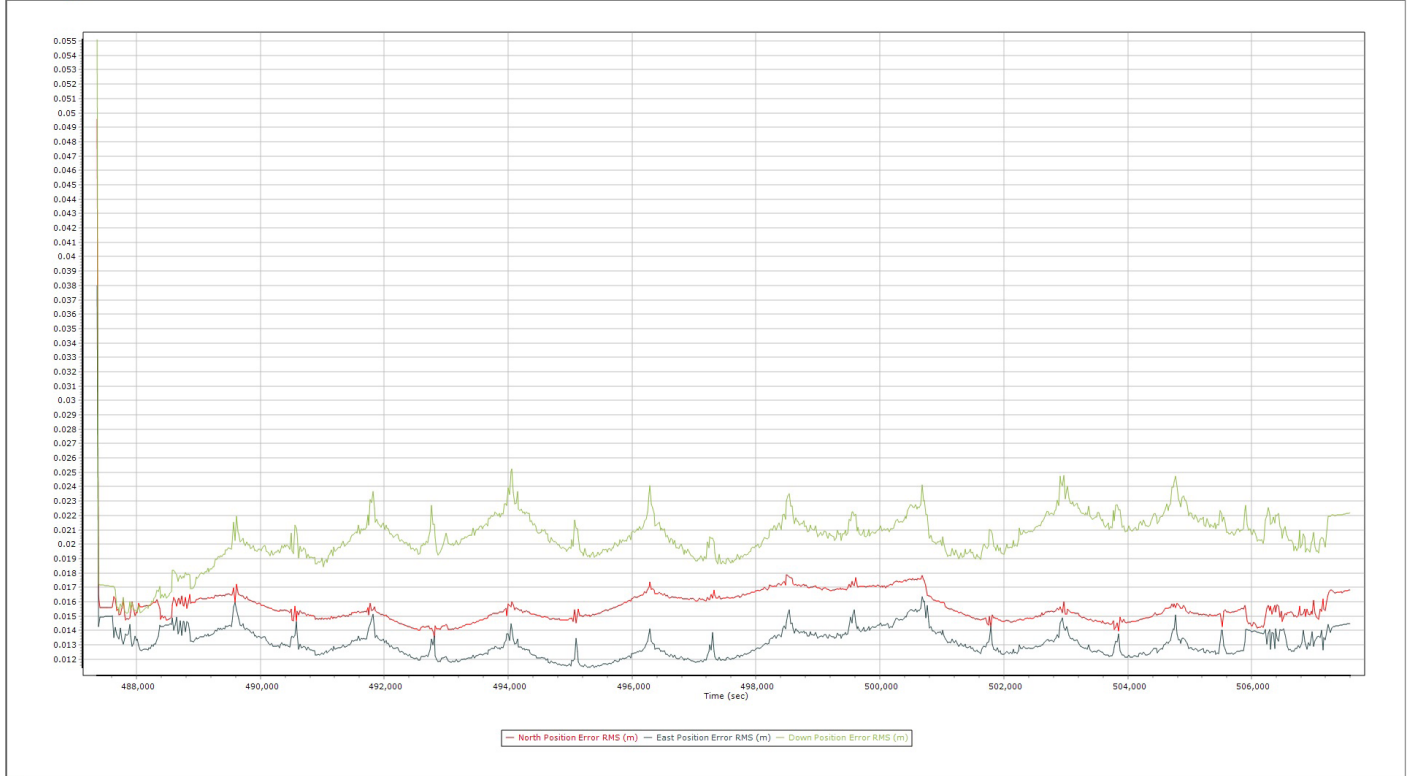
# 20161118-A (N69WA, SN354)



Ready

Display - GW\_11-18-16A\_354\_N69WA - Smoothed Performance Metrics, Reference Frame

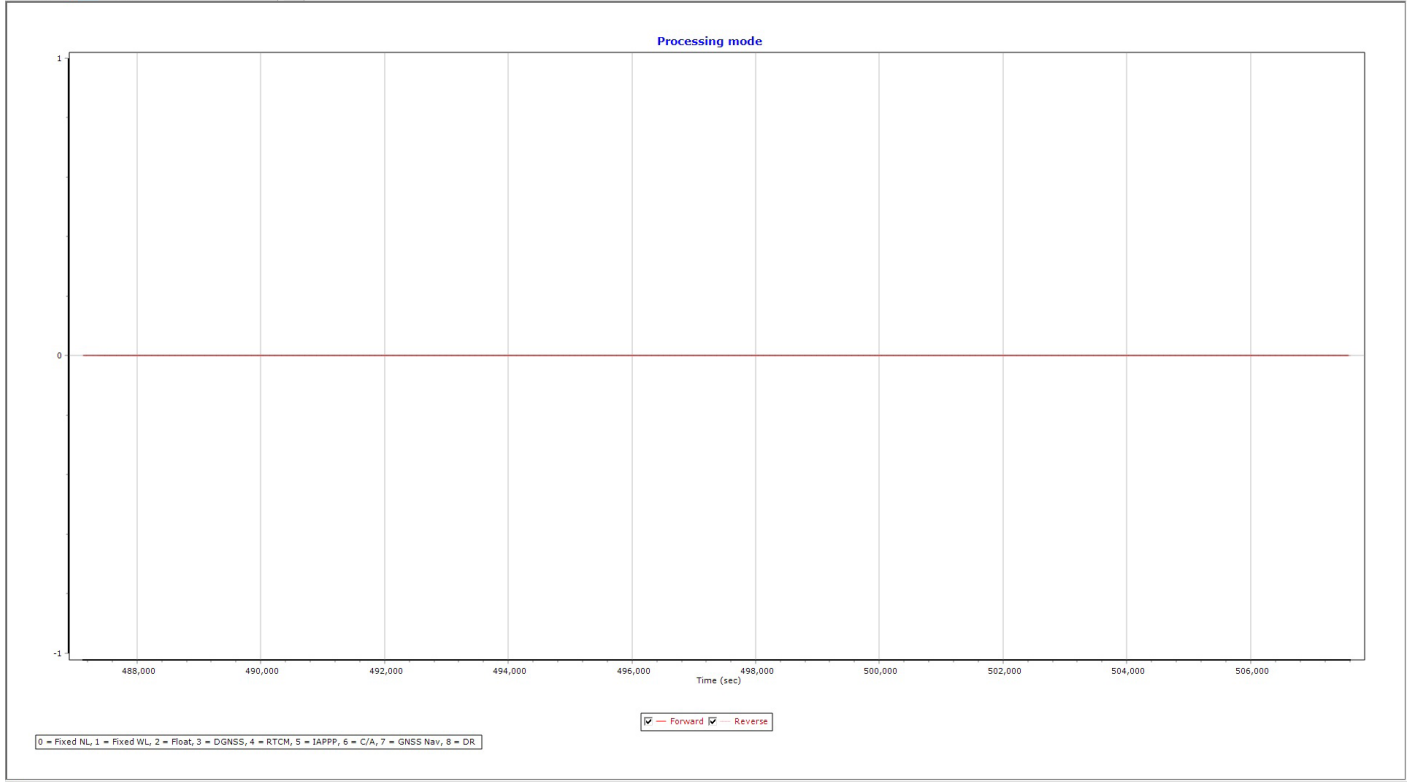
File Edit Tools View Help



Ready

Display - GW\_11-18-16A\_354\_N69WA - Smoothed Performance Metrics, Reference Frame

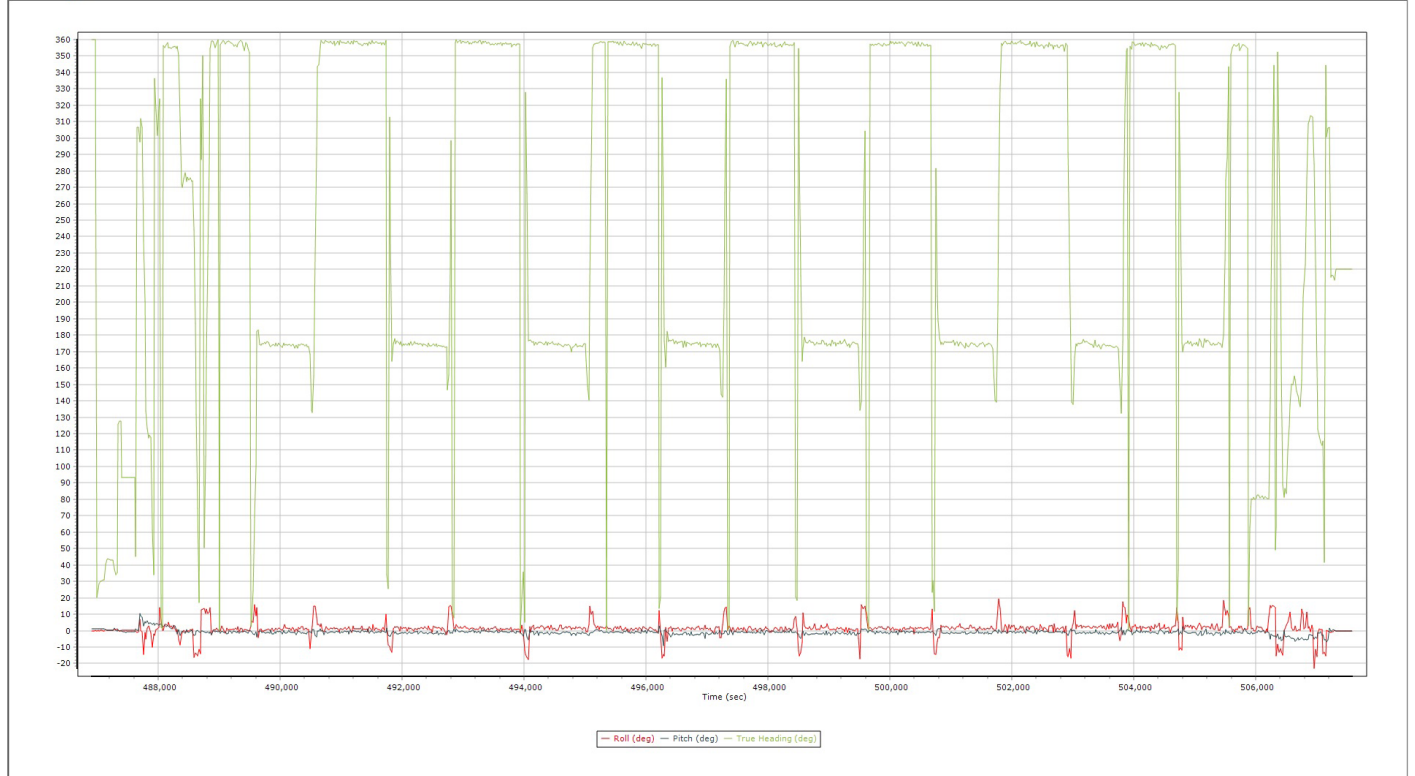
File Edit Tools View Help



Ready

Display - GW\_11-18-16A\_354\_N69WA - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready



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


Date: 11 / 18 / 2016 Pilot: AC  
 Project: QSI 28794-South Operator: MLM  
 Aircraft: N69WA  
 Sensor: 5060354 HD: A

Flight Plan		Weather	
Roll Comp:	On	Pressure (gnd):	
Scan Rate:	56	Temperature (gnd):	
Pulse Rate:	300	Temperature (air):	
Scan Angle:	18.5	Dew Point:	
Desired Range:	1525	Turbulence:	Mild
Planned GPS:	150	Visibility:	

POS/AV Filename: Nov18

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
Tie	1540	1544	270	1502	0.9	15	146	Tie for 11/14. No Fig 8
65	1600	1614	180	1545	0.9	15	150	
64	1618	1635	0	1570	0.9	16	126	
63	1638	1651	180	1571	1.0	16	154	
62	1655	1712	0	1610	1.2	16	122	
61	1716	1730	180	1509	1.0	17	150	
60	1733	1749	0	1544	1.0	17	120	
59	1752	1806	180	1510	1.1	16	155	
58	1810	1827	0	1554	0.9	17	128	
57	1830	1845	180	1537	0.9	17	150	
56	1848	1904	0	1500	0.9	19	126	
55	1907	1921	180	1530	1.0	18	150	
54	1926	1941	0	1520	1.2	15	130	Turbulence
53	1944	1956	180	1555	1.0	18	150	Lt snow on Mt. Washington
52	1959	2011	0	1551	1.0	18	130	Lt snow on Mt. Washington
51	2014	2024	180	1380	1.0	18	150	Lt snow on Mt. Washington
Tie	2032	2037	090	2000	1.0	18	150	Long tie to cover 11/14

Base Station		Location: KIZG	
Point ID: OC2770	Time On(UTC): 1500	Time On(UTC): 1500	
Position Type: Known	Time Off(UTC): 2110	Time Off(UTC): 2110	
Antenna Height: 2 Meters	PDOP: 1	PDOP: 1	
Latitude: _____	SVs: 15	SVs: 15	
Longitude: _____			

Airborne Station	
Time On: 1512 UTC	Engine Start(24HR LCL): 1010
Kinematic On: 1518 UTC	Engine Stop(24HR LCL): 1600
Kinematic Off: 2055 UTC	
Time Off: 2100 UTC	

Page \_\_\_\_ of \_\_\_\_

# Base Station Log

Coordinate Manager

Station Information

Station ID: gw

Coordinates

Latitude: N 43 59 30.27906000

Longitude: W 70 56 57.48401000

Altitude: 107.4620 m

Decimal Degrees

Antenna Frame

Height: 2.000 m

Method: Bottom of antenna mount

Manufacturer: NovAtel

Type: 702GG

Offset from Measured Point to APC: 0.086 m

Ground Reference Point (GRP) coordinates Apply Changes

---

Station Database

Station ID: gw Station Fullname: gw

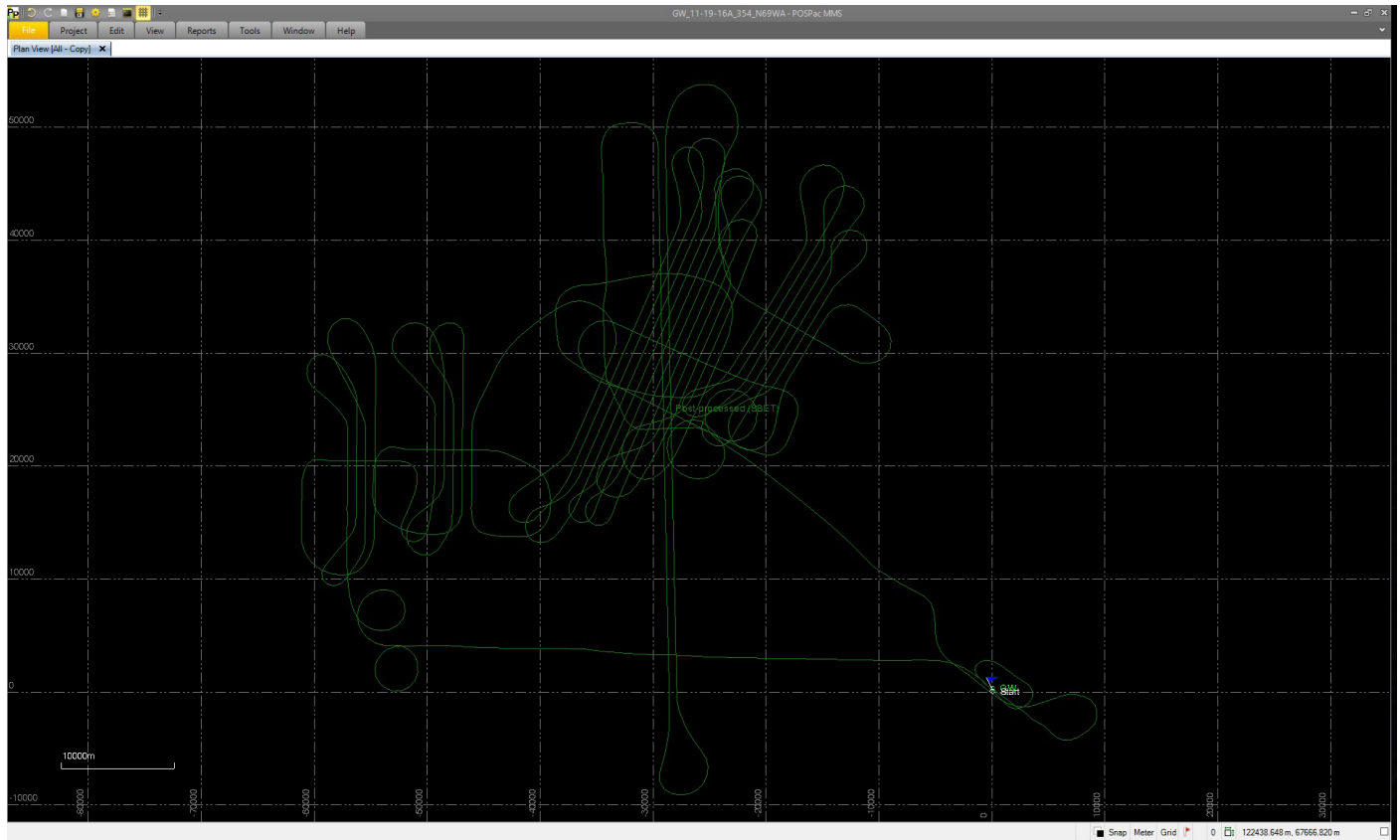
Primary Service ID:  Edit Coordinate Accuracy: UNKNOWN\_ACC

Secondary Service IDs:  Edit Add Delete Update

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

Import Coordinates Export Coordinates Close

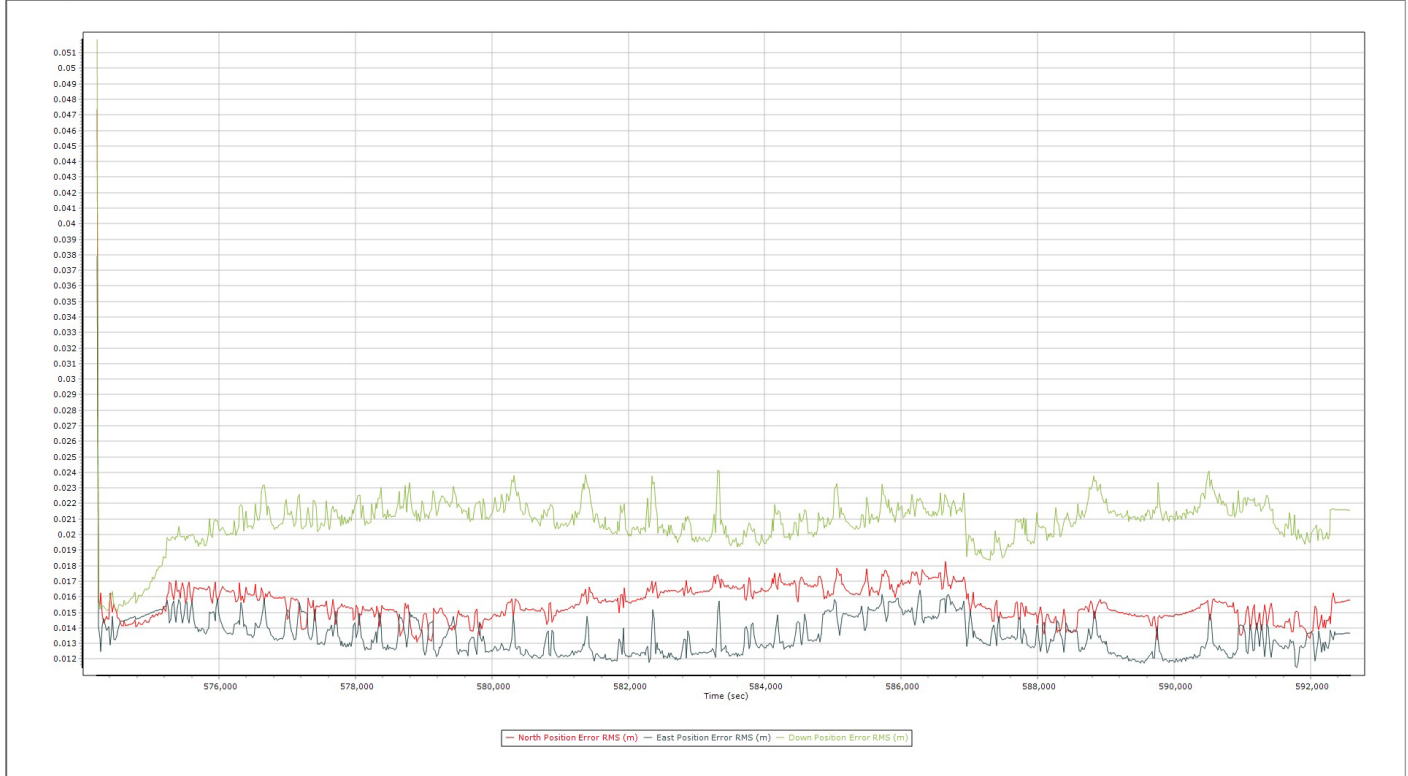
# 20161119-A (N69WA, SN354)



Ready

Display - GW\_11-19-16A\_354\_N69WA - Smoothed Performance Metrics, Reference Frame

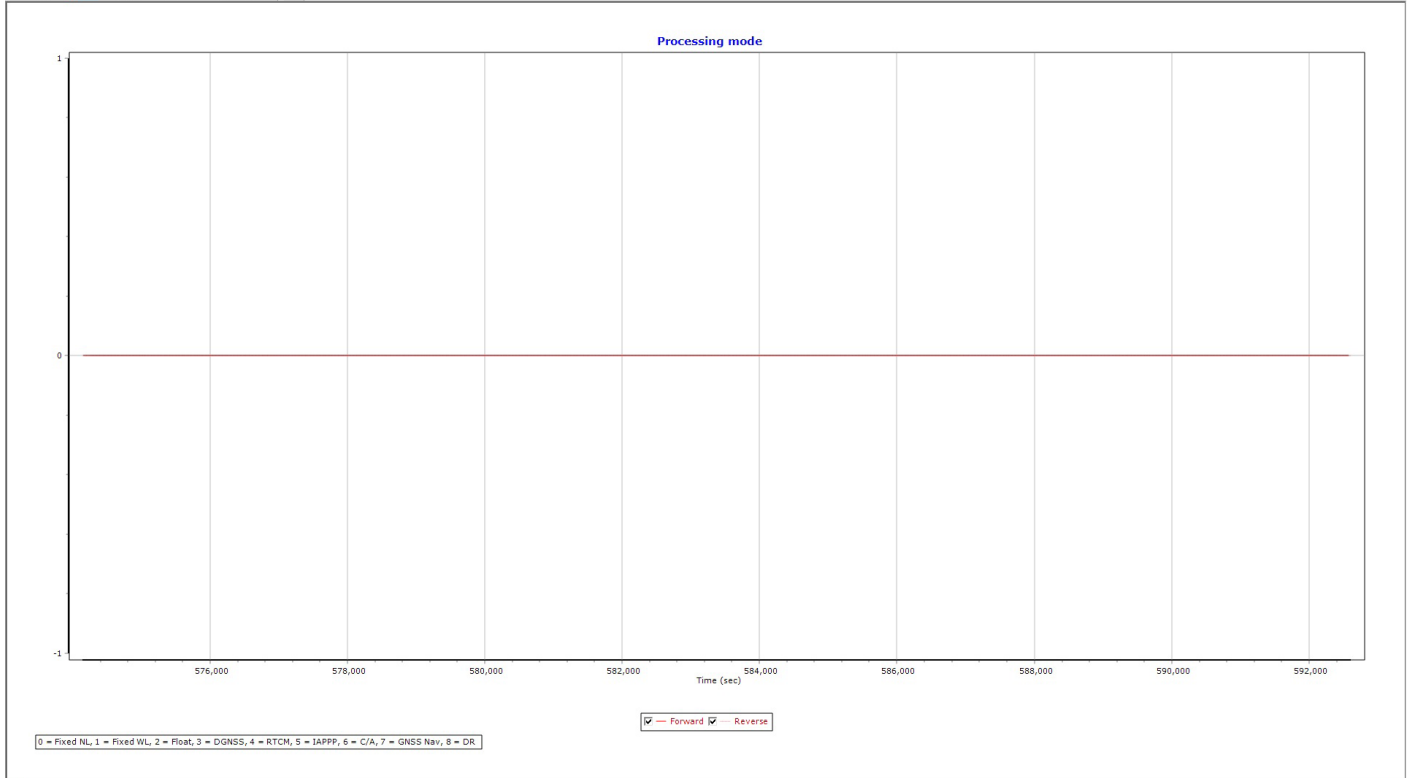
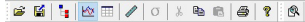
File Edit Tools View Help



Ready

Display - GW\_11-19-16A\_354\_N69WA - Smoothed Performance Metrics, Reference Frame

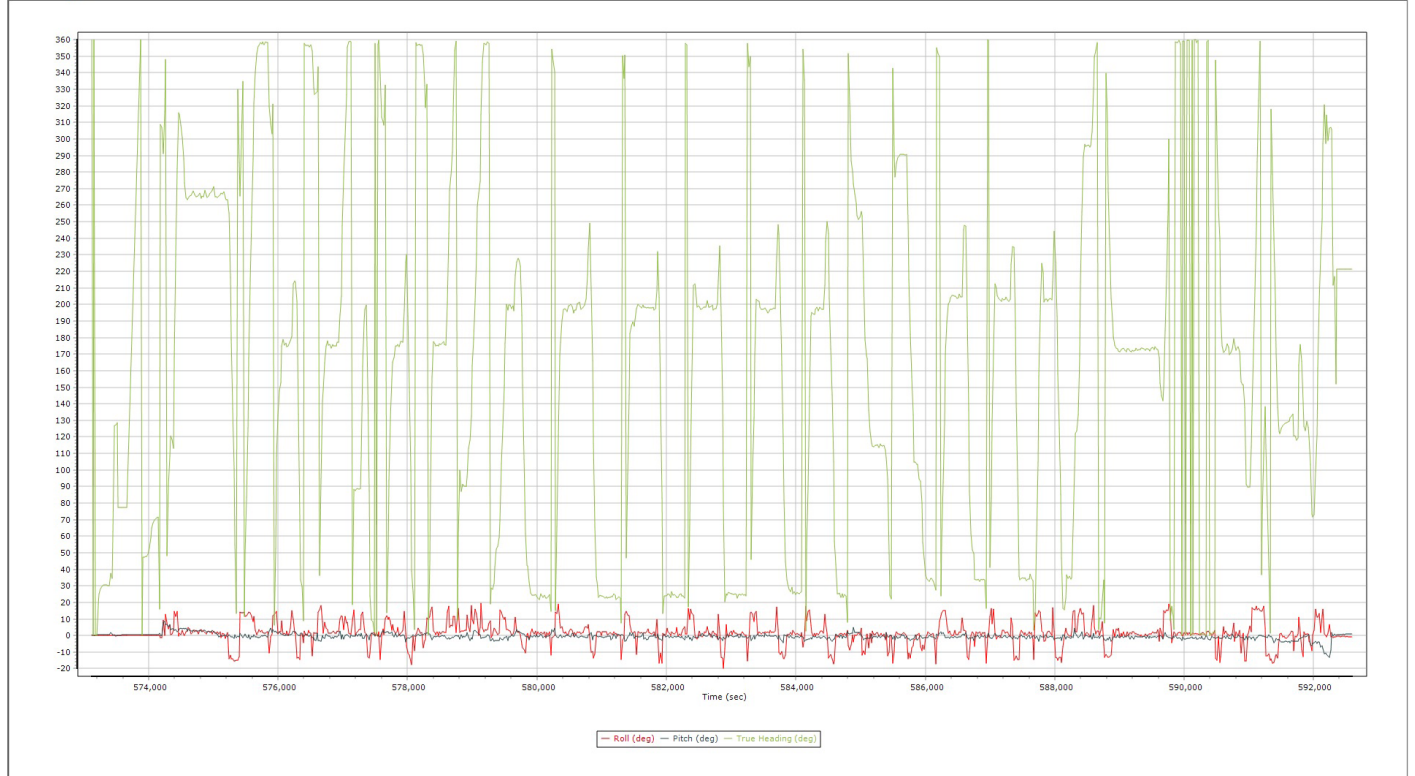
File Edit Tools View Help



Ready

Display - GW\_11-19-16A\_354\_N69WA - Real Time Trajectory, Vehicle Frame

File Edit Tools View Help



Ready

# Flight Log

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



Date: 11 / 19 / 2016 Pilot: AC  
 Project: QSI 28794-Mountains Operator: MLM  
 Aircraft: N69WA  
 Sensor: 5060354 HD: A

POS/AV Filename: Nov19

Flight Plan		Weather	
Roll Comp:	On	Pressure (gnd):	
Scan Rate:	50	Temperature (gnd):	
Pulse Rate:	250	Temperature (air):	
Scan Angle:	21	Dew Point:	
Desired Range:	1550	Turbulence:	Mild
Planned GPS:	150	Visibility:	

Line #	Start Time	End Time	HDG	Range	PDOF	SV	Speed (kts)	Flight Notes
4	1556	1557	0	1525	1.0	15	150	
3	1602	1603	180	1560	1.0	15	134	
2	1607	1608	0	1540	1.0	16	150	
1	1613	1615	180	1571	1.0	16	140	
5	1620	1621	090	1564	1.0	16	134	
10	1625	1626	0	1547	0.9	15	140	
9	1631	1632	180	1558	0.9	16	136	
8	1635	1637	0	1534	0.9	17	148	
7	1642	1643	180	1524	1.0	15	140	
11	1647	1648	090	1537	1.0	16	146	
6	1653	1654	0	1573	1.1	16	142	
31	1659	1701	203	1580	1.1	16	144	
30	1705	1710	023	1570	1.1	17	150	
29	1736	1719	203	1479	1.0	18	138	
28	1723	1728	023	1556	1.0	17	154	
27	1732	1737	203	1584	0.9	17	140	Lt snow
26	1740	1744	023	1557	0.9	18	150	Lt snow
25	1748	1752	203	1600	1.0	18	144	Lt snow
24	1756	1800	023	1500	0.9	18	150	
23	1804	1808	203	1556	1.0	18	146	

Base Station	Airborne Station
Location: KIZG Point ID: OC270 Position Type: Known Antenna Height: 2 Meters Latitude: _____ Longitude: _____	Time On: 1510 UTC Kinematic On: 1516 UTC Kinematic Off: 1930 UTC Time Off: 1930 UTC

Engine Start(24HR LCL): 1010  
 Engine Stop(24HR LCL): 1430

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



Date: 11 / 19 / 2016 Pilot: AC  
 Project: QSI 28794-Mountains Operator: MLM  
 Aircraft: N69WA  
 Sensor: 5060354 HD: A

POS/AV Filename: Nov19

Flight Plan		Weather	
Roll Comp:	On	Pressure (gnd):	
Scan Rate:	50	Temperature (gnd):	
Pulse Rate:	250	Temperature (air):	
Scan Angle:	21	Dew Point:	
Desired Range:	1550	Turbulence:	Mild
Planned GPS:	150	Visibility:	

Line #	Start Time	End Time	HDG	Range	PDOF	SV	Speed (kts)	Flight Notes
22	1812	1814	023	1564	1.0	17	150	
21	1819	1820	203	1400	1.0	17	142	
20	1825	1825	023	1574	1.0	17	150	
32	1833	1835	116	1600	0.9	15	134	
Tie	1839	1841	290	1200	0.9	18	157	Extra tie for short lines
18	1847	1849	031	1555	0.9	19	150	
17	1853	1856	211	1555	0.9	19	150	
16	1859	1902	031	1566	1.0	18	150	
15	1906	1908	211	1547	1.0	18	142	
14	1912	1914	031	1550	1.0	18	148	
13	1917	1919	211	1522	1.0	17	142	
12	1923	1924	031	1573	1.1	16	150	
19	1928	1929	299	1530	1.2	15	160	

<b>Base Station</b> Point ID: OC270 Position Type: Known Antenna Height: 2 Meters Latitude: _____ Longitude: _____	Location: KIZG Time On(UTC): 1500 Time Off(UTC): 2050 PDOF: 1 SV's 15	<b>Airborne Station</b> Time On: 1510 UTC Kinematic On: 1516 UTC Kinematic Off: 1930 UTC Time Off: 1930 UTC	Engine Start(24HR LCL): 1010 Engine Stop(24HR LCL): 1430
---	---	---	---



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



Date: 11 / 19 / 2016 Pilot: AC  
 Project: QSI 28794-South Operator: MLM  
 Aircraft: N69WA  
 Sensor: 5060354 HD: A

POS/AV Filename: Nov19.169

Flight Plan		Weather	
Roll Comp:	On	Pressure (gnd):	
Scan Rate:	58	Temperature (gnd):	
Pulse Rate:	300	Temperature (air):	
Scan Angle:	18.5	Dew Point:	
Desired Range:	1525	Turbulence:	Mild
Planned GPS:	150	Visibility:	

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
50	1935	1946	180	1550	1.2	15	150	
49	1951	2000	0	1530	1.0	17	154	Lt snow
Tie	2009	2010	090	1525	1.0	17	145	

<b>Base Station</b>	Location: KIZG
Point ID: OC2770	Time On(UTC): 1500
Position Type: Known	Time Off(UTC): 2050
Antenna Height: 2 Meters	PDOP: 1
Latitude: _____	SV's 15
Longitude: _____	

<b>Airborne Station</b>
Time On: 1510 UTC
Kinematic On: 1516 UTC
Kinematic Off: 1930 UTC
Time Off: 1930 UTC

Engine Start(24HR LCL): 1431  
 Engine Stop(24HR LCL): 1541

# Base Station Log

Coordinate Manager

---

**Station Information**

Station ID:

Coordinates

Latitude: N 43 59 30.27898000

Longitude: W 70 56 57.48405000

Altitude:  m

Decimal Degrees

Ground Reference Point (GRP) coordinates Apply Changes

---

**Antenna** Frame

Height:  m

Method:

Manufacturer:

Type:

Offset from Measured Point to APC:  m

---

**Station Database**

Station ID:  Station Fullname:

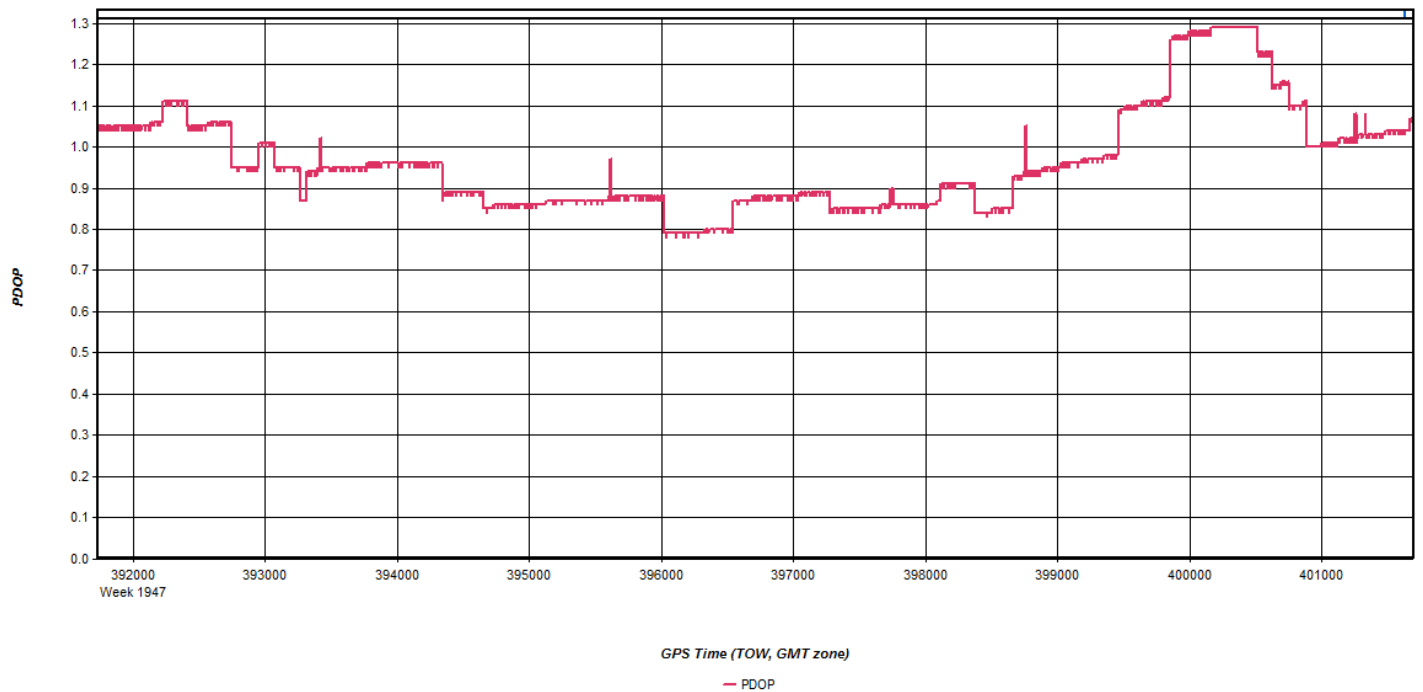
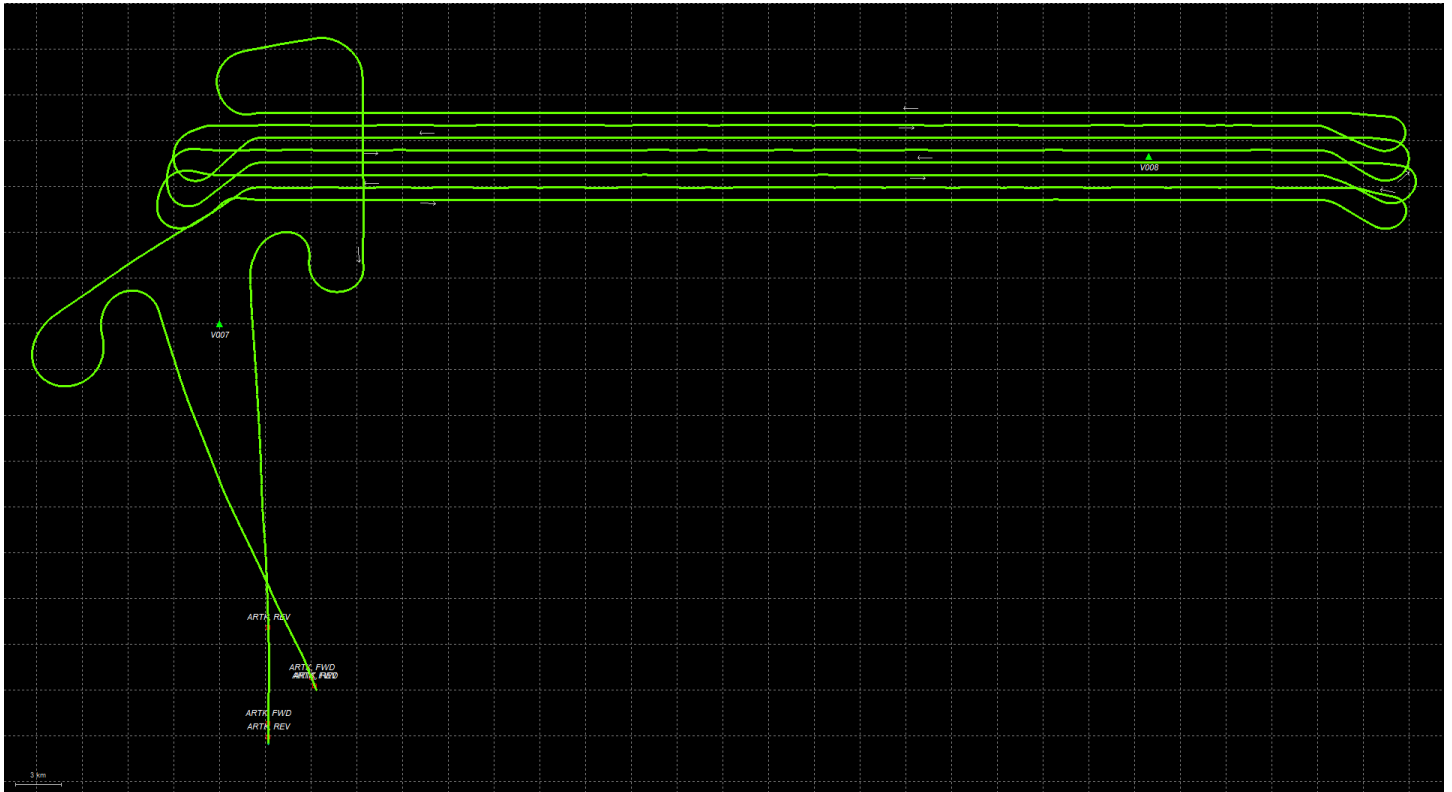
Primary Service ID:  Edit Coordinate Accuracy:

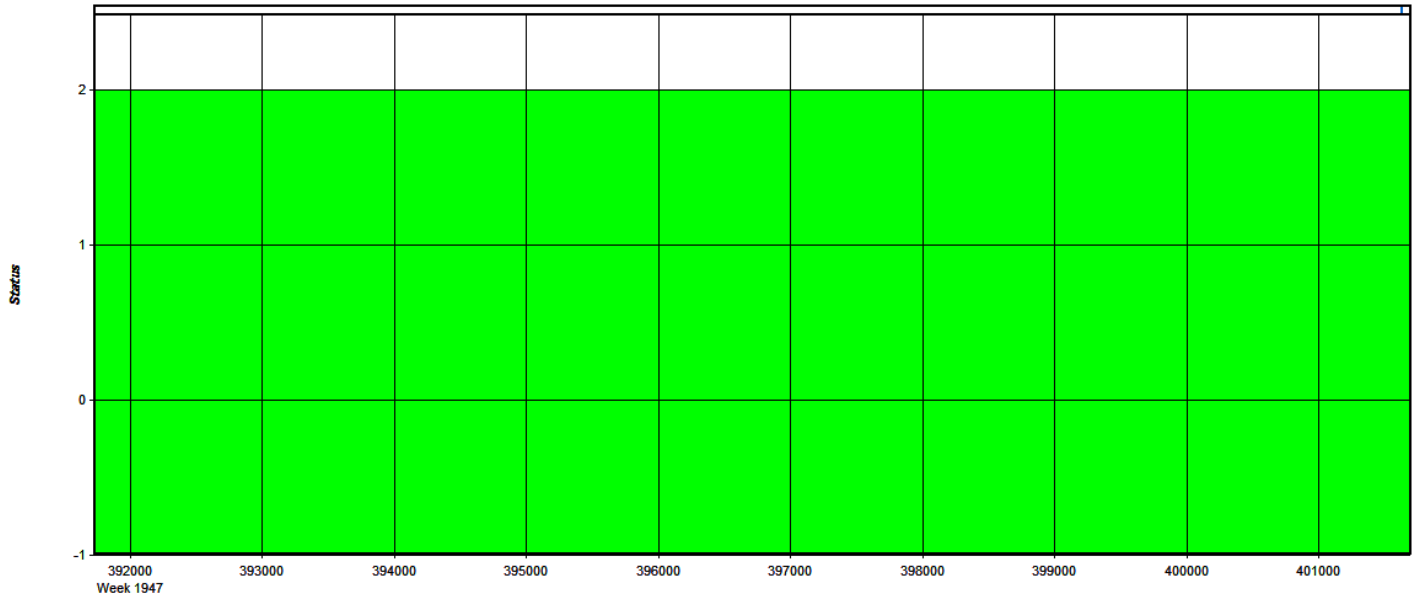
Secondary Service IDs:  Edit Add Delete Update

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

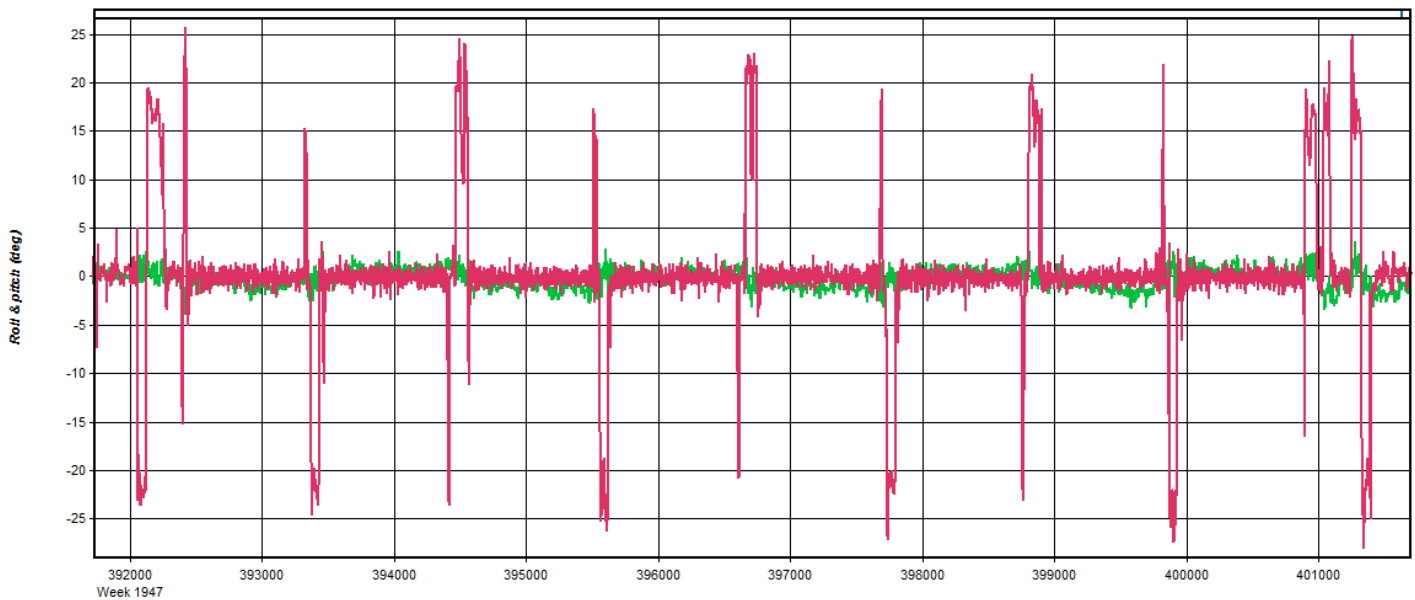
Import Coordinates Export Coordinates Close

# 20170504-A (N262AS, SN7161)

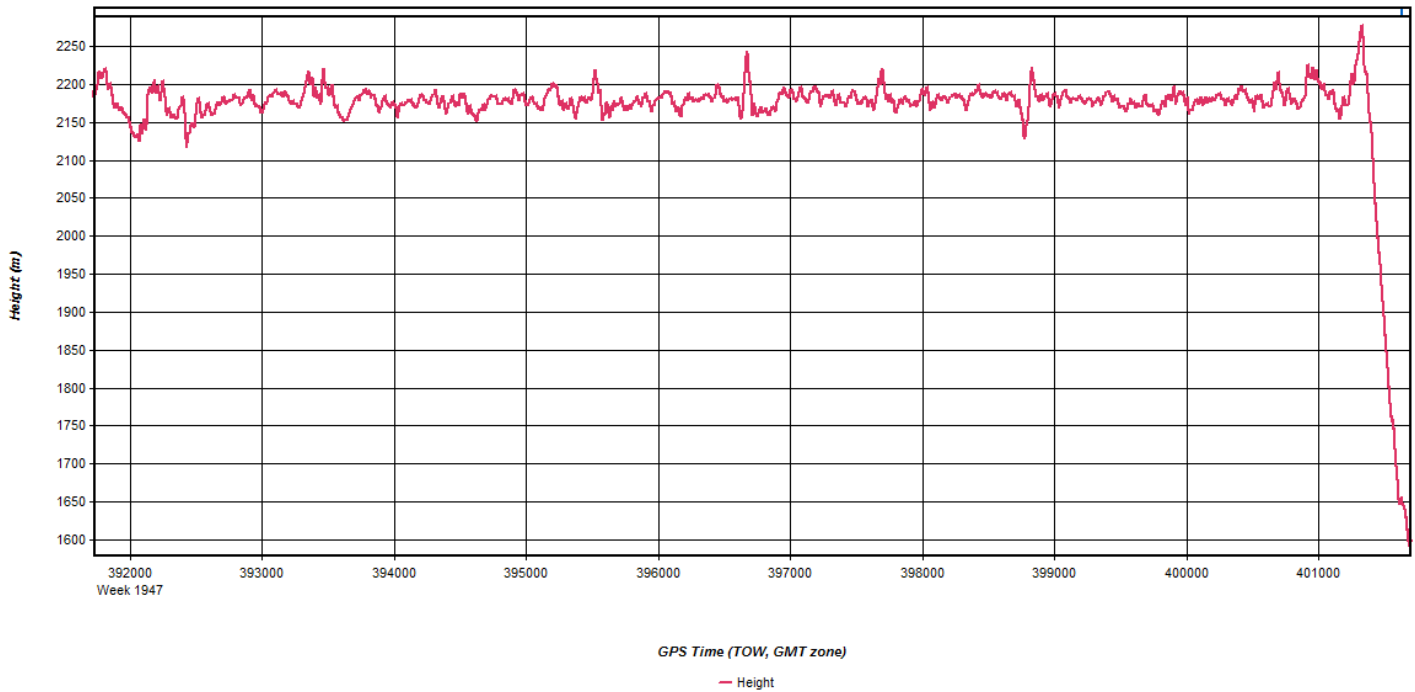
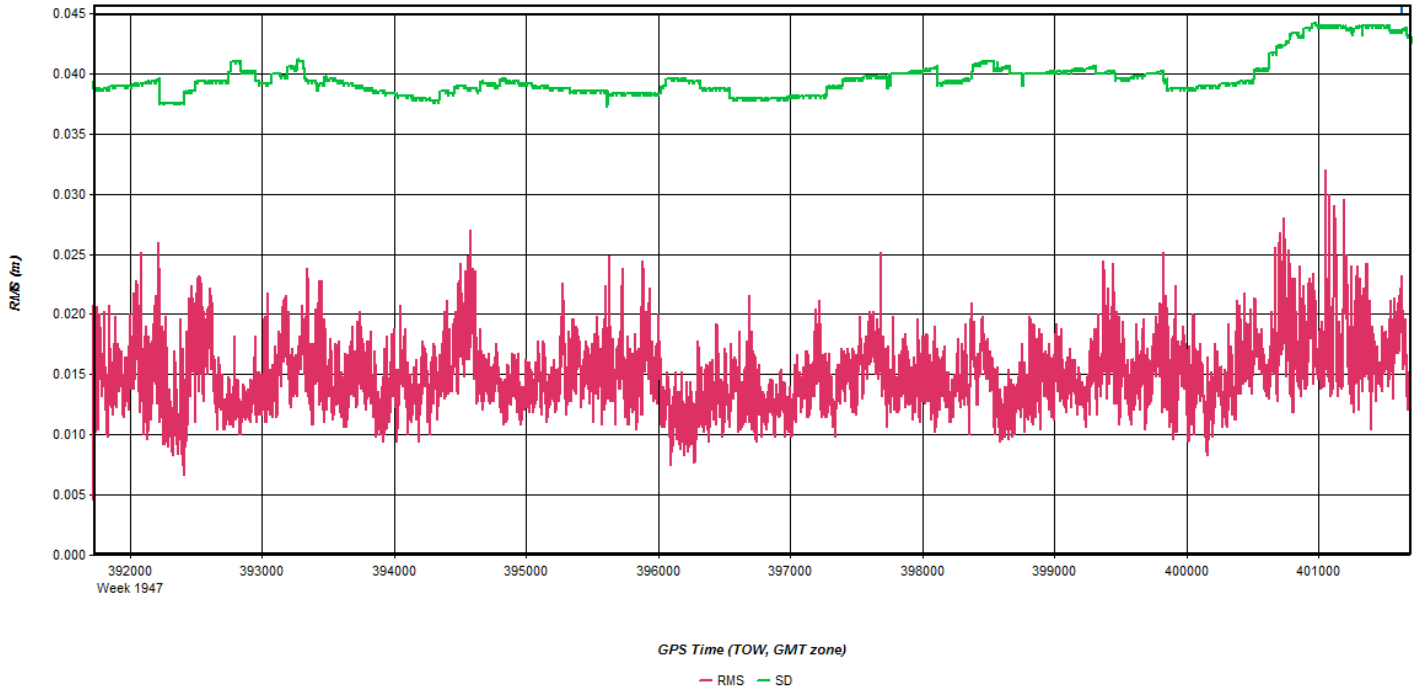


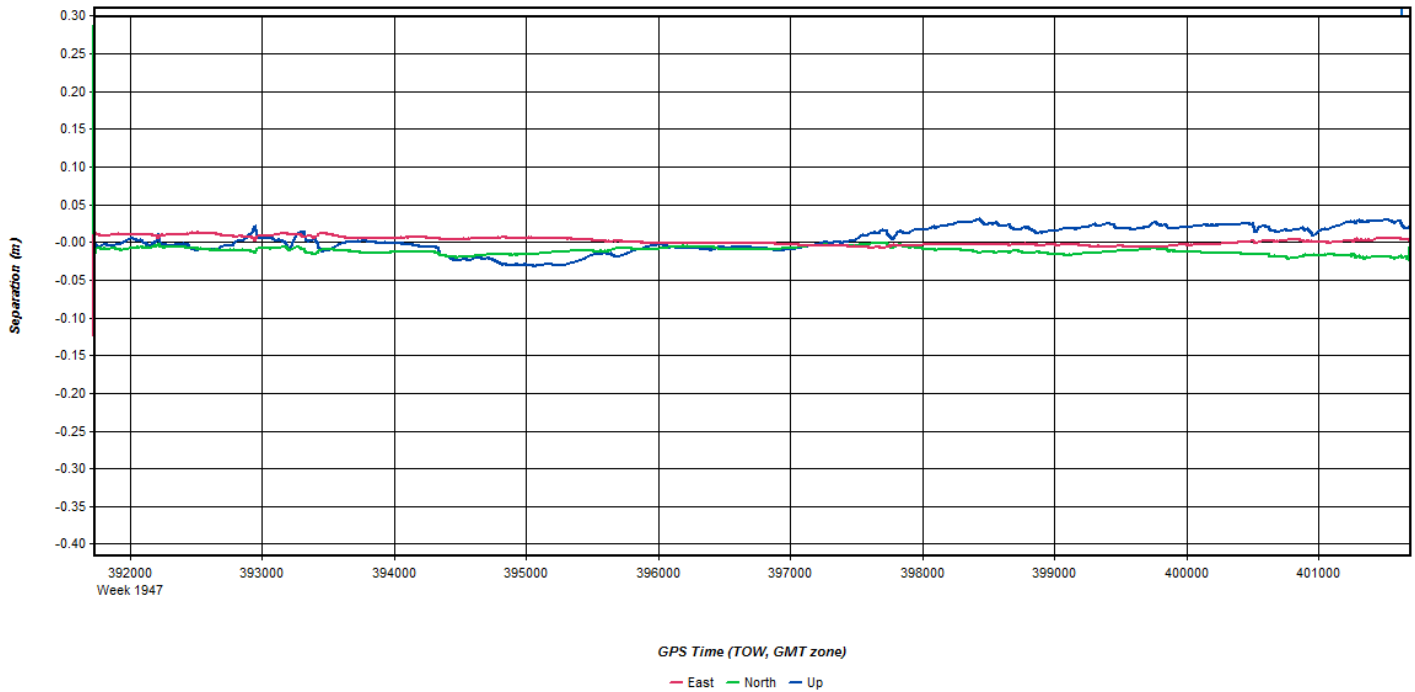
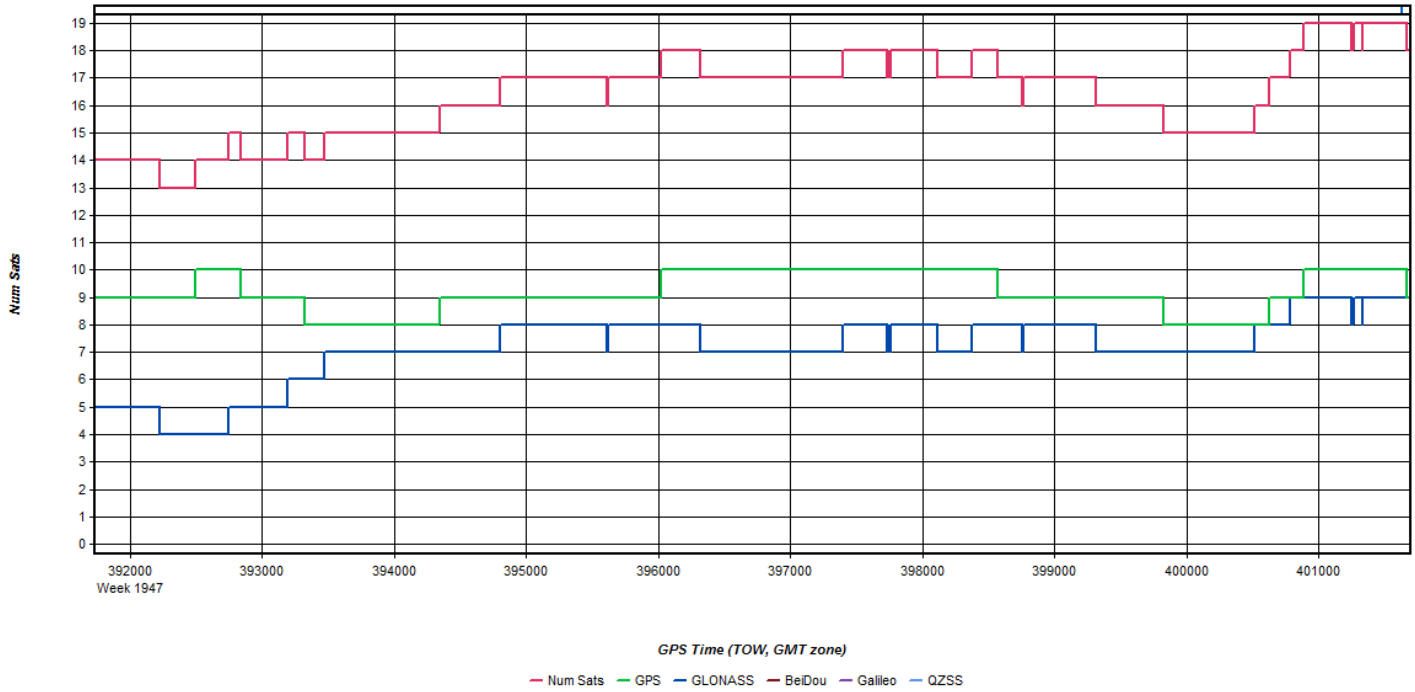


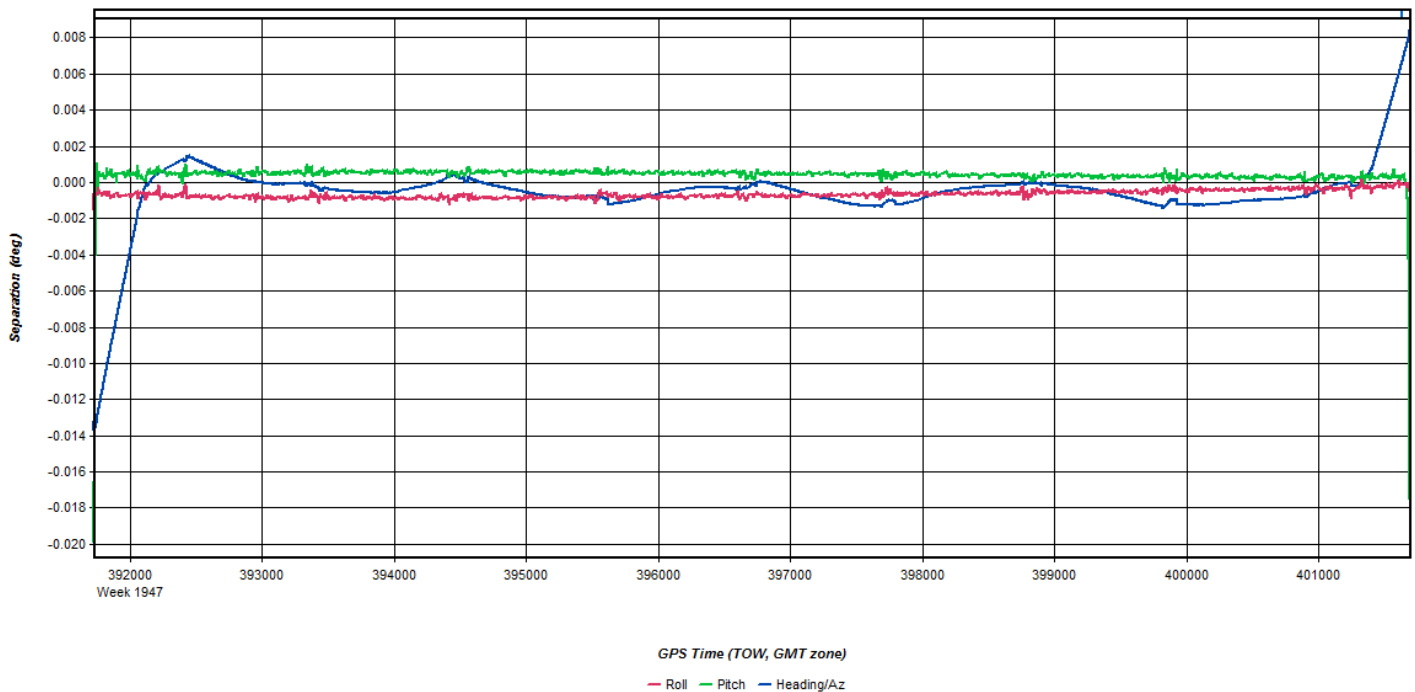
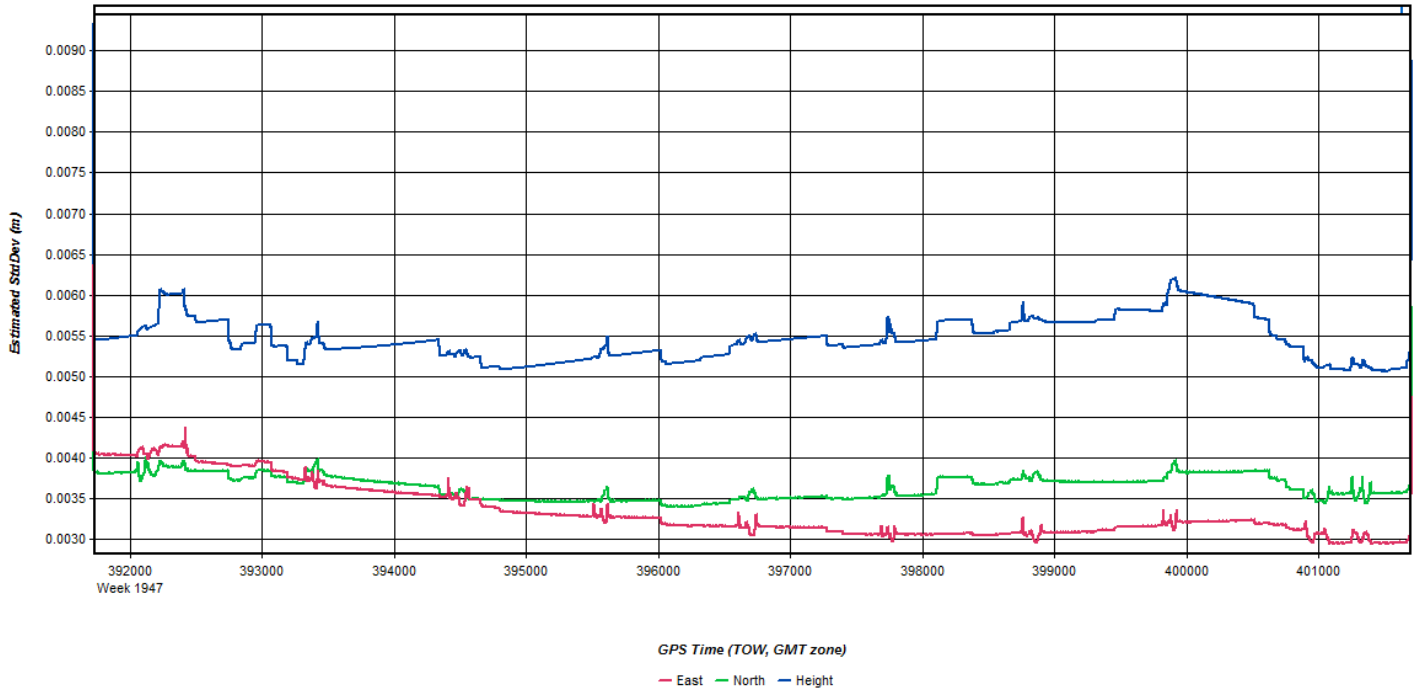
GPS Time (TOW, GMT zone)  
— Float — Forward Fixed — Reverse Fixed — Fixed (2 or more)



GPS Time (TOW, GMT zone)  
— Roll — Pitch











# Flight Log

**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(email Log daily to Flight\_Log\_distribution\_List@quantumspatial.com)

Date: 5-4-17  
UTC (A) a c d e pg 1 of 2

Project: USGS - MAWE - 2100 Proj #: 29513 Flight Mgmt File: 20170504-121128

Aircraft: N262AS Begin Hobbs: 6592.9 End Hobbs: 6596.4 Total: 3.5 Pilot: RAOTKE Co-Pilot: - Tech: SCHOONE

Dep Apt: KBGR Dep Time (Ld): 08:18 (Z): 12:18 Arr Apt: KBGR Arr Time (Local): 11:58 (Z): 15:58 Tot Time Aloft:

CORS: (Y) N Sta 1: MELI Sta 2: MELI Flyovers: (Y) N If Y, times: Sta1) 12:42 Sta2) 15:39

GPS Unit: Y (N) Sta 1: Sta 2: Flyovers: Y (N) If Y, times: Sta1) Sta2)

Gd Temp beg: 7 °c End: 12 °c OAT beg: -2 °c End: -1 °c Altimeter begin: 30.23 end: 30.24

LIDAR	Type	<u>ALS-70</u>	Serial #	<u>7161</u>	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	<u>140</u>	Avg Pt Spacing	Mag CB	Storage Name/c
	FOV	<u>36</u>	Scan Freq	<u>56</u>	MplA <u>(Y) N</u>	Pulse In Air	<u>2</u>	Pulse Rate	<u>262.6</u>	Power		
											Tot CB	<u>015</u>

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PDOF/Sec	GPS Altitude	Crab	Turb (ft/s)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
1073	90	13:00	13:14	144	1.0/20	7136	-5		HIGH THW DVC 9-10 VIS - TRACE ABOVE OF SMOKE VERY WEST END
1072	270	13:18	13:33	147	1.1/17	7146	8		SMOKES
1071	90	13:36	13:51	145	1.2/17	7149	-6		
1070	270	13:54	14:09	144	1.2/18	7156	7		
1069	90	14:13	14:27	147	1.2/19	7152	-5		LIGHT TURB - EAST END
1068	270	14:30	14:45	143	1.1/20	7152	5		
1067	90	14:48	15:03	150	1.3/18	7156	-4		
1066	270	15:06	15:21	147	1.1/19	7162	6		
XTIME	179	15:24	15:27	150	1.1/19	7110	-		

Total Proj Lines: Lines Flown: 8 Lines Remain: Online Time: 0.5 Mob Time: 1.0 Notes:

Scanned by CamScanner

# Base Station Log

Coordinate/Antenna Settings ? X

Master Remote

Base Station

1: V007 Name: V007  Disabled

File: E:\Proc\29513\_Maine\Mike\_Cox\_5-8-17\20170504\_121128\VRS\

Coordinates

Latitude: North 45 46 35.00018 Coord. options

Longitude: West 68 49 44.40979 Save to Favorites

Ellipsoidal height: 100.015 m

Datum: WGS84 Proc Datum: WGS84

Epoch: year

Antenna Height

From station file: TRM57971.00, NONE View STA File

Antenna profile: TRM57971.00 Info

Measured height: 0.000 m

ARP to L1 offset: 0.065 m

Applied height: 0.065 m

Measured to

ARP

L1 Phase Centre

Compute From Slant

OK Cancel

Coordinate/Antenna Settings ? X

Master Remote

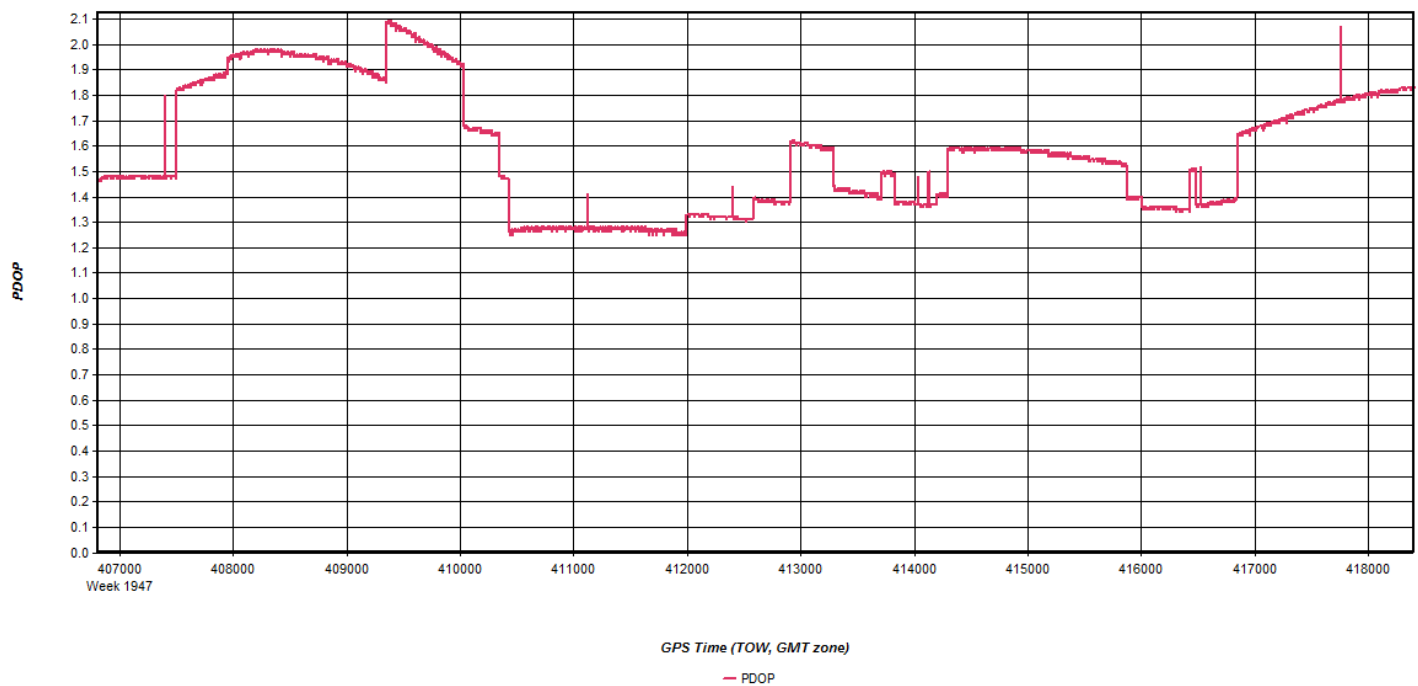
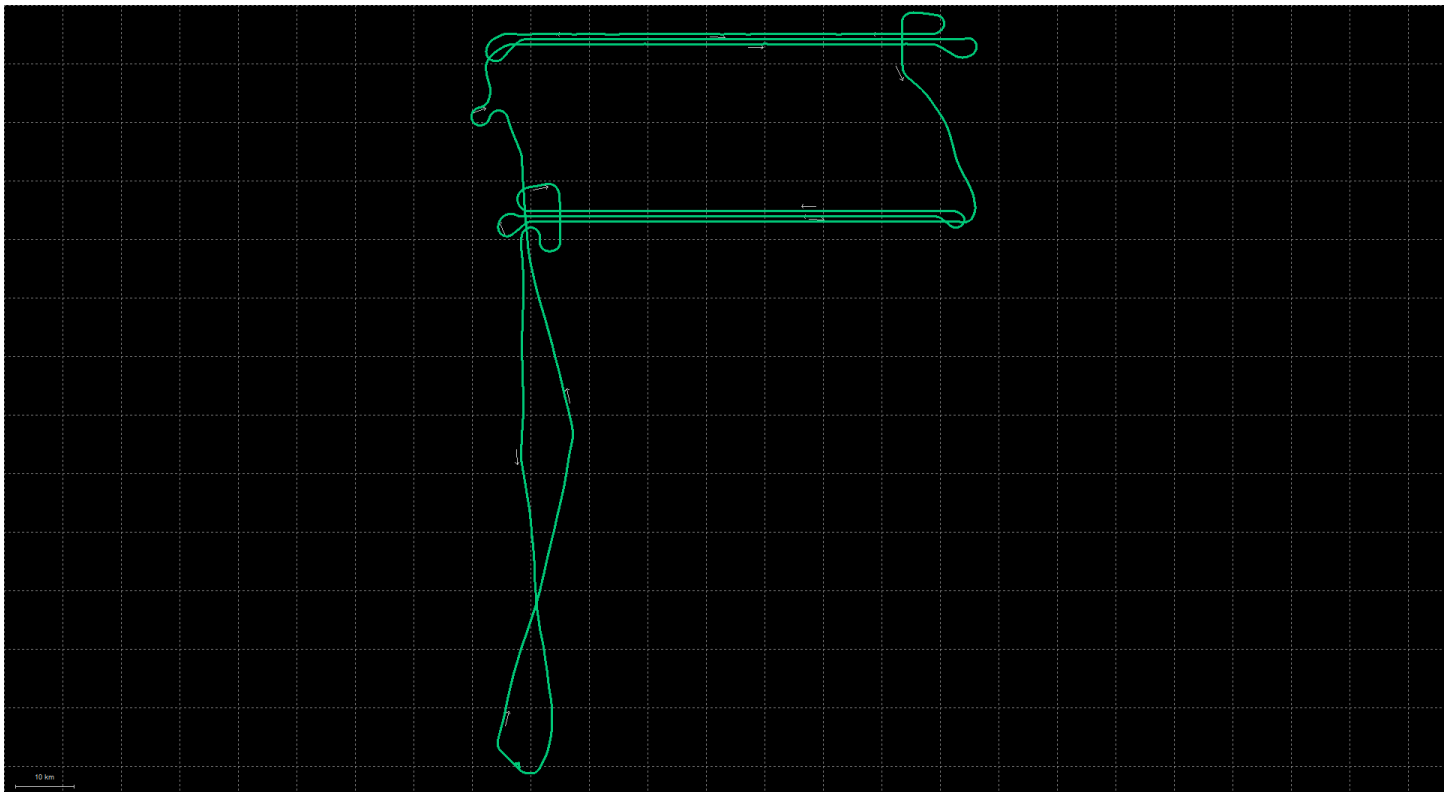
Base Station  
 2: V008 Name: V008  Disabled  
 File: E:\Proc\29513\_Maine\Mike\_Cox\_5-8-17\20170504\_121128\VRS\

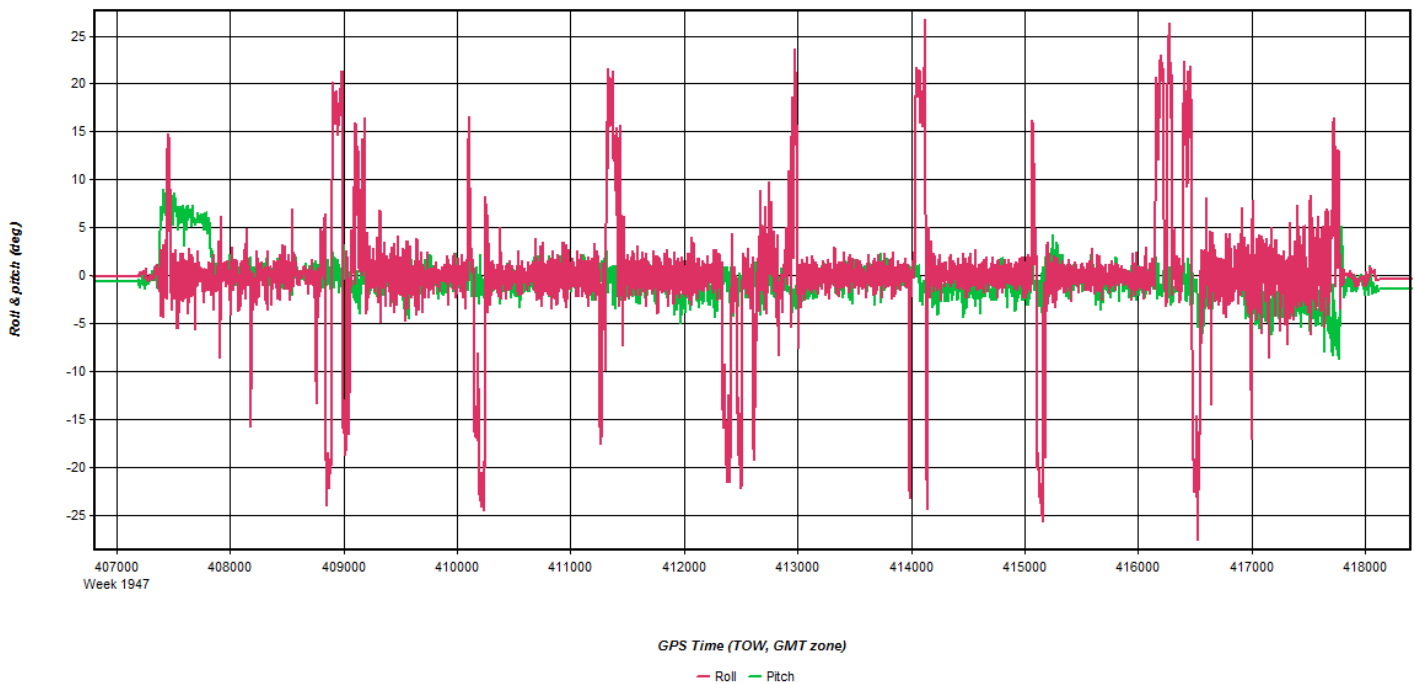
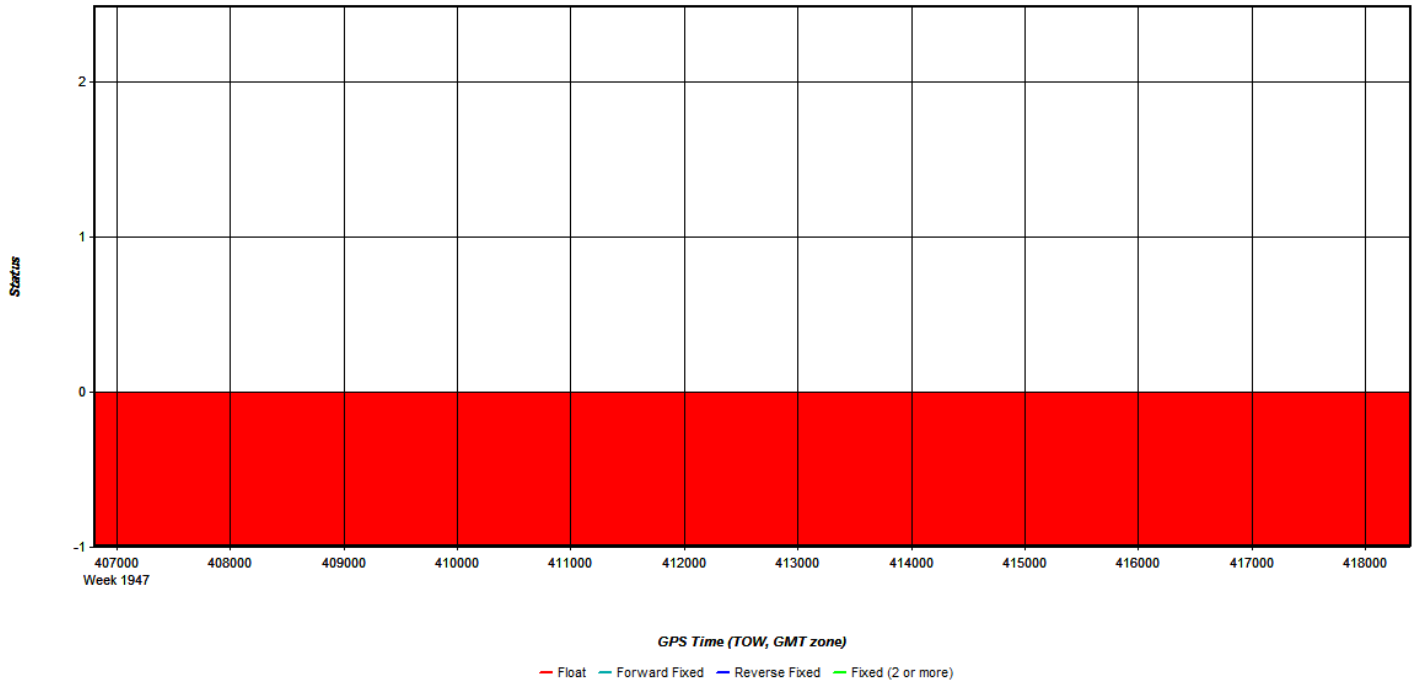
Coordinates  
 Latitude: North 45 52 25.64018 Coord. options  
 Longitude: West 68 03 11.01067 Save to Favorites  
 Ellipsoidal height: 99.996 m  
 Datum: WGS84 Proc Datum: WGS84  
 Epoch: year

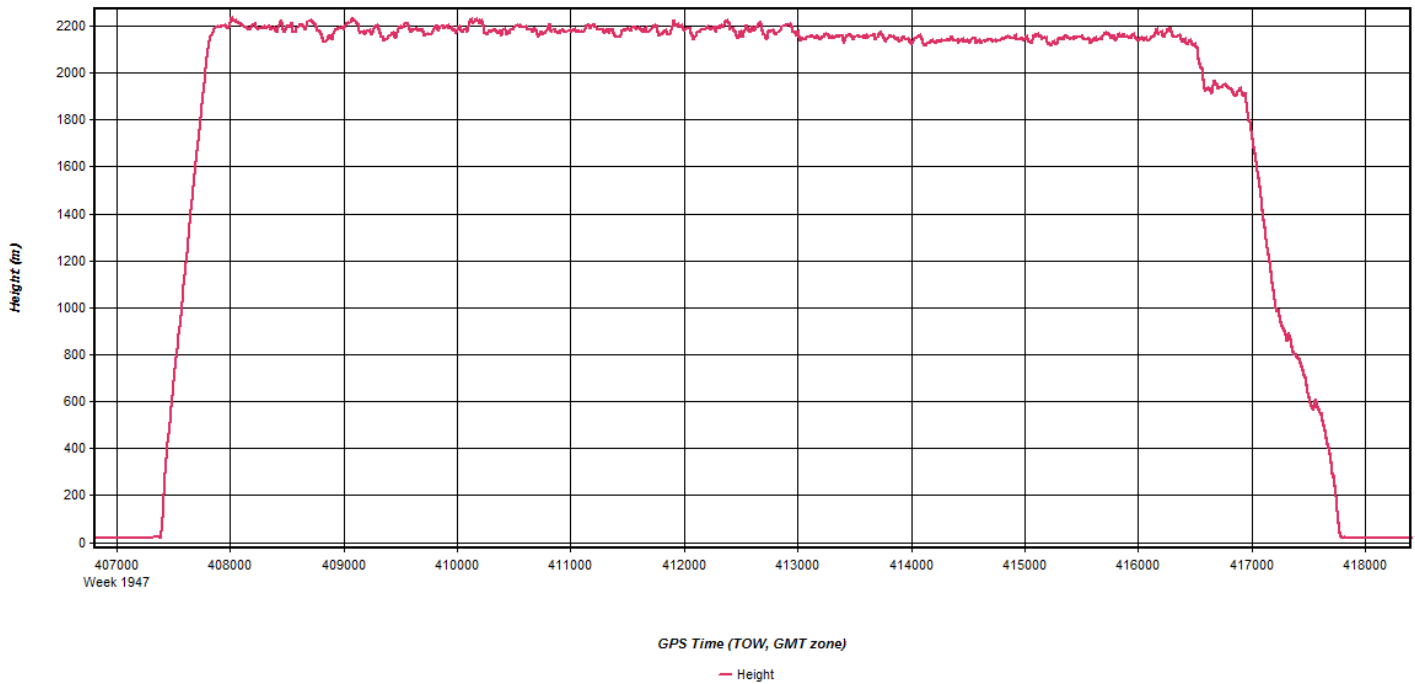
Antenna Height  
 From station file: TRM57971.00, TZGD View STA File  
 Antenna profile: TRM57971.00, TZGD Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.065 m  
 Applied height: 0.065 m  
 Measured to  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

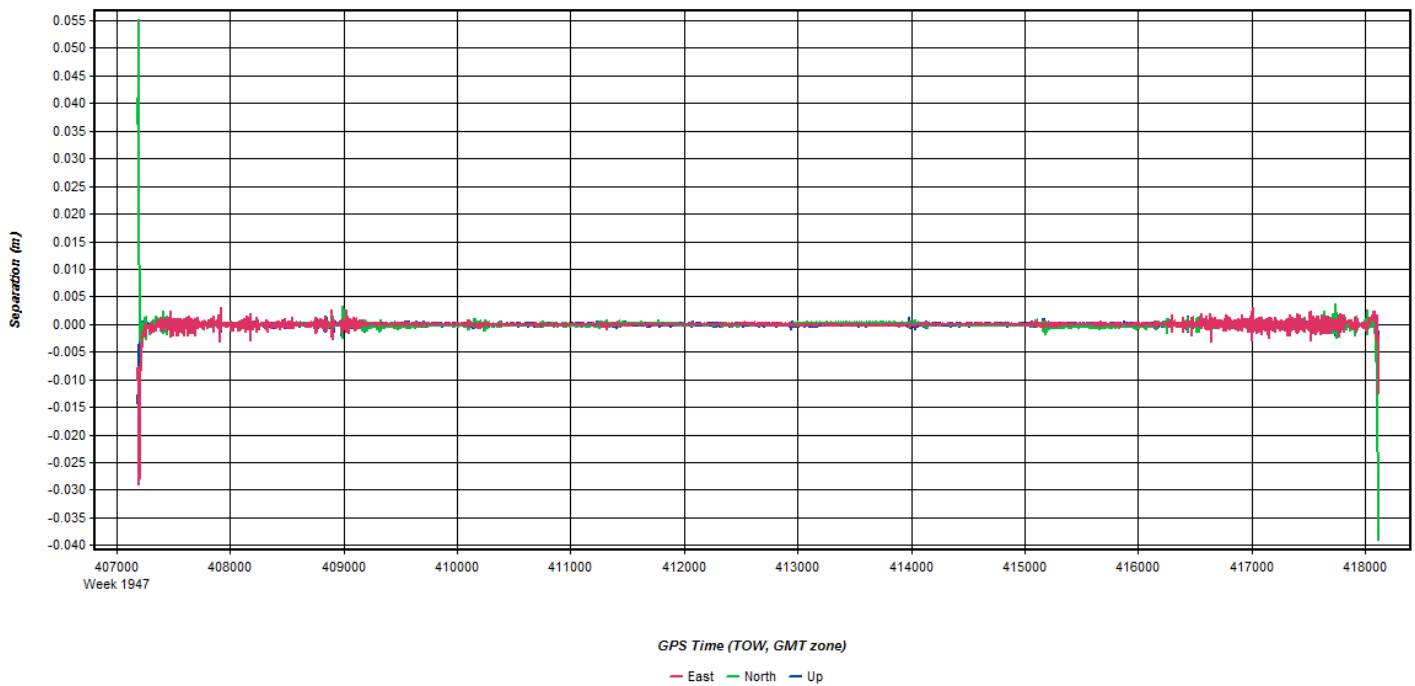
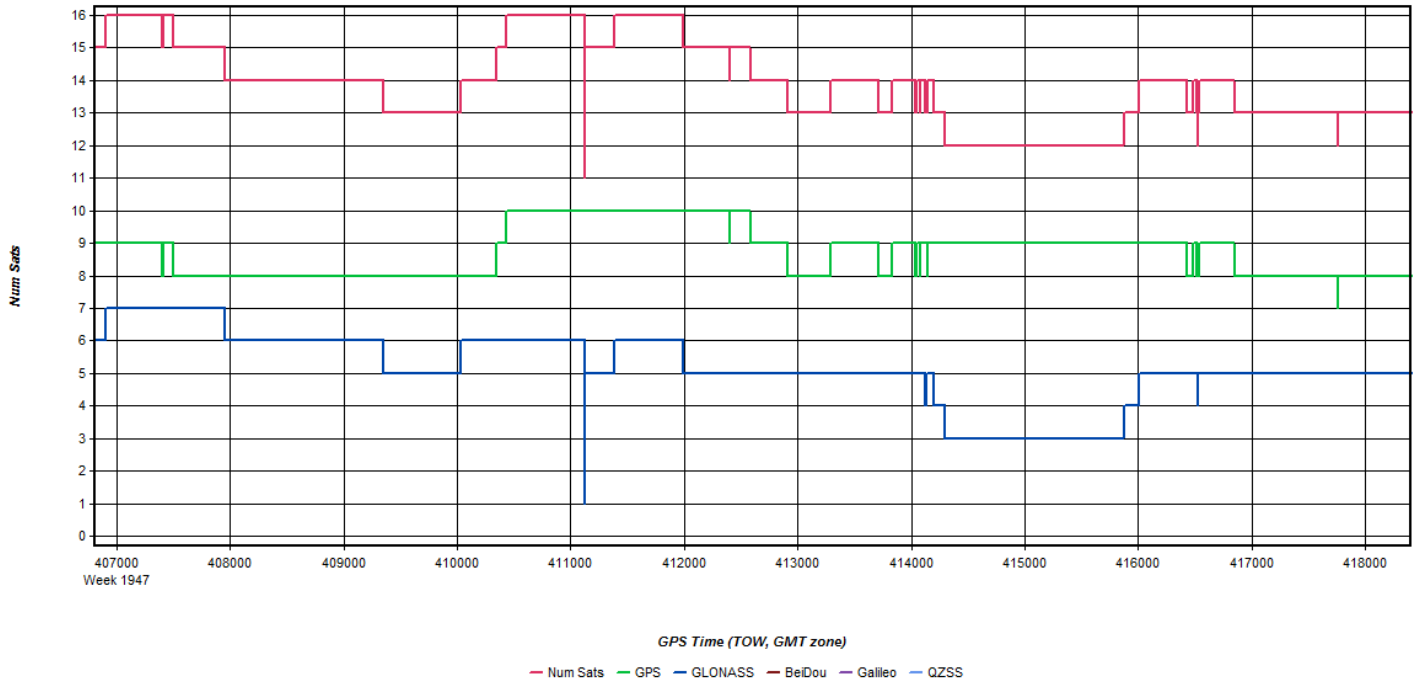
# 20170504-B (N262AS, SN7161)

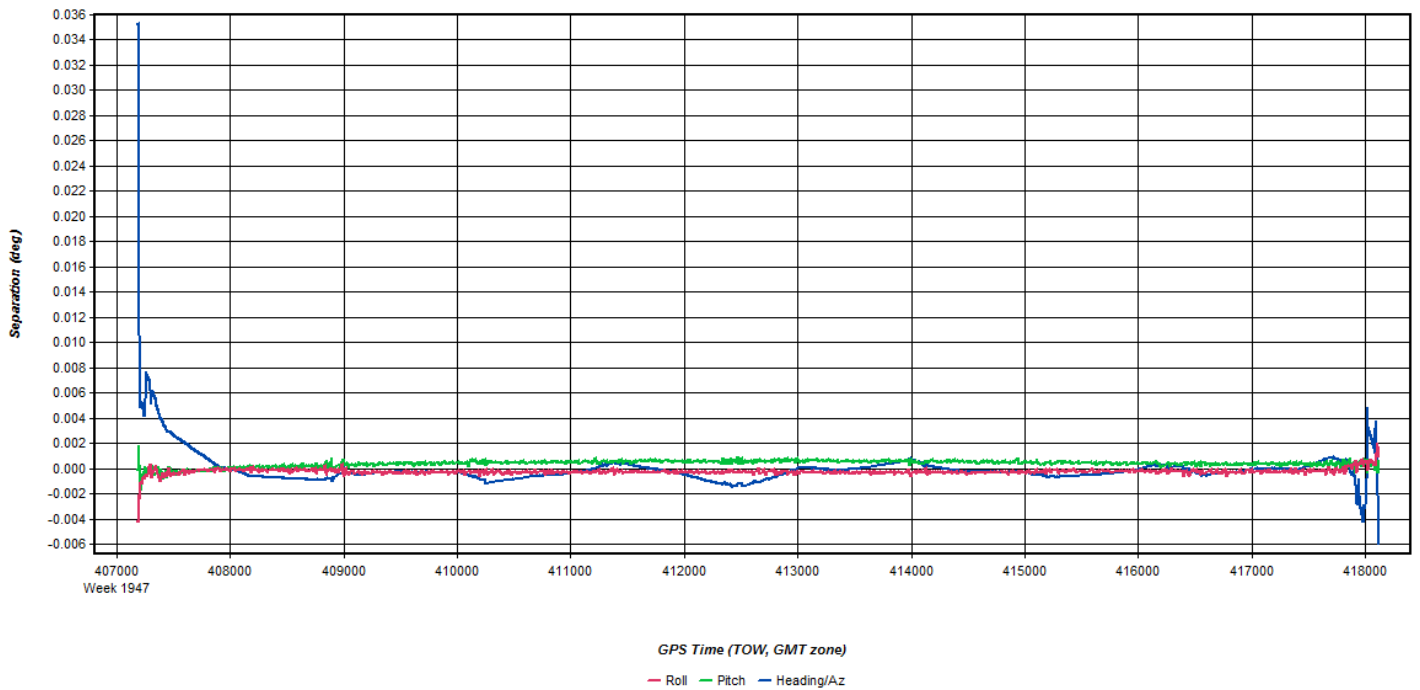
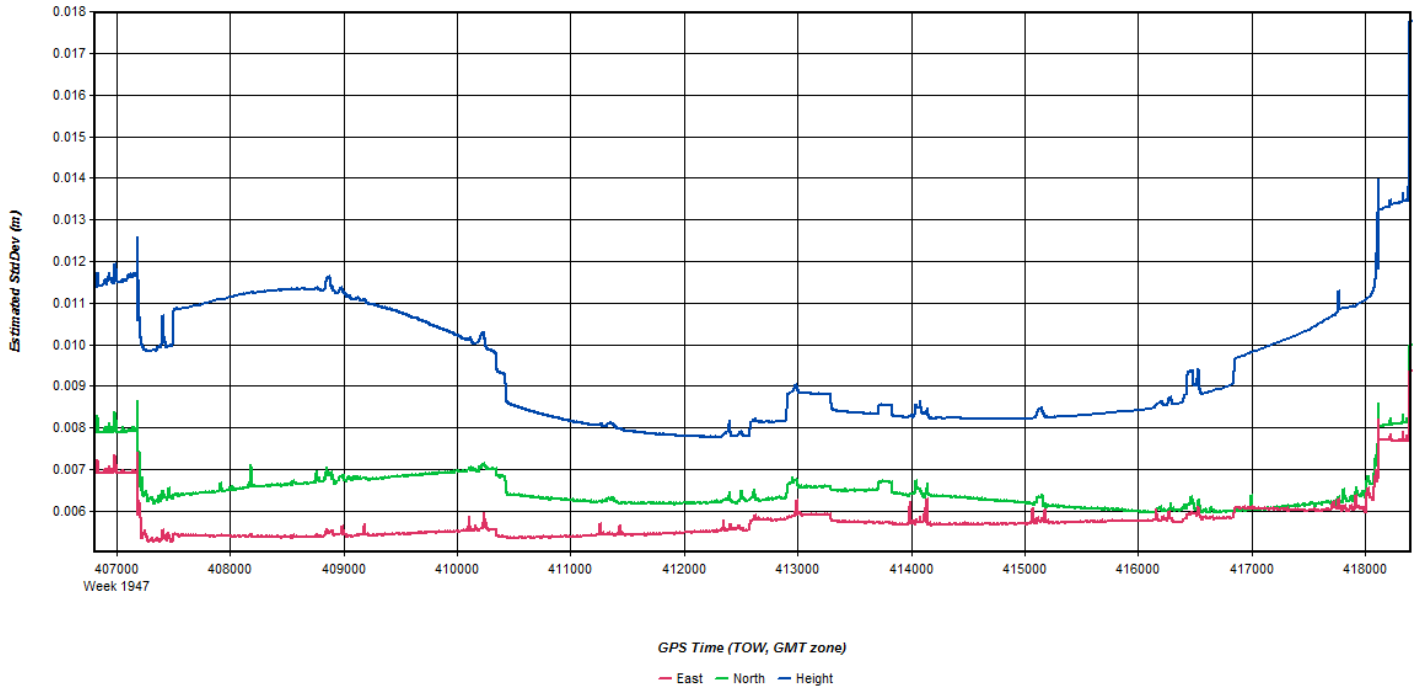


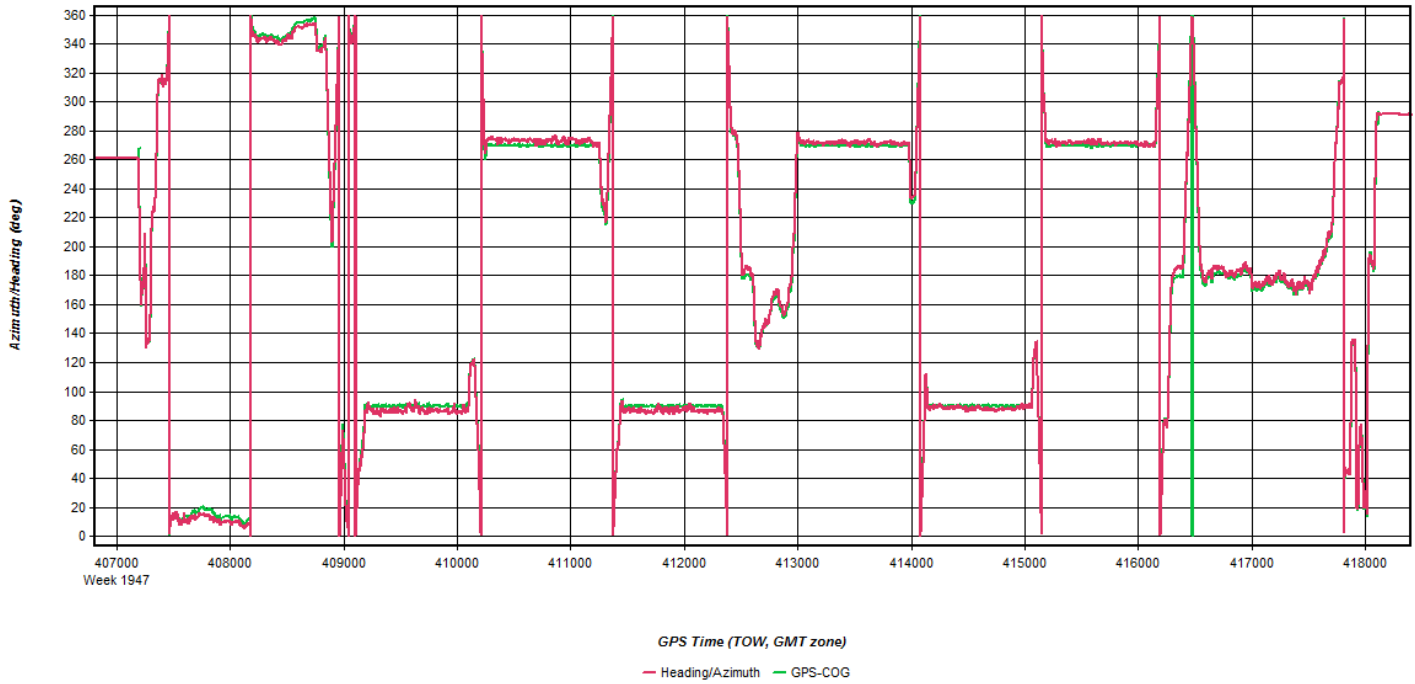












# Flight Log

**Quantum Spatial** Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc  
(email Log daily to Flight\_Log\_distribution\_List@quantumspatial.com)

Date: 5-4-17  
UTC (A) a c d e pg 1 of 2

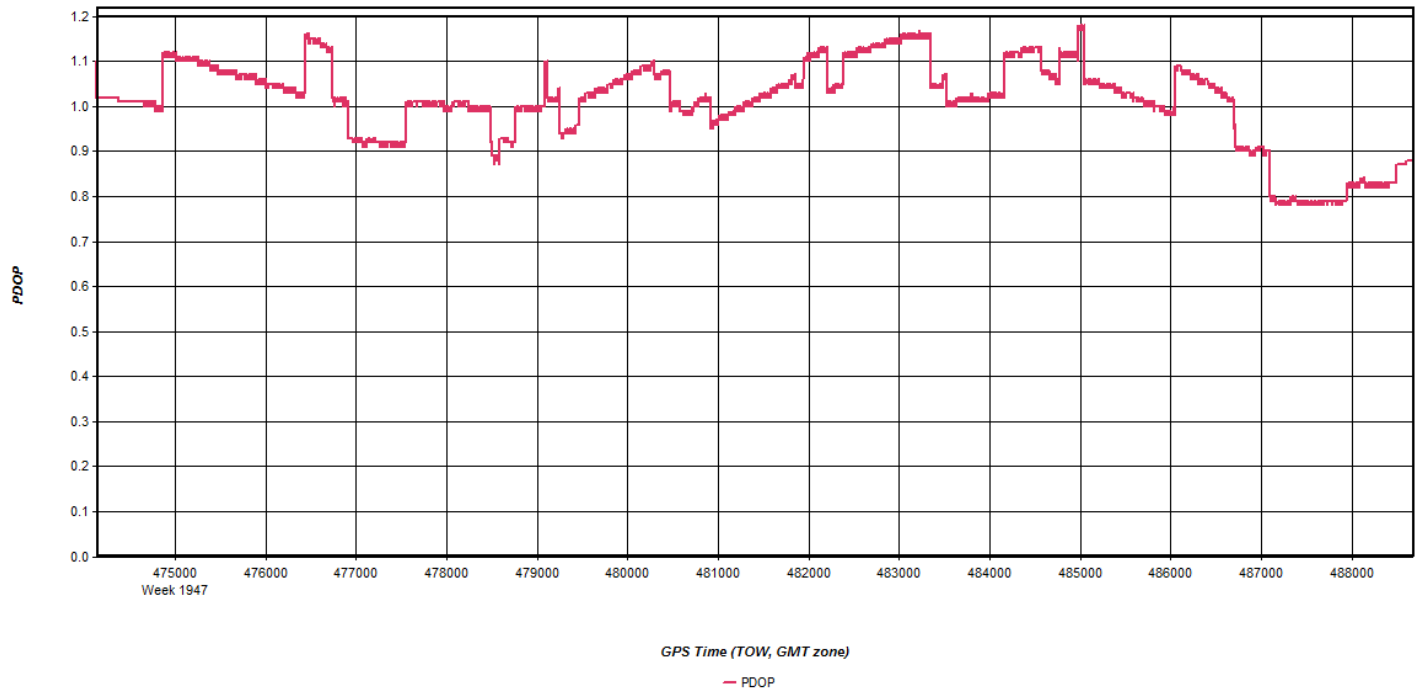
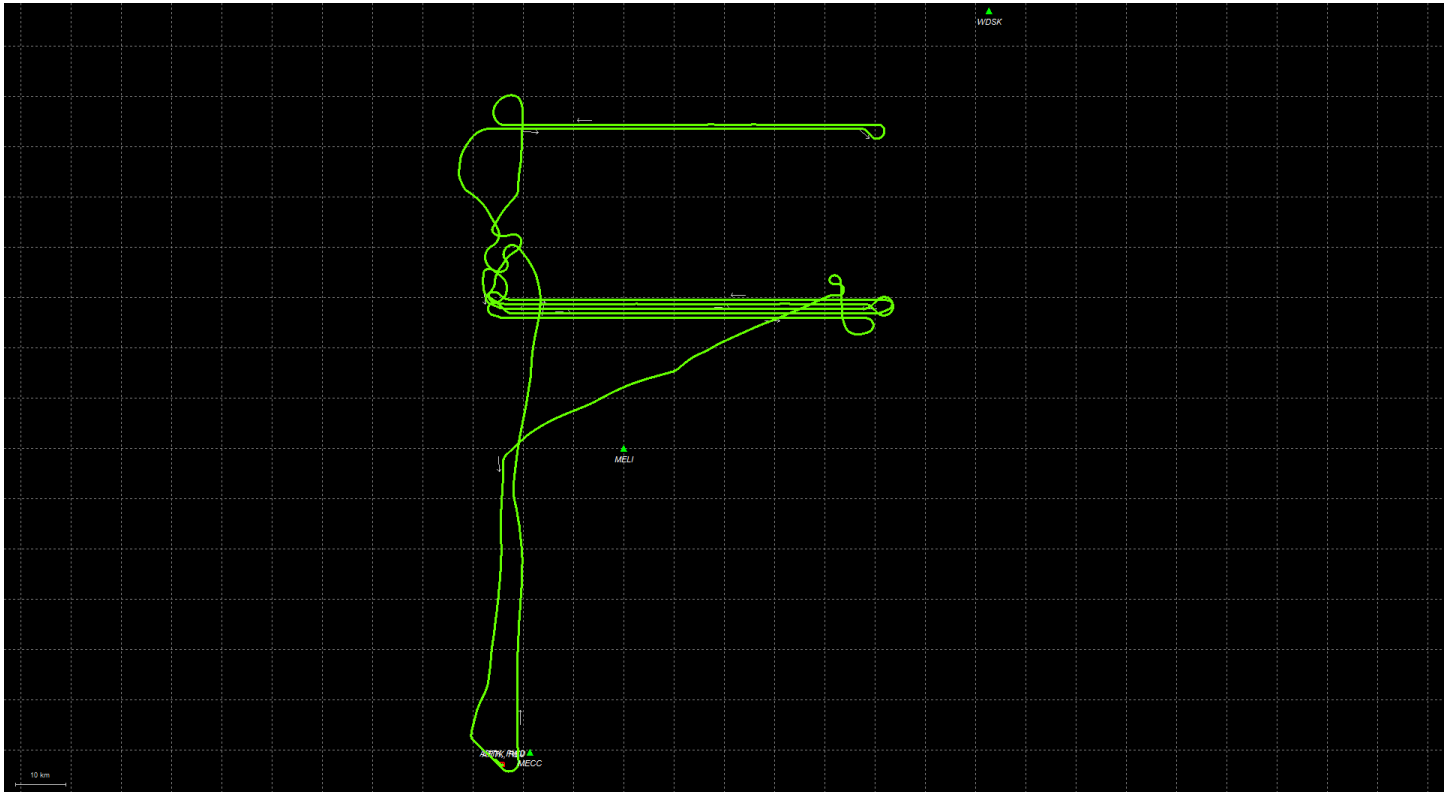
Project: USGS - MAWE - 2100		Proj #: 29513		Flight Mgmt File: 20170504-121128	
Aircraft: N262AS		Begin Hobbs: 6592.9	End Hobbs: 6596.4	Total: 3.5	Pilot: RADTKE
Dep Apt: KBGR		Dep Time (Ld): 08:18 (Z): 12:18	Arr Apt: KBGR	Arr Time (Local): 18:58 (Z): 15:58	Tot Time Aloft:
GPS Unit: Y (N)		Sta 1: MELI	Sta 2: MELI	Flyovers: Y (N)	If Y, times: Sta1) 12:42 Sta2) 15:59
Gd Temp beg: 7 °c		End: 12 °c	OAT beg: -2 °c	End: -1 °c	Altimeter begin: 30.23 end: 30.24
LIDAR	Type: ALS-70	Serial #: 7161	Alt AGL:	Alt AMSL:	Avg Terr Ht:
	FOV: 36	Scan Freq: 56	MplA: (N) / N	Pulse In Air: 2	Pulse Rate: 262.6
					Max Gdspd: 140
					Power: 100%
					Avg Pt Spacing
					PPSM
					Bag CB: 13
					End CB: 55
					Tot CB: 4R
					Storage Name/c: 015

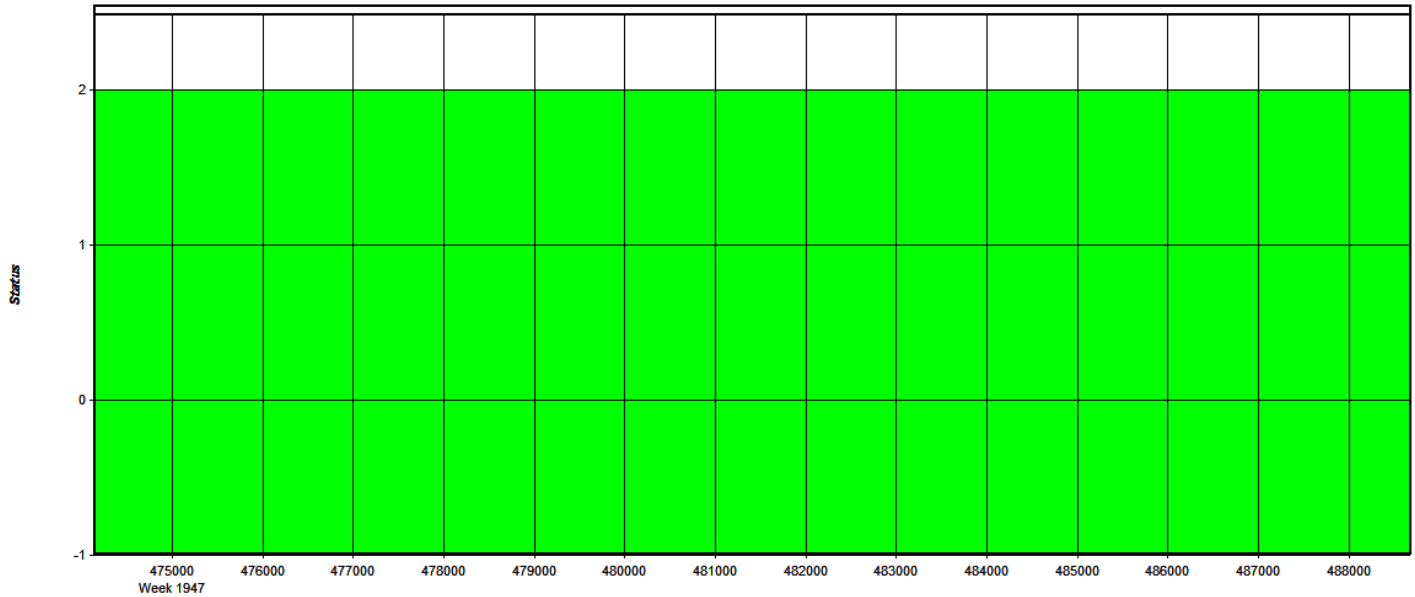
Line #	Hdg	Start [UTC]	End [UTC]	Gd Spd	PDOF/Sec	GPS Altitude	Crab	Turb (ft/s)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
1073	90	13:00	13:14	144	1.0/20	7136	-5		HIGH THW DVC 9-10 VIS - TRACE amount of smoke VERY WEST END
1072	270	13:18	13:33	147	1.1/17	7146	8		SMOKES
1071	90	13:36	13:51	145	1.2/17	7149	-6		
1070	270	13:54	14:09	144	1.2/18	7156	7		
1069	90	14:13	14:27	147	1.2/19	7152	-5		LIGHT TURB - EAST END
1068	270	14:30	14:45	143	1.1/20	7152	5		
1067	90	14:48	15:03	150	1.3/18	7156	-4		
1066	270	15:06	15:21	147	1.1/19	7162	6		
X TIE	179	15:24	15:27	150	1.1/19	7110	-		

Total Proj Lines:	Lines Flown: 8	Lines Remain:	Online Time: 0.5	Job Time: 1.0	Notes:
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Scanned by CamScanner

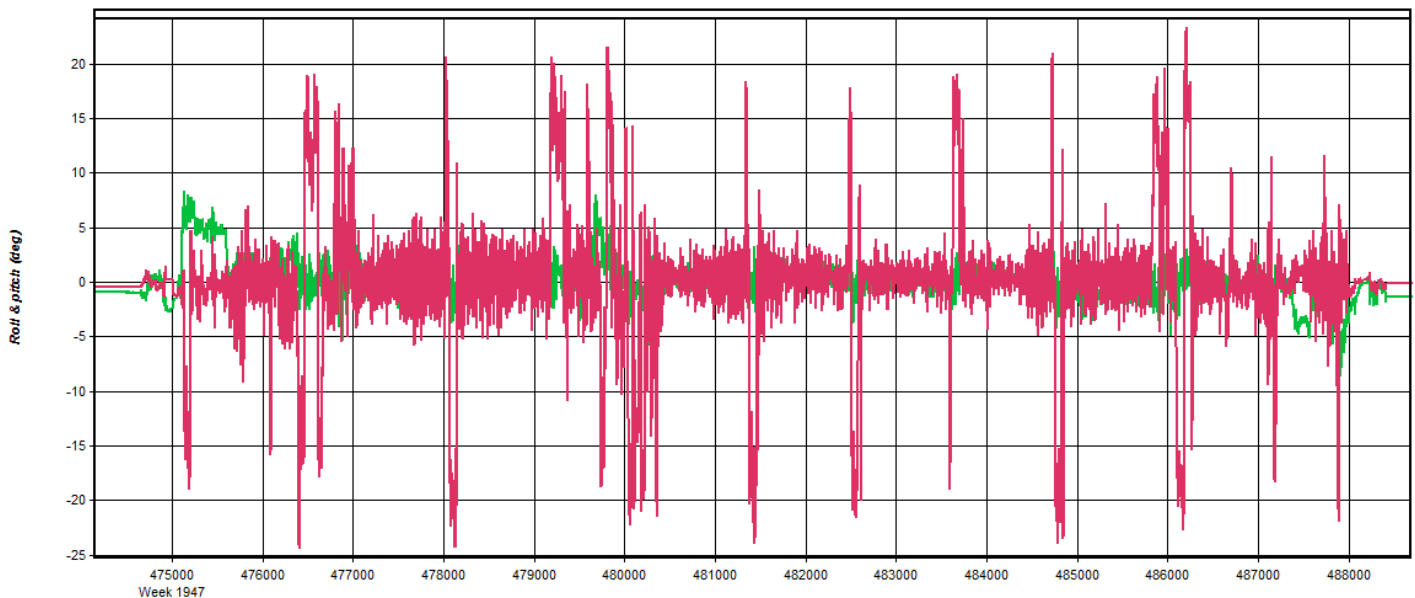
# 20170505-A (N262AS, SN7161)





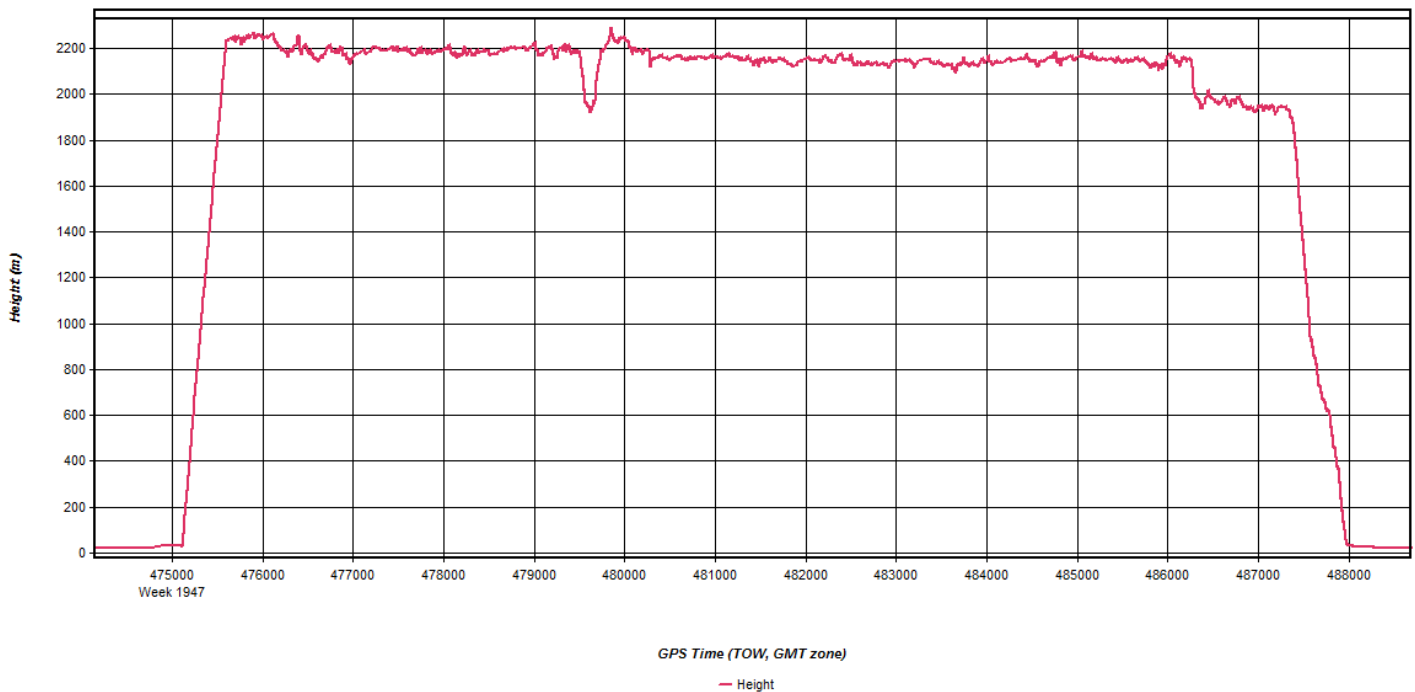
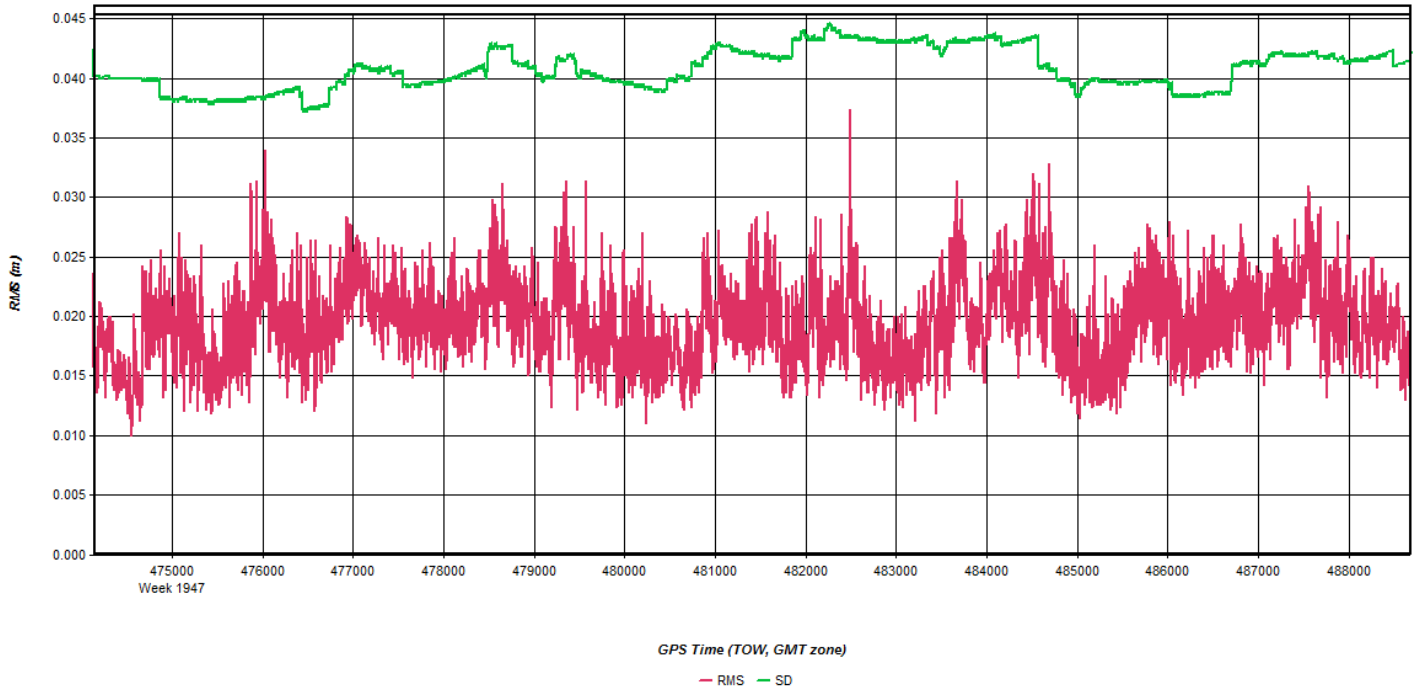
GPS Time (TOW, GMT zone)

— Float — Forward Fixed — Reverse Fixed — Fixed (2 or more)

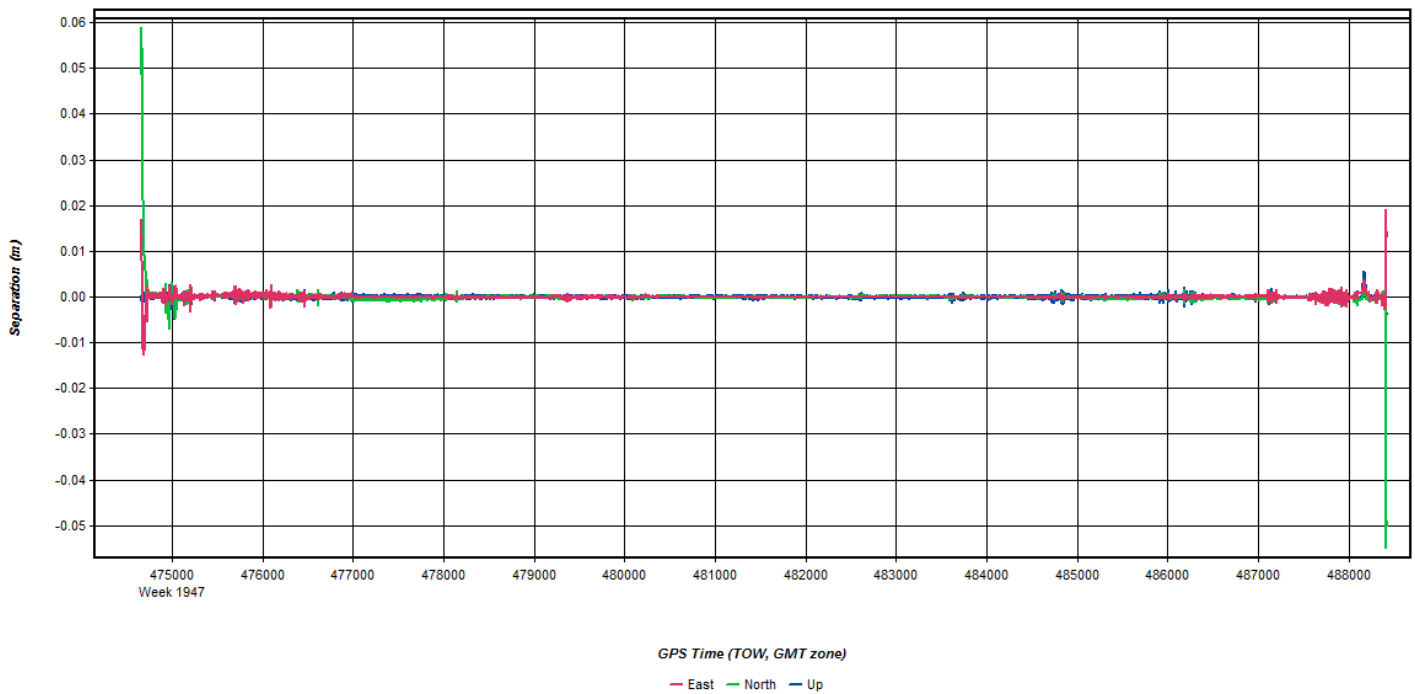
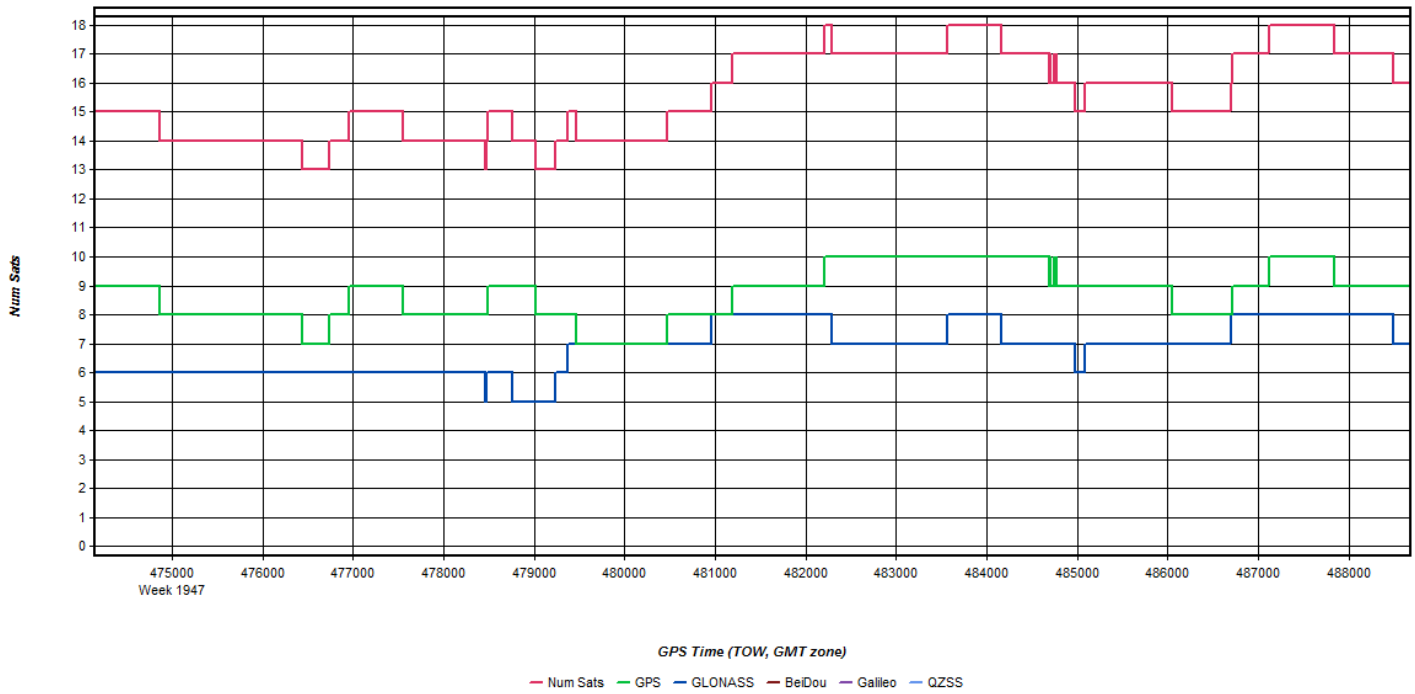


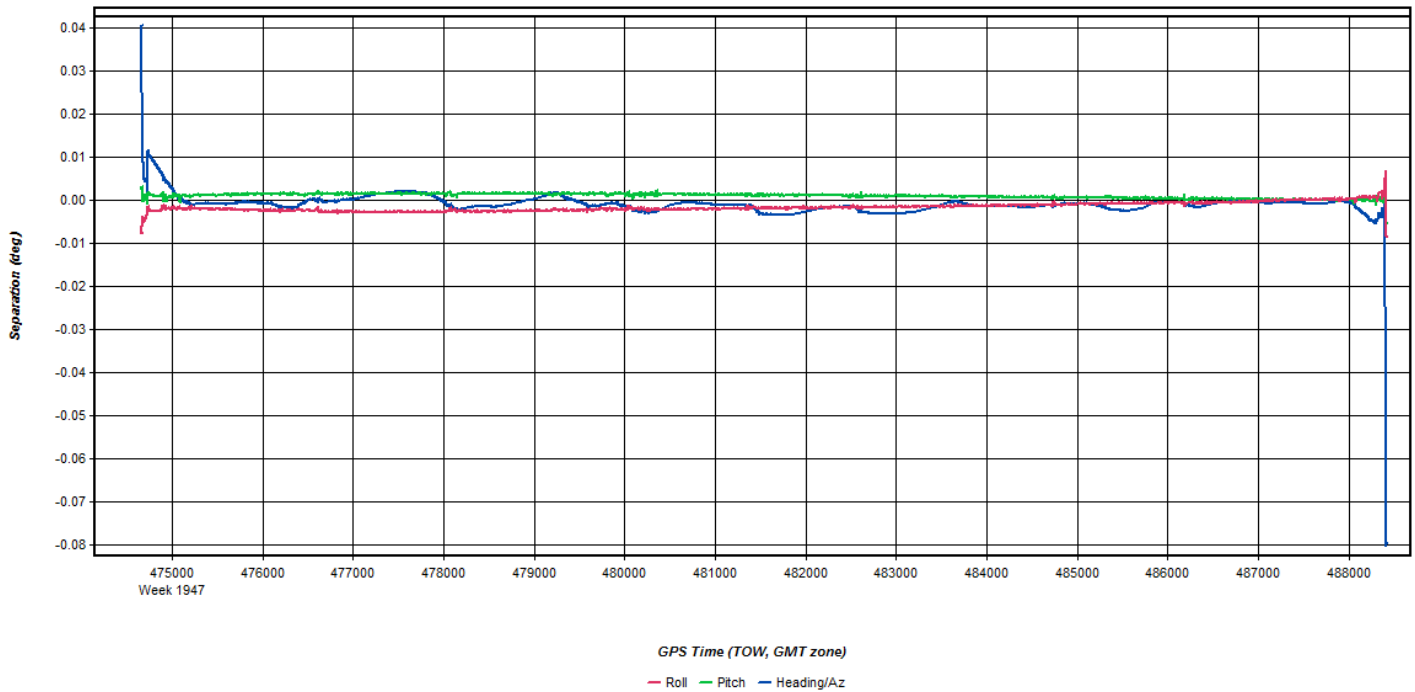
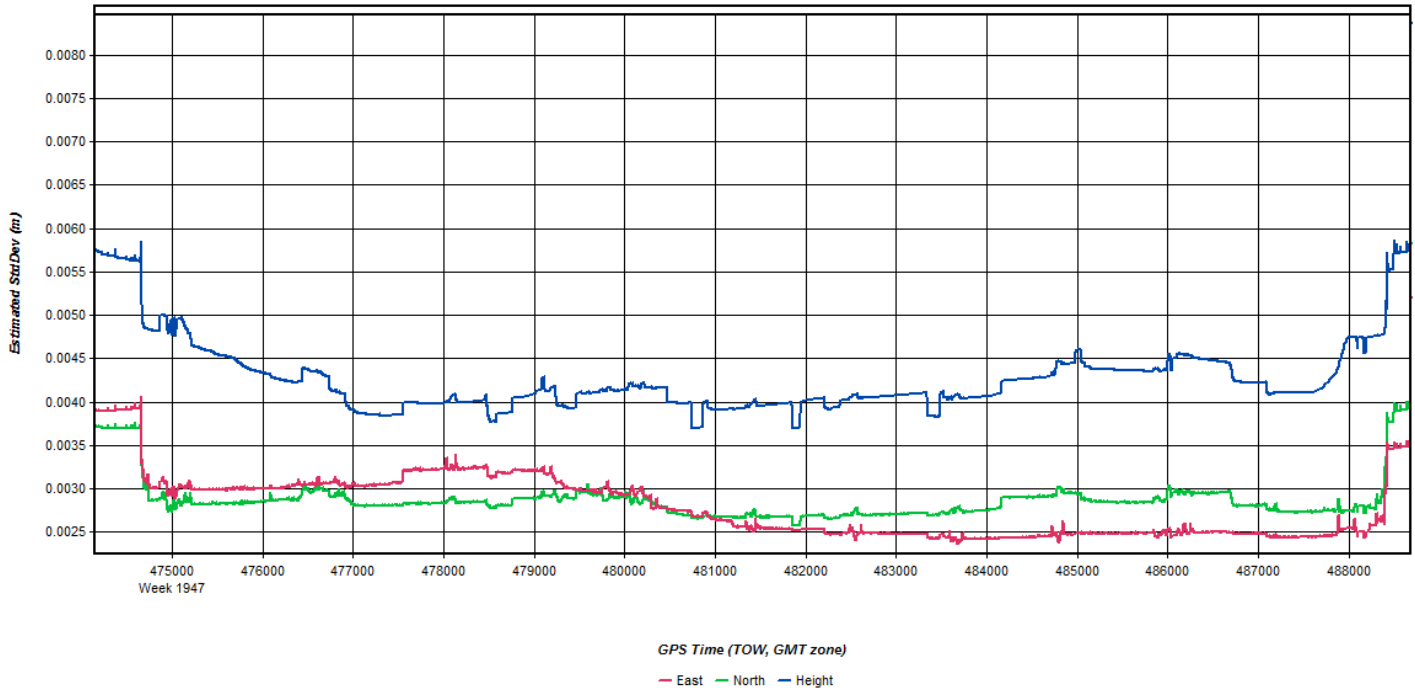
GPS Time (TOW, GMT zone)

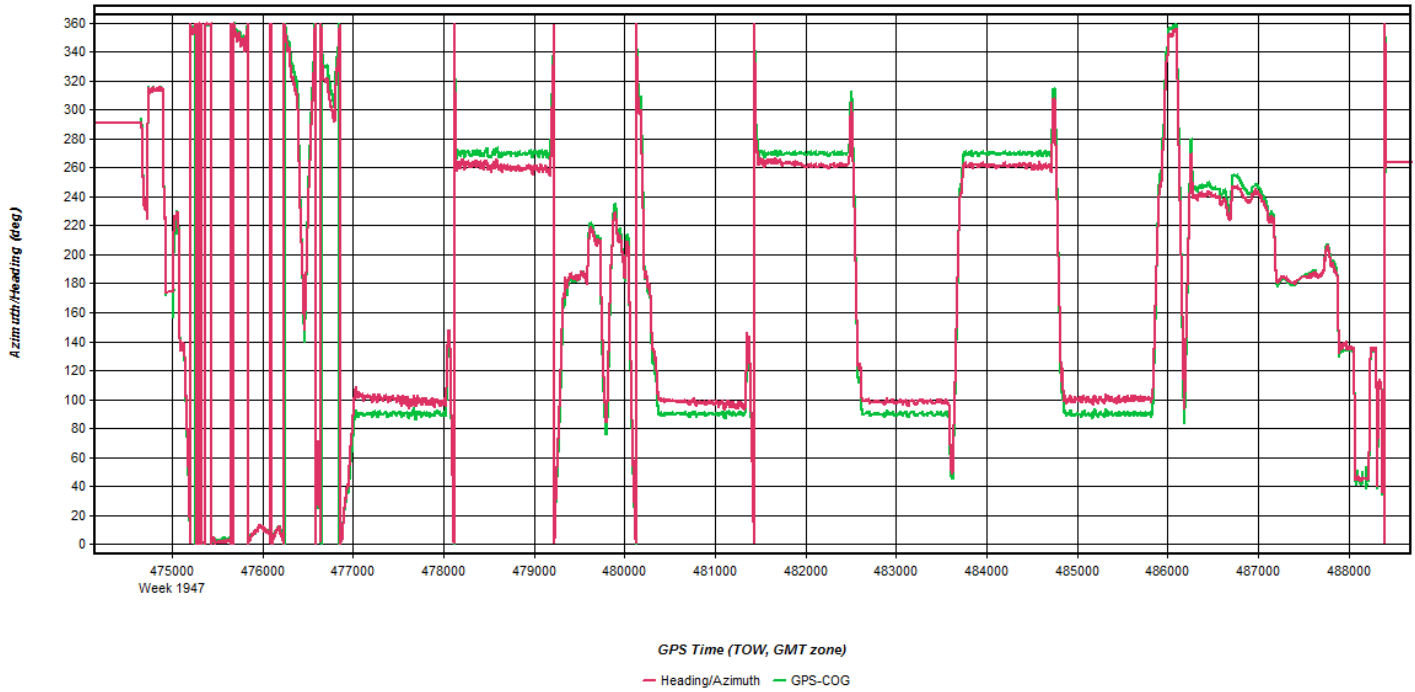
— Roll — Pitch











# Flight Log

**Quantum Spatial** Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc Date: 5-5-17

(email Log daily to flight\_log\_distribution\_list@quantumspatial.com) Life: A B C D E Pg 1 of 1

Project: USGS_MANE_2100		Proj #: 29513		Flight Mgmt File: 20170505-121128			
Aircraft: N202AS	Begin Hobbs: 6599.3	End Hobbs: 6602.8	Total: 3.5	Pilot: BARHAM	Co-Pilot: -	Tech: SCILIONE	
Dep Apt: KBBR	Dep Time (Ld): 07:42	(Z): 11:42	Arr Apt: KBBR	Arr Time (Local):	(Z):	Tot Time Aloft:	
CORS: <input checked="" type="checkbox"/> N	Sta 1: MELI	Sta 2: MELI	Flyovers: Y / N	If Y, times: Sta 1) 12:11	Sta 2) 15:16		
GPS Unit: Y <input checked="" type="checkbox"/>	Sta 1:	Sta 2:	Flyovers: Y <input checked="" type="checkbox"/>	If Y, times: Sta 1)	Sta 2)		
Gd Temp beg: 7 °c	End: 12 °c	OAT beg: °c	End: °c	Altimeter begin: 30.17	end: 30.15		
LIDAR	Type ALS-70	Serial # 7161	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdepd 140	Avg Pt Spacing
	FOV 36	Scan Freq 56	MpiA <input checked="" type="checkbox"/> N	Pulse In Air 2	Pulse Rate 262.6	Power 100%	PPSM

Mag CB 394	Storage Name/ #
End CB 433	016
Tot CB 39	

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PDOP/sens	GPS Altitude	Crsb	Turb (0-4)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
1062	90	12:31	12:46	136	1.0/17	7162	10		OVC 11K - 7500 IN SOME AREAS VIS 16
1061	270	12:49	13:05	134	0.9/19	7162	-6		HEAVYER HAZE UNDERNEATH US ON EAST END 15 MILES IN - LIGHT TURB
X TIE	S	13:08	13:10	118	1.0/17	7200	-		
1102	90	13:26	13:41	135	1.1/17	7047	10		SMOOTHER & CLEARER
1101	270	12:45	14:00	193	1.2/18	7047	-6		
1103	90	14:03	14:19	140	1.3/18	7037	9		
1104	270	14:22	14:38	142	1.2/19	7037	-8		
1105	90	14:41	14:56	142	1.4/18	7050	9		
X TIE	N	14:59	15:01	153	1.1/19	7100	-		

Total Proj Lines:	Lines Flown: 7	Lines Remain:	Online Time: 2.5	Mob Time: 1.0	Notes:
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Scanned by CamScanner

# Base Station Log

Coordinate/Antenna Settings ? X

Master Remote

Base Station

3: MECC Name: MECC  Disabled

File: E:\Proc\29513\_Maine\Mike\_Cox\_5-8-17\20170505\_114057\VRS\1

Coordinates

Latitude: North 44 49 33.21003 Coord. options

Longitude: West 68 44 38.60195 Save to Favorites

Ellipsoidal height: 20.586 m

Datum: WGS84 Proc Datum: WGS84

Epoch: year

Antenna Height

From station file: TRM55971.00, NONE View STA File

Antenna profile: TRM55971.00 Info

Measured height: 0.000 m

ARP to L1 offset: 0.067 m

Applied height: 0.067 m

Measured to

ARP

L1 Phase Centre

Compute From Slant

OK Cancel

Coordinate/Antenna Settings ? X

Master Remote

Base Station  
 1: MELI Name: MELI  Disabled  
 File: E:\Proc\29513\_Maine\Mike\_Cox\_5-8-17\20170505\_114057\VRS\1

Coordinates  
 Latitude: North 45 21 49.15536 Coord. options  
 Longitude: West 68 30 26.61463 Save to Favorites  
 Ellipsoidal height: 54.567 m  
 Datum: WGS84 Proc Datum: WGS84  
 Epoch: year

Antenna Height  
 From station file: TRM57971.00, NONE View STA File  
 Antenna profile: TRM57971.00 Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.065 m  
 Applied height: 0.065 m  
 Measured to  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

Coordinate/Antenna Settings ? X

Master Remote

Base Station  
2: WDSK Name: WDSK  Disabled  
File: E:\Proc\29513\_Maine\Mike\_Cox\_5-8-17\20170505\_114057\VRS\1

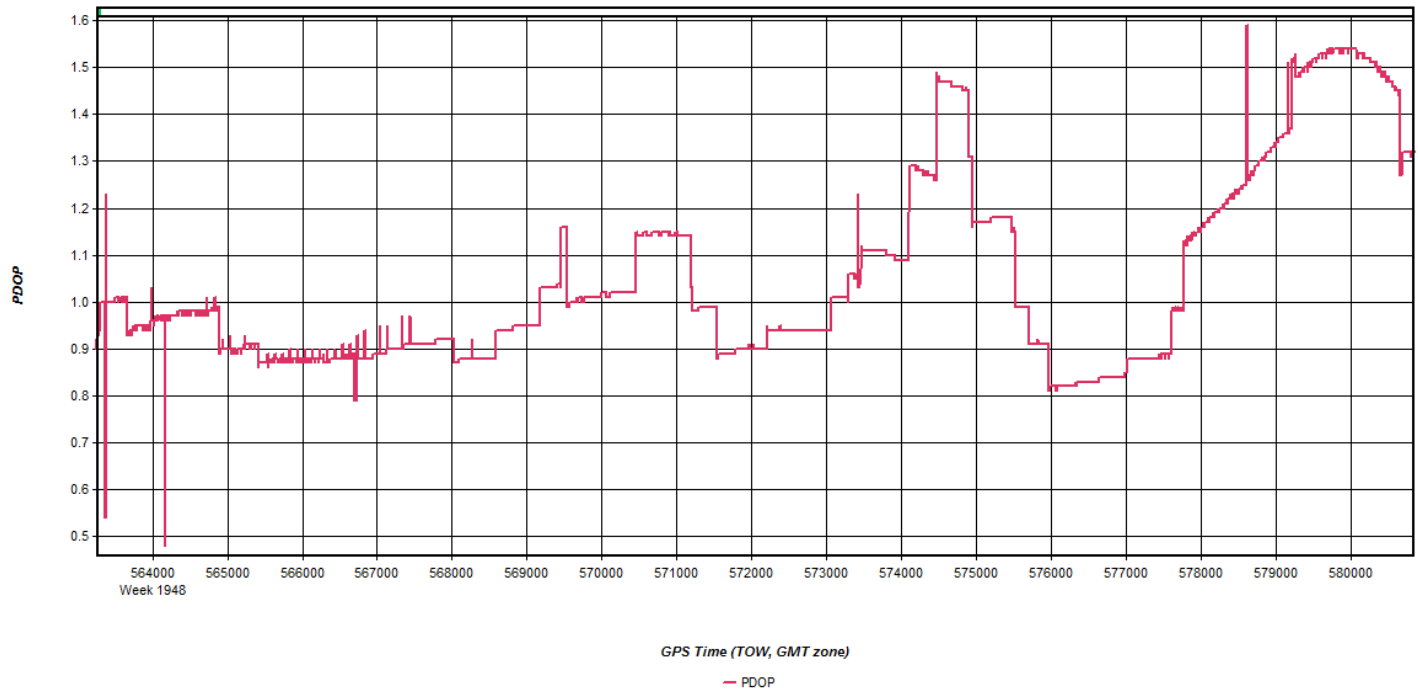
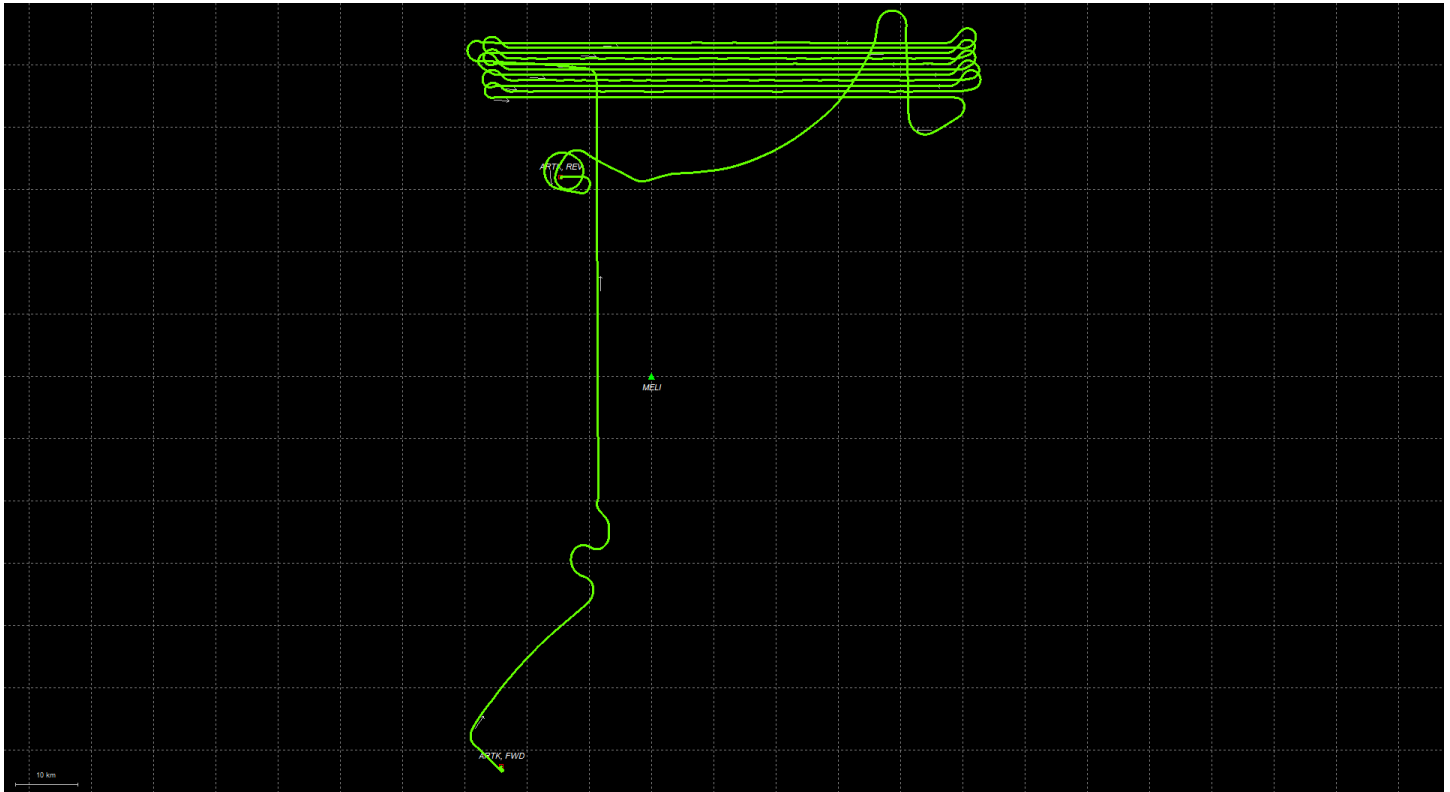
Coordinates  
Latitude: North 46 08 18.21991 Coord. options  
Longitude: West 67 35 09.17491 Save to Favorites  
Ellipsoidal height: 37.784 m  
Datum: WGS84 Proc Datum: WGS84  
Epoch: year

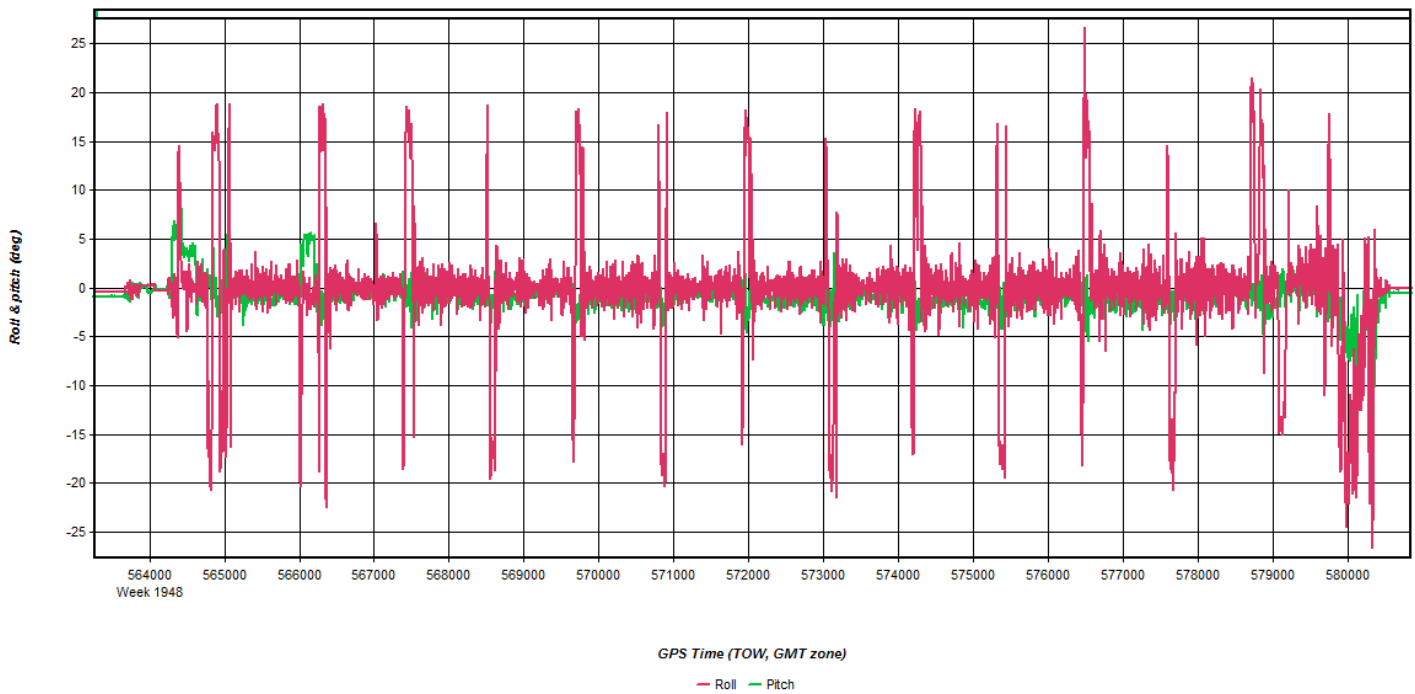
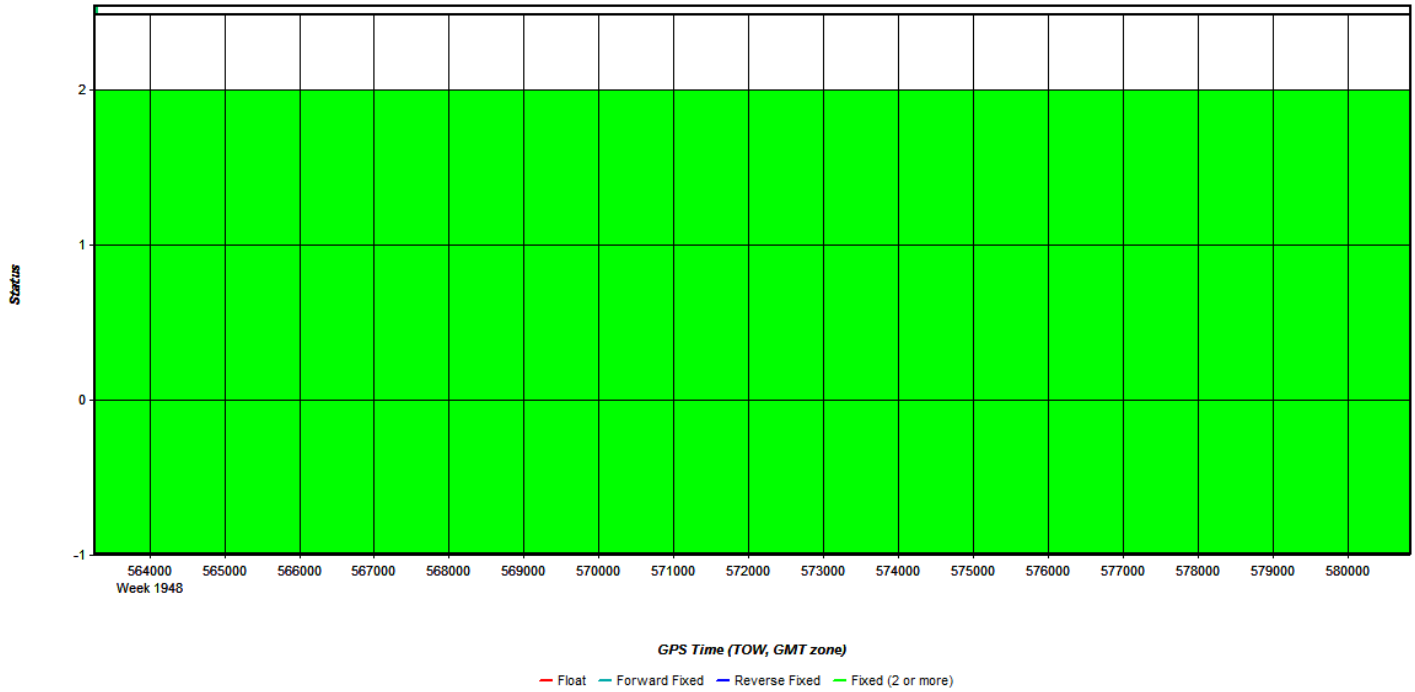
Antenna Height  
From station file: TRM57971.00, TZGD View STA File  
Antenna profile: TRM57971.00, TZGD Info  
Measured height: 0.000 m  
ARP to L1 offset: 0.065 m  
Applied height: 0.065 m  
Measured to  
 ARP  
 L1 Phase Centre  
Compute From Slant

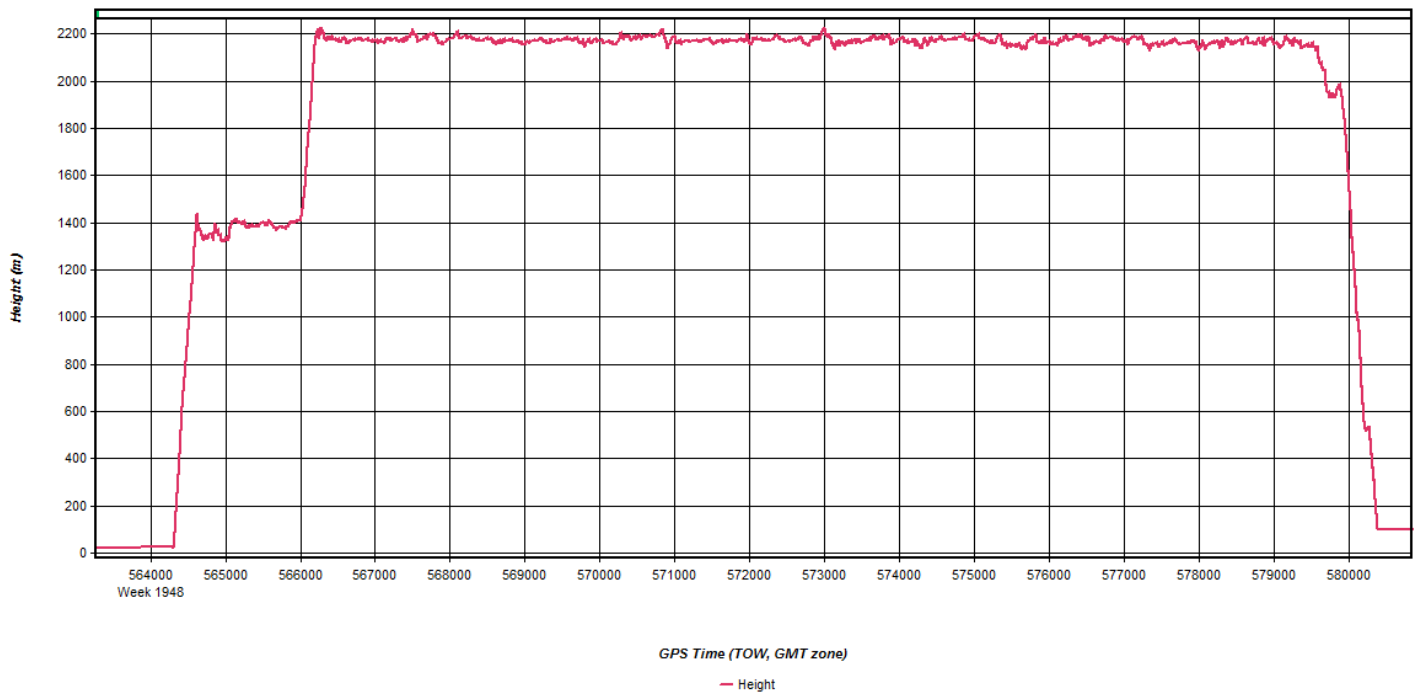
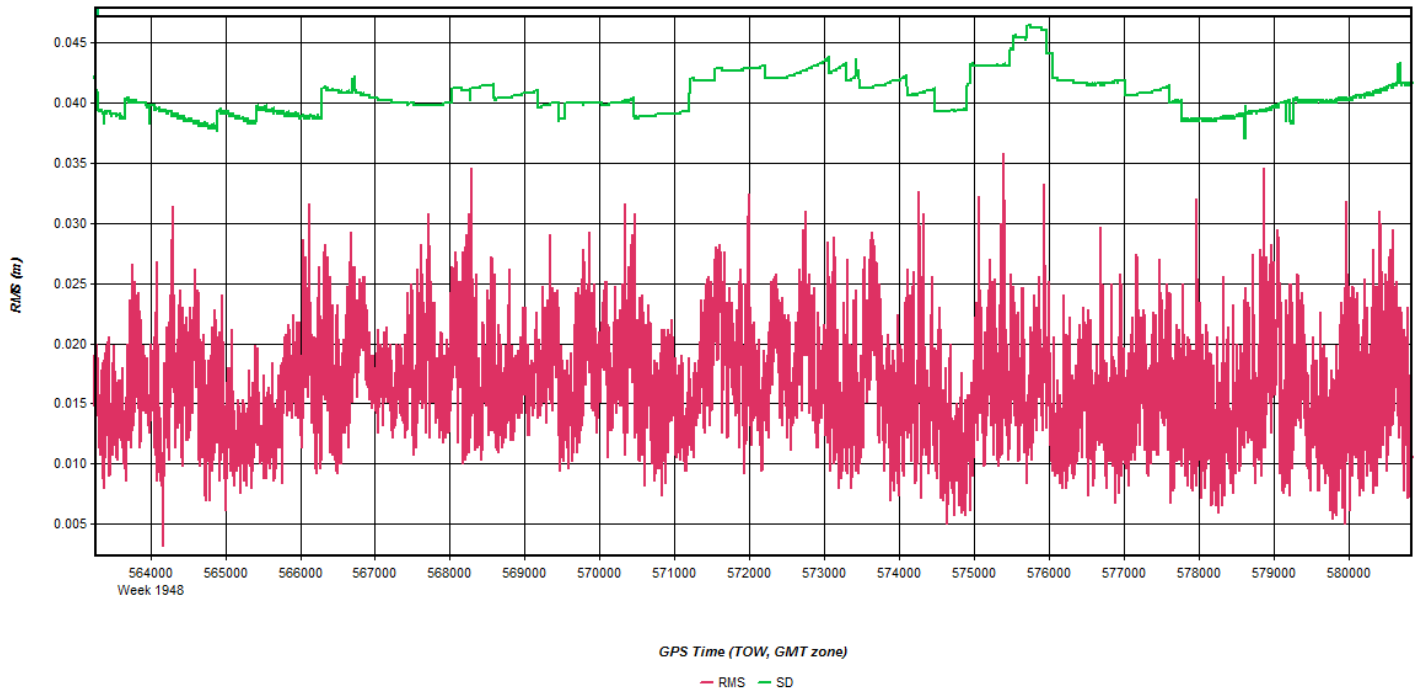
OK Cancel

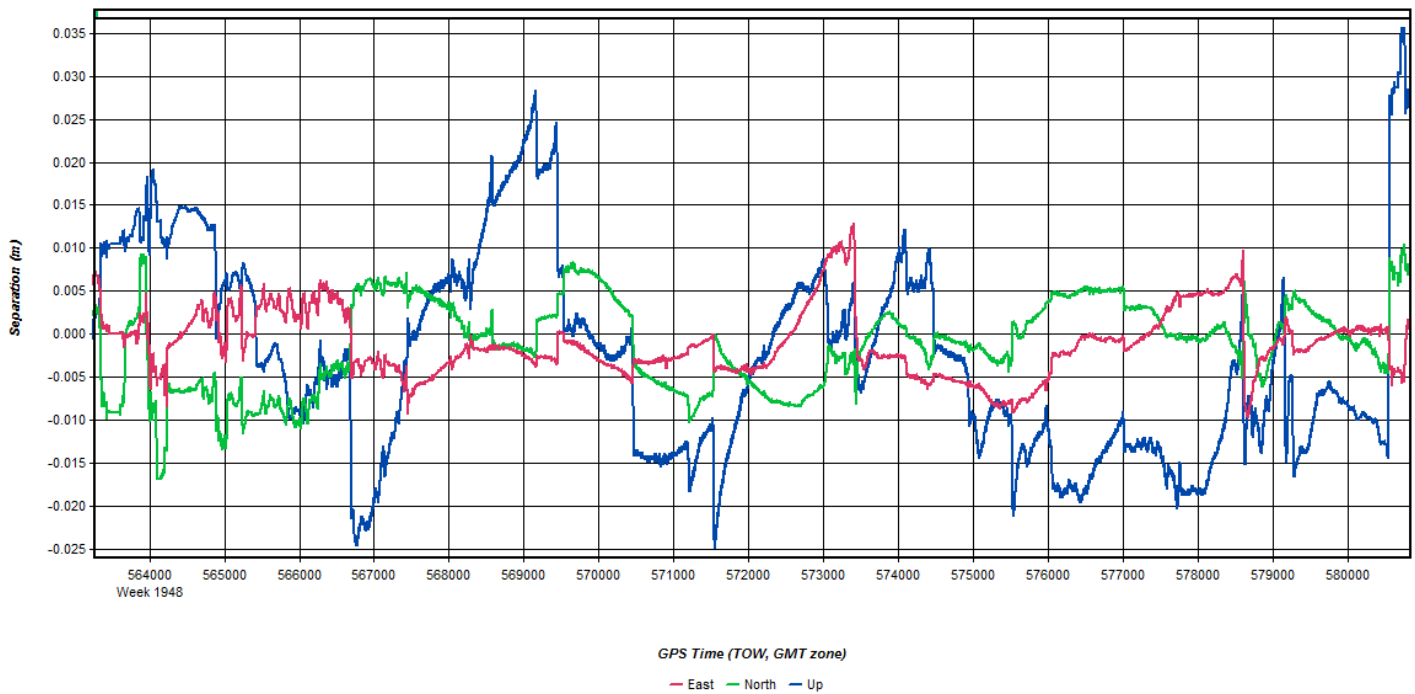
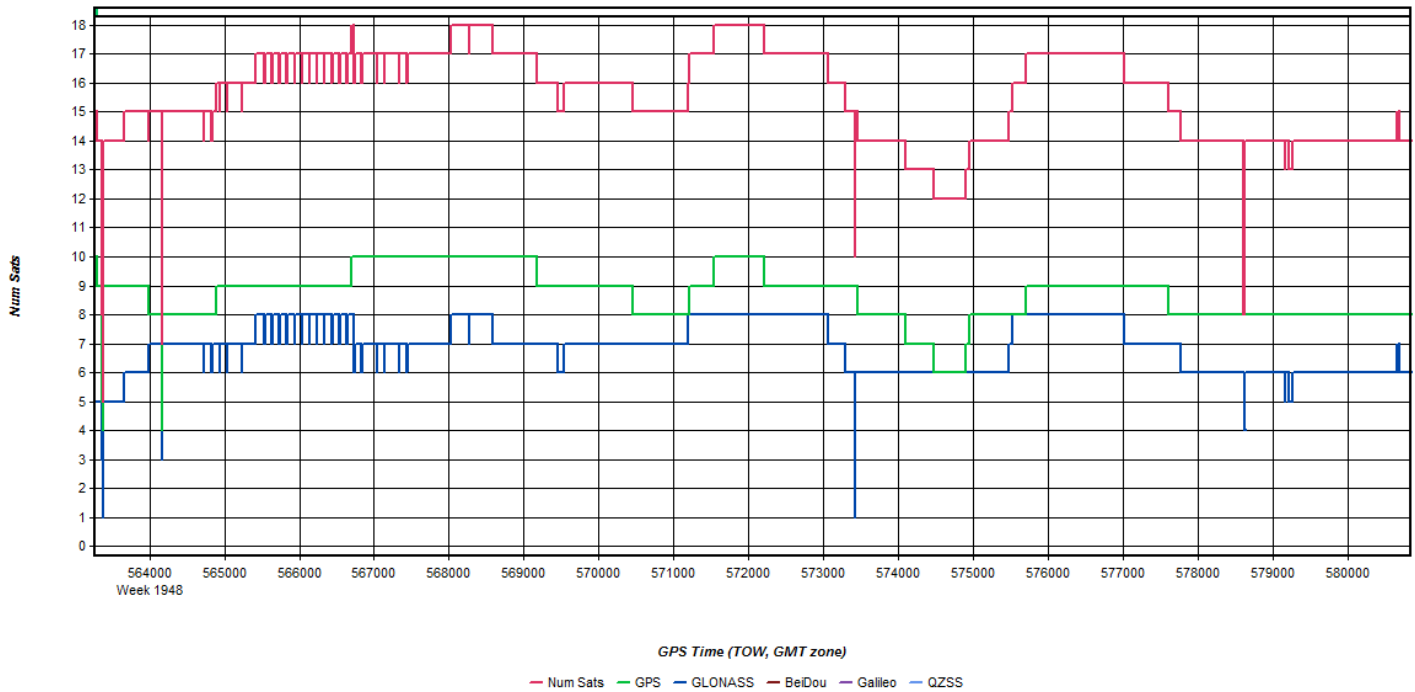
# 20170513-A (N262AS, SN7161)

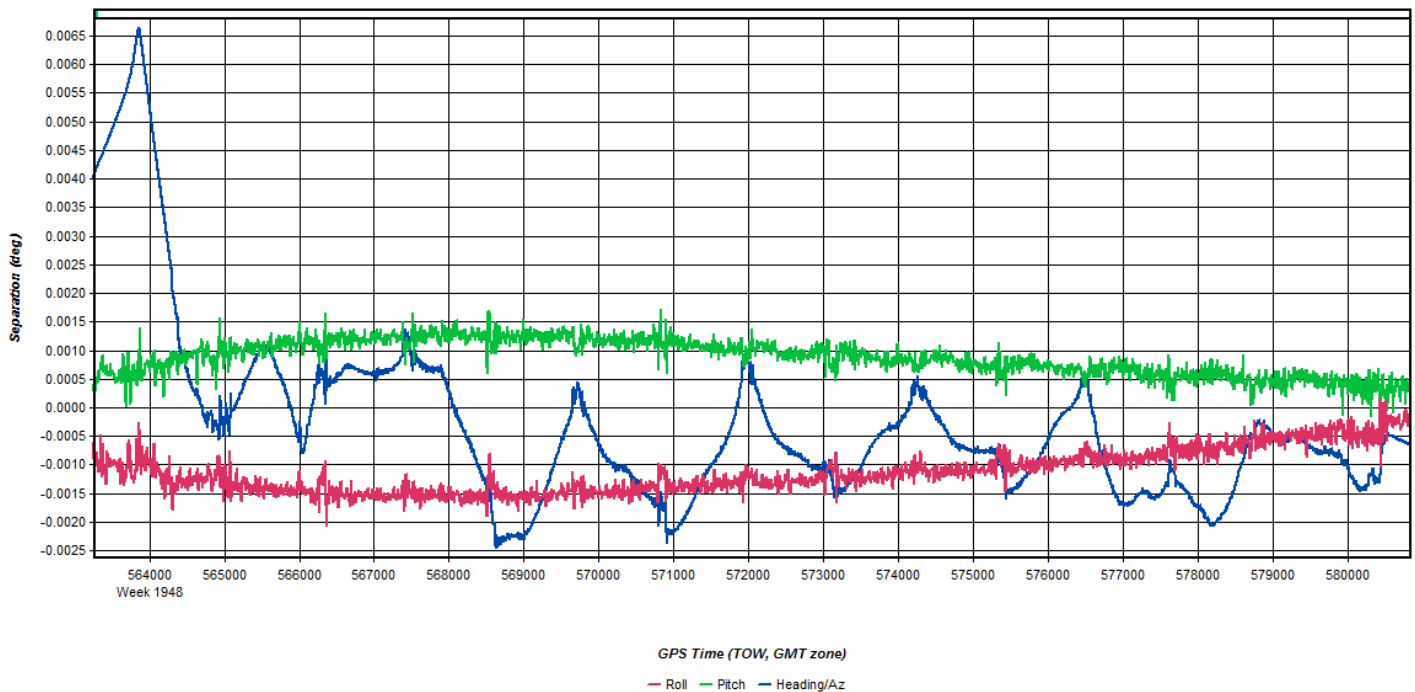
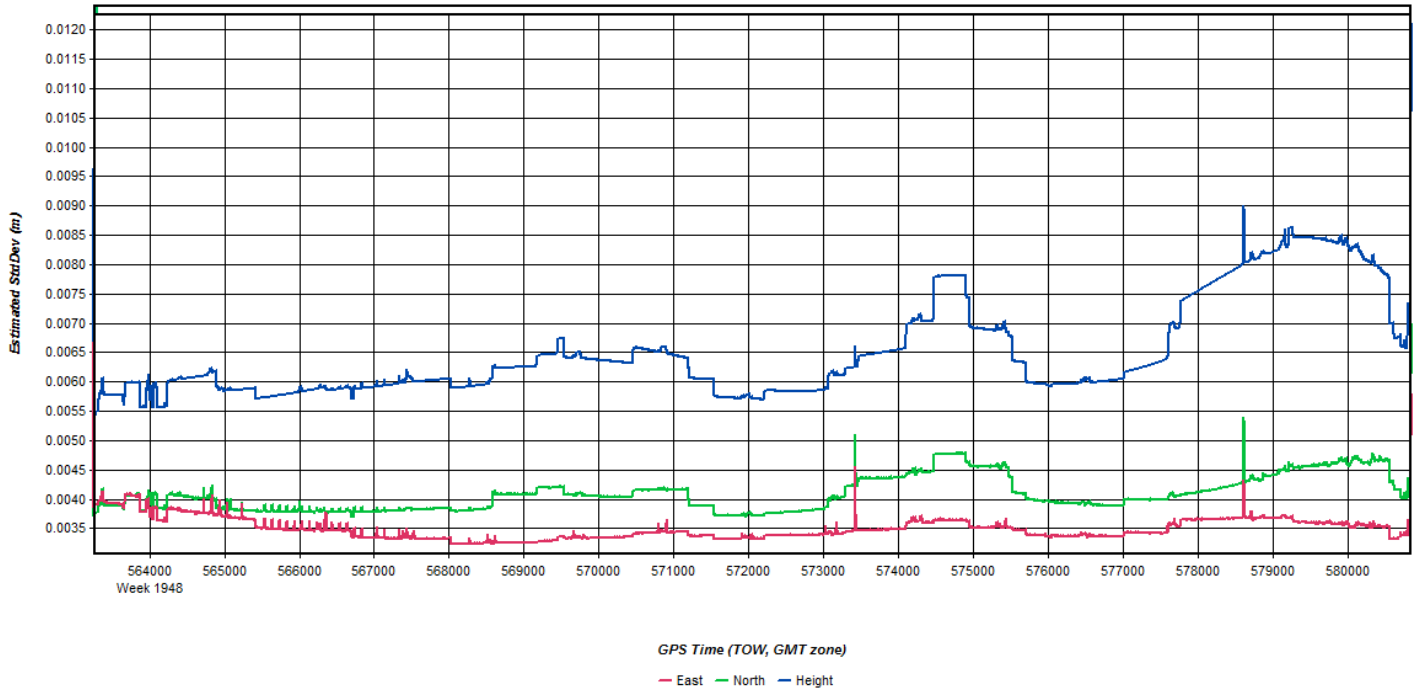


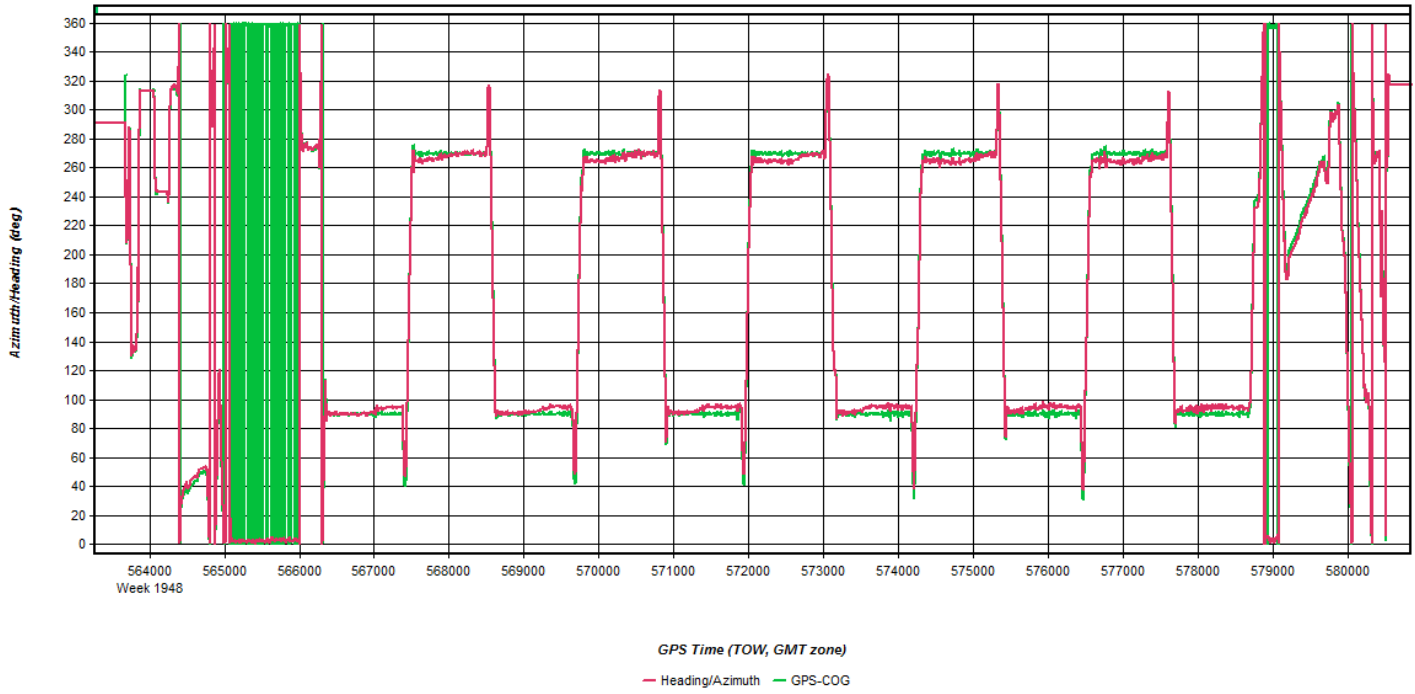












# Flight Log

**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc** Date: 5-13-17

(email log daily to flight\_log\_distribution\_list@quantumspatial.com) Ltr: (A) B C D E Pg 1 of 2

Project: USGS_AWAY		Proj #: 29513		Flight Mgmt File: 20170513-122603	
Aircraft: N262AS		Begin Hobbs: 66613.9		End Hobbs: 66618.4 Total: 4.5	
Pilot: BARNHAM		Co-Pilot: -		Tech: SCIBONE	
Dep Apt: KBBG		Dep Time [Lcl]: 08:12 [Z]: 12:42		Arr Apt: KMYT	
Arr Time [Local]: 13:12 [Z]: 17:12		Tot Time Aloft:			
CORR: Y/N		Sta 1: MELI		Sta 2:	
GPS Unit: Y/N		Sta 1:		Sta 2:	
Flyovers: Y/N		# Y, times: Sta1		Sta2	
Flyovers: Y/N		# Y, times: Sta1		Sta2	
Gd Temp beg: 11 °C		End: 18 °C		OAT beg: °C	
End: °C		Altimeter begin: 30.04		end: 30.00	
LIDAR	Type: ALS-70	Serial #: 7161	ALT AGL	ALT AMSL	Avg Terr Ht
	FOV: 36	Scan Freq: 56	MpIA: 31N	Pulse In Air: 2	Pulse Rate: 262.6
	Max Gdspd: 140	Avg Pt Spacing	Mag CR: 0	Storage Name: 016	
	Power: 100%	PPSM	End CR: 69	Tot CR: 69	

Line #	Hgt	Start [UTC]	End [UTC]	Gd Spd	MPA/Rate	GPS Altitude	Crab	Turb [0-1]	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
9001	0	12:59	13:13	150	1.2/17	4579	+2		SKY VIS 78
1074	90	13:20	13:35	139	1.3/18	7135	+1		
1075	270	13:38	13:54	143	1.2/19	7129	-5		CUE POPPING TO THE NORTH
1076	90	13:57	14:13	134	1.3/18	7126	+1		
1077	270	14:16	14:32	139	1.3/18	7126	-4		CUE STARTING TO FAN ON THE WEST END
1078	90	14:35	14:51	145	1.0/20	7119	+2		
1079	270	14:54	15:09	146	1.2/19	7116	-4		
1080	90	15:13	15:28	140	1.1/19	7118	+1		
1081	270	15:32	15:48	142	1.2/17	7119	-4		
1082	90	15:50	16:06	144	1.1/18	7113	+2		CUE 5-7 MILES IN FROM W. END (PARTIAL)
1083	270	16:10	16:25	138	1.2/18	7110	-4		CUE 13-12.5 MILES IN FROM W. END (PARTIAL) 11-10 IN, 6,7,5
1084	90	16:28	16:44	140	1.3/17	7116	+3		LIGHT TURBULANCE
XTRC	N	16:47	16:50	141	1.5/16	7021	-		CUE AT 6900

Total Proj Lines:	Lines Flown: 12	Lines Remain:	Online Time: 3.8	Job Time: .7	Notes:
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Scanned by CamScanner

# Base Station Log

Coordinate/Antenna Settings ? X

Master Remote

Base Station

1: MELI Name: MELI  Disabled

File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-16-17\20170513\_122603.m

Coordinates

Latitude: North 45 21 49.15536 Coord. options

Longitude: West 68 30 26.61463 Save to Favorites

Ellipsoidal height: 54.567 m

Datum: WGS84 Proc Datum: WGS84

Epoch: year

Antenna Height

From station file: TRM57971.00, NONE View STA File

Antenna profile: TRM57971.00 Info

Measured height: 0.000 m

ARP to L1 offset: 0.065 m

Applied height: 0.065 m

Measured to

ARP

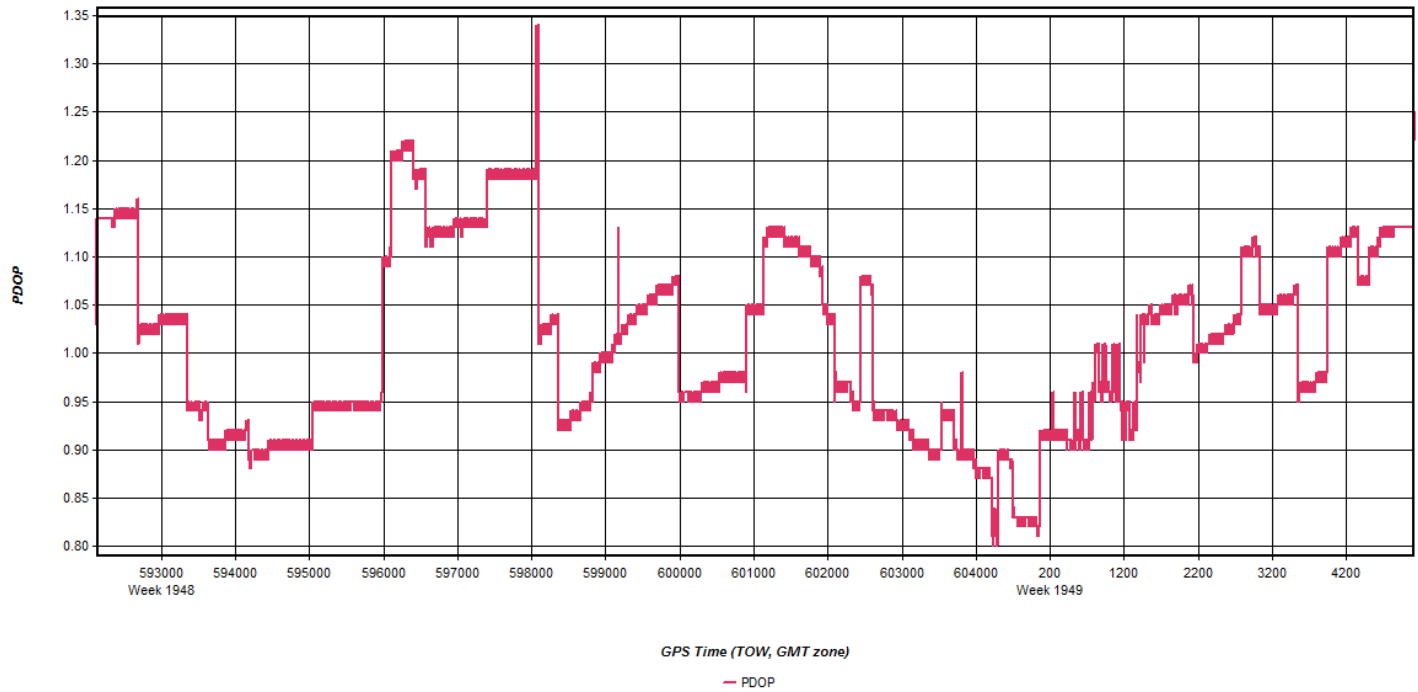
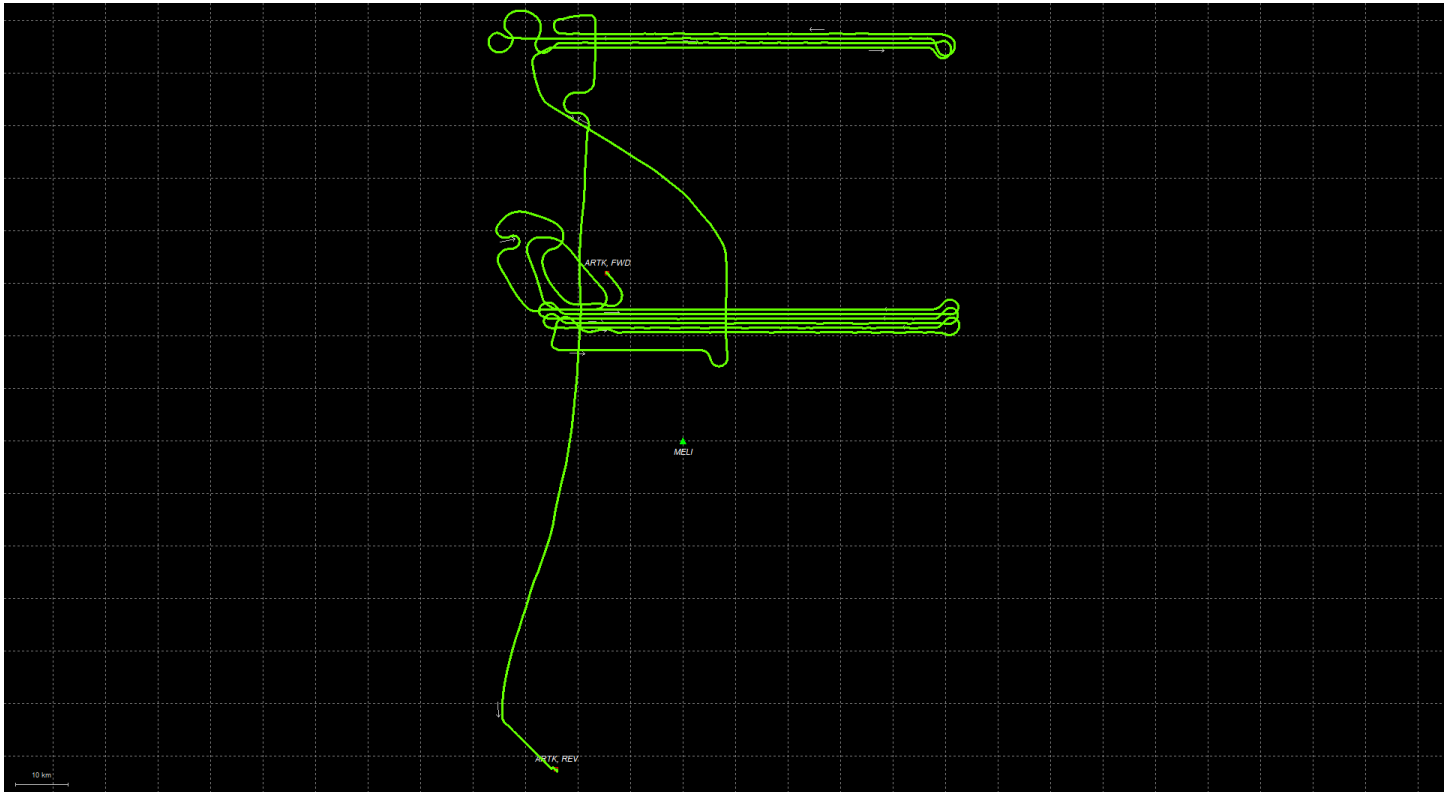
L1 Phase Centre

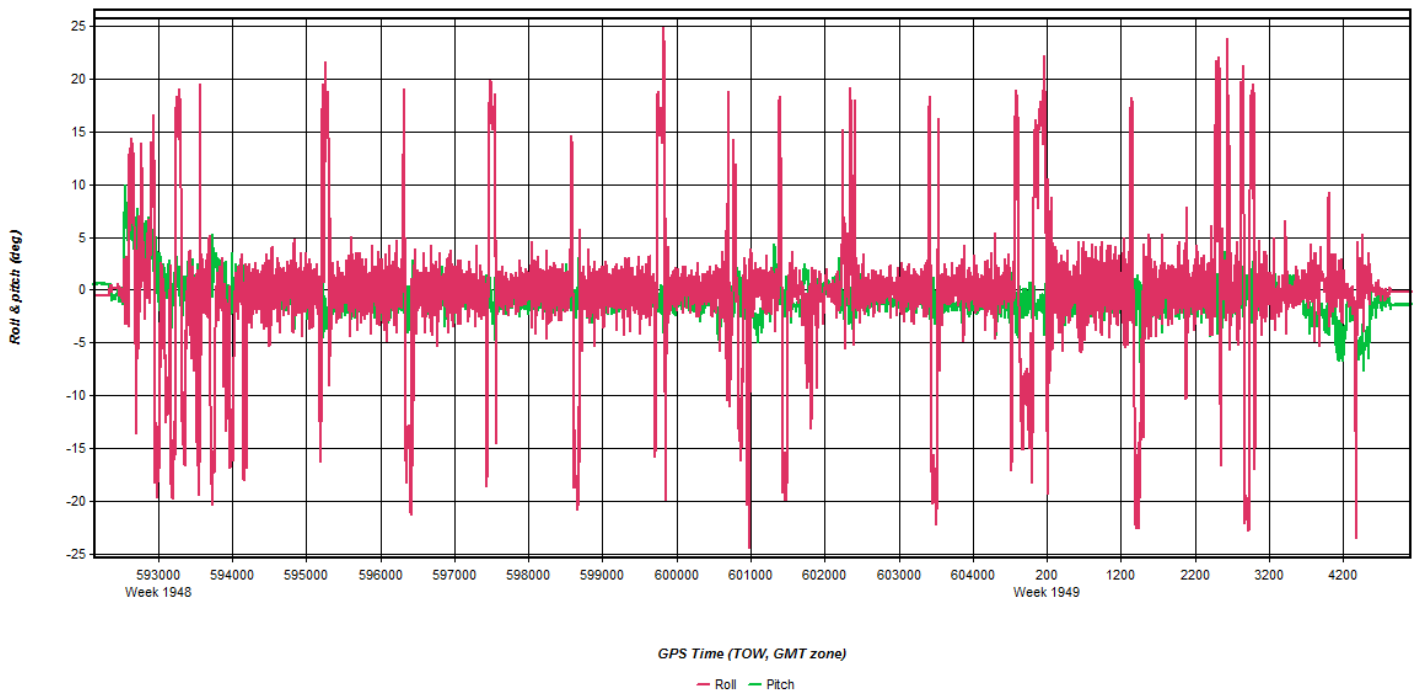
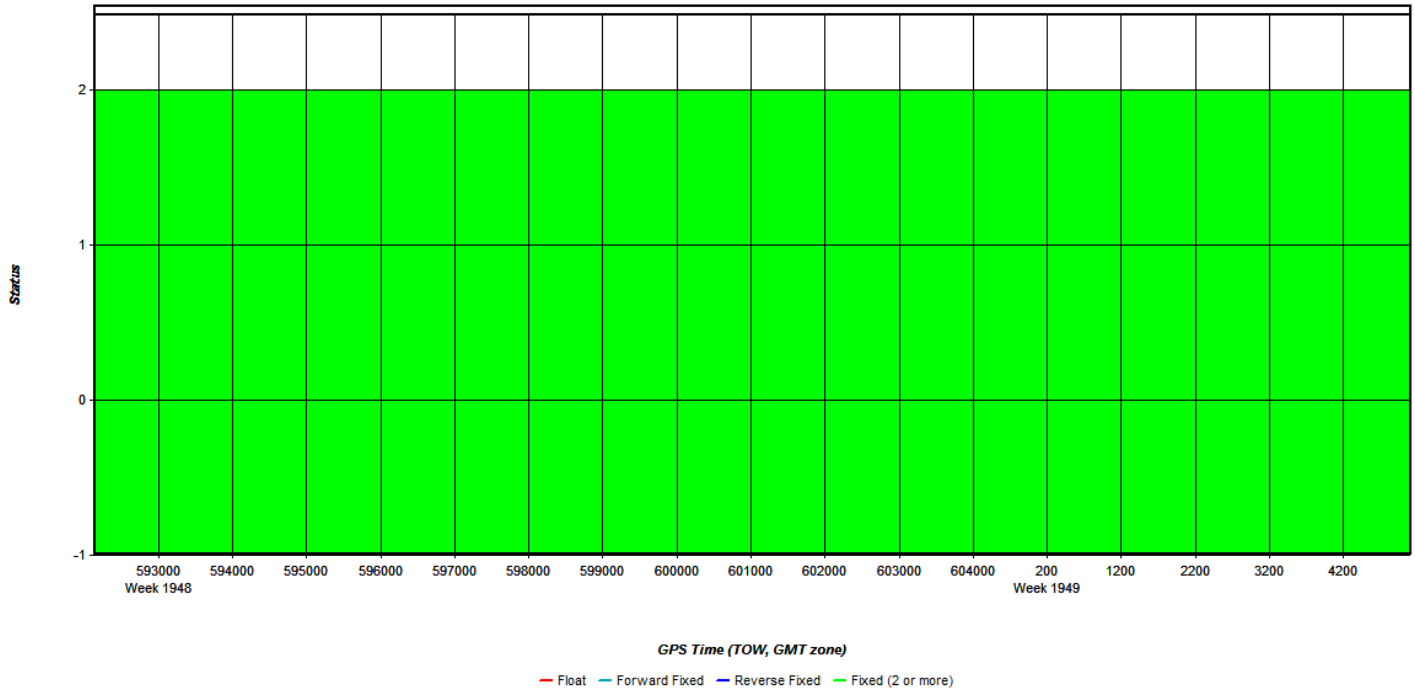
Compute From Slant

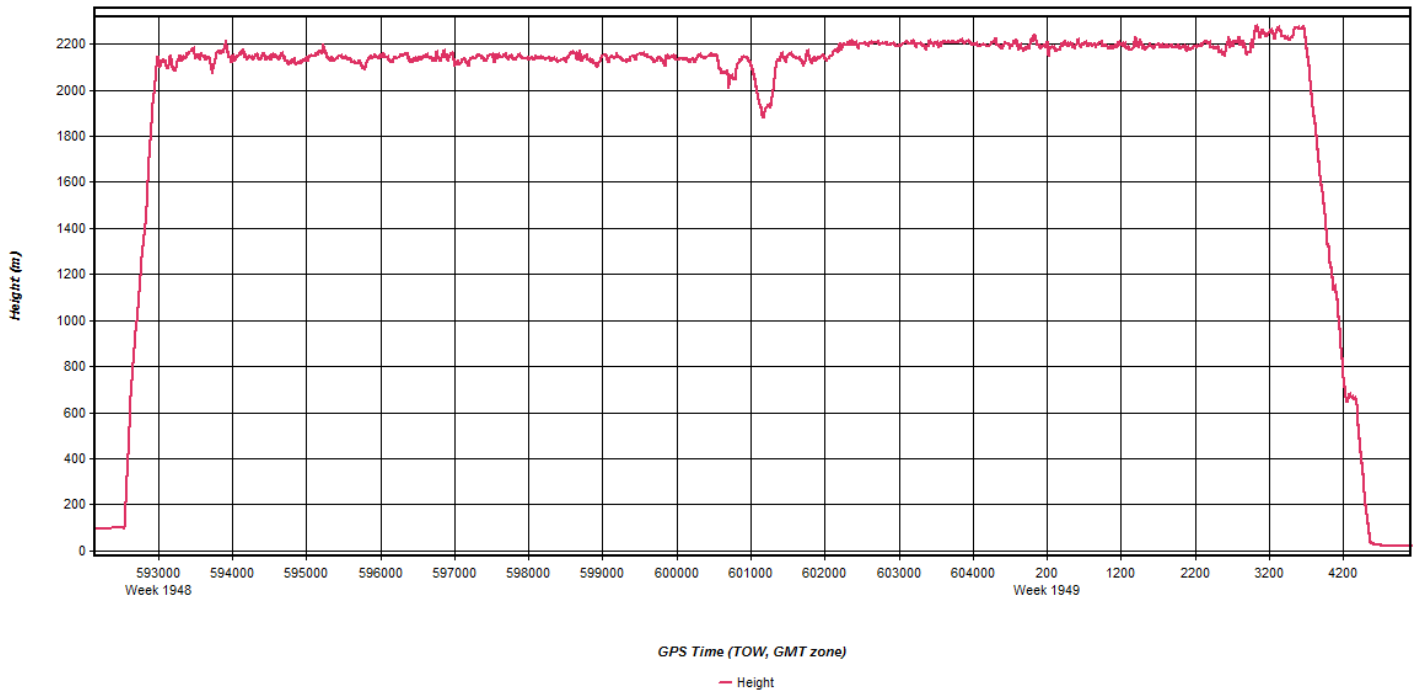
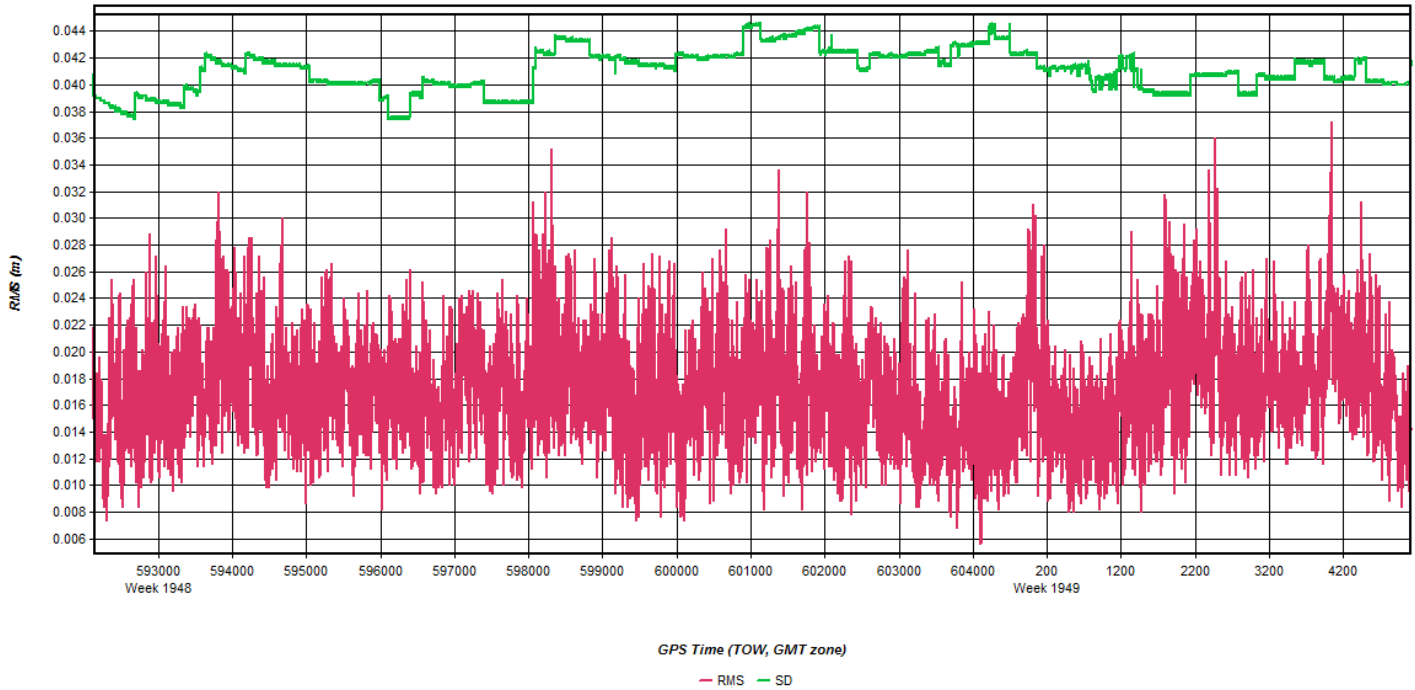
OK Cancel

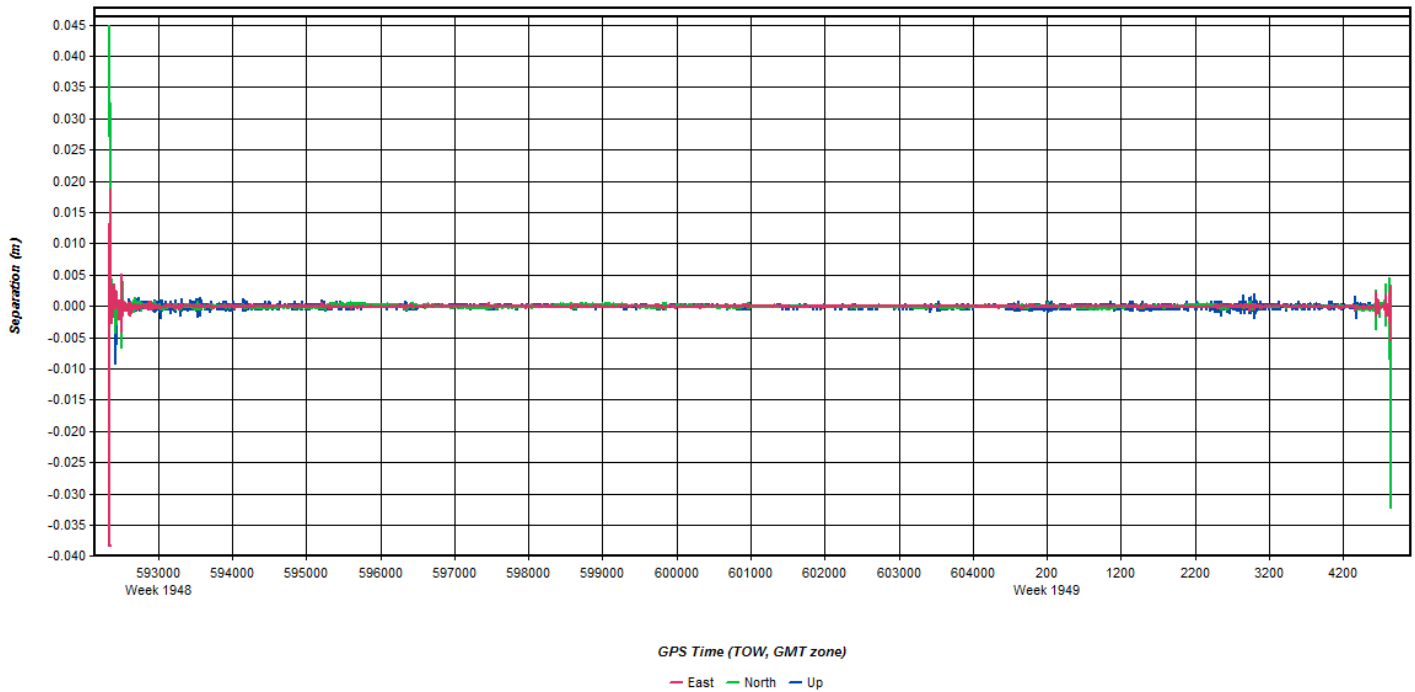
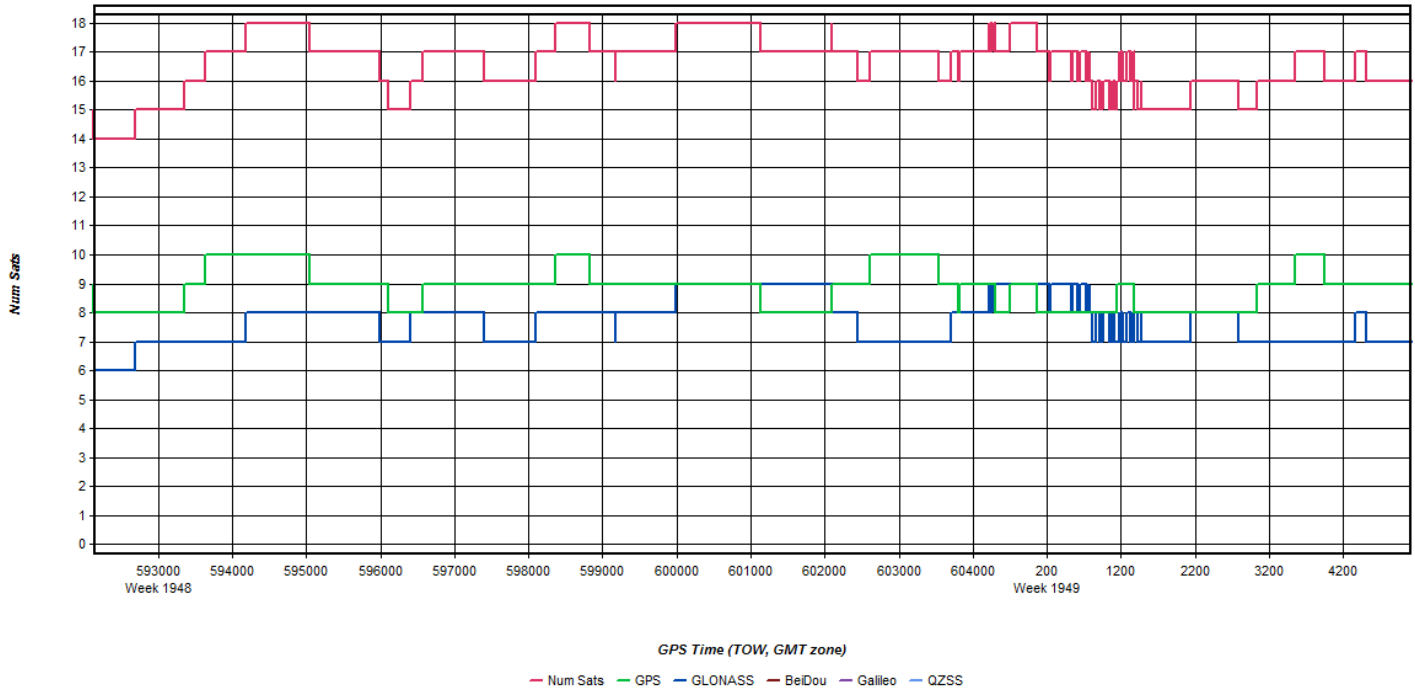


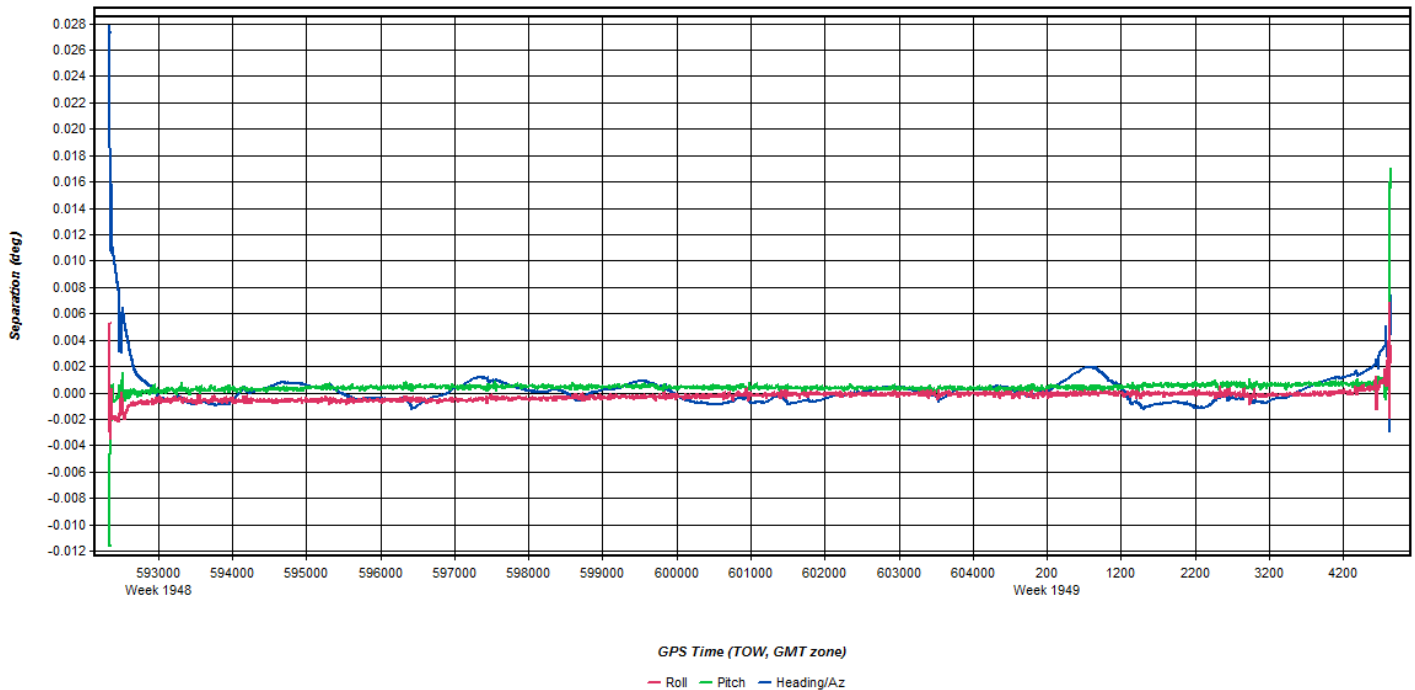
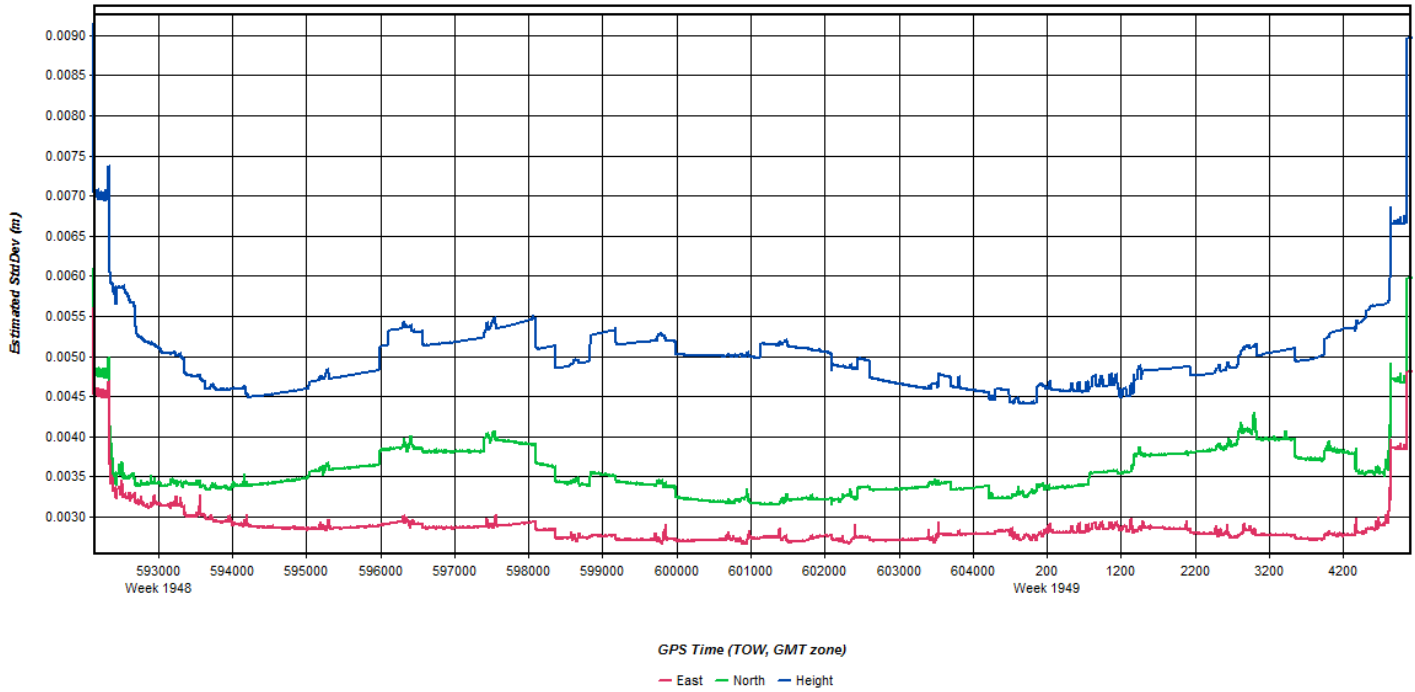
# 20170513-B (N262AS, SN7161)

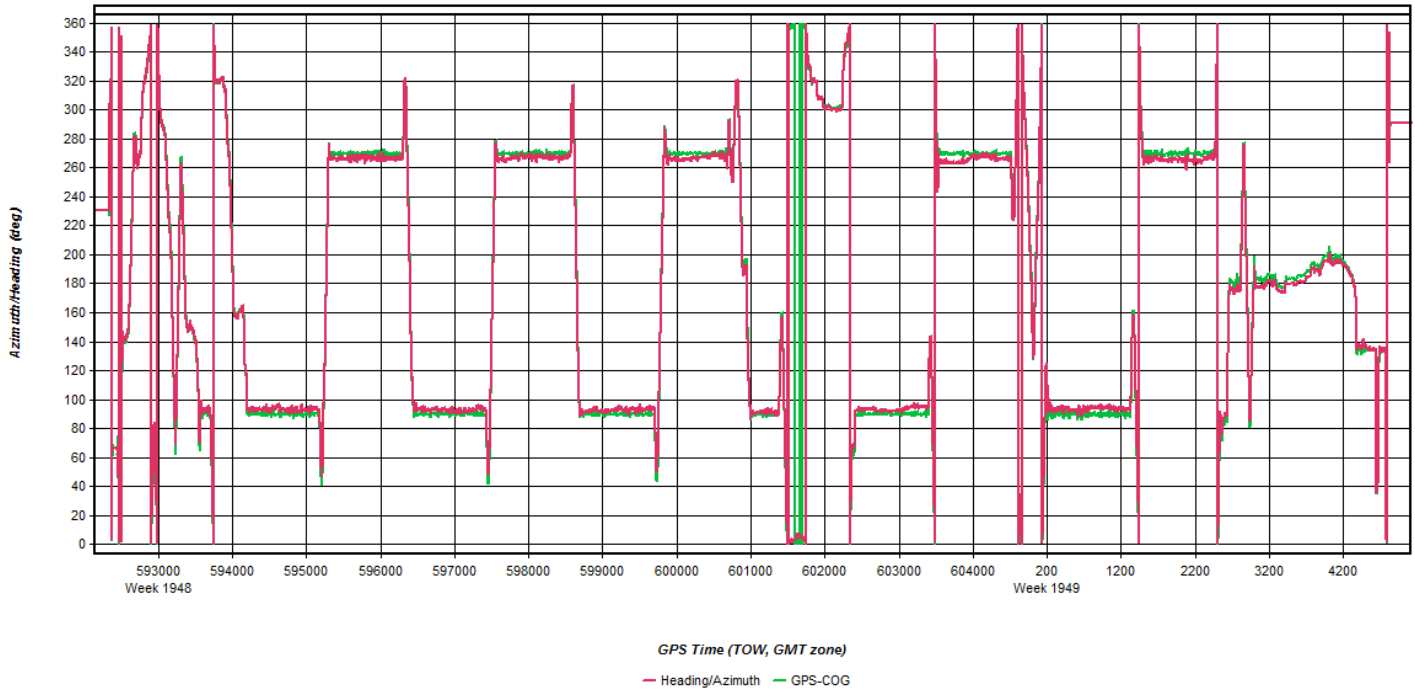












# Flight Log

**Q Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc** Date: 5-13-17

(email log daily to flight\_log\_distribution\_list@quantumspatial.com) Ltr: (A) B C D E Pg 1 of 2

Project: USGS_AWAY		Proj #: 29513		Flight Mgmt File: 20170513-122603	
Aircraft: N262AS		Begin Hobbs: 66013.9		End Hobbs: 66018.4 Total: 4.5	
Pilot: BARNHAM		Co-Pilot: -		Tech: SCIBONE	
Dep Apt: KBBG		Dep Time [Lcl]: 08:12 [Z]: 12:42		Arr Apt: KMYT	
Arr Time [Local]: 13:12 [Z]: 17:12		Tot Time Aloft:			
CORR: Y/N		Sta 1: MELI		Sta 2:	
Flyovers: Y/N		# Y, times: Sta1		Sta2	
GPS Unit: Y/N		Sta 1:		Sta 2:	
Flyovers: Y/N		# Y, times: Sta1		Sta2	
Gd Temp beg: 11 °C		End: 18 °C		OAT beg: °C	
End: °C		Altimeter begin: 30.04		end: 30.00	
LIDAR	Type: ALS-70	Serial #: 7161	ALT AGL	ALT AMSL	Avg Terr Ht
	FOV: 36	Scan Freq: 56	MpIA: 31N	Pulse In Air: 2	Pulse Rate: 262.6
	Max Gdspd: 140	Avg Pt Spacing	Mag CR: 0	Storage Name: 016	
	Power: 100%	PPSM	End CR: 69	Tot CR: 69	

Line #	Hgt	Start [UTC]	End [UTC]	Gd Spd	MPA/Rate	GPS Altitude	Crab	Turb [0-1]	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
9001	0	12:59	13:13	150	1.2/17	4579	+2		SKY VIS 78
1074	90	13:20	13:35	139	1.3/18	7135	+1		
1075	270	13:38	13:54	143	1.2/19	7129	-5		CUE POPPING TO THE NORTH
1076	90	13:57	14:13	134	1.3/18	7126	+1		
1077	270	14:16	14:32	139	1.3/18	7126	-4		CUE STARTING TO FAN ON THE WEST END
1078	90	14:35	14:51	145	1.0/20	7119	+2		
1079	270	14:54	15:09	146	1.2/19	7116	-4		
1080	90	15:13	15:28	140	1.1/19	7118	+1		
1081	270	15:32	15:48	142	1.2/17	7119	-4		
1082	90	15:50	16:06	144	1.1/18	7113	+2		CUE 5-7 MILES IN FROM W. END (PARTIAL)
1083	270	16:10	16:25	138	1.2/18	7110	-4		CUE 13-12.5 MILES IN FROM W. END (PARTIAL) 11-10 IN, 6,7,5
1084	90	16:28	16:44	140	1.3/17	7116	+3		LIGHT TURBULANCE
XTRC	N	16:47	16:50	141	1.5/16	7021	-		CUE AT 6900

Total Proj Lines:	Lines Flown: 12	Lines Remain:	Online Time: 3.8	Job Time: .7	Notes:
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Scanned by CamScanner



# Base Station Log

Coordinate/Antenna Settings ? X

Master Remote

Base Station

1: MELI Name: MELI  Disabled

File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-16-17\20170513\_202711\m

Coordinates

Latitude: North 45 21 49.15536 Coord. options

Longitude: West 68 30 26.61463 Save to Favorites

Ellipsoidal height: 54.567 m

Datum: WGS84 Proc Datum: WGS84

Epoch: year

Antenna Height

From station file: TRM57971.00, NONE View STA File

Antenna profile: TRM57971.00 Info

Measured height: 0.000 m

ARP to L1 offset: 0.065 m

Applied height: 0.065 m

Measured to

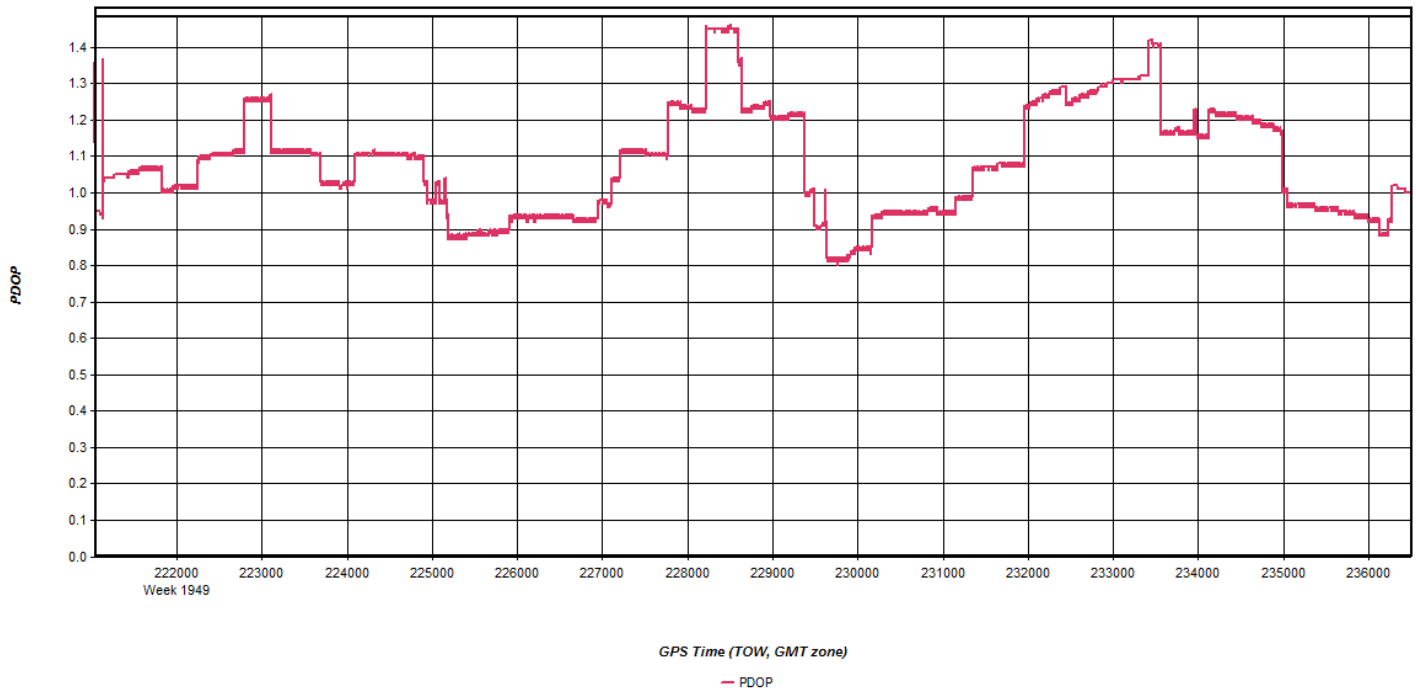
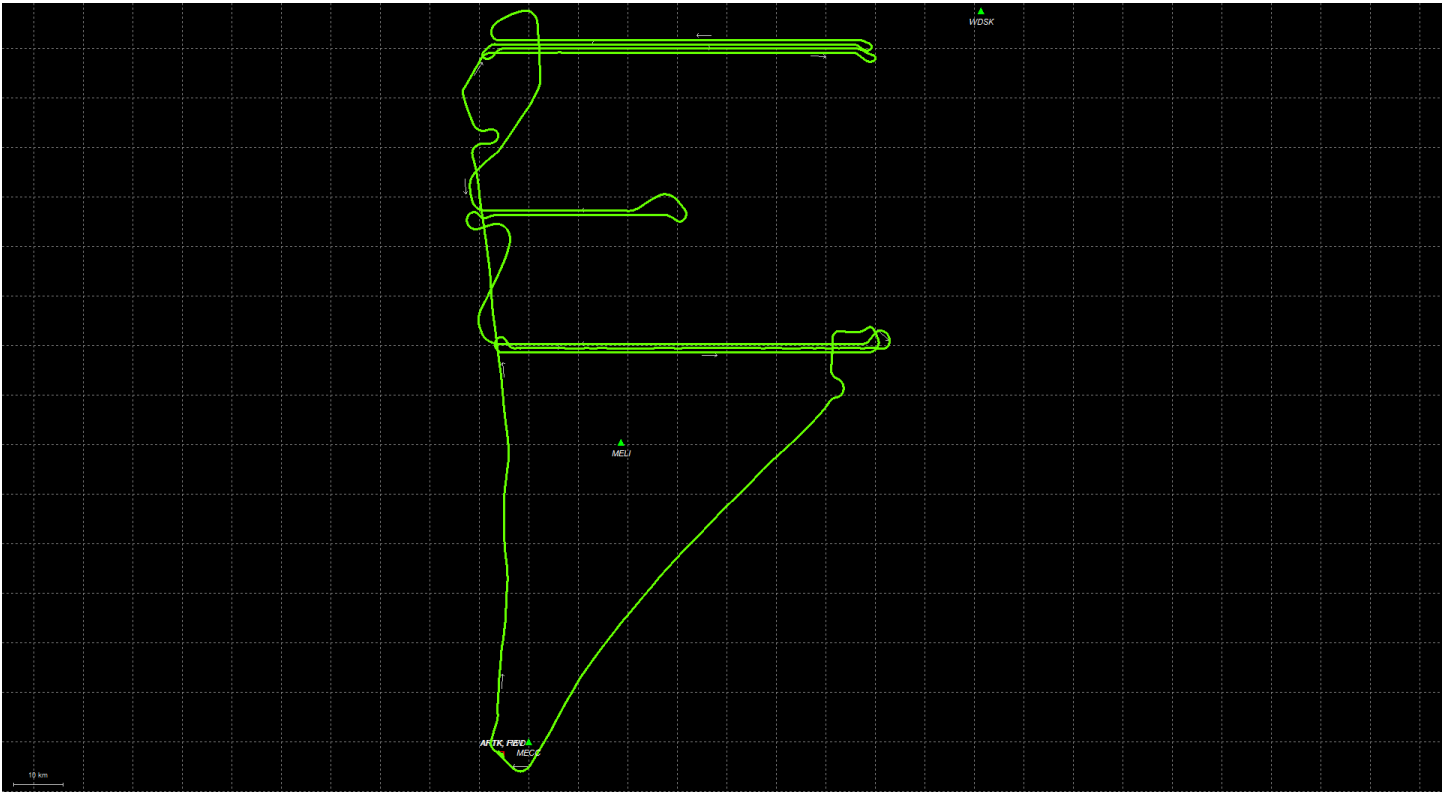
ARP

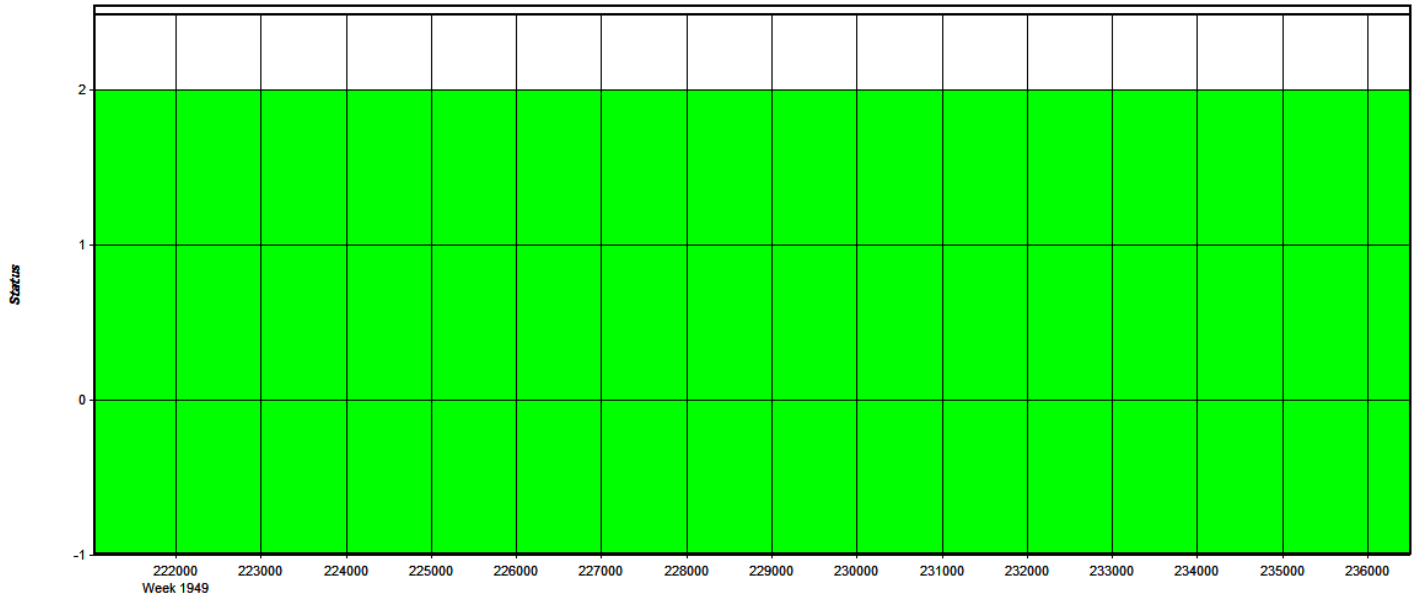
L1 Phase Centre

Compute From Slant

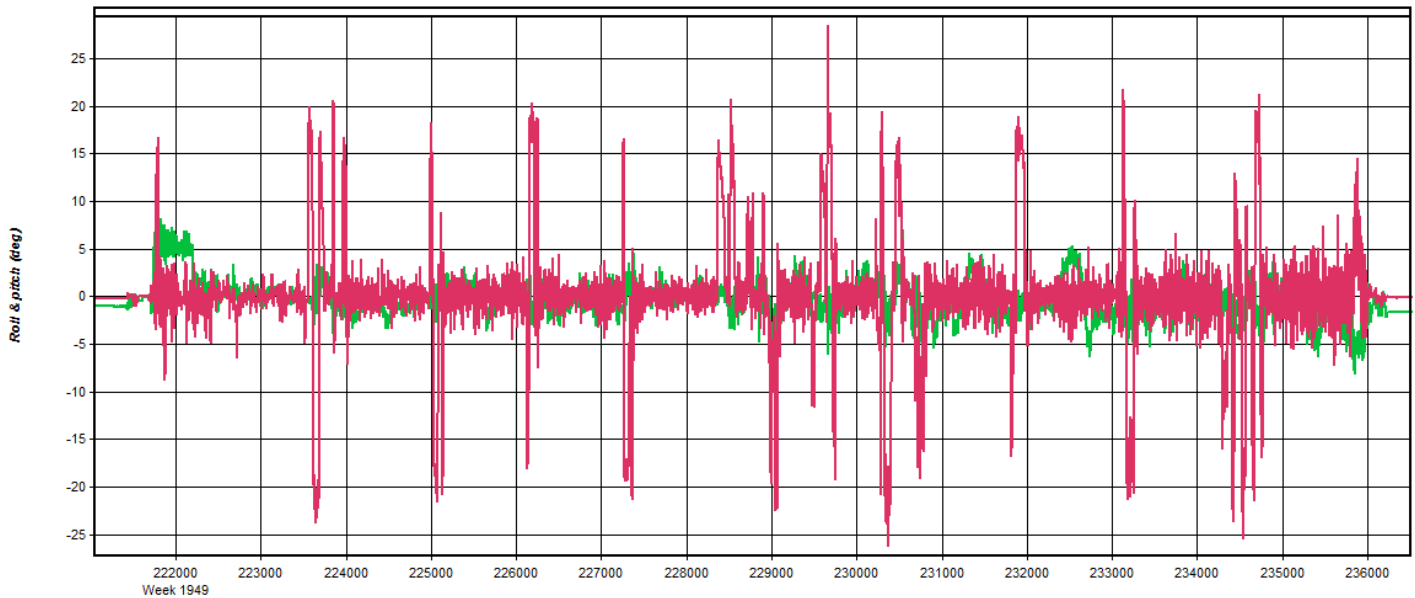
OK Cancel

# 20170516-A (N262AS, SN7161)

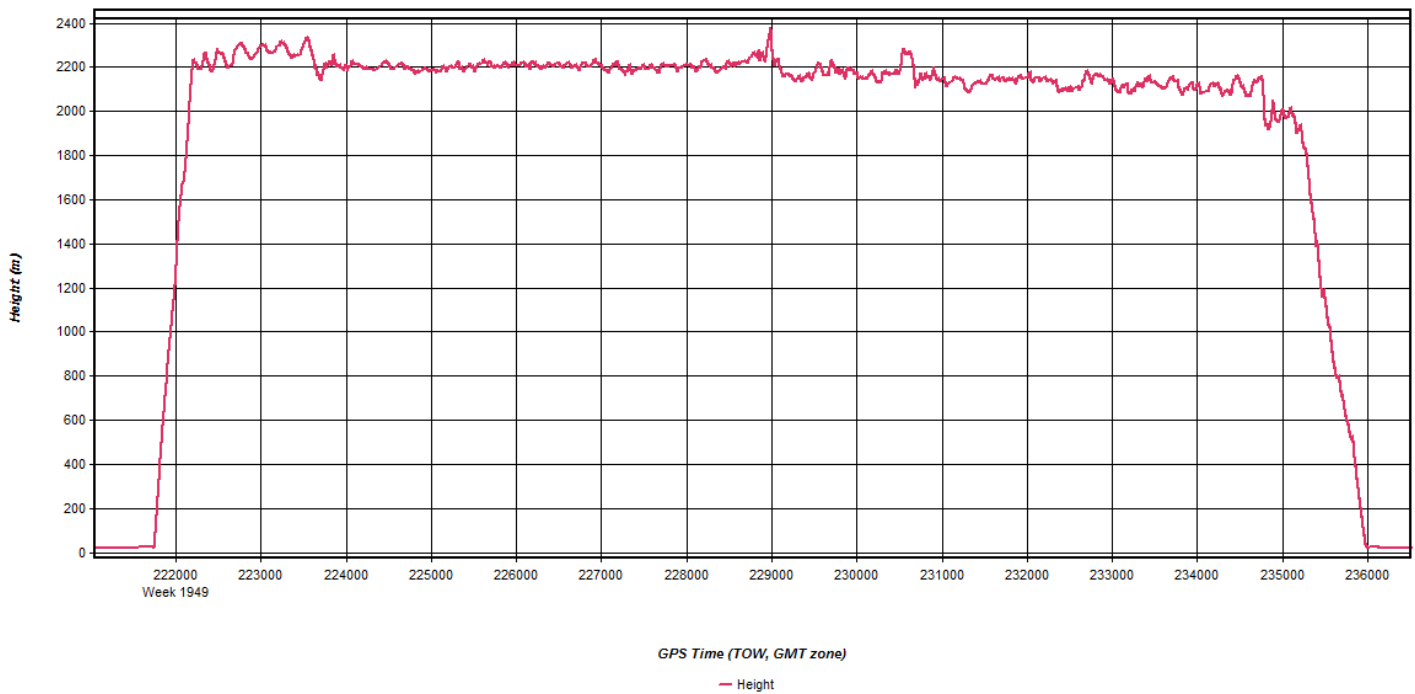
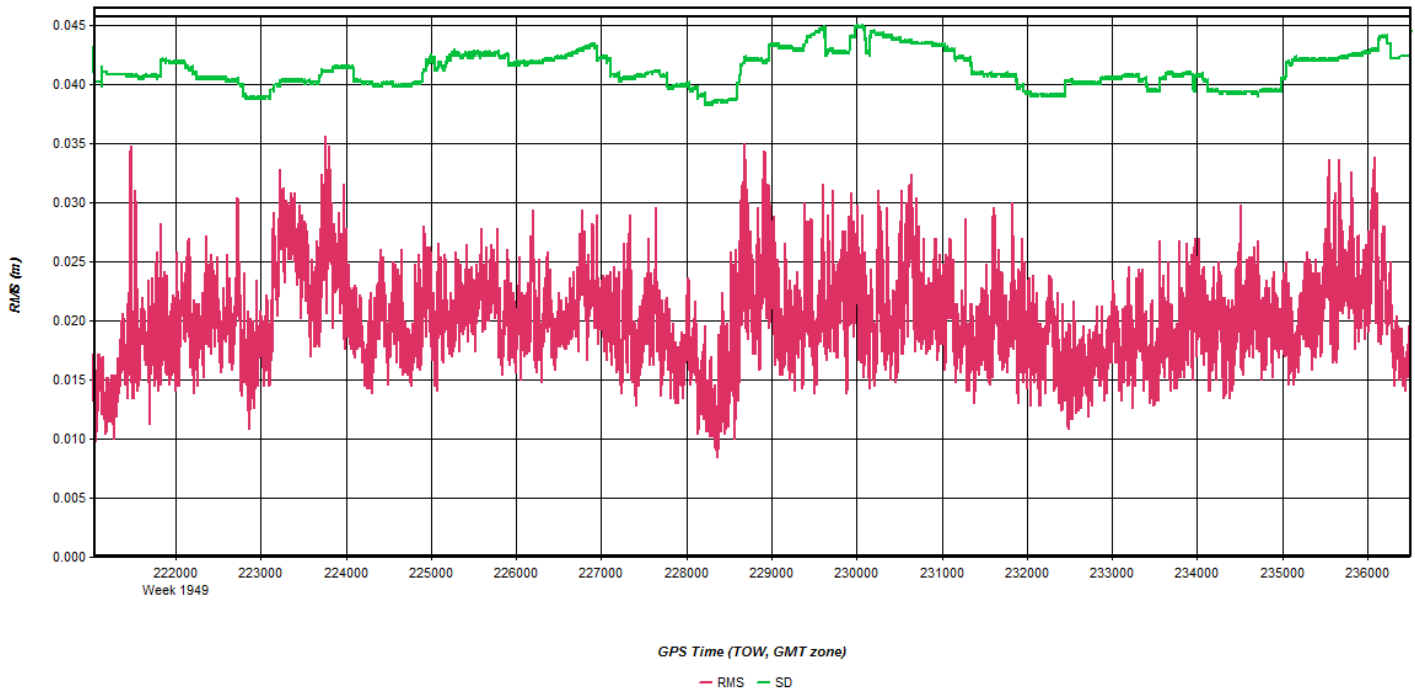


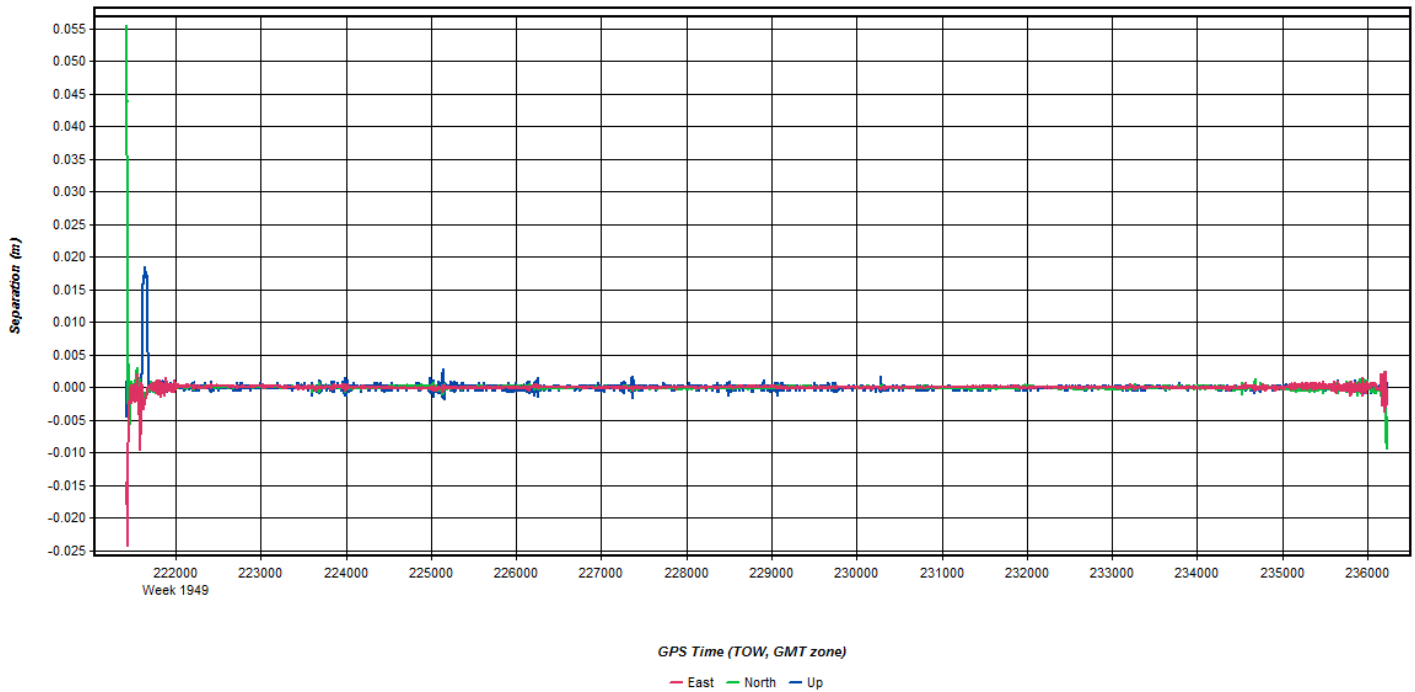
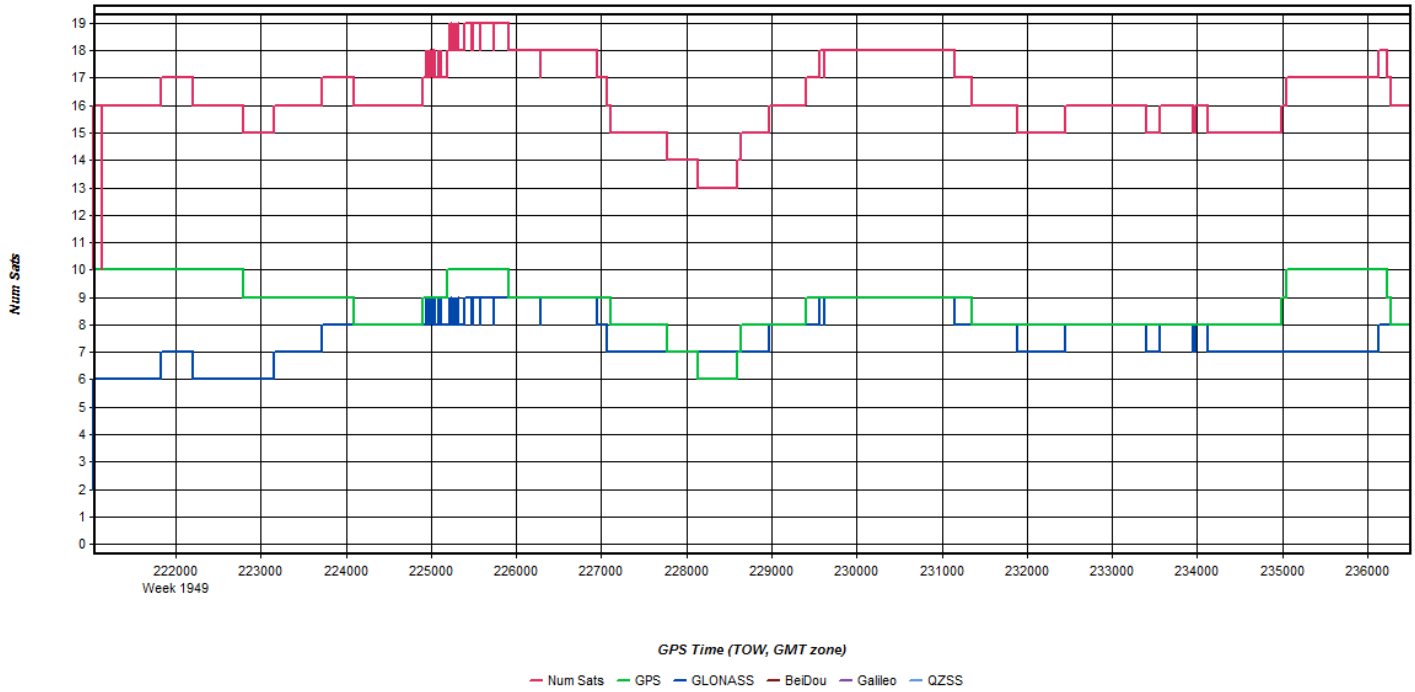


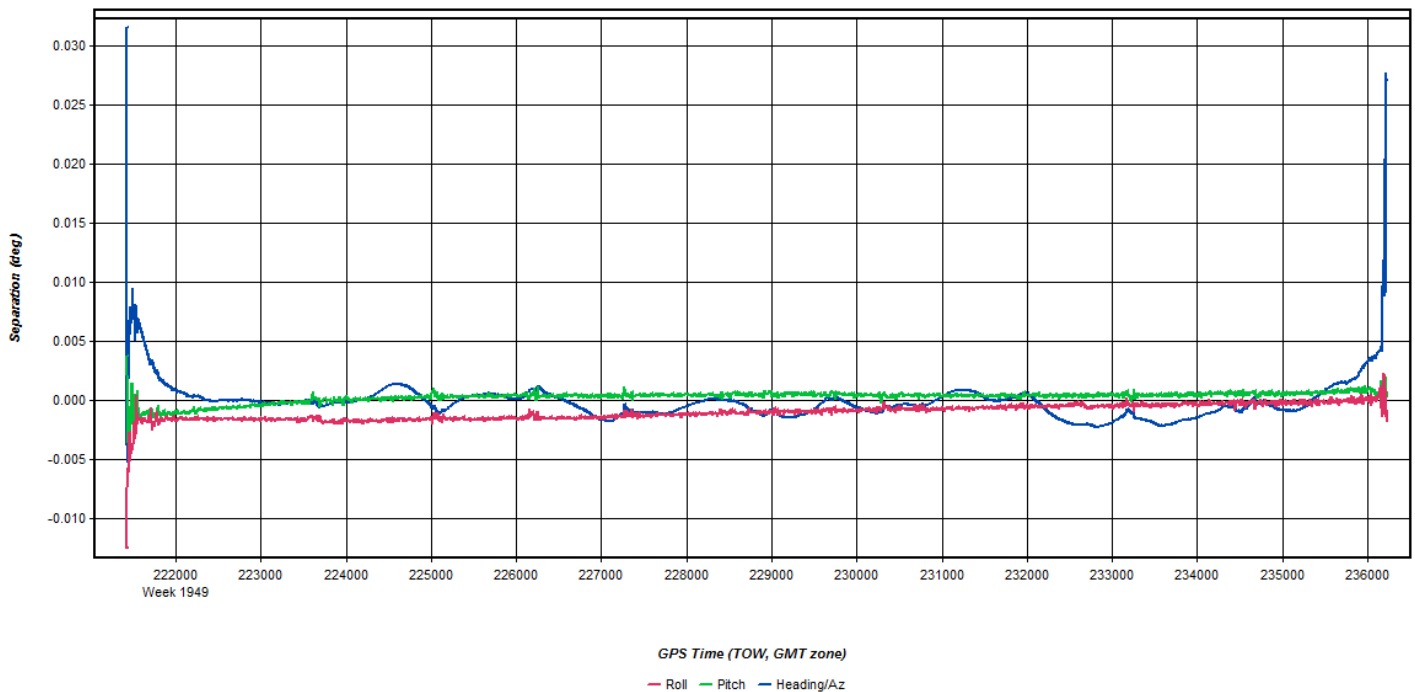
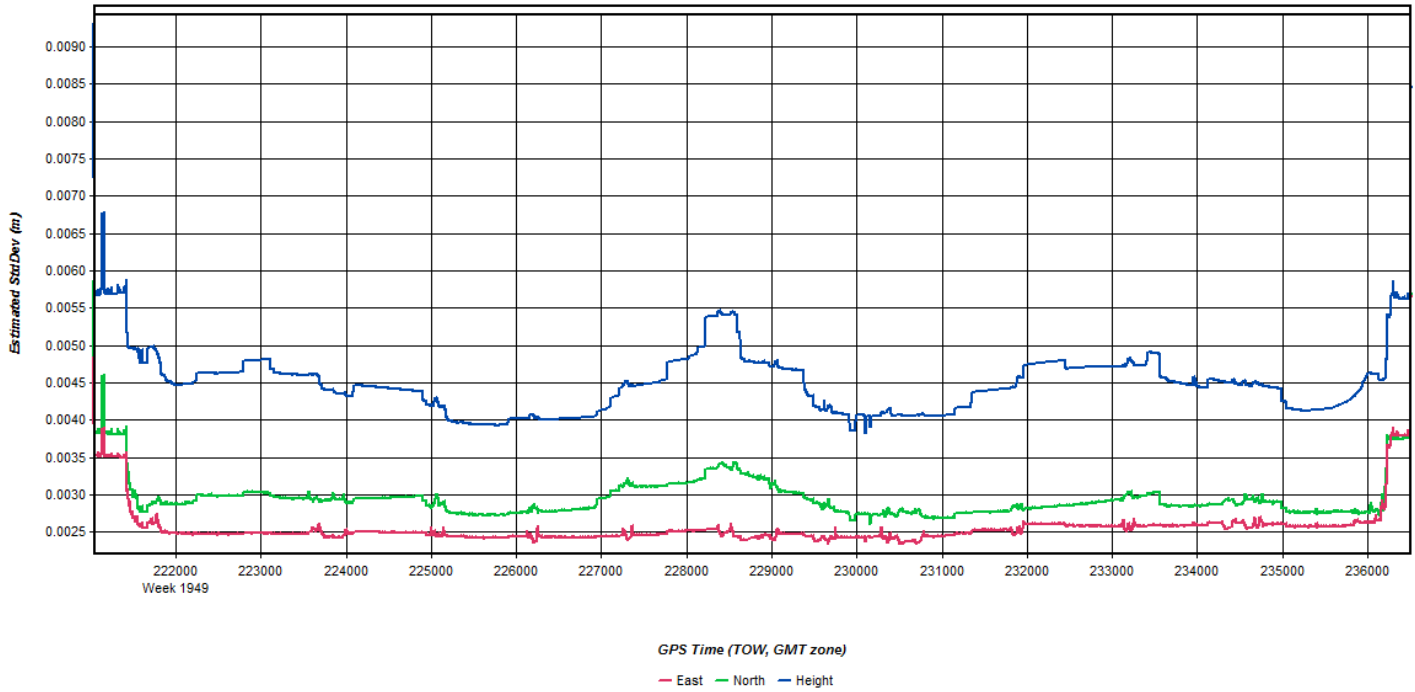
GPS Time (TOW, GMT zone)  
— Float — Forward Fixed — Reverse Fixed — Fixed (2 or more)

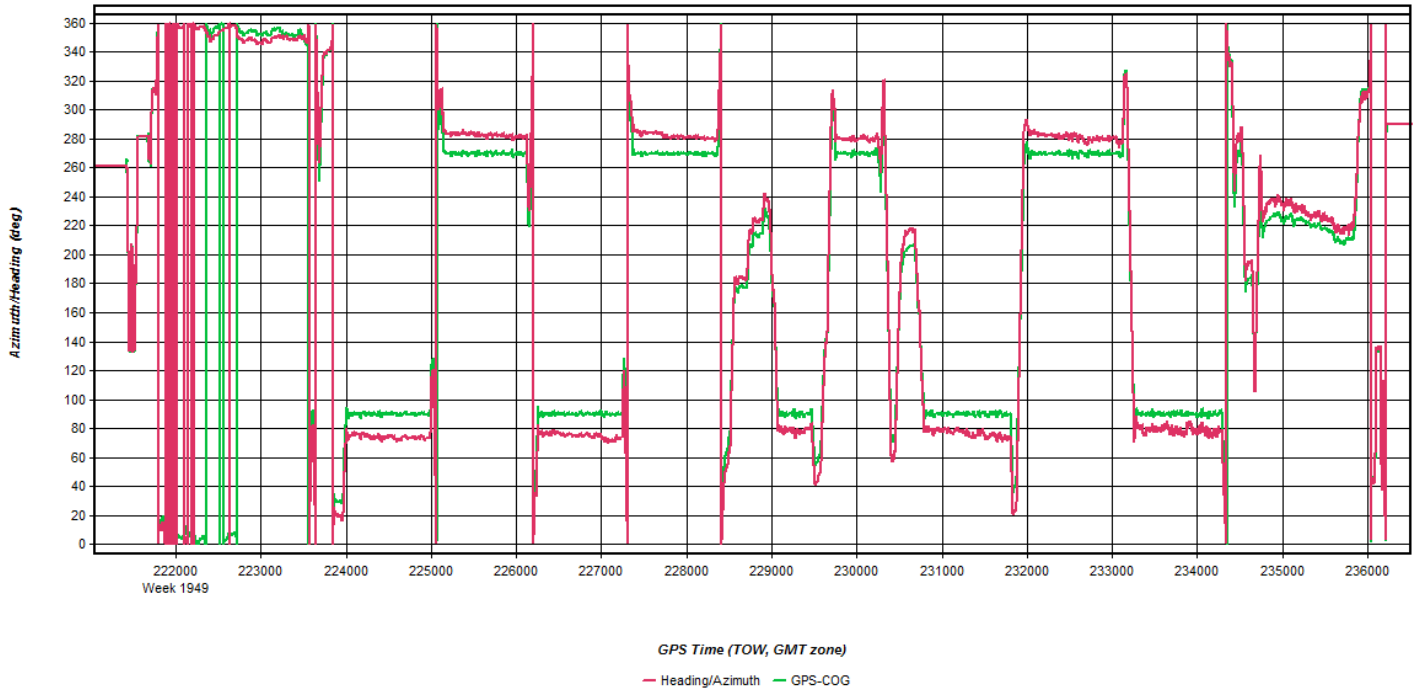


GPS Time (TOW, GMT zone)  
— Roll — Pitch











# Flight Log

**Quantum Spatial, Inc** Date: 5-16-17  
(email log daily to flight\_log\_distribution\_list@quantumspatial.com) Lit:  A  B  C  D  E Pg. 1 of 1

Project: USGS - MAINE - 2100		Proj #: 29513		Flight Mgmt File: 20170516			
Aircraft: N268AS	Begin Hobbs: 6623.1	End Hobbs: 6687.1	Total: 4.0	Pilot: BARHAM	Co-Pilot: -	Tech: SCHONE	
Dep Apt: KQGR	Dep Time (Ldt): 09:24 (Z): 13:24	Arr Apt: KQGR	Arr Time (Local): 13:35 (Z): 17:35	Tot Time Aloft:			
CORS: <input checked="" type="radio"/> I N Sta 1: MELI		Sta 2:	Flyovers: <input checked="" type="radio"/> I N	If Y, times: Sta1) 13:51		Sta2)	
GPS Unit: Y / N Sta 1:		Sta 2:	Flyovers: Y / N	If Y, times: Sta1)		Sta2)	
Gd Temp beg: 15 °c End: °c		OAT beg: 1 °c End: 2 °c	Altimeter begin: 29.76		end:		
LIDAR	Type ALS-70	Serial # 7161	ALT AGL	ALT AMSL	Avg Terr Ht	Max Gdepd 190	Avg Pt Spacing
	FOV 36	Scan Freq 56	MplA <input checked="" type="radio"/> I N	Pulse In Air 2	Pulse Rate 202.6	Power 100%	PPSM
						Bag GB 174	Storage Name# 015
						End GB 218	
						Ter GB 44	

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POD/s Sens	GPS Altitude	Crab	Turb (ft)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
1044	90	14:13	14:29	137	1.2/18	7234	-10		SKC VIS 8 CUE 6X OFF TO THE WEST
1043	270	14:32	14:48	133	1.1/19	7244	+13		
1042	90	14:51	15:07	136	1.2/19	7243	-14		
1041	270	15:09	15:25	137	1.1/19	7224	+15		CUE FORMING W. END
XTIE	S	15:29	15:31	145	1.1/20	7248	-		
1082	90	15:38	15:43	134	1.1/18	7113	-10		W. END TO 13 MILES - PARTIAL LINE COMP.
1083	270	15:49	15:56	132	1.2/18	7110	+10		17 MILES TO W. END - PARTIAL LINE COMP.
1085	90					7119			NO GO - CUE
1112	90	16:07	16:23	132	1.2/18	7001	-11		
1113	270	16:27	16:44	130	1.2/17	6998	+15		
1114	90	16:48	17:04	143	1.2/17	6995	-10		
XTIE	S	17:09	17:10	135	1.1/19	6824	-		

Total Proj Lines:	Lines Flown: 9	Lines Remain:	Online Time: 3.0	Job Time: 1.0	Notes:
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Scanned by CamScanner

# Base Station Log

Coordinate/Antenna Settings ? X

Master Remote

Base Station

1: MECC Name: MECC  Disabled

File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-17-17\20170516\_132233\

Coordinates

Latitude: North 44 49 33.21003 Coord. options

Longitude: West 68 44 38.60195 Save to Favorites

Ellipsoidal height: 20.586 m

Datum: WGS84 Proc Datum: WGS84

Epoch: year

Antenna Height

From station file: TRM57971.00, NONE View STA File

Antenna profile: TRM57971.00 Info

Measured height: 0.000 m

ARP to L1 offset: 0.065 m

Applied height: 0.065 m

Measured to

ARP

L1 Phase Centre

Compute From Slant

OK Cancel

Coordinate/Antenna Settings ? X

Master Remote

Base Station  
 2: MELI Name: MELI  Disabled  
 File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-17-17\20170516\_132233.V

Coordinates  
 Latitude: North 45 21 49.15536 Coord. options  
 Longitude: West 68 30 26.61463 Save to Favorites  
 Ellipsoidal height: 54.567 m  
 Datum: WGS84 Proc Datum: WGS84  
 Epoch: year

Antenna Height  
 From station file: TRM57971.00, NONE View STA File  
 Antenna profile: TRM57971.00 Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.065 m  
 Applied height: 0.065 m  
 Measured to  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

Coordinate/Antenna Settings ? X

Master Remote

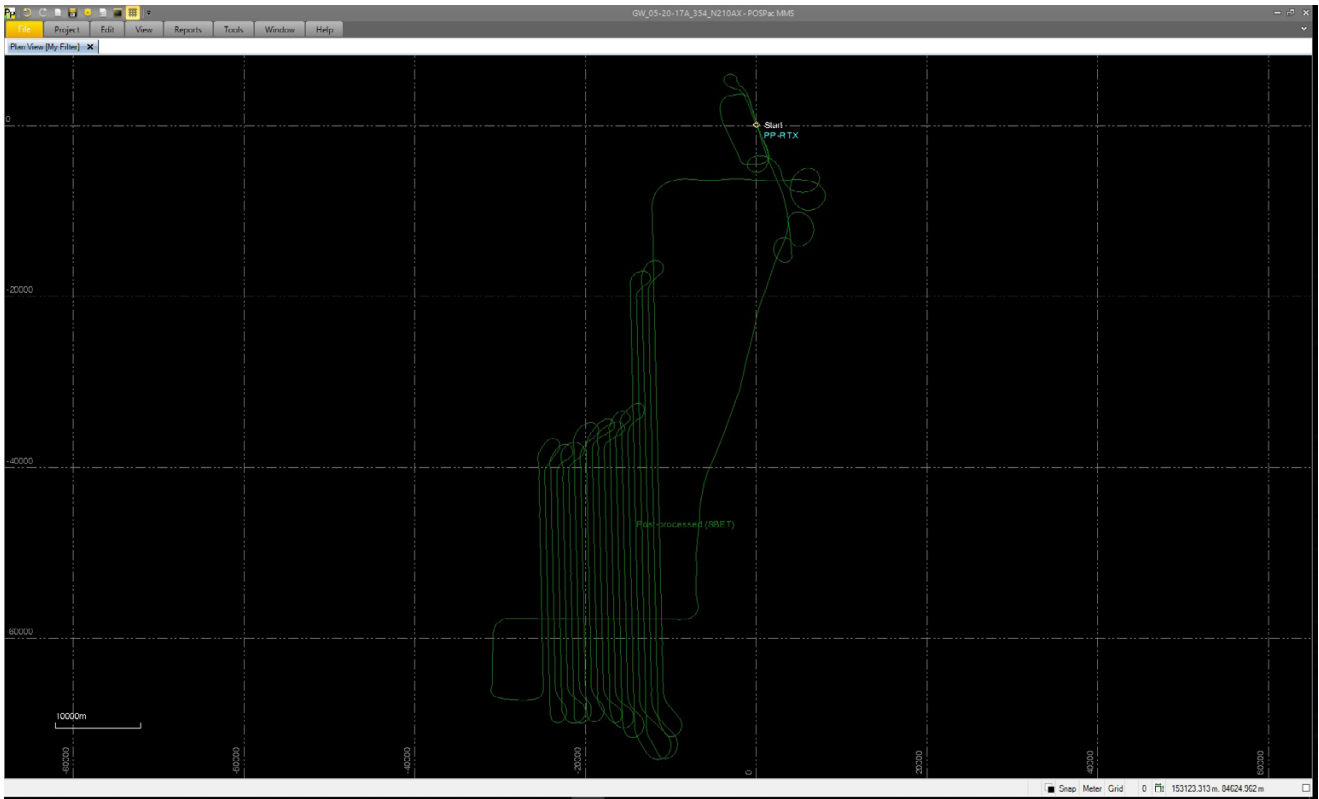
Base Station  
 3: WDSK Name: WDSK  Disabled  
 File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-17-17\20170516\_132233\

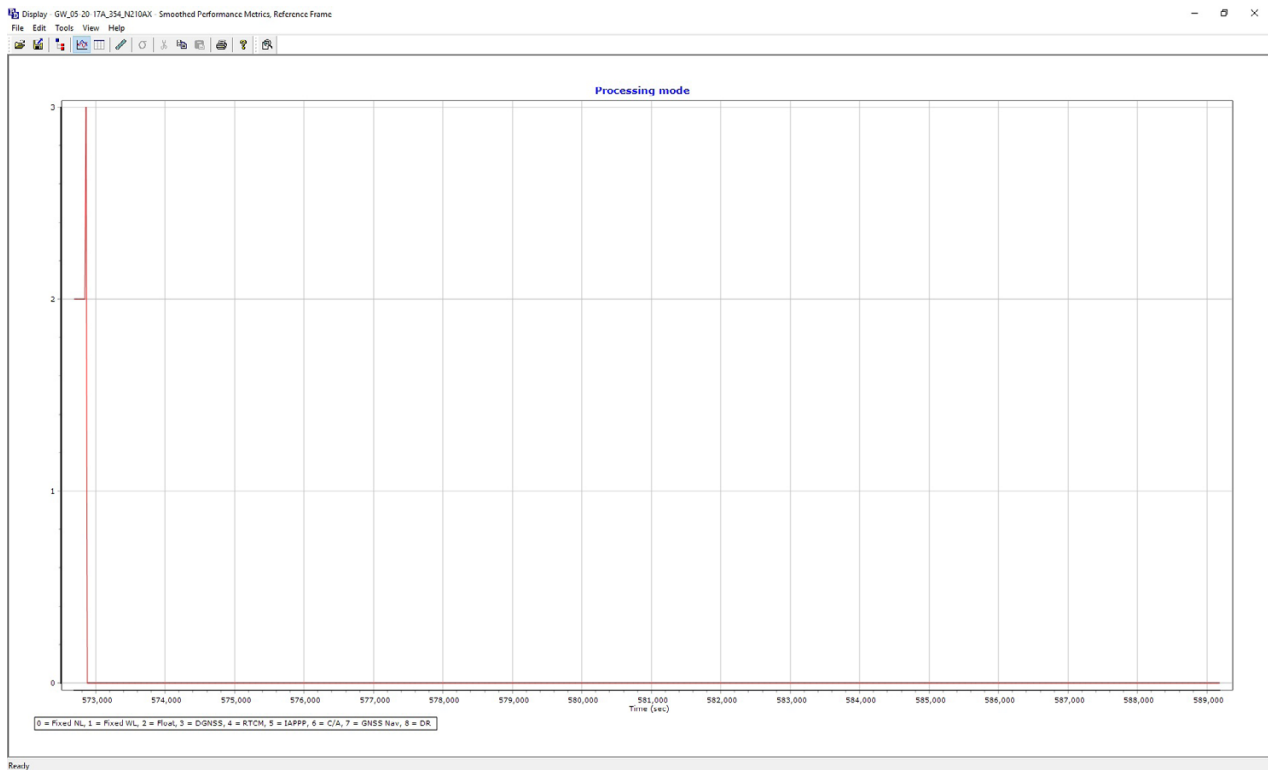
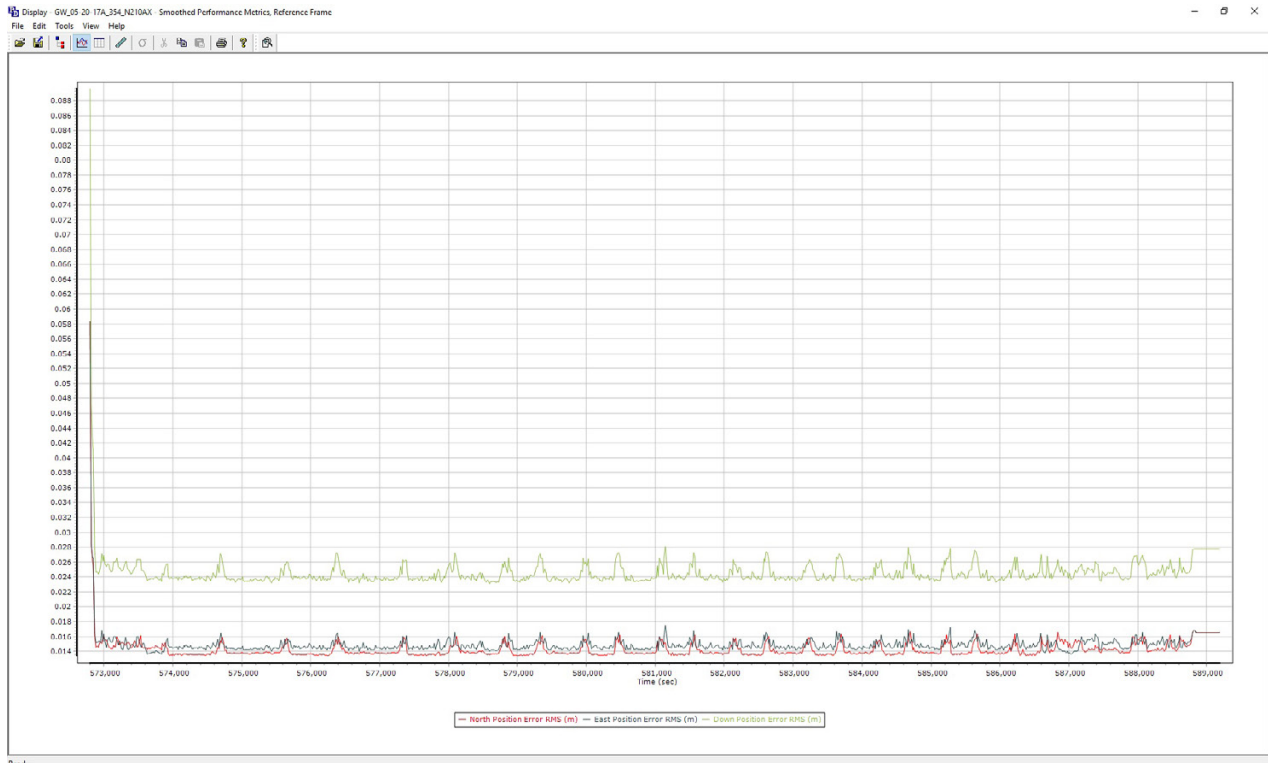
Coordinates  
 Latitude: North 46 08 18.22013 Coord. options  
 Longitude: West 67 35 09.17534 Save to Favorites  
 Ellipsoidal height: 37.773 m  
 Datum: WGS84 Proc Datum: WGS84  
 Epoch: year

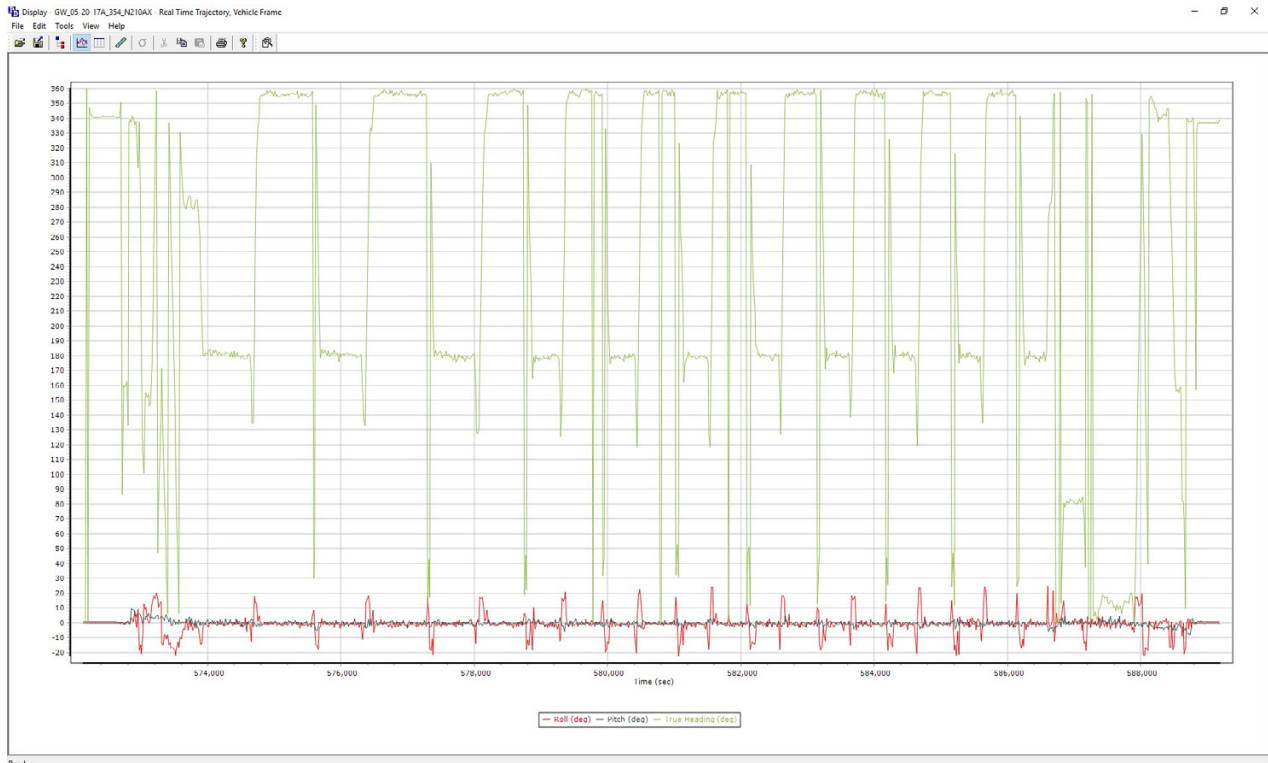
Antenna Height  
 From station file: TRM57971.00, TZGD View STA File  
 Antenna profile: TRM57971.00, TZGD Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.065 m  
 Applied height: 0.065 m  
 Measured to  
 ARP  
 L1 Phase Centre  
 Compute From Slant

OK Cancel

# 20170520-A (N210AX, SN354)









# Flight Log

## Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.3



Date: 05-20-17 Pilot: A.C.  
 Project: 16 PA - 787 - South Operator: R.D.  
 Aircraft: N210AX HD: B  
 Sensor: 5060354 POS/AV Filename: 20170520

Flight Plan		Weather	
Roll Comp:	On or Off	Pressure (gnd):	30.33
Multipulse:	On or Off	Temperature (gnd):	66°F
Beam Divergence:	Wide or <u>Narrow</u>	Temperature (air):	40
Scan Frequency:	56	Dew Point:	Light
System PRF:	300	Turbulence:	20+
Scan Angle:	37	Visibility:	20+
Desired Range:	1525		
Planned Speed:	150		

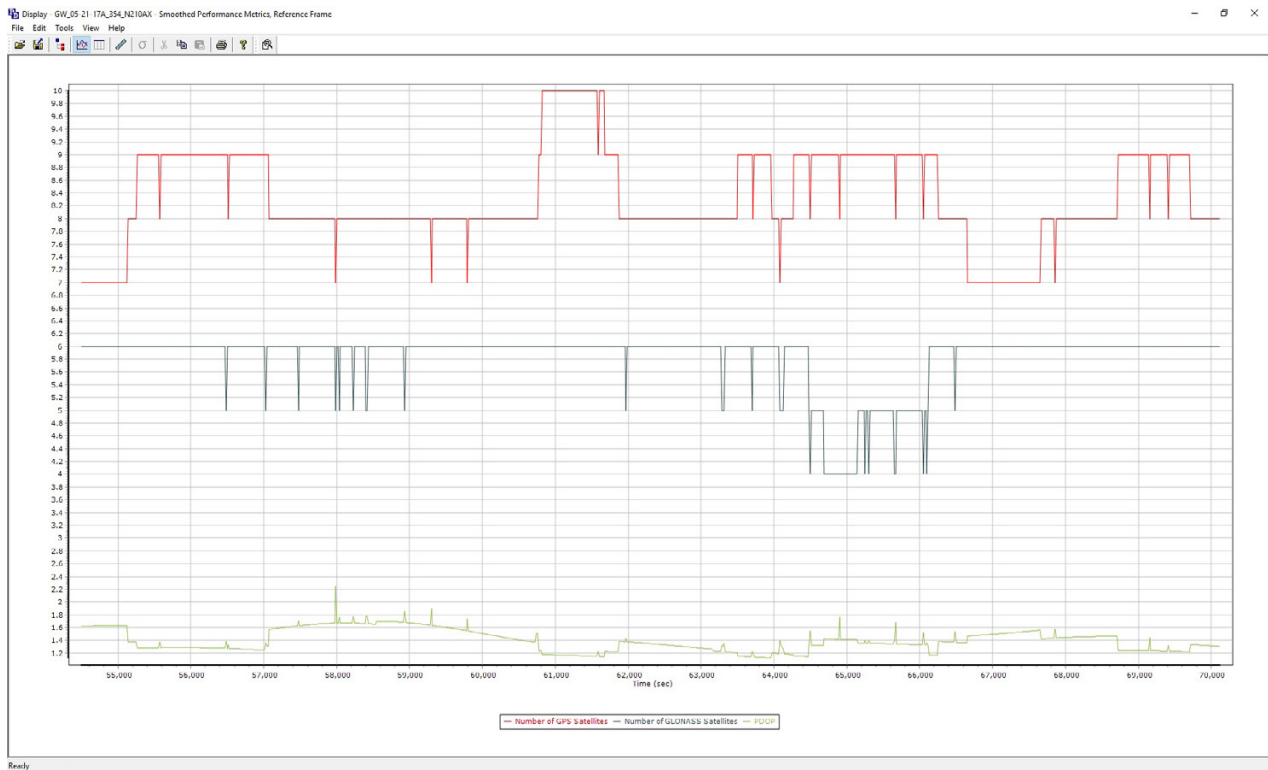
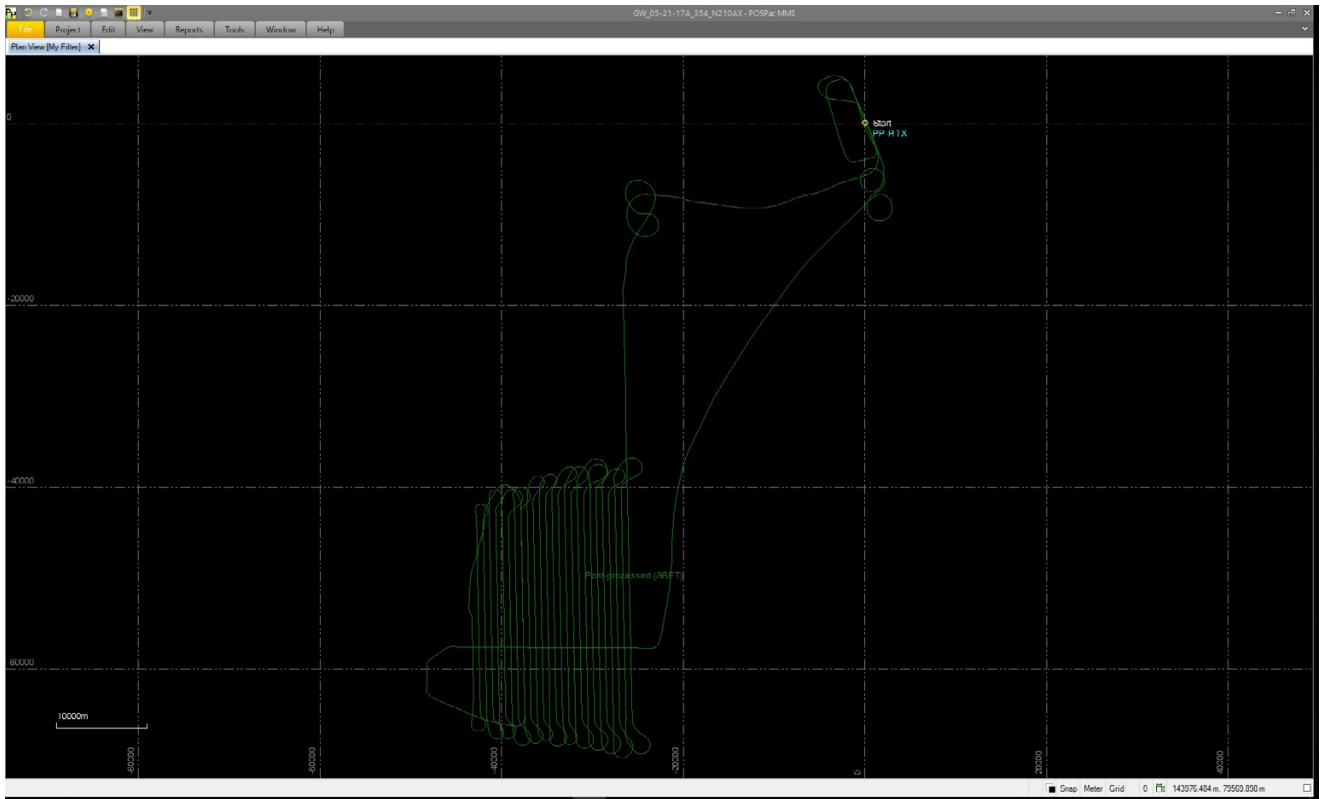
Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
47	15:27	15:37	178	1350	1.07	18	151	
46	15:40	15:53	358	1628	1.07	18	130	
45	15:55	16:04	178	1500	1.17	17	144	
44	16:09	16:21	358	1481	1.40	16	128	
43	16:23	16:33	178	1616	1.18	16	145	
42	16:38	16:45	358	1236	1.14	16	122	
41	16:48	16:54	178	1701	0.98	18	154	
40	16:57	17:05	358	1881	0.97	19	130	
39	17:07	17:13	178	1572	1.00	18	150	
38	17:16	17:23	358	1790	0.97	18	121	
37	17:25	17:31	178	1610	0.97	17	152	
36	17:34	17:41	358	1717	0.93	17	129	
35	17:43	17:49	178	1601	0.93	16	153	
34	17:52	17:58	358	1581	0.88	17	122	
33	18:01	18:07	178	1446	0.97	16	150	
32	18:09	18:16	358	1616	1.03	15	121	
31	18:18	18:23	178	1350	1.07	15	154	
30	18:26	18:32	358	1465	1.07	15	128	
29	18:34	18:39	178	1428	1.06	15	152	
28	18:42	18:48	358	1673	1.23	14	126	

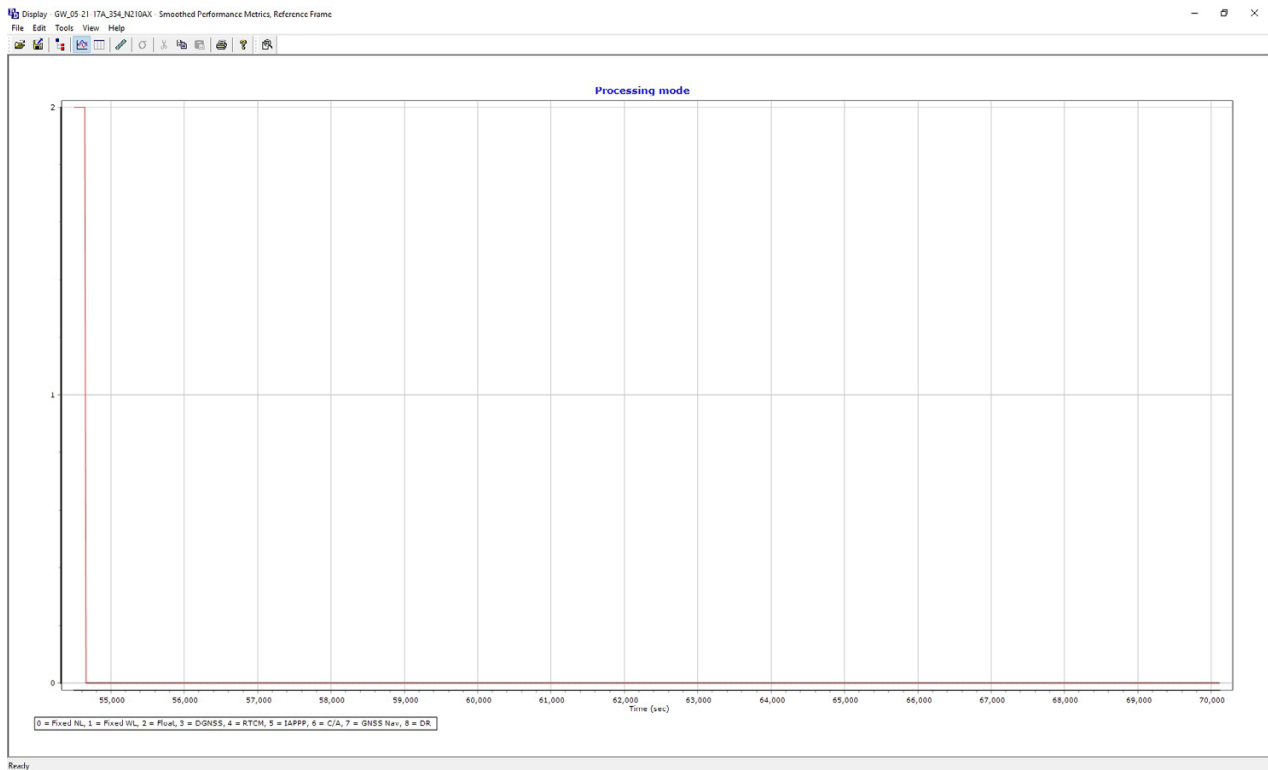
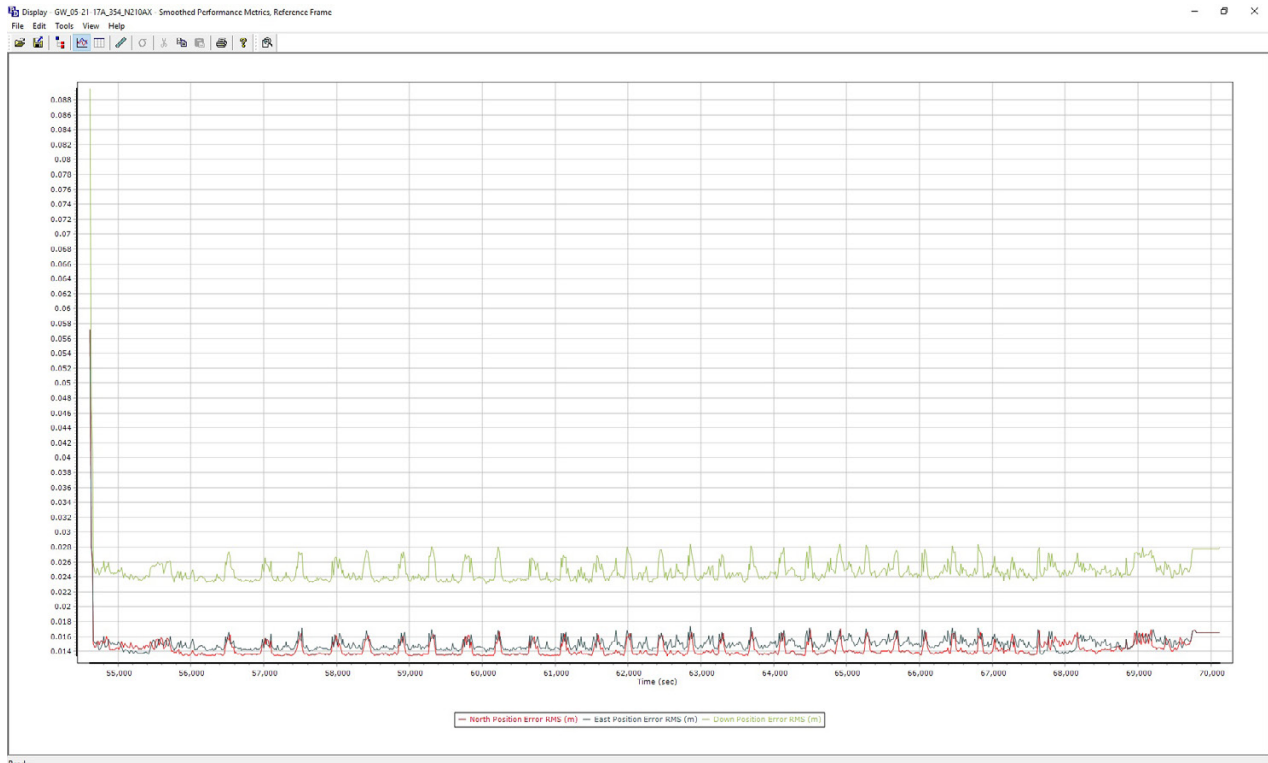
Base Station		Location: <u>KBML</u>	
Point ID:	<u>Berlin 1959</u>	Time On(UTC):	<u>14:40</u>
Position Type:	<u>Known</u> Autonomous	Time Off(UTC):	<u>19:50</u>
Antenna Height:	<u>2.0</u> Meters	PDOP:	
Latitude:	<u>44 34 37.38607 N</u>	SVs:	
Longitude:	<u>071 10 43.66613 W</u>		

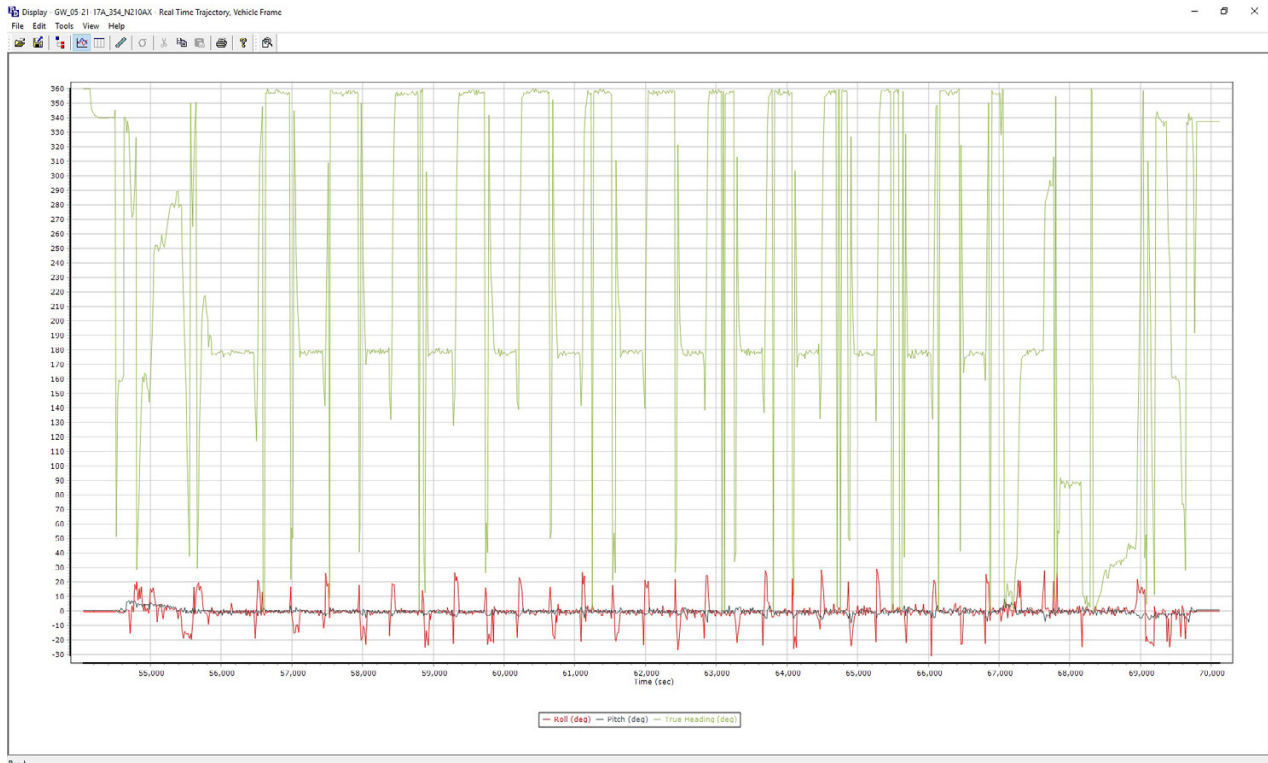
Airborne Station	
Time On:	<u>14:55</u> UTC
Kinematic On:	<u>15:04</u> UTC
Kinematic Off:	<u>19:34</u> UTC
Time Off:	<u>19:39</u> UTC

Engine Start(24HR LCL): 10:50 Hobbs Start: KBML  
 Engine Stop(24HR LCL): 15:40 Hobbs Stop: KBML  
 Page 1 of 2

# 20170521-A (N210AX, SN354)







# Flight Log

## Keystone Aerial Surveys, Inc. - LIDAR FLIGHT REPORT - v1.3



Date: 05-21-17 Pilot: A.C.  
 Project: KAS 167A-787\_South Operator: R.D.  
 Aircraft: N240AX HD: A  
 Sensor: 5060354 N/A

POS/AV Filename: 20170521

Flight Plan		Weather	
Roll Comp:	<u>(On)</u> or Off	Pressure (gnd):	<u>30.31</u>
Multipulse:	On or <u>Off</u>	Temperature (gnd):	<u>70</u>
Beam Divergence:	Wide or <u>(Narrow)</u>	Temperature (air):	<u>43</u>
Scan Frequency:	<u>56</u>	Dew Point:	<u>Light</u>
System PRF:	<u>300</u>	Turbulence:	<u>10+</u>
Scan Angle:	<u>37</u>	Visibility:	<u>10+</u>
Desired Range:	<u>1525</u>		<u>20170521.758</u>
Planned Speed:	<u>150</u>		<u>20170521.781</u>

Line #	Start Time	End Time	HDG	Range	PDOP	SV	Speed (kts)	Flight Notes
26	15:35	15:41	178	1604	1.15	18	142	
25	15:43	15:49	358	1715	1.15	18	132	
24	15:51	15:57	178	1457	1.12	18	152	
23	15:59	16:05	358	1578	1.42	15	133	
22	16:07	16:13	178	1555	1.44	15	154	
21	16:15	16:20	358	1633	1.43	16	142	
20	16:23	16:27	178	1576	1.52	15	156	
19	16:29	16:35	358	1632	1.50	15	138	
18	16:37	16:42	178	1565	1.21	16	152	
17	16:44	16:50	358	1545	1.10	17	134	
16	16:52	16:57	178	1472	0.97	19	154	
15	16:59	17:05	358	1586	1.00	18	136	
14	17:07	17:12	178	1627	1.00	18	144	
13	17:14	17:20	358	1515	0.98	18	138	
12	17:21	17:27	178	1499	1.11	17	145	
11	17:28	17:34	358	1596	1.07	16	132	
10	17:35	17:40	178	1603	1.02	17	146	
9	17:42	17:48	358	1519	1.03	16	138	
8	17:49	17:54	178	1430	0.98	17	150	
7	17:56	18:01	358	1580	0.99	16	138	

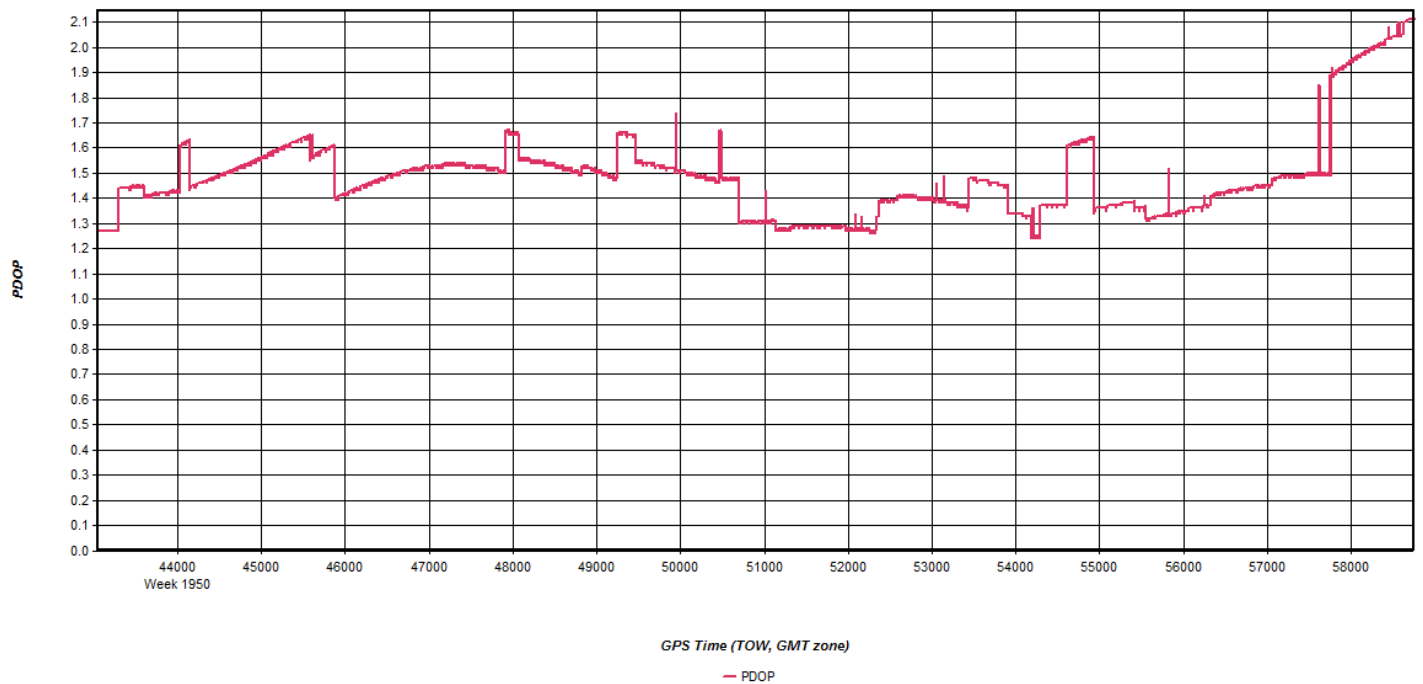
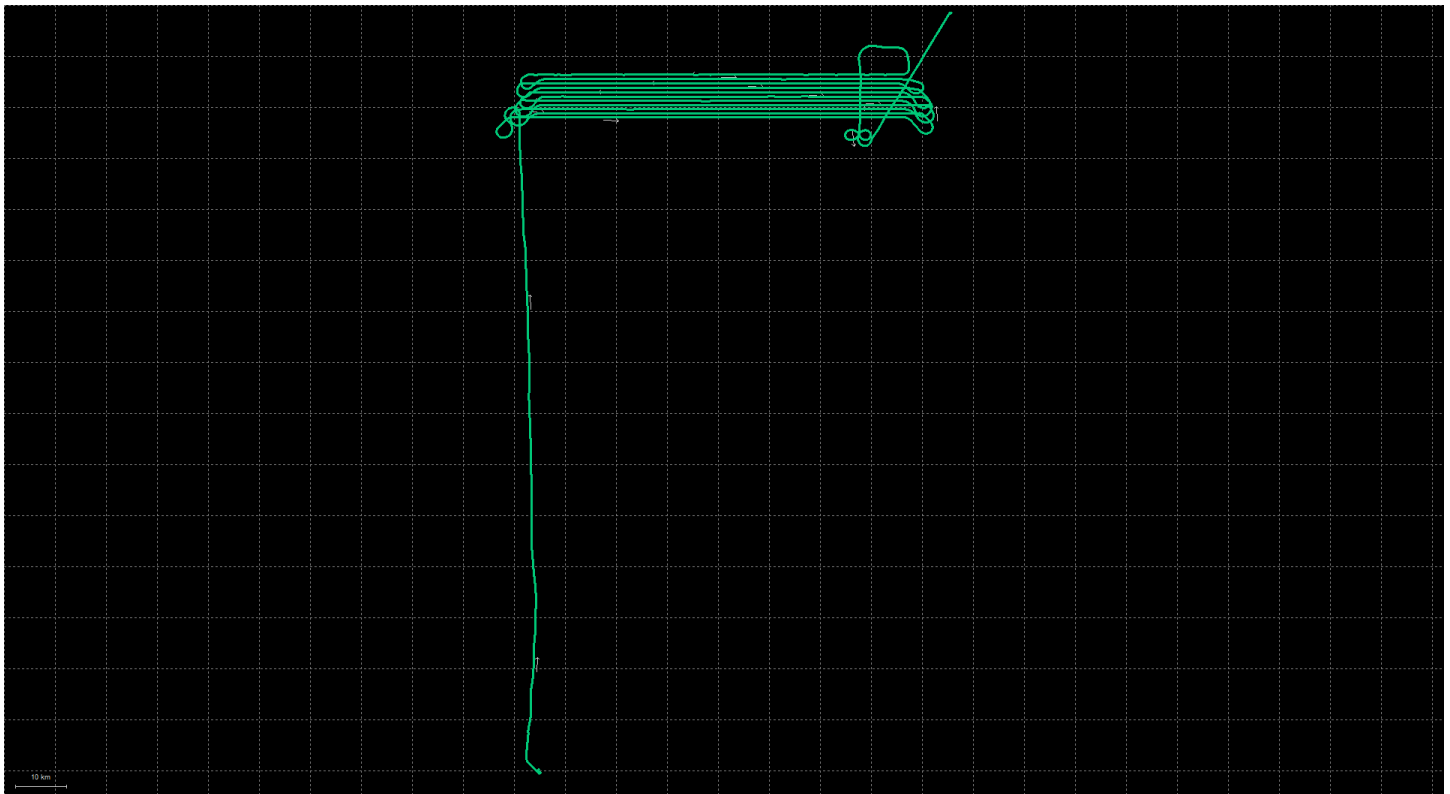
*Alt. End: Gap in coverage due to Terrain change.*

Engine Start(24HR LCL): 10:56 Hobbs Start: KBML  
 Engine Stop(24HR LCL): 15:30 Hobbs Stop: KBML  
 Page 1 of 2

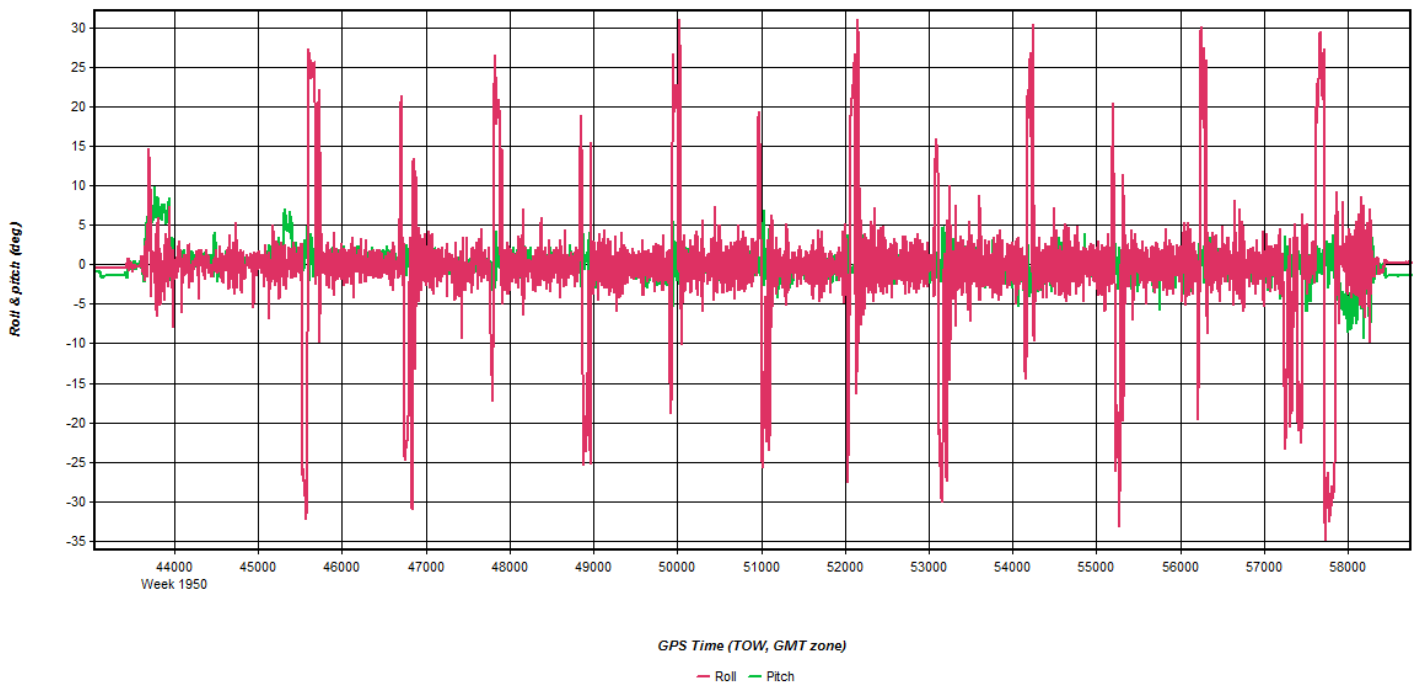
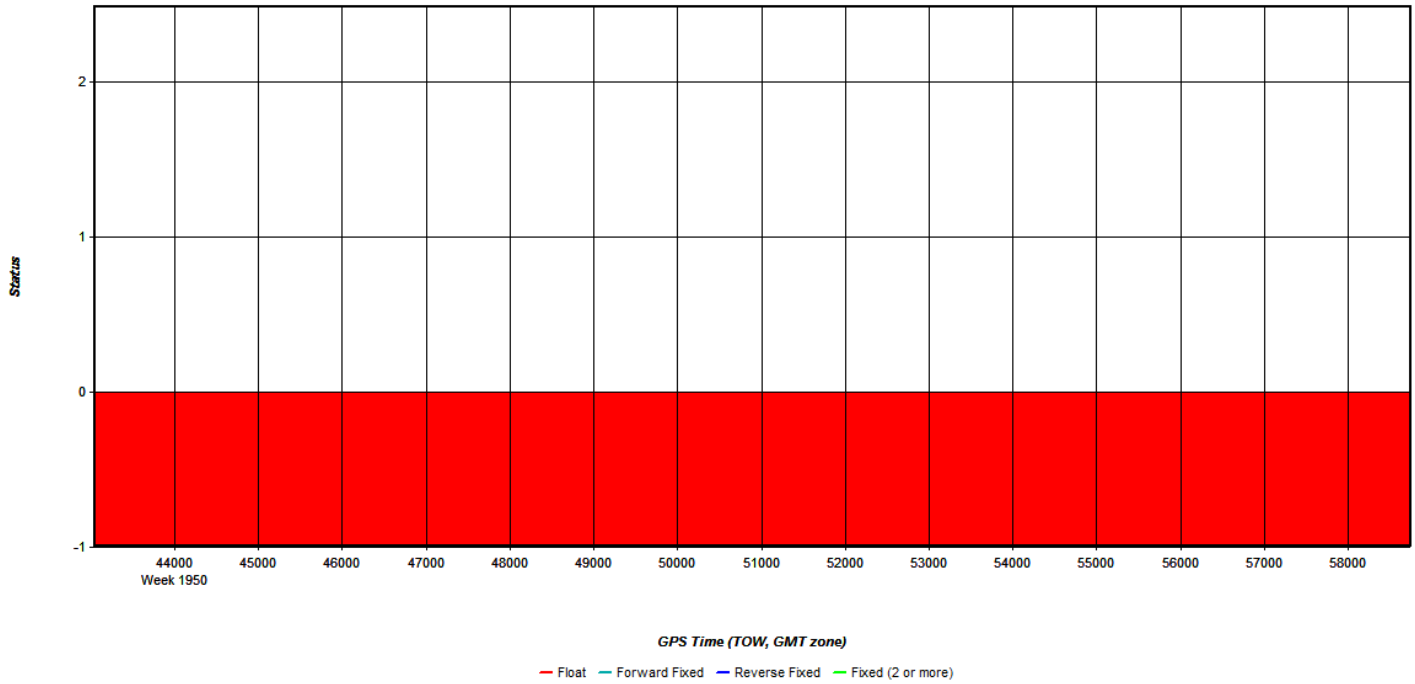
Airborne Station	
Time On:	<u>15:00</u> UTC
Kinematic On:	<u>15:07</u> UTC
Kinematic Off:	<u>17:23</u> UTC
Time Off:	<u>17:28</u> UTC

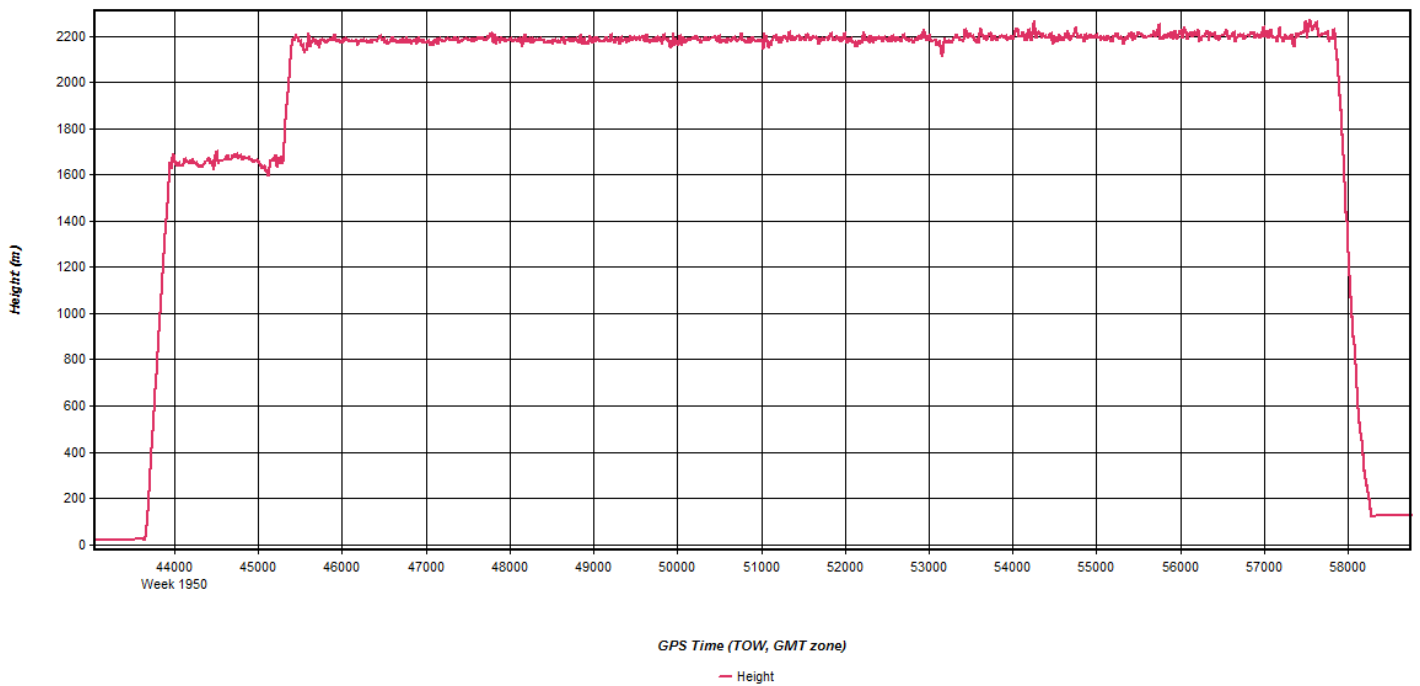
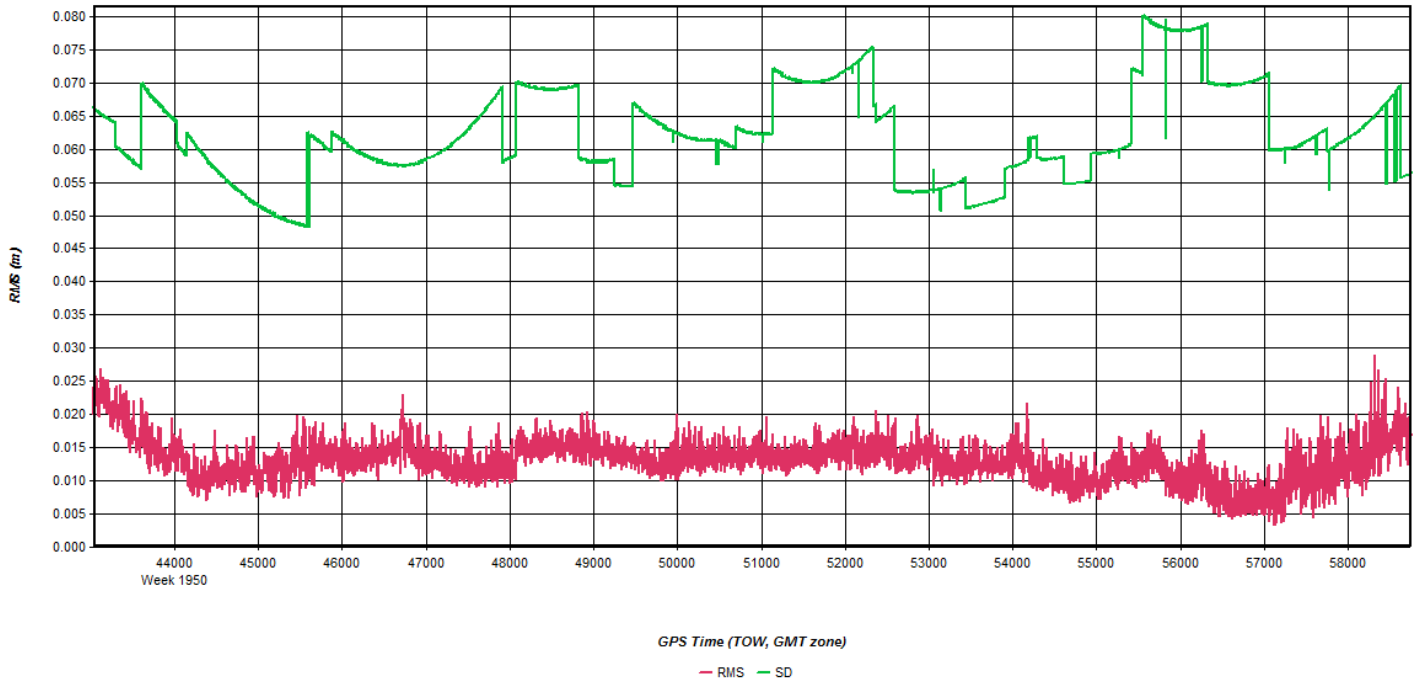
Base Station	
Location:	<u>KBML</u>
Point ID:	<u>Berlin 1957</u>
Position Type:	<u>Known/Autonomous</u>
Antenna Height:	<u>2.0</u> Meters
Latitude:	<u>44 34 37.38607 N</u>
Longitude:	<u>071 10 43.66613 W</u>
Time On(UTC):	<u>17:37</u>
Time Off(UTC):	<u>17:37</u>
PDOP:	
SVs:	

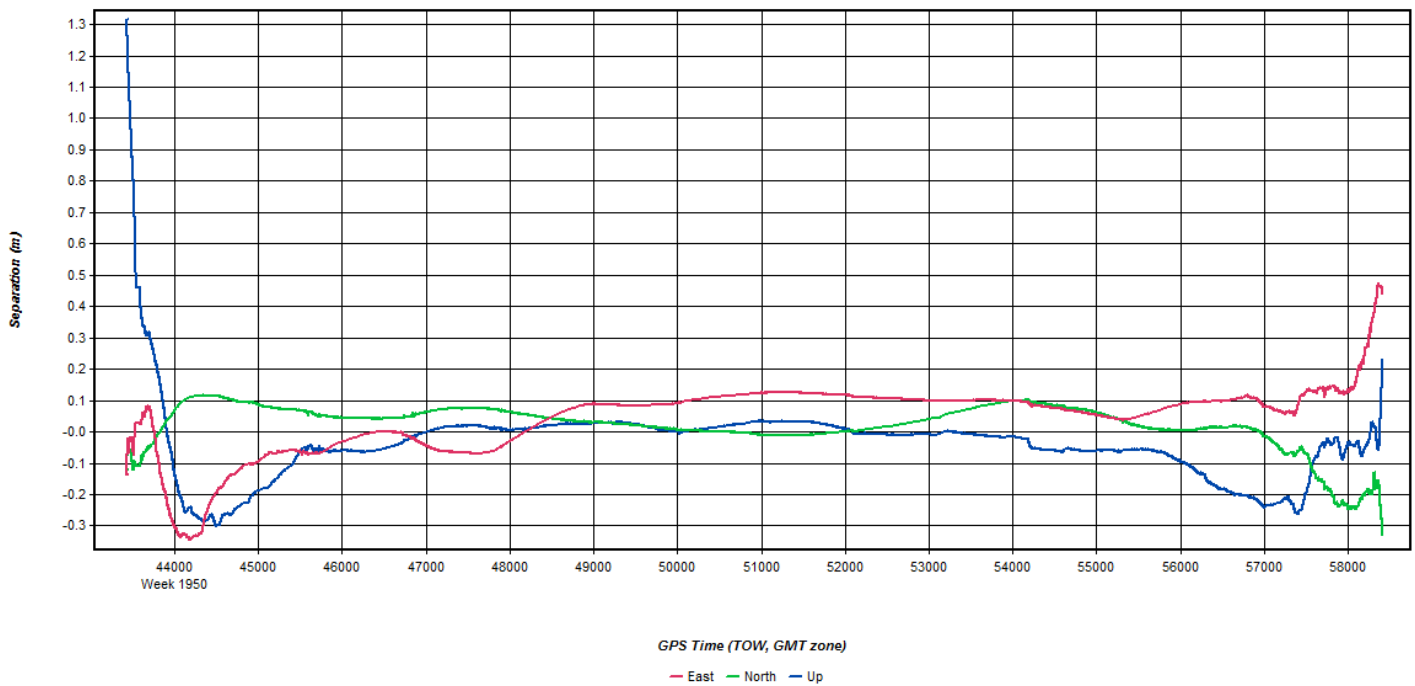
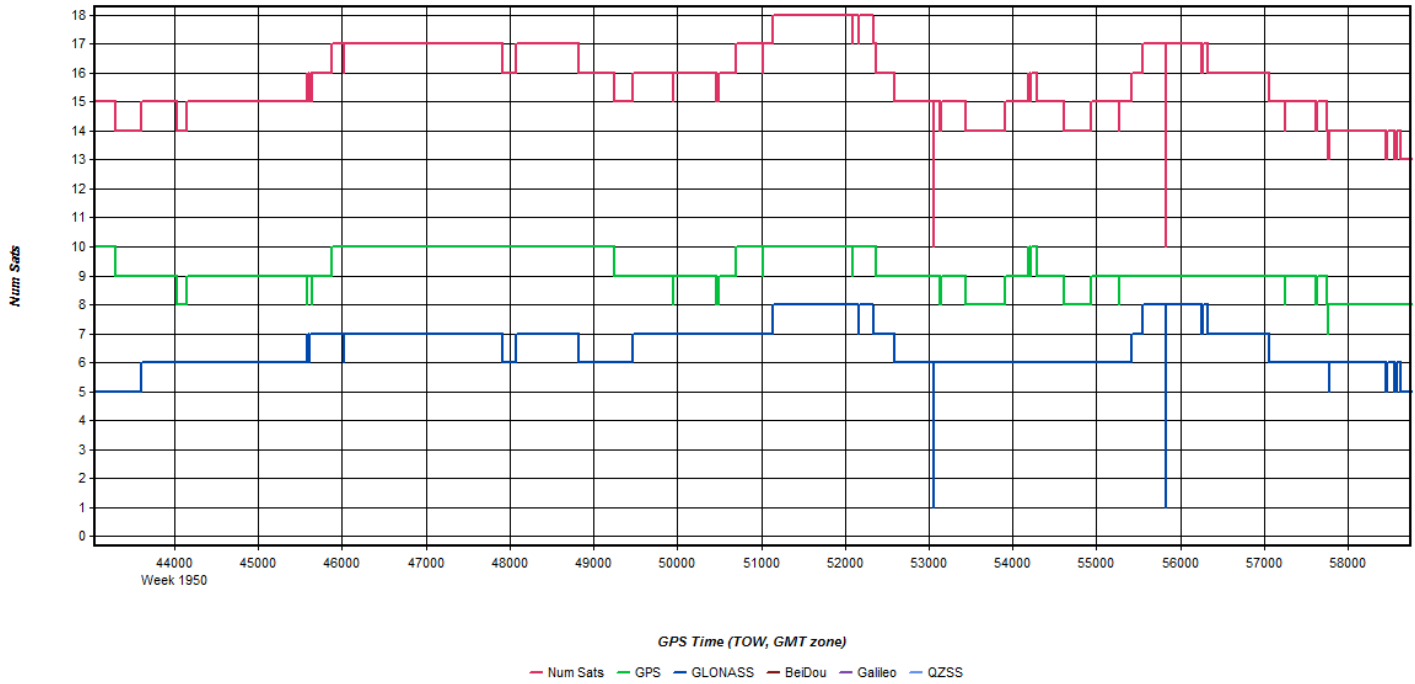
# 20170521-A (N262AS, SN7161)

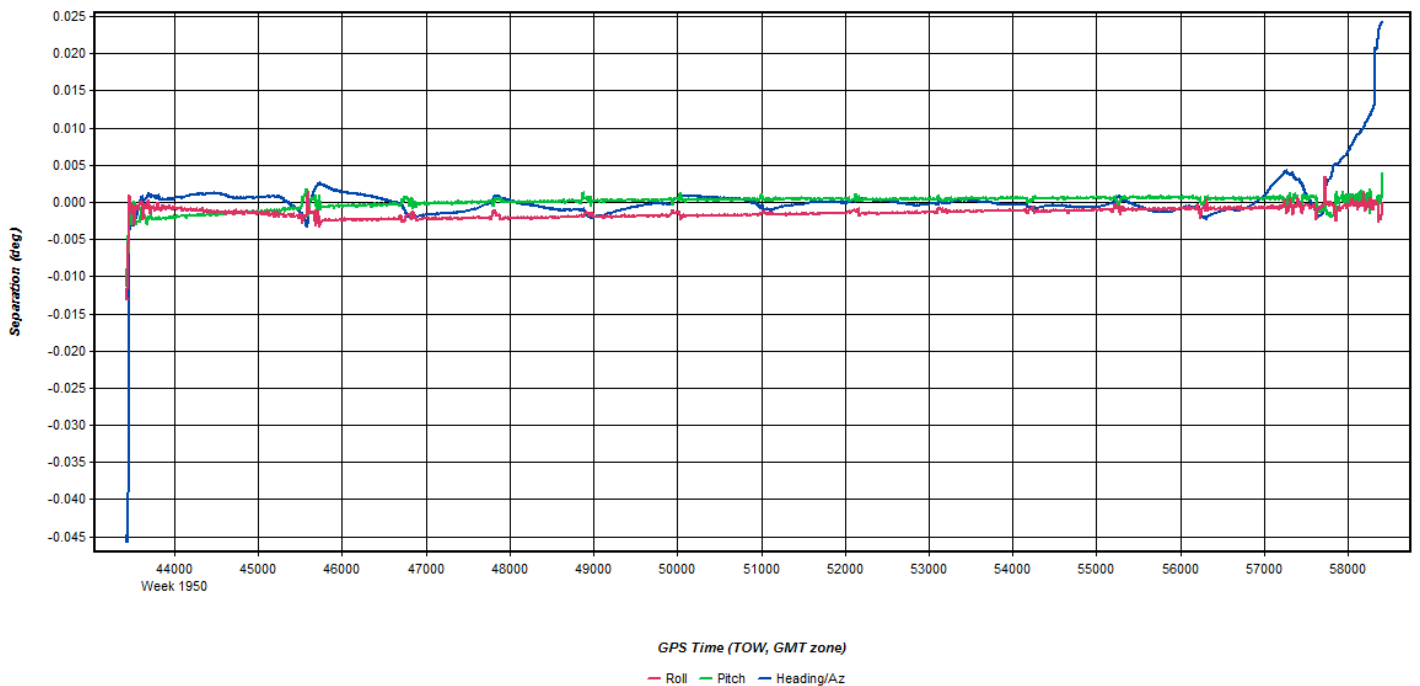
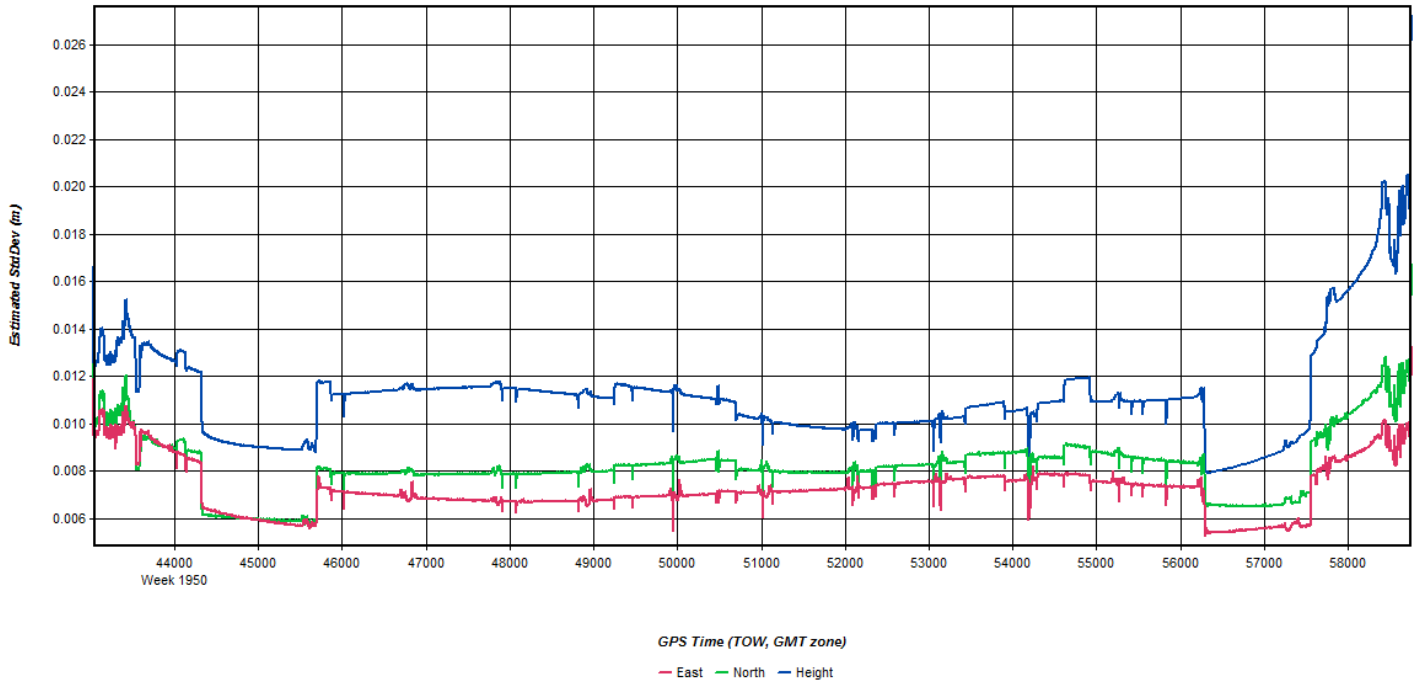


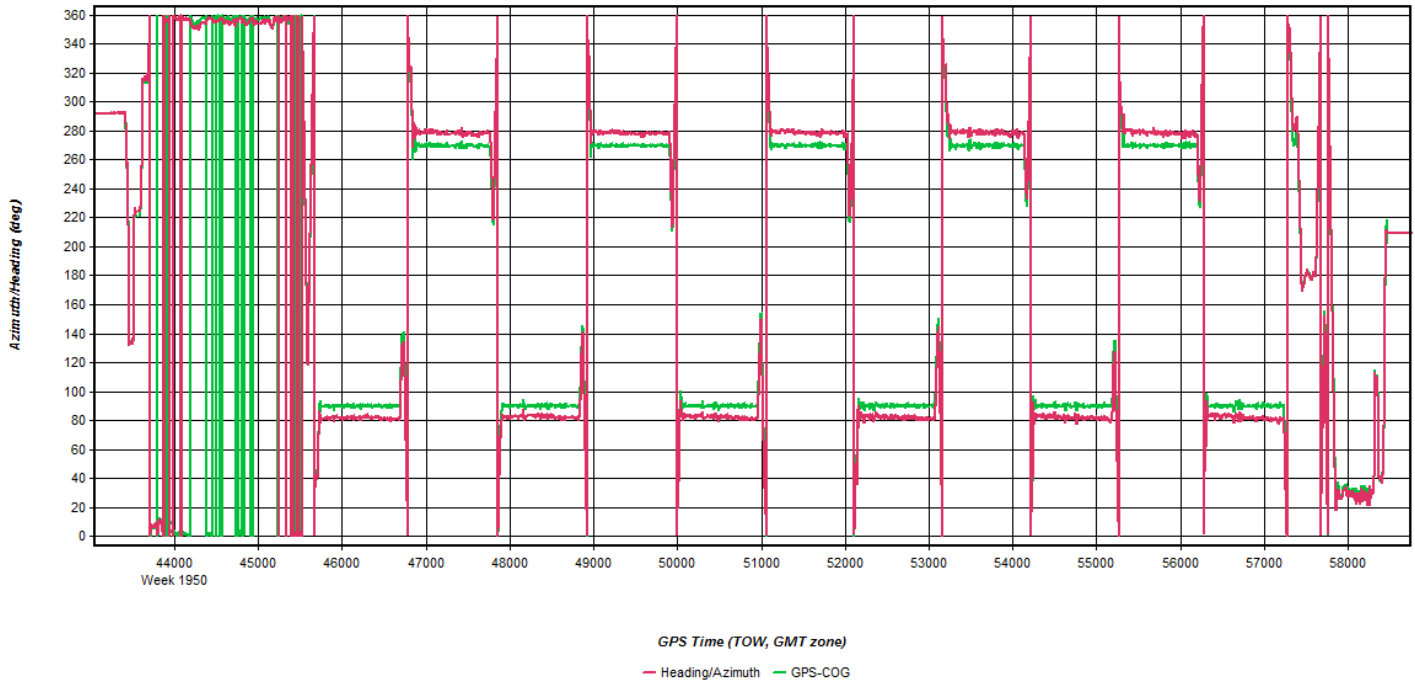










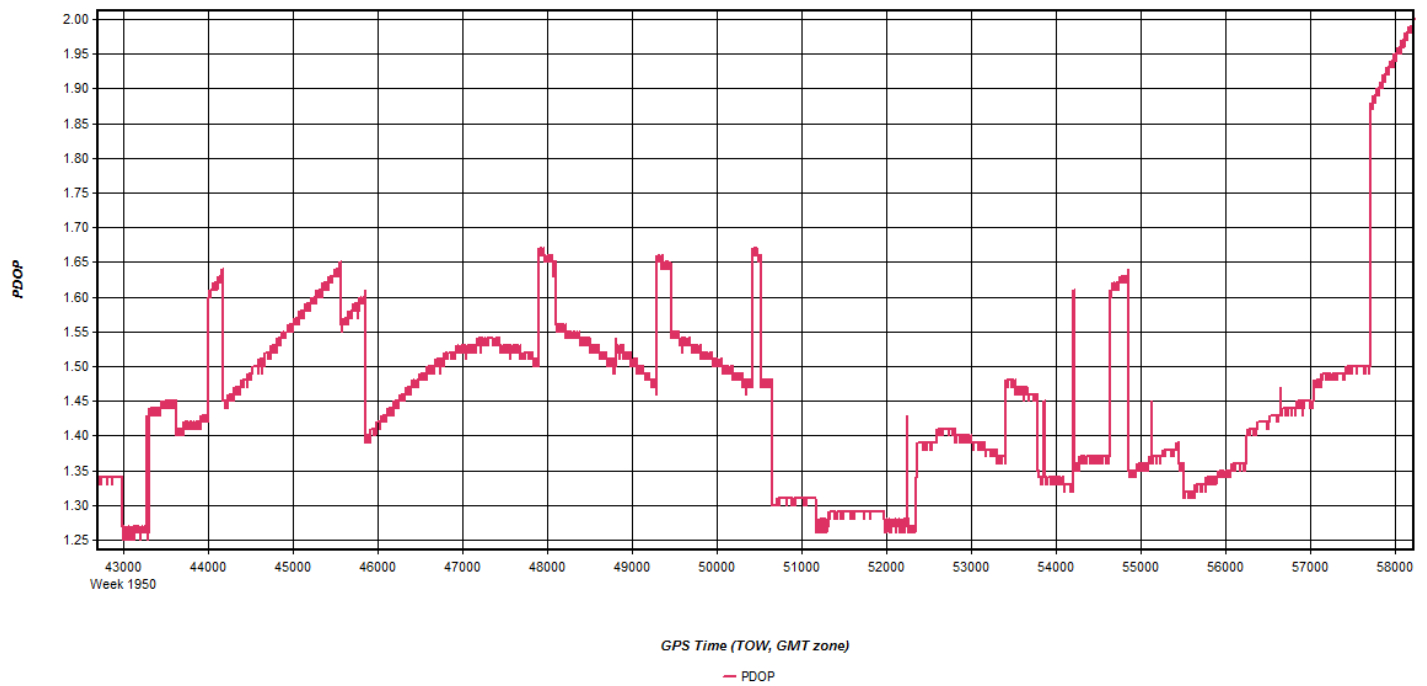
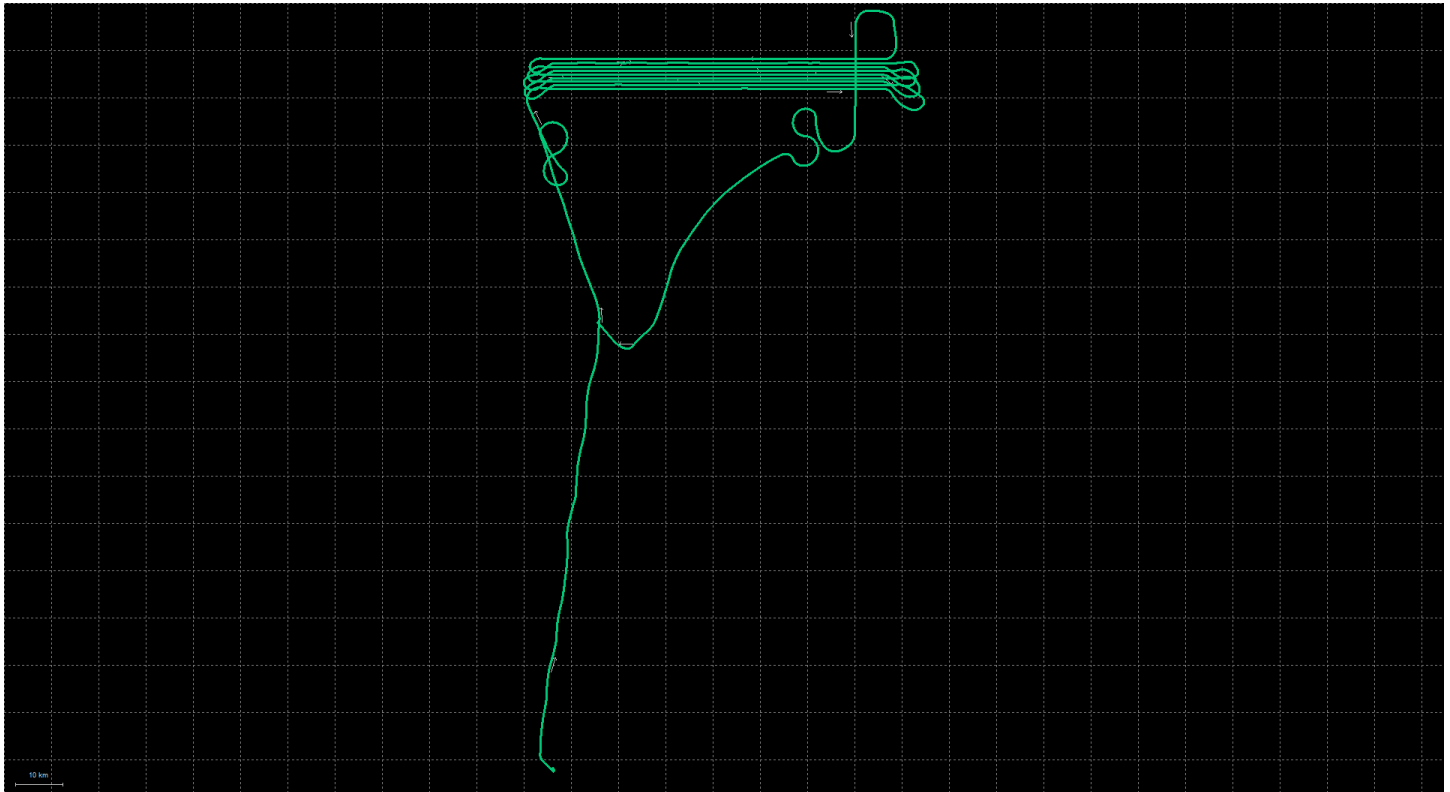


# Flight Log

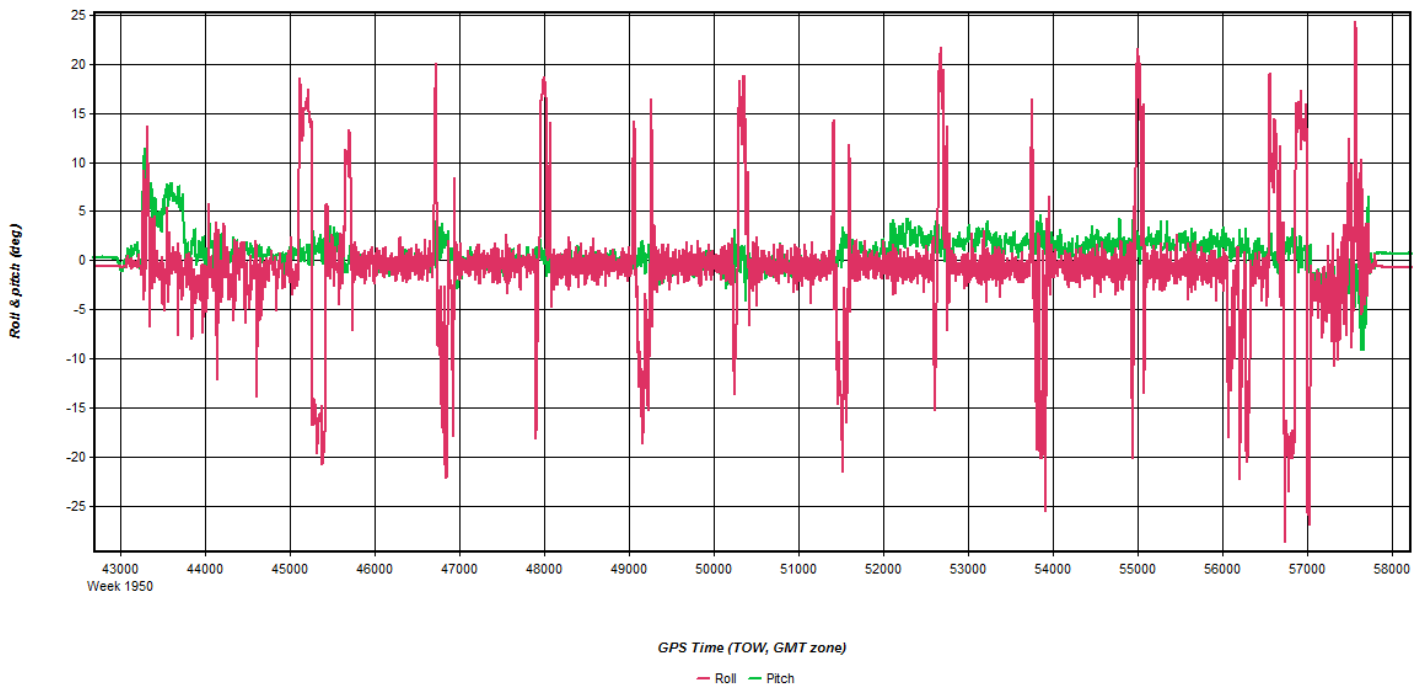
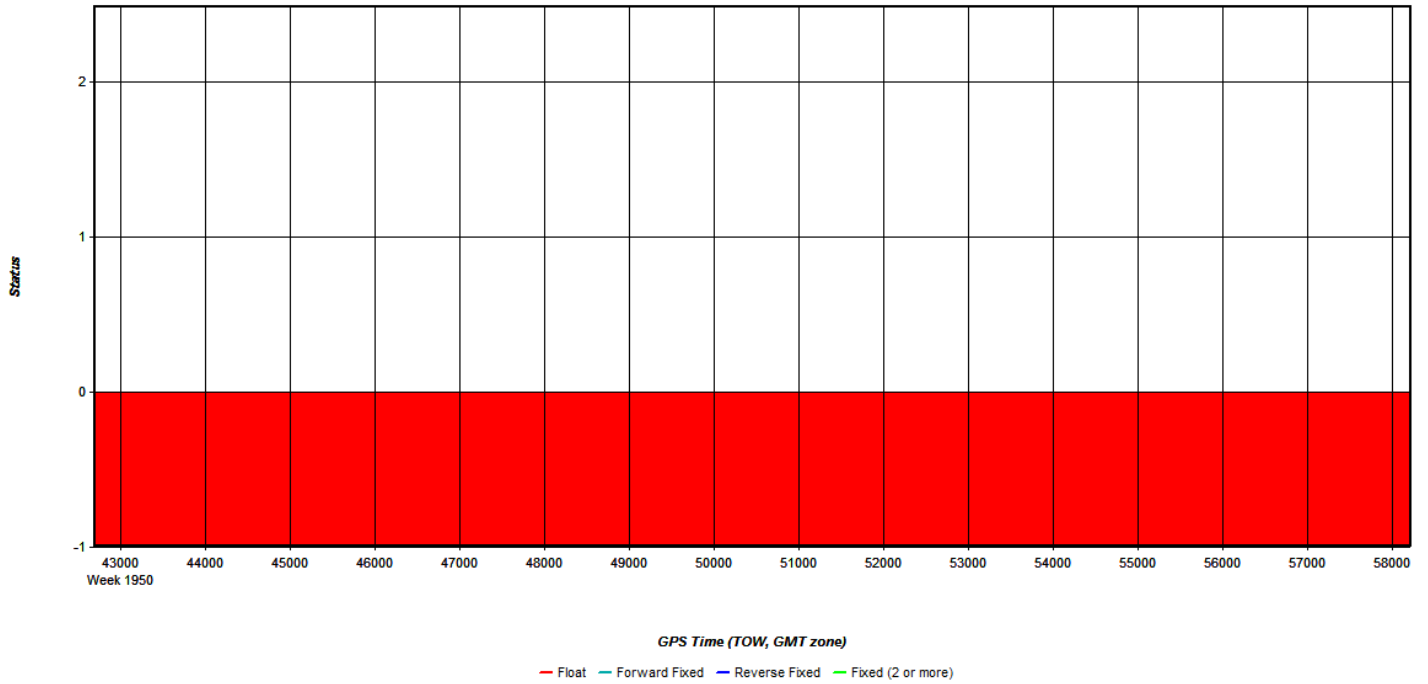
Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc												Date: 5-21-17																	
(email log daily to flight_log_distribution_list@quantumspatial.com)												LIDAR B C D E pg 1 of 2																	
Project: USGS-AWAE-2100			Proj #: 29513			Flight Mgmt File: 20170521-115540																							
Aircraft: N262AS			Begin Hobbs: 6634.5		End Hobbs: 6638.6		Total: 4.1		Pilot: NEILSON		Co-Pilot: -	Tech: SCHOONE																	
Dep Apt: KBGR			Dep Time (Local): 08:00 (Z): 12:00			Arr Apt: KHUL			Arr Time (Local): 12:12 (Z): 16:12			Tot Time Aloft:																	
CORS: <input checked="" type="checkbox"/> I N			Sta 1: MELT		Sta 2: MEPI		Flyovers: Y / N			If Y, times: Sta1)		Sta2)																	
GPS Unit: <input checked="" type="checkbox"/> I N			Sta 1: KBGR		Sta 2:		Flyovers: Y / N			If Y, times: Sta1)		Sta2)																	
Gd Temp beg: 12 °C			End: 16 °C		OAT beg: °C		End: °C		Altimeter begin: 30.38			end: 30.31																	
LIDAR	Type	ALS-70	Serial #	7161	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdepd	Avg Pz Spacing	Mag Cal	221	Storage Name/No	015																
	FOV	30	Scan Freq	50	MplA	<input checked="" type="checkbox"/> I N	Pulse Rate	2000.0	Power	100%	PPSM	End Cal	077																
												Tot Cal	50																
Line #												Hdg		Start (UTC)		End (UTC)		Gd Spd		Foot/s		GPS Altitude		Crab		Turb (0-3)		FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.	
1066		90		12:43		12:57		150		1.2/18		7162		-8						SKC VIS 8-9 LIGHT TURBULANCE WEST END									
1059		270		13:01		13:15		153		1.3/18		7165		+9															
1058		90		13:19		13:33		148		1.2/19		7169		-8															
1057		270		13:36		13:51		150		1.4/18		7169		+9															
1056		90		13:54		14:08		149		1.3/17		7178		-6															
1055		270		14:12		14:26		154		1.1/19		7181		+10															
1054		90		14:29		14:44		143		1.2/19		7192		-8															
1053		270		14:47		15:01		154		1.1/19		7201		+9															
1052		90		15:04		15:19		149		1.2/18		7201		-7															
1051		270		15:22		15:36		153		1.1/18		7205		+10															
1050		90		15:38		15:53		155		1.2/18		7205		-6															
X TIME		S		15:57		16:00		146		1.3/17		7280		-															
Total Proj Lines:		Lines Flown:		11		Lines Remain:				Online Time:		3.3		Mob Time:		.8		Notes:											

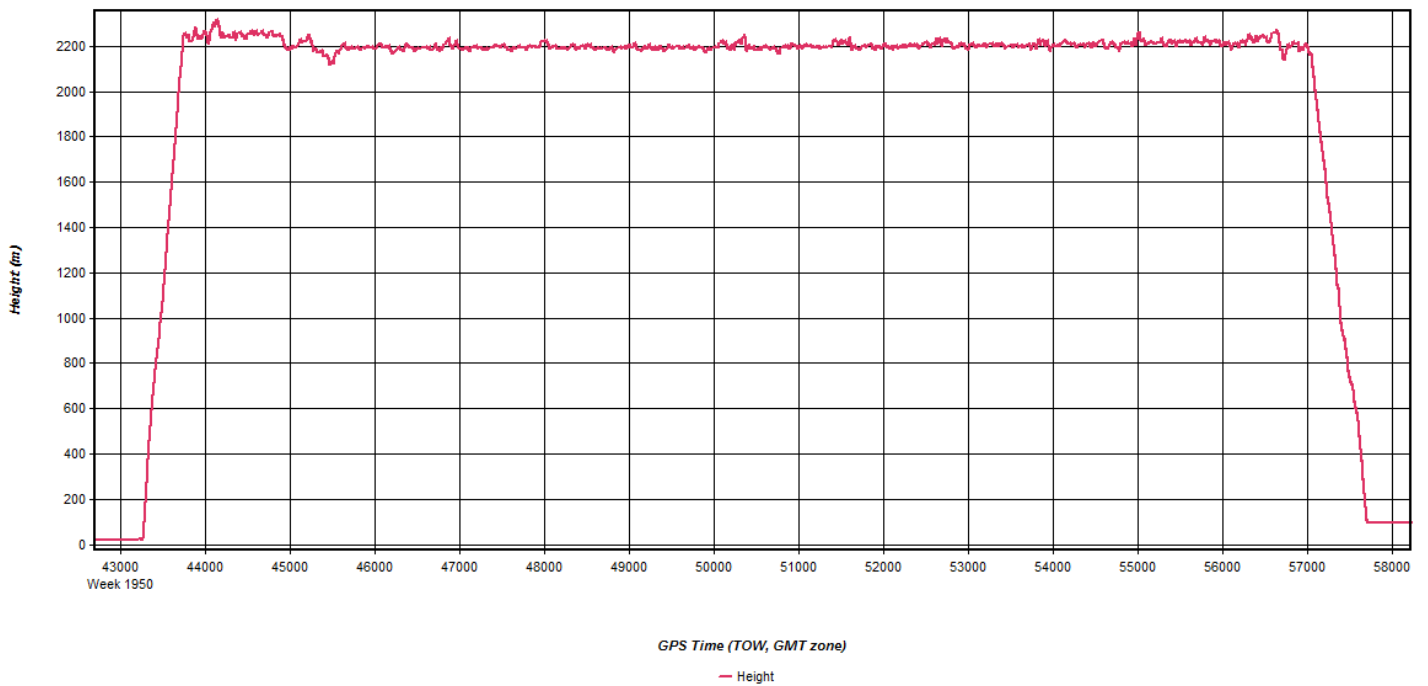
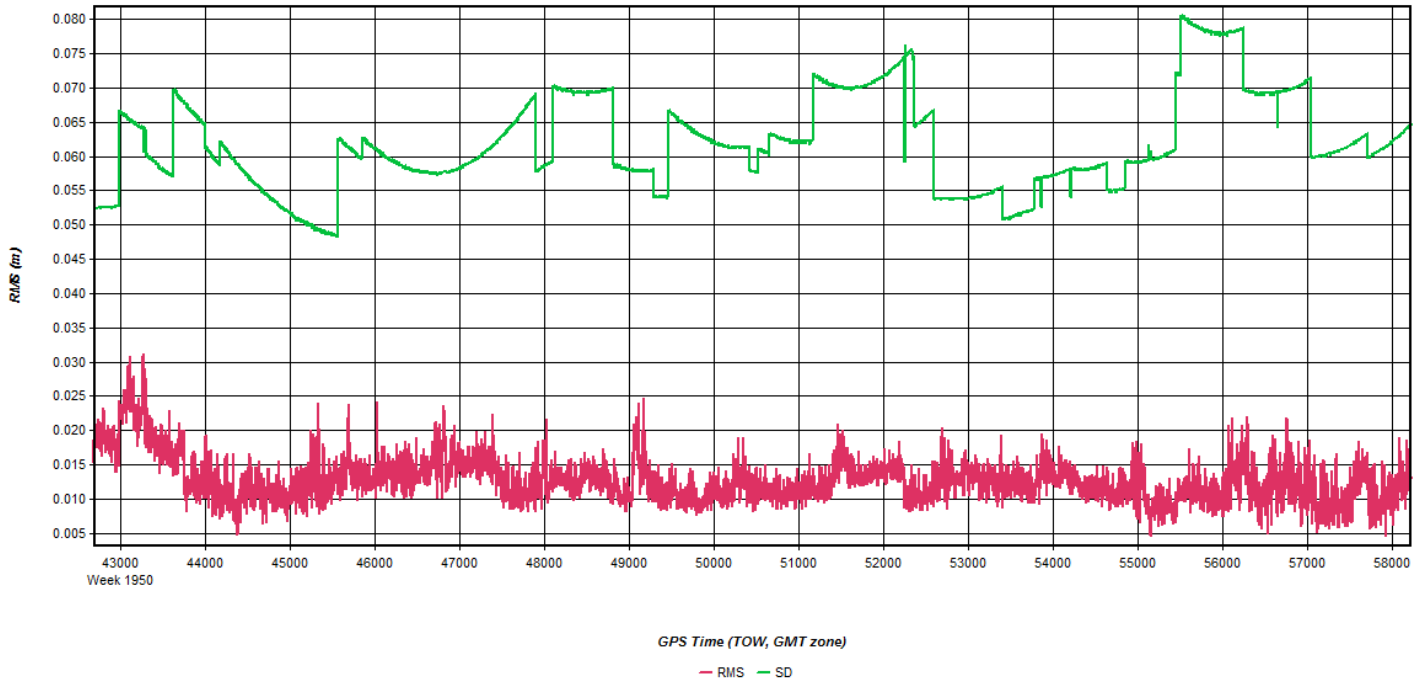
Scanned by CamScanner

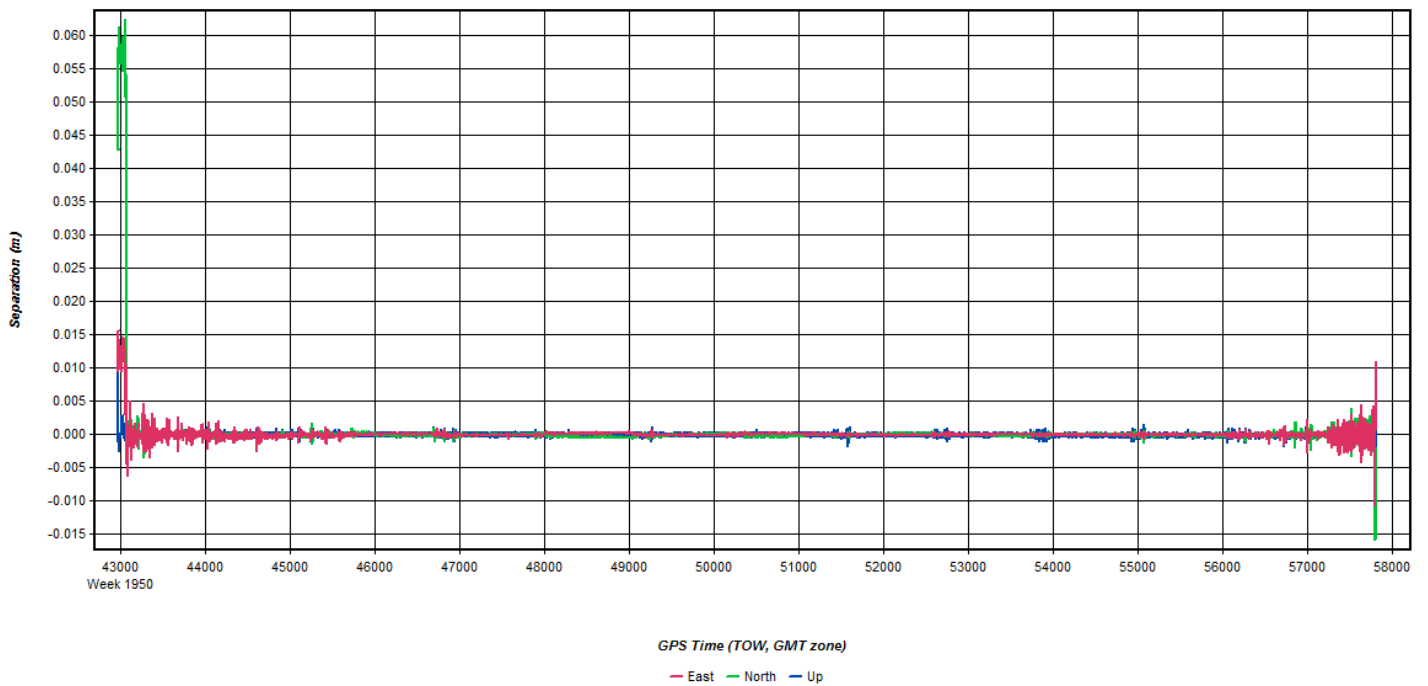
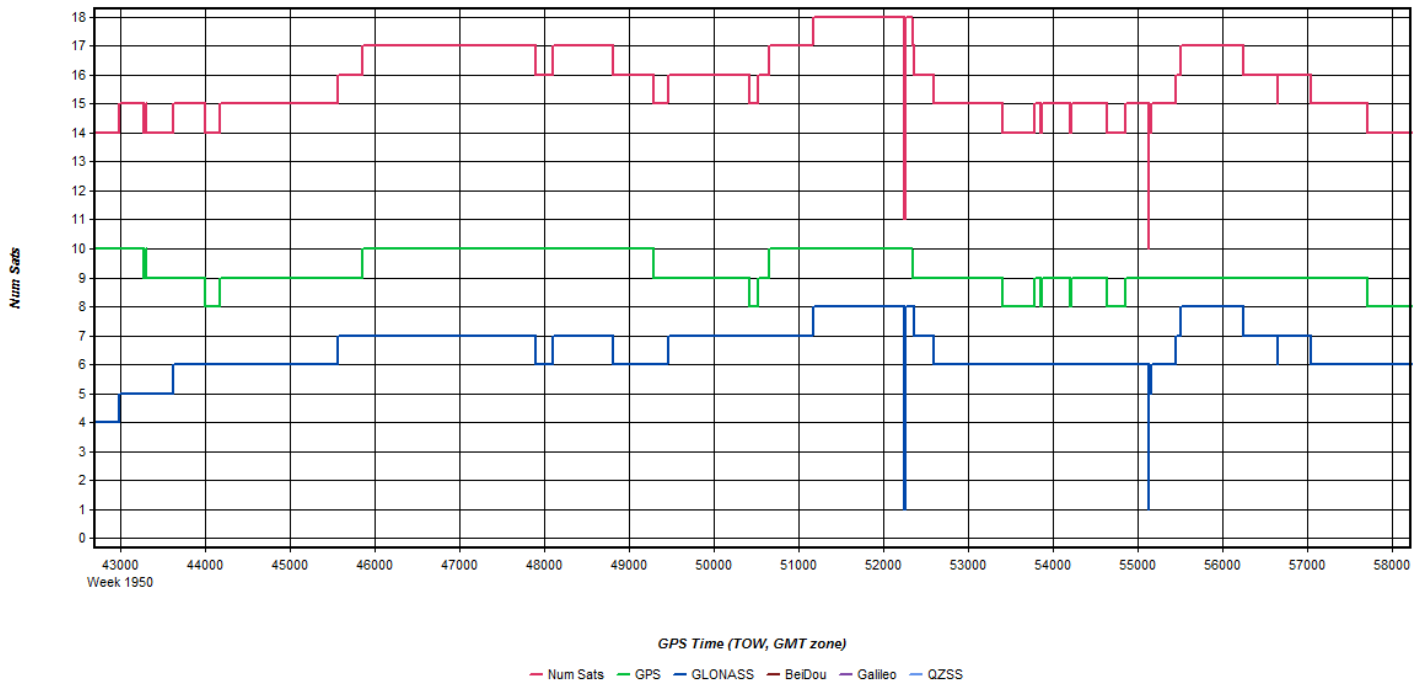
# 20170521-A (N73TM, SN7178)

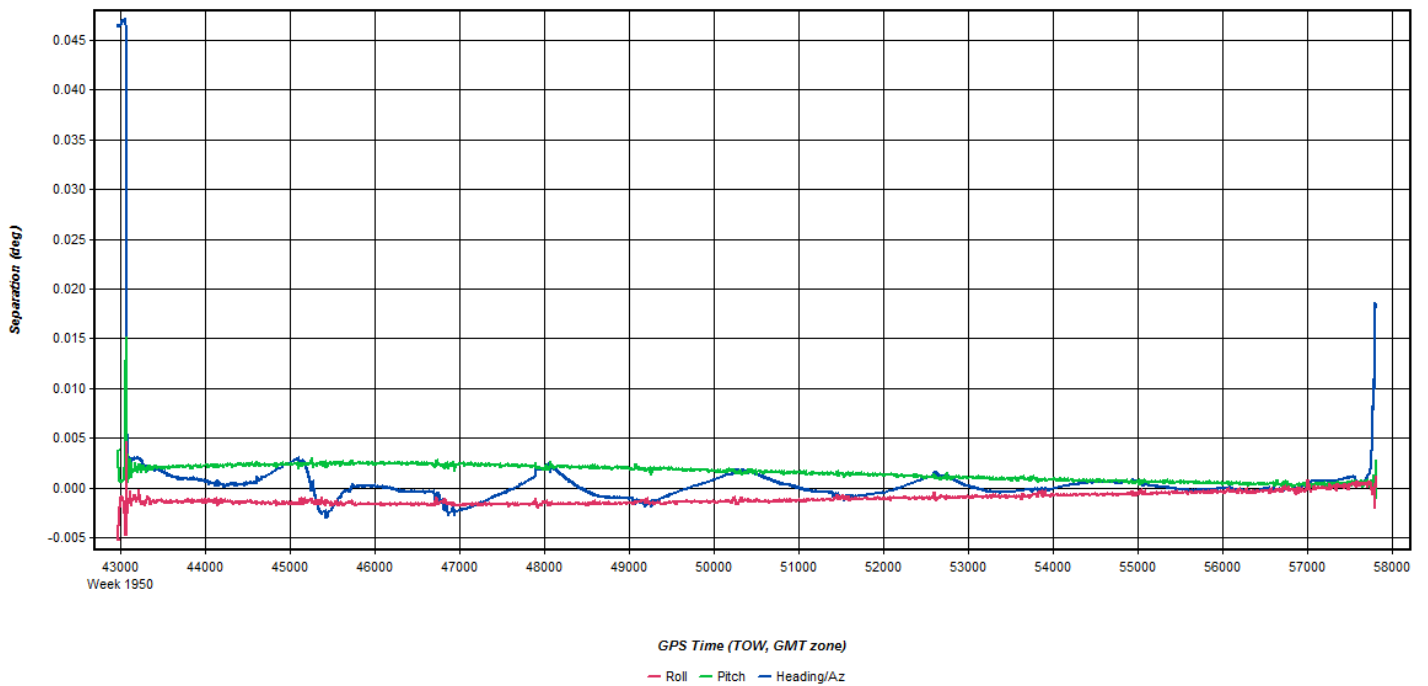
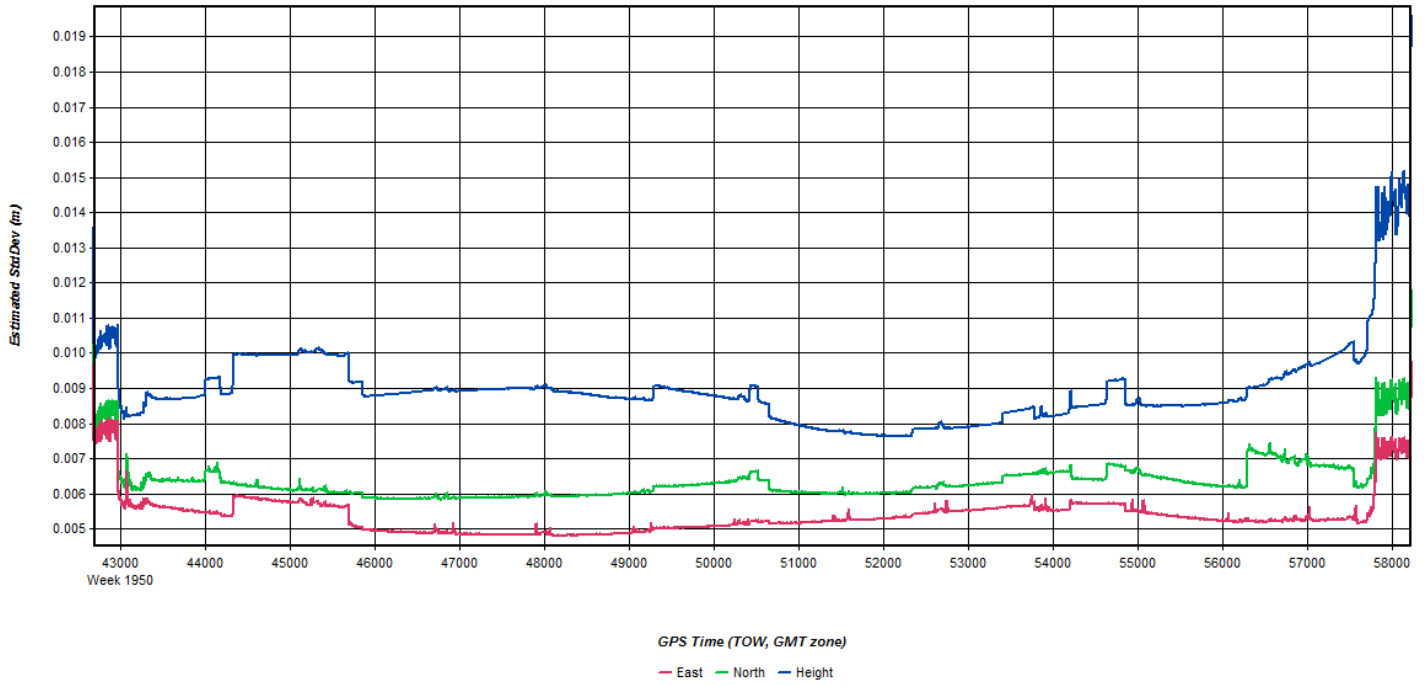


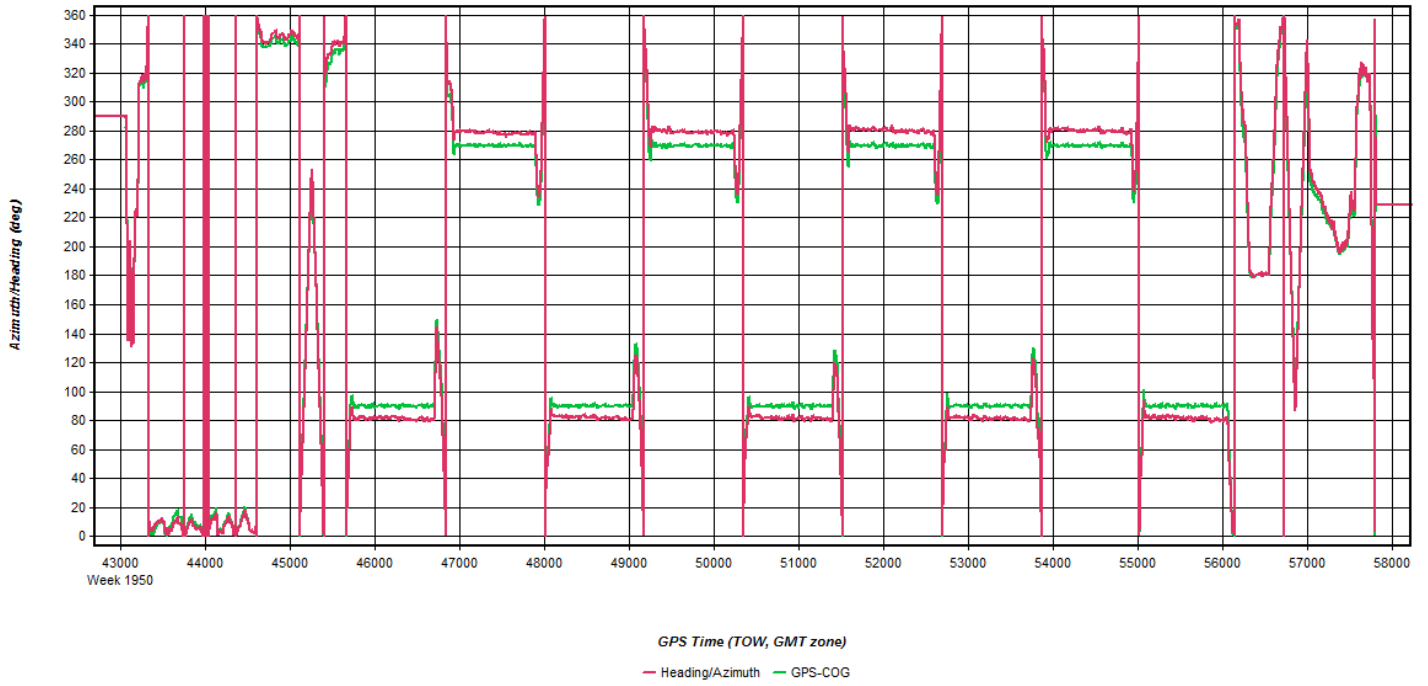












# Flight Log

**Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc**  
(email log data to flight\_log\_distribution@quantumspatial.com)

Project: USGS ME Flight Mgmt File: 217 0521-14846 Date: 5-21-17 A  
USGS Q S I ML AT

Aircraft: N737M Begin Hobbs: 6724.6 End Hobbs: 7287.7 Total: 563.1 Pilot: JFK Co-Pilot: JSWAN Tech: JSWAN  
 Dep Apt: BGR Dep Time (LST): 0800 ZT: 1200 Arr Apt: 1202 Air Time (Local): 1602 ZT: KMLT Tot Time (Alert): 1202

CORS: 01N Sta 1: MELI Sta 2: MECC Flyovers: 01N If Y, times: (Sta1) 1202 (Sta2) 1202

GPS Unit: 01N Sta 1: AA2846/BGR Sta 2: KMLT Flyovers: Y 10 If Y, times: (Sta1) 3037 (Sta2) 3034

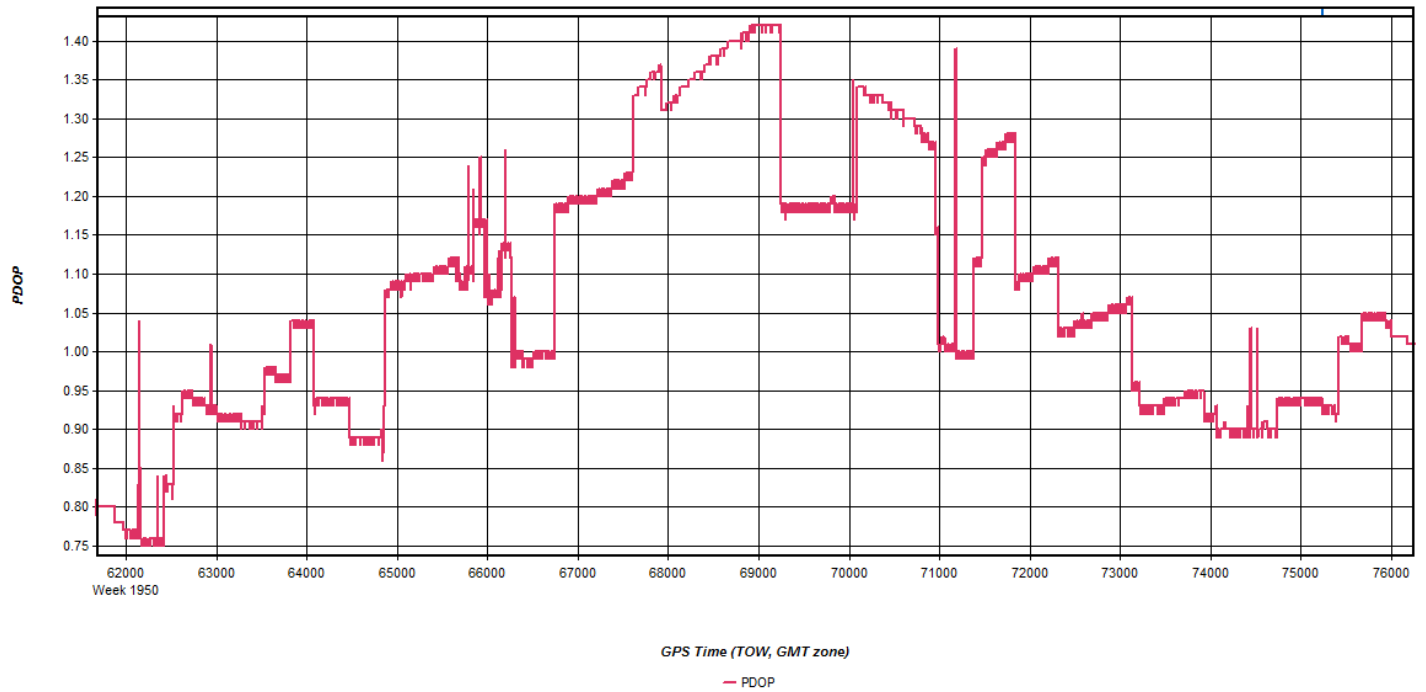
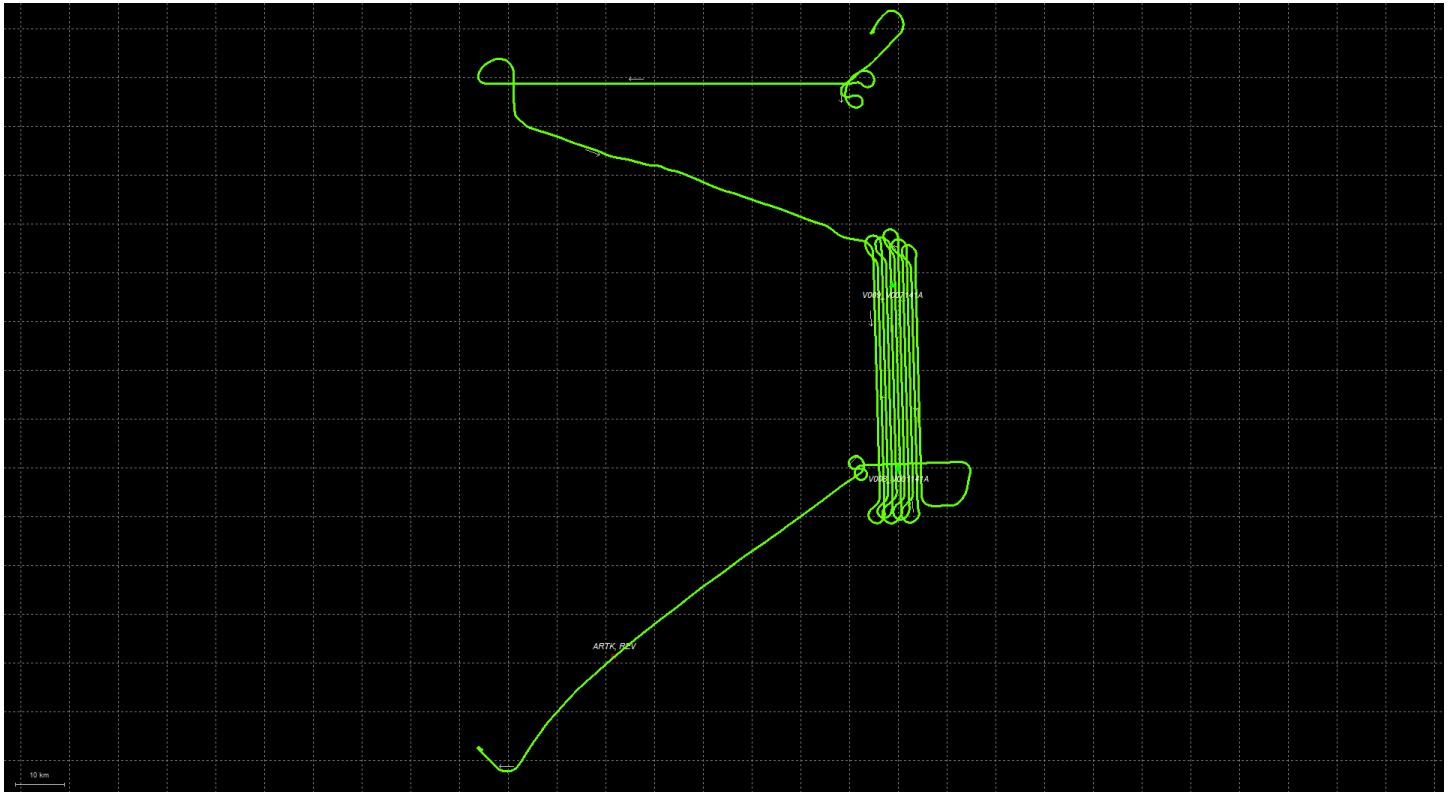
Gal Temp beg: 15 °C End: 17 °C OAT beg: 0 °C End: 0 °C Altimeter begin: 3037 end: 3034

LIDAR	Type	COV	Mag	Surf (m)	Roll (deg)	Pitch (deg)	GPR	GPS/Altitude	Crs	Turb	Fuel						
											Rate	Power	Temp	Alt			
1040	90	1242	1257	141	1219	7199	0										
1039	270	1302	1318	148	1219	7230	0										
1038	90	1321	1336	144	1318	7235	0										
1037	240	1341	1356	142	1318	7212	0										
1036	90	1400	1416	145	1402	7184	0										
1035	270	1420	1436	135	1219	7191	0										
1034	90	1440	1455	143	1119	7194	0										
1033	270	1459	1515	143	1217	7227	0										
1032	90	1518	1533	142	1118	7259	0										
1031	180	1538	1540	140	1218	7274	0										

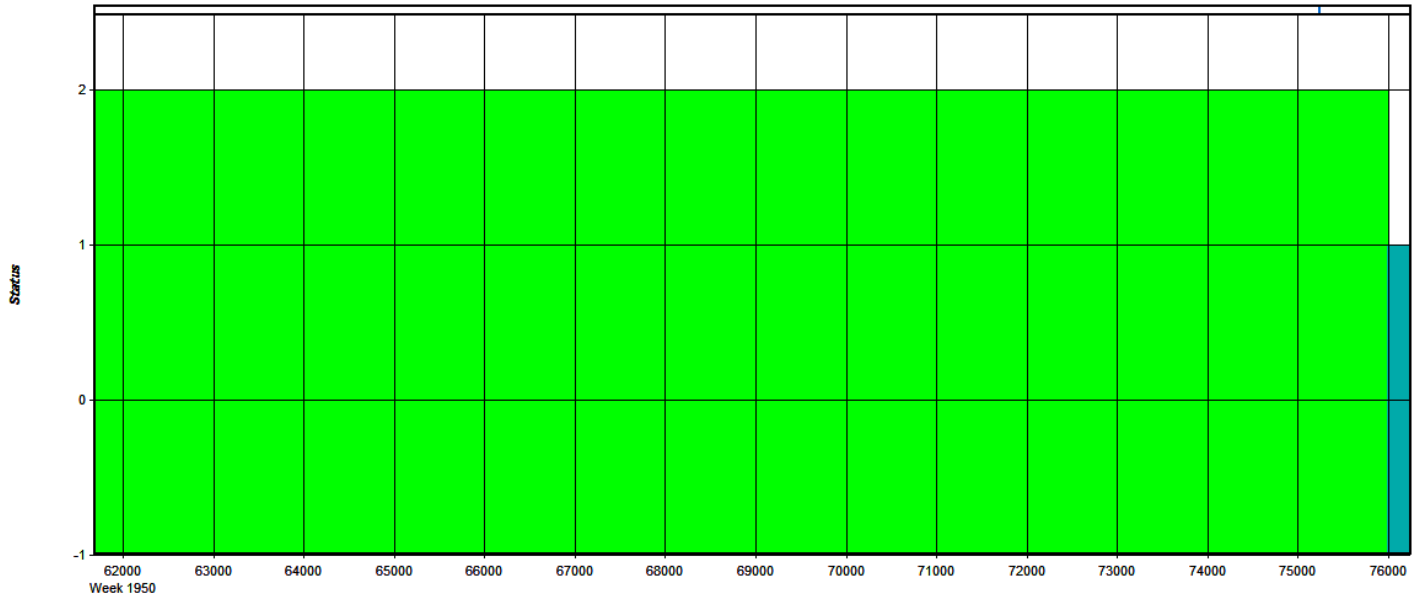
FLIGHT LOG NOTES: unplanned x-tie → Fig 8 → KMLT (1602)  
BGR → MELI (1223) → Fig 8 (1231-1236)  
 (A) Hobbs = 41  
 online = 3.0  
 mob = 1.1

Scanned by CamScanner

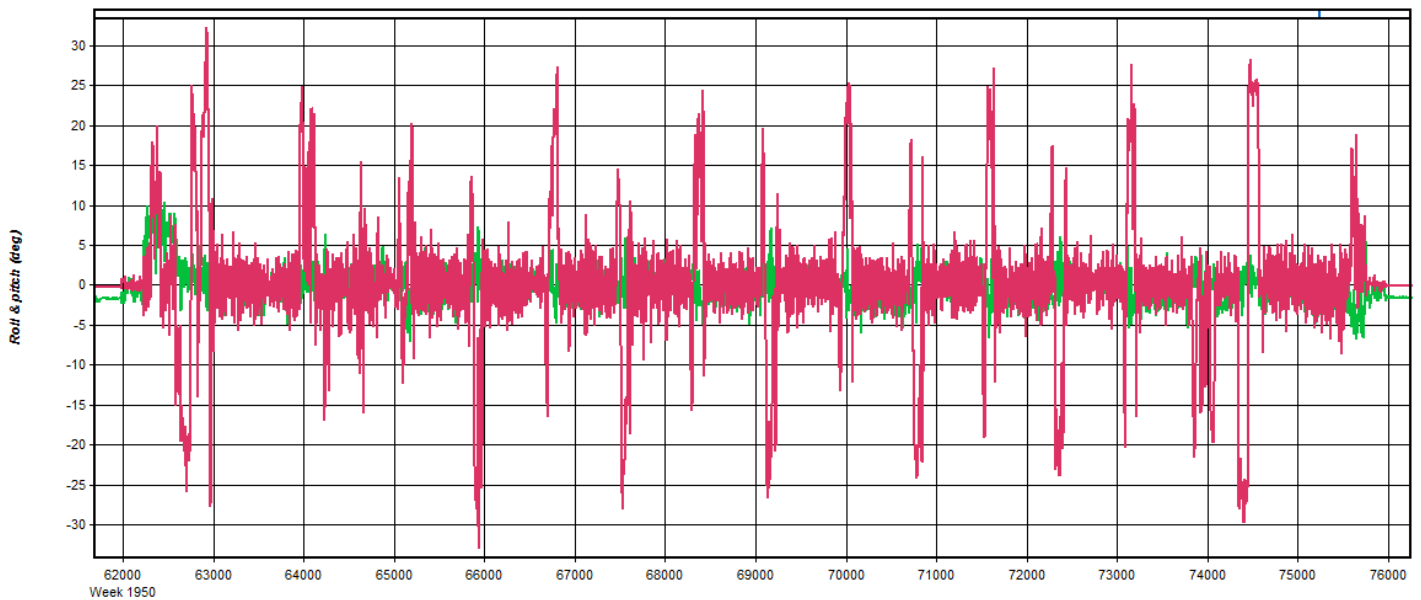
# 20170521-B (N262AS, SN7161)



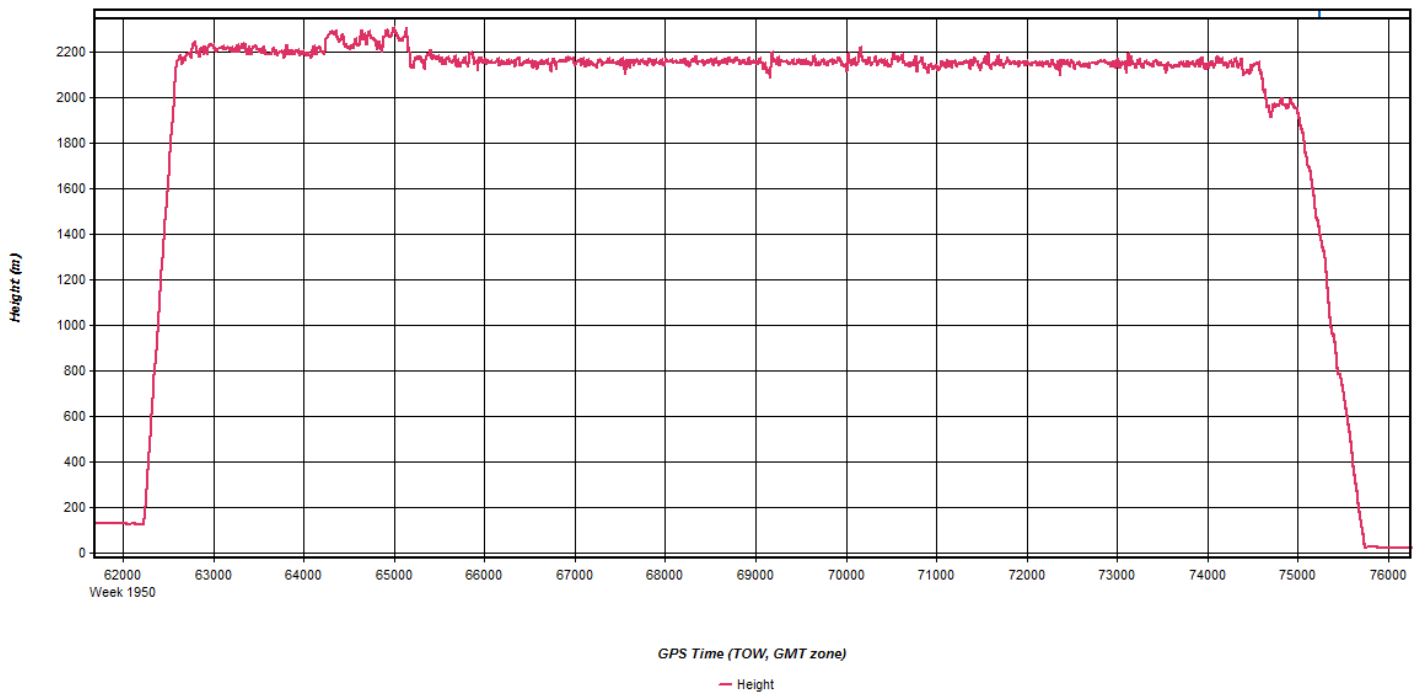
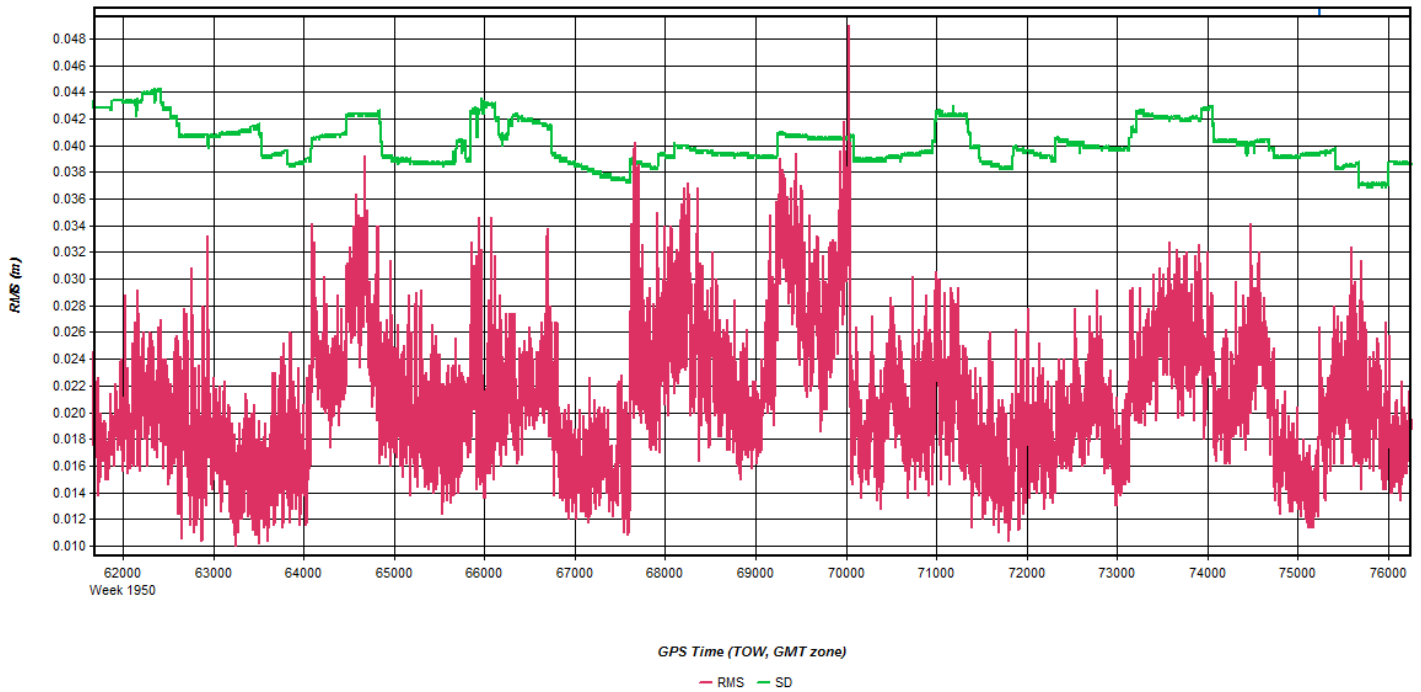


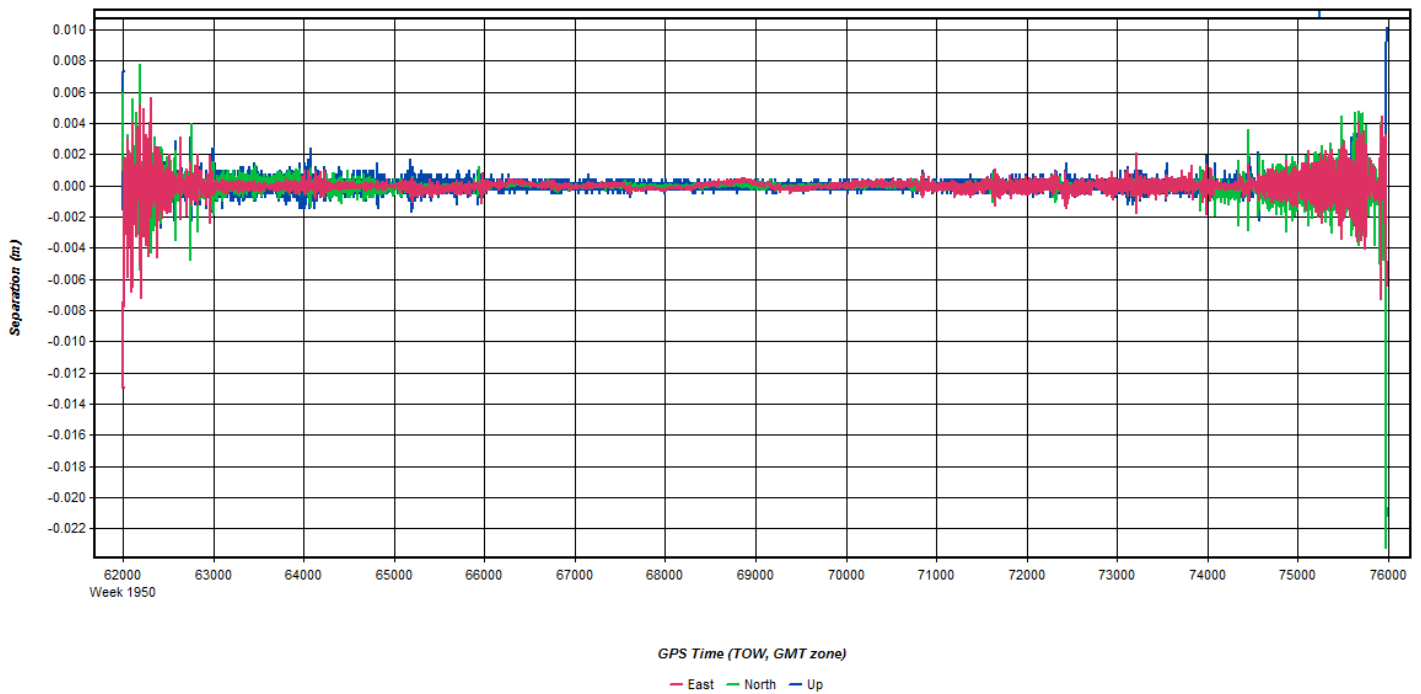


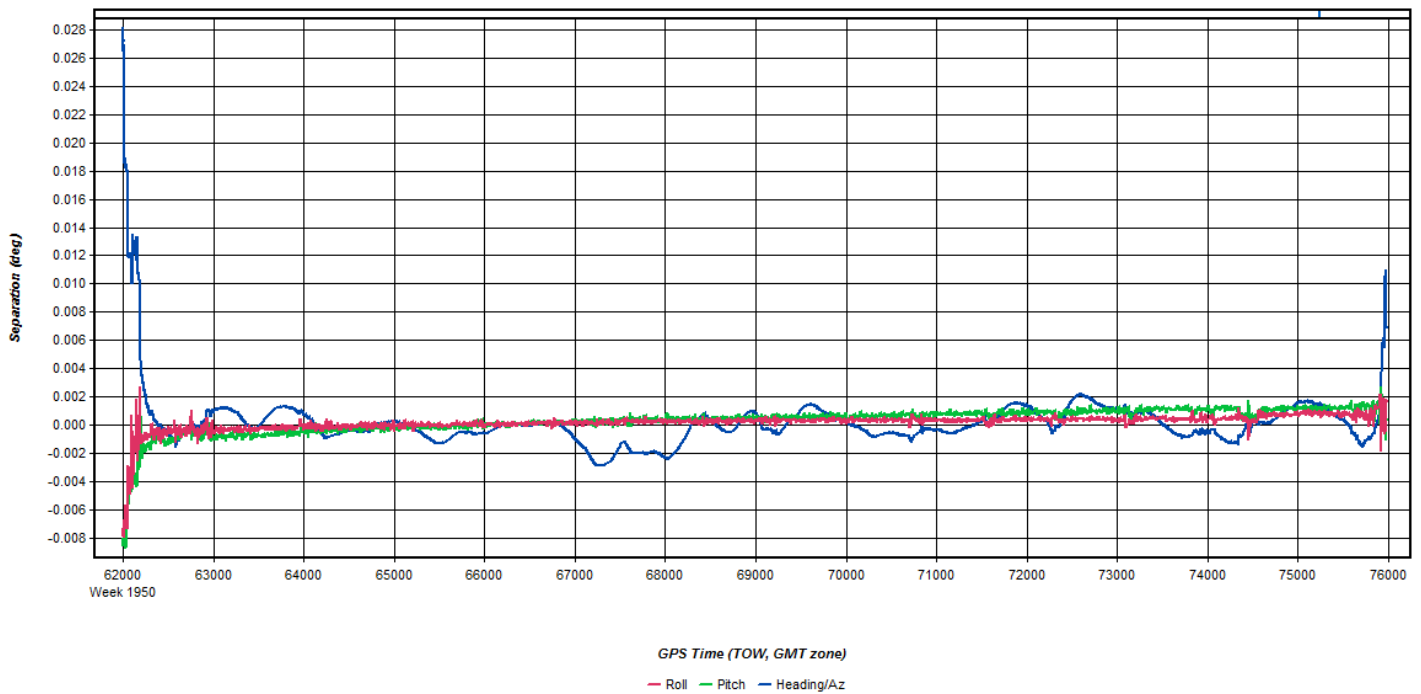
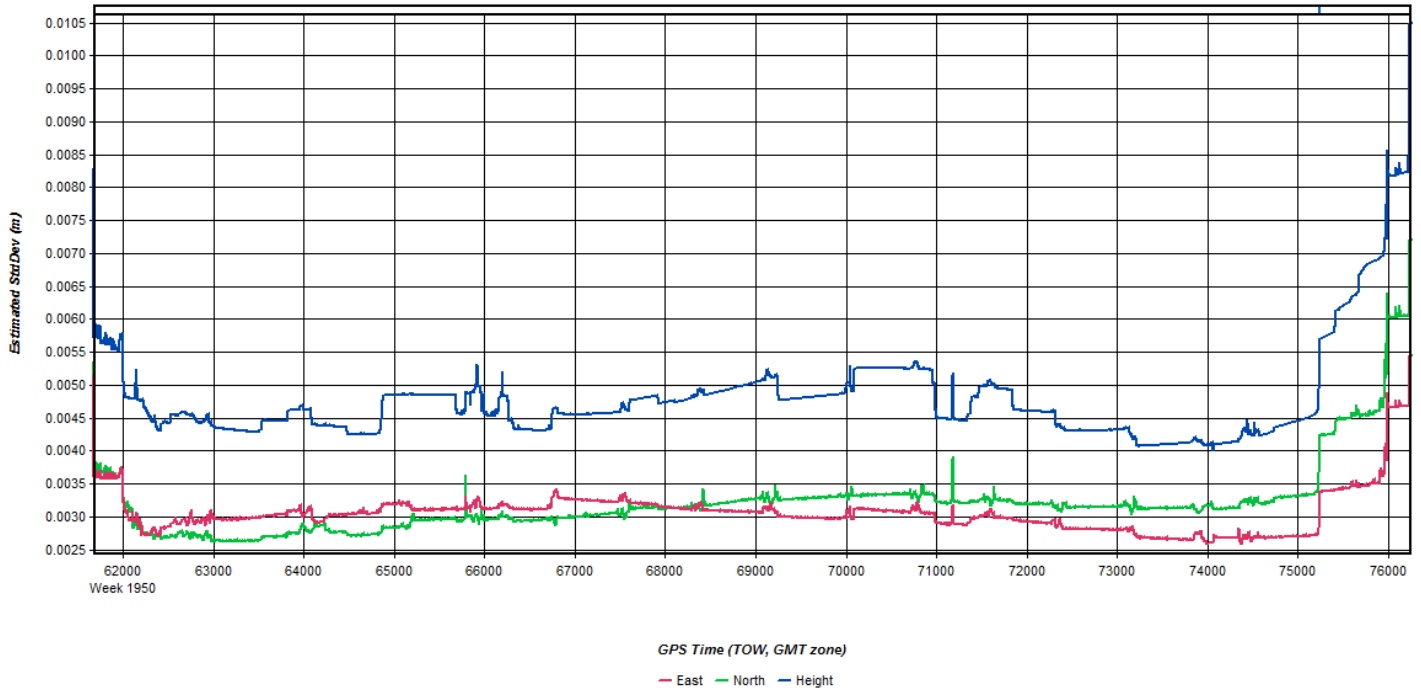
GPS Time (TOW, GMT zone)  
— Float — Forward Fixed — Reverse Fixed — Fixed (2 or more)

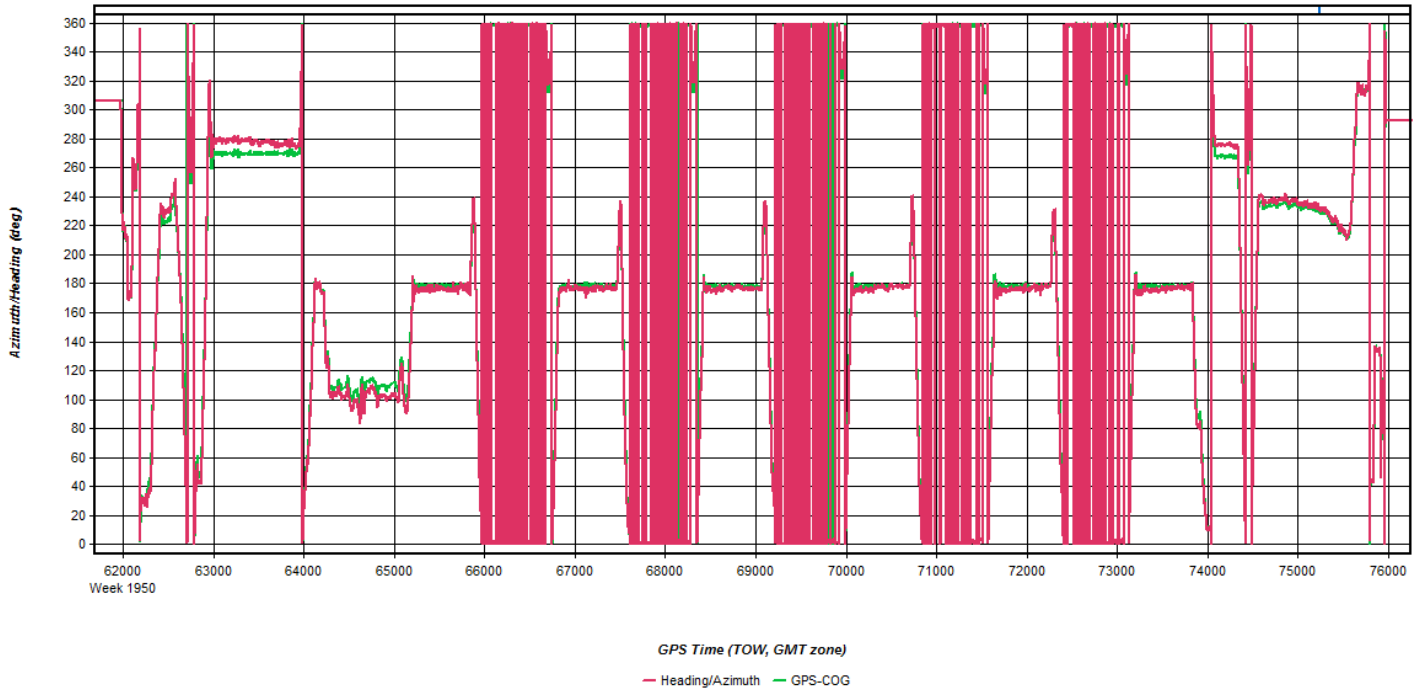


GPS Time (TOW, GMT zone)  
— Roll — Pitch









# Flight Log

Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc												Date: 5-21-17																																																																																																																																																																																						
(email log daily to flight_log_distribution_list@quantumspatial.com)												LIDAR B C D E pg 1 of 2																																																																																																																																																																																						
Project: USGS-AWAE-2100			Proj #: 29513			Flight Mgmt File: 20170521-115540																																																																																																																																																																																												
Aircraft: N262AS			Begin Hobbs: 6634.5		End Hobbs: 6638.6		Total: 4.1		Pilot: NEILSON		Co-Pilot: -	Tech: SCHOONE																																																																																																																																																																																						
Dep Apt: KBGR			Dep Time (Local): 08:00 (Z: 12:00)		Arr Apt: KHUD		Arr Time (Local): 12:12 (Z: 16:12)		Tot Time Aloft:																																																																																																																																																																																									
CORS: <input checked="" type="checkbox"/> I N			Sta 1: MELT		Sta 2: MEPI		Flyovers: Y / N		If Y, times: Sta1)		Sta2)																																																																																																																																																																																							
GPS Unit: <input checked="" type="checkbox"/> I N			Sta 1: KBGR		Sta 2:		Flyovers: Y / N		If Y, times: Sta1)		Sta2)																																																																																																																																																																																							
Gd Temp beg: 12 °c			End: 16 °c		OAT beg: °c		End: °c		Altimeter begin: 30.38		end: 30.31																																																																																																																																																																																							
LIDAR	Type	ALS-70	Serial #	7161	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdepd	Avg Pz Spacing	Mag Cal	221	Storage Name/No	015																																																																																																																																																																																					
	FOV	30	Scan Freq	50	MpiA	<input checked="" type="checkbox"/> I N	Pulse Rate	202.6	Power	100%	End Cal	077	Tot Cal	50																																																																																																																																																																																				
<table border="1"> <thead> <tr> <th>Line #</th> <th>Hdg</th> <th>Start (UTC)</th> <th>End (UTC)</th> <th>Gd Spd</th> <th>FOV/Scan</th> <th>GPS Altitude</th> <th>Crab</th> <th>Turb (0-3)</th> <th colspan="5">FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.</th> </tr> </thead> <tbody> <tr> <td>1066</td> <td>90</td> <td>12:43</td> <td>12:57</td> <td>150</td> <td>1.2/18</td> <td>7162</td> <td>-8</td> <td></td> <td colspan="5">SKC VIS 8-9 LIGHT TURBULANCE WEST END</td> </tr> <tr> <td>1059</td> <td>270</td> <td>13:01</td> <td>13:15</td> <td>153</td> <td>1.3/18</td> <td>7165</td> <td>+9</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1058</td> <td>90</td> <td>13:19</td> <td>13:33</td> <td>148</td> <td>1.2/19</td> <td>7169</td> <td>-8</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1057</td> <td>270</td> <td>13:36</td> <td>13:51</td> <td>150</td> <td>1.4/18</td> <td>7169</td> <td>+9</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1056</td> <td>90</td> <td>13:54</td> <td>14:08</td> <td>149</td> <td>1.3/17</td> <td>7178</td> <td>-6</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1055</td> <td>270</td> <td>14:12</td> <td>14:26</td> <td>154</td> <td>1.1/19</td> <td>7181</td> <td>+10</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1054</td> <td>90</td> <td>14:29</td> <td>14:44</td> <td>143</td> <td>1.2/19</td> <td>7192</td> <td>-8</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1053</td> <td>270</td> <td>14:47</td> <td>15:01</td> <td>154</td> <td>1.1/19</td> <td>7201</td> <td>+9</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1052</td> <td>90</td> <td>15:04</td> <td>15:19</td> <td>149</td> <td>1.2/18</td> <td>7201</td> <td>-7</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1051</td> <td>270</td> <td>15:22</td> <td>15:36</td> <td>153</td> <td>1.1/18</td> <td>7205</td> <td>+10</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>1050</td> <td>90</td> <td>15:38</td> <td>15:53</td> <td>155</td> <td>1.2/18</td> <td>7205</td> <td>-6</td> <td></td> <td colspan="5"></td> </tr> <tr> <td>X TIME</td> <td>S</td> <td>15:57</td> <td>16:00</td> <td>146</td> <td>1.3/17</td> <td>7280</td> <td>-</td> <td></td> <td colspan="5"></td> </tr> </tbody> </table>													Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	FOV/Scan	GPS Altitude	Crab	Turb (0-3)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.					1066	90	12:43	12:57	150	1.2/18	7162	-8		SKC VIS 8-9 LIGHT TURBULANCE WEST END					1059	270	13:01	13:15	153	1.3/18	7165	+9							1058	90	13:19	13:33	148	1.2/19	7169	-8							1057	270	13:36	13:51	150	1.4/18	7169	+9							1056	90	13:54	14:08	149	1.3/17	7178	-6							1055	270	14:12	14:26	154	1.1/19	7181	+10							1054	90	14:29	14:44	143	1.2/19	7192	-8							1053	270	14:47	15:01	154	1.1/19	7201	+9							1052	90	15:04	15:19	149	1.2/18	7201	-7							1051	270	15:22	15:36	153	1.1/18	7205	+10							1050	90	15:38	15:53	155	1.2/18	7205	-6							X TIME	S	15:57	16:00	146	1.3/17	7280	-						
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	FOV/Scan	GPS Altitude	Crab	Turb (0-3)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.																																																																																																																																																																																									
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1057	270	13:36	13:51	150	1.4/18	7169	+9																																																																																																																																																																																											
1056	90	13:54	14:08	149	1.3/17	7178	-6																																																																																																																																																																																											
1055	270	14:12	14:26	154	1.1/19	7181	+10																																																																																																																																																																																											
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Total Proj Lines:		Lines Flown: 11		Lines Remain:		Online Time: 3.3		Mob Time: 1.8		Notes:																																																																																																																																																																																								

Scanned by CamScanner

# Base Station Log

Coordinate/Antenna Settings ? X

Master Remote

Base Station  
1: V008\_V001141A Name: V008\_V001141A  Disabled  
File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-23-17\20170521\_170620\

Coordinates  
Latitude: North 45 19 12.89006 Coord. options  
Longitude: West 67 43 32.91996 Save to Favorites  
Ellipsoidal height: 100.000 m  
Datum: WGS84 Proc Datum: WGS84  
Epoch: year

Antenna Height  
From station file: TRM57971.00, TZGD View STA File  
Antenna profile: TRM57971.00, TZGD Info  
Measured height: 0.000 m  
ARP to L1 offset: 0.065 m  
Applied height: 0.065 m  
Measured to  
 ARP  
 L1 Phase Centre  
Compute From Slant

OK Cancel

Coordinate/Antenna Settings ? X

Master Remote

Base Station  
 2: V009\_V007141A Name: V009\_V007141A  Disabled  
 File: E:\Proc\29513\_Maine\Jim\_Schoone\_5-23-17\20170521\_170620\

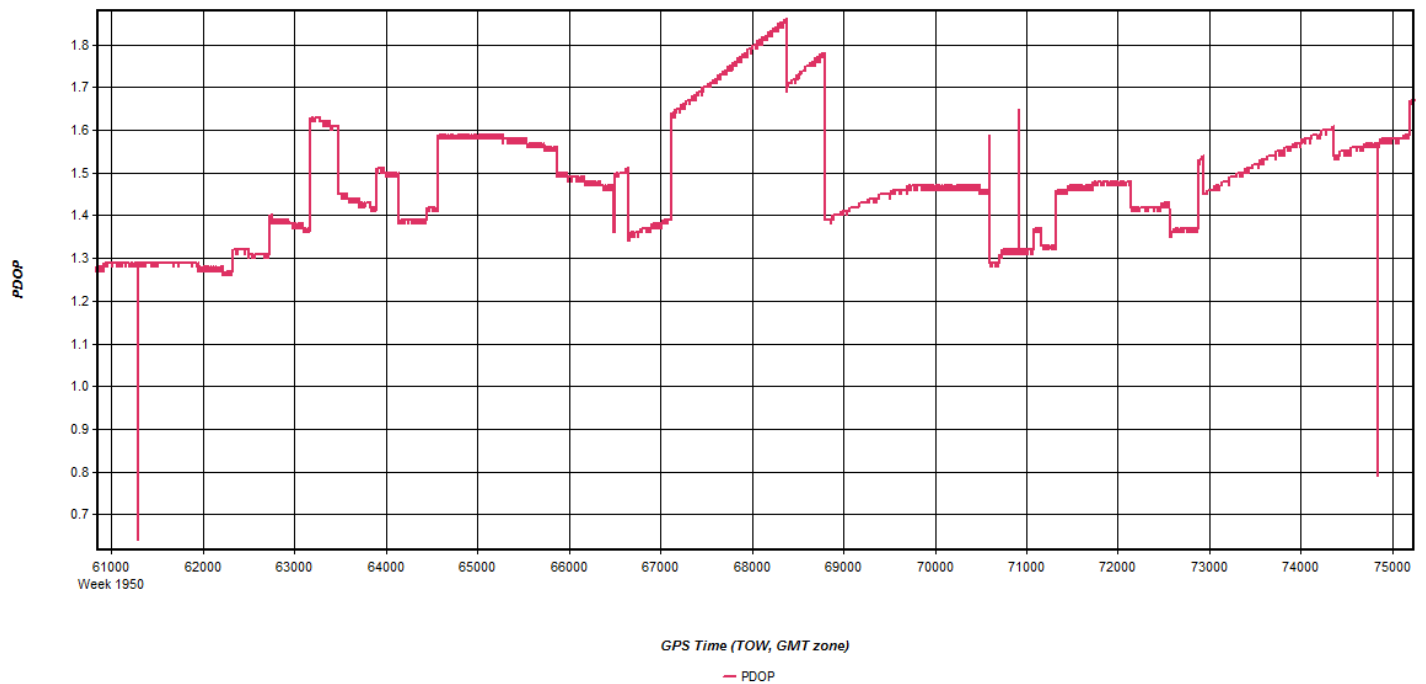
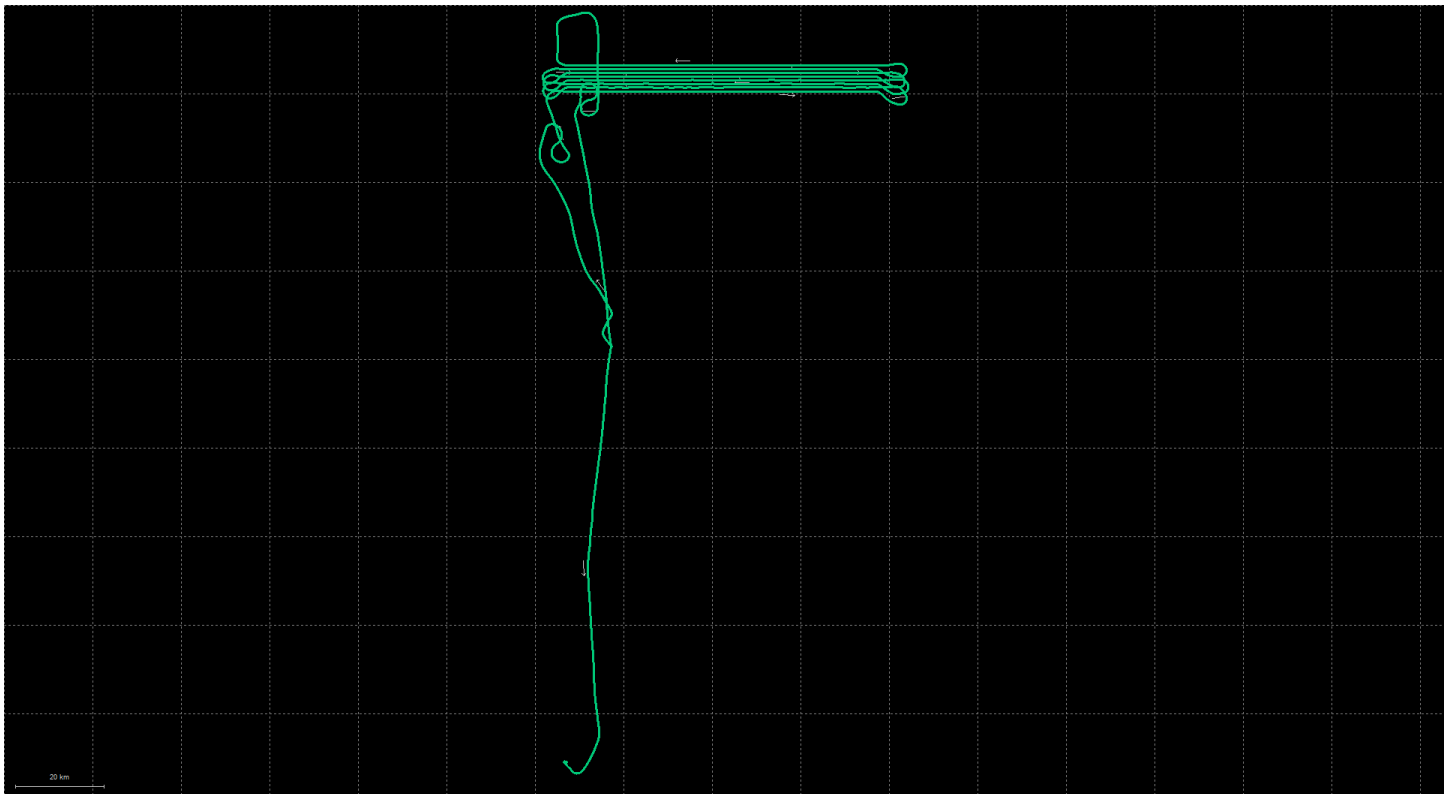
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 Longitude: West 67 44 24.80989 Save to Favorites  
 Ellipsoidal height: 100.000 m  
 Datum: WGS84 Proc Datum: WGS84  
 Epoch: year

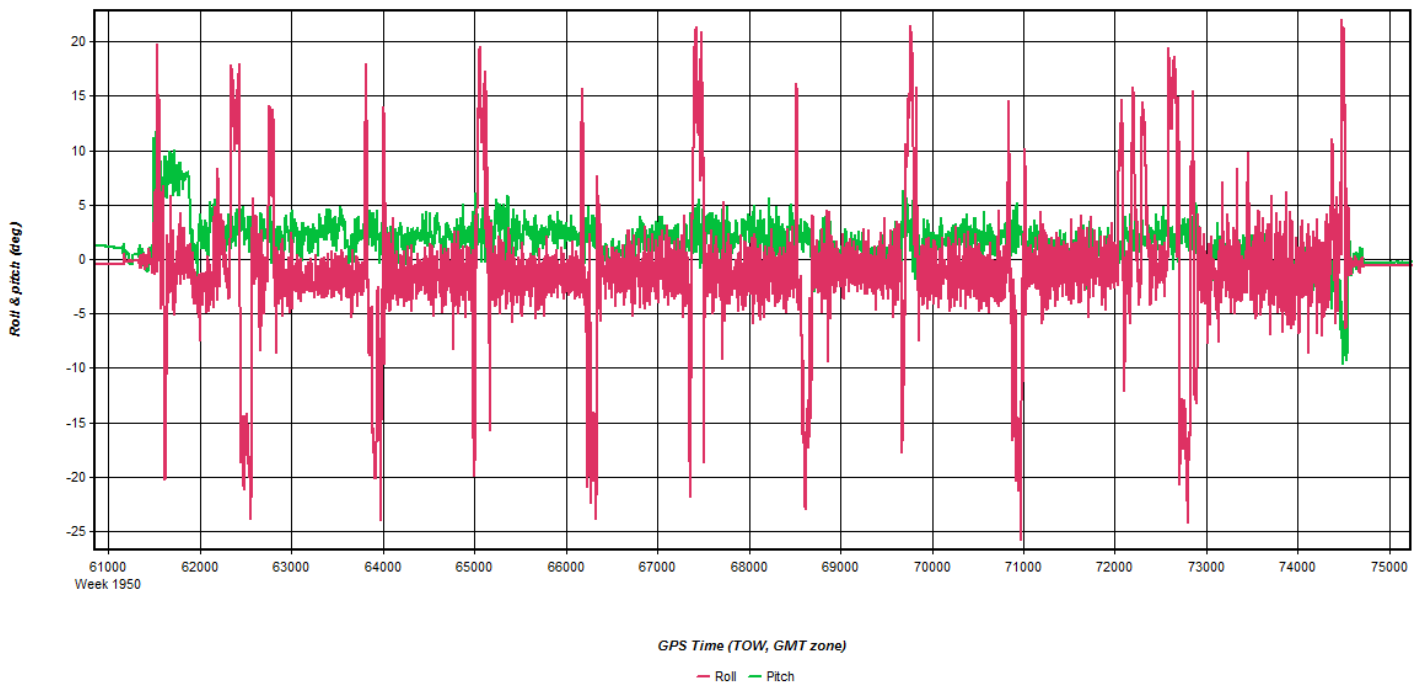
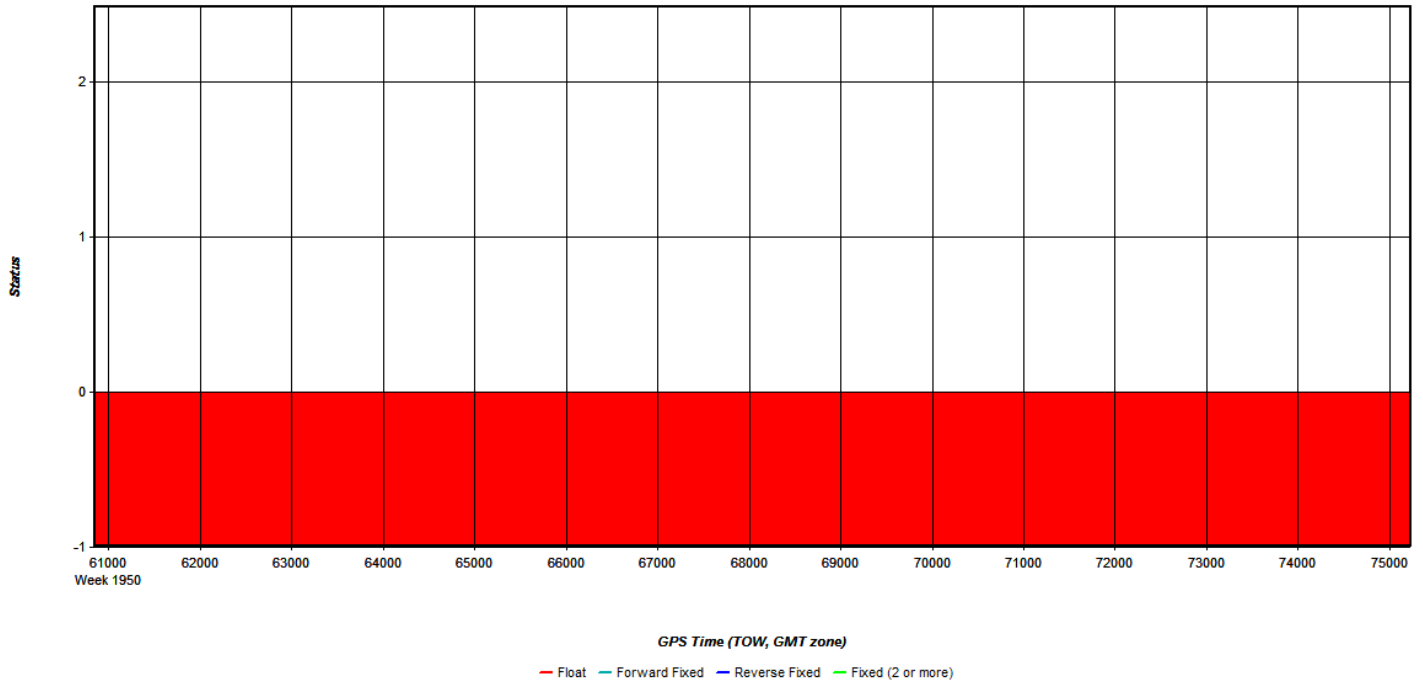
Antenna Height  
 From station file: TRM55971.00, TZGD View STA File  
 Antenna profile: TRM55971.00, TZGD Info  
 Measured height: 0.000 m  
 ARP to L1 offset: 0.065 m  
 Applied height: 0.065 m  
 Measured to  
 ARP  
 L1 Phase Centre  
 Compute From Slant

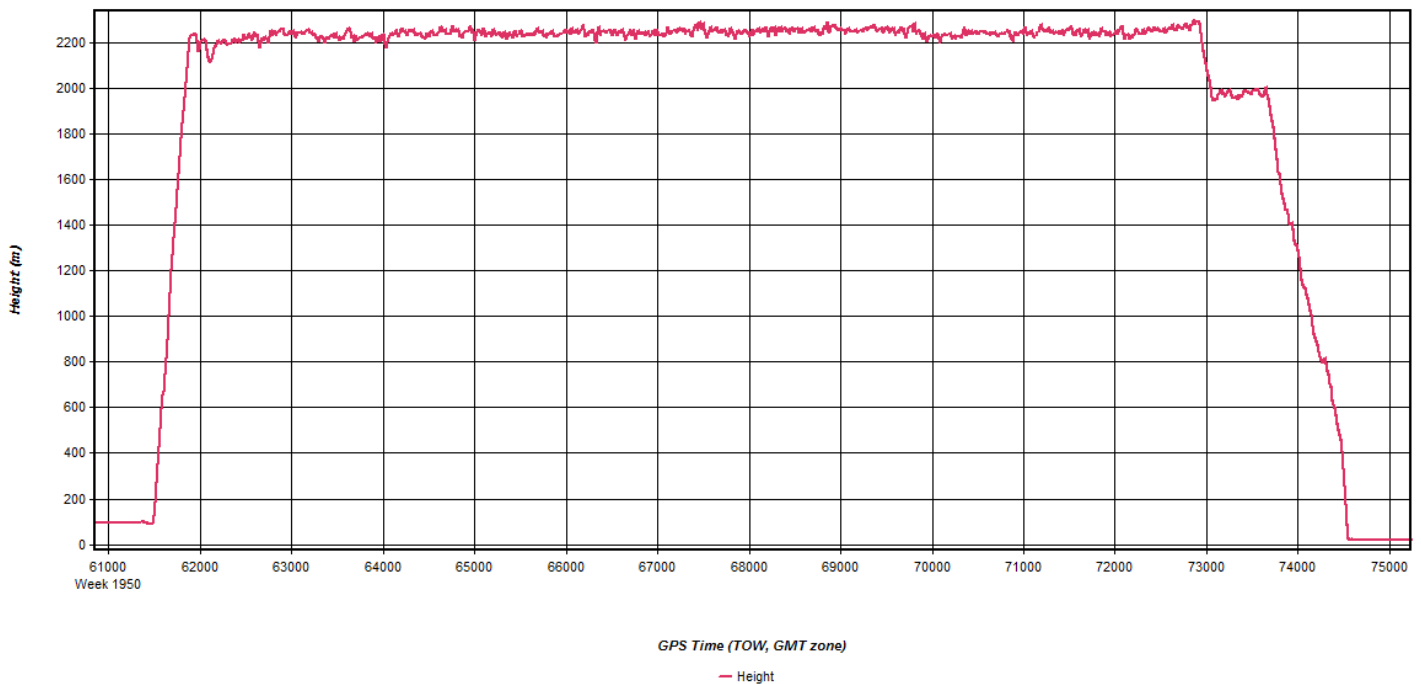
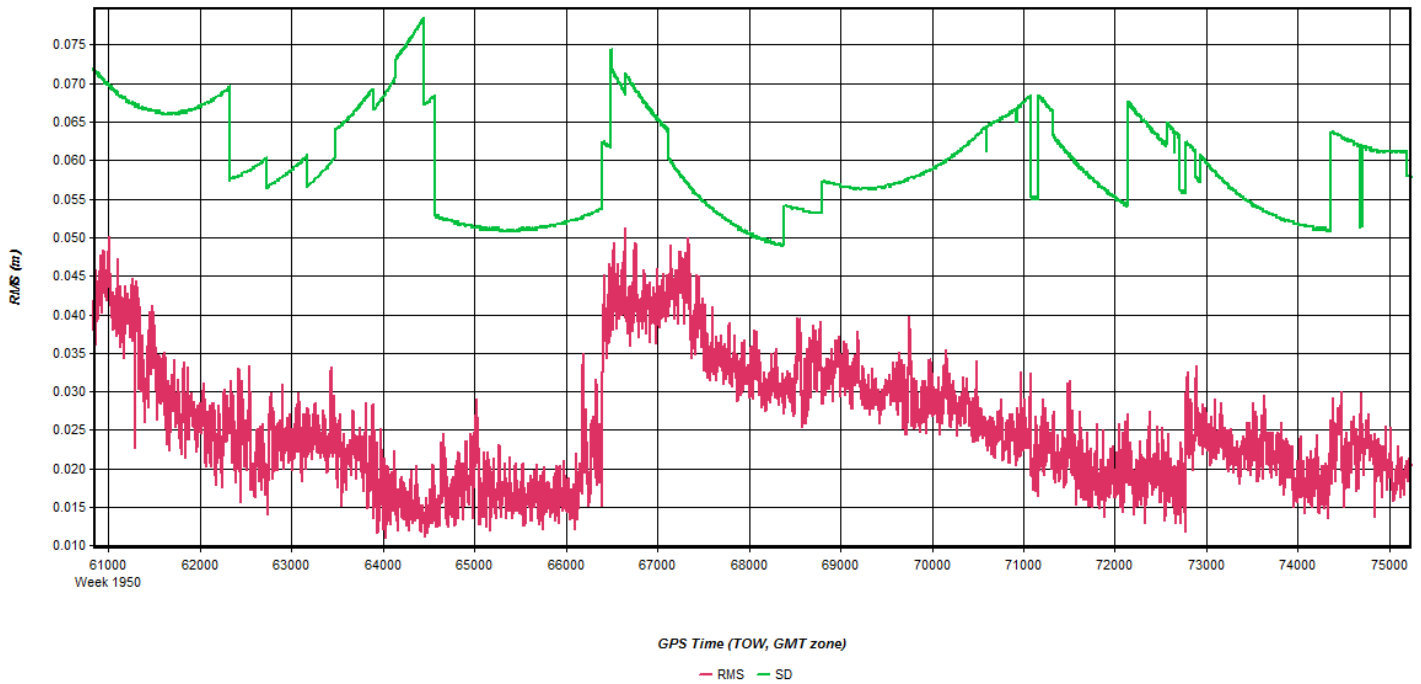
OK Cancel

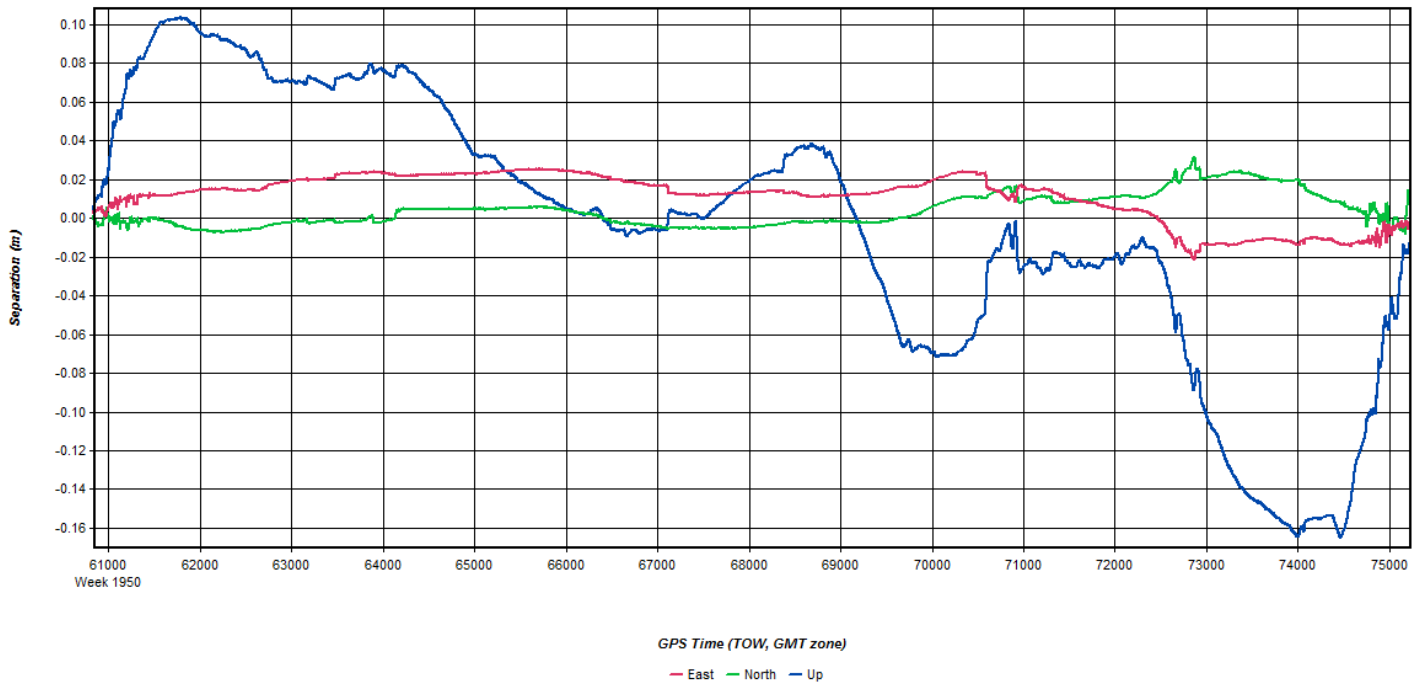
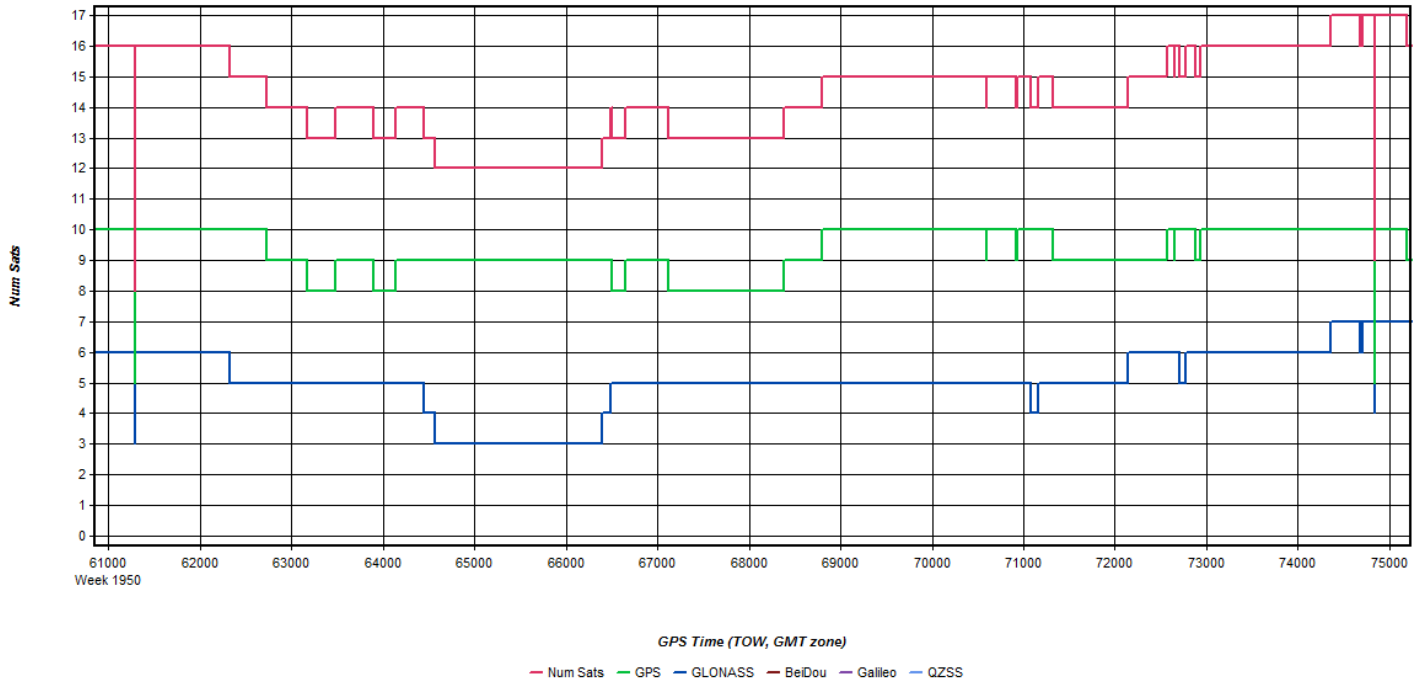


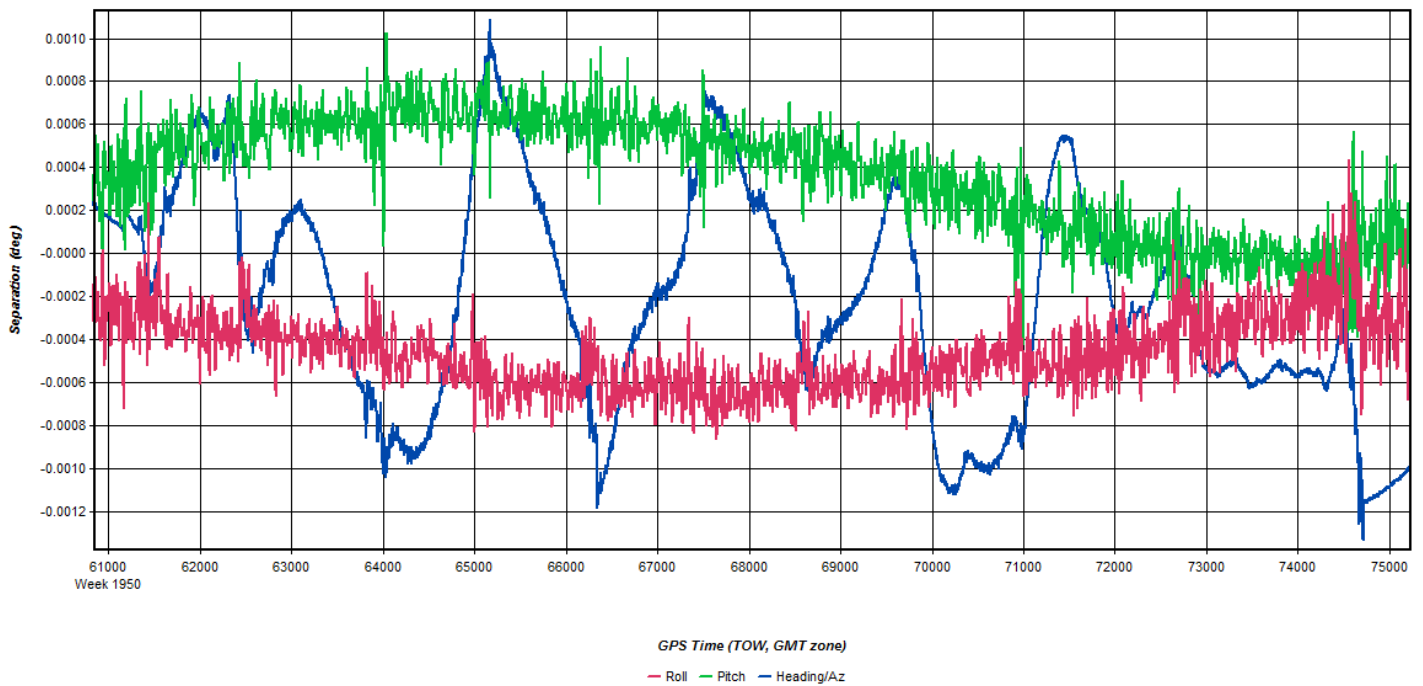
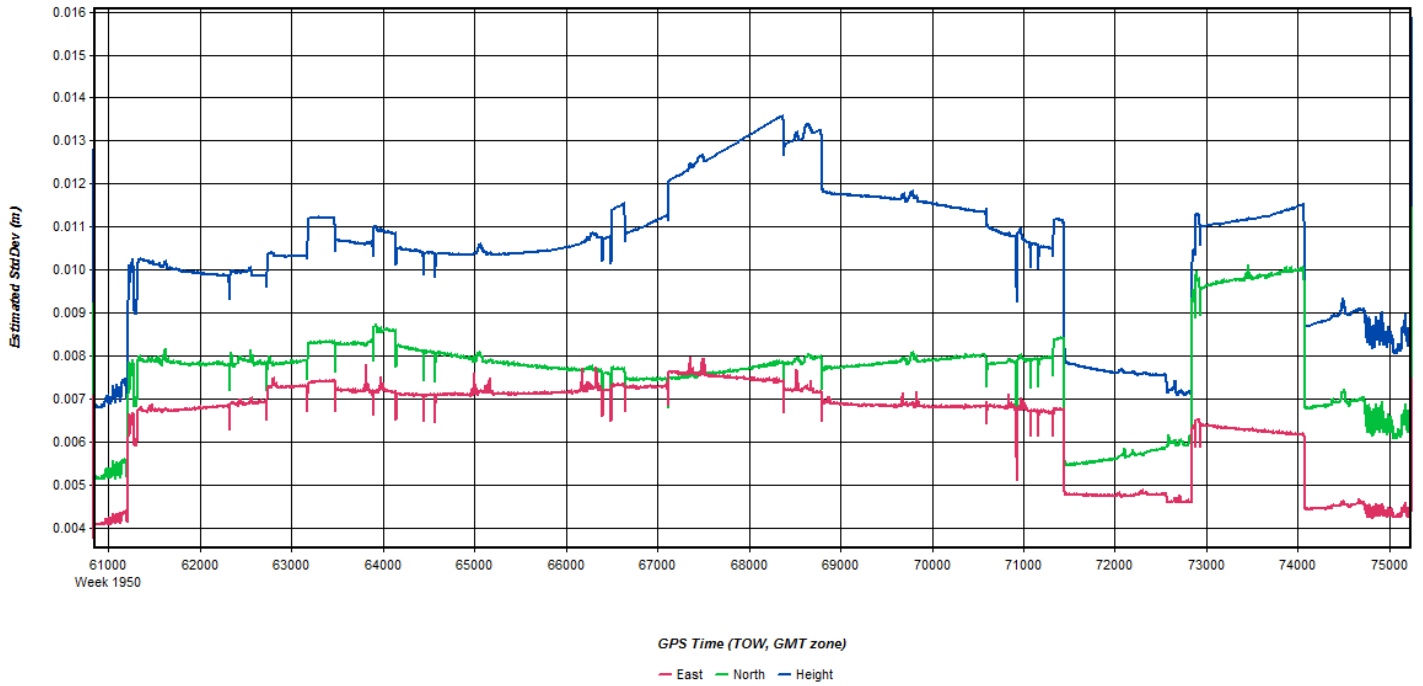
# 20170521-B (N73TM, SN7178)

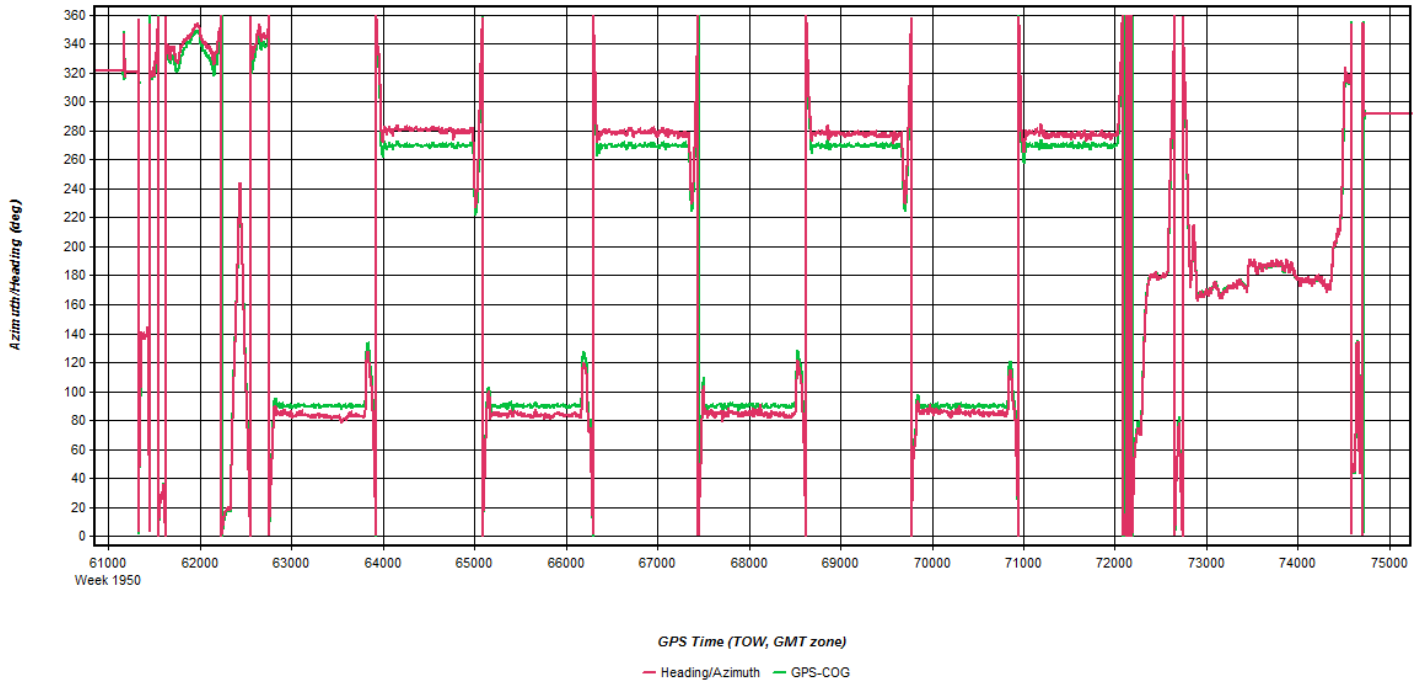












# Flight Log

**Quantum Spatial**  
Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc  
(email log data to flight\_log\_distribution@quantumspatial.com)

Date: 5-21-17  
US: 0 3 0 1

Project: USGS ME  
Flight Mgmt File: 217 0521-14846  
Tech: JSWAN

Aircraft: 173TM  
End Hobbs: 6724.6  
Pilot: JFLG  
Co-Pilot: JSWAN

Dep Apt: BGR  
Begin Time (LGS): 0800  
Air Apt: 1200  
Air Time (Local): 1602  
KMLT  
Tot Time Alert:

CORS: 01N Sta 1: MELI  
Sta 2: MEC  
Flyovers: 01N If Y, times: Sta1 12.23 Sta2)

GPS Unit: 01N Sta 1: AA2846/BGR  
Sta 2: KMLT  
Flyovers: Y 100 If Y, times: Sta1 3037 end: 3034

Gal Temp beg: 15°C  
End: 17°C  
OAT beg: 0°C  
End: 0°C  
Altimeter begin: 3037

Type	Alt	Wind	Rate	Alt	Rate	Power	Power
COV	570	778	56	MpA	Y/N	In Air	Power
1040	90	1242	157	141	1219	7199	0
1039	270	1302	1318	148	1219	7230	0
1038	90	1321	1336	144	1318	7235	0
1037	240	1341	1356	142	1318	7212	0
1036	90	1400	1416	145	1400	7184	0
1035	270	1420	1436	135	1319	7191	0
1034	90	1440	1455	143	1419	7194	0
1033	270	1459	1515	143	1417	7227	0
1032	90	1518	1533	142	1418	7259	0
X41	180	1538	1540	140	1418	7274	0

FLIGHT LOG NOTES: -visibility, clouds, smoke, ground, etc.

BGR → MELI (1223) → F, 8.5 (12.31 - 1236)

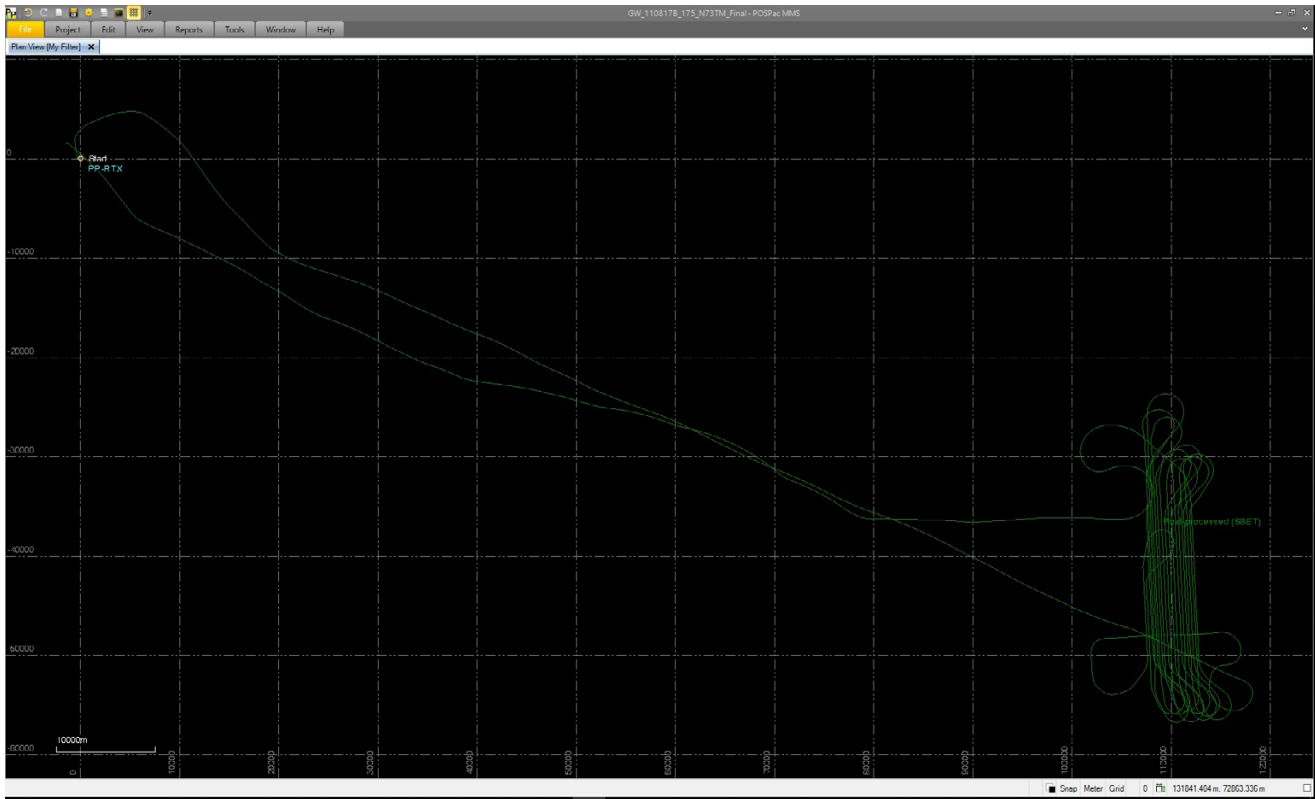
Unplanned X-ite → F, 8.5 → KMLT (1602)

Hobbs = 41  
online = 3.0  
mob = 1.1

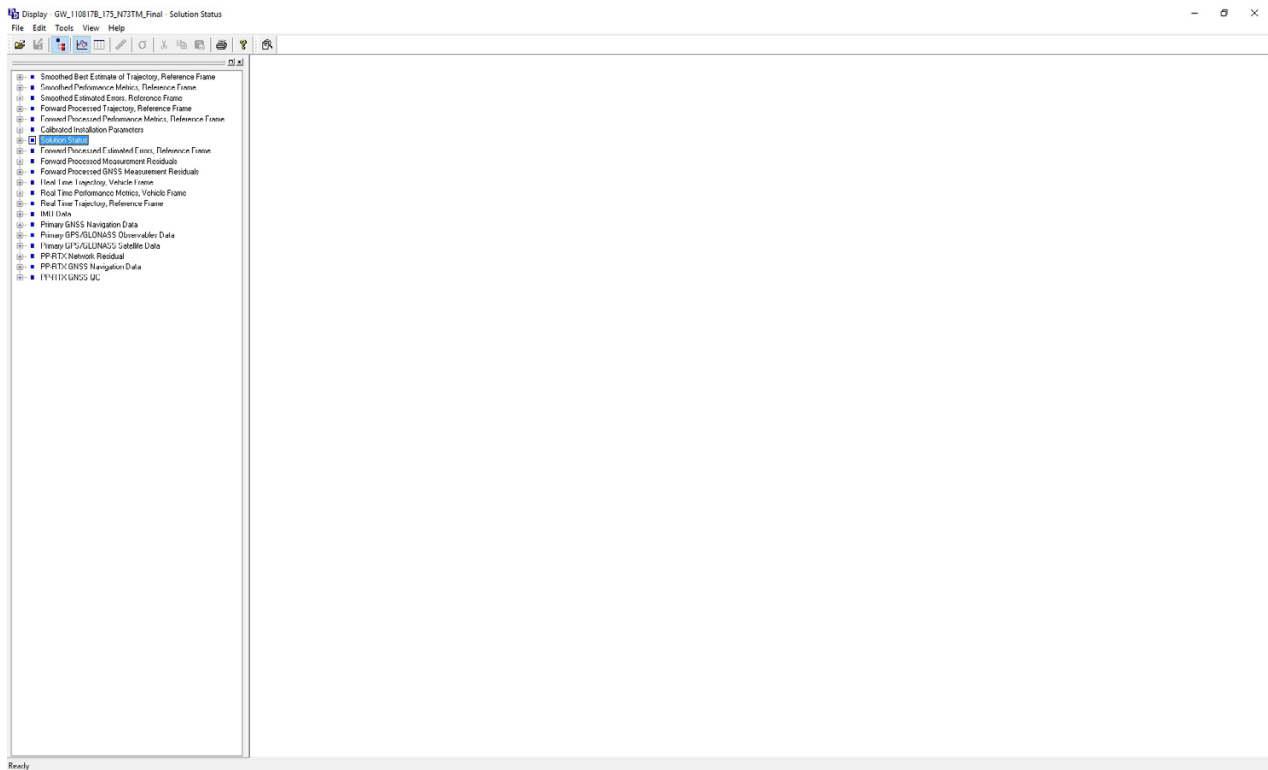
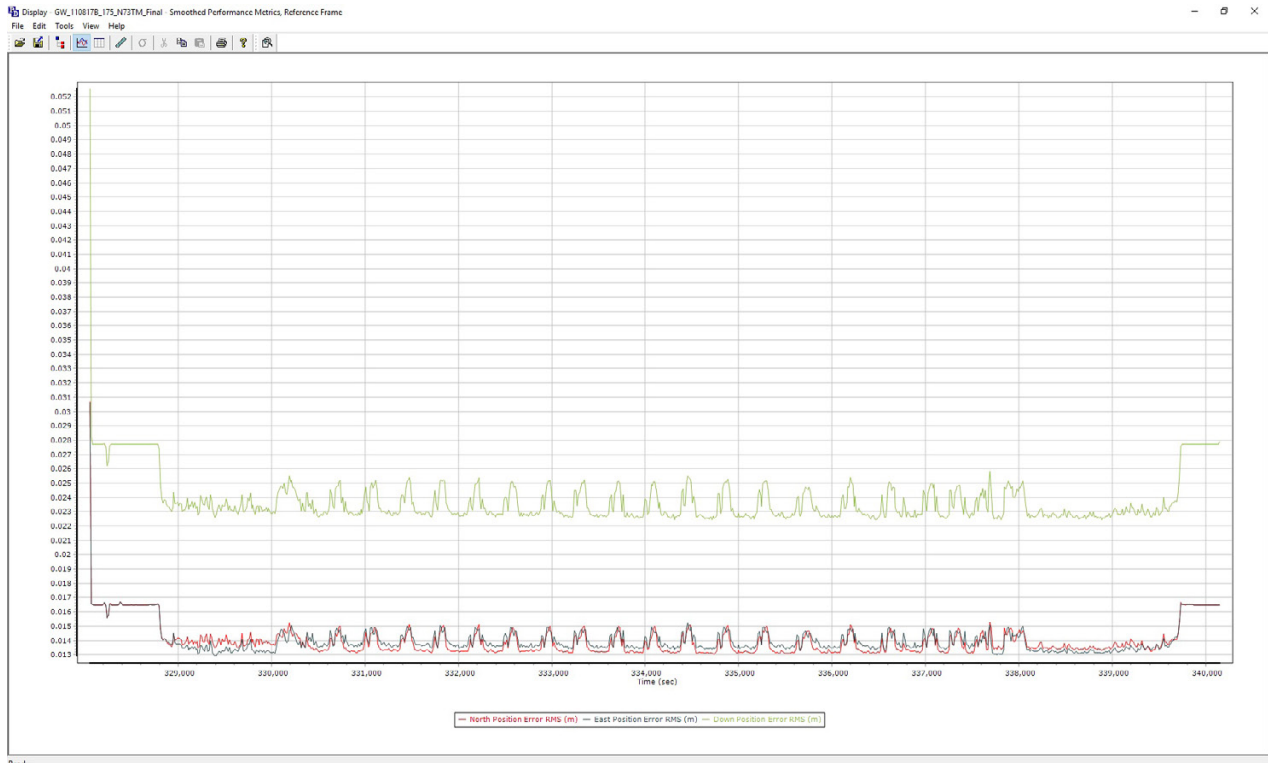
Scanned by CamScanner



# 20171108-B (N73TM, SN175)



Call the selection and put it on the Clipboard





# Flight Log

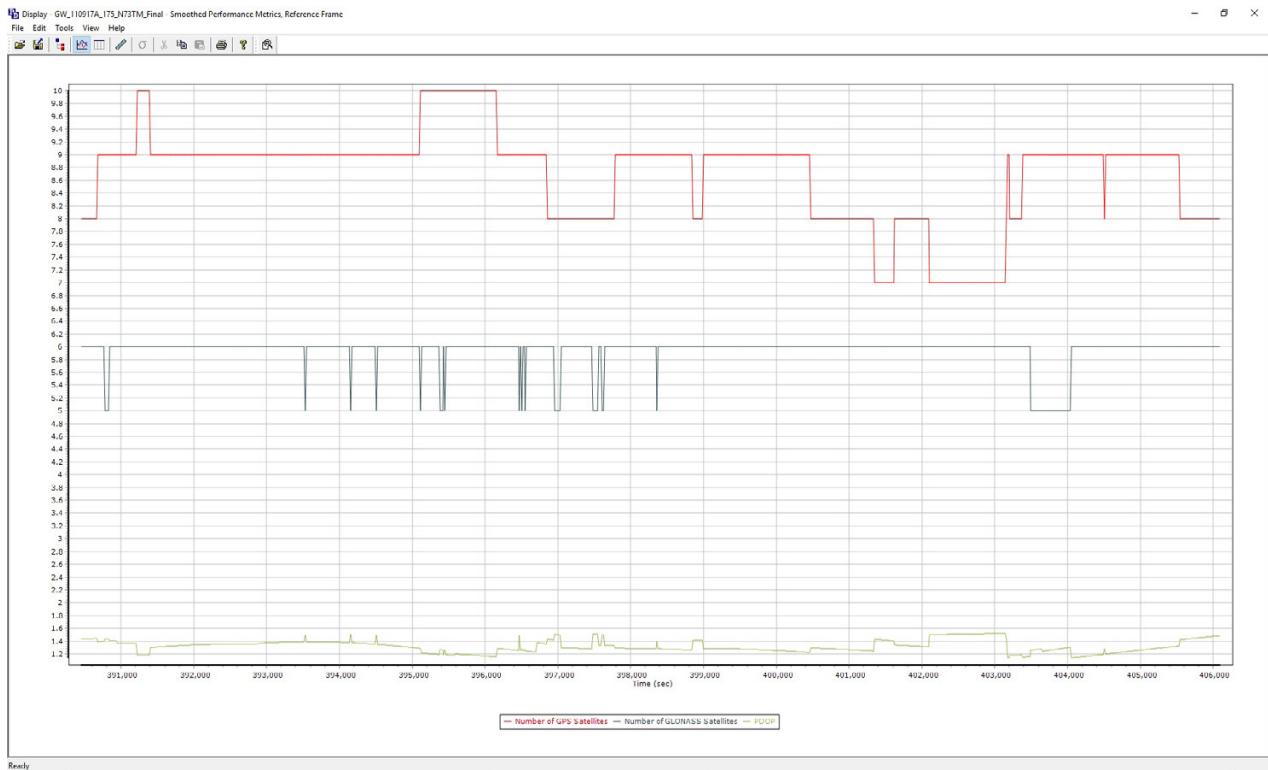
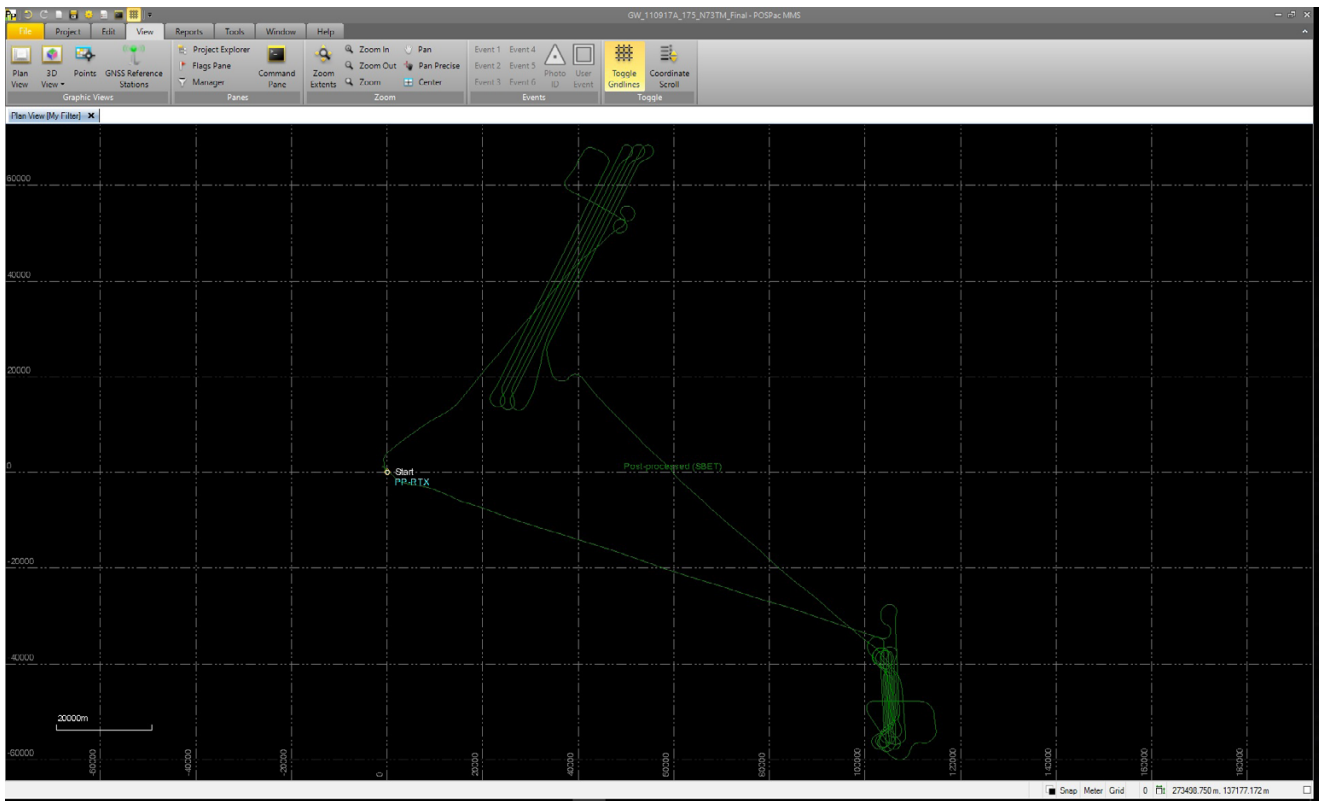
**Airborne LiDAR Data Collection Log Sheet :: Quantum Spatial, Inc** Date: NOVEMBER 8<sup>th</sup> 2017  
(email Log daily to Flight\_Log\_distribution\_List@quantumspatial.com) "20171108b\_Vermont-N737M" Lift: A  C  D  E Pg 1 of 2

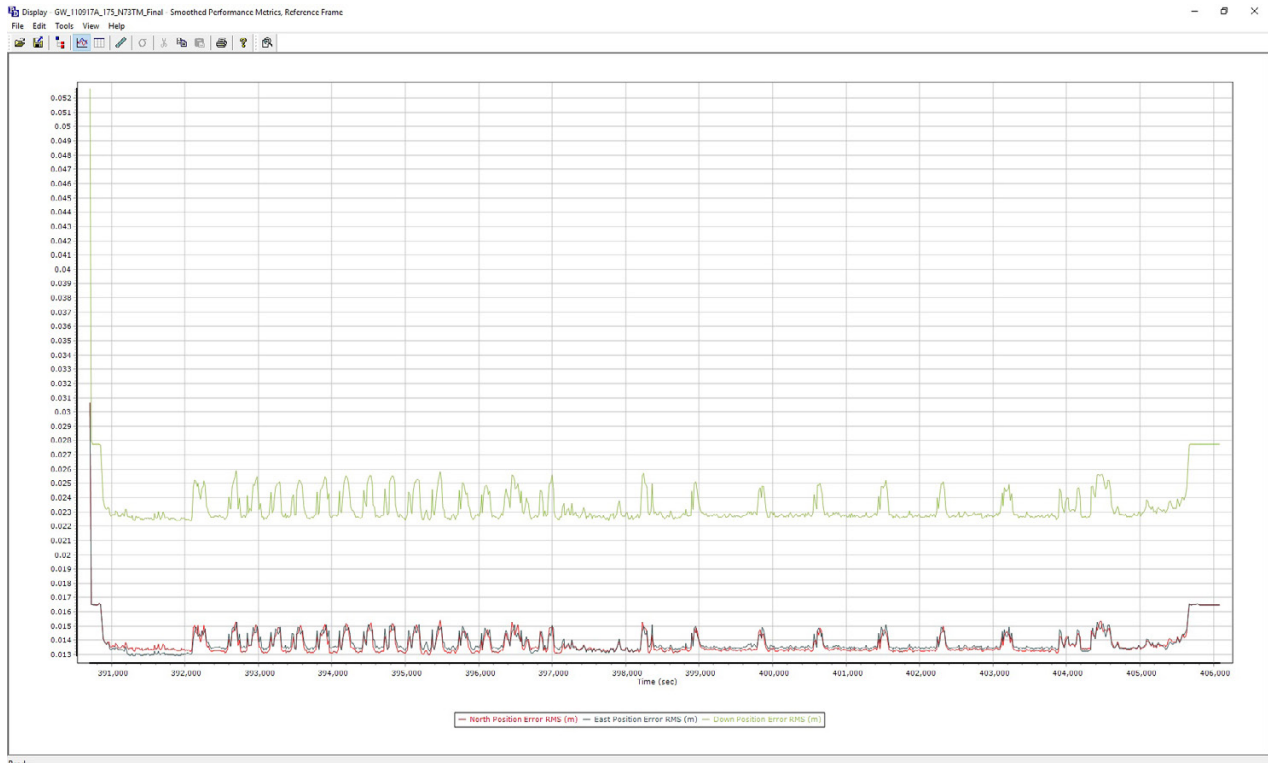
Project: <u>UMBAGOG ADD-ON</u>		Proj #: <u>28794</u>		Flight Mgmt File: <u>28794-1560-1350m</u>	
Aircraft: <u>N737M</u>		Begin Hobbs: <u>6939.1</u>		End Hobbs: <u>6942.1</u> Total: <u>3.0</u>	
Pilot: <u>C. CHRISTOPHER</u>		Co-Pilot: <u>-</u>		Tech: <u>P. HARAK</u>	
Dep Apt: <u>KBTV</u>		Dep Time (Lcl): <u>14:20</u> (Z): <u>19:20Z</u>		Arr Apt: <u>KBTV</u> Arr Time (Local): <u>17:21</u> (Z): <u>22:21</u>	
CORs: <input checked="" type="radio"/> N		Sta 1: <u>NETWORK</u>		Sta 2: <u>-</u>	
Flyovers: <input checked="" type="radio"/> Y		IF Y, times: Sta1) <u>STATICS</u>		Sta2) <u>-</u>	
GPS Unit: <input checked="" type="radio"/> N		Sta 1: <u>CAP sat @ BTV FBO</u>		Sta 2: <u>-</u>	
Flyovers: <input checked="" type="radio"/> Y		IF Y, times: Sta1) <u>STATICS</u>		Sta2) <u>-</u>	
Gd Temp beg: <u>+05 °C</u>		End: <u>SEE SHEET 2 °C</u>		OAT beg: <u>-08 °C</u> End: <u>SEE SHEET 2 °C</u>	
Altimeter begin: <u>30.27"</u>		end: <u>SEE SHEET 2</u>			
LiDAR	Type: <u>RIEGL</u>	Serial #: <u>9999175</u>	Alt: <u>1350m</u> AGL	Alt: <u>VARIOUS</u> AMSL	Avg Terr Ht: <u>VARIOUS</u>
	<u>LMS-Q1560</u>	Scan Freq: <u>2400 LPS</u>	MPIA: <u>Y/N</u>	Pulses In Air: <u>-</u>	Pulse Rate: <u>800 kHz</u>
	FOV: <u>58.5°</u>				Power: <u>50%</u>
					Avg Pt Spacing: <u>0.70m</u>
					PPSM: <u>4.57 ppsm</u>
					Max Gdspd: <u>150 kts</u>
					Storage Name/LOAN: <u>CI C2</u>
					End GB: <u>2019</u>
					Top/Mid/BOT: <u>SET 2</u>
					Top/Mid/BOT: <u>TOP/MID/BOT</u>

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PDOP#Sats	GPS Altitude	Crab	Turb (0.-)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc. (Fig 8019:36→19:45Z)
43	S	19:47	19:50	~150kts	1.2/18	5430'	2°	-	h.e. str above & below, W winds ~20kts, occ turb
42	N	19:53	19:56	~155kts	1.2/18	5430'	2°	-	" " " " " " " " " " " "
41	S	20:00	20:03	~150kts	1.2/18	5450'	4°	-	" " " " " " " " " " " "
40	N	20:06	20:09	~150kts	1.1/18	5450'	2°	-	" " " " " " " " " " " "
39	S	20:12	20:15	~150kts	1.1/18	5430'	4°	-	" " " " " " " " " " " "
38	N	20:18	20:21	~155kts	1.2/16	5520'	3°	-	" " " " " " " " " " " "
37	S	20:25	20:28	~150kts	1.3/16	5560'	3°	Ø	" " " " " " " " " " " "
36	N	20:31	20:34	~150kts	1.2/17	5580'	3°	Ø	" " " " " " " " " " " "
35	S	20:37	20:40	~150kts	1.2/17	5650'	3°	Ø	" " " " " " " " " " " "
34	N	20:43	20:46	~150kts	1.2/17	5730'	2°	Ø	" " " " " " " " " " " "
33	S	20:50	20:53	~150kts	1.4/16	5690'	3°	Ø	" " " " " " " " " " " "
32	N	20:55	20:59	~155kts	1.4/16	5490'	2°	Ø	" " " " " " " " " " " "
31	S	21:02	21:06	~150kts	1.1/18	5490'	2°	Ø	" " " " " " " " " " " "
30	N	21:09	21:13	~155kts	1.1/19	5490'	3°	Ø	" " " " " " " " " " " "
29	S	21:17	21:21	~150kts	1.1/18	5520'	3°	Ø	" " " " " " " " " " " "
28	N	21:25	21:28	~155kts	1.1/17	5520'	2°	Ø	" " " " " " " " " " " "
27	S	21:34	21:36	~150kts	1.1/17	5900'	3°	Ø	" " " " " " " " " " " "
26	N	21:39	21:41	~150kts	1.2/16	5970'	2°	Ø	" " " " " " " " " " " "

Total Proj Lines: 59    Lines Flown: 19    Lines Remain: 40    Online Time: 2:03    Mob Time: 0:58    Notes: "20171108b\_Vermont-N737M"

# 20171109-A (N73TM, SN175)





Ready



Ready



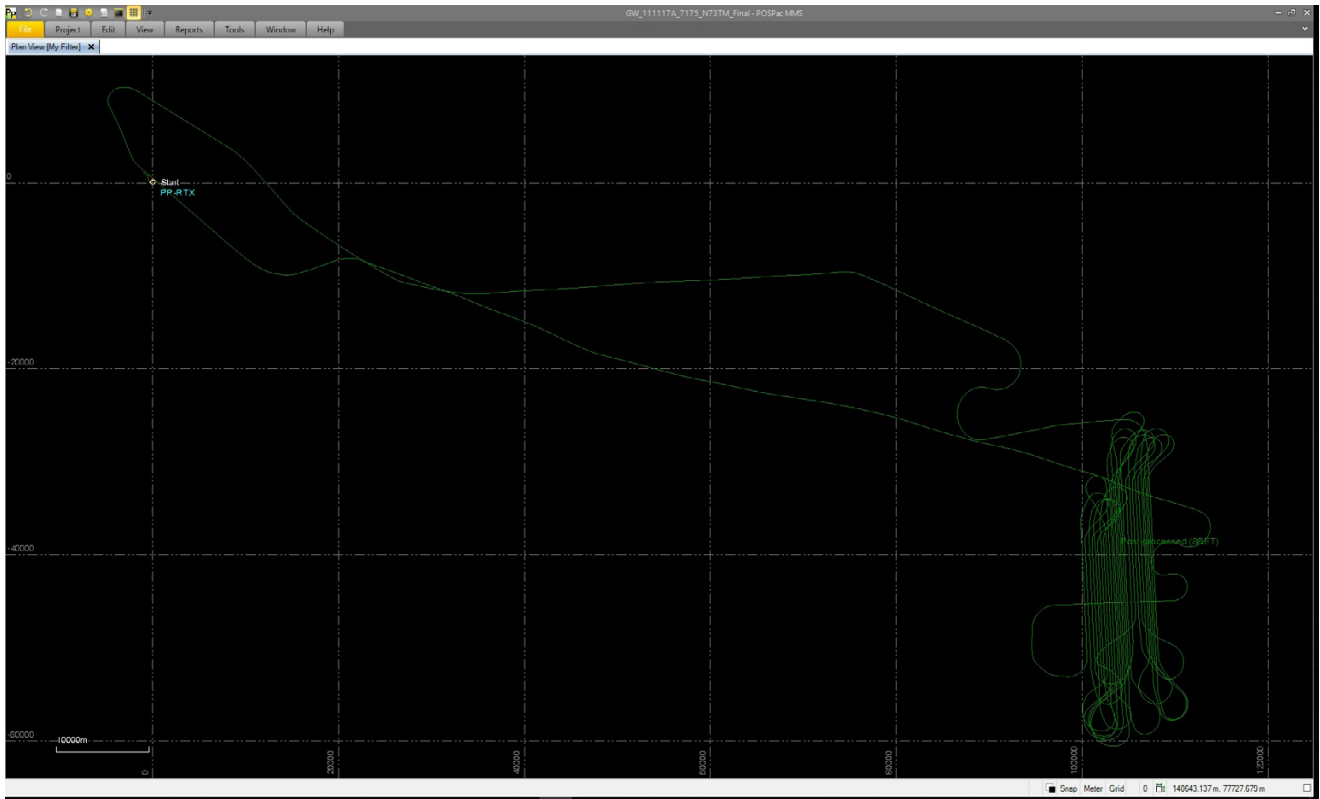


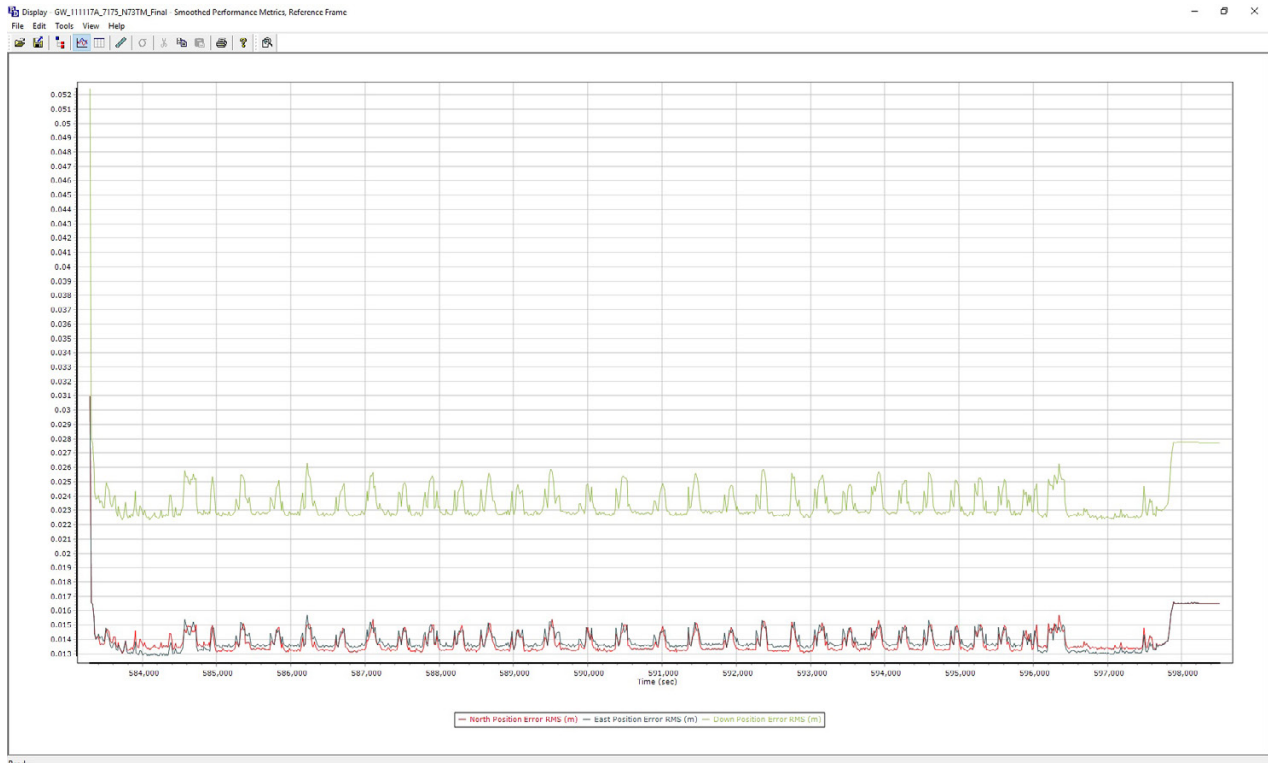
# Flight Log

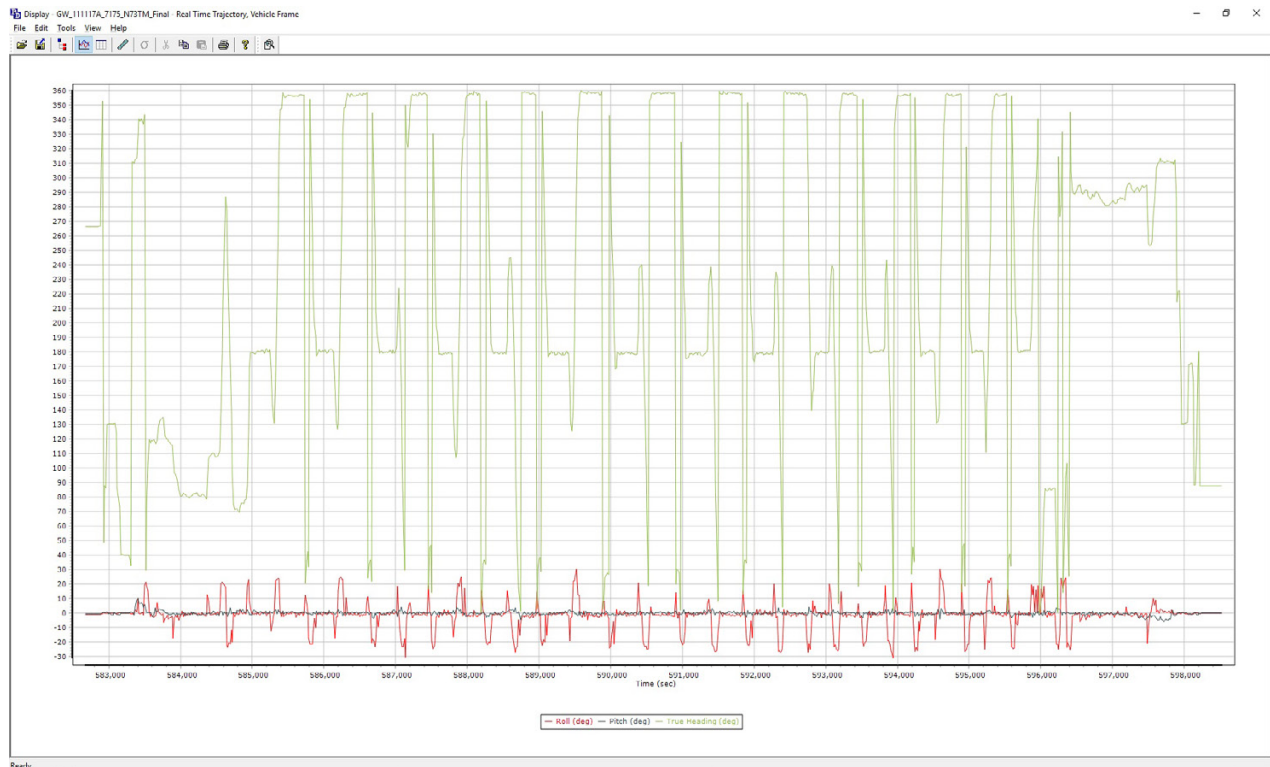
Airborne LIDAR Data Collection Log Sheet :: Quantum Spatial, Inc										Date: 11-9-17	
(email log daily to flight_log_distribution_list@quantumspatial.com)										Lit: (A) B C D E Pg 1 of 2	
Project: UMAGOG ADDON		Proj #: 28794		Flight Mgmt File: 20171108-N73TM-A							
Aircraft: N73TM		Begin Hobbs: 6942.1		End Hobbs: 6946.2		Total: 4.1		Pilot: WAGNER		Co-Pilot: - Tech: SCHOCNE	
Dep Apt: KBTW		Dep Time (Lcl): 07:24 (Z): 12:24		Arr Apt: KBTW		Arr Time (Local): (Z):		Tot Time Aloft: 27			
CORS: Y / N		Sta 1:		Sta 2:		Flyovers: Y / N		IF Y, times: Sta1		Sta2	
GPS Unit: D / N		Sta 1: KBTW-STATIC		Sta 2:		Flyovers: Y (N)		IF Y, times: Sta1		Sta2	
Gd Temp beg: -3 °C		End: 7 °C		OAT beg: -3 °C		End: -3 °C		Altimeter begin: 30.20		end: 30.14	
LIDAR	Type	Serial #	Alt	Alt	Avg Terr	Max	Avg Pt	1	Beg GB	End GB	Storage Name/No
	Q1560	9999175	AGL 4429	AMSL	Ht	Gdspd 150	Spacing				
	FOV	Scan Freq	MpIA	Pulse In Air	Pulse Rate	Power	PPSM	2	244.41	235.97	SET 2
	58.52	120LPS	Y / N		400KHz	50%	4.57				
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	FOF/Sec	GPS Altitude	Crab	Turb (0,+)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.		
56	193	13:01	13:03	146	1.3/17	6673	-6		HIGH THIN CIRRUS - GROUND FOG EAST PART OF PROJECT		
55	13	13:06	13:07	153	1.3/17	6791	+5		VIS TIP SOUTH AIR		
54	193	13:11	13:12	149	1.2/18	6552	-6				
53	13	13:15	13:17	148	1.2/17	6336	+5				
52	193	13:21	13:23	146	1.2/17	6333	-5				
51	13	13:26	13:28	155	1.2/17	6333	+5				
50	193	13:31	13:33	144	1.2/17	6326	-6				
49	13	13:36	13:38	151	1.2/17	6192	+5				
48	193	13:42	13:44	149	1.1/18	6100	-5				
47	13	13:47	13:48	155	1.1/18	6097	+5		Poss. CUF ON MOUNTAIN TOP/PEAK		
46	193	13:53	13:55	147	1.1/18	6097	-5				
45	13	13:58	14:00	148	1.0/18	6097	+6				
44	193	14:03	14:05	147	1.1/17	6096	-6				
27											
Cross	W	14:11	14:13	146	1.0/17	6148	-		CLOUDING OUT SET 5500		
Total Proj Lines: 59		Lines Flown: 19/13		Lines Remain: 27		Online Time: 1.2		Mob Time: 6		Notes: BASE START 06:55/11:55GMT	

Scanned by CamScanner

# 20171111-A (N73TM, SN175)







# Flight Log

**Q Airborne LiDAR Data Collection Log Sheet :: Quantum Spatial, Inc** Date: NOVEMBER 11<sup>th</sup>, 2017

(email Log daily to flight\_log\_distribution\_list@quantumspatial.com) "20171111a\_Vermont\_N73TM" LIFE: (A) B C D E Pg 1 of 2

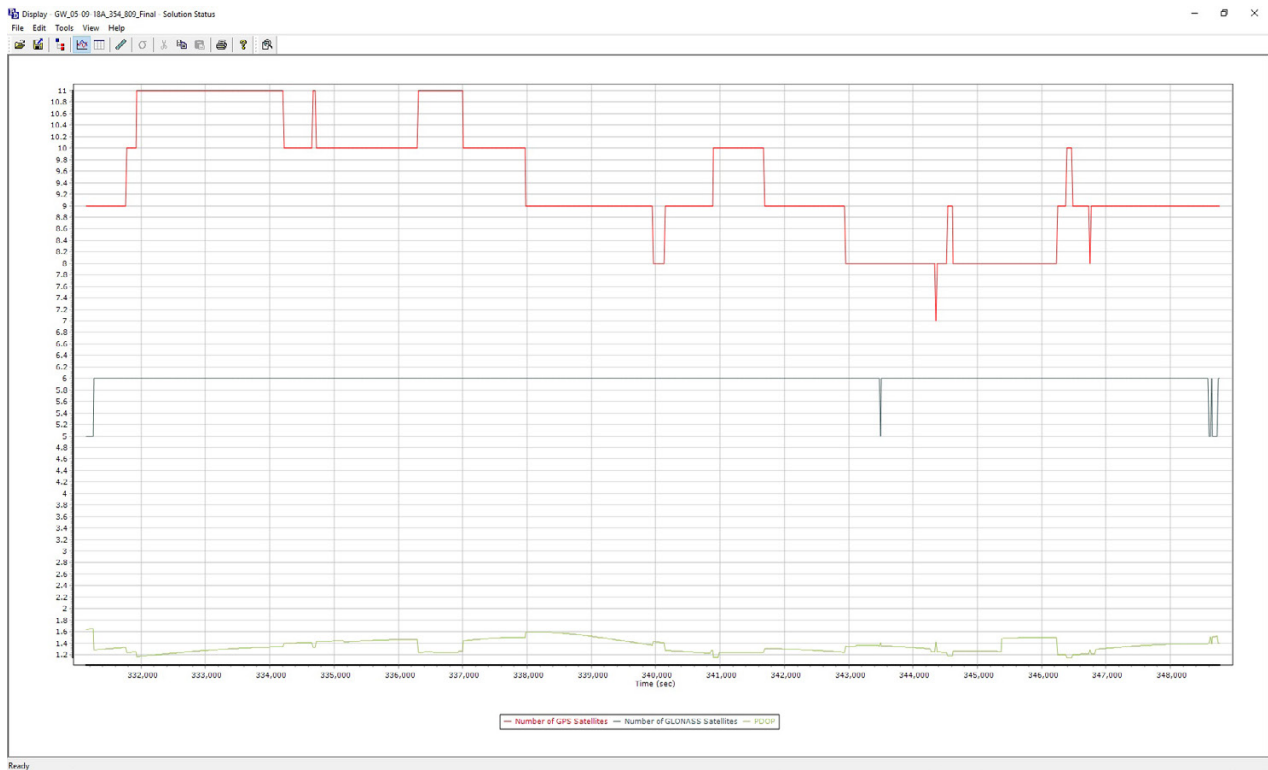
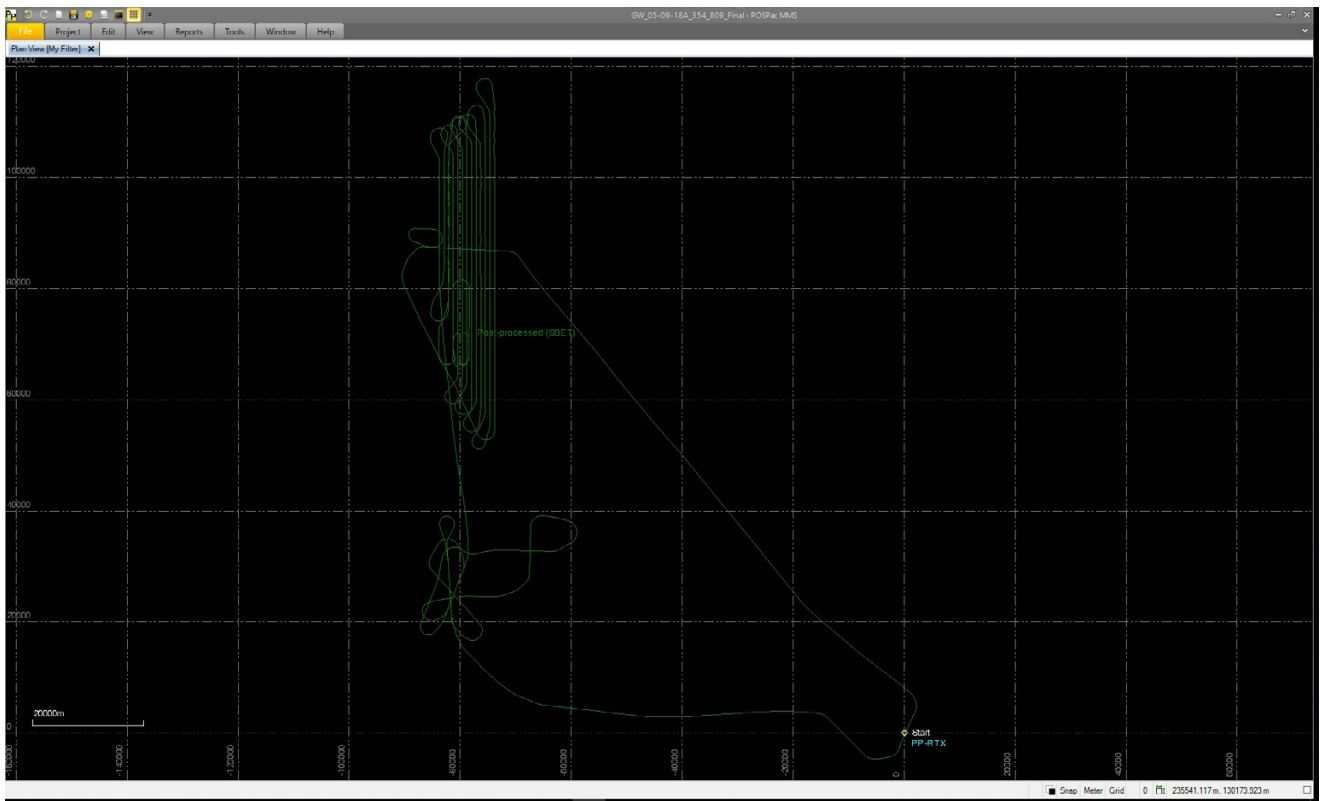
Project: UMBAGOG ADD-ON		Proj #: 28794		Flight Mgmt File: 28794-1560-1350m	
Aircraft: N73TM		Begin Hobbs: 6948.1		End Hobbs: 6952.1 Total: 4.0	
Dep Apt: KBTW		Dep Time (Lcl): 13:02 Z: 18:02 Z		Arr Apt: KBTW Arr Time (Local): 17:03 Z: 22:03 Z	
CORS: (Y) N		Sta 1: Network		Sta 2: -	
GPS Unit: (Y) N		Sta 1: Cap set @ BTW FBO		Sta 2: -	
Gd Temp beg: -02 °C		End: SEE SHEET 2 °C		OAT beg: -07 °C	
				End: SEE SHEET 2 °C	
				Altimeter begin: 30.58 " end: SEE SHEET 2	
LiDAR	Type: RIEGL	Serial #: 9999175	Alt: 1350m / 4430ft	Alt: AMSL	VARIATIONS
	FOV: 58.5°	Scan Freq: 240 LPS COMBINED	MPIA Y / N	Pulses In Air	
				Avg Terr Ht: VARIATIONS	Max Gdepd: 150 kts
				Pulse Rate: 800 kHz COMBINED	Power: 50%
					Avg Pt Spacing: 0.70m
					PPSM avg: 4.57 pps/m
					Storage Name: C1 C2
					End GB: 254 244
					Tot GB: 254 244
					LOAN SET 2
					TDR/MIN/ BOT

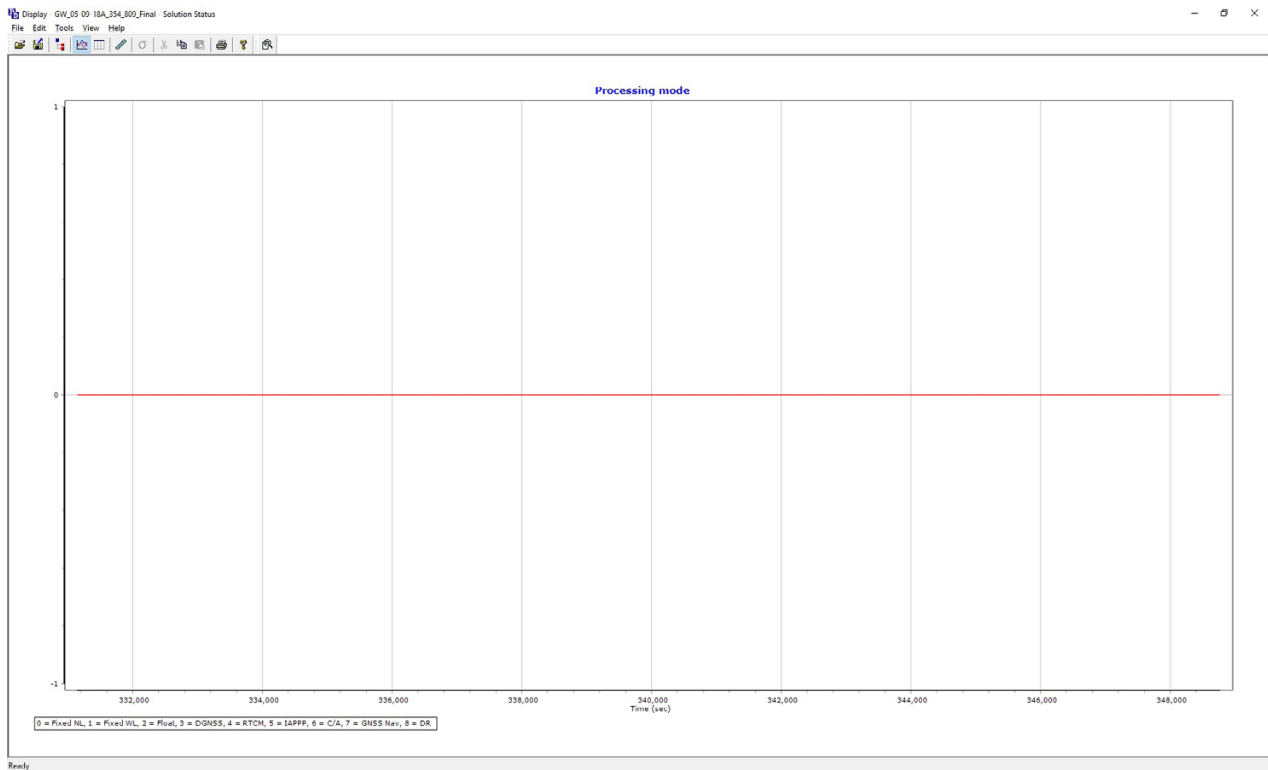
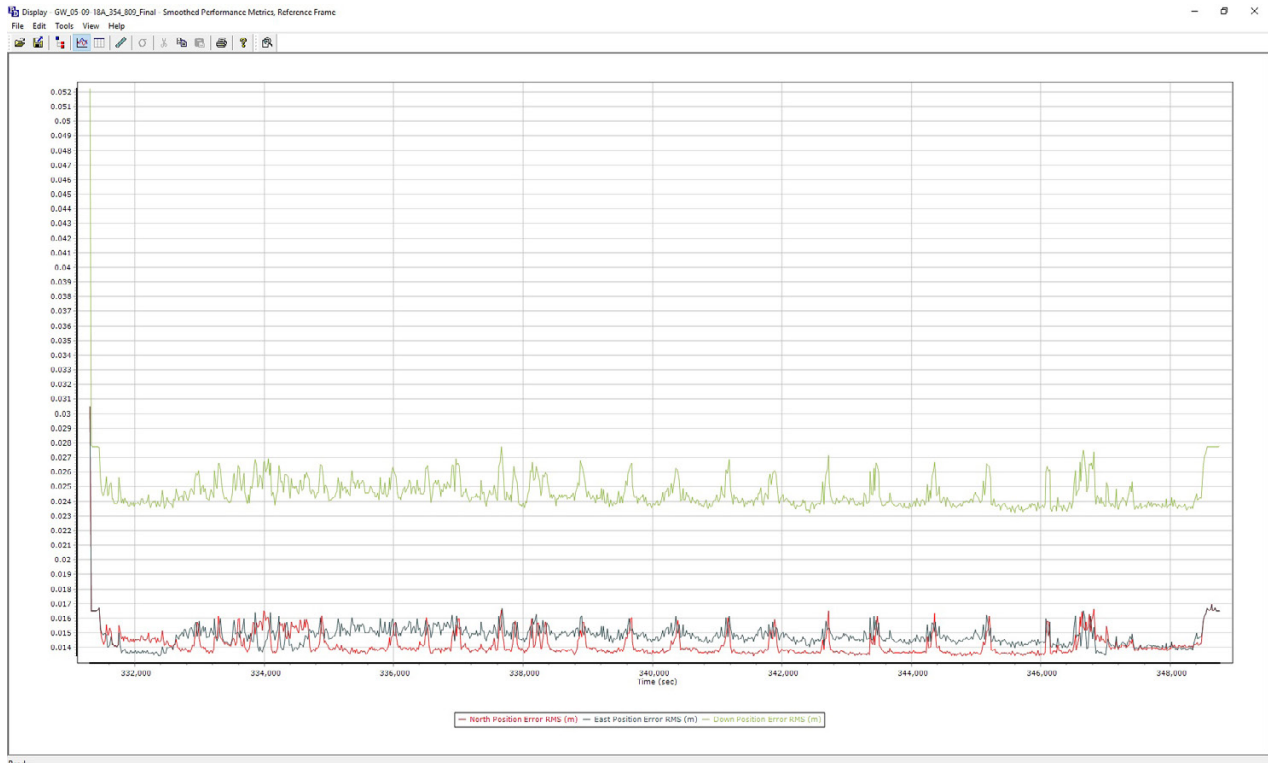
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PDOP/Sats	GPS Altitude	Crab	Turb (0-+)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
27	S	18:30	18:34	~150 kts	1.1/18	5530'	2°	0	- hz, skc above & below, NW winds ~20 kts., smooth, trace of snow in some areas
26	N	18:38	18:42	~145 kts	1.1/18	5540'	2°	0	" " " " " " " " " " " "
25	S	18:45	18:49	~155 kts	1.1/18	5550'	2°	0	" " " " " " " " " " " "
24	N	18:52	18:56	~150 kts	1.2/17	5550'	1°	0	" " " " " " " " " " " "
23	S	18:59	19:03	~155 kts	1.4/16	5530'	2°	0	" " " " " " " " " " " "
22	N	19:07	19:10	~145 kts	1.9/15	5500'	1°	0	" " " " " " " " " " " "
21	S	19:13	19:16	~155 kts	1.4/16	5480'	1°	0	" " " " " " " " " " " "
20	N	19:20	19:23	~150 kts	1.3/17	5470'	1°	0	" " " " " " " " " " " "
19	S	19:26	19:29	~155 kts	1.3/17	5460'	1°	0	" " " " " " " " " " " "
18	N	19:33	19:36	~150 kts	1.2/18	5440'	1°	0	" " " " " " " " " " " "
17	S	19:39	19:43	~155 kts	1.3/18	5440'	1°	0	" " " " " " " " " " " "
16	N	19:47	19:51	~145 kts	1.2/18	5430'	1°	0	" " " " " " " " " " " "
15	S	19:55	19:59	~155 kts	1.2/18	5430'	1°	0	" " " " " " " " " " " "
14	N	20:03	20:08	~145 kts	1.2/18	5430'	1°	0	" " " " " " " " " " " "
13	S	20:11	20:15	~150 kts	1.4/15	5430'	1°	0	" " " " " " " " " " " "
12	N	20:19	20:23	~150 kts	1.2/16	5430'	1°	0	" " " " " " " " " " " "
11	S	20:27	20:31	~155 kts	1.2/17	5430'	1°	0	" " " " " " " " " " " "
10	N	20:34	20:38	~150 kts	1.1/17	5430'	1°	0	" " " " " " " " " " " "

Total Proj Lines: 59    Lines Flown: 27    Lines Remain: 0    Online Time: 3:06    Mob Time: 0:55    Notes: "20171111a\_Vermont\_N73TM"

# 20180509-A (N869, SN354)









# Flight Log

**KEYSTONE**  
LIDAR FLIGHT REPORT - v2.11

**Pick-ups**

Date: 5/18/18  
Project: 187  
Altitude: 3169  
Sensor: 354

Pilot: NN  
Operator: CM / BD  
HD: A

POS/AV filename: 10PA-187-81A-SENSOR-20180518-1

**Weather**

Pressure (hPa): 30.118  
Temperature (C): 16.0  
Dew Point: 8.0  
Turbulence: NA  
Wind Speed & Gusts: 8 Kt  
Visibility: 6.1 km

**Flight Plan**

Narrow  
On: 6:17  
Off: 1:08  
Scan Half Angle: 1.8  
Laser PRF: 250  
Desired Range: 1400  
Max. Gnd Speed: 150

Flight Notes:  
Stops in mountains  
Circular around in distance to 15

Line #	Start Time	End Time	HDS	Rate	POOP	SV	Speed (kph)	Flight Notes
1	20:52	20:54	355				150	
2	20:54	20:57	517	5881	0.93	19	150	NO good for clouds and had in coverage - reject
3	20:57	20:58	209	4036	0.94	19	150	good
4	20:58	20:59	209	5892	0.97	19	152	Good
5	20:59	21:00	209	4710	1.03	20	150	Good
6	21:00	21:02	209	5710	1.03	18	144	Good
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

**Base Station**

Point ID: 1011  
Position Type: 1  
Address Height: 14.50  
Latitude: 43.00  
Longitude: 70.00

Time On (UTC): 19:55  
Time Off (UTC): 14:59

**Alabama Station**

Time On (UTC): 19:55  
Time Off (UTC): 14:59

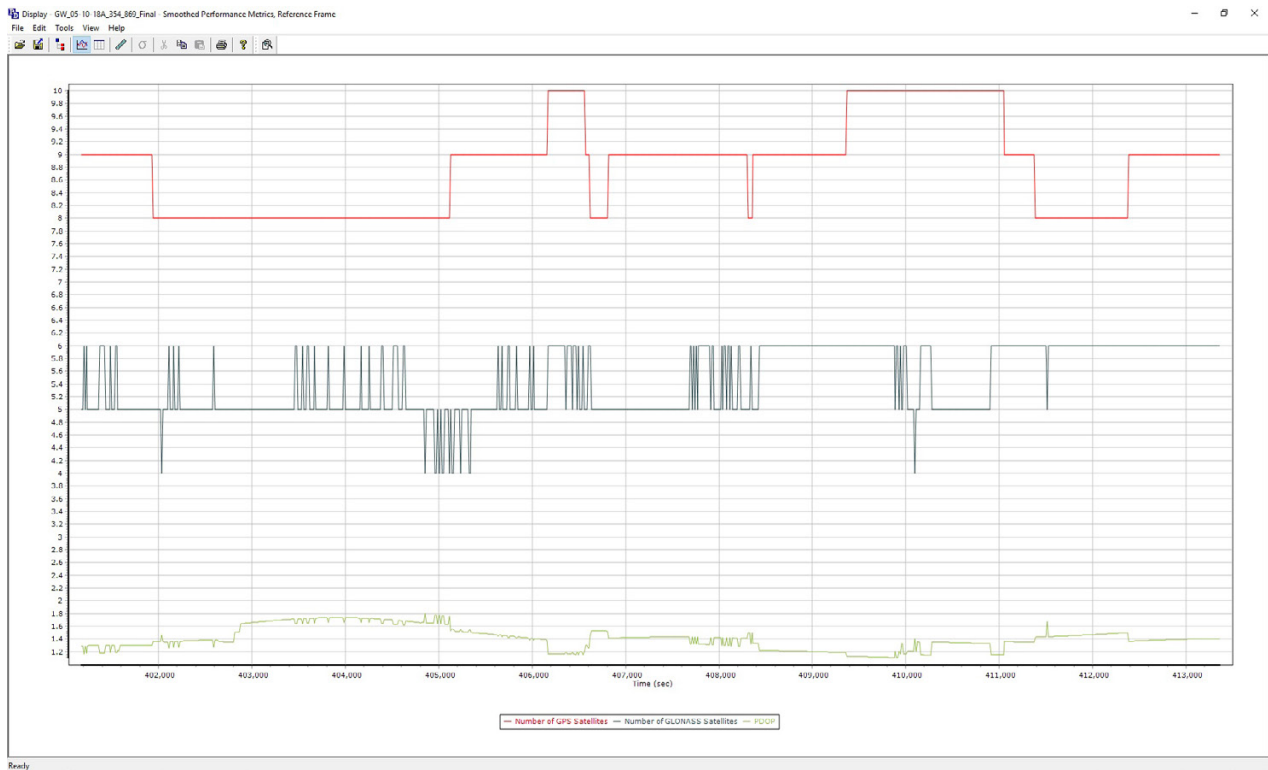
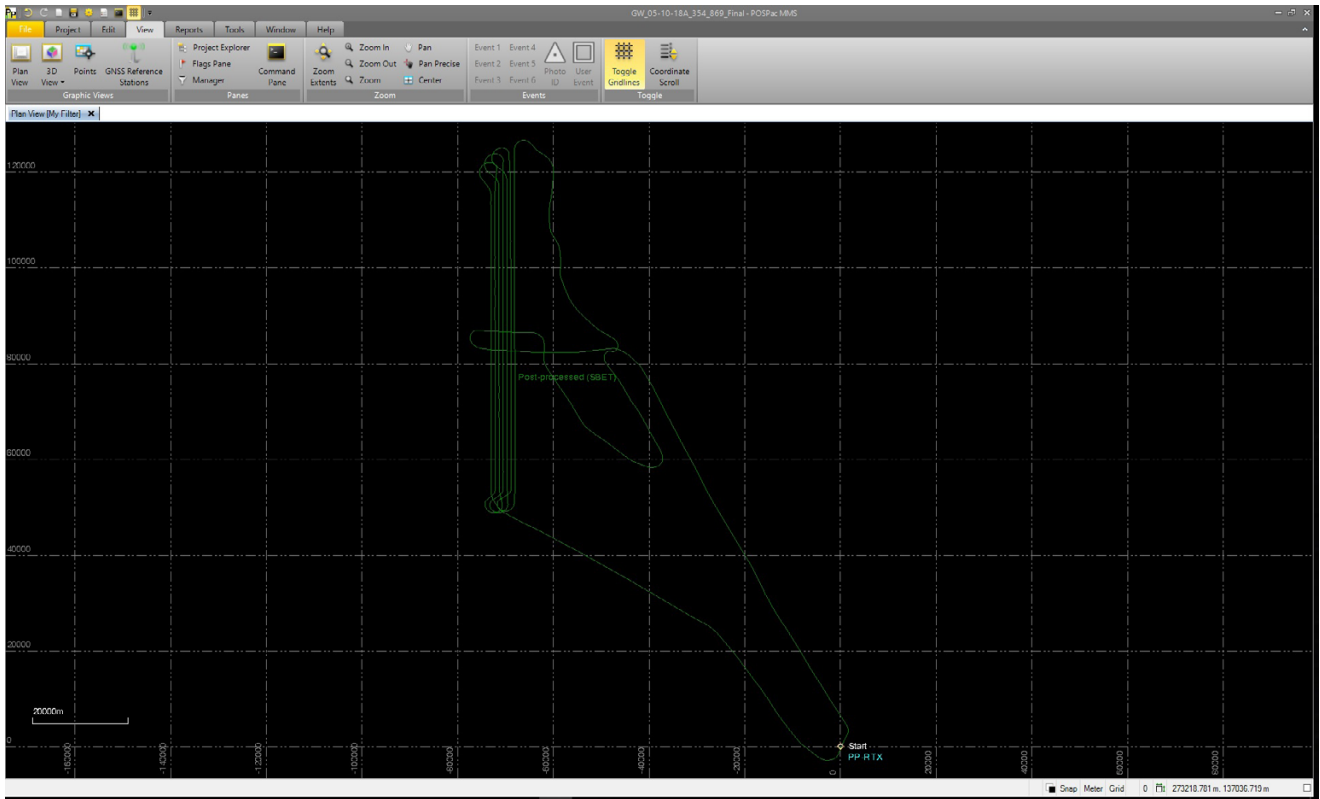
**Engine Start (OHR (L)):** 3:48  
**Engine Stop (OHR (L)):** 3:48  
**Total Flight Time:** 0:00

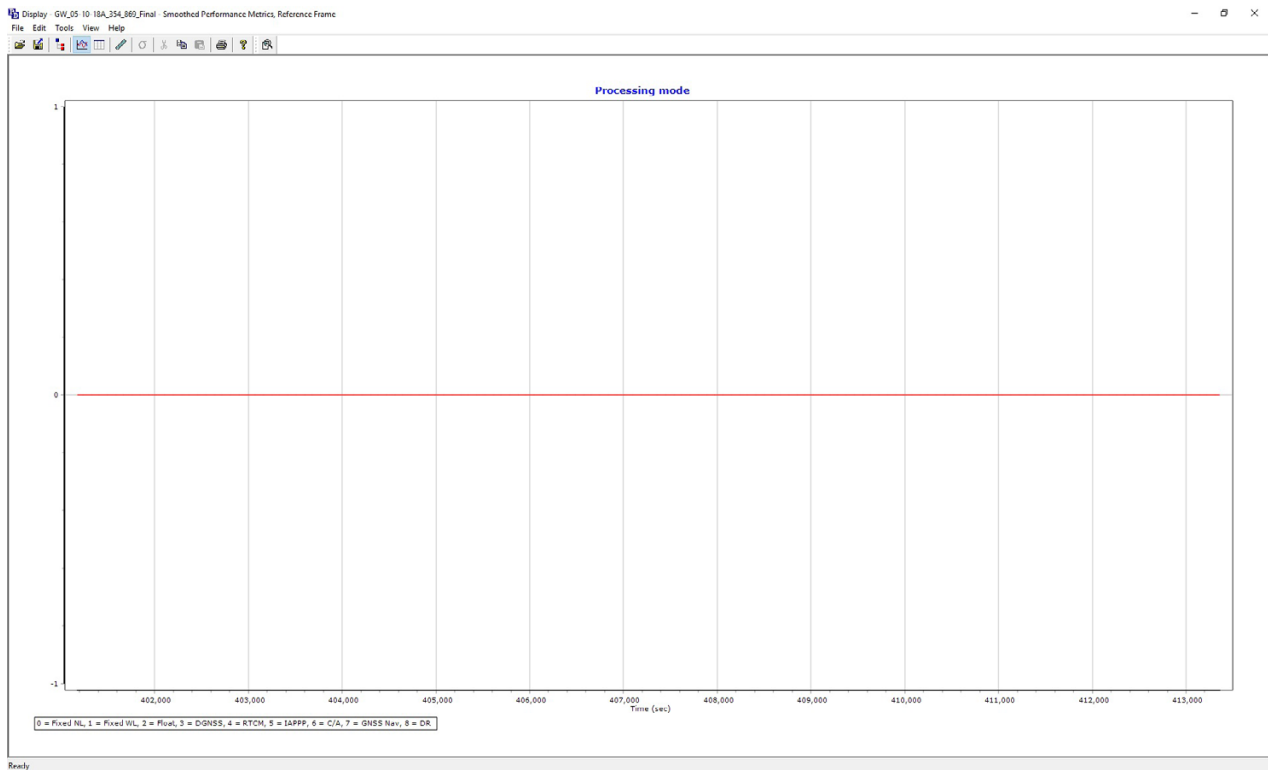
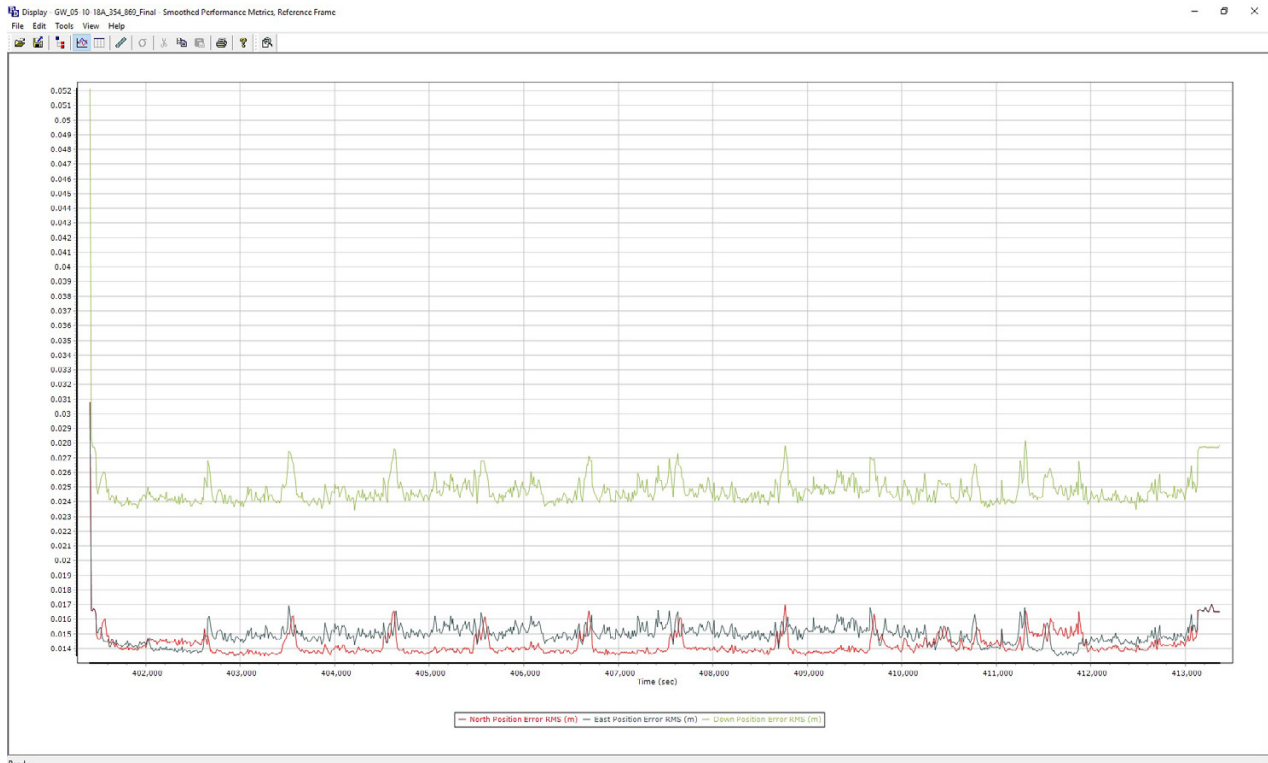
**Departure Airport:** Low  
**Arrival Airport:** Low

Page: 1 of 1

PME - Low  
Ferry 18:15 - 14:57

# 20180510-A (N869, SN354)









# Flight Log

**KEystone**  
LIDAR FLIGHT REPORT - V2.11

Date: 5/10/18 Pilot: NN  
 Project: 787 Aircraft: 8189 Operator: GM  
 Sensor: 354 HD: S

POS/AV Filename: \\PA787-8189-SEN354-2018-0510-2

**Weather**

Pressure (in): 29.91  
 Temperature (in): 11.0  
 Temperature (air): 11.0  
 Dew Point: 5.9  
 Turbulence: 18/15  
 Wind Speed & Gusts: High thin clouds  
 Visibility: High thin clouds

**Flight Plan**

Beam Divergence: Narrow  
 Roll Comp: On  
 Multipulse: On / Off  
 Scan Frequency: 124  
 Scan Hill Angle: 3.1  
 Laser PPRF: 350  
 Desired Range: 1435  
 Pilid Ground Speed: 140

**Weather**

Pressure (in): 29.91  
 Temperature (in): 11.0  
 Temperature (air): 11.0  
 Dew Point: 5.9  
 Turbulence: 18/15  
 Wind Speed & Gusts: High thin clouds  
 Visibility: High thin clouds

Line #	Start Time	End Time	HOS	Range	POOP	SV	Speed (kts)	Flight Notes
1	15:51	16:04	359	52-49	141	10	157	
2	16:07	16:33	179	44-38	124	15	158	
3	16:35	16:37	359	53-38	103	17	150	
4	16:43	16:56	179	38-44	158	10	140	
5	16:59	17:12	359	53-38	205	17	153	
6	17:16	17:30	179	48-38	100	17	153	
7	17:34	17:48	359	48-38	105	10	150	
8	18:10	18:18	272	50-38	101	17	134	Light rain at end of line
9								Light rain before we could get the line
10								Attempted tie line w/ rain in the area
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

**Base Station**

Point ID: 787 Location: 787  
 Precision: 2 Elevation: 13:30  
 Address Height: 16:30  
 Latitude: 16  
 Longitude: 18

**Albion Station**

Time On (UTC): 15:13  
 Time Off (UTC): 15:27  
 Time On (UTC): 18:48  
 Time Off (UTC): 18:49

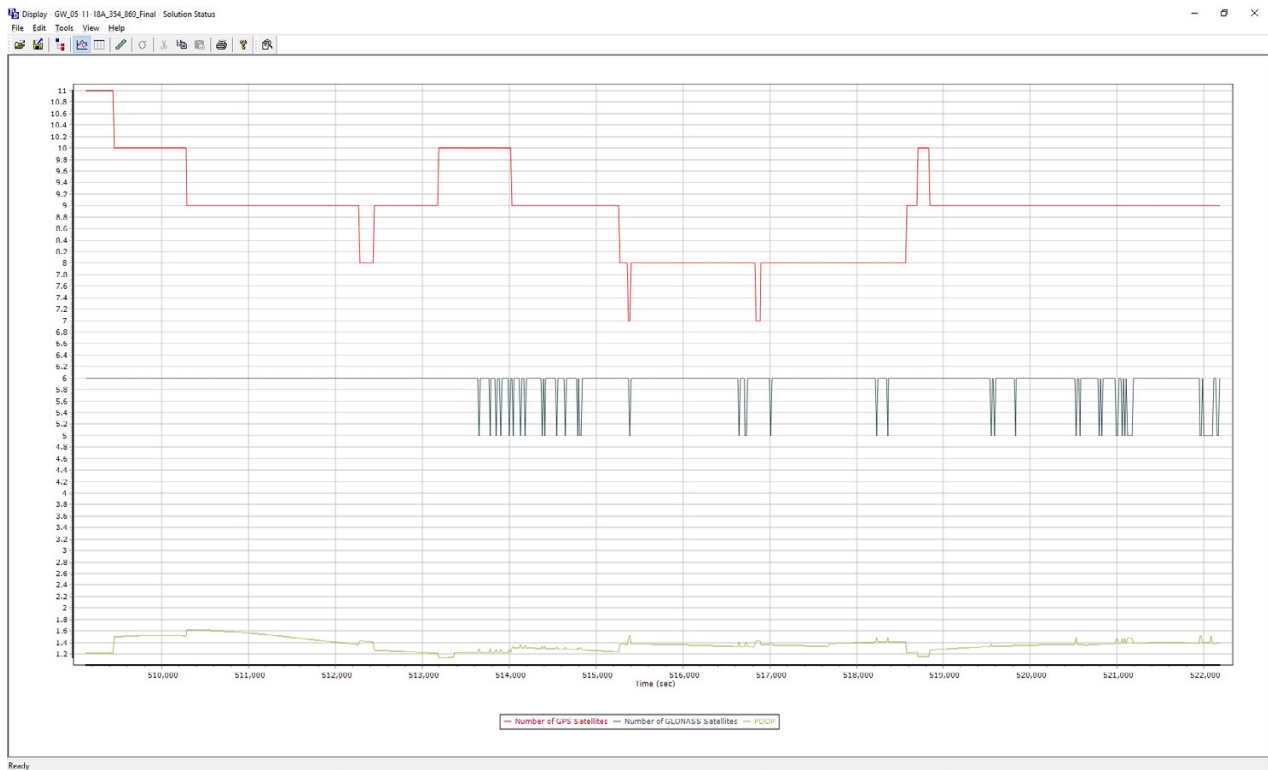
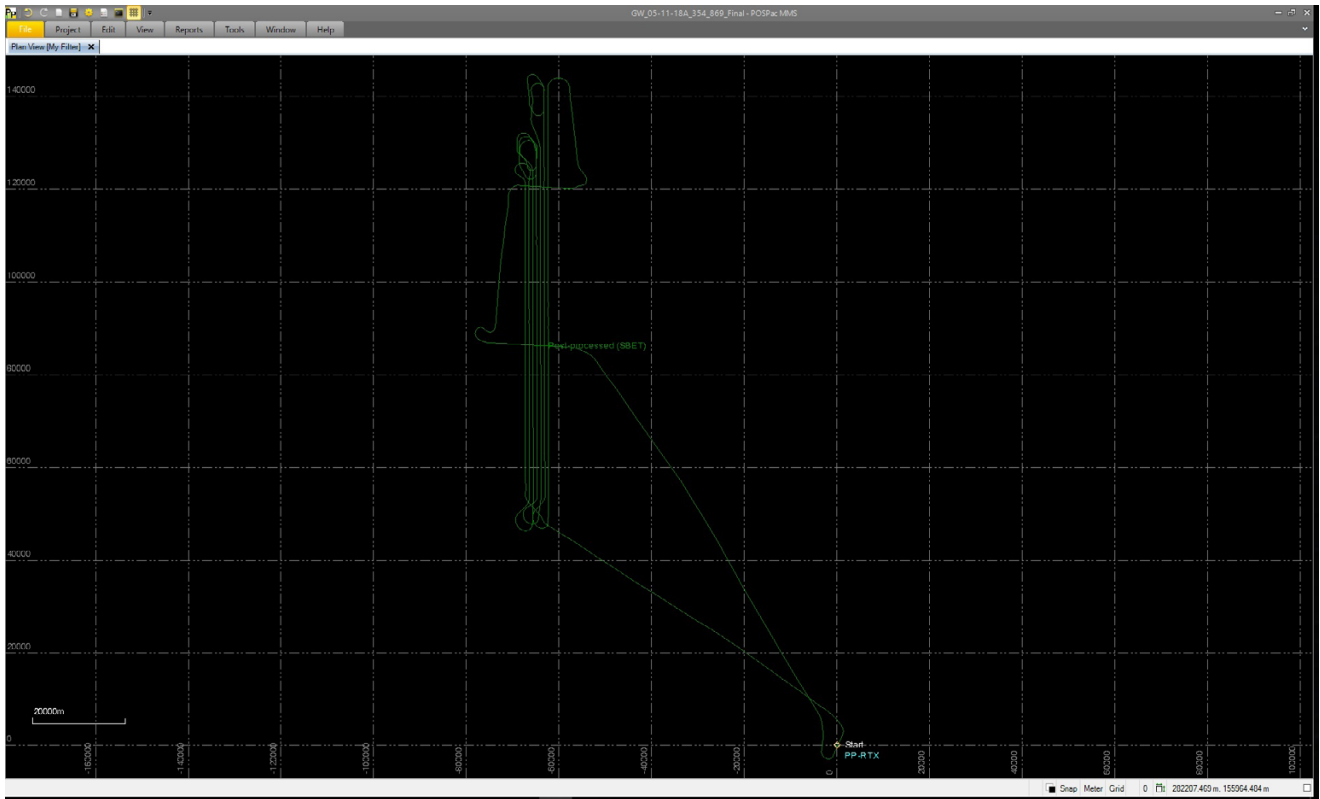
**Engine Start (24HR LCL):** 11:07  
**Engine Stop (24HR LCL):** 14:54  
**Total Flight Time:** \_\_\_\_\_

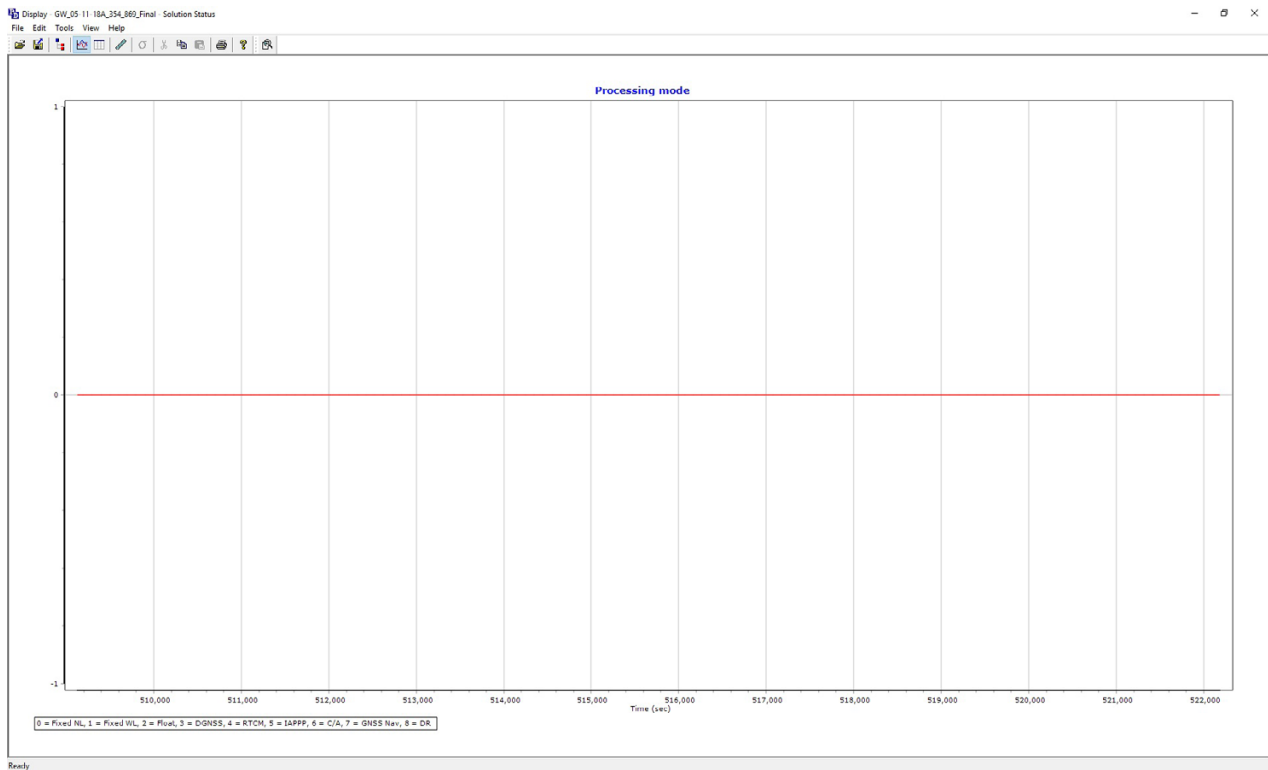
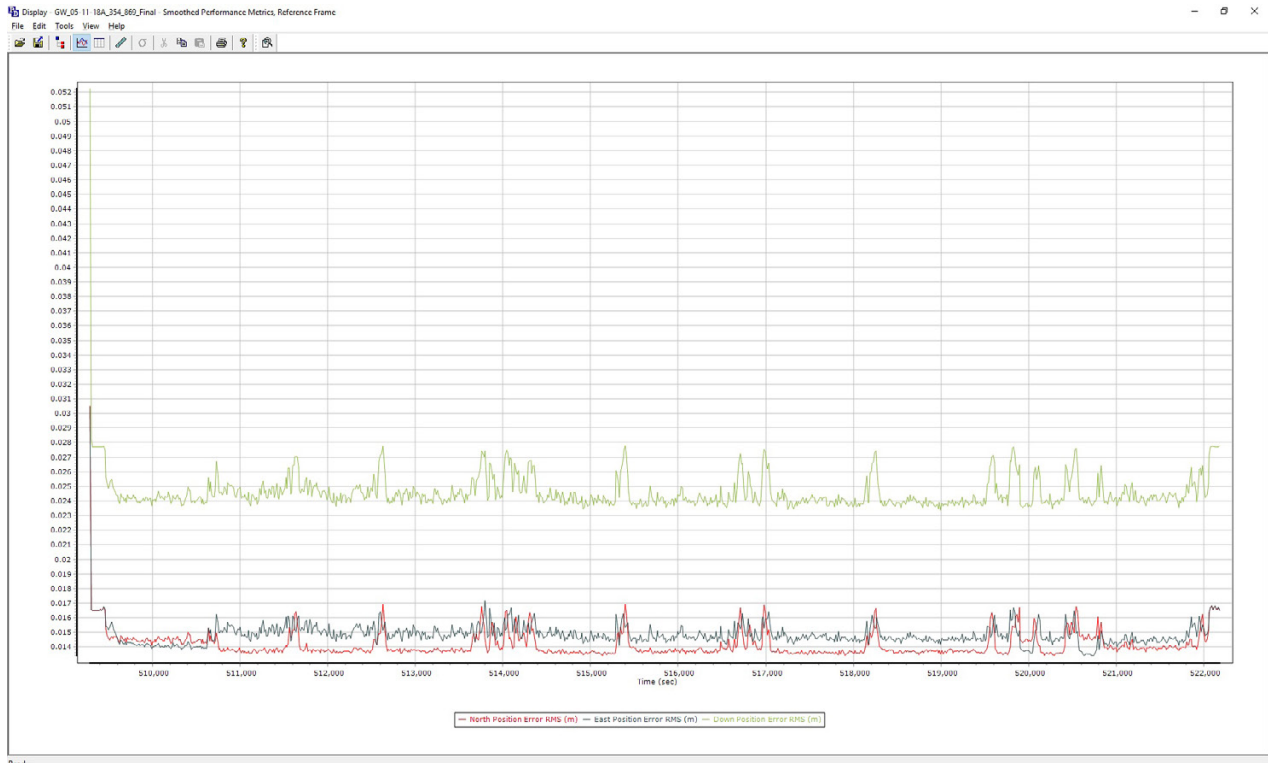
**Departure Airport:** 787  
**Arrival Airport:** 787

Page: \_\_\_\_\_ of \_\_\_\_\_

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# 20180511-A (N869, SN354)

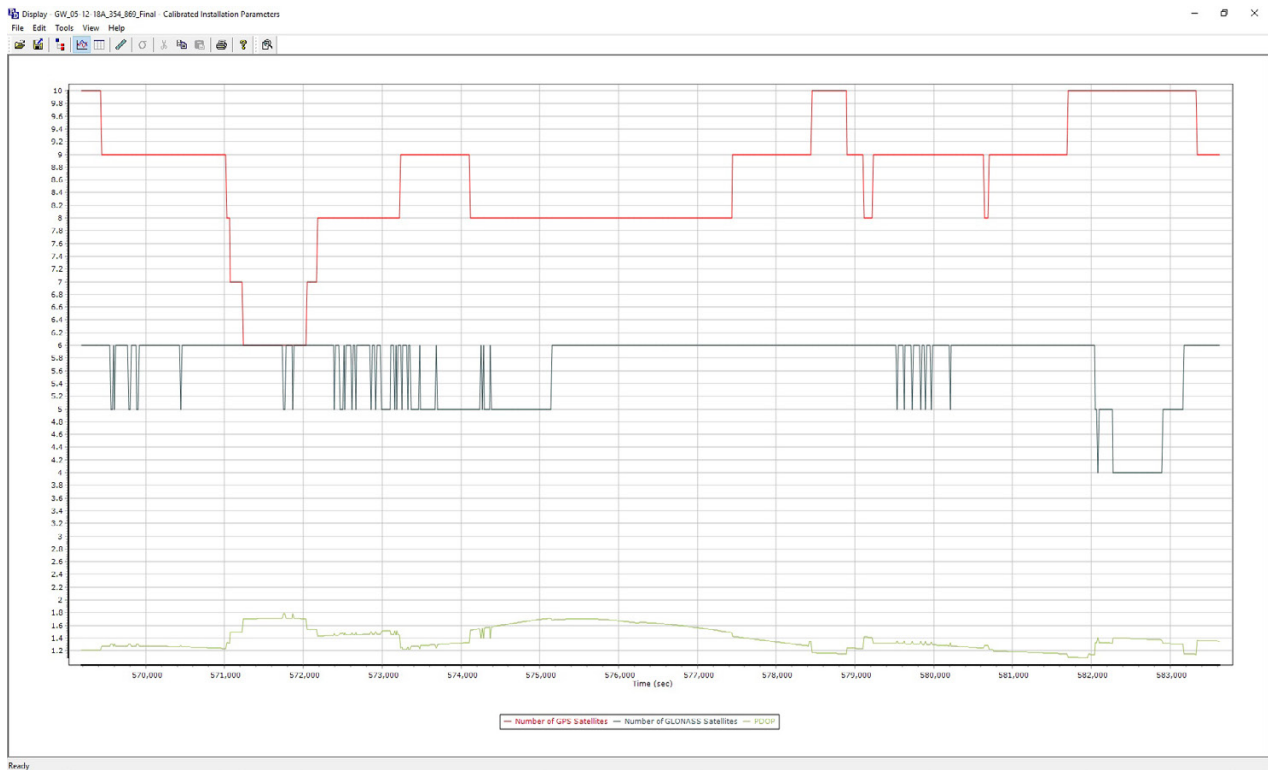
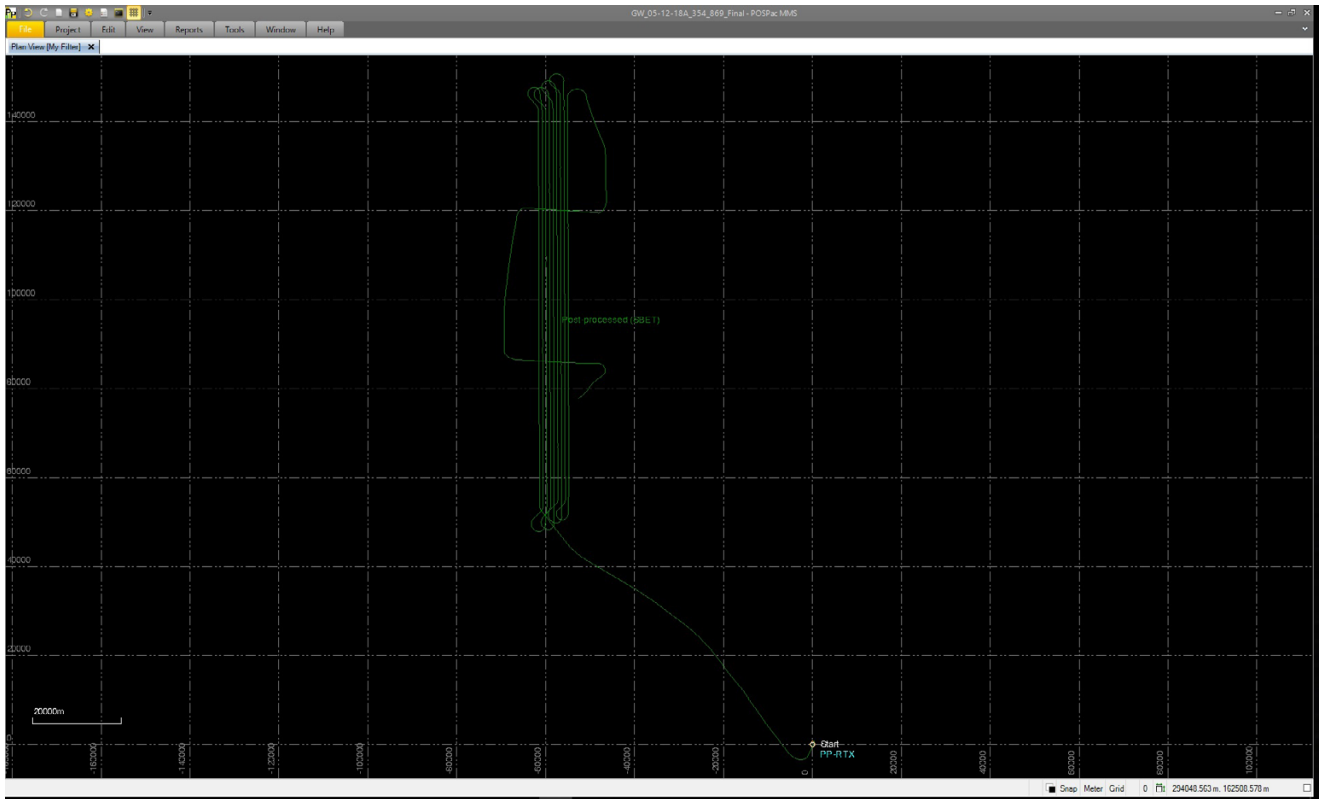




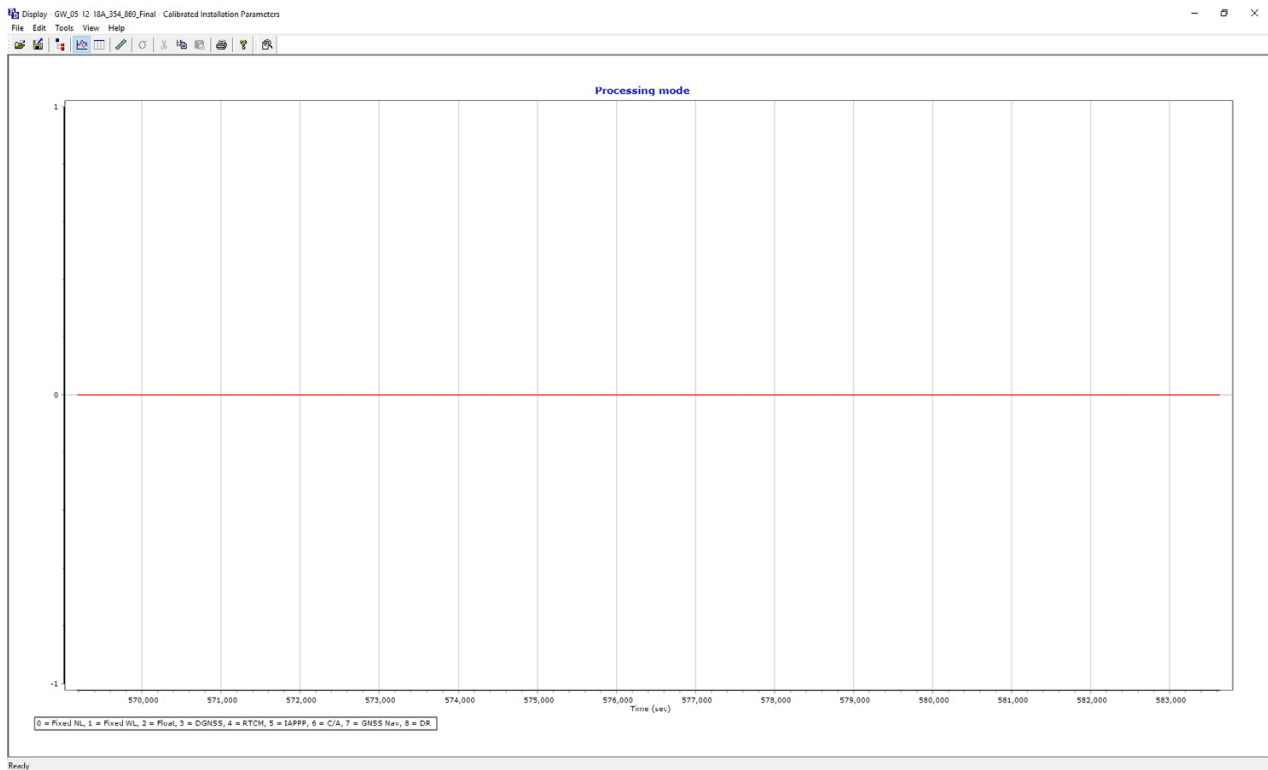
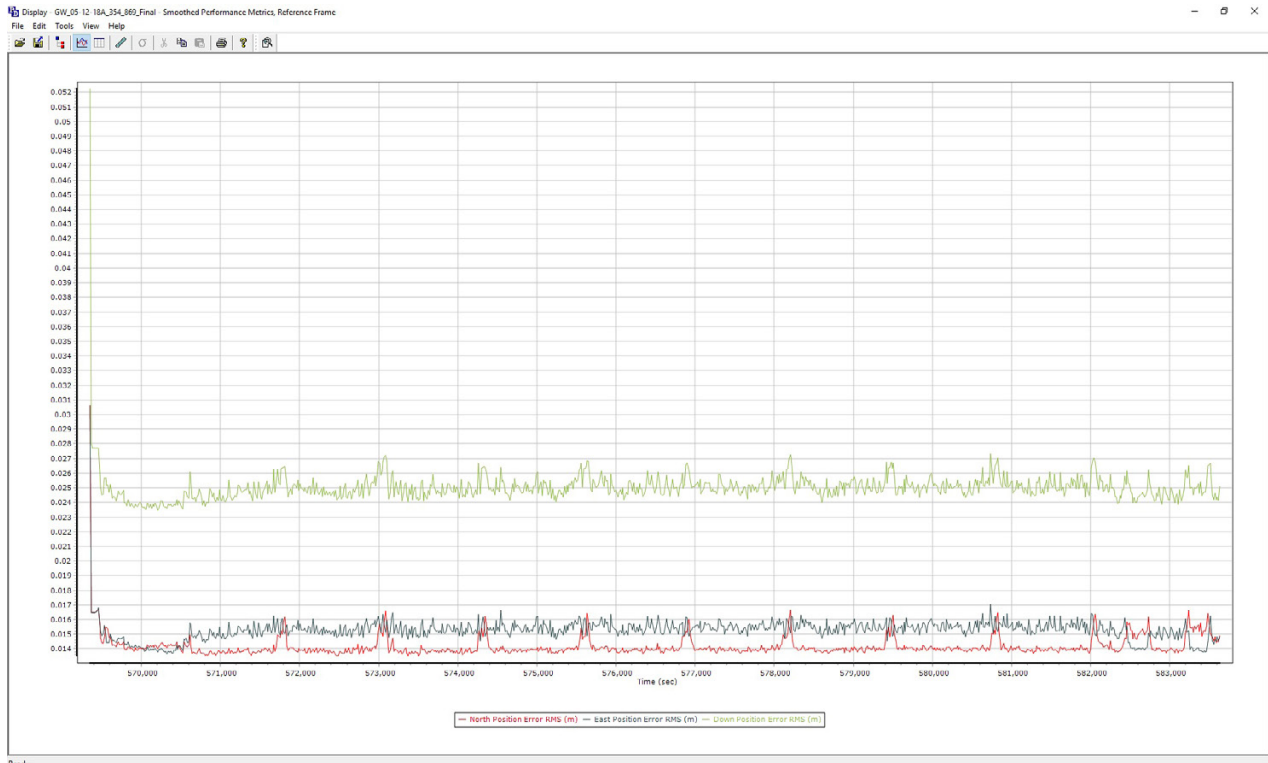


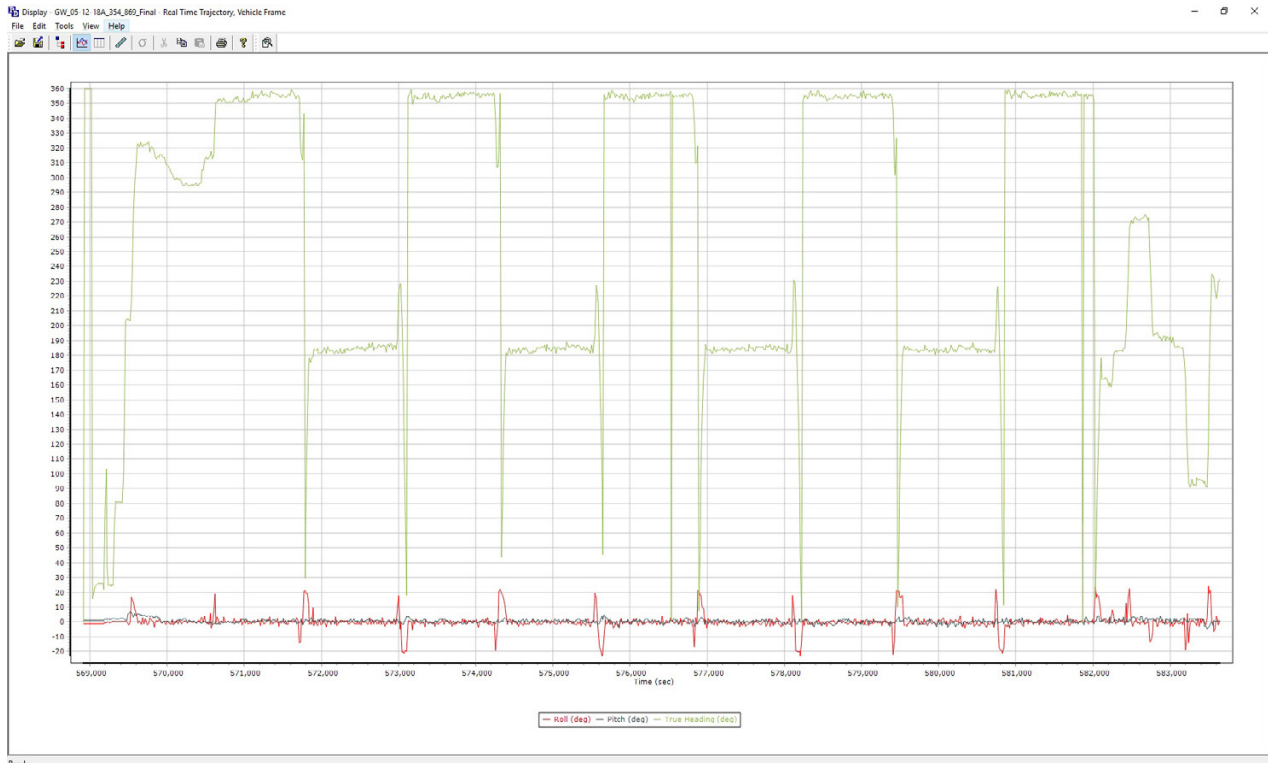


# 20180512-A (N869, SN354)









# Flight Log

**KEYSTONE SURVEYS**

**LIDAR FLIGHT REPORT - V2.11**

Date: 5/12/18 Pilot: NN

Project: 787 Operator: CM

Aircraft: 869 HD: 15

Sensor: 354

POS/AV Filename: 110PAT187\_810A\_SENS354\_0180513\_4

**Flight Plan**

Beam Divergence: Narrow

Roll Comp: On

Multiplexer: 66 / Off

Scan Frequency: 14

Scan Rate Angle: 21

Laser PPRF: 350

Desired Range: 1435

Final Grid Speed: 110

**Weather**

Pressure (Std): 30.23

Temperature (Std): 18.7 C

Temperature (Alt): 5.7 C

Dew Point: -04.1 F

Turbulence: SLIGHT

Wind Speed & Gust: 10-15

Visibility: 10+

Line #	Start Time	End Time	HDG	Range	POPP	SV	Flight Notes
1	14:30	14:48	354	490.5	100%	17	
2	14:50	15:09	179	447.8	100%	16	
3	15:13	15:30	354	483.8	100%	18	
4	15:34	15:52	179	433.7	100%	17	
5	15:55	16:13	354	523.1	100%	16	
6	16:14	16:35	179	410.1	100%	18	
7	16:38	16:57	354	482.0	100%	18	
8	16:59	17:18	179	435.1	100%	18	
9	17:22	17:40	354	418.3	100%	18	
10	17:44	17:53	179	414.3	100%	19	
11	18:00	18:04	354	501.3	100%	18	
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

**Base Station**

Point ID:	Location:	1601
Position Type:	Known/Elevation:	1531.5
Antenna Height:	Time on (UTC):	22:58
Latitude:	PPPP:	1.8
Longitude:	SPR:	1.8

**Albatross Station**

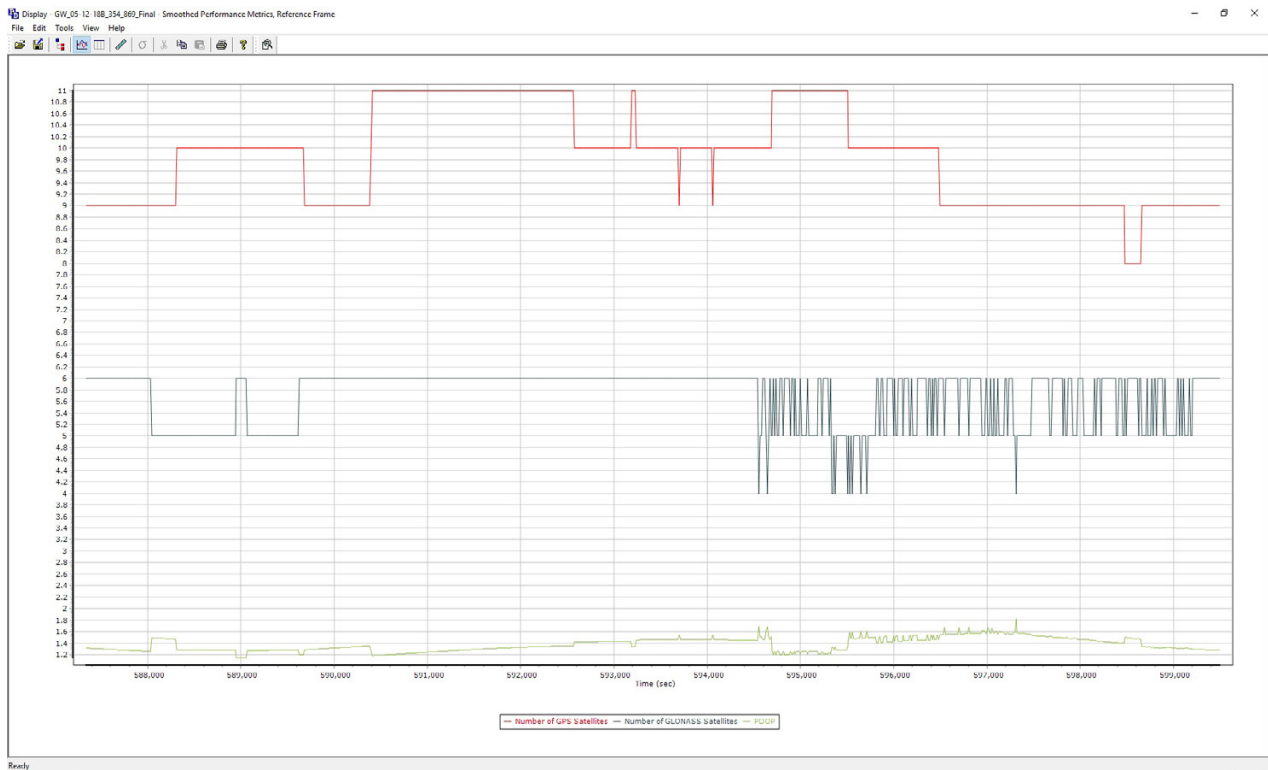
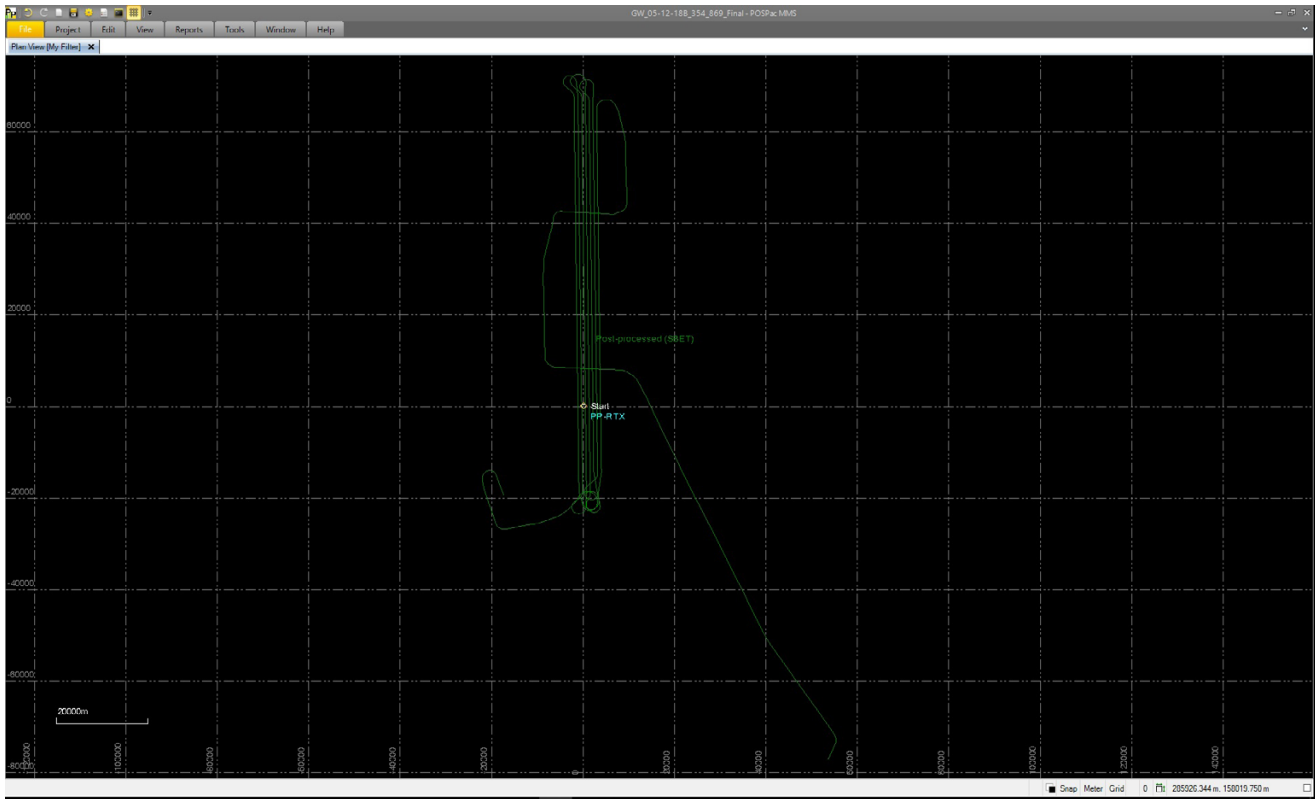
Time on (UTC):	14:01
Removes on (UTC):	14:04
Removes off (UTC):	14:11
Time off (UTC):	14:11

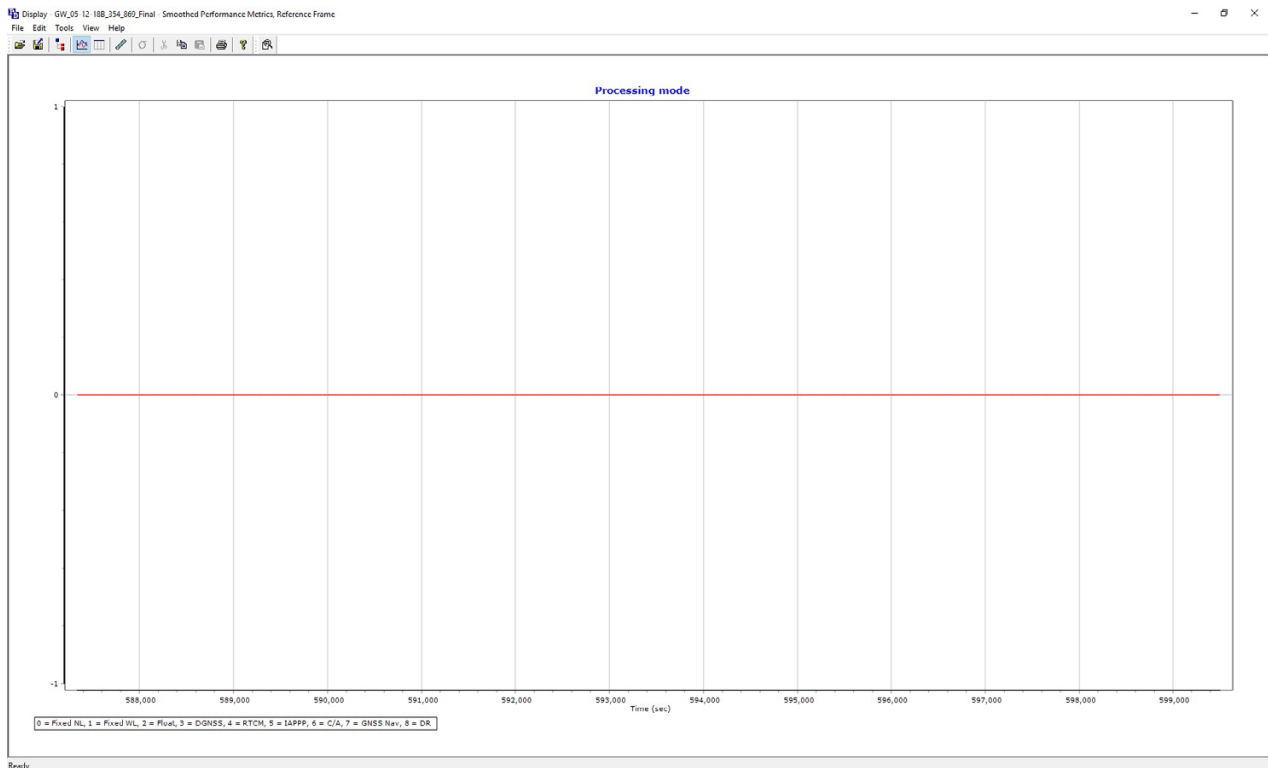
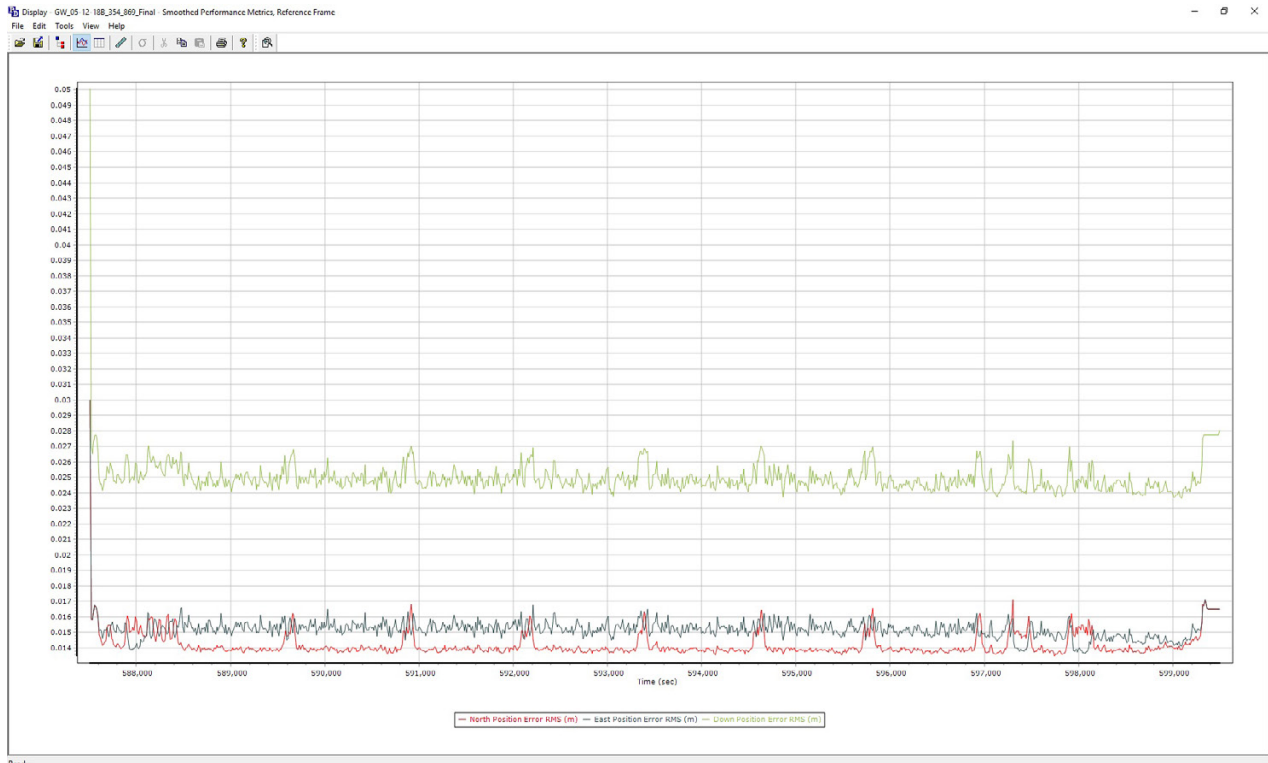
**Engine Start (ZHR, LCL):** 9:58  
**Engine Stop (ZHR, LCL):** 14:18  
**Total Flight Time:** 4:48  
**Departure Airport:** LCO  
**Arrival Airport:** BNL

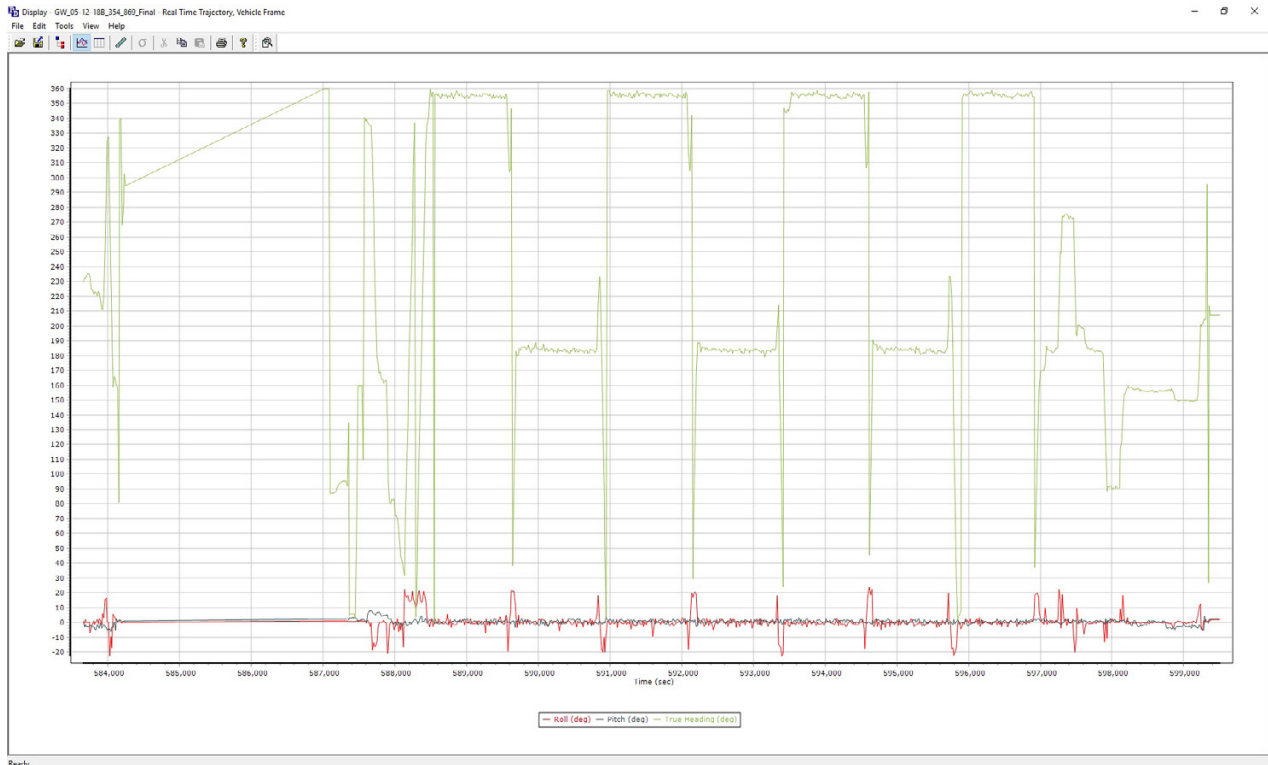
**Page:** 1 of 1

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20180512-B (N869,  
SN354)







# Flight Log

Flight Plan		Weather	
Beam Divergence	Narrow	Pressure (inHg)	30.05
Roll Comp.	On	Temperature (pod)	15.1 C
Multiplex	On / Off	Temperature (air)	8.5 C
Scan Frequency	1.44	Dew Point:	-5.6 C
Scan Rate/Avg	21	Turbulence	Slight
User PRF	250	Wind Speed & Gusts:	10+
Desired Range	1435	Visibility:	10+
Pod Grid Speed	1160		
Flight Notes:	Some takes are still frozen		

**KEYSTONE**  
**AERIAL SURVEYS**



**LiDAR FLIGHT REPORT - v2.11**

Date: 5/12/18  
 Project: 787  
 Aircraft: 869  
 Sensor: 854  
 Pilot: NJS  
 Operator: CM  
 HD: P

POS/AV File Name: 16PA787-81A-SENS54-018051A-5

Line #	GS Time	Pod Time	HDS	Range	POOP	SV	Flight Notes
1	19:08	19:41.6	359	5040	1.03	16	
2	19:10	20:27	174	4373	0.98	17	
3	20:31	20:37	359	4730	1.08	18	
4	20:31	20:38	174	4715	1.04	18	
5	20:52	21:04	359	5012	1.07	18	
6	21:12	21:38	174	5027	1.07	18	
7	21:31	21:48	359	5084	1.09	17	4.6 Lat (North)
8	21:55	21:57	275	4119	1.05	17	4.6 Lat (South)
9	22:05	22:08	275	5180	1.08	17	
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

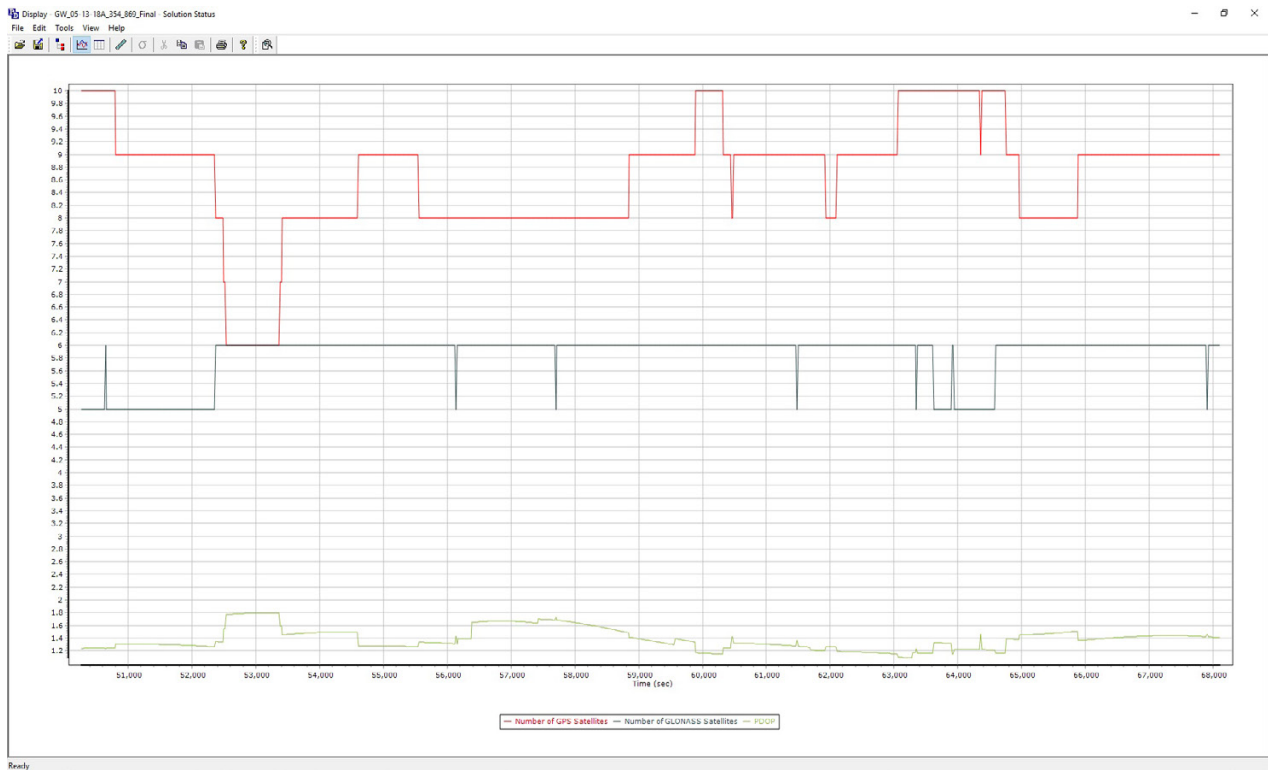
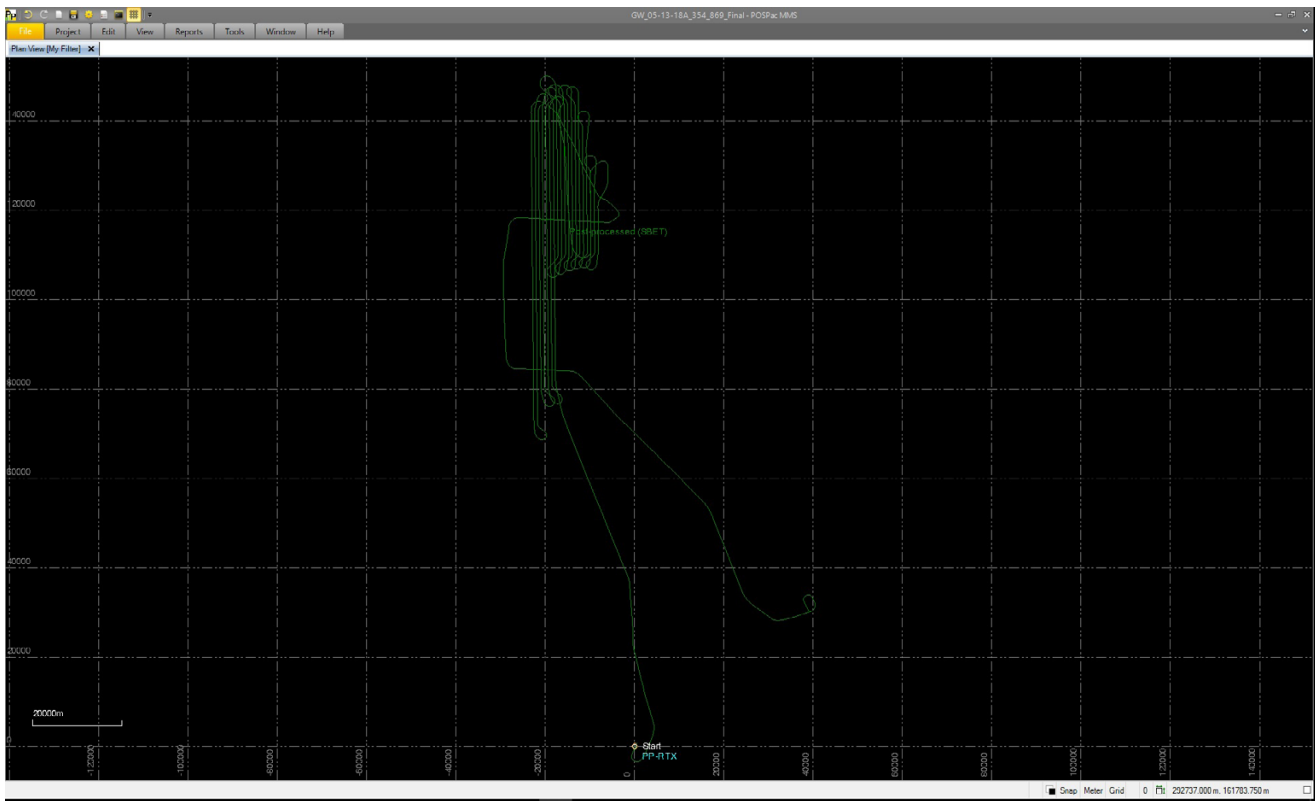
Engine Start (24HR LCL):	14:58	Departure Airport:	RMF
Engine Stop (24HR LCL):	18:35	Arrival Airport:	RMF
Total Flight Time:	Sensor Time (LCL) 15:08		

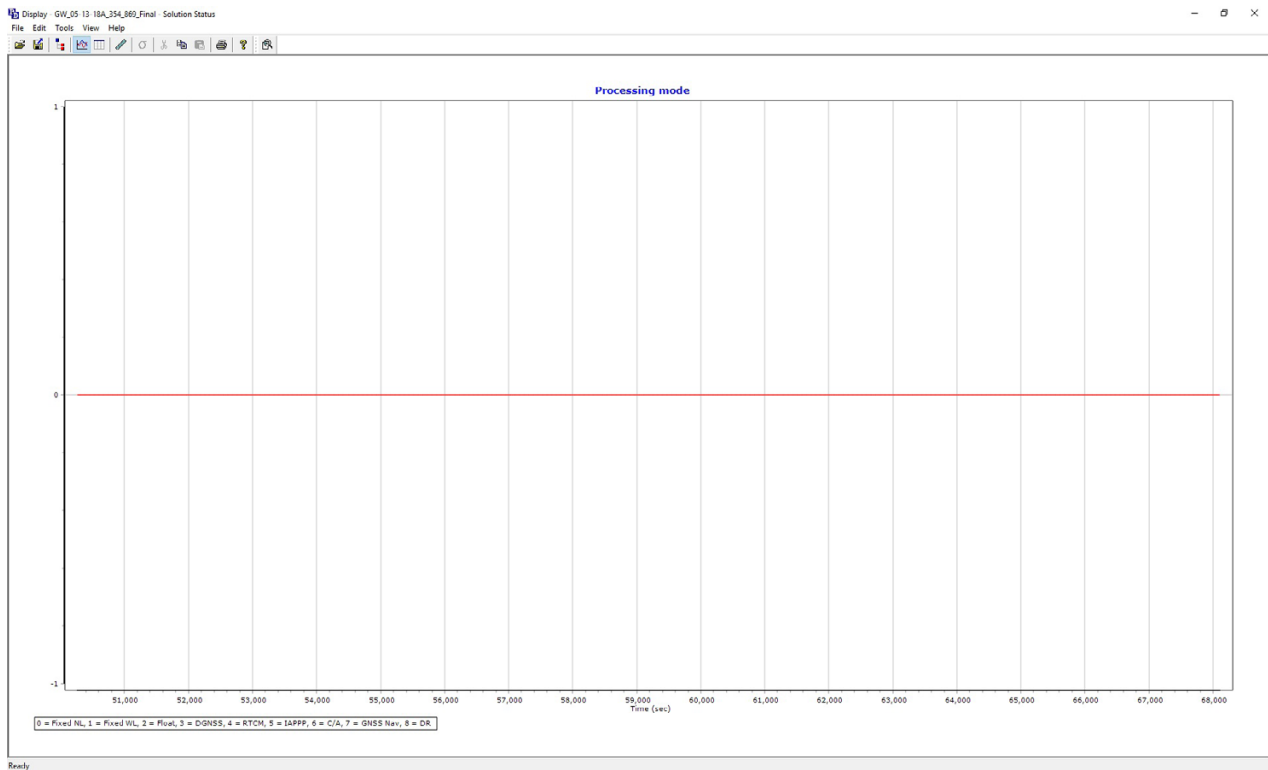
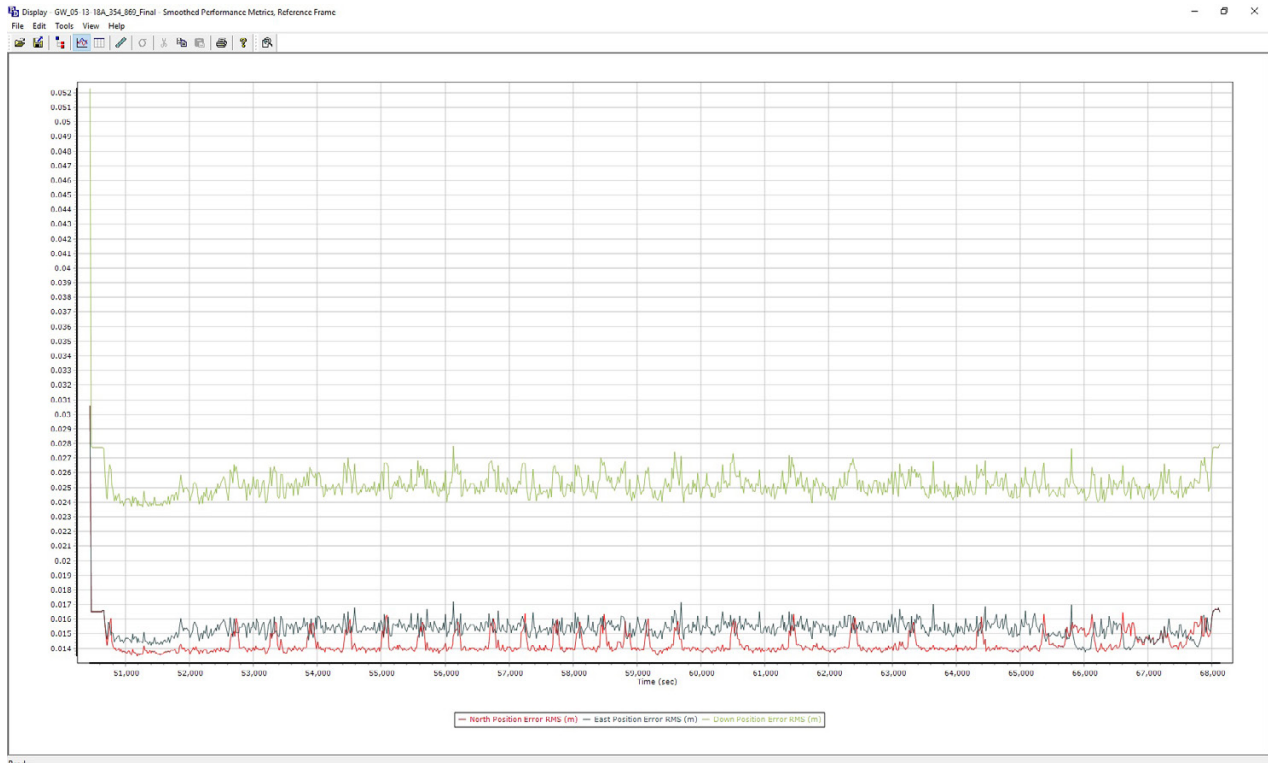
Time on (UTC)	19:04
Engine on (UTC)	19:00
Engine off (UTC)	22:00
Time off (UTC)	22:00

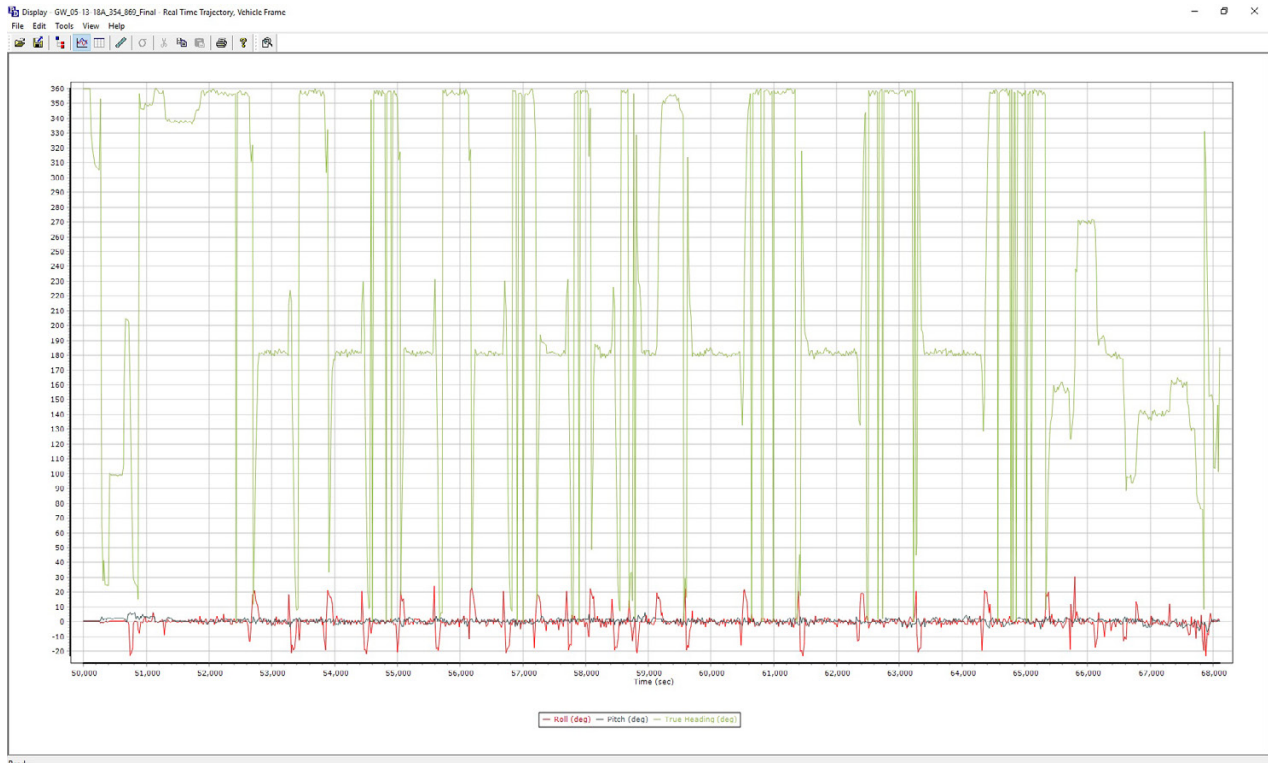
Point ID	Location	Lat	Lon
Position Type	Height (Meters)	15.4	15.4
Altitude Height	POOP	22.38	22.38
Latitude	POOP	1.5	1.5
Longitude	POOP	18	18



# 20180513-A (N869, SN354)







# Flight Log

**KEystone**  
**LIDAR FLIGHT REPORT - v2.11**

DATE: 5/13/18  
 Project: 787  
 Aircraft: 869  
 Sensor: 354

PILOT: NN  
 Operator: CM  
 HD: B

POSNAV filename: 1108\_787\_869\_Sensor354\_20180513\_10

**Flight Plan**      **Weather**

Beam Divergence: Narrow      Pressure (psi): 30.30  
 Roll Comp: On      Temperature (F): 15.0  
 Multibeam: On / Off      Temperature (F): 7.0  
 Scan Frequency: 1.0 Hz      Dew Point: 0.40  
 Scan Half Angle: 2.1      Turbulence: Light  
 Laser PPRF: 250      Wind Speed & Gust: 1.0 kts  
 Desired Range: 1.00      Visibility: Clear  
 Ping Ground Speed: 1.00

Flight Notes:

Line #	Start Time	End Time	HOG	Range	PROF	SU	Speed (Kts)	Flight Notes
1	14:24	14:27	359	4335	0.20	12	14.0	
2	14:27	14:27	359	4335	0.20	12	14.0	
3	14:28	14:57	359	4335	1.00	13	15.0	
4	14:58	14:57	359	4335	1.00	13	15.0	
5	15:08	15:07	359	4335	1.00	13	15.0	
6	15:08	15:10	359	4335	1.00	13	15.0	
7	15:19	15:20	359	4335	1.00	13	15.0	
8	15:38	15:38	359	4335	1.00	13	15.0	
9	15:37	15:44	359	4335	1.00	13	15.0	
10	15:47	15:53	359	4335	1.00	13	15.0	
11	15:54	16:00	359	4335	1.00	13	15.0	
12	16:03	16:07	359	4335	1.00	13	15.0	
13	16:10	16:17	359	4335	1.00	13	15.0	
14	16:16	16:17	359	4335	1.00	13	15.0	
15	16:28	16:28	359	4335	1.00	13	15.0	
16	16:35	16:47	359	4335	1.00	13	15.0	
17	17:05	17:08	359	4335	1.00	13	15.0	
18	17:21	17:34	359	4335	1.00	13	15.0	
19	17:36	17:51	359	4335	1.00	13	15.0	
20	17:54	18:08	359	4335	1.00	13	15.0	
21	18:17	18:24	359	4335	1.00	13	15.0	
22	18:30	18:30	359	4335	1.00	13	15.0	
23								
24								
25								

**Altimeter Station**

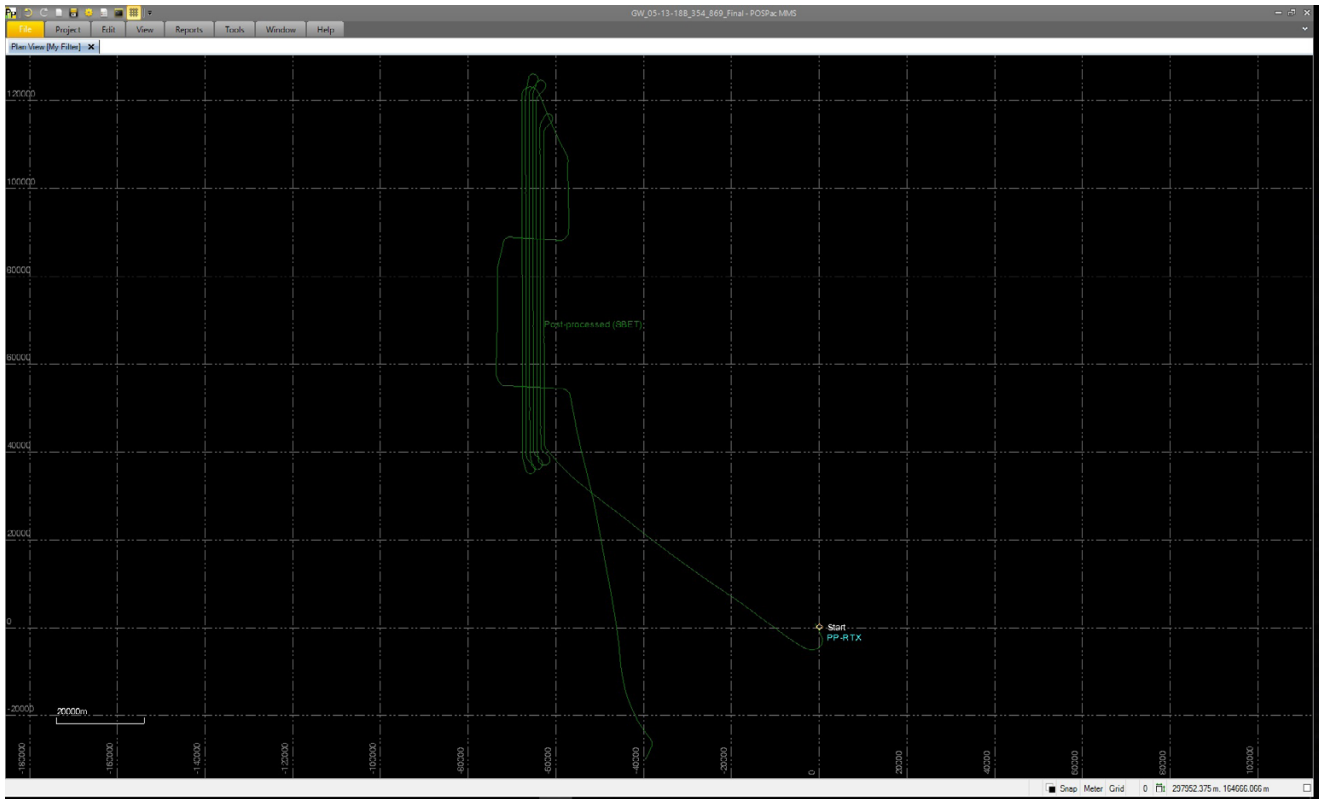
Time on UTC: 13:57  
 Mean Sea Level (MSL): 13:57  
 Time on UTC: 13:57

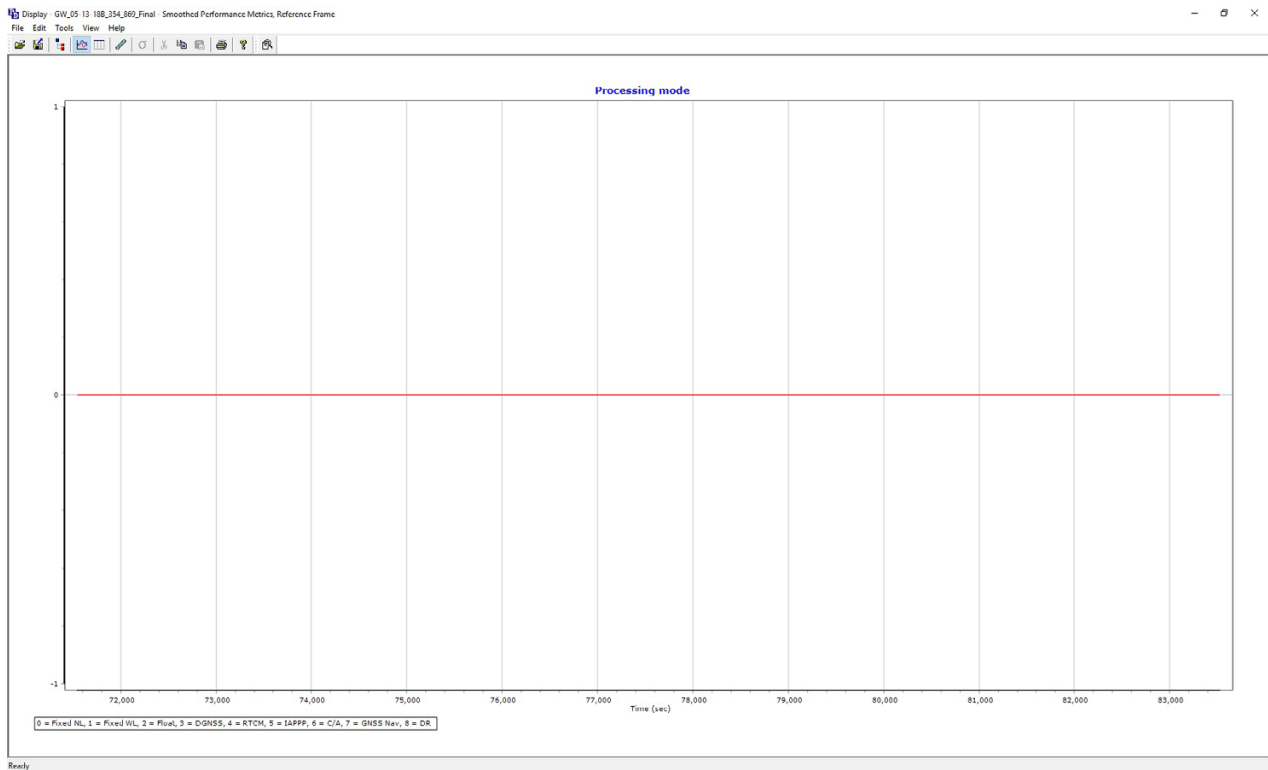
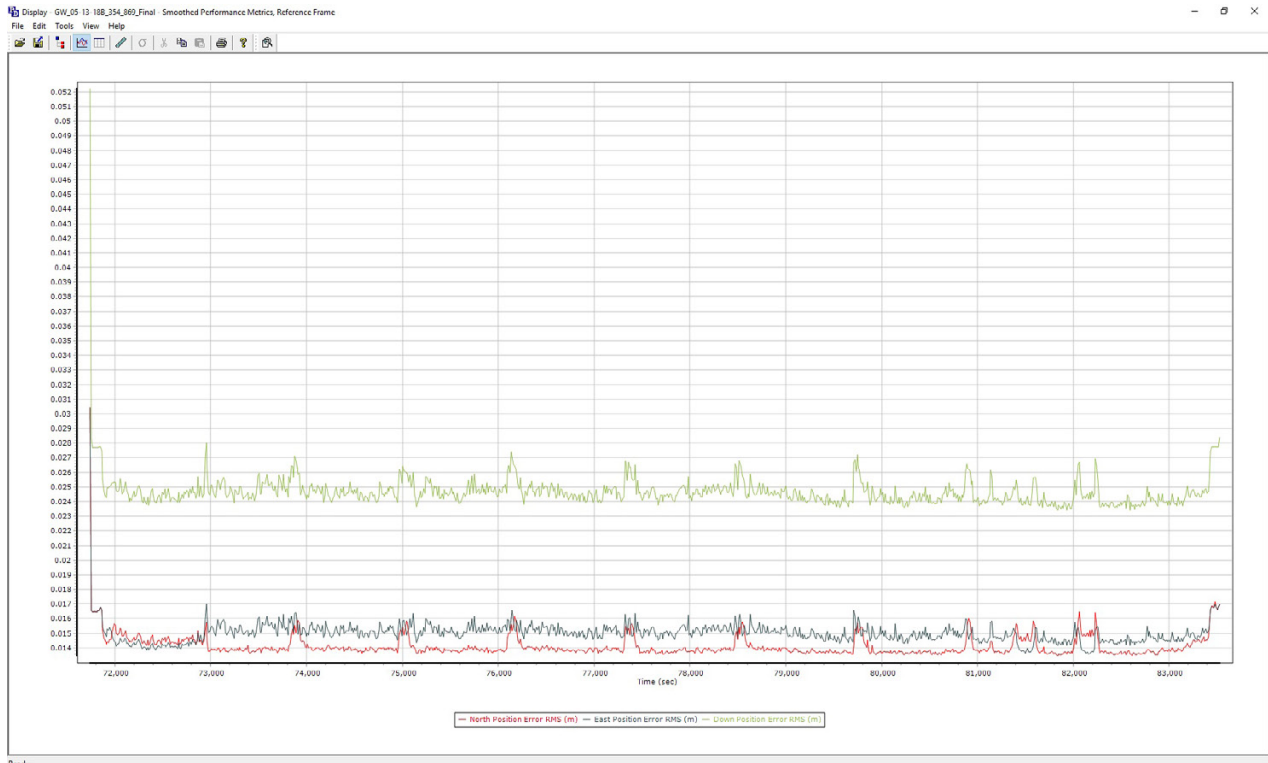
**Engine Start (24HR LCL):** 9:49      **Departure Airport:** LCL  
**Engine Stop (24HR LCL):** 14:57      **Arrival Airport:** LCL  
**Total Flight Time:** 5:08

10:04 10:05 305-351  
 2:44

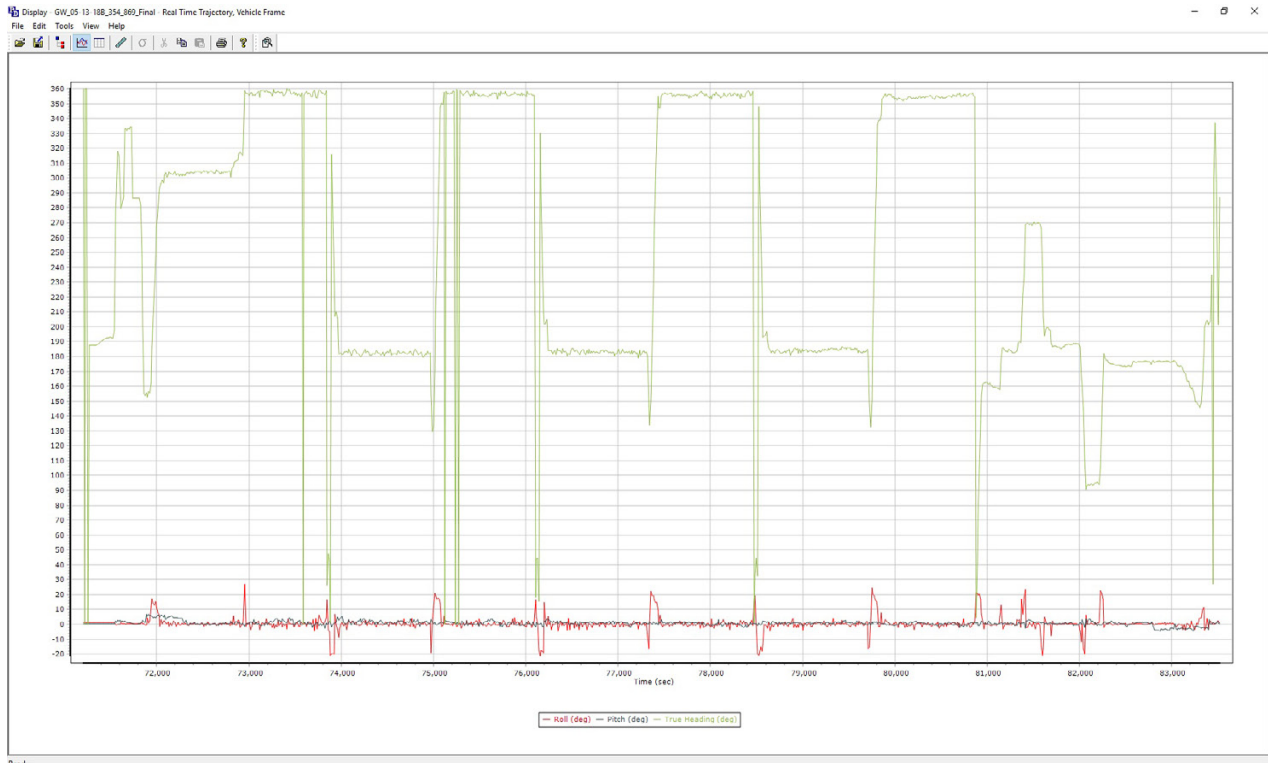
Does not have coverage - REDD  
 1.00 at 18:14 of line  
 the line (North)  
 the line (South)

# 20180513-B (N869, SN354)









# Flight Log

**REXSTONE**  
KENSINGTON

**LIDAR FLIGHT REPORT - v2.11**

Date: 5/13/18 Pilot: MM  
 Project: 787 Operator: MM  
 Aircraft: 869 HD: B  
 Sensor: 354

POS/AVI filename: 1109A787\_869\_SEN354\_00180513-7

**Weather**

Pressure (inHg): 30.10  
 Temperature (deg): 54.0  
 Dew Point: 51.6  
 Turbulence: SLIGHT  
 Wind Speed & Gusts: 5 Kts  
 Visibility: Clear

**Flight Plan**

Beam Divergence: 0.4  
 Roll Comp: On  
 Multipulse: Off  
 Scan Frequency: 81  
 Scan Half Angle: 3.0  
 Laser PPR: 1435  
 Desired Range: 160  
 Ping End Speed: 160

**Weather**

Pressure (inHg): 30.10  
 Temperature (deg): 54.0  
 Dew Point: 51.6  
 Turbulence: SLIGHT  
 Wind Speed & Gusts: 5 Kts  
 Visibility: Clear

Line #	Start Time	End Time	HOS	Range	POOP	SV	Speed (kt)	Flight Notes
1	20:10	20:30	524	4412	1003	17	161	
2	20:32	20:49	524	5150	1257	17	160	
3	20:52	21:08	354	2707	157	17	160	
4	21:10	21:28	179	3824	108	17	160	
5	21:31	21:47	354	5502	125	17	160	
6	21:50	22:07	179	5274	125	17	160	
7	22:11	22:27	354	5616	125	17	160	
8	22:31	22:46	273	5010	125	17	160	the line (North)
9	22:49	22:59	98	4505	125	17	160	the line (South)
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

**Base Station**

Point ID: 600 Location: 600  
 Station Type: 2 Time On (UTC): 13:34  
 Antenna Height: 2 Meters: 23.18  
 Latitude: POOP POOP: 1.4  
 Longitude: SV SV: 12

**Altimeter Station**

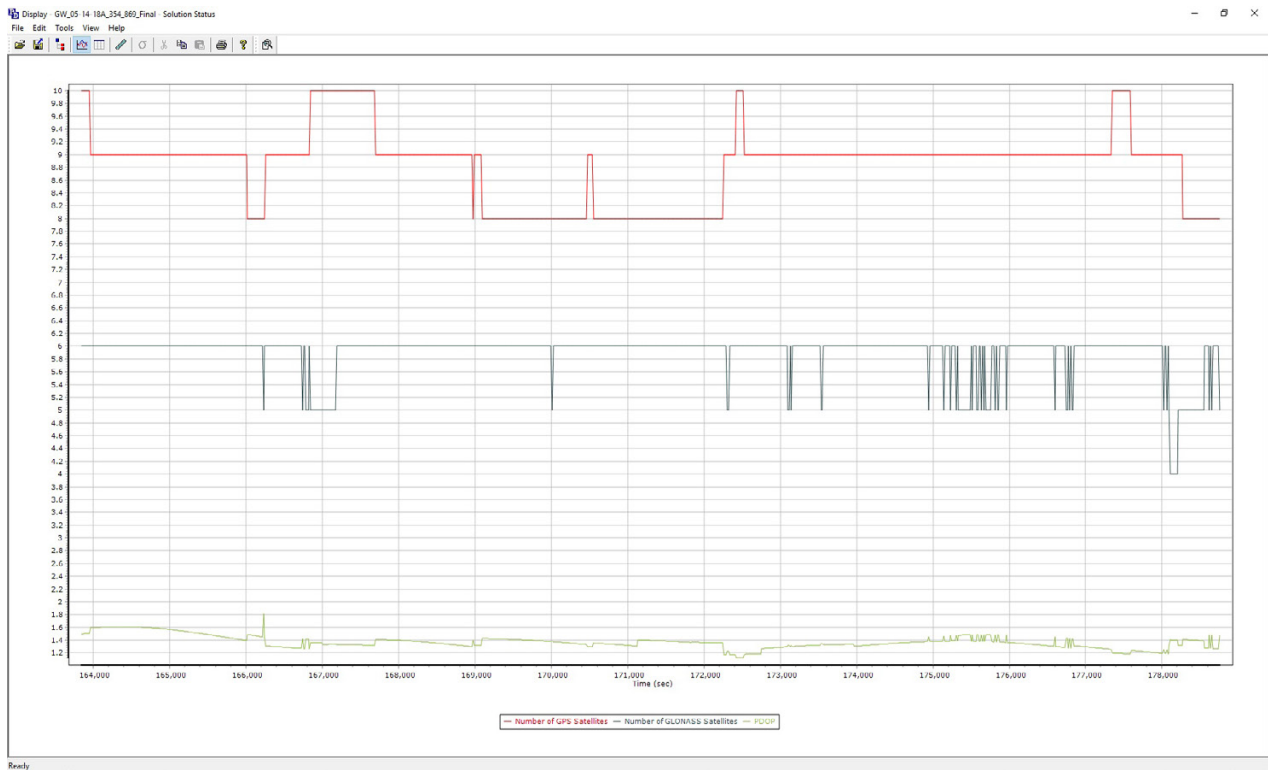
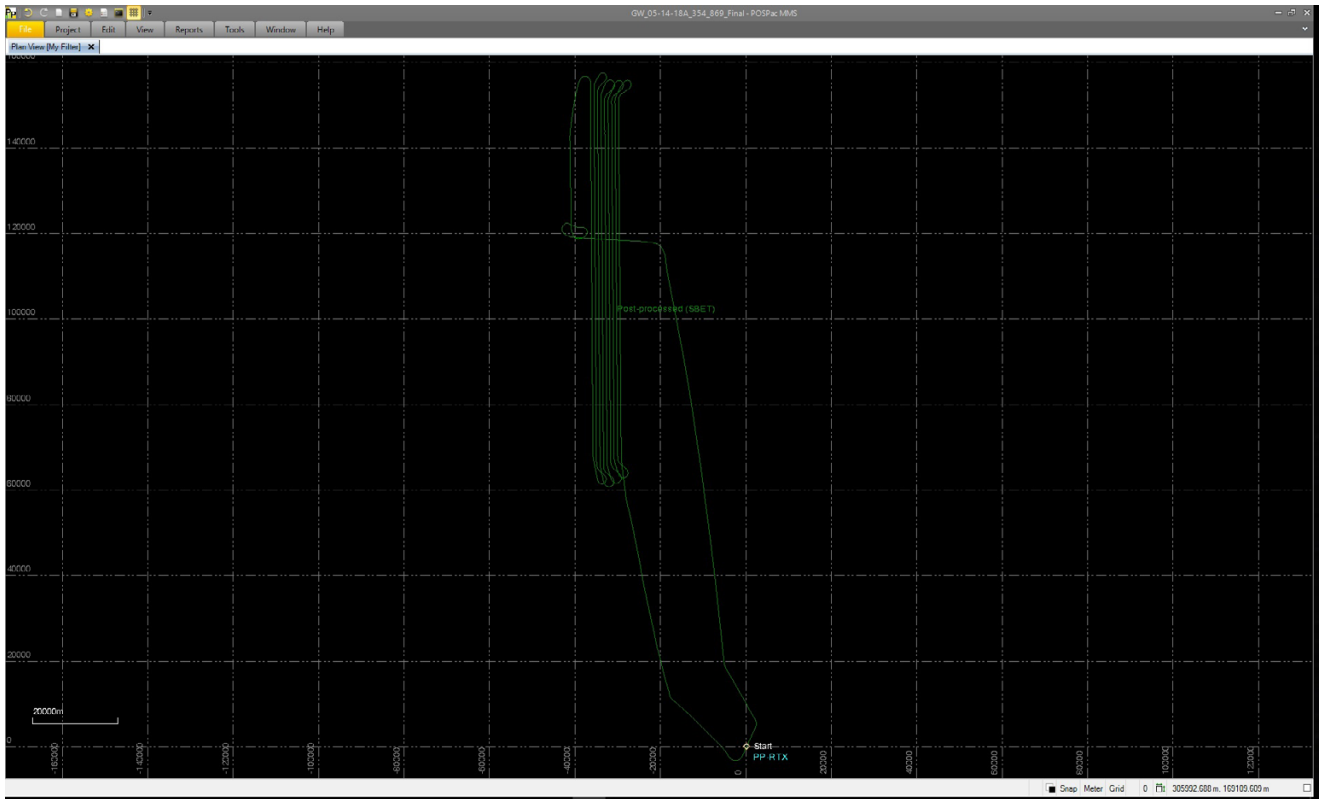
Time on (UTC): 10:14  
 Altimeter on (UTC): 14:51  
 Altimeter off (UTC): 22:11  
 Time off (UTC): 23:11

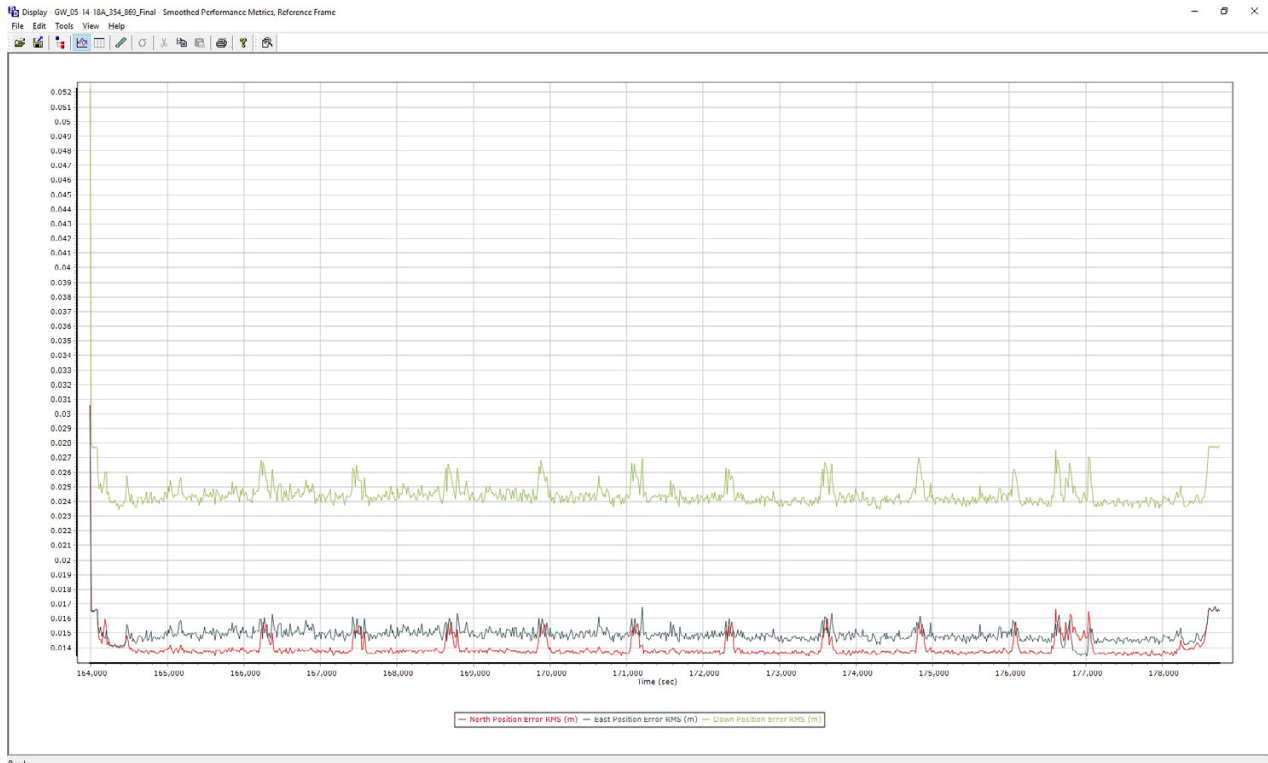
**Engine Start (BAR CL)**: 5:14 Departure Airport: AUG  
**Engine Stop (BAR CL)**: 9:14 Arrival Airport: EGW  
**Total Flight Time**: 3:53

Sensor time (UTC): 18:50 2:57 18:50  
352-310

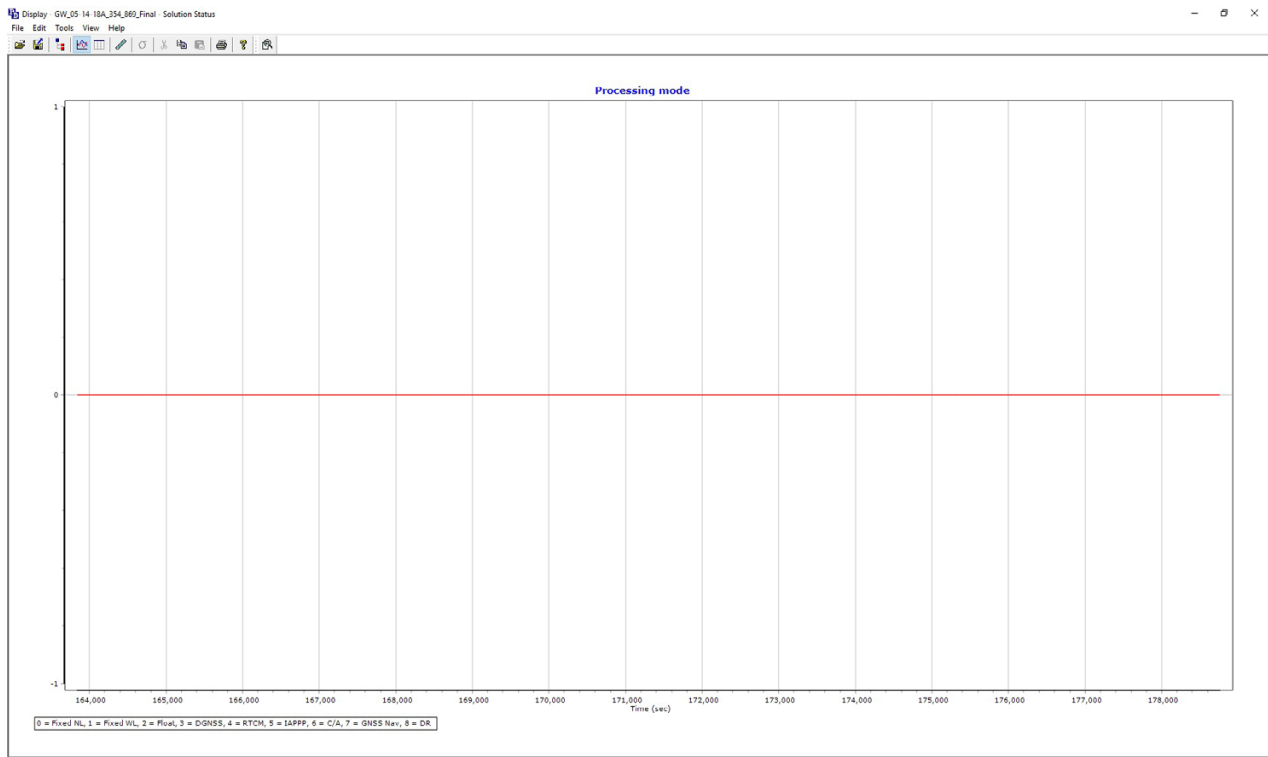
Page: 1 of 1

# 20180514-A (N869, SN354)

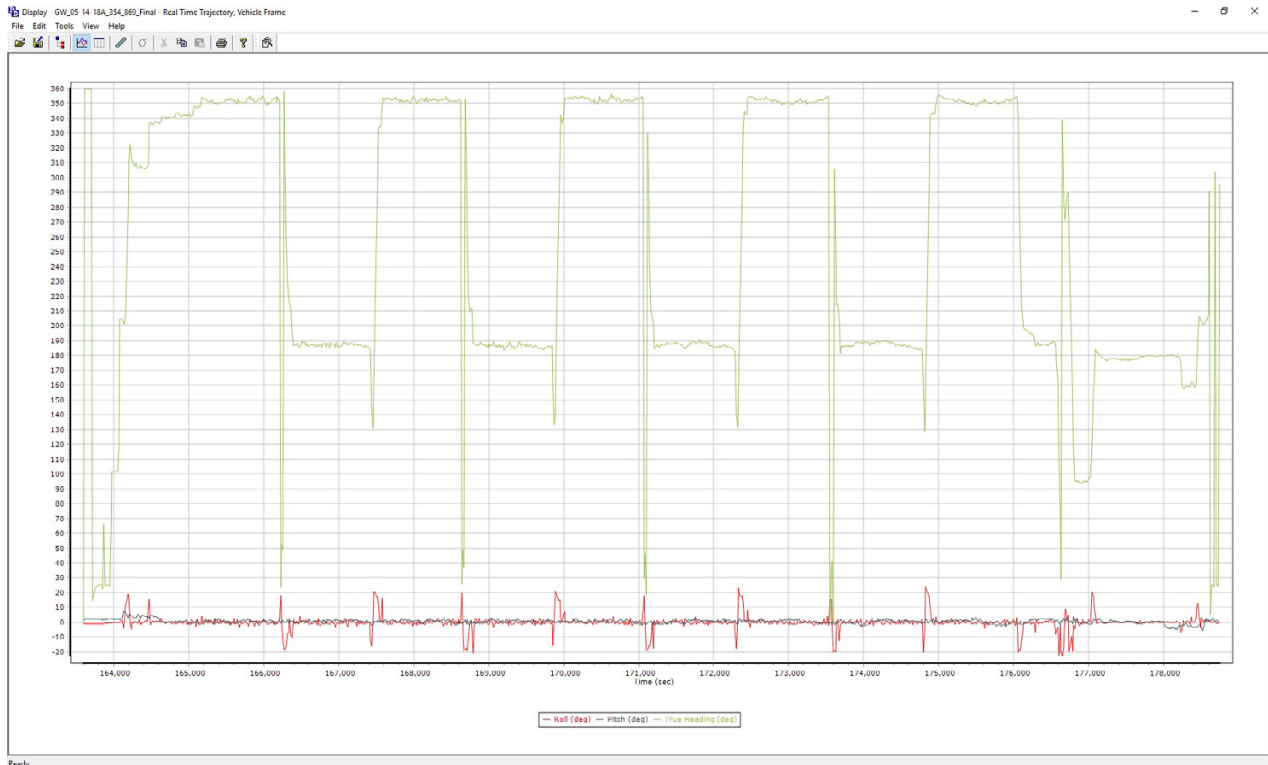




Ready



Ready



# Flight Log

**KEystone**  
LIDAR FLIGHT REPORT - v2.11

Date: 5/14/18 Pilot: NN  
 Project: 187 Operator: CN  
 Aircraft: SVA Sensor: A  
 HD: A

POS/AV filename: 108787-809-SEN354-30180514-8

**Flight Plan** Narrow  
 On: On  
 (On/Off) 0/1  
 Multipulse 64  
 Scan Frequency 31  
 Scan Half Angle 350  
 Laser PRF 1435  
 Desired Range 100  
 Pnd Grnd Speed 100

**Weather**  
 Pressure (hPa): 28.4  
 Temperature (hPa): 17.0  
 Temperature (air): 11.0  
 Dew Point: 11.0  
 Turbulence: Slight  
 Wind Speed & Gusts: 10.4  
 Visibility: 10.4

Flight Notes: Large Lakes  
 Hour 22/29 see next

Line #	Start Time	End Time	HOS	Range	POOP	SV	Speed (ft/s)	Flight Notes
1	21:59	22:10	559	4980	107	18	150	
2	22:13	22:30	179	4018	93	19	157	The lead-in part is not fully covered
3	22:33	22:45	559	4874	101	17	159	because of a lake at that SW-then end.
4	22:53	23:01	179	4118	93	18	157	
5	23:03	23:21	559	4102	100	18	157	
6	23:23	23:51	179	5081	95	18	157	
7	23:54	00:12	559	5084	100	18	157	
8	00:14	00:53	179	5078	100	17	157	
9	00:56	00:54	559	5216	112	17	157	Tie line (North)
10	01:01	01:01	93	4007	103	17	157	
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

**Base Station**

Point ID	Location	Time On (UTC)
Point Type	Station	Time Off (UTC)
Antenna Height	POOP	Time Off (UTC)
Antenna	SV	SV

**Airborne Station**

Time On (UTC)	21:59
Estimated On (UTC)	21:59
Estimated Off (UTC)	22:59
Time Off (UTC)	22:59

**Engine Start (ZARR LCL):** 17:22  
**Engine Stop (ZARR LCL):** 4:33  
**Total Flight Time:** 4:33

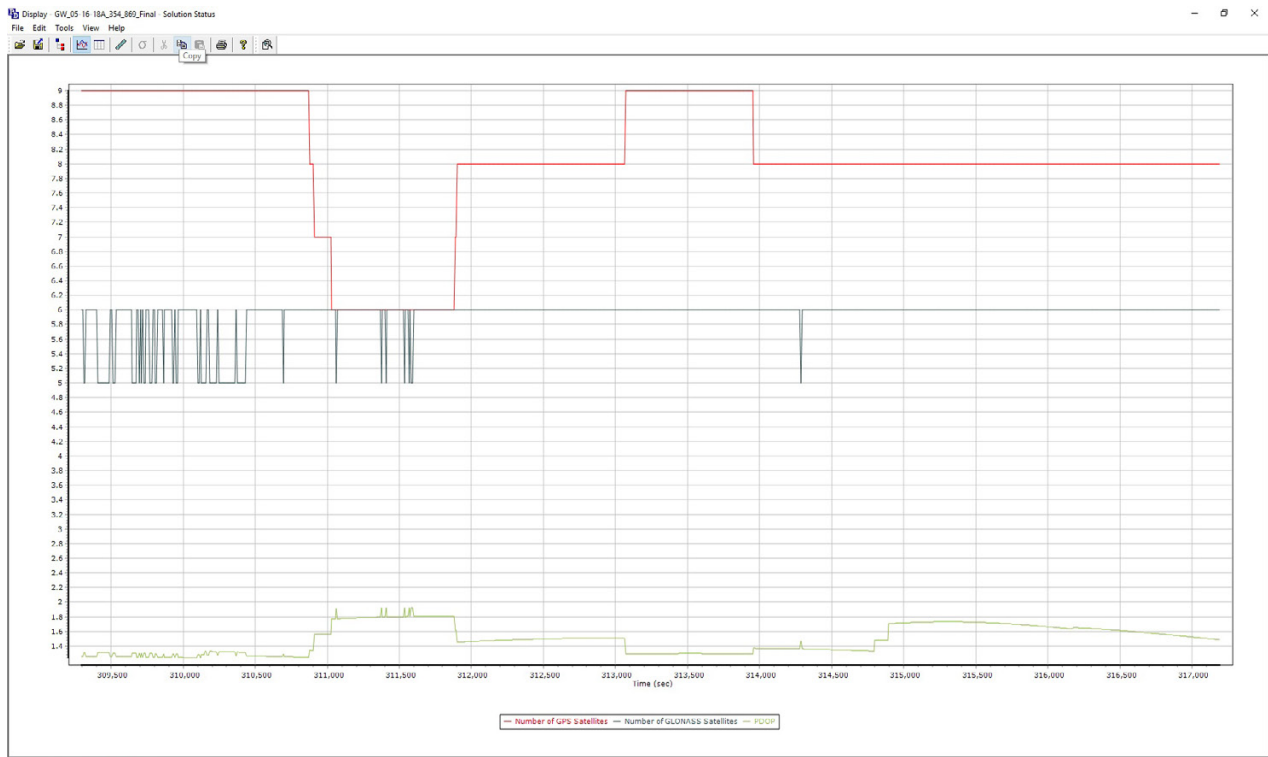
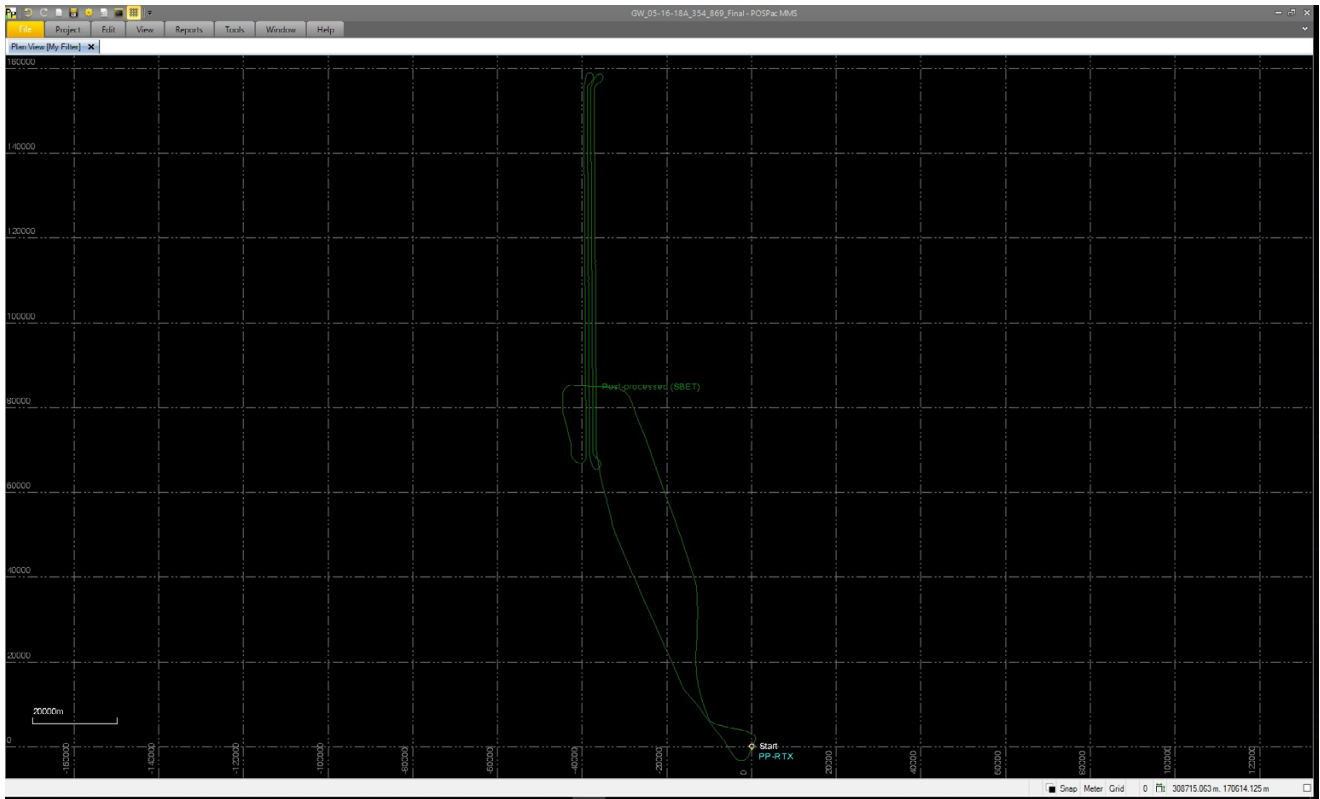
Sensor time (LCL) 18:05  
 5:53 3:27 3:11-3:13  
 9:09

**Departure Airport:** LEW  
**Arrival Airport:** LEW

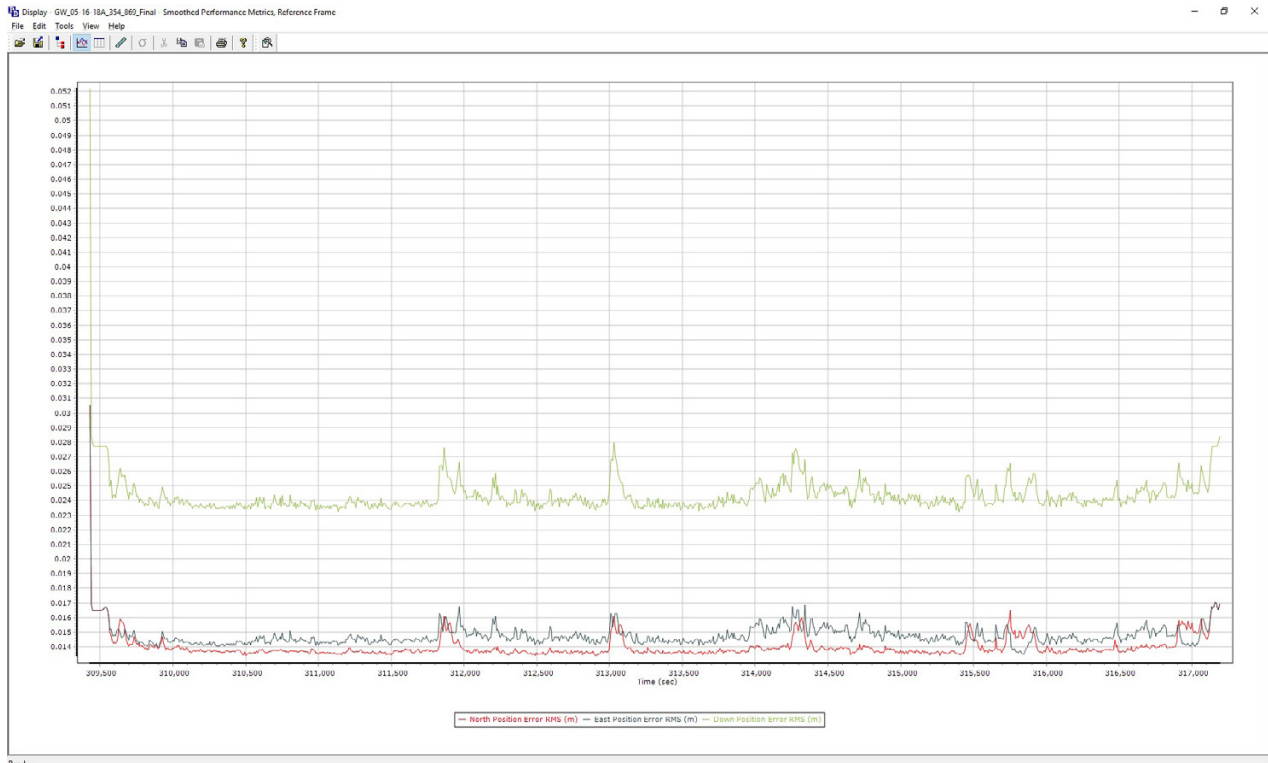
Page: 1 of 1

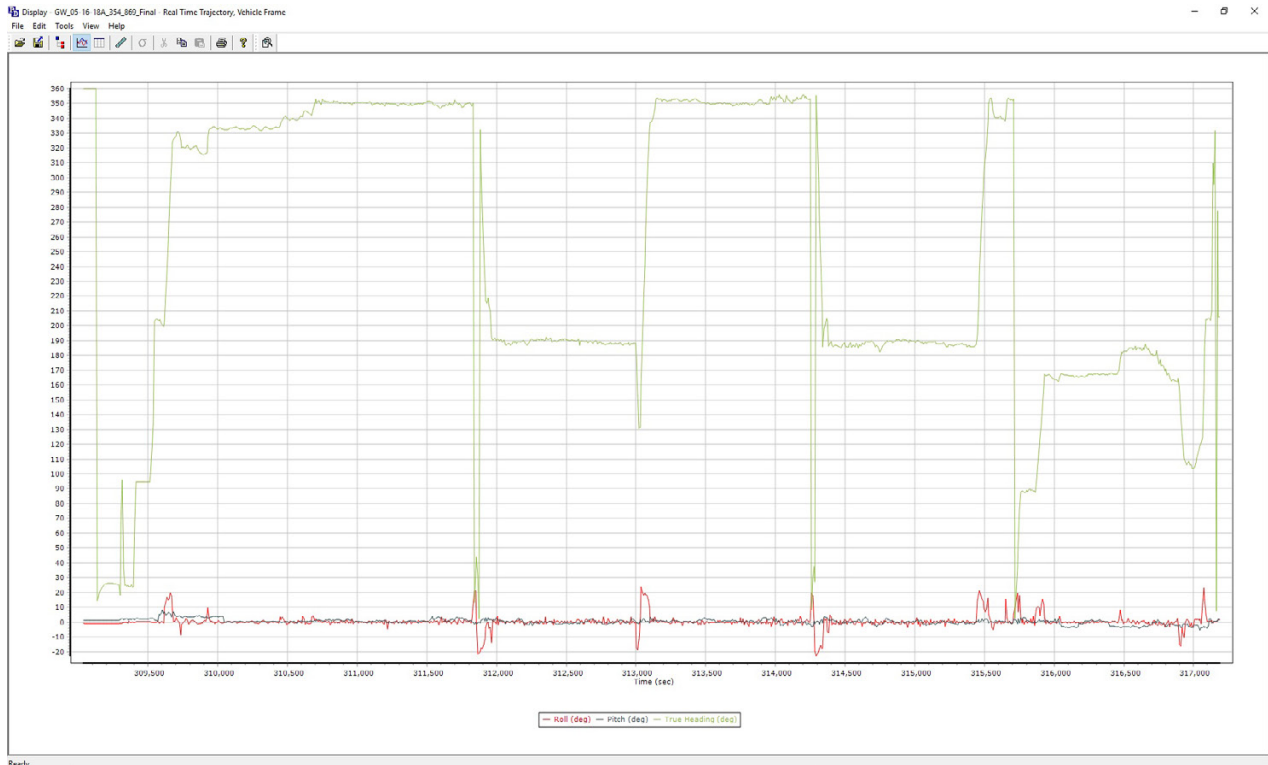
# 20180516-A (N869, SN354)





Copy the selection and put it on the Clipboard





# Flight Log

**REXSTONE**  
LIDAR FLIGHT REPORT - v2.11

Date: 8/16/18 Pilot: NN  
 Project: 787 Operator: AM  
 Aircraft: 289 HD: A  
 Sensor: 354

POS/AV Filename: 10P787-86A-SEN354-101805169

Flight Plan		Weather	
Beam Divergence	Narrow	Pressure (psf)	30.34
Roll Comp.	On	Temperature (psf)	11.6
Multipulse	On / Off	Temperature (air)	8.6
Scan Frequency	104	Dew Point	01.6
Scan Rate Angle	3	Turbulence	Slight
User PPR	250	Wind Speed & Gusts	10-14kts
Desired Range	1435	Visibility	10+
Min Grid Speed	140		

Line #	Start Time	End Time	HOG	Range	PDOP	SV	Speed (kts)	Flight Notes
1	14:18	14:37	559	5070	1.16	14	140	
2	14:39	14:56	179	5083	1.54	15	141	
3	14:59	15:17	353	5041	1.07	18	144	
4	15:21	15:37	179	5070	1.18	17	157	
5	15:43	15:44	98	4388	1.13	110	163	Final (Suva)
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Base Station				Airborne Station			
Point ID	Location	Time On (UTC)	SVs	Time On (UTC)	SVs	Time Off (UTC)	SVs
Base Station	Base Station	13:31	13	13:53	15	14:18	15
Point Type	Accuracy	Method	PDOP	Method	PDOP	Method	PDOP
Base Station	2	A	3.0	A	3.0	A	3.0
Latitude	Longitude	Altitude	Height	Latitude	Longitude	Altitude	Height

Engine Start (24HR LCD)		Engine Stop (24HR LCD)		Total Flight Time	
Engine Start	9:46	Engine Stop	13:09	Total Flight Time	3:33
Departure Airport	LEW	Arrival Airport	LEW		

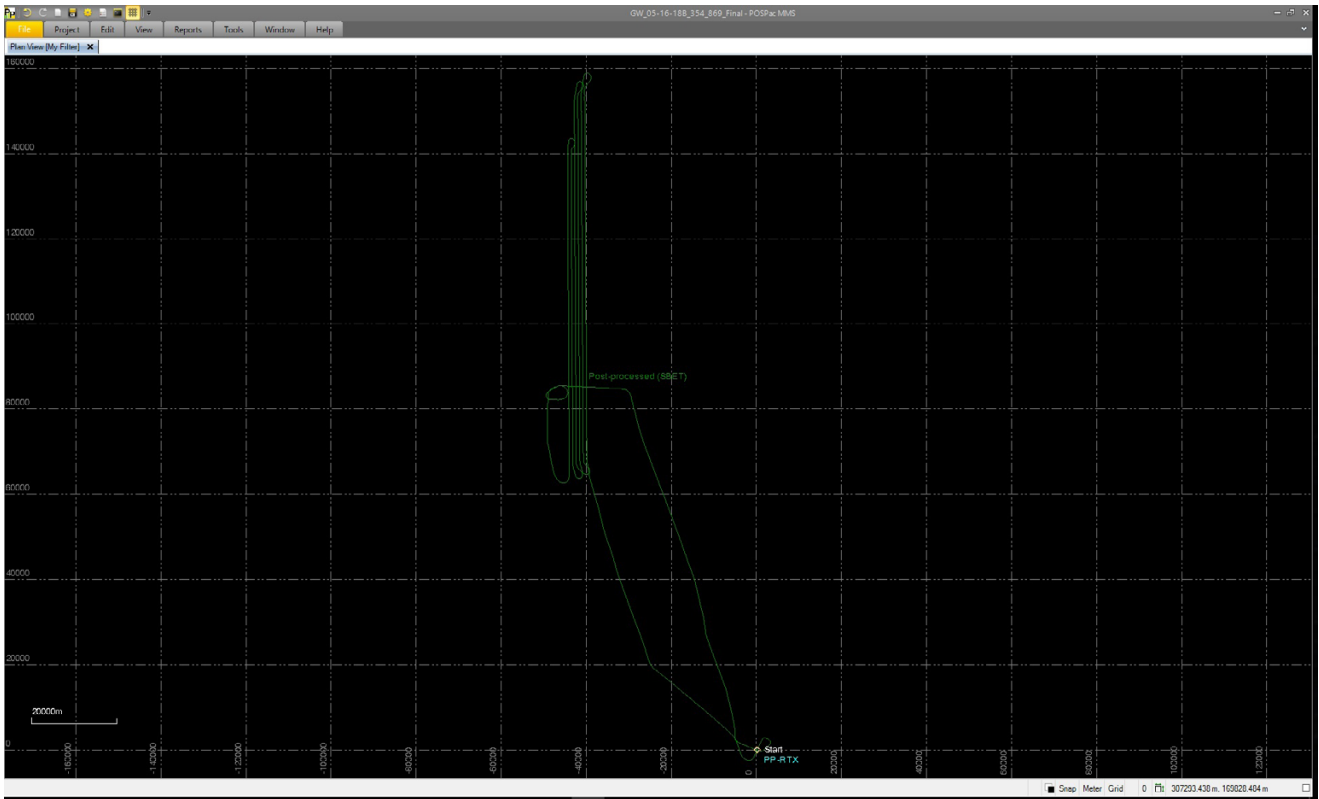
  

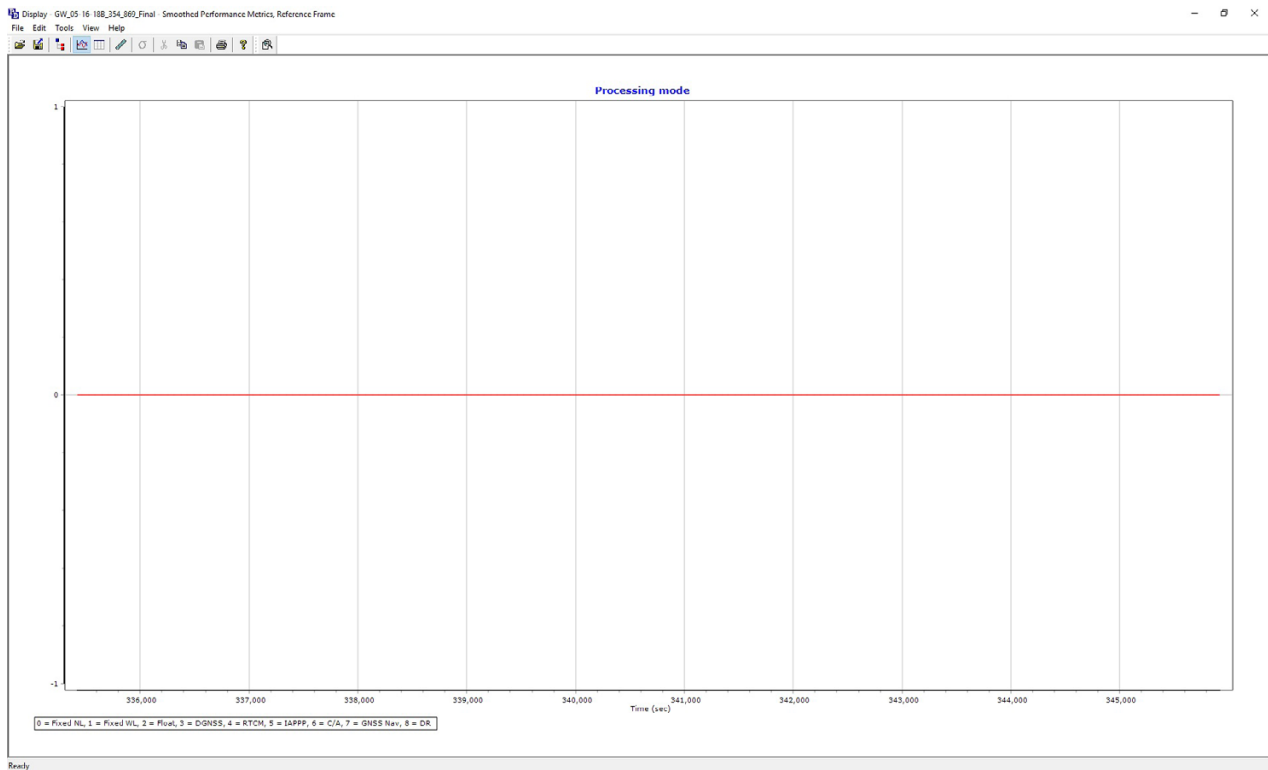
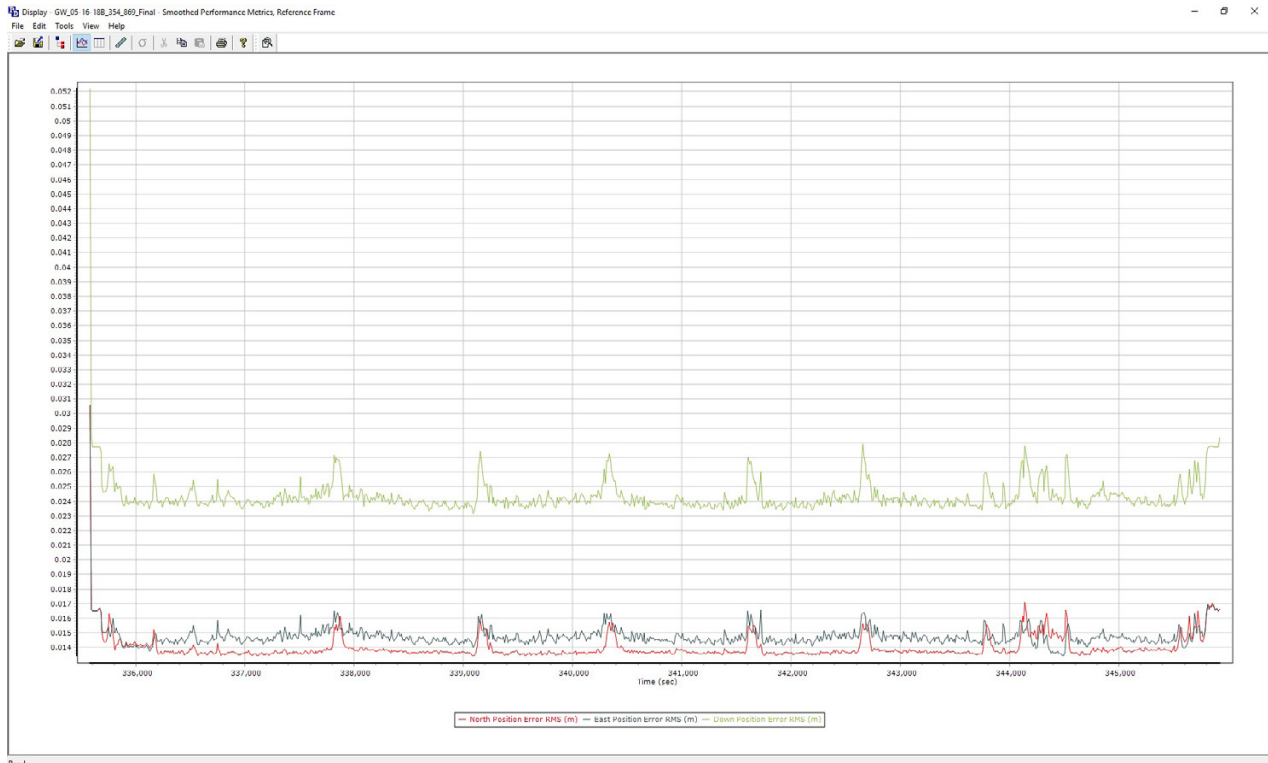
SESS: 10:18 14:13 394-404  
11:44

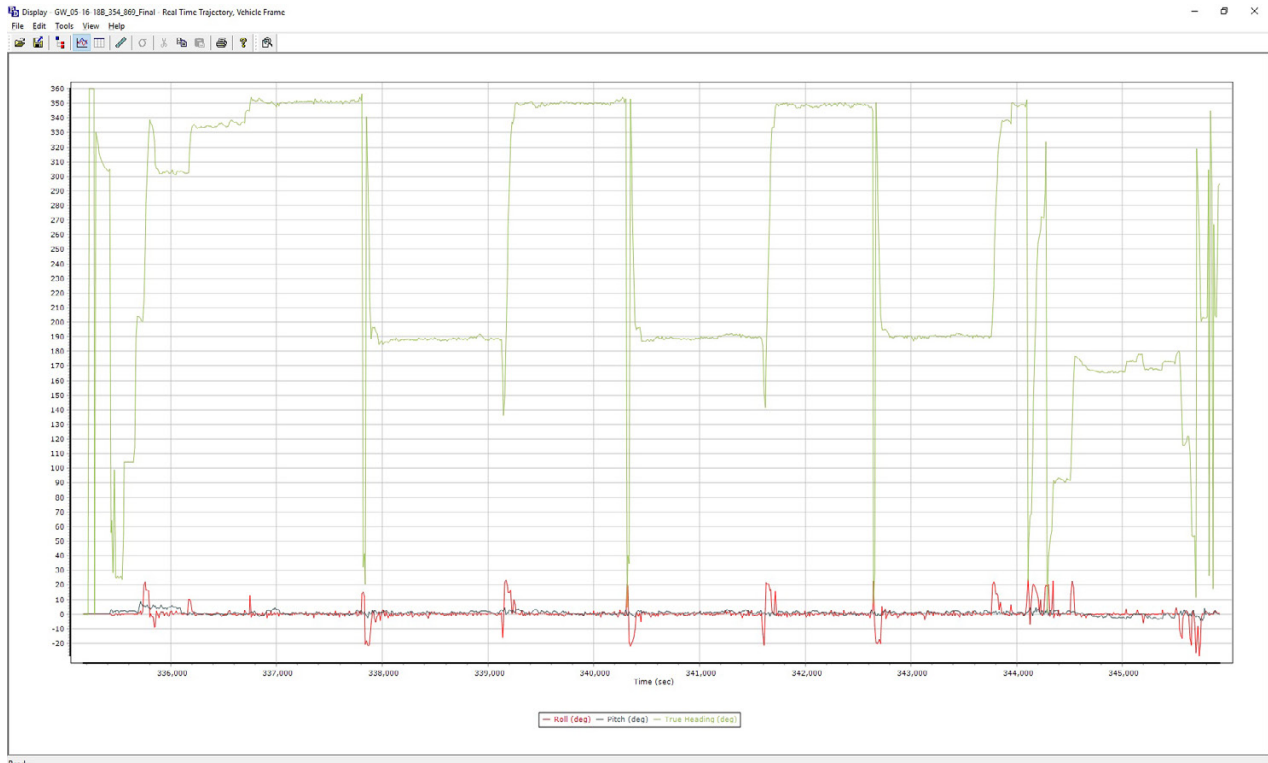
Page: 1 of 1

Scanned by CamScanner

# 20180516-B (N869, SN354)









# Flight Log

**KEYSTONE SURVEYS**

**LIDAR FLIGHT REPORT - v2.11**

Date: 5/10/18 Pilot: NW

Project: 787 Operator: CM

Aircraft: 869 Sensor: 354 HD: A

POS/AV Filename: \\FA 787-508\_SENS54-2018.05.11\_10

Flight Plan		Weather	
Bay Distance	Narrow	Pressure (psi)	29.12
Roll Comp.	On	Temperature (F)	51.0
Multipulse	Ch / Off	Temperature (C)	10.5
Scan Frequency	1.4	Flow Point	DLG
Scan Half Angle	3.1	Turbulence	Light
User PPR	3.0	Wind Speed & Gust	4.5 / 4.2
Desired Range	14.85	Visibility	1.0
Prod Grid Speed	11.0		

Line #	Start Time	End Time	HOG	Range	POOP	SV	Speed (Kts)	Flight Notes
1	21:50	21:50	354	5400	1.07	17	13.4	
2	21:52	22:12	179	6000	1.00	17	13.4	
3	22:14	22:51	259	4000	1.04	17	13.4	
4	22:53	23:11	359	6400	1.05	17	13.4	
5	23:13	23:29	179	3440	1.04	18	13.7	
6	23:31	23:40	92	4570	0.94	18	13.7	
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Base Station		Altimeter Station	
Point ID	Location	Time On (UTC)	Time On (UTC)
Position Type	Known (Elevation)	Estimated On (UTC)	Estimated On (UTC)
Antenna Height	Meters	Time Off (UTC)	Time Off (UTC)
Latitude	POOP		
Longitude	SVs		

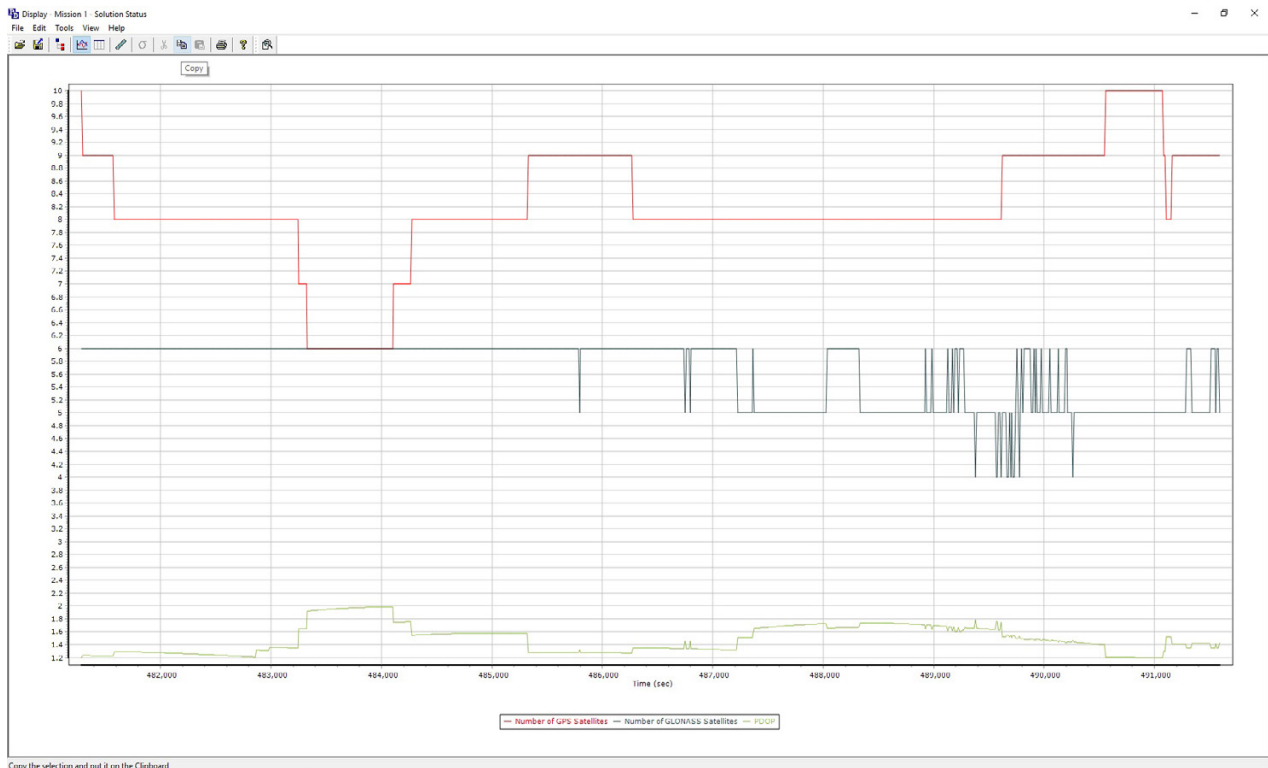
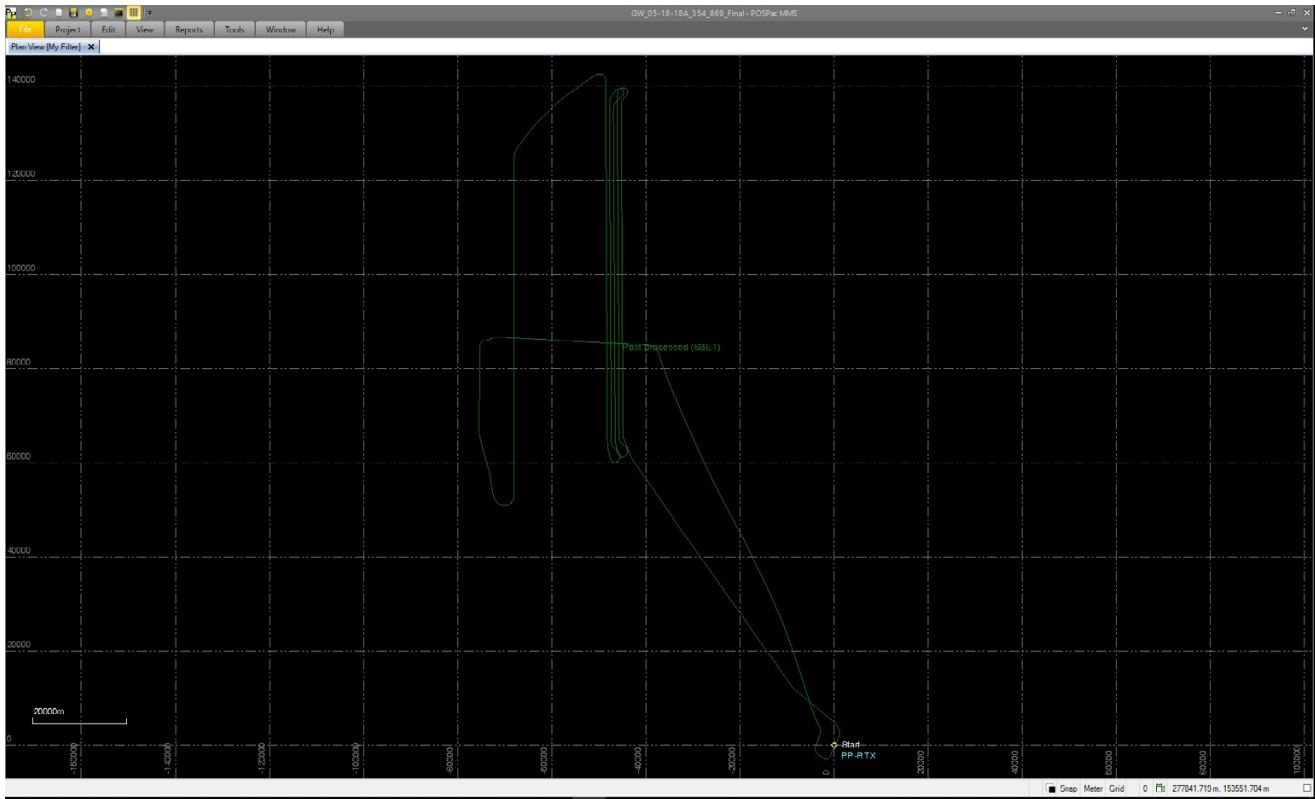
Engine Start (ZHR/CC)	17:02	Departure Airport	120
Engine Stop (ZHR/CC)	20:17	Arrival Airport	120
Total Flight Time	3:15		

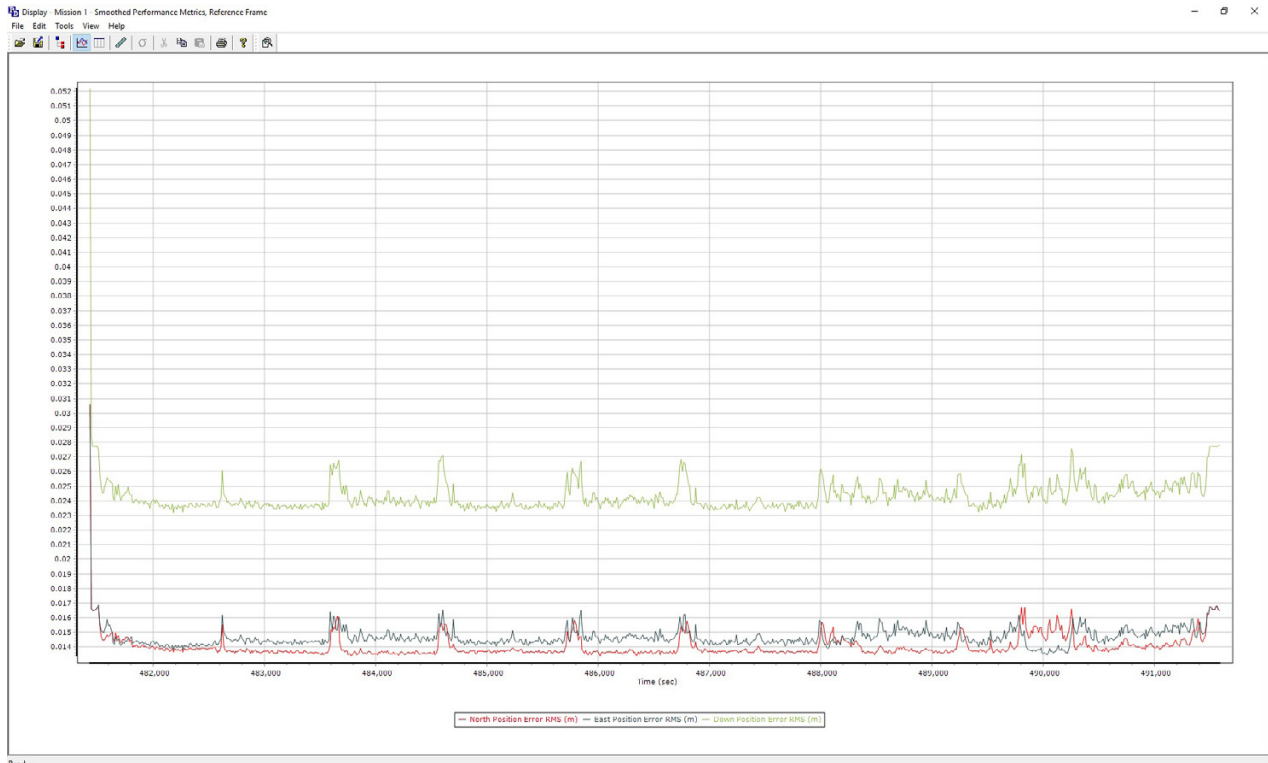
Start time (est) 17:52  
End time (est) 21:13  
Total time 3:21

401-403

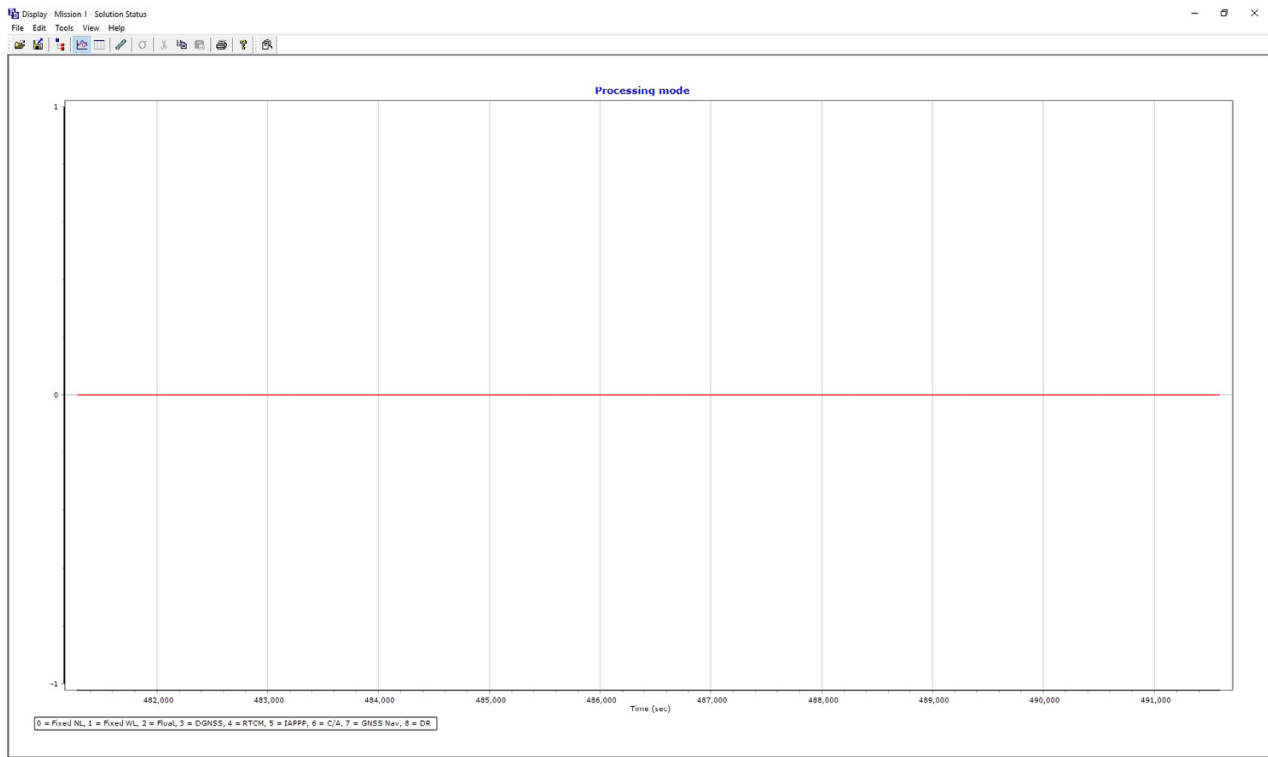
Page: 1 of 1

# 20180518-A (N869, SN354)

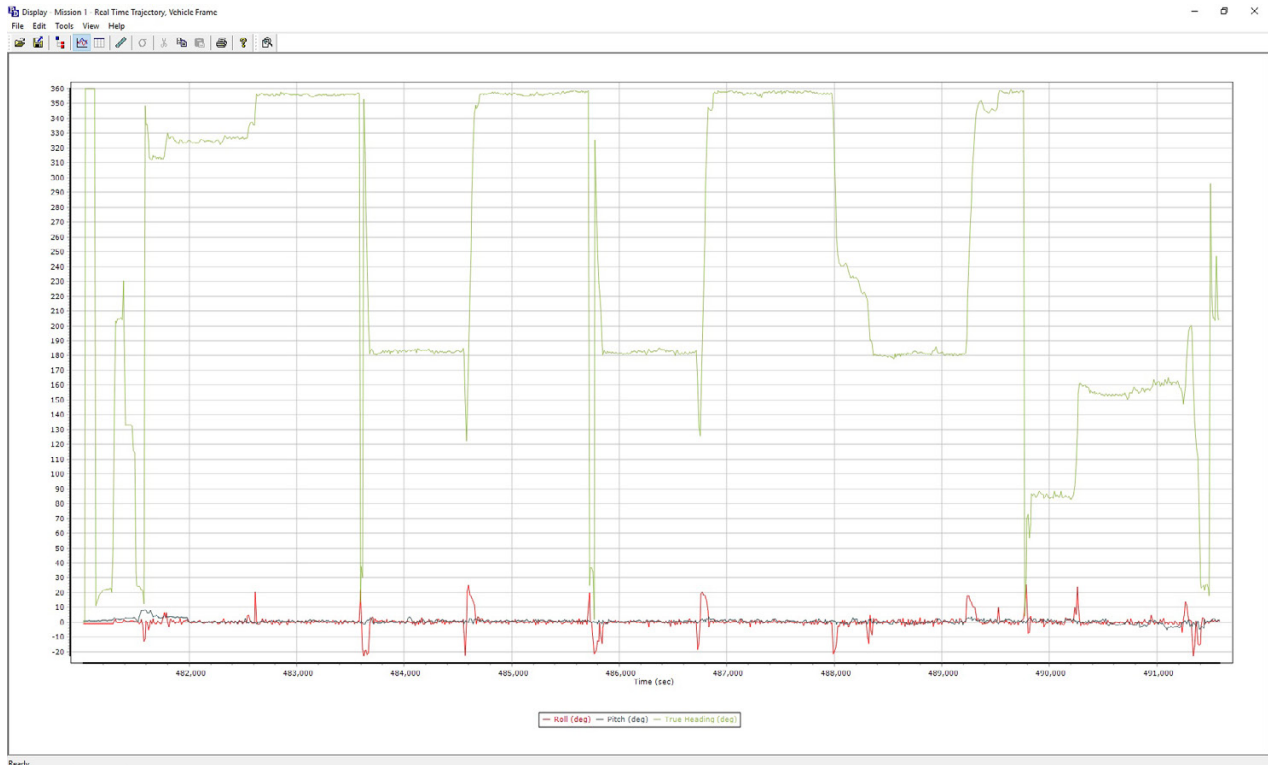




Ready



Ready



# Flight Log

**KEYSTONE**  
SURVEILLANCE

Date: 5/18/18 Pilot: NN  
 Project: 787 Operator: CM  
 Aircraft: 809 HD: A  
 Sensor: 357

POS/AV Filename: 10PA 787-809-SEN357-20180518 - 11

**Flight Plan**

Beam Divergence: Narrow  
 Roll Comp: On  
 Multipulse: (On) / off  
 Scan Frequency: 80  
 Scan Rate Angle: 850  
 Laser PPR: 1485  
 Desired Range: 1600  
 Pnd Grid Speed: \_\_\_\_\_

**Weather**

Pressure (hPa): 30.11  
 Temperature (C): 11.5  
 Temperature (F): 52.7  
 Dew Point: 0.2  
 Turbulence: Slight  
 Wind Speed & Gusts: 22 kts  
 Visibility: Clear

Line #	Start Time	End Time	HOG	Range	POCP	SV	Speed (Kts)	Flight Notes
1	14:03	14:19	359	4910	1.10	11	141	
2	14:21	14:35	170	4077	1.11	15	105	
3	14:38	14:55	359	5234	1.16	15	73.2	
4	14:57	15:12	179	4030	1.01	17	161	
5	15:14	15:33	359	5152	0.99	16	160	
6	15:39	15:53	179	3410	1.09	15	151.6	
7	16:04	16:05	92	4828	0.910	16	142	tie line (south)
8	16:08	16:10	92	4895	0.95	16	161	tie line (south)
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

<b>Base Station</b>	Location: <u>100</u>
Point ID: _____	Time on (UTC): <u>13:57</u>
Position Type: <u>Static</u>	Checksum on (UTC): <u>15:41</u>
Antenna Height: _____	Checksum off (UTC): <u>10:31</u>
Latitude: _____	Time off (UTC): <u>18:55</u>
Longitude: _____	POCP: <u>5.3</u>
	SW: <u>18</u>

<b>Autobase Station</b>	Time on (UTC): <u>13:57</u>
Checksum on (UTC): <u>15:41</u>	Time off (UTC): <u>18:55</u>
Checksum off (UTC): <u>10:31</u>	POCP: <u>5.3</u>
Time off (UTC): <u>18:55</u>	SW: <u>18</u>

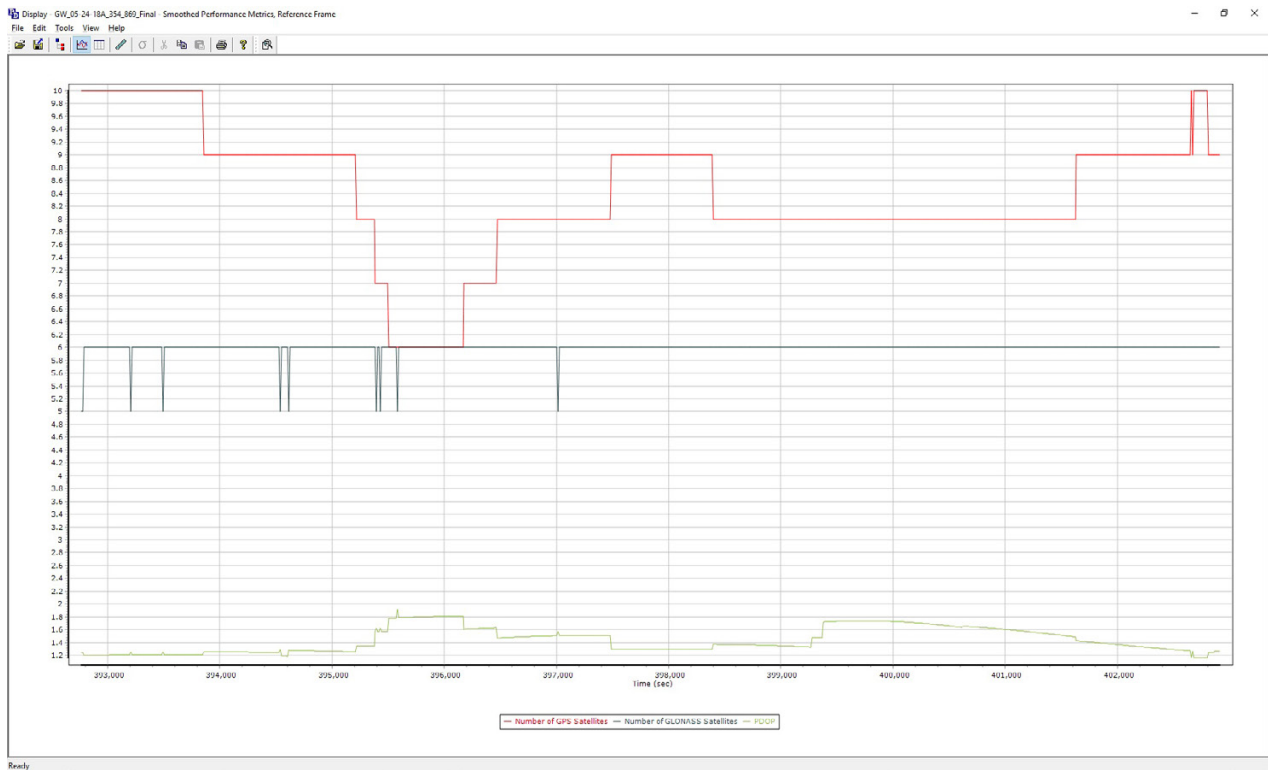
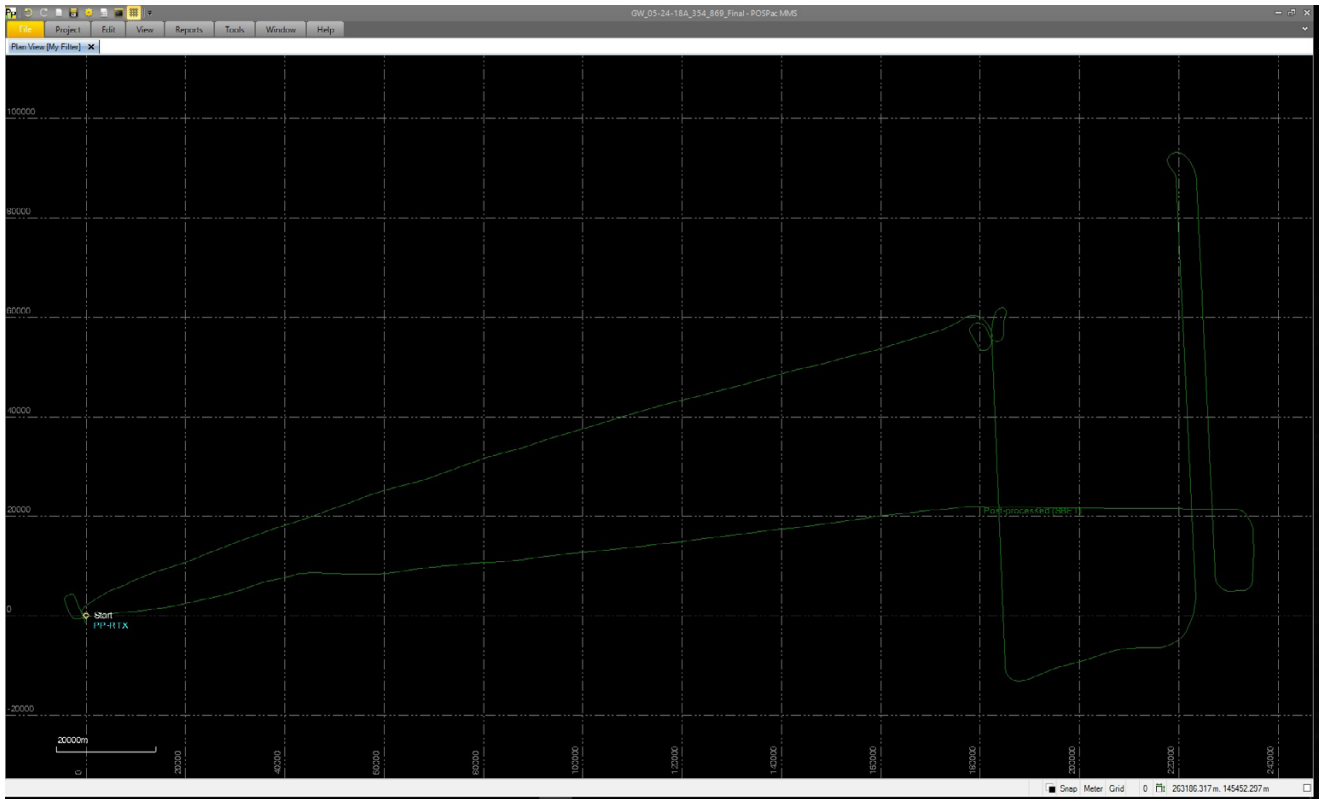
  

Engine Start (ZHR (L)): <u>07:32</u>	Departure Airport: <u>L200</u>
Engine Stop (ZHR (L)): <u>12:33</u>	Arrival Airport: <u>L200</u>
Total Flight Time: _____	Page: _____ of _____

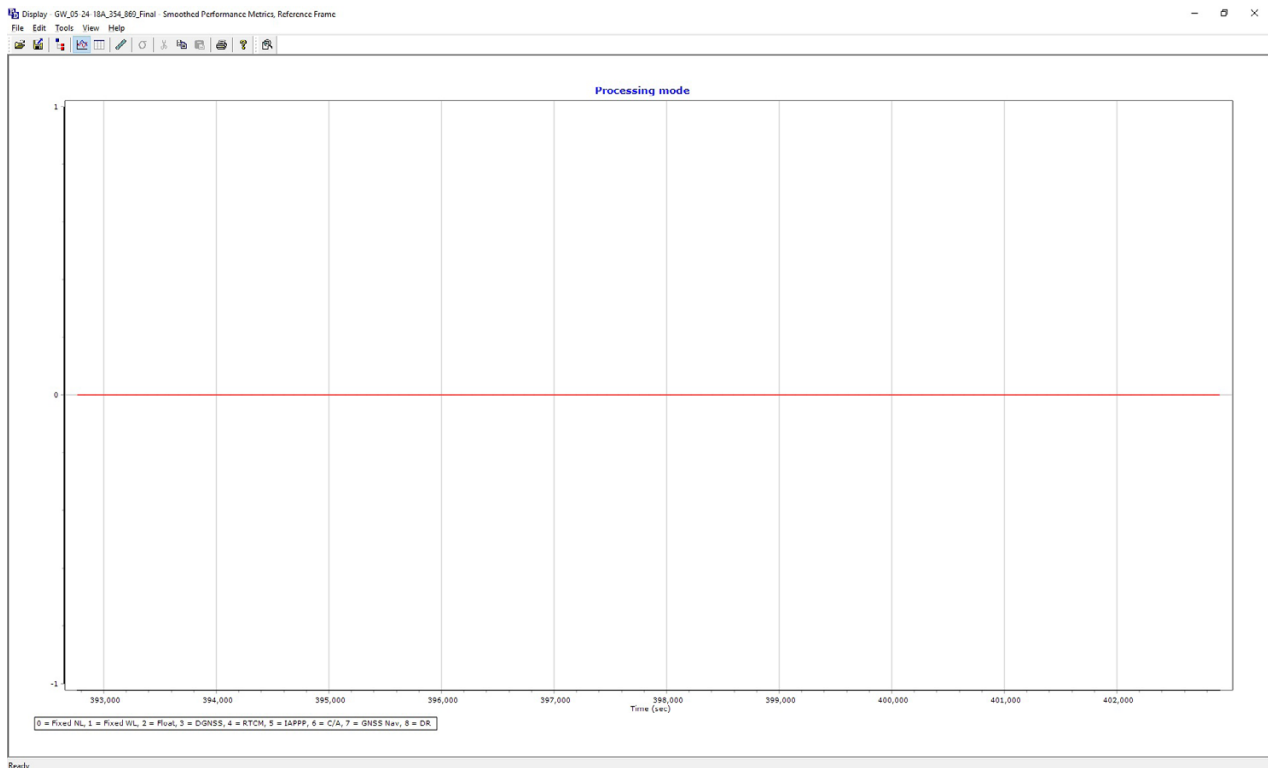
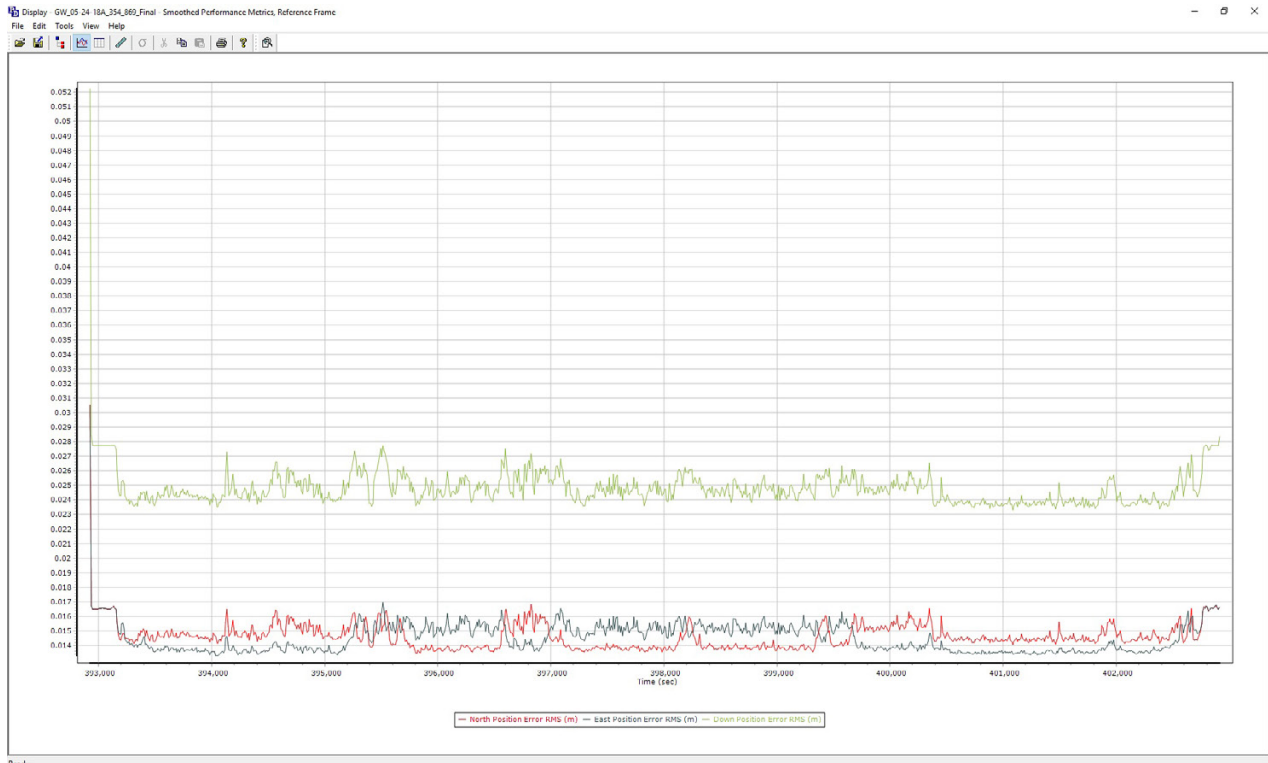
Sensor time (L2L) 424-489  
 10:04  
 12:10

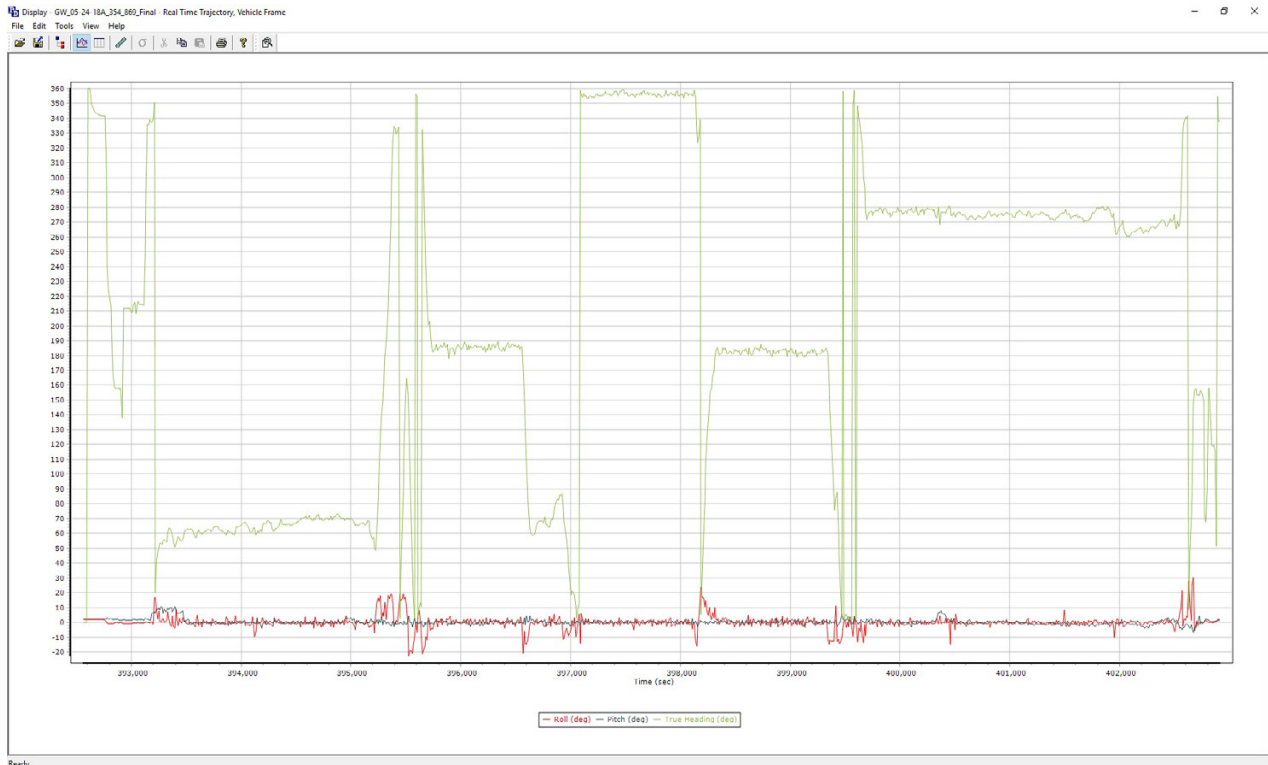
Scanned by CamScanner

# 20180524-A (N869, SN354)









# Flight Log

**KEYSTONE**  
**GERMANSMEARS**

**LIDAR FLIGHT REPORT - v2.11**

Date: 8/24/18 Pilot: RC  
 Project: 8109 Operator: CM  
 Aircraft: 354 Sensor: A

POS/AV Filename: 1084-787-8109-SEN354-20180824-12

Flight Plan		Weather	
Beam Divergence	Narrow	Pressure (in):	30.7
Roll Comp:	On	Temperature (ft):	14.6
Multipulse:	On/Off	Temperature (air):	0.6
Scan Frequency:	91	Dew Point:	-0.2°C
Scan Half Angle:	250	Turbulence:	SLYHR
Laser PPS:	1425	Wind Speed & Gusts:	10-4
Retired Range:	160	Visibility:	
Flight Notes:			

Line #	Start Time	End Time	HDS	Range	POOP	SV	Flight Notes
1	13:49	13:49	179				
2	13:55	14:09	179	3747	0.910	16	Agect - Pilot DNT on line
3	14:18	14:35	359	4812	0.98	18	
4	14:40	14:55	179	4197	1.06	17	tie line
5	15:01	15:04	272	4233	1.05	17	tie line
6	15:10	15:18	272	6149	1.34	16	
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Base Station		Airborne Station	
Point ID:	N/A	Time On (UTC):	13:51
Position Type:	Known/Autonomous	Knowledge On (UTC):	13:59
Antenna Height:	N/A	Knowledge Off (UTC):	13:55
Latitude:	N/A	Time Off (UTC):	13:56
Longitude:	N/A	Time Off (UTC):	13:56

Engine Start (ZHR LCL)		Engine Stop (ZHR LCL)	
Engine Start (ZHR LCL):	8:38	Engine Stop (ZHR LCL):	11:57
Total Flight Time:	3:19	Departure Airport:	PBG
		Arrival Airport:	PBG

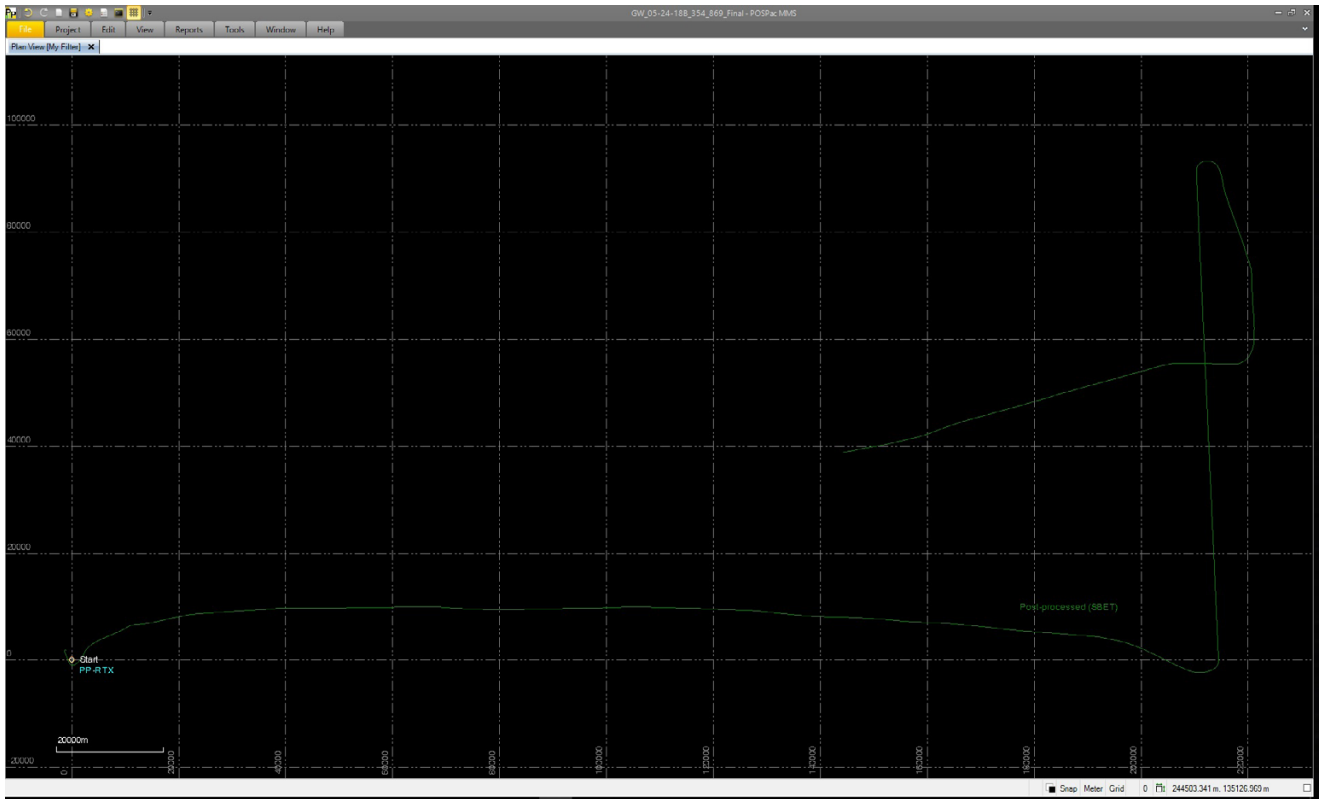
  

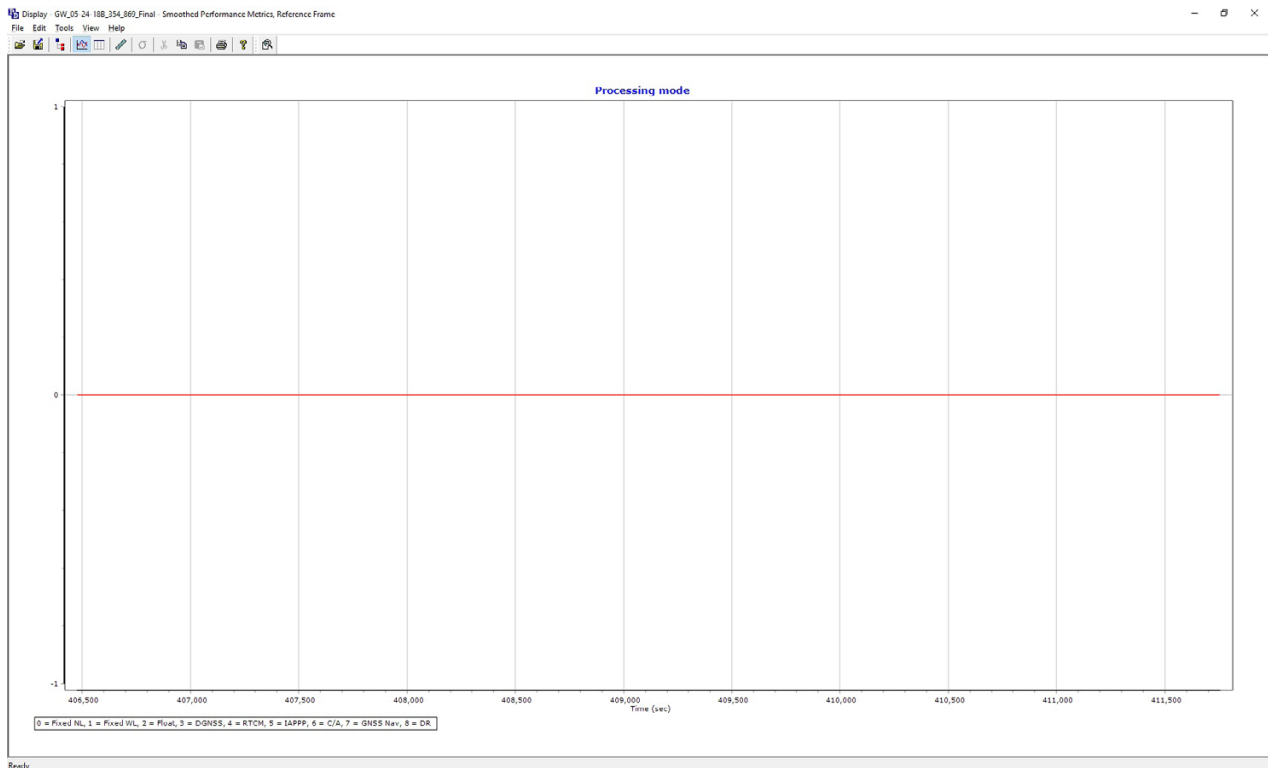
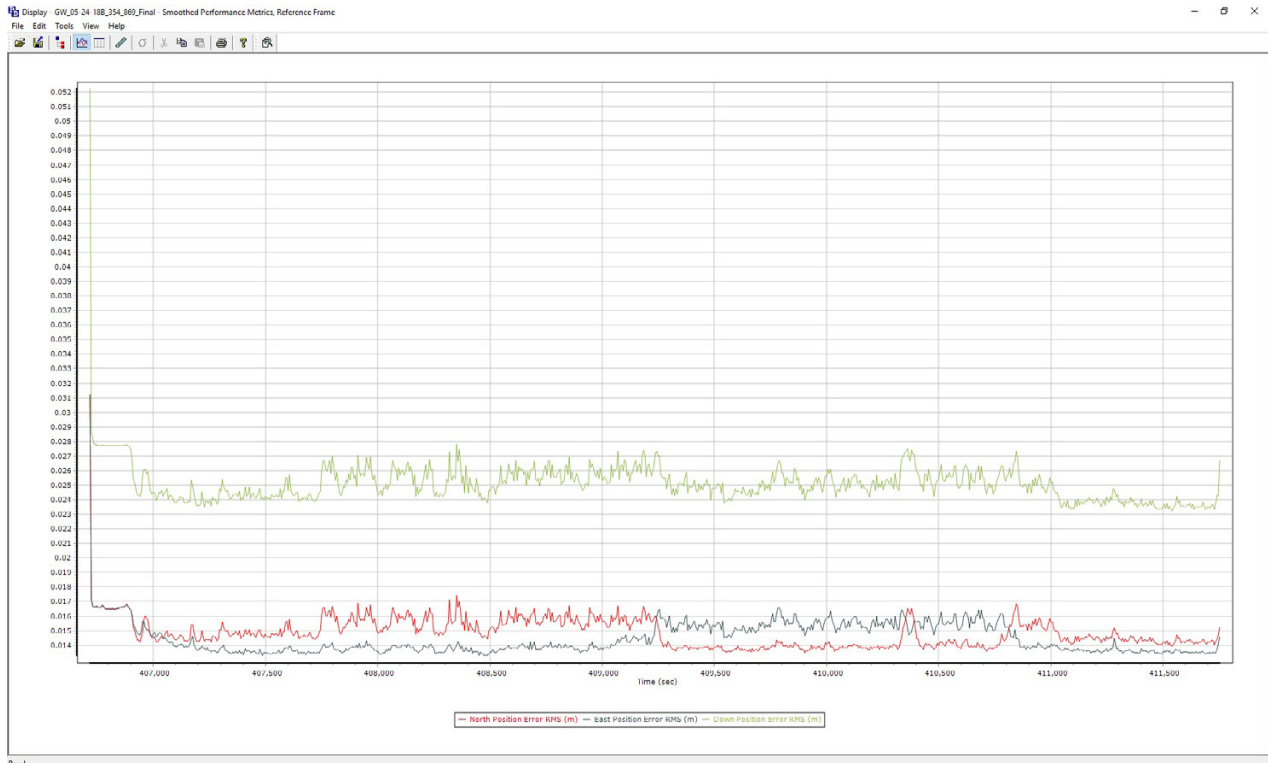
Airborne Station  
 Time On (UTC): 13:51  
 Knowledge On (UTC): 13:59  
 Knowledge Off (UTC): 13:55  
 Time Off (UTC): 13:56

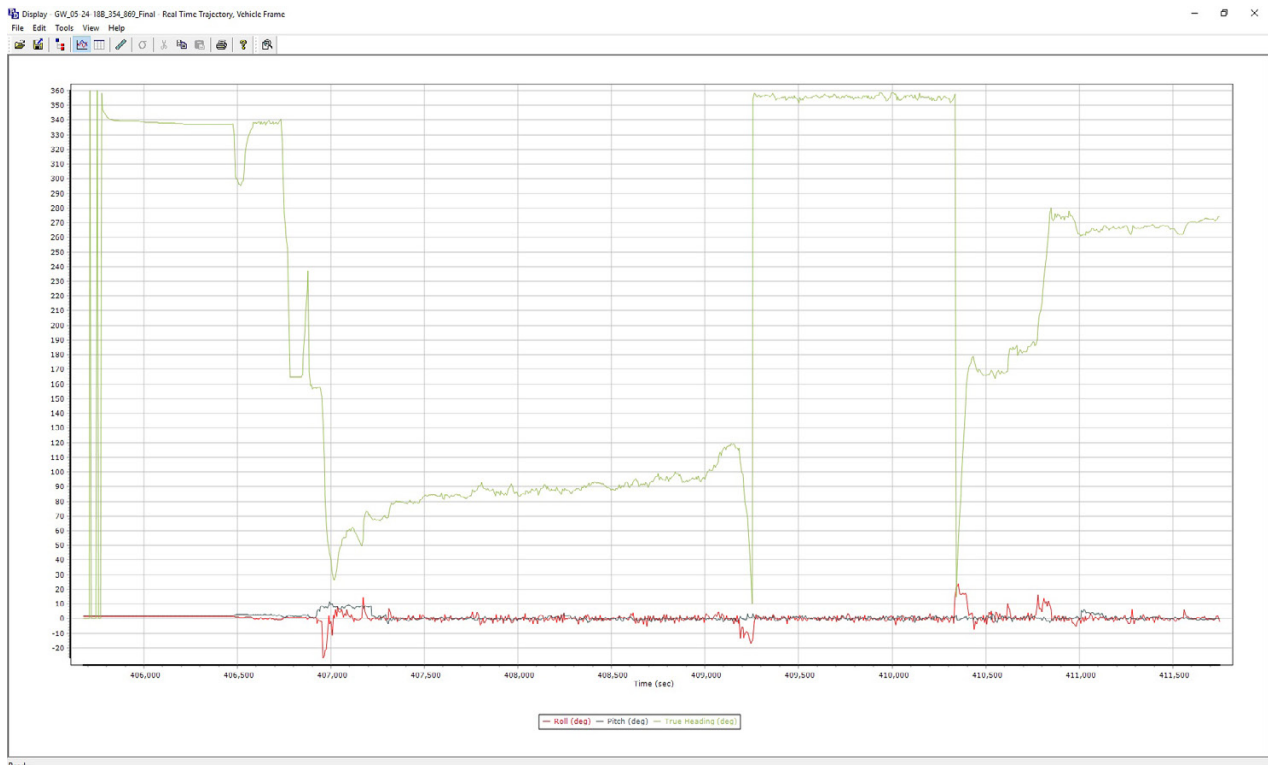
Engine Start (ZHR LCL): 8:38  
 Engine Stop (ZHR LCL): 11:57  
 Total Flight Time: 3:19  
 Departure Airport: PBG  
 Arrival Airport: PBG

Page: 1 of 1

# 20180524-B (N869, SN354)







# Flight Log

**KEYSTONE SURVEYS**

**LIDAR FLIGHT REPORT - v2.11**

Date: 5/24/18 Pilot: RC  
 Project: 787 Operator: CM  
 Aircraft: 809  
 Sensor: 354 HD: A

POS/AV Filename: 1004787-809-SEN354-20180524-13

Flight Plan		Weather	
Beam Divergence:	Narrow	Pressure (mgf):	
Rot Comp:	On	Temperature (mgf):	
Multipulse:	On / Off	Temperature (air):	
Scan Frequency:	104	Dew Point:	
Scan Half Angle:	2.1	Turbulence:	
Laser PPR:	ASD	Wind Speed & Gusts:	
Distal Range:	1435	Visibility:	
Prod End Speed:	100		

Line #	Start Time	End Time	HDS	Range	POCP	SV	Speed (kts)	Flight Notes
1	17:43	17:59	359	5453	1.34	5	103	
2	18:07	18:09	373	4000	1.16	10	759	has lines
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Base Station		Albatross Station	
Point ID:	N/A	Time On (UTC)	17:10
Position Type:	Known/Autonomous	Remarks On (UTC)	17:51
Antenna Height:	N/A Meters	Time Off (UTC)	
Latitude:	N/A	Remarks Off (UTC)	
Longitude:	N/A	Time Off (UTC)	

Engine Start (ZHR LCL):	21:37	Departure Airport:	FRS
Engine Stop (ZHR LCL):	0:50	Arrival Airport:	FRS
Total Flight Time:	4:33		

SENSY Inc (11) AEGPS  
 1:45 043 485-493  
 2:09 043

Page: 1 of 7

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## Appendix B

# Survey Report

## **USGS –Northern New Hampshire LiDAR and Check Point Control Surveys for Project: Umbagog**

Sewall performed survey work to establish and collect vertical and horizontal quality control points throughout the project area. The project included collecting 54 LiDAR calibration points, 85 non-vegetated (NVA) check points, 63 vegetated check points (VVA) and 6 published control points. A total of 208 points were collected for this project, of which two were alternate points.

A combination of RTK GPS and static GPS, and traditional surveying methods were used during this project. The RTK GPS survey procedure involved placing a GPS receiver on a check point and collecting three minute “fixed” observations. RTK GPS corrected observations were provided from a Virtual Reference Station Systems (VRS network – KeyNetGPS, Inc. – New England).

Virtual Reference Station System is a series of continuously operating, high precision GNSS reference stations working through a cellular modem. Two observations were taken at each check point and the two coordinates were compared and averaged. Published control check points were also located with RTK methods. A Hiper II centimeter accuracy survey grade GPS receiver was used to collect the data. A total of 66 points were collected using this method.

In areas with limited cellular coverage, Static GPS methods were used to collect check points. The methods consisted of collecting data using a Hiper II dual frequency GPS receivers. The data was downloaded and processed using OPUS-RS. A total of 84 points were collected using this method.

In areas under the tree canopy, traditional surveying methods were used. Pairs of points were collected in open areas using GPS methods. The points were occupied using a Topcon GTS300 or Topcon DS203AC total station to survey the forested check points. Multiple observations were collected at each check point and the coordinates were compared and averaged. A total of 56 points were collected using this method.

All of the GPS information was downloaded, processed and analyzed using Topcon Tools processing software. Our final horizontal coordinates are shown in UTM – Zone 19N, NAD83 (2011) Epoch 2010, meters. The final elevations refer to NAVD 88 (GEOID12b), meters.

<b>GPS Control Summary</b>
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Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 11-29-2016

Station	Northing (Y)	Easting (X)	Elevation	Description
BE01	4853726.65	330540.28	135.91	GRAVEL
BE02	4864457.39	333497.11	146.80	GRAVEL
BE03	4881503.66	337638.60	159.56	GRAVEL
BE04	4876274.55	284845.15	205.80	GRAVEL
BE05	4903754.15	321236.93	592.11	GRAVEL
BE06	4900572.63	338978.07	161.14	GRAVEL
BE07	4943063.85	344284.62	464.99	GRAVEL
BE08	4915889.78	348112.10	245.47	GRAVEL
BE09	4933069.22	338220.23	485.45	GRAVEL
BE10	4948431.28	327203.08	360.63	GRAVEL
BE11	4951925.38	337203.63	381.72	GRAVEL
BE12	4962222.12	328839.41	380.96	GRAVEL
BE13	4969438.86	319451.81	457.06	LAWN
BE14	4970889.20	338790.40	386.21	NATIVE TILL
BE15	4952397.37	361307.72	380.61	GRAVEL
BE16	4980449.86	350618.47	517.75	GRAVEL
BE16 ALT	4980506.83	350716.54	526.59	GRAVEL
BE17	4982912.52	332113.32	433.48	GRAVEL
BE18	4991789.31	376107.08	400.58	GRAVEL
BE19	4991154.84	365630.00	633.04	GRAVEL
BE20	4990625.14	352185.59	484.04	GRAVEL
BE21	4990888.21	334061.01	592.74	GRAVEL
BE22	4999450.72	341316.89	473.67	GRAVEL
BE23	4997293.91	353095.37	591.21	GRAVEL
BE24	4997544.56	364845.85	566.69	GRAVEL/GRASS
BE25	5009374.76	382981.39	362.22	GRAVEL
BE26	5019243.98	372879.05	396.53	GRAVEL
BE27	5018857.55	361340.49	621.29	NATIVE TILL
BE28	5010797.58	360090.10	595.48	GRAVEL
BE29	5018477.55	344981.65	591.02	GRAVEL
BE30	5006299.28	346753.45	619.37	GRAVEL

Station	Northing (Y)	Easting (X)	Elevation	Description
BE31	5006124.58	377442.22	417.79	GRAVEL
BE32	4887567.79	311634.45	301.97	GRASS
BE33	4966406.51	364828.86	679.13	GARDEN SOIL
BE34	4959999.26	347999.47	443.67	GRAVEL
BE35	4878814.98	298369.43	671.28	GRAVEL
BE36	4903724.10	338813.88	204.89	GRAVEL
BE37	4927848.57	334329.73	486.97	GRAVEL
BE38	4940554.10	335124.69	520.02	GRAVEL
BE39	4969669.56	331057.90	515.49	GRAVEL
BE40	4998538.76	361036.00	546.54	GRAVEL
BE41	4929800.54	322730.10	331.18	GRAVEL
BE42	4908164.84	357836.74	193.36	GRAVEL
BE43	4951785.18	349611.44	466.33	GRAVEL
BE44	4979909.59	317570.37	671.80	GRAVEL
BE45	4926650.17	320632.04	475.72	GRAVEL
BE46	4958751.19	322302.99	541.72	GRAVEL
BE47	4971546.82	378293.15	499.45	GRAVEL
BE48	4892021.03	339262.36	157.47	GRAVEL
BE49	4983443.09	378740.50	464.72	GRAVEL
BE50	4864510.98	339989.77	213.43	GRAVEL
BE51	4862651.60	336204.37	259.17	GRAVEL
BE52	4896334.31	321378.12	343.27	GRAVEL
BE53	4965537.07	376096.46	607.74	GRAVEL
BE54	4972124.99	353075.47	470.54	GRAVEL
BE54 ALT	4976785.28	349359.59	460.62	GRAVEL
BE55	4978402.12	339540.28	386.77	GRAVEL

<b>GPS Control Summary</b>
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Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 11-29-2016

Station	Northing (Y)	Easting (X)	Elevation	Description
CA01	4853739.04	330593.85	135.81	GRAVEL
CA02	4857692.80	337784.04	310.58	PAVEMENT
CA03	4864464.85	333465.89	146.66	GRAVEL
CA04	4870778.48	336988.11	176.78	PAVEMENT
CA05	4876796.68	330857.14	154.29	PAVEMENT
CA06	4881491.46	337643.38	159.42	GRAVEL
CA07	4887386.96	325397.80	193.63	PAVEMENT
CA08	4876173.72	319912.31	293.08	PAVEMENT
CA09	4887568.16	311589.58	303.76	GRAVEL
CA10	4876290.46	284889.48	205.93	GRAVEL
CA11	4894372.36	285109.60	596.11	PAVEMENT
CA12	4882184.46	292692.95	353.72	PAVEMENT
CA13	4903780.42	321259.25	591.54	GRAVEL
CA14	4894976.68	308256.91	403.42	PAVEMENT
CA15	4918776.84	324956.00	244.07	PAVEMENT
CA16	4900563.59	338979.09	161.20	GRAVEL
CA17	4917423.21	337144.78	224.83	GRAVEL
CA18	4937988.16	326586.51	344.19	PAVEMENT
CA19	4943117.47	344192.75	464.66	GRAVEL
CA20	4875835.67	305382.90	464.46	PAVEMENT
CA21	4915018.84	314345.23	425.18	PAVEMENT
CA22	4915909.68	348138.00	245.39	GRAVEL
CA23	4926829.18	327261.97	332.56	GRAVEL
CA24	4933034.84	338239.36	485.93	GRAVEL
CA25	4948403.76	327201.49	360.52	PAVEMENT
CA26	4951929.55	337151.09	381.42	GRAVEL
CA27	4962188.83	328842.38	380.85	GRAVEL
CA28	4969470.90	319446.11	458.28	GRAVEL
CA29	4970823.70	338690.93	385.38	GRAVEL
CA30	4959906.29	348002.51	443.64	GRAVEL
CA31	4952452.63	361306.35	382.72	GRAVEL

Station	Northing (Y)	Easting (X)	Elevation	Description
CA32	4953149.10	370756.44	266.69	PAVEMENT
CA33	4966435.81	364822.70	679.70	PAVEMENT
CA34	4980342.67	370261.97	463.79	PAVEMENT
CA35	4980694.19	360171.54	467.50	GRAVEL
CA36	4980457.20	350675.72	518.53	GRAVEL
CA37	4982933.76	332140.01	434.34	GRAVEL
CA38	4991793.65	376070.92	400.22	FIELD
CA38 ALT	4991911.94	376225.41	400.01	GRAVEL
CA39	4991185.02	365589.53	633.12	GRAVEL
CA40	4990644.42	352175.37	484.13	GRAVEL
CA41	4990832.19	334062.25	591.76	GRAVEL
CA42	4999425.15	341338.49	473.66	GRAVEL
CA43	4997328.70	353068.66	592.28	GRAVEL
CA44	4997576.07	364863.21	566.30	GRAVEL
CA45	4999558.15	386916.22	353.59	PAVEMENT
CA46	5009406.99	382961.56	362.05	GRAVEL
CA47	5019214.71	372901.46	395.53	GRAVEL
CA48	5026640.90	358657.15	433.32	PAVEMENT
CA49	5018855.75	361372.29	623.04	GRAVEL
CA50	5010762.09	360110.35	595.13	GRAVEL
CA51	5018509.56	344975.02	591.70	GRAVEL
CA52	5006193.82	346767.18	626.36	GRAVEL
CA53	5006082.76	377454.67	418.36	GRAVEL

<b>GPS Control Summary</b>
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Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 11-29-2016

Station	Northing (Y)	Easting (X)	Elevation	Description
FO01	4853753.17	330597.58	136.05	FOREST
FO02	4864455.58	333534.88	145.79	FOREST
FO03	4876872.67	330655.65	152.73	FOREST
FO04	4881529.34	337640.03	157.40	FOREST
FO05	4887408.46	325407.27	198.07	FOREST
FO06	4876170.02	319961.38	292.28	FOREST
FO07	4887542.74	311681.44	300.89	FOREST
FO08	4876261.23	284911.93	207.24	FOREST
FO09	4894397.98	285131.60	597.96	FOREST
FO10	4882117.54	292718.95	355.23	FOREST
FO11	4903798.30	321259.12	594.62	FOREST
FO12	4895006.53	308253.76	402.36	FOREST
FO13	4917402.36	337107.32	227.39	FOREST
FO14	4875871.28	305327.84	470.66	FOREST
FO15	4915000.81	314317.37	424.76	FOREST
FO16	4915869.60	348206.34	246.18	FOREST
FO17	4926781.64	327294.67	331.88	FOREST
FO18	4932993.80	338276.71	489.55	FOREST
FO19	4948428.86	327170.24	359.90	FOREST
FO20	4951867.60	337178.49	384.59	FOREST
FO21	4962222.08	328895.63	380.91	FOREST
FO22	4969472.01	319481.48	456.60	FOREST
FO23	4959976.71	347945.01	440.94	FOREST
FO24	4952357.71	361335.70	377.77	FOREST
FO25	4953085.31	370704.44	267.87	FOREST
FO26	4966431.90	364876.72	690.49	FOREST
FO27	4980584.55	360084.83	466.99	FOREST
FO28	4980535.37	350737.19	529.59	FOREST
FO29	4982982.19	332091.05	438.61	FOREST
FO30	4991721.95	376132.91	399.73	FOREST
FO31	4991121.90	365641.87	633.86	FOREST

Station	Northing (Y)	Easting (X)	Elevation	Description
FO32	4990670.02	352174.68	485.37	FOREST
FO33	4990902.32	334009.98	601.08	FOREST
FO34	4999447.17	341285.79	473.25	FOREST
FO35	4997275.30	353066.68	589.93	FOREST
FO36	4997601.57	364889.99	563.58	FOREST
FO37	4999383.44	386805.71	352.04	FOREST
FO38	5009333.15	383028.04	360.97	FOREST
FO39	5019237.04	372924.45	401.07	FOREST
FO40	5026683.32	358630.57	433.03	FOREST
FO41	5018858.57	361407.54	625.84	FOREST
FO42	5010787.74	360134.11	596.05	FOREST
FO43	5018497.35	344899.99	591.51	FOREST
FO44	5006117.36	377497.48	416.58	FOREST
FO45	4971481.56	378352.57	500.88	FOREST
FO46	4943074.91	344355.13	468.41	FOREST
FO47	4908158.32	357816.66	191.03	FOREST
FO48	4980013.02	370864.01	477.92	FOREST
FO49	4910505.76	323335.93	371.54	FOREST
FO50	4917338.73	342789.44	221.76	FOREST
FO51	4940554.88	335143.06	520.96	FOREST
FO52	4984302.57	375288.35	483.05	FOREST
FO53	4964664.69	357163.81	569.81	FOREST
FO54	4896329.35	324454.61	415.22	FOREST
FO55	4903700.94	338746.61	206.87	FOREST



<b>GPS Control Summary</b>
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Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 11-29-2016

Station	Northing (Y)	Easting (X)	Elevation	Description
SH01	5006233.49	346708.98	618.14	EVERGREENS
SH02	4970883.94	338834.66	385.79	ALDERS
SH03	4926769.23	327278.14	331.69	MIXED
SH04	4900594.27	339016.64	159.48	PINES
SH05	4870797.98	337005.51	177.78	POPLARS
TW01	4857707.44	337761.03	308.60	GRASS
TW02	4938012.63	327042.13	340.43	WEEDS
TW03	5018942.34	361372.81	625.31	WEEDS

<b>GPS Control Summary</b>
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Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 11-29-2016

Station	Northing (Y)	Easting (X)	Elevation	Description
UA01	4870781.18	336995.24	176.70	PAVEMENT
UA02	4876759.43	330876.80	153.94	PAVEMENT
UA03	4887389.87	325359.53	193.46	PAVEMENT
UA04	4894341.64	285090.32	597.84	PAVEMENT
UA05	4918797.64	324944.73	243.83	PAVEMENT
UA06	4937961.40	326595.31	344.19	PAVEMENT
UA07	4914990.50	314357.44	424.68	PAVEMENT
UA08	4926825.96	327283.45	332.84	PAVEMENT
UA09	4953135.01	370787.82	266.64	PAVEMENT
UA10	4980339.59	370278.93	464.01	PAVEMENT
UA11	4980639.77	360128.10	467.67	PAVEMENT
UA12	4999565.78	386935.96	353.66	PAVEMENT
UA13	5026634.04	358697.27	433.02	PAVEMENT
UA14	4918572.97	334765.00	215.36	PAVEMENT
UA15	4890526.44	325345.83	231.05	PAVEMENT
UA16	4904488.38	312377.65	821.23	PAVEMENT
UA17	4932041.76	329080.10	345.13	PAVEMENT
UA18	4859403.89	332174.39	147.33	PAVEMENT
UA19	4917594.52	342930.28	218.41	PAVEMENT
UA20	4879987.83	286051.69	246.07	PAVEMENT
UA21	4913988.70	326013.28	329.51	PAVEMENT
UA22	4898981.11	307428.52	578.71	PAVEMENT
UA23	4853155.48	336419.48	142.99	PAVEMENT
UA24	4876151.96	319946.57	291.26	PAVEMENT
UA25	4944633.64	321569.02	358.67	PAVEMENT
UA26	4906464.28	322544.03	493.03	PAVEMENT
UA27	4886147.43	285352.87	401.92	PAVEMENT
UA28	4882151.22	292711.07	353.97	PAVEMENT

<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 11-29-2016

Station	Northing (Y)	Easting (X)	Elevation	Description
OC2809	4872850.48	332562.41	142.39	DISK
RANGELEY	4983268.89	369139.47	552.14	DISK
RANGELEY	4983268.83	369139.48	552.15	DISK
RANGELEY	4983268.84	369139.49	552.12	DISK
D47	4918488.21	334626.13	219.19	DISK
BBDW29	4882543.85	328708.54	164.88	DISK

Point ID	BE01
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4853726.64	330540.28	135.90

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	BE02
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4864457.39	333497.11	146.80

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.016
RMSE Z	0.031
Method	STATIC GPS

**PHOTOS:**



Point ID	BE03
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4881503.66	337638.60	159.56

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	BE04
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876274.55	284845.15	205.80

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	BE05
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

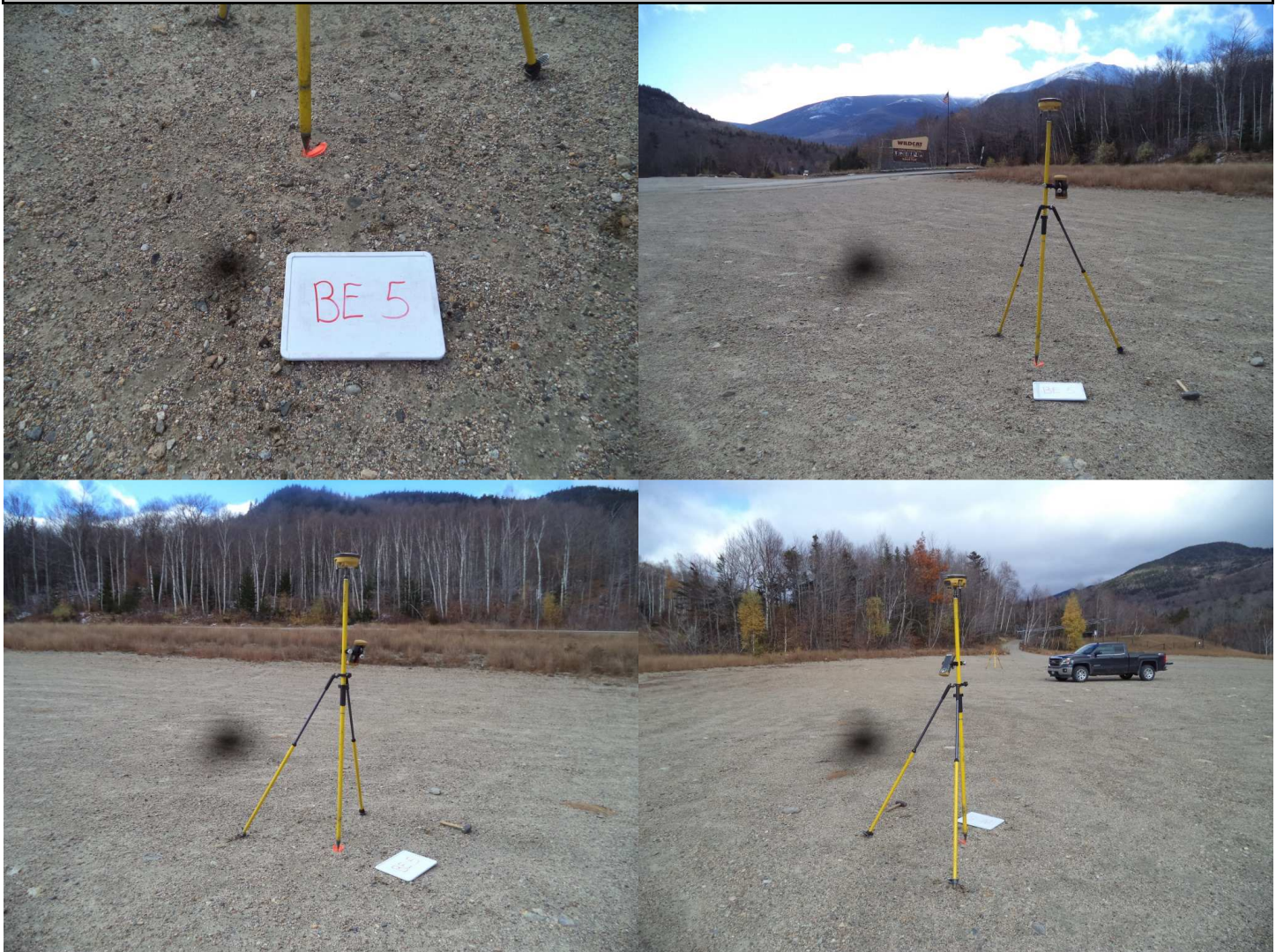
Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4903754.16	321236.92	592.11

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.003
RMSE Z	0.003
Method	RTK GPS

PHOTOS:





Point ID	BE06
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4900572.63	338978.07	161.14

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.018
RMSE Z	0.024
Method	STATIC GPS

PHOTOS:



Point ID	BE07
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4943063.85	344284.62	464.99

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.019
RMSE Z	0.025
Method	STATIC GPS

PHOTOS:



Point ID	BE08
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4915889.78	348112.10	245.47

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	BE09
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4933069.22	338220.23	485.45

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.003
RMSE Z	0.005
Method	RTK GPS

PHOTOS:



Point ID	BE10
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4948431.28	327203.08	360.63

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	BE11
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4951925.38	337203.63	381.72

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.013
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	BE12
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4962222.12	328839.41	380.96

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.022
RMSE Z	0.022
Method	STATIC GPS

PHOTOS:



Point ID	BE13
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4969438.86	319451.81	457.06

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:





Point ID	BE14
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4970889.20	338790.40	386.21

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.013
RMSE Z	0.027
Method	STATIC GPS

PHOTOS:



Point ID	BE15
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4952397.37	361307.72	380.61

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.009
RMSE Z	0.019
Method	STATIC GPS

**PHOTOS:**



Point ID	BE16 ALT
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4980506.83	350716.54	526.59

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	763-0107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.020
RMSE Z	0.038
Method	STATIC GPS

PHOTOS:



Point ID	BE16
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4980449.86	350618.46	517.75

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.019
RMSE Z	0.037
Method	STATIC GPS

PHOTOS:



Point ID	BE17
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4982912.52	332113.32	433.48

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.017
RMSE Z	0.020
Method	STATIC GPS

**PHOTOS:**



Point ID	BE18
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4991789.31	376107.08	400.58

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.007
RMSE Z	0.013
Method	STATIC GPS

PHOTOS:



Point ID	BE19
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4991154.84	365630.00	633.04

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.007
RMSE Z	0.033
Method	STATIC GPS

PHOTOS:



Point ID	BE20
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4990625.14	352185.59	484.04

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.009
RMSE Z	0.021
Method	STATIC GPS

**PHOTOS:**





Point ID	BE21
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4990888.21	334061.01	592.74

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.012
RMSE Z	0.021
Method	STATIC GPS

PHOTOS:



Point ID	BE22
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4999450.72	341316.89	473.67

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.021
RMSE Z	0.025
Method	STATIC GPS

PHOTOS:



Point ID	BE23
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4997293.91	353095.37	591.21

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.018
RMSE Z	0.039
Method	STATIC GPS

**PHOTOS:**



Point ID	BE24
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4997544.56	364845.85	566.69

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.017
RMSE Z	0.043
Method	STATIC GPS

PHOTOS:



Point ID	BE25
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5009374.76	382981.38	362.22

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.005
RMSE Z	0.010
Method	STATIC GPS

**PHOTOS:**



Point ID	BE26
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5019243.98	372879.05	396.53

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.011
RMSE Z	0.018
Method	STATIC GPS

PHOTOS:



Point ID	BE27
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018857.55	361340.49	621.29

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.011
RMSE Z	0.028
Method	STATIC GPS

PHOTOS:



Point ID	BE28
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5010797.58	360090.10	595.48

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.021
RMSE Z	0.028
Method	STATIC GPS

**PHOTOS:**





Point ID	BE29
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018477.55	344981.65	591.02

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.020
RMSE Z	0.030
Method	STATIC GPS

PHOTOS:



Point ID	BE30
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
5006299.28	346753.45	619.37

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-0107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.016
RMSE Z	0.017
Method	STATIC GPS

PHOTOS:



Point ID	BE31
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
5006124.58	377442.22	417.79

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.006
RMSE Z	0.013
Method	STATIC GPS

PHOTOS:



Point ID	BE32
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Caroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4887567.79	311634.45	301.97

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.020
RMSE Z	0.035
Method	STATIC GPS

PHOTOS:



Point ID	BE33
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4966406.51	364828.86	679.13

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-01-2016
RMSE Hz	0.021
RMSE Z	0.029
Method	STATIC GPS

PHOTOS:



Point ID	BE34
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4959999.26	347999.47	443.66

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.013
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	BE35
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4878814.98	298369.43	671.28

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.016
RMSE Z	0.023
Method	STATIC GPS

**PHOTOS:**



Point ID	BE36
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4903724.10	338813.88	204.89

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.019
RMSE Z	0.026
Method	STATIC GPS

**PHOTOS:**





Point ID	BE37
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4927848.57	334329.72	486.97

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	BE38
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4940554.09	335124.69	520.02

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	BE39
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4969669.56	331057.90	515.49

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.031
RMSE Z	0.040
Method	STATIC GPS

PHOTOS:



Point ID	BE40
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4998538.76	361036.00	546.54

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.015
RMSE Z	0.015
Method	STATIC GPS

PHOTOS:



Point ID	BE41
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4929800.54	322730.09	331.18

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	BE42
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4908164.84	357836.74	193.36

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	BE43
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4951785.18	349611.44	466.33

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.012
RMSE Z	0.025
Method	STATIC GPS

**PHOTOS:**



Point ID	BE44
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4979909.59	317570.37	671.80

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.030
RMSE Z	0.034
Method	STATIC GPS

PHOTOS:





Point ID	BE45
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4926650.17	320632.04	475.72

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.026
RMSE Z	0.029
Method	STATIC GPS

PHOTOS:



Point ID	BE46
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4958751.19	322302.99	541.72

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.026
RMSE Z	0.027
Method	STATIC GPS

PHOTOS:



Point ID	BE47
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4971546.82	378293.15	499.45

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-01-2016
RMSE Hz	0.023
RMSE Z	0.033
Method	STATIC GPS

PHOTOS:



Point ID	BE48
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4892021.03	339262.36	157.47

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	BE49
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

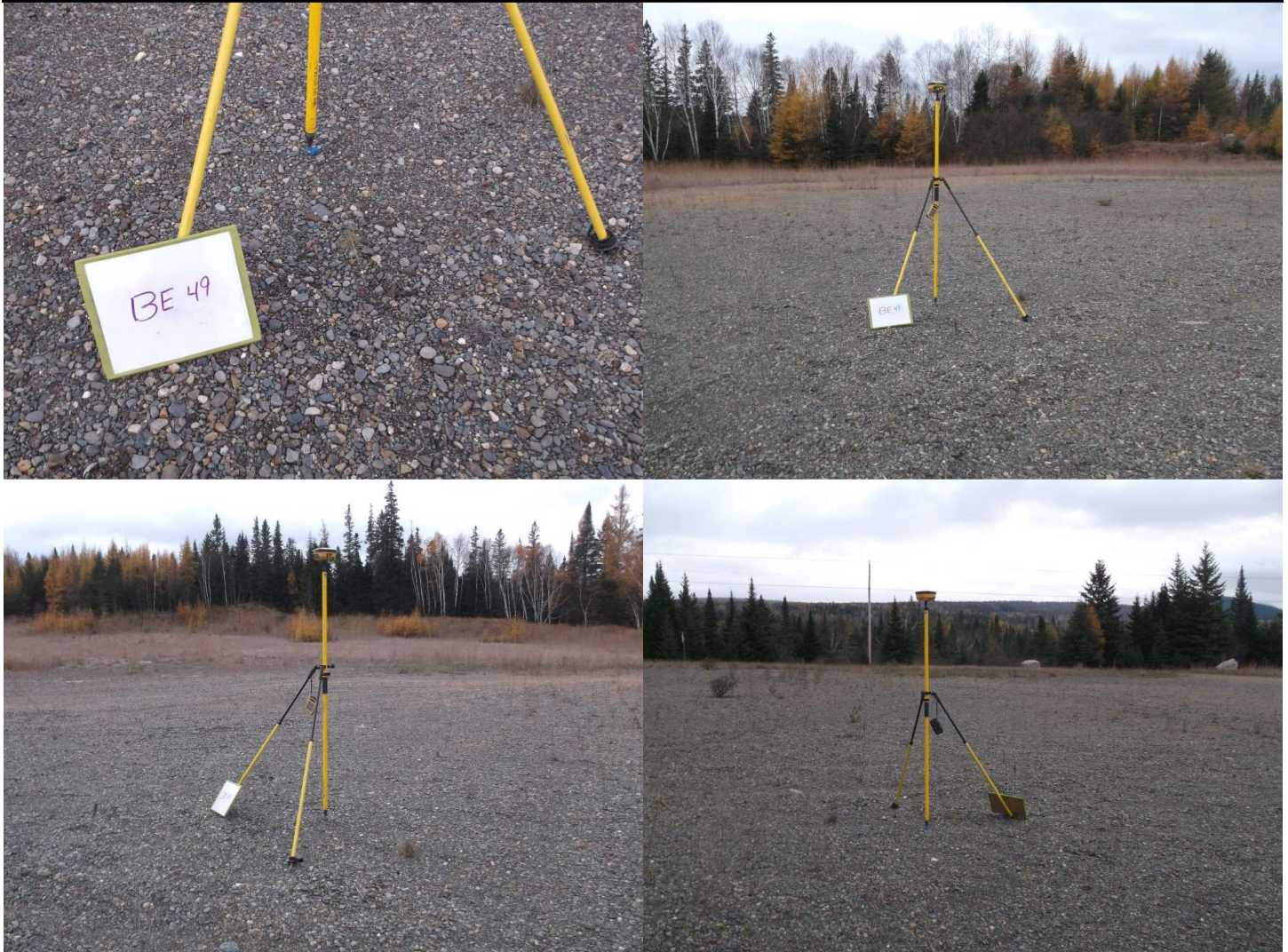
Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4983443.09	378740.50	464.72

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	GPS RTK

PHOTOS:



Point ID	BE50
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4864510.98	339989.76	213.43

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	BE51
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4862651.60	336204.37	259.17

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.050
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	BE52
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4896334.31	321378.12	343.27

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:





Point ID	BE53
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4965537.07	376096.46	607.74

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.006
RMSE Z	0.011
Method	STATIC GPS

PHOTOS:



Point ID	BE54 ALT
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4976785.28	349359.59	460.62

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.006
RMSE Z	0.008
Method	STATIC GPS

PHOTOS:



Point ID	BE54
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4972124.99	353075.47	470.54

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.007
RMSE Z	0.012
Method	STATIC GPS

**PHOTOS:**



Point ID	BE55
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4978402.12	339540.28	386.77

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.012
RMSE Z	0.013
Method	STATIC GPS

**PHOTOS:**



Point ID	CA01
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4853739.04	330593.85	135.80

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	CA02
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4857692.80	337784.04	310.58

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA03
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4864464.84	333465.89	146.66

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.013
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	CA04
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

<b>Northing</b>	<b>Easting</b>	<b>Elevation</b>
4870778.48	336988.10	176.78

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**





Point ID	CA05
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876796.68	330857.14	154.29

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	CA06
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4881491.46	337643.38	159.42

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA07
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4887386.96	325397.80	193.63

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA08
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876173.72	319912.31	293.08

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA09
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4887568.16	311589.58	303.76

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.019
RMSE Z	0.035
Method	STATIC GPS

**PHOTOS:**



Point ID	CA10
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876290.46	284889.48	205.93

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	CA11
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4894372.36	285109.60	596.11

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA12
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4882184.46	292692.94	353.72

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.018
RMSE Z	0.031
Method	STATIC GPS

PHOTOS:





Point ID	CA13
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4903780.42	321259.25	591.54

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.009
RMSE Z	0.009
Method	RTK GPS

**PHOTOS:**



Point ID	CA14
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4894976.68	308256.91	403.42

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.007
RMSE Z	0.034
Method	STATIC GPS

PHOTOS:



Point ID	CA15
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

<b>Northing</b>	<b>Easting</b>	<b>Elevation</b>
4918776.84	324956.00	244.07

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	CA16
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4900563.59	338979.09	161.20

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.017
RMSE Z	0.024
Method	STATIC GPS

PHOTOS:



Point ID	CA17
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4917423.21	337144.78	224.83

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA18
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4937988.16	326586.51	344.19

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.003
RMSE Z	0.003
Method	RTK GPS

PHOTOS:



Point ID	CA19
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4943117.47	344192.75	464.66

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.017
RMSE Z	0.028
Method	STATIC GPS

**PHOTOS:**



Point ID	CA20
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4875835.67	305382.89	464.46

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.011
RMSE Z	0.024
Method	STATIC GPS

PHOTOS:





Point ID	CA21
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4915018.84	314345.22	425.18

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	CA22
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4915909.68	348138.00	245.39

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	CA23
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4926829.18	327261.97	332.56

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA24
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4933034.84	338239.36	485.93

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.002
RMSE Z	0.003
Method	RTK GPS

**PHOTOS:**



Point ID	CA25
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4948403.76	327201.49	360.52

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA26
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4951929.55	337151.09	381.42

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.013
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	CA27
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4962188.83	328842.38	380.85

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.024
RMSE Z	0.036
Method	STATIC GPS

**PHOTOS:**



Point ID	CA28
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4969470.90	319446.11	458.28

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:





Point ID	CA29
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4970823.70	338690.92	385.38

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.007
RMSE Z	0.024
Method	STATIC GPS

PHOTOS:



Point ID	CA30
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4959906.30	348002.51	443.64

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.010
RMSE Z	0.030
Method	STATIC GPS

PHOTOS:



Point ID	CA31
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4952452.63	361306.35	382.72

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-04-2016
RMSE Hz	0.010
RMSE Z	0.018
Method	STATIC GPS

PHOTOS:



Point ID	CA32
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4953149.10	370756.44	266.69

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-01-2016
RMSE Hz	0.013
RMSE Z	0.029
Method	STATIC GPS

**PHOTOS:**



Point ID	CA33
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4966435.81	364822.70	679.70

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-01-2016
RMSE Hz	0.008
RMSE Z	0.025
Method	STATIC GPS

PHOTOS:



Point ID	CA34
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4980342.67	370261.97	463.79

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	CA35
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4980694.19	360171.54	467.50

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA36
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

<b>Northing</b>	<b>Easting</b>	<b>Elevation</b>
4980457.20	350675.72	518.53

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.005
RMSE Z	0.017
Method	STATIC GPS

**PHOTOS:**





Point ID	CA37
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4982933.76	332140.01	434.34

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.010
RMSE Z	0.030
Method	STATIC GPS

PHOTOS:



Point ID	CA38 ALT
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4991911.94	376225.41	400.01

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.006
RMSE Z	0.017
Method	STATIC GPS

**PHOTOS:**



Point ID	CA38
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

<b>Northing</b>	<b>Easting</b>	<b>Elevation</b>
4991793.65	376070.92	400.22

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.005
RMSE Z	0.015
Method	STATIC GPS

PHOTOS:



Point ID	CA39
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4991185.02	365589.53	633.12

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.013
RMSE Z	0.037
Method	STATIC GPS

PHOTOS:



Point ID	CA40
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4990644.42	352175.37	484.13

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.008
RMSE Z	0.021
Method	STATIC GPS

PHOTOS:



Point ID	CA41
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4990832.18	334062.25	591.76

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.008
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	CA42
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4999425.15	341338.49	473.66

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.012
RMSE Z	0.030
Method	STATIC GPS

**PHOTOS:**



Point ID	CA43
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4997328.70	353068.66	592.28

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.010
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**





Point ID	CA44
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4997576.07	364863.21	566.30

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.006
RMSE Z	0.031
Method	STATIC GPS

**PHOTOS:**



Point ID	CA45
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4999558.15	386916.22	353.59

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.011
RMSE Z	0.023
Method	STATIC GPS

PHOTOS:



Point ID	CA46
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5009406.99	382961.56	362.05

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.007
RMSE Z	0.013
Method	STATIC GPS

**PHOTOS:**



Point ID	CA47
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
5019214.71	372901.46	395.53

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-0107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.012
RMSE Z	0.020
Method	STATIC GPS

PHOTOS:



Point ID	CA48
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5026640.90	358657.15	433.32

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.005
RMSE Z	0.018
Method	STATIC GPS

**PHOTOS:**



Point ID	CA49
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

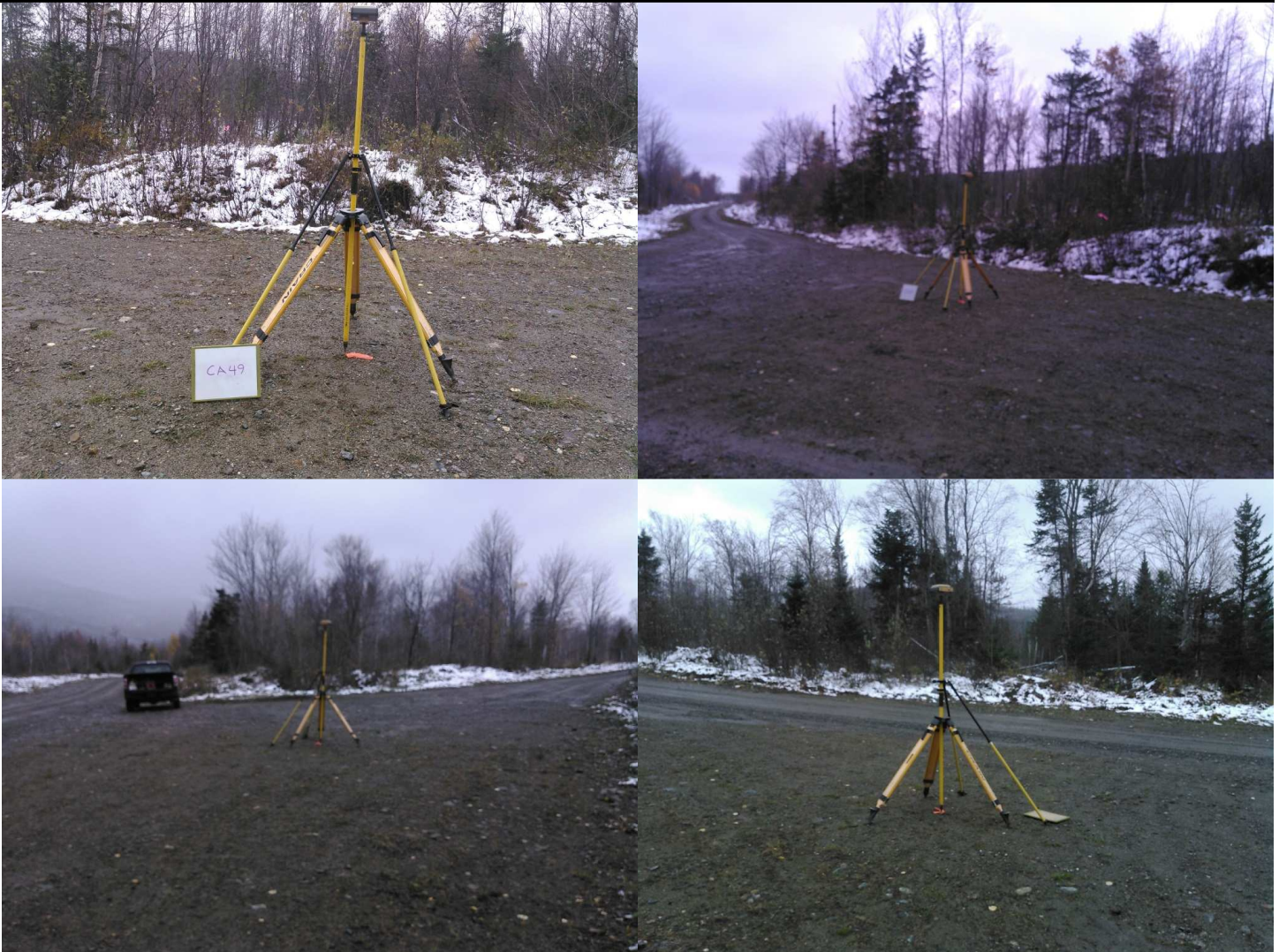
Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018855.74	361372.29	623.04

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.008
RMSE Z	0.022
Method	STATIC GPS

PHOTOS:



Point ID	CA50
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5010762.09	360110.35	595.13

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.012
RMSE Z	0.029
Method	STATIC GPS

PHOTOS:



Point ID	CA51
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018509.56	344975.02	591.70

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-2-2016
RMSE Hz	0.016
RMSE Z	0.024
Method	STATIC GPS

**PHOTOS:**





Point ID	CA52
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5006193.82	346767.18	626.36

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-2-2016
RMSE Hz	0.004
RMSE Z	0.008
Method	STATIC GPS

PHOTOS:



Point ID	CA53
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5006082.76	377454.67	418.36

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-2-2016
RMSE Hz	0.008
RMSE Z	0.015
Method	STATIC GPS

**PHOTOS:**



Point ID	FO01
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4853753.17	330597.58	136.05

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-24-2016
Occupy PT	CA01
Back Sight PT	BE01
RMSE Hz	0.004
RMSE Z	0.004

**PHOTOS:**



Point ID	FO02
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4864455.58	333534.88	145.79

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-24-2016
Occupy PT	BE02
Back Sight PT	CA03
RMSE Hz	0.019
RMSE Z	0.034

PHOTOS:



Point ID	FO03
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876872.67	330655.65	152.73

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	700
Back Sight PT	701
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO04
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4881529.33	337640.03	157.40

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-27-2016
Occupy PT	BE03
Back Sight PT	CA06
RMSE Hz	0.005
RMSE Z	0.005

**PHOTOS:**



Point ID	FO05
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4887408.46	325407.27	198.07

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA07
Back Sight PT	UA03
RMSE Hz	0.005
RMSE Z	0.005

PHOTOS:



Point ID	FO06
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876170.01	319961.38	292.28

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	702
Back Sight PT	CA08
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:





Point ID	FO07
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4887542.74	311681.44	300.89

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	BE32
Back Sight PT	CA09
RMSE Hz	0.023
RMSE Z	0.038

PHOTOS:



Point ID	FO08
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876261.23	284911.93	207.24

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	CA10
Back Sight PT	BE04
RMSE Hz	0.005
RMSE Z	0.005

**PHOTOS:**



Point ID	FO09
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4894397.98	285131.60	597.96

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	CA11
Back Sight PT	UA04
RMSE Hz	0.005
RMSE Z	0.005

PHOTOS:



Point ID	FO10
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4882117.54	292718.95	355.23

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	UA28
Back Sight PT	CA12
RMSE Hz	0.020
RMSE Z	0.028

PHOTOS:



Point ID	FO11
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4903798.30	321259.12	594.62

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA13
Back Sight PT	BE05
RMSE Hz	0.012
RMSE Z	0.012

PHOTOS:



Point ID	FO12
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4895006.53	308253.76	402.36

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA14
Back Sight PT	704
RMSE Hz	0.010
RMSE Z	0.037

PHOTOS:



Point ID	FO13
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4917402.36	337107.32	227.38

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA17
Back Sight PT	710
RMSE Hz	0.004
RMSE Z	0.005

PHOTOS:



Point ID	FO14
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4875871.28	305327.84	470.66

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	703
Back Sight PT	CA20
RMSE Hz	0.013
RMSE Z	0.027

PHOTOS:





Point ID	FO15
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4915000.81	314317.37	424.76

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA21
Back Sight PT	UA07
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO16
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4915000.81	314317.37	424.76

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-27-2016
Occupy PT	CA22
Back Sight PT	BE08
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO17
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4926781.64	327294.67	331.88

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	UA08
Back Sight PT	CA23
RMSE Hz	0.005
RMSE Z	0.005

**PHOTOS:**



Point ID	FO18
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4932993.80	338276.71	489.55

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	CA24
Back Sight PT	BE09
RMSE Hz	0.005
RMSE Z	0.006

**PHOTOS:**



Point ID	FO19
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4948428.86	327170.24	359.90

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	BE10
Back Sight PT	CA25
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO20
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4951867.60	337178.49	384.59

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-03-2016
Occupy PT	CA26
Back Sight PT	BE11
RMSE Hz	0.016
RMSE Z	0.030

PHOTOS:



Point ID	FO21
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4962222.08	328895.63	380.91

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-03-2016
Occupy PT	BE12
Back Sight PT	CA27
RMSE Hz	0.028
RMSE Z	0.040

PHOTOS:



Point ID	FO22
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4969472.01	319481.48	456.60

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-04-2016
Occupy PT	CA28
Back Sight PT	BE13
RMSE Hz	0.004
RMSE Z	0.005

PHOTOS:





Point ID	FO23
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4959976.71	347945.01	440.94

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-03-2016
Occupy PT	BE34
Back Sight PT	CA30
RMSE Hz	0.016
RMSE Z	0.030

PHOTOS:



Point ID	FO24
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

<b>Coordinate System</b>
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4952357.71	361335.70	377.77

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-04-2016
Occupy PT	BE15
Back Sight PT	CA31
RMSE Hz	0.012
RMSE Z	0.022

**PHOTOS:**



Point ID	FO25
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4953085.31	370704.44	267.87

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-04-2016
Occupy PT	CA32
Back Sight PT	UA09
RMSE Hz	0.016
RMSE Z	0.032

**PHOTOS:**



Point ID	FO26
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4966431.90	364876.72	690.49

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-01-2016
Occupy PT	CA33
Back Sight PT	BE33
RMSE Hz	0.011
RMSE Z	0.028

PHOTOS:



Point ID	FO27
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

<b>Coordinate System</b>
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4980584.55	360084.83	466.99

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-27-2016
Occupy PT	304
Back Sight PT	UA11
RMSE Hz	0.004
RMSE Z	0.005

**PHOTOS:**



Point ID	FO28
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

<b>Coordinate System</b>
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4980535.37	350737.19	529.59

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	BE16 ALT
Back Sight PT	BE16
RMSE Hz	0.023
RMSE Z	0.041

**PHOTOS:**



Point ID	FO29
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4982982.19	332091.05	438.61

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-03-2016
Occupy PT	BE17
Back Sight PT	CA37
RMSE Hz	0.020
RMSE Z	0.023

PHOTOS:



Point ID	FO30
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4991721.95	376132.91	399.73

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	BE18
Back Sight PT	CA38
RMSE Hz	0.010
RMSE Z	0.015

PHOTOS:





Point ID	FO31
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

<b>Coordinate System</b>
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4991121.90	365641.87	633.86

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	BE19
Back Sight PT	CA39
RMSE Hz	0.010
RMSE Z	0.036

**PHOTOS:**



Point ID	FO32
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4990670.02	352174.68	485.37

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA40
Back Sight PT	BE20
RMSE Hz	0.011
RMSE Z	0.024

PHOTOS:



Point ID	FO33
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4990902.32	334009.98	601.08

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-03-2016
Occupy PT	BE21
Back Sight PT	CA41
RMSE Hz	0.015
RMSE Z	0.024

**PHOTOS:**



Point ID	FO34
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4999447.17	341285.79	473.25

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	CA51
Back Sight PT	BE29
RMSE Hz	0.019
RMSE Z	0.027

PHOTOS:



Point ID	FO35
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4997275.30	353066.68	589.93

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	BE23
Back Sight PT	CA43
RMSE Hz	0.015
RMSE Z	0.028

PHOTOS:



Point ID	FO36
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4997601.57	364889.99	563.58

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	CA44
Back Sight PT	BE24
RMSE Hz	0.009
RMSE Z	0.034

PHOTOS:



Point ID	FO37
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4999383.44	386805.71	352.04

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	121
Back Sight PT	122
RMSE Hz	0.015
RMSE Z	0.027

**PHOTOS:**



Point ID	FO38
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5009333.15	383028.04	360.97

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-24-2016
Occupy PT	BE25
Back Sight PT	CA46
RMSE Hz	0.008
RMSE Z	0.013

**PHOTOS:**





Point ID	FO39
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5019237.04	372924.45	401.07

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	BE26
Back Sight PT	CA47
RMSE Hz	0.014
RMSE Z	0.021

**PHOTOS:**



Point ID	FO40
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5026683.32	358630.57	433.03

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-24-2016
Occupy PT	100
Back Sight PT	CA48
RMSE Hz	0.007
RMSE Z	0.019

**PHOTOS:**



Point ID	FO41
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018858.57	361407.54	625.84

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	CA49
Back Sight PT	BE27
RMSE Hz	0.011
RMSE Z	0.025

**PHOTOS:**



Point ID	FO42
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5010787.74	360134.11	596.05

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-24-2016
Occupy PT	CA50
Back Sight PT	BE28
RMSE Hz	0.015
RMSE Z	0.032

PHOTOS:



Point ID	FO43
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018497.35	344899.99	591.51

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	CA51
Back Sight PT	BE29
RMSE Hz	0.019
RMSE Z	0.027

PHOTOS:



Point ID	FO44
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5006117.36	377497.48	416.58

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-25-2016
Occupy PT	CA53
Back Sight PT	BE31
RMSE Hz	0.011
RMSE Z	0.018

PHOTOS:



Point ID	F045
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4971481.56	378352.57	500.88

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-01-2016
Occupy PT	149
Back Sight PT	BE47
RMSE Hz	0.011
RMSE Z	0.017

**PHOTOS:**



Point ID	FO46
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4943074.91	344355.13	468.41

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-04-2016
Occupy PT	BE07
Back Sight PT	CA19
RMSE Hz	0.022
RMSE Z	0.028

PHOTOS:





Point ID	FO47
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4908158.32	357816.66	191.03

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-27-2016
Occupy PT	BE42
Back Sight PT	711
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO48
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4980013.02	370864.01	477.92

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-27-2016
Occupy PT	307
Back Sight PT	308
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO49
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4910505.76	323335.93	371.54

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	707
Back Sight PT	708
RMSE Hz	0.005
RMSE Z	0.005

PHOTOS:



Point ID	FO50
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4917338.73	342789.44	221.76

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-27-2016
Occupy PT	717
Back Sight PT	716
RMSE Hz	0.004
RMSE Z	0.004

PHOTOS:



Point ID	FO51
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4940554.88	335143.06	520.96

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	BE38
Back Sight PT	715
RMSE Hz	0.005
RMSE Z	0.005

PHOTOS:



Point ID	FO52
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4984302.57	375288.35	483.05

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-01-2016
Occupy PT	146
Back Sight PT	147
RMSE Hz	0.011
RMSE Z	0.013

PHOTOS:



Point ID	FO53
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4964664.69	357163.81	569.81

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-01-2016
Occupy PT	158
Back Sight PT	159
RMSE Hz	0.013
RMSE Z	0.035

PHOTOS:



Point ID	FO54
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4896329.35	324454.61	415.22

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	705
Back Sight PT	706
RMSE Hz	0.005
RMSE Z	0.005

**PHOTOS:**





Point ID	FO55
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4903700.94	338746.61	206.87

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	10-26-2016
Occupy PT	709
Back Sight PT	BE36
RMSE Hz	0.021
RMSE Z	0.027

PHOTOS:



Point ID	SH01
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5006233.49	346708.98	618.14

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-2-2016
RMSE Hz	0.005
RMSE Z	0.010
Method	STATIC GPS

**PHOTOS:**



Point ID	SH02
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4970883.94	338834.66	385.79

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-2-2016
RMSE Hz	0.006
RMSE Z	0.024
Method	STATIC GPS

**PHOTOS:**



Point ID	SH03
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4926769.23	327278.14	331.69

Operator	John Allen
Instrument Model	Topcon GTS300
Date (MM-DD-YYYY)	11-02-2016
Occupy PT	UA08
Back Sight PT	CA23
RMSE Hz	0.001
RMSE Z	0.002

**PHOTOS:**



Point ID	SH01
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4900594.27	339016.64	159.48

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.016
RMSE Z	0.022
Method	STATIC GPS

PHOTOS:



Point ID	SH05
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4870797.98	337005.51	177.78

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	TW01
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4857707.44	337761.03	308.60

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	TW02
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4938012.63	327042.13	340.42

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**





Point ID	TW03
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5018942.34	361372.81	625.31

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.008
RMSE Z	0.022
Method	STATIC GPS

PHOTOS:



Point ID	UA01
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4870781.18	336995.24	176.70

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	UA02
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876759.43	330876.80	153.94

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	UA03
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4887389.87	325359.53	193.46

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA04
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4894341.64	285090.32	597.84

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA05
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

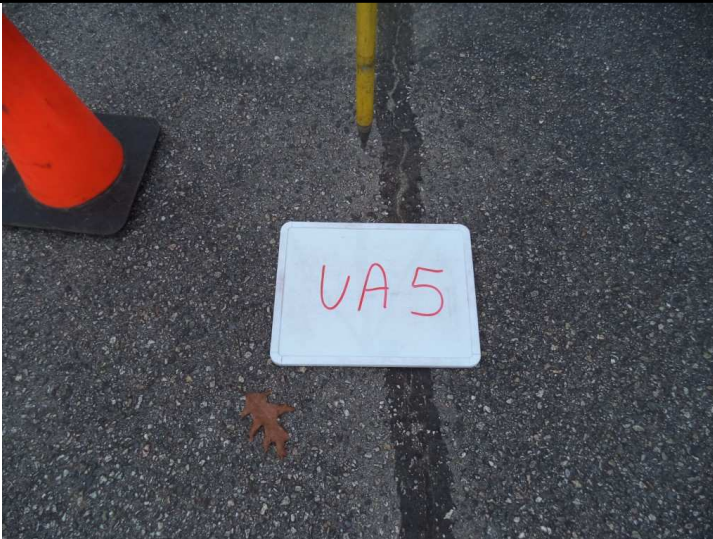
Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4918797.64	324944.73	243.83

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA06
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4937961.40	326595.31	344.19

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	UA07
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4914990.50	314357.44	424.68

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:





Point ID	UA08
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4926825.96	327283.45	332.84

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-02-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA09
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4953135.01	370787.82	266.64

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-01-2016
RMSE Hz	0.013
RMSE Z	0.031
Method	STATIC GPS

**PHOTOS:**



Point ID	UA10
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4980339.59	370278.93	464.00

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA11
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4980639.77	360128.10	467.67

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00107
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	UA12
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4999565.78	386935.96	353.66

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.011
RMSE Z	0.024
Method	STATIC GPS

**PHOTOS:**



Point ID	UA13
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5026634.04	358697.27	433.01

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.011
RMSE Z	0.027
Method	STATIC GPS

**PHOTOS:**



Point ID	UA14
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4918572.97	334765.00	215.36

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	UA15
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

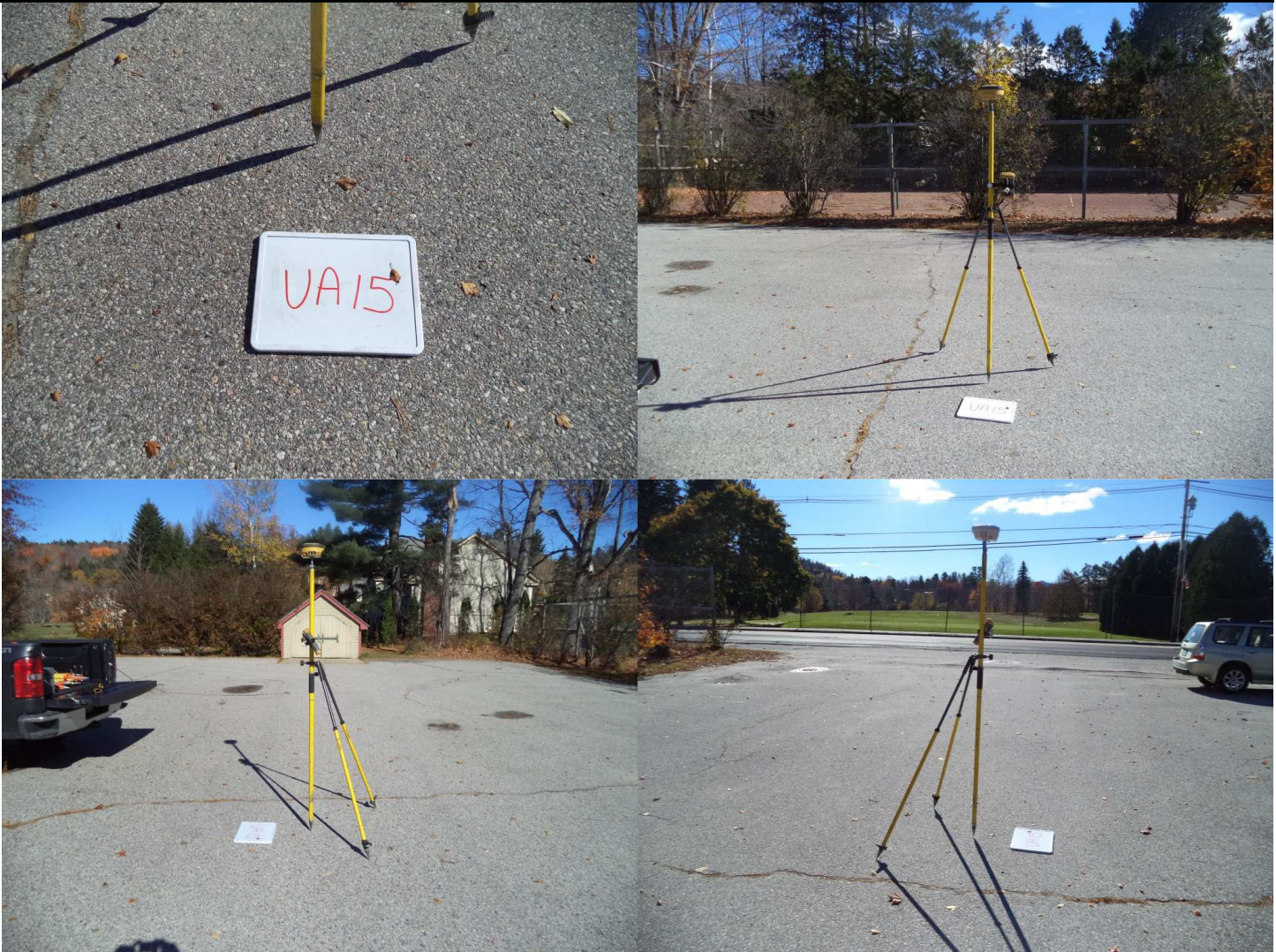
Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

<b>Northing</b>	<b>Easting</b>	<b>Elevation</b>
4890526.44	325345.83	231.05

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:





Point ID	UA16
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4904488.38	312377.65	821.23

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA17
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4932041.76	329080.10	345.13

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	UA18
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4859403.89	332174.39	147.33

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA19
Project No.	28794
Project Name	Umbagog
State	Maine
County	Oxford
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4917594.52	342930.28	218.41

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	UA20
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4879987.83	286051.69	246.07

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA21
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

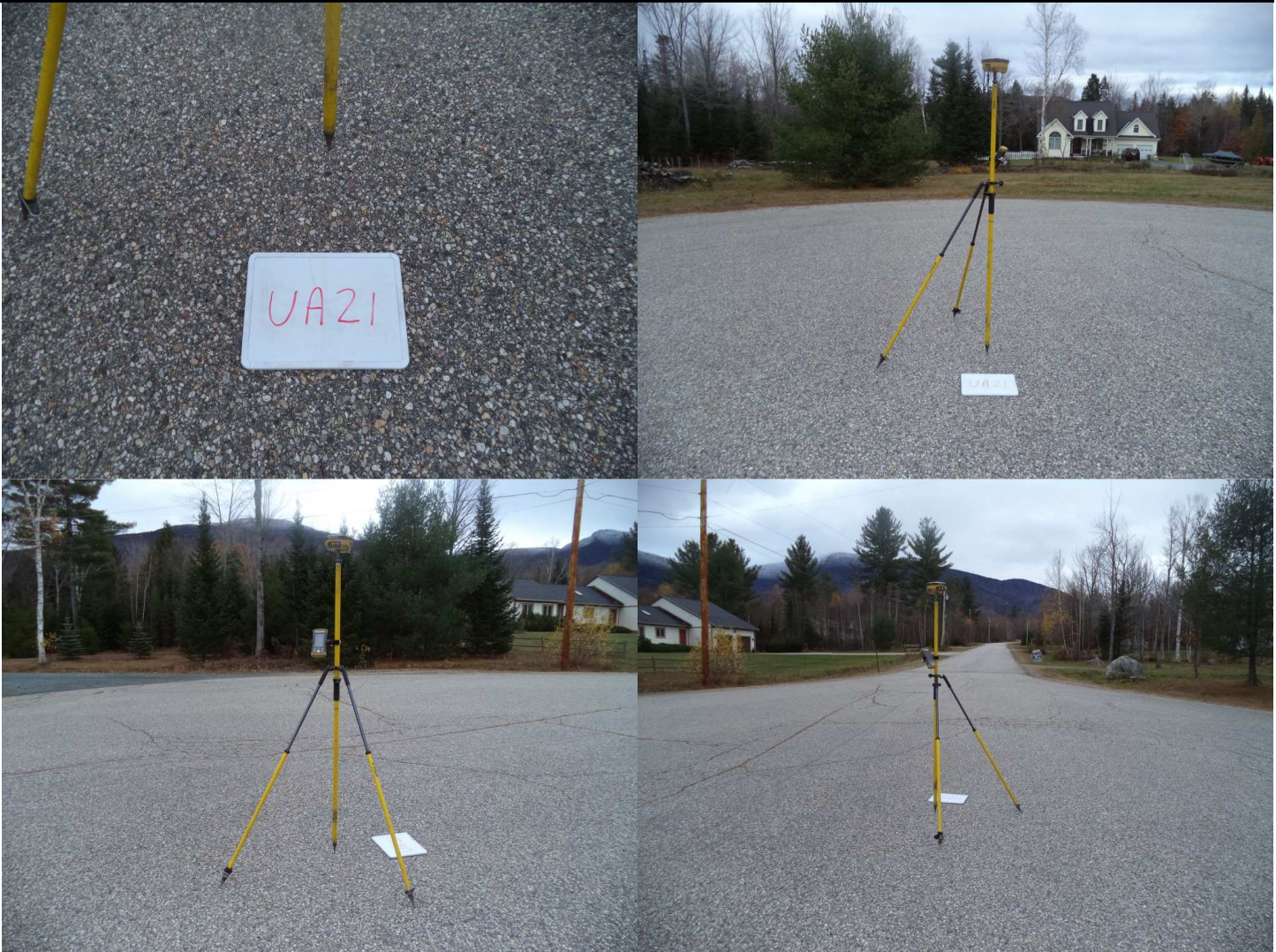
Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4913988.70	326013.28	329.51

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA22
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4898981.11	307428.52	578.71

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA23
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4853155.48	336419.48	142.99

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:





Point ID	UA24
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4876151.96	319946.57	291.26

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.002
RMSE Z	0.003
Method	RTK GPS

PHOTOS:



Point ID	UA25
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4944633.64	321569.02	358.67

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0509
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-03-2016
RMSE Hz	0.025
RMSE Z	0.033
Method	STATIC GPS

**PHOTOS:**



Point ID	UA26
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4906464.28	322544.03	493.03

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.001
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	UA27
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4886147.43	285352.87	401.92

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	UA28
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4882151.22	292711.06	353.97

Operator	John Allen
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0515
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2016
RMSE Hz	0.017
RMSE Z	0.025
Method	STATIC GPS

PHOTOS:



Point ID	BBDW29
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
X	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4882543.85	328708.54	164.88

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-26-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	D47
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Coos
Quad	

	Aerial Target
	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
X	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4918488.21	334626.13	219.15

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	OC2809
Project No.	28794
Project Name	Umbagog
State	New Hampshire
County	Carroll
Quad	

	Aerial Target
	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
X	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4872850.48	332562.41	142.39

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.003
RMSE Z	0.004
Method	RTK GPS

PHOTOS:





Point ID	PF1188
Project No.	28794
Project Name	Umbagog
State	Maine
County	Franklin, Rangeley Airport
Quad	

	Aerial Target
	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
X	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4983268.83	369139.49	552.15

Operator	Dan Livingstone
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0788
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2016
RMSE Hz	0.005
RMSE Z	0.013
Method	STATIC GPS

PHOTOS:



## **USGS – Eastern Central Maine LiDAR and Check Point Control Surveys for Project: Umbagog 2017**

Sewall performed survey work to establish and collect vertical and horizontal quality control points throughout the project area. The project included collecting 11 LiDAR calibration points, 8 non-vegetated (NVA) check points, 4 vegetated check points (VVA) and 1 published control point. A total of 24 points were collected for this project.

A combination of RTK GPS, fast static GPS, and traditional surveying methods were used during this project. The RTK GPS survey procedure involved placing a GPS receiver on a check point and collecting three minute “fixed” observations. RTK GPS corrected observations were provided from a Virtual Reference Station Systems (VRS network – KeyNetGPS, Inc. or Maine Dept. of Transportation).

Virtual Reference Station System is a series of continuously operating, high precision GNSS reference stations working through a cellular modem. Two observations were taken at each check point and the two coordinates were compared and averaged. Published control check points were also located with RTK methods. A Hiper II centimeter accuracy survey grade GPS receiver was used to collect the data. A total of 16 points were collected using this method.

In areas with limited cellular coverage, fast static GPS methods were used to collect check points. The methods consisted of collecting data using two or three Hiper GD dual frequency GPS receivers. One unit was setup as a “base” which collected data during all of the “rover” sessions within a point cluster area. The point clusters consisted of 2 to 5 points each. The data was downloaded and processed using the closest CORS station. A total of 4 points were collected using this method.

In areas under the tree canopy, traditional surveying methods were used. Pairs of points were collected in open areas using GPS methods. The points were occupied using a Topcon GTS total station to survey the forested check points as well as locating a few other points near the forested points. Multiple observations were collected at each check point and the coordinates were compared and averaged. A total of 4 points were collected using this method.

All of the GPS information was downloaded, processed and analyzed using Topcon Tools processing software. Our final horizontal coordinates are shown in UTM – Zone 19N, NAD83 (2011) Epoch 2010, meters. The final elevations refer to NAVD 88 (GEOID12b), meters.

<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 6/28/2017

Station	Northing (Y)	Easting (X)	Elevation	Description
BE201	5070672.57	572427.21	147.36	GRAVEL
BE202	5071580.05	552390.71	171.28	PAVEMENT
BE203	5103918.64	563252.83	217.37	GRAVEL
BE204	5097377.83	570419.74	279.91	GRAVEL
BE205	5112129.93	550377.74	246.41	GRAVEL
BE206	5079794.46	573021.16	125.68	GRAVEL

<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM Zone 19N NAD83 (2011)  
 Vertical Datum: NAVD88 - GEOID12B  
 Units: Meters  
 Date: 6/28/2017

Station	Northing (Y)	Easting (X)	Elevation	Description
CA201	5071551.11	552377.71	170.18	PAVEMENT
CA202	5070694.53	572417.40	147.45	PAVEMENT
CA203	5086625.72	551689.16	237.64	GRAVEL
CA204	5095364.04	556822.66	137.84	PAVEMENT
CA205	5104077.97	563173.77	217.13	PAVEMENT
CA206	5110496.03	572922.20	180.11	PAVEMENT
CA207	5112168.56	559642.17	279.54	PAVEMENT
CA208	5112117.96	550390.03	245.04	PAVEMENT
CA209	5097387.62	570454.80	280.38	PAVEMENT
CA210	5079837.15	572989.80	124.74	GRAVEL
CA211	5084750.07	563428.41	183.55	GRAVEL

<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
Project Name: Umbagog  
Horizontal Datum: UTM Zone 19N NAD83 (2011)  
Vertical Datum: NAVD88 - GEOID12B  
Units: Meters  
Date: 6/28/2017

Station	Northing (Y)	Easting (X)	Elevation	Description
FO201	5071567.50	552349.31	169.38	FOREST
FO202	5112151.11	559636.83	278.71	FOREST
FO203	5084779.65	563397.97	181.90	FOREST
FO204	5070635.78	572461.13	148.96	FOREST

<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
Project Name: Umbagog  
Horizontal Datum: UTM Zone 19N NAD83 (2011)  
Vertical Datum: NAVD88 - GEOID12B  
Units: Meters  
Date: 6/28/2017

Station	Northing (Y)	Easting (X)	Elevation	Description
UA201	5095366.99	556849.98	137.72	PAVEMENT
UA202	5110504.47	572937.66	180.6	PAVEMENT

<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
Project Name: Umbagog  
Horizontal Datum: UTM Zone 19N NAD83 (2011)  
Vertical Datum: NAVD88 - GEOID12B  
Units: Meters  
Date: 6/28/2017

Station	Northing (Y)	Easting (X)	Elevation	Description
MDOT JIMMY	5106897.14	564680.48	169.85	DISK

Point ID	BE201
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5070672.57	572427.21	147.36

Operator	Rob Prescott
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	1.8 Meters

Date (MM-DD-YYYY)	05-11-2017
RMSE Hz	0.019
RMSE Z	0.030
Method	STATIC GPS

PHOTOS:





Point ID	BE202
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
5071580.05	552390.71	171.28

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	BE203
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5103918.64	563252.83	217.37

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	BE204
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5097377.83	570419.74	279.91

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



Point ID	BE205
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
5112129.93	550377.74	246.41

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	BE206
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

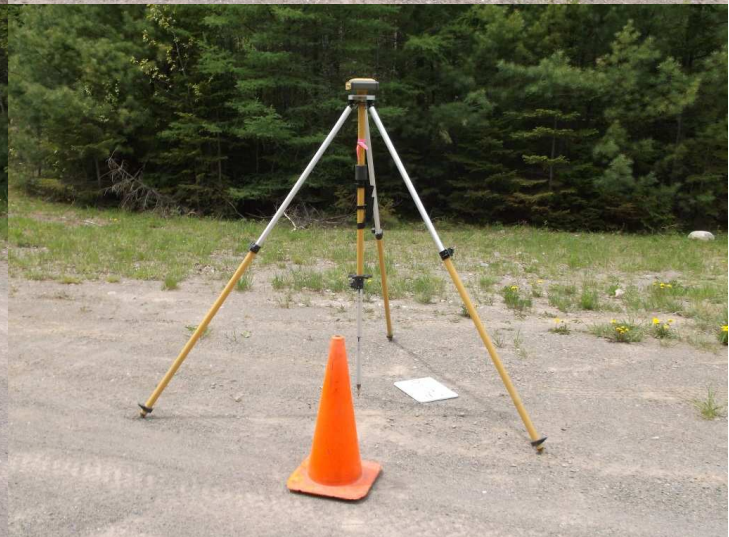
Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5079794.46	573021.16	125.68

Operator	Rob Prescott
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	1.8 Meters

Date (MM-DD-YYYY)	05-25-2017
RMSE Hz	0.019
RMSE Z	0.030
Method	STATIC GPS

**PHOTOS:**



Point ID	CA201
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5071551.11	552377.71	170.18

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	CA202
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5070694.53	572417.40	147.45

Operator	Rob Prescott
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	1.8 Meters

Date (MM-DD-YYYY)	05-11-2017
RMSE Hz	0.019
RMSE Z	0.030
Method	STATIC GPS

PHOTOS:



Point ID	CA203
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5086625.72	551689.16	237.64

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:





Point ID	CA204
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
5095364.04	556822.66	137.84

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	CA205
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5104077.97	563173.77	217.13

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	CA206
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
5110496.03	572922.20	180.11

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.003
RMSE Z	0.003
Method	RTK GPS

PHOTOS:



Point ID	CA207
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5112168.56	559642.17	279.54

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.003
RMSE Z	0.003
Method	RTK GPS

PHOTOS:



Point ID	CA208
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5112117.96	550390.03	245.04

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	CA209
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5097387.62	570454.80	280.38

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

**PHOTOS:**



Point ID	CA210
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

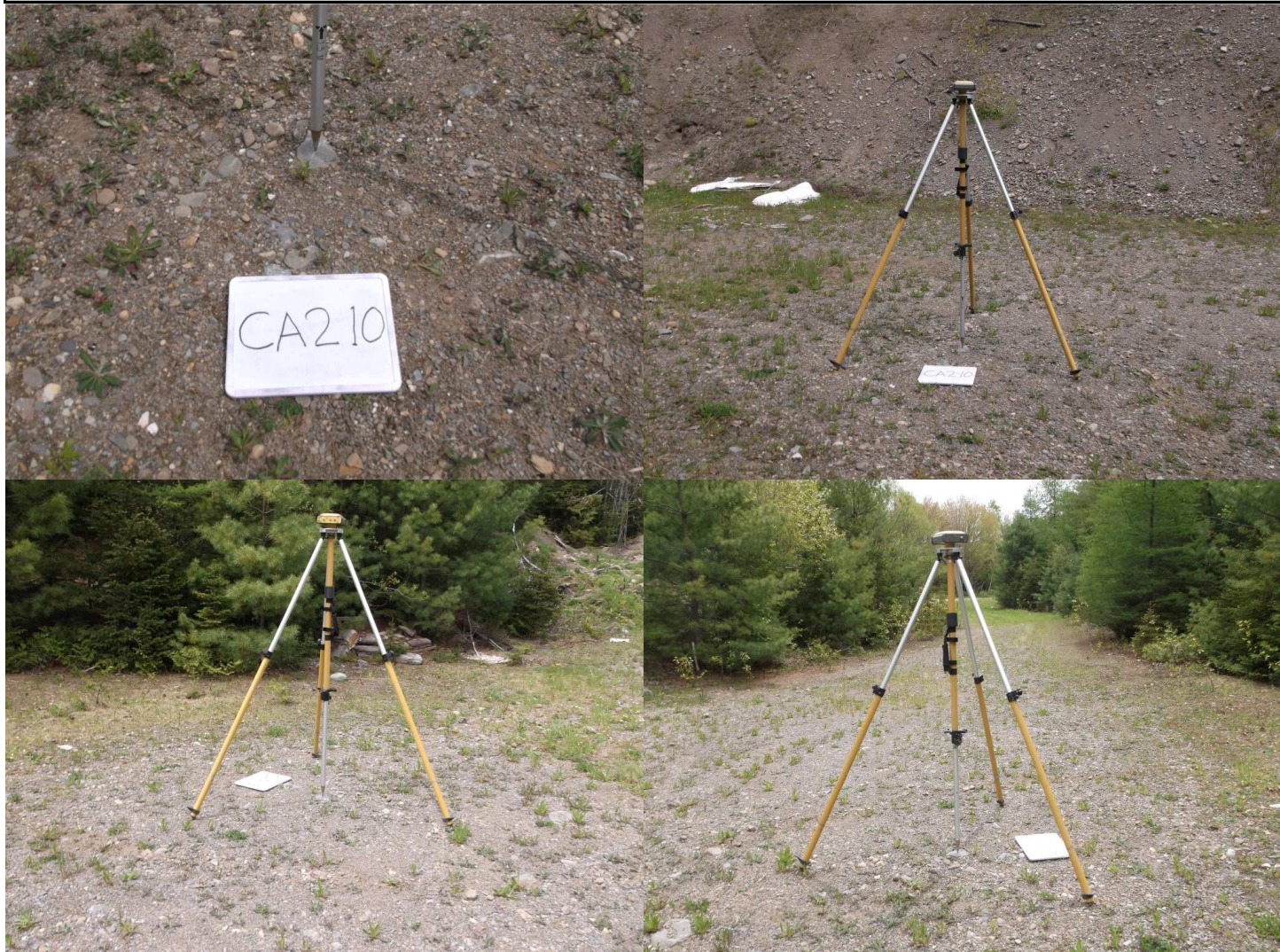
Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5079837.15	572989.80	124.74

Operator	Rob Prescott
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	1.8 Meters

Date (MM-DD-YYYY)	05-25-2017
RMSE Hz	0.017
RMSE Z	0.030
Method	STATIC GPS

**PHOTOS:**



Point ID	CA211
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5084750.07	563428.41	183.55

Operator	Rob Prescott
Receiver Model	Topcon Hiper GD
Receiver S/N	272-0793
Antenna Height	1.8 Meters

Date (MM-DD-YYYY)	05-25-2017
RMSE Hz	0.016
RMSE Z	0.030
Method	STATIC GPS

**PHOTOS:**





Point ID	FO201
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5071567.50	552349.31	169.38

Operator	John Allen
Instrument Model	Topcon GTS311
Date (MM-DD-YYYY)	05-03-2017
Occupy PT	CA201
Back Sight PT	BE202
RMSE Hz	0.002
RMSE Z	0.002

**PHOTOS:**



Point ID	FO202
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5112151.11	559636.83	278.71

Operator	John Allen
Instrument Model	Topcon GTS311
Date (MM-DD-YYYY)	05-03-2017
Occupy PT	CA207
Back Sight PT	600
RMSE Hz	0.001
RMSE Z	0.002

**PHOTOS:**



Point ID	FO203
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5084779.65	563397.97	181.90

Operator	Rob Prescott
Instrument Model	Topcon GTS311
Date (MM-DD-YYYY)	05-25-2017
Occupy PT	CA211
Back Sight PT	916
RMSE Hz	0.015
RMSE Z	0.030

**PHOTOS:**



Point ID	FO204
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5070635.78	572461.13	148.96

Operator	Rob Prescott
Instrument Model	Topcon GTS311
Date (MM-DD-YYYY)	05-11-2017
Occupy PT	CA202
Back Sight PT	BE201
RMSE Hz	0.019
RMSE Z	0.030

**PHOTOS:**



Point ID	UA201
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
5095366.99	556849.98	137.72

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

**PHOTOS:**



Point ID	UA202
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
5110504.47	572937.66	180.60

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.002
RMSE Z	0.002
Method	RTK GPS

PHOTOS:



Point ID	MDOT JIMMY
Project No.	28794
Project Name	Umbagog Spring 2017
State	Maine
County	Aroostook
Quad	

	Aerial Target
	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
X	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
5106897.14	564680.48	169.85

Operator	John Allen
Receiver Model	Topcon Hiper II
Receiver S/N	763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	05-03-2017
RMSE Hz	0.001
RMSE Z	0.001
Method	RTK GPS

PHOTOS:



## **USGS –Northern New Hampshire LiDAR and Check Point Control Surveys for Project: Umbagog**

Sewall performed survey work to establish and collect vertical and horizontal quality control points throughout the project area. The project included collecting 4 LiDAR calibration points, 3 non-vegetated (NVA) check points, 3 vegetated check points (VVA) and 1 published control points. A total of 11 points were collected for this project.

A combination of RTK GPS and static GPS, and traditional surveying methods were used during this project. The RTK GPS survey procedure involved placing a GPS receiver on a check point and collecting three minute “fixed” observations. RTK GPS corrected observations were provided from a Virtual Reference Station Systems (VRS network – KeyNetGPS, Inc. – New England).

Virtual Reference Station System is a series of continuously operating, high precision GNSS reference stations working through a cellular modem. Two observations were taken at each check point and the two coordinates were compared and averaged. Published control check points were also located with RTK methods. A Hiper II centimeter accuracy survey grade GPS receiver was used to collect the data.

In areas with limited cellular coverage, Static GPS methods were used to collect check points. The methods consisted of collecting data using a Hiper II dual frequency GPS receivers. The data was downloaded and processed using OPUS-RS. A total of 5 points were collected using this method.

In areas under the tree canopy, traditional surveying methods were used. Pairs of points were collected in open areas using GPS methods. The points were occupied using a Topcon DS203AC total station to survey the forested check points. Multiple observations were collected at each check point and the coordinates were compared and averaged. A total of 3 points were collected using this method.

All of the GPS information was downloaded, processed and analyzed using Topcon Tools processing software. Our final horizontal coordinates are shown in UTM – Zone 19N, NAD83 (2011) Epoch 2010, meters. The final elevations refer to NAVD 88 (GEOID12b), meters.



<b>GPS Control Summary</b>
----------------------------

Project Number: 84815S  
 Project Name: Umbagog  
 Horizontal Datum: UTM - Zone 19  
 Vertical Datum: NAD83 (2011) GEOID12B  
 Units: Meters  
 Date: 11-13-2017

Station	Northing (Y)	Easting (X)	Elevation	Description
CA1	4886687.86	272265.89	335.72	ASPHALT
CA2	4884661.96	275448.76	380.02	GRAVEL
CA3	4879784.98	276819.63	551.66	ASPHALT
CA4	4884030.77	272886.67	427.86	CONCRETE
UA1	4879796.90	276779.13	552.02	ASPHALT
BE1	4886693.58	272275.72	335.61	GRAVEL
BE2	4884042.39	272850.39	430.01	GRAVEL
FO1	4884057.77	272831.23	434.98	FORESTED
FO2	4879811.90	276781.15	550.13	FORESTED
FO3	4886711.57	272288.61	335.81	FORESTED
PUBLISHED CONTROL	4880575.51	276227.30	564.89	DISK BEAVER POND

Point ID	CA1
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4886687.86	272265.89	335.72

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	10-26-2017
RMSE Hz	0.01
RMSE Z	0.02
Method	STATIC GPS

PHOTOS:



Point ID	CA2
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4884661.96	275448.76	380.02

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0793-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	10-26-2017
RMSE Hz	0.01
RMSE Z	0.03
Method	STATIC GPS

PHOTOS:



Point ID	CA3
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

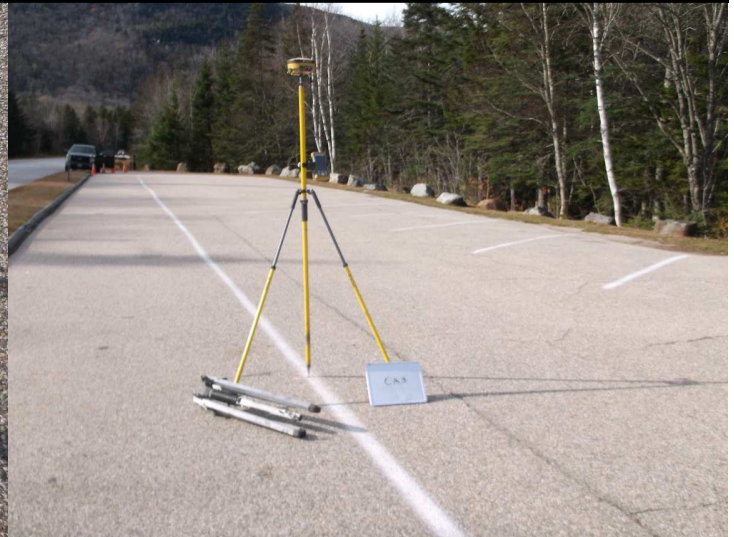
Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4879784.98	276819.63	551.66

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.01
RMSE Z	0.02
Method	RTK GPS

PHOTOS:



Point ID	CA4
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4884030.77	272886.67	427.86

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0793-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.01
RMSE Z	0.03
Method	STATIC GPS

PHOTOS:



Point ID	UA1
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4879796.90	276779.13	552.02

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.01
RMSE Z	0.02
Method	RTK GPS

PHOTOS:



Point ID	BE1
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4886693.58	272275.72	335.61

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	10-26-2017
RMSE Hz	0.01
RMSE Z	0.03
Method	STATIC GPS

**PHOTOS:**



Point ID	BE2
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4884042.39	272850.39	430.01

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.01
RMSE Z	0.03
Method	STATIC GPS

**PHOTOS:**





Point ID	FO1
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

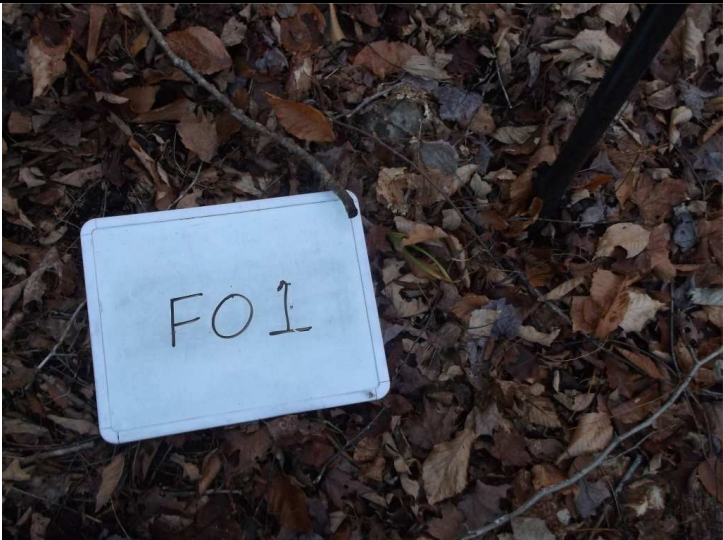
	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

<b>Northing</b>	<b>Easting</b>	<b>Elevation</b>
4884057.77	272831.23	434.98

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	11-08-2017
Occupy PT	BE2
Back Sight PT	CA4
RMSE Hz	0.01
RMSE Z	0.03

**PHOTOS:**



Point ID	FO2
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
UTM – Zone 19N	
NAVD88	
GEOID12B	
Meters	

Northing	Easting	Elevation
4879811.90	276781.15	550.13

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-27-2017
Occupy PT	UA1
Back Sight PT	CA3
RMSE Hz	0.01
RMSE Z	0.02

**PHOTOS:**



Point ID	FO3
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

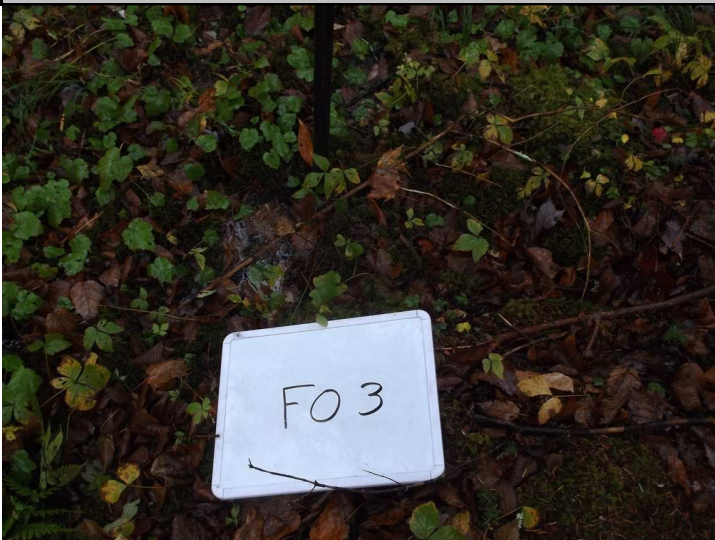
	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 19N
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4886711.57	272288.61	335.81

Operator	Dan Livingstone
Instrument Model	Topcon DS203AC
Date (MM-DD-YYYY)	10-26-2017
Occupy PT	CA1
Back Sight PT	BE1
RMSE Hz	0.01
RMSE Z	0.02

PHOTOS:



Point ID	BEAVER POND
Project No.	28794
Project Name	Umbagog Fall 2017
State	New Hampshire
County	Grafton
Quad	

	Aerial Target
	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
X	Published Control

Coordinate System	NAD83(2011)
	UTM – Zone 19N
	NAVD88
	GEOID12B
	Meters

Northing	Easting	Elevation
4880575.51	276227.30	564.89

Operator	Dan Livingstone
Receiver Model	Topcon Hiper II
Receiver S/N	0763-00106
Antenna Height	2.0 Meters

Date (MM-DD-YYYY)	10-26-2017
RMSE Hz	0.01
RMSE Z	0.03
Method	RTK GPS

PHOTOS:

