Project Report Appendices

The following section contains the appendices as listed in the South Central Pennsylvania 2017 LiDAR Project Report.

Appendix A

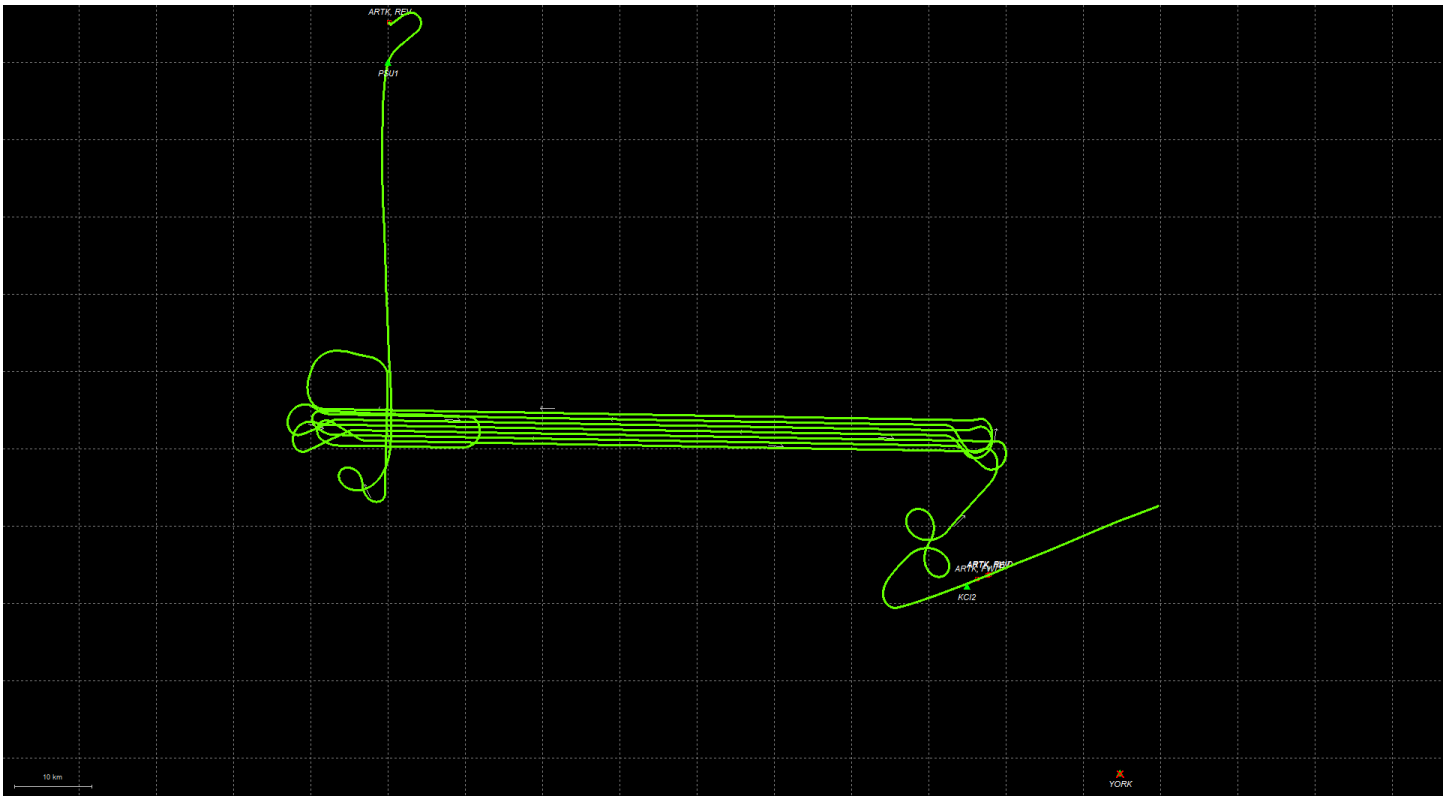
GPS/IMU Processing Statistics
Flight Logs
Base Station Logs

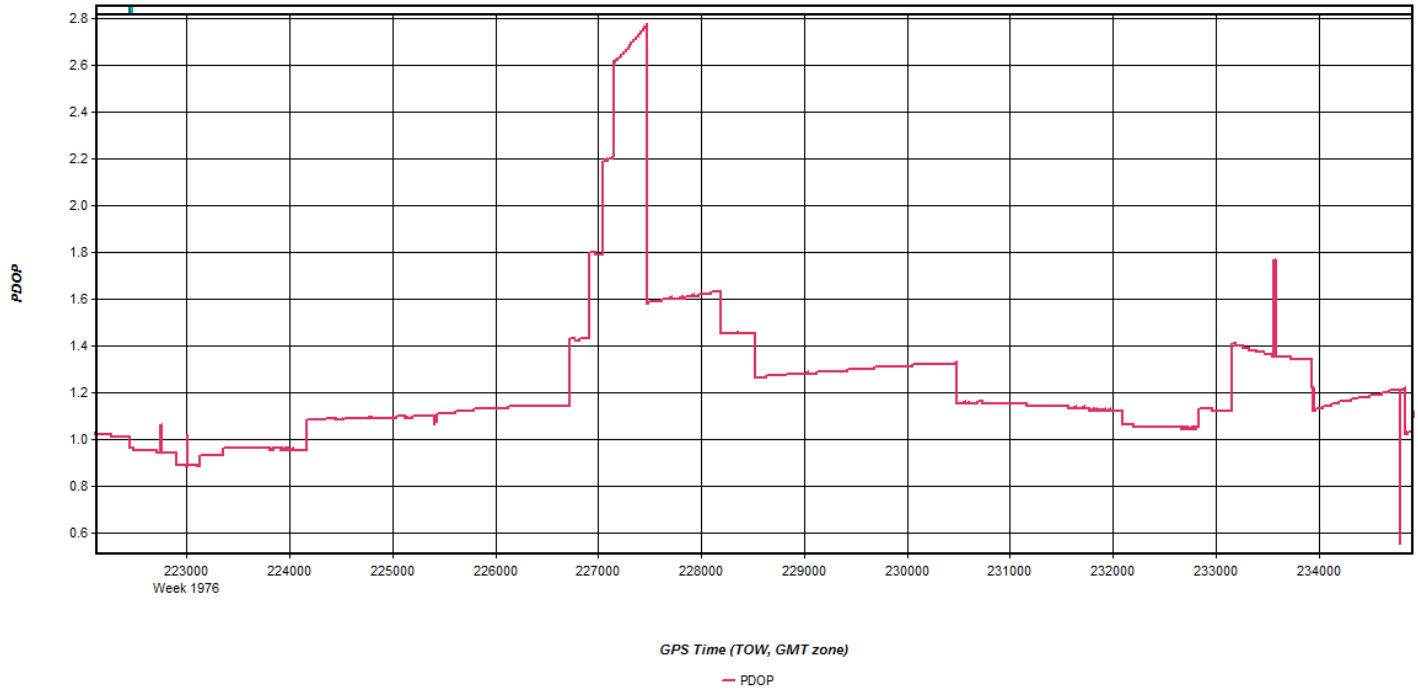
There were 40 total lifts. Flight-related data are found on the following pages.

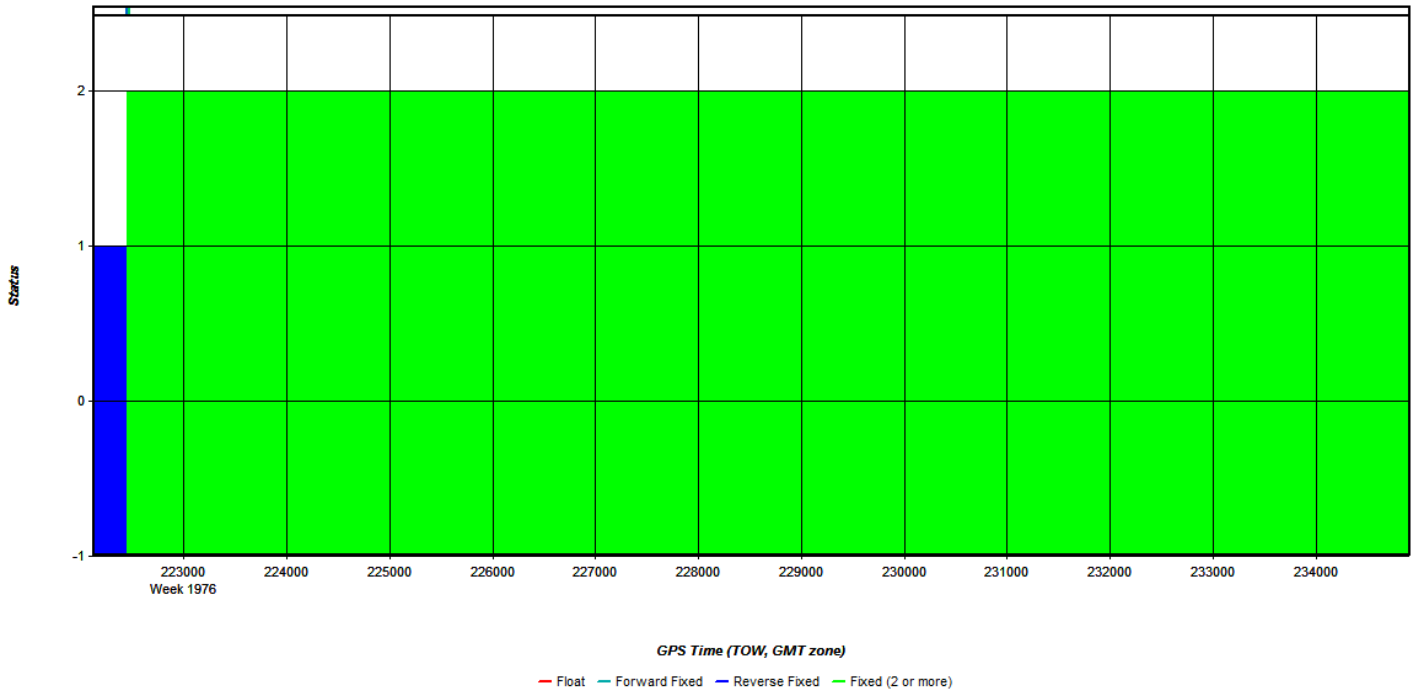
November 21, 2017-A (N812TB, SN7161) 3
November 21, 2017-B (N812TB, SN7161) 12
November 23, 2017-A (N73TM, SN175) 21
November 23, 2017-A (N812TB, SN7161) 26
November 23, 2017-A (N1107Q, SN1256) 34
November 24, 2017-A (N1107Q, SN1256) 39
November 24, 2017-B (N1107Q, SN1256) 44
November 24, 2017-C (N1107Q, SN1256) 49
November 24, 2017-A (N812TB, SN7161) 54
November 24, 2017-B (N812TB, SN7161) 63
November 24, 2017-A (N73TM, SN175) 72
November 24, 2017-B (N73TM, SN175) 77
November 26, 2017-A (N1107Q, SN1256) 82
November 27, 2017-A (N1107Q, SN1256) 87
November 27, 2017-B (N1107Q, SN1256) 92
November 27, 2017-A (N73TM, SN175) 97
November 28, 2017-A (N73TM, SN175) 102
November 28, 2017-A (N812TB, SN7161) 106
November 28, 2017-A (N1107Q, SN1256) 115
November 28, 2017-B (N1107Q, SN1256) 120
November 29, 2017-A (N812TB, SN7161) 125
November 29, 2017-B (N812TB, SN7161) 134
November 29, 2017-A (N916WC, SN8119) 141
November 29, 2017-B (N916WC, SN8119) 149
December 1, 2017-A (N812TB, SN7161) 157
December 1, 2017-A (N916WC, SN8119) 165
December 2, 2017-A (N916WC, SN8119) 173
December 2, 2017-A (N812TB, SN7161) 181
December 2, 2017-B (N812TB, SN7161) 189
December 2, 2017-C (N812TB, SN7161) 197
December 3, 2017-A (N916WC, SN8119) 206
December 3, 2017-B (N812TB, SN7161) 214
December 4, 2017-A (N812TB, SN7161) 223
December 4, 2017-A (N916WC, SN8119) 232

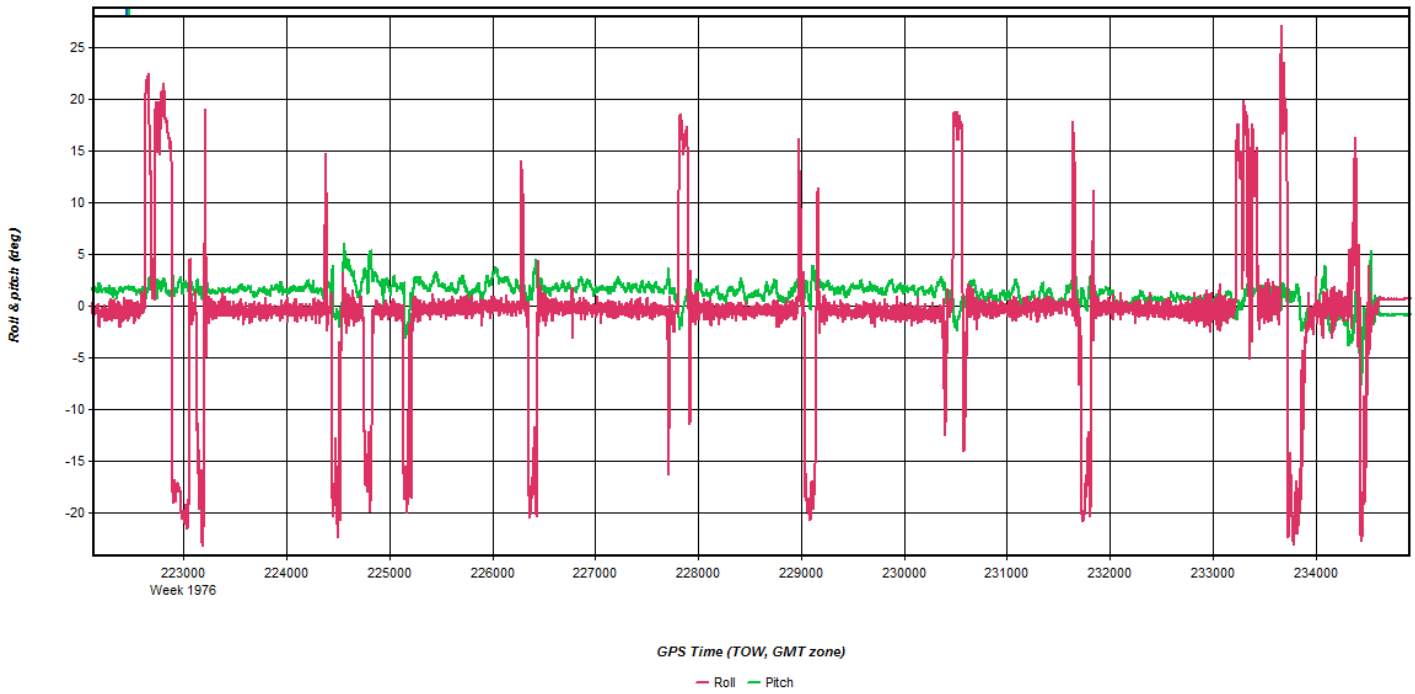
December 4, 2017-B (N916WC, SN8119) 240
December 6, 2017-A (N916WC, SN8119) 248
December 8, 2017-A (N916WC, SN8119) 256
December 8, 2017-B (N916WC, SN8119) 264
December 8, 2017-C (N916WC, SN8119) 272
December 21, 2017-A (N916WC, SN8119) 281

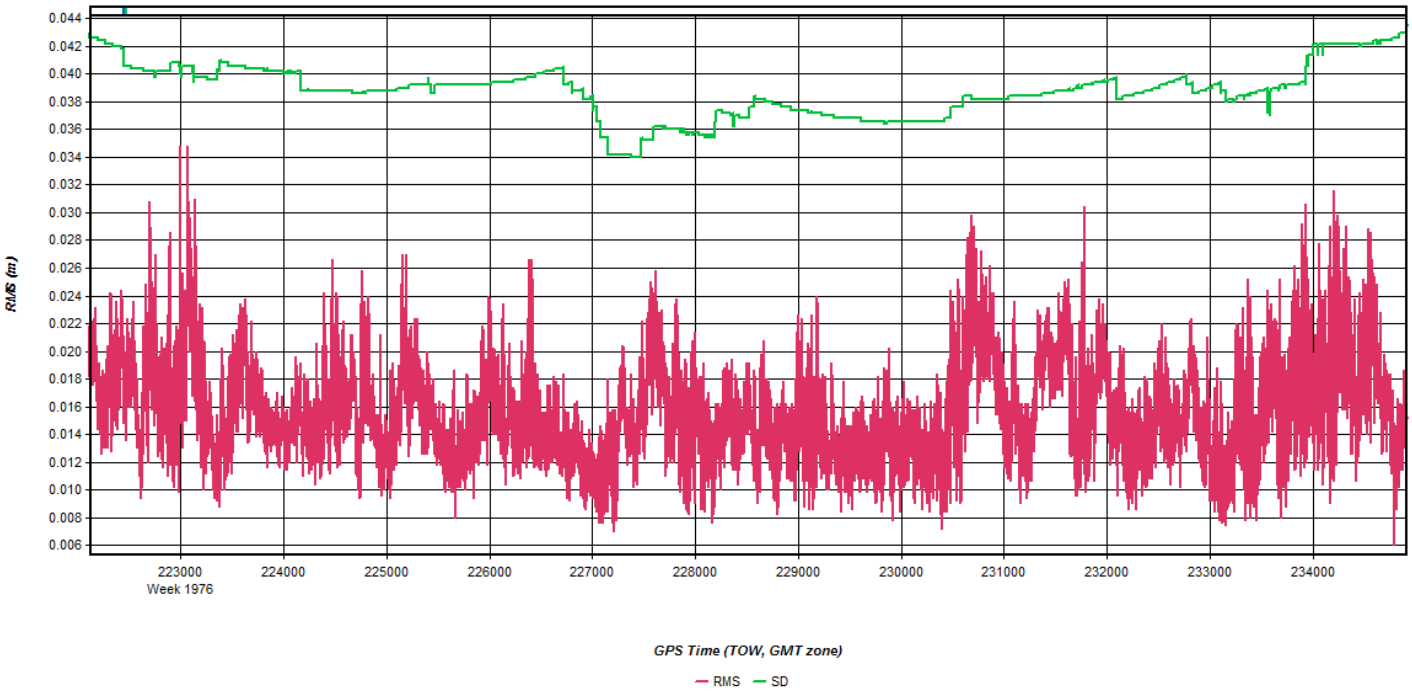
November 21, 2017-A (N812TB, SN7161)

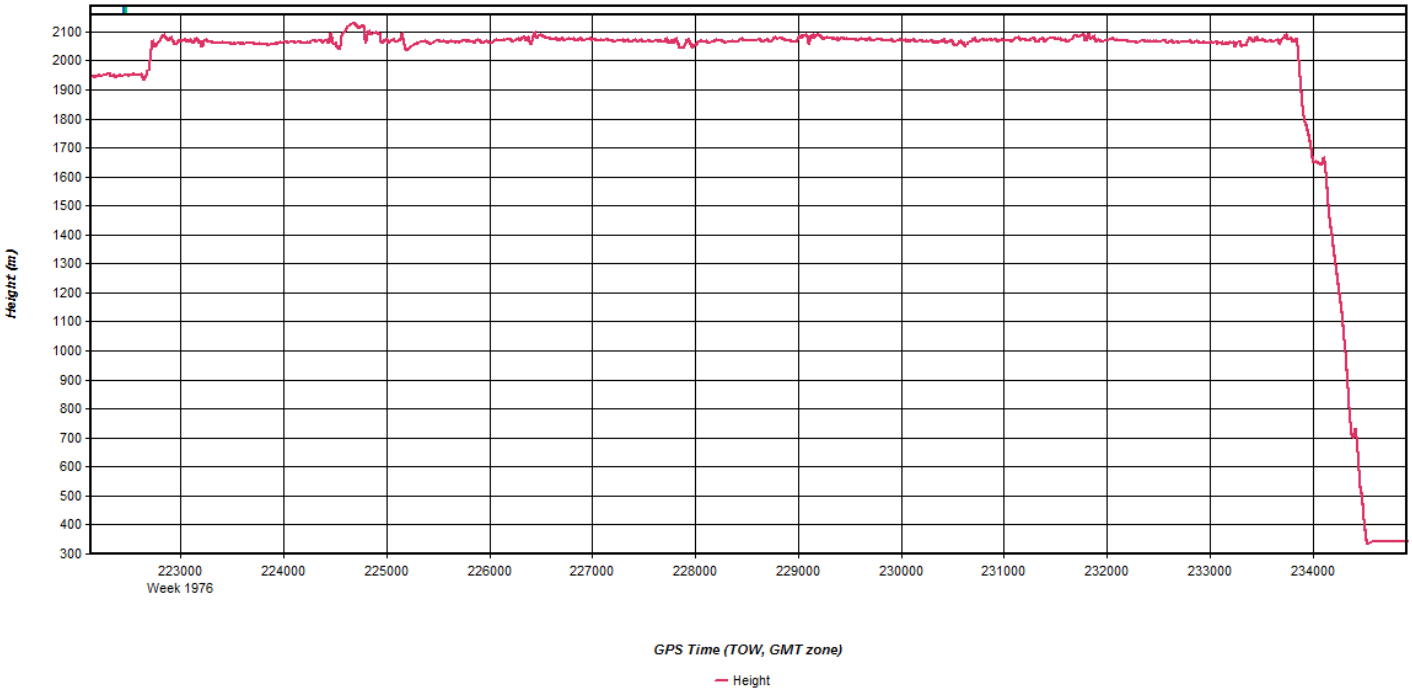

ARTK_REM
PSU1
ARTK_REM
KCI2
10 km
YORK

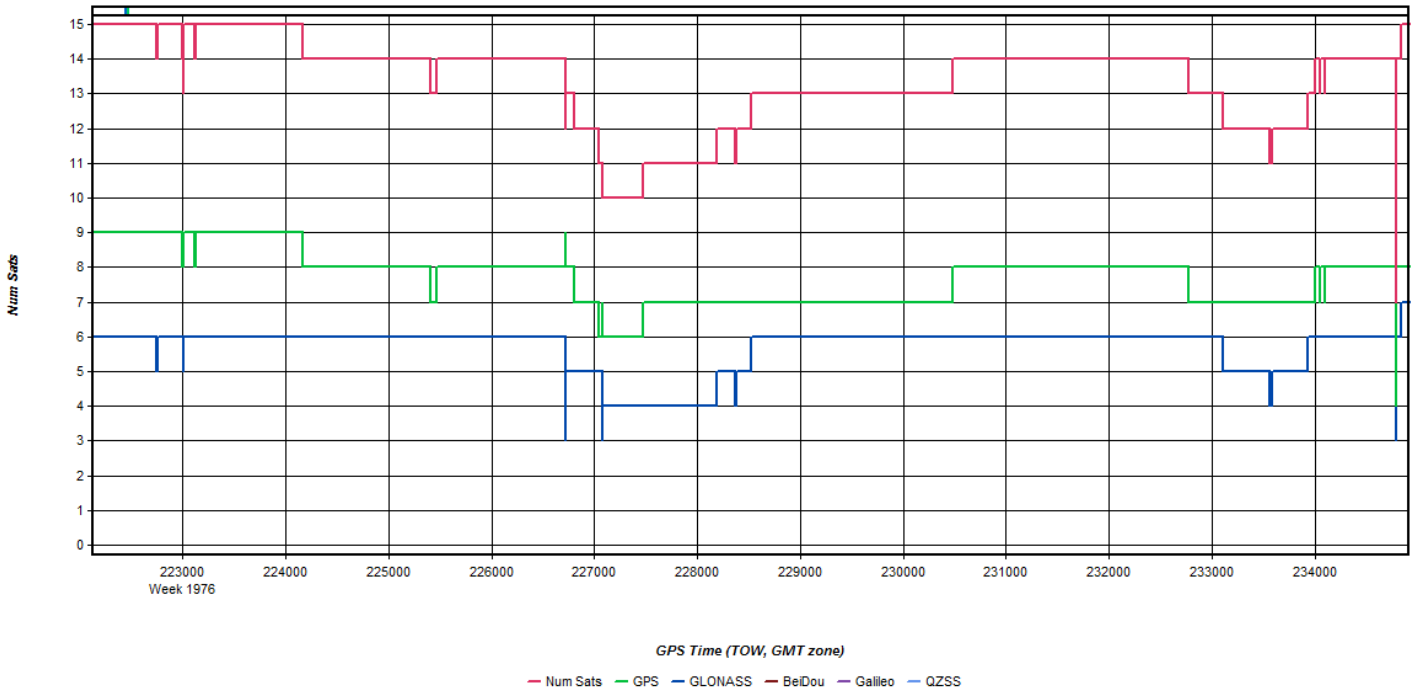

PDOP
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
PDOP

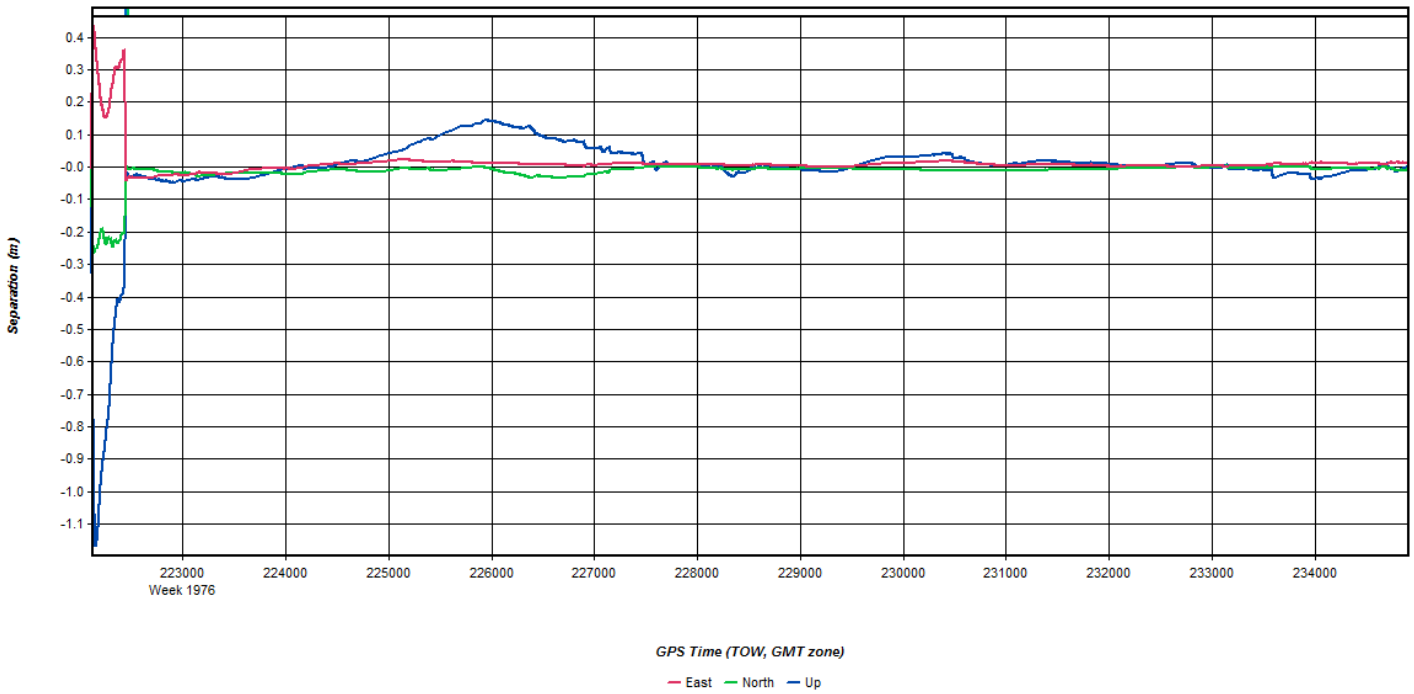

Status
2
1
0
-1
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

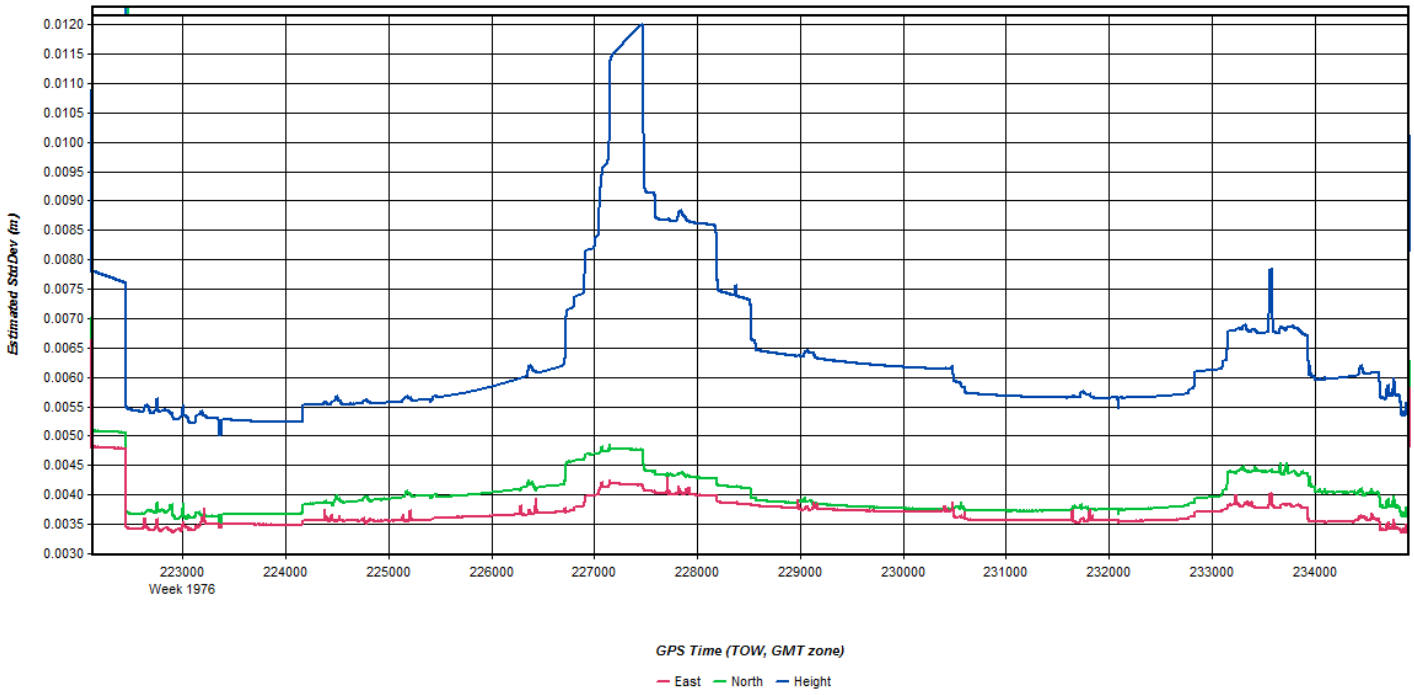

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
Roll
Pitch


RMS (m)
0.044
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
RMS
SD

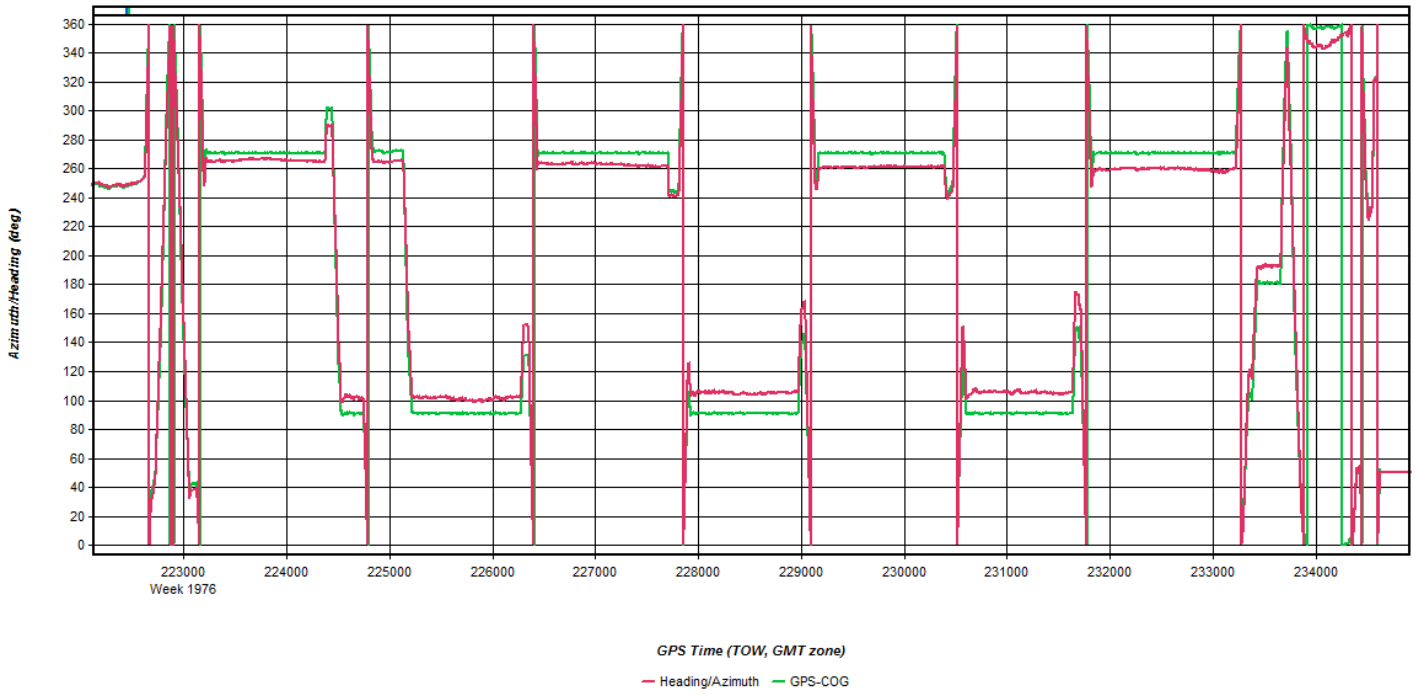

Height (m)
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
Height

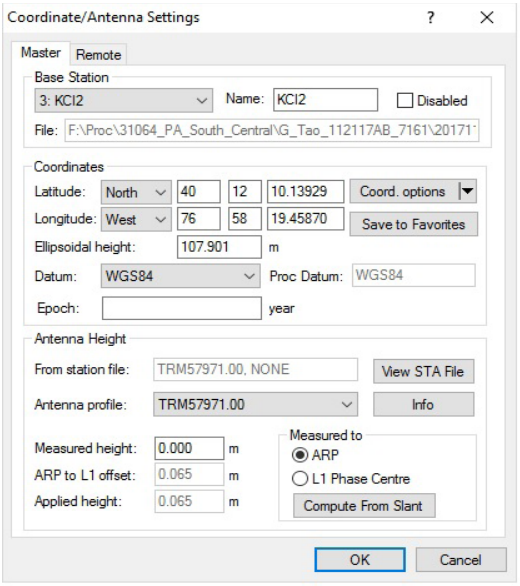

Num Sats
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

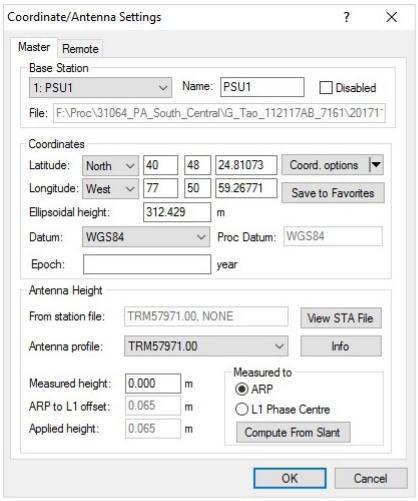

Separation (m)
0.4
0.3
0.2
0.1
-0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1.0
-1.1
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
East
North
Height

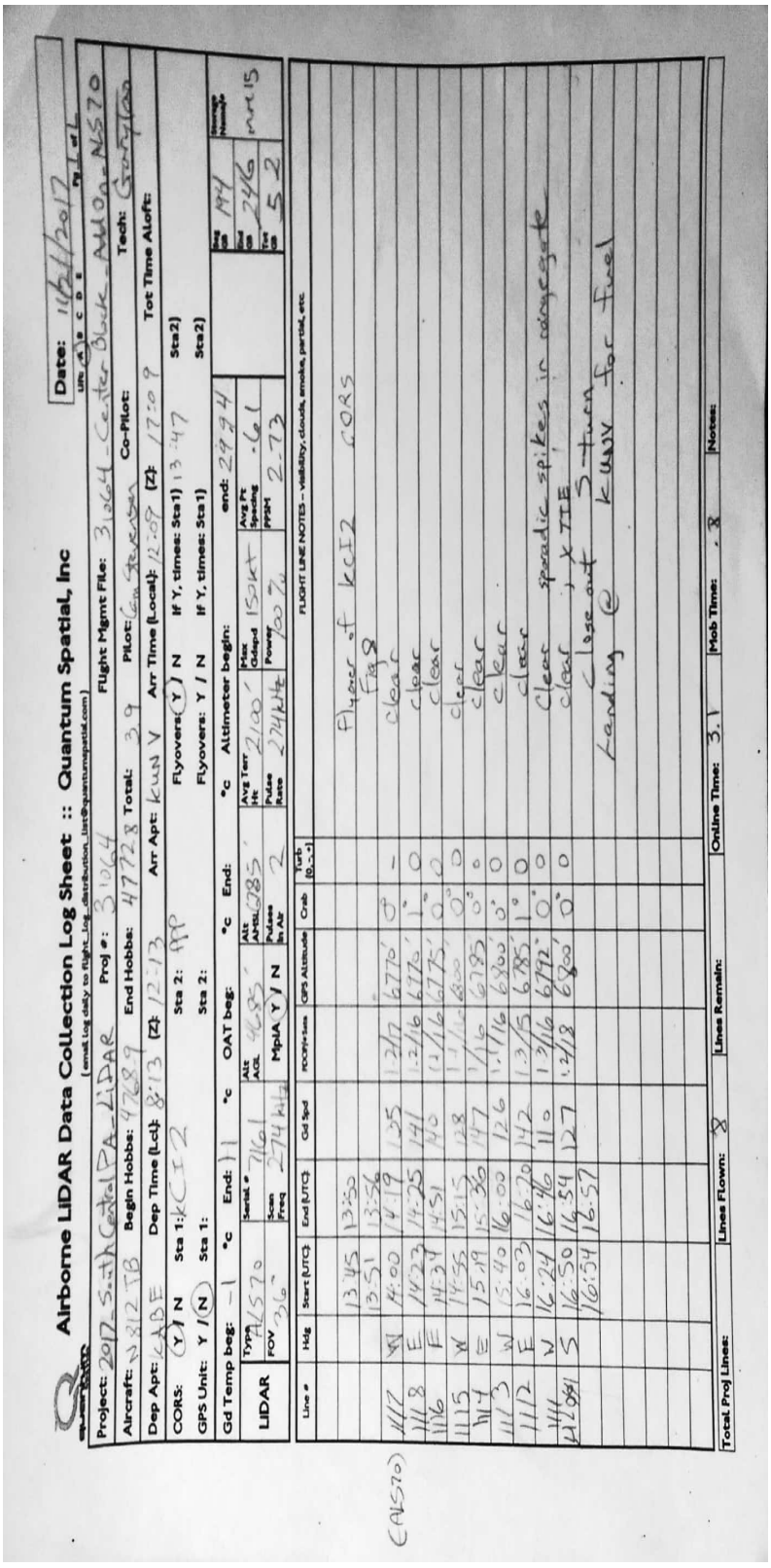

Separation (deg)
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
-0.007
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
223000
Week 1976
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
3: KCI2
Name: KCI2
Disabled
File: F:\Proc\31064_PA_South_Central\G_Tao_112117AB_7161\20171
Coordinates
Latitude: North 40 12 10.13929
Coord. options
Longitude: West 76 58 19.45870
Save to Favorites
Ellipsoidal height: 107.901 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
Master
Remote
Base Station
1: PSU1
Name:
PSU1
Disabled
File:
F:\Proc\31064_PA_South_Central\G_Tao_112117AB_7161\20171
Coordinates
Latitude:
North
40
48
24.81073
Coord. options
Longitude:
West
77
50
59.26771
Save to Favorites
Ellipsoidal height:
312.429
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

Flight Log



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

Date: 11/21/2017 Pilot

Project: 2017_SouthCentralPA_LiDAR Proj #: 31064 Flight Mgmt File: 31064_CenterBlock_AllOps_NS70

Aircraft: N812TB Begin Hobbs: 47689 End Hobbs: 47728 Total: 3.9 Pilot: Cam Stevenson Co-Pilot: Tech: Grayson

Dep Apt: KABE Dep Time (Lcl): 8:13 (Z): 12:13 Arr Apt: KUNV Arr Time (Local): 12:09 (Z): 17:09 Tot Time Aloft:

CORS: (Y) / N Sta 1: KCI2 Sta 2: PPP Flyovers: (Y) / N If Y, times: Sta1) 13:47 Sta2)

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

Gd Temp beg: -1 °c End: 11 °c OAT beg: °c End: °c Altimeter begin: end: 29.94

LiDAR: Type ALS70 Serial # 7161 Alt AGL 4635' Alt ASL 6285' Avg Terr Ht 2100' Max Odgrd 150kt Avg Pt Spacing .61

FOV 36° Scan Freq 274 kHz MpiA Y / N Pulses in Air 2 Pulse Rate 274kHz Power 203.7w PRR 2.73

Flt Hrs: Beg 194.7 End 247.6 Dur 52 Memory: mm15

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	ROC/-tion	GPS Altitude	Crab	Turb (0,1,2)	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc.
									Flyover of KCI2 CORS
		13:45	13:55						Fog
		13:51	13:56						
1117	W	14:00	14:19	125	1217	6770'	0°	-	clear
1118	E	14:23	14:25	141	12/16	6775'	1°	0	
1116	E	14:34	14:51	140	12/16	6775'	0°	0	clear
1115	W	14:55	15:15	128	1/16	6800'	0°	0	clear
1114	E	15:19	15:36	147	1/16	6785'	0°	0	clear
1113	W	15:40	16:00	126	1/16	6800'	0°	0	clear
1112	E	16:03	16:20	142	1/3/16	6785'	1°	0	clear
1111	N	16:24	16:46	110	1/3/16	6772'	0°	0	clear spradic spikes in cmpgate
1108	S	16:50	16:54	127	1/3/16	6800'	0°	0	clear, XTIE
		16:54	16:57						Close out Sturn
									Landing @ KUNV for fuel

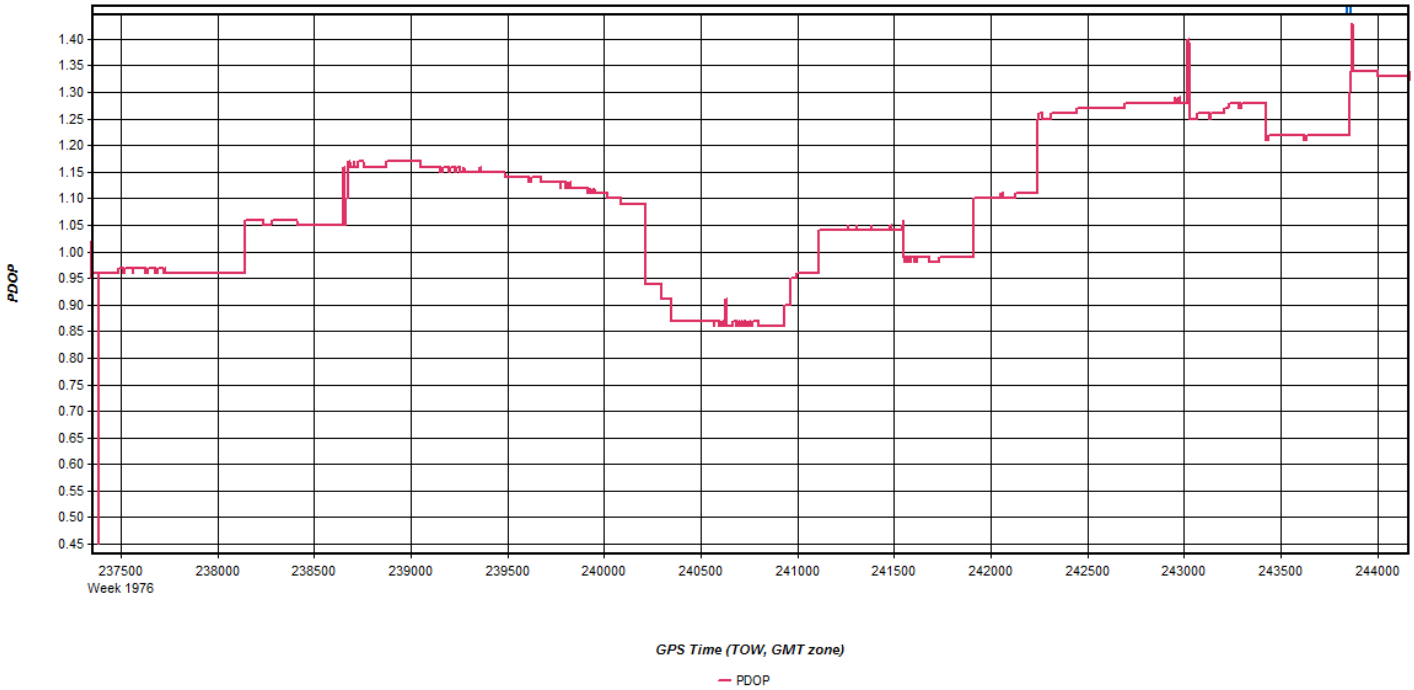
Total Proj Lines: Lines Flown: 8 Lines Remain: Online Time: 3.1 Mob Time: .8 Notes:

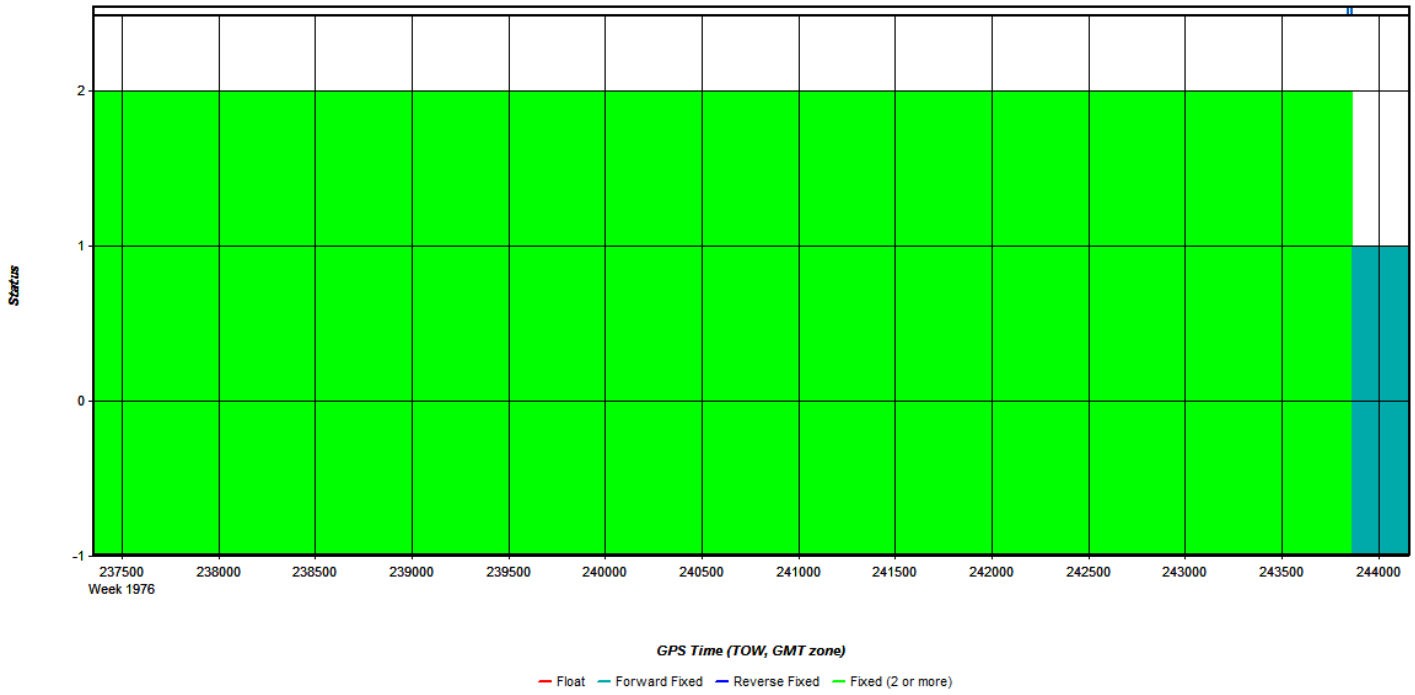
(ALS70)

Scanned by CamScanner

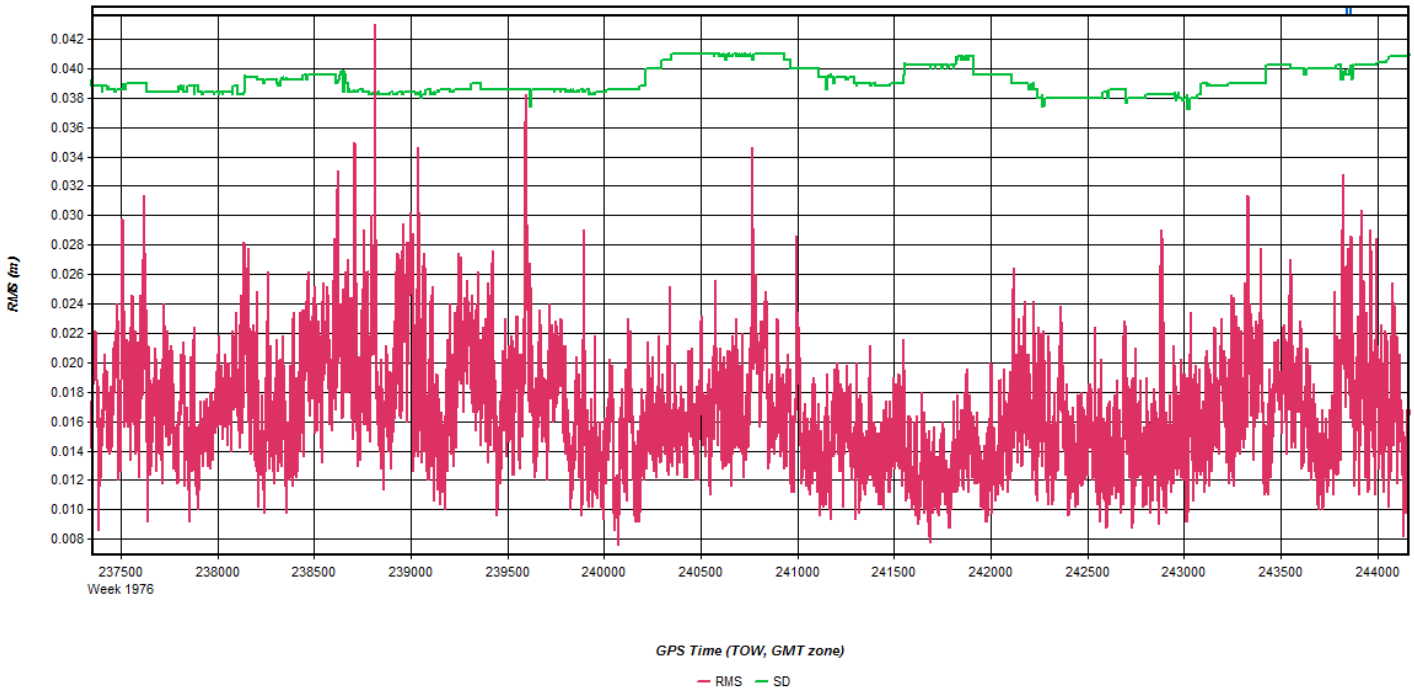
November 21, 2017-B (N812TB, SN7161)

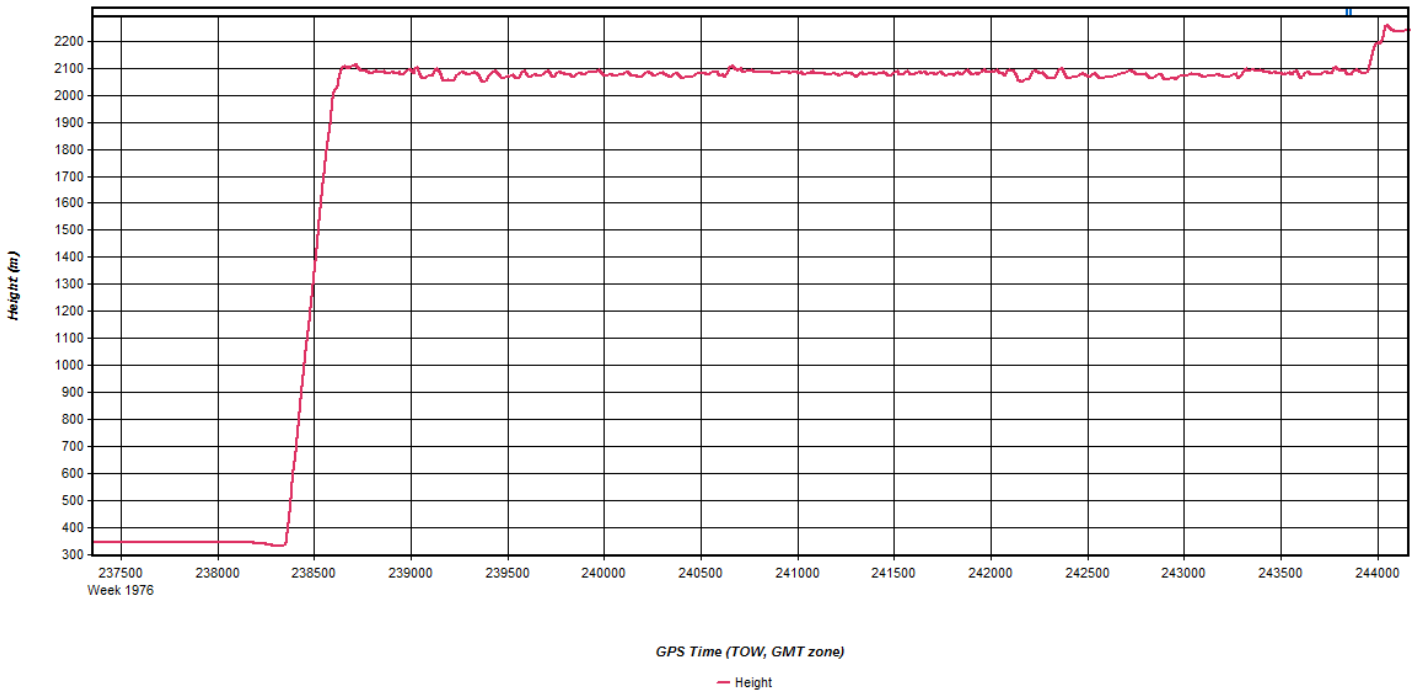

ARTK_FWD
PSU1
ARTK_REV
5 km

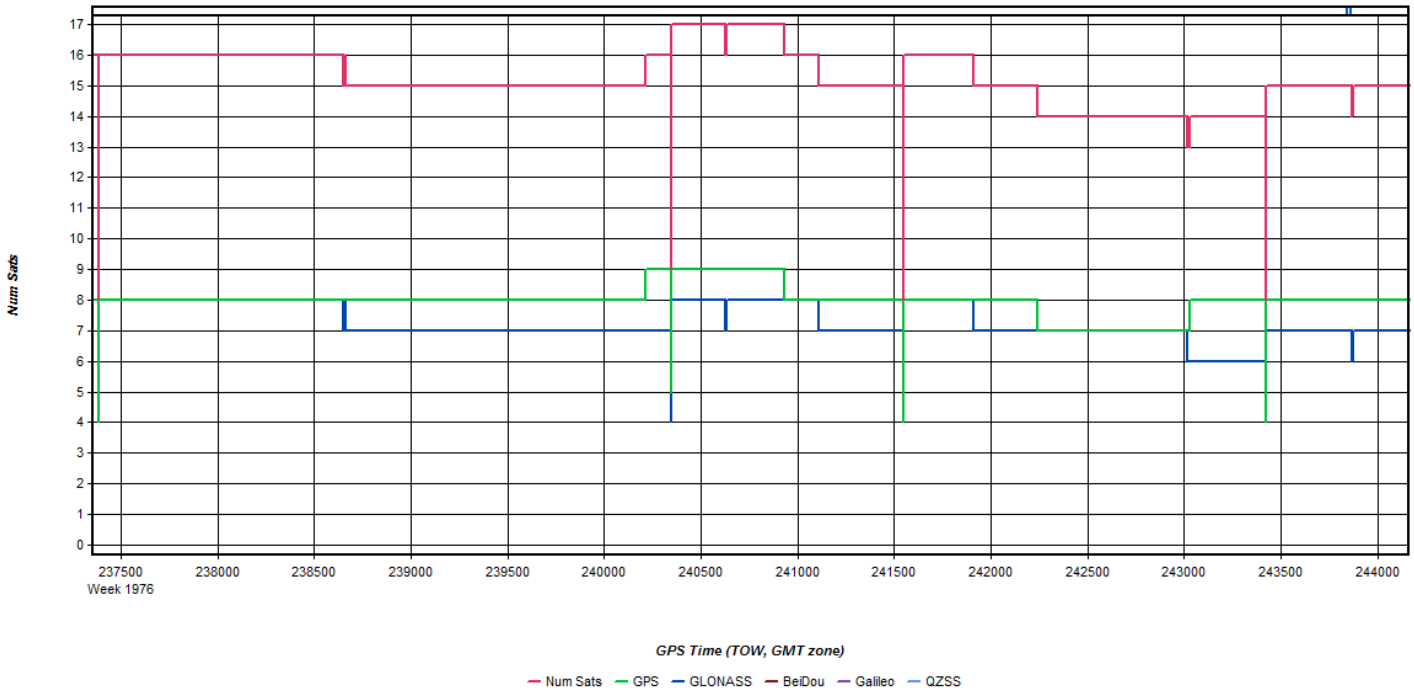

PDOP
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
PDOP

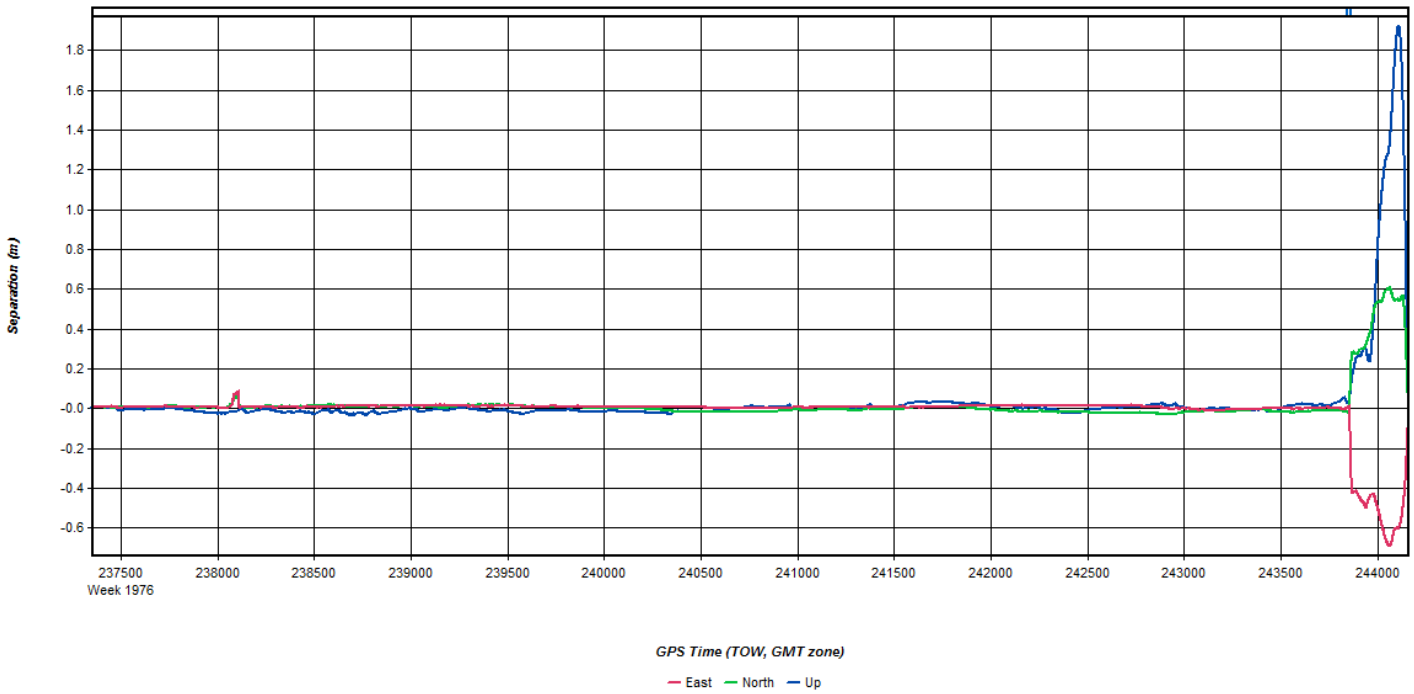

Status
2
1
0
-1
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

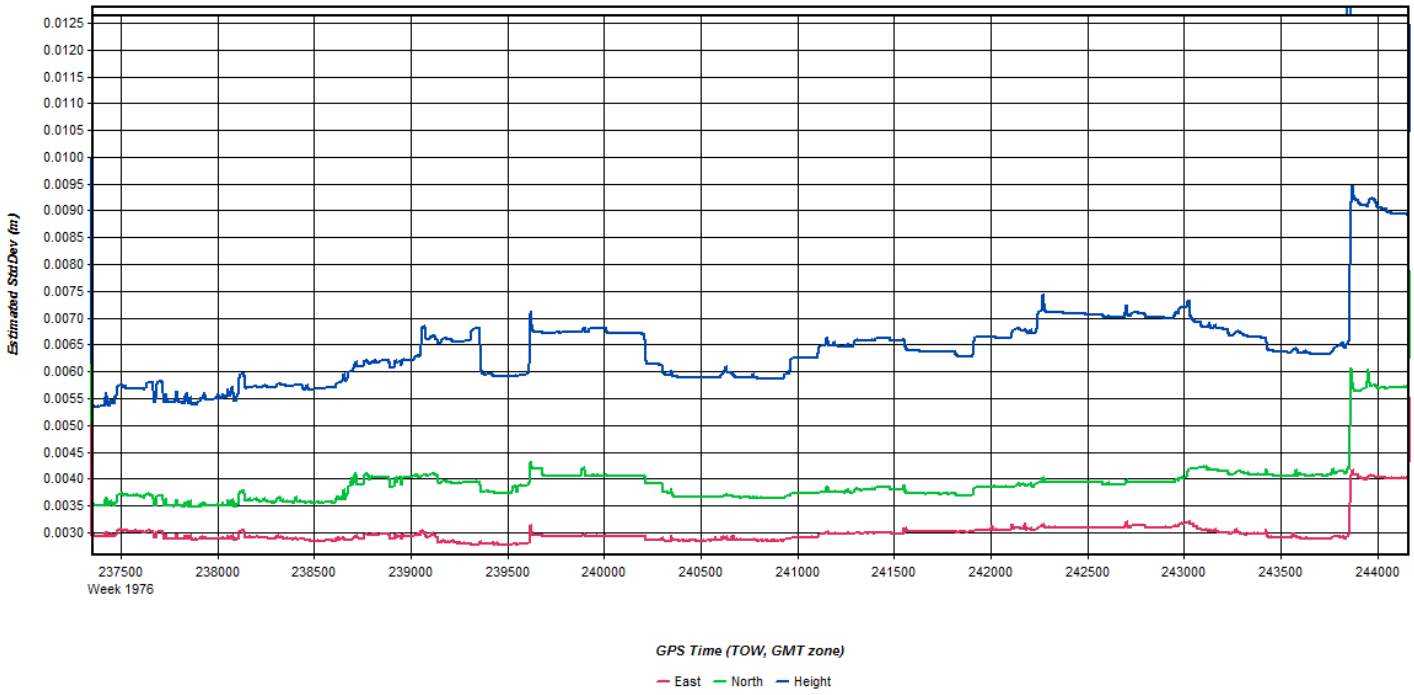

Roll & pitch (deg)
20
15
10
5
0
-5
-10
-15
-20
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
Roll
Pitch

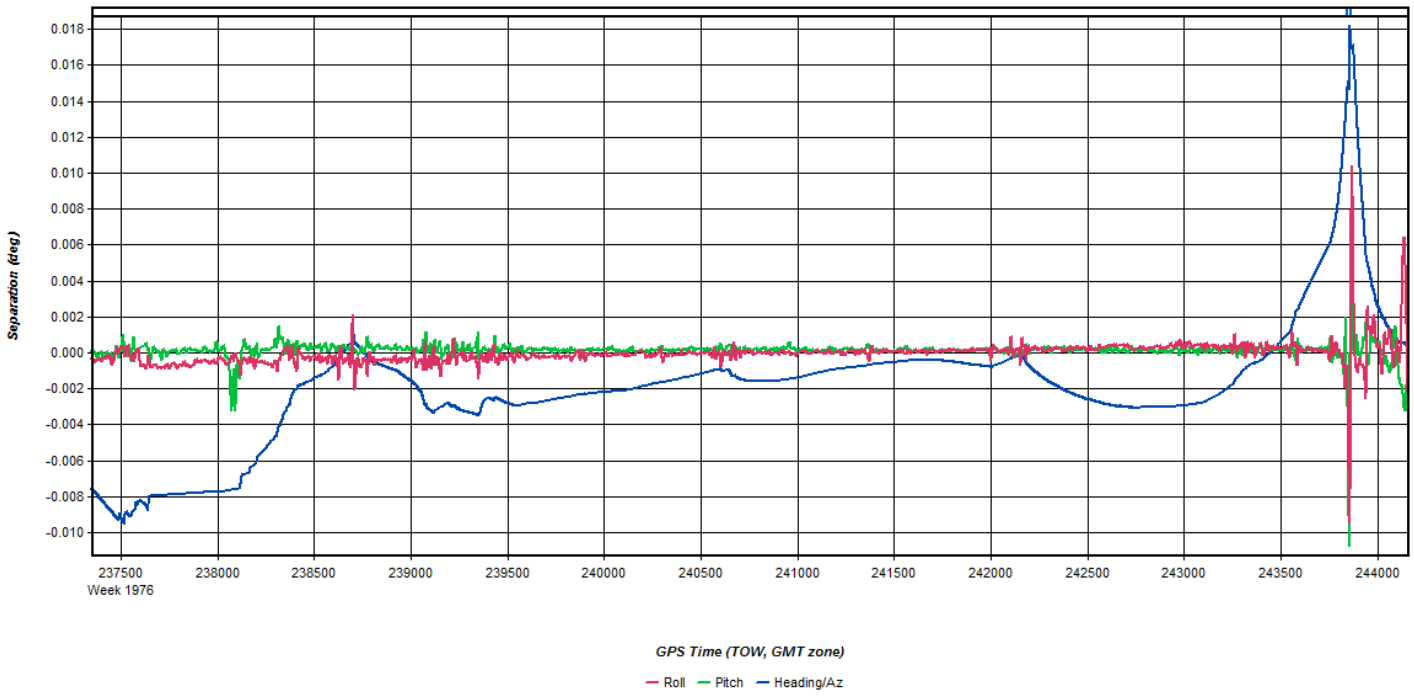

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
RMS
SD

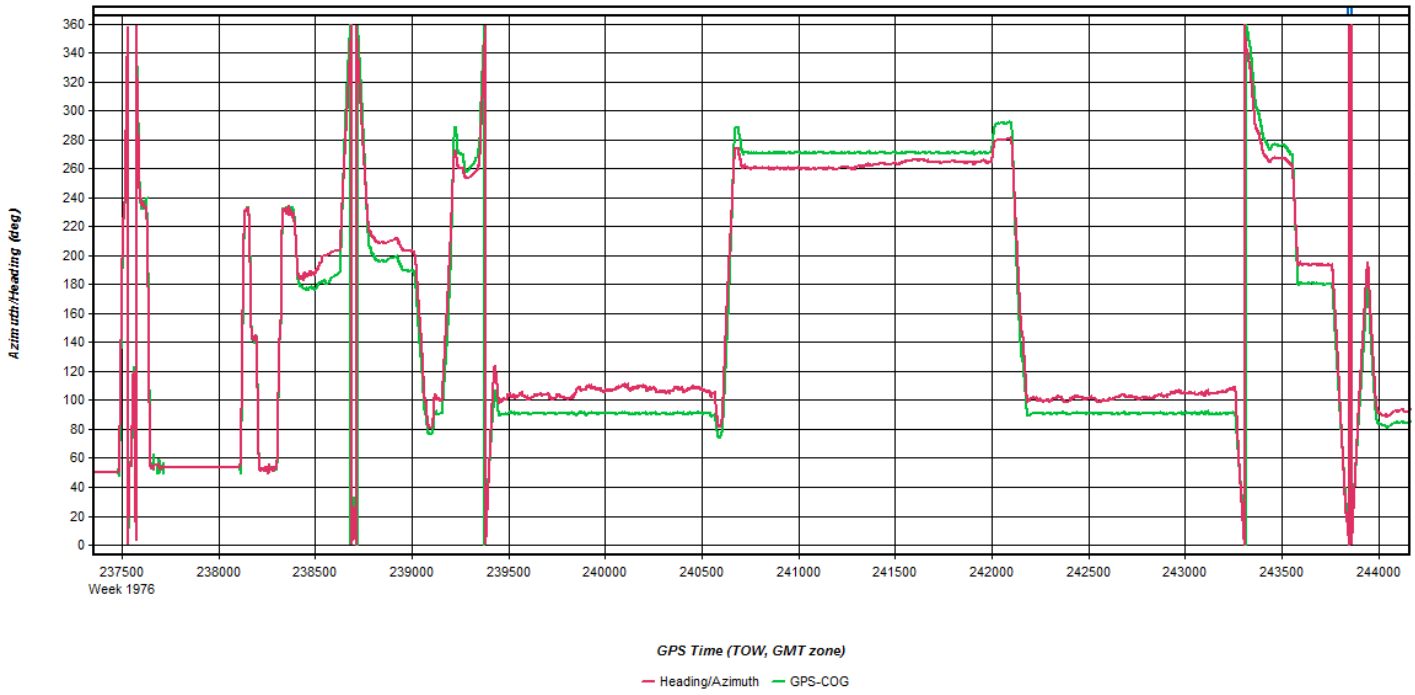

Height (m)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
Height

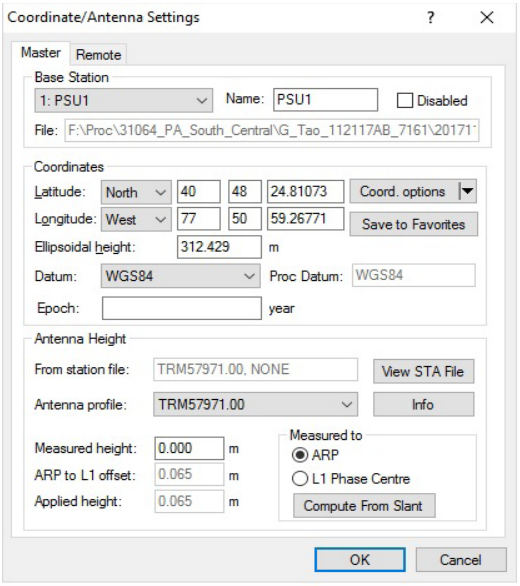

Num Sats
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

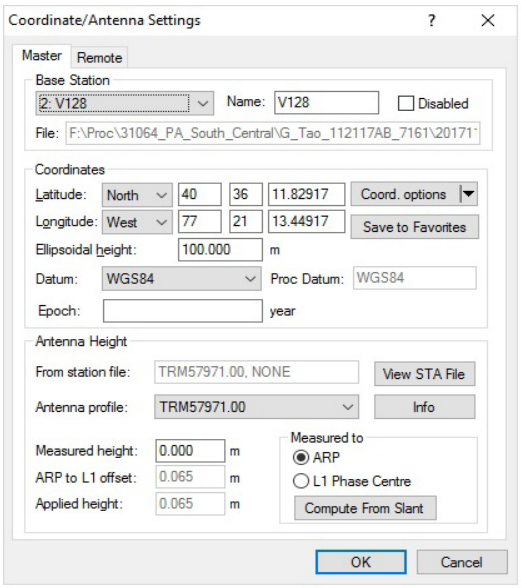

Separation (m)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0125
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
East
North
Height

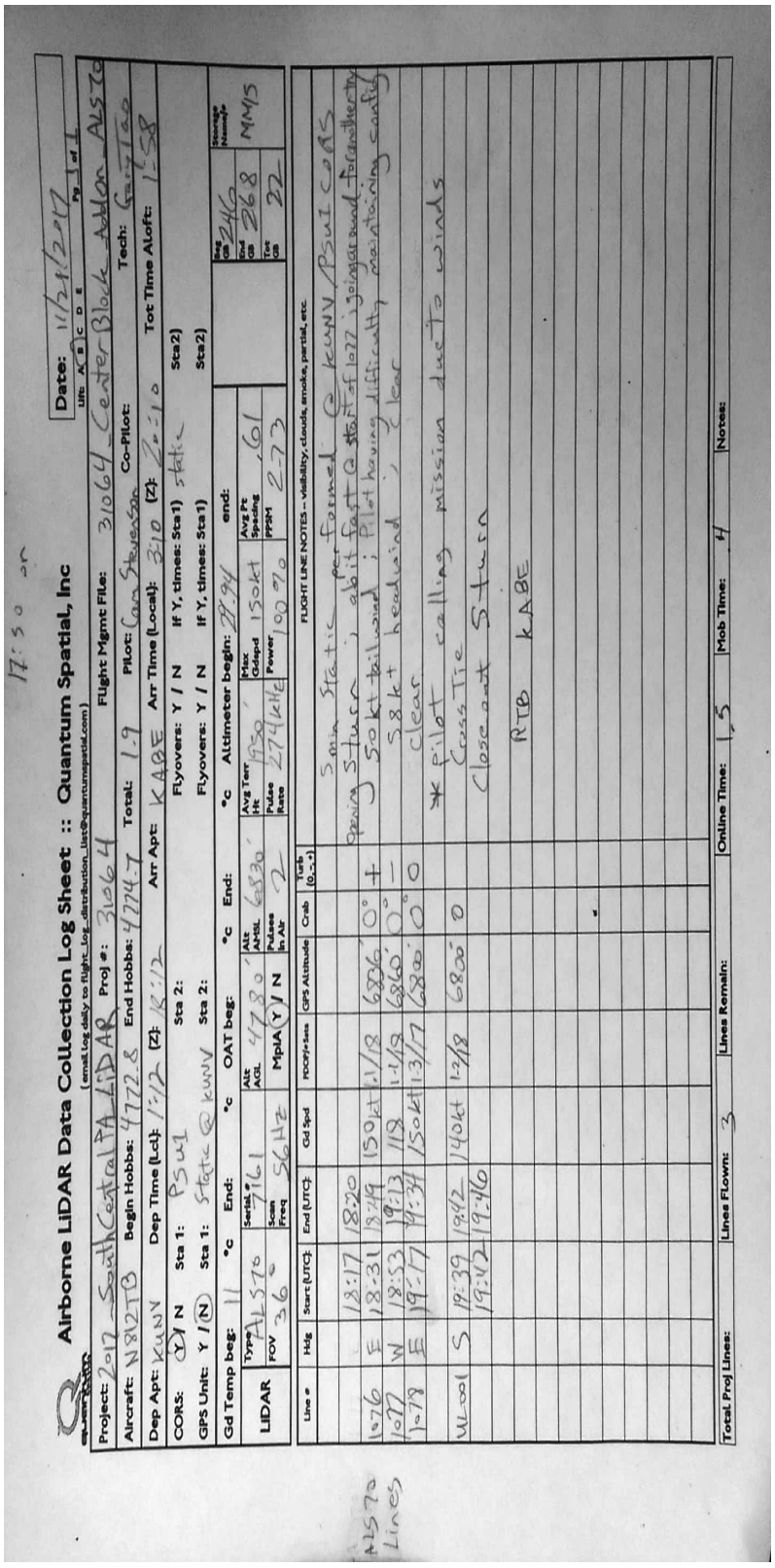

Separation (deg)
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
-0.010
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
237500
Week 1976
238000
238500
239000
239500
240000
240500
241000
241500
242000
242500
243000
243500
244000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\G_Tao_112117AB_7161\20171
Coordinates
Latitude: North 40 48 24.81073
Coord. options
Longitude: West 77 50 59.26771
Save to Favorites
Ellipsoidal height: 312.429 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
Master
Remote
Base Station
2: V128
Name: V128
Disabled
File: F:\Proc\31064_PA_South_Central\G_Tao_112117AB_7161\20171
Coordinates
Latitude: North 40 36 11.82917 Coord. options
Longitude: West 77 21 13.44917 Save to Favorites
Ellipsoidal height: 100.000 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

Flight Log



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

(email Log daily to flight_Log_distribution_List@quantumspatial.com)

Date: 11/21/2017 Pg 1 of 1

Life: A B C D E

Project: 2017 SouthCentralPA_LiDAR Proj #: 31064 Flight Mgmt File: 31064_CenterBlock_AGL570

Aircraft: N812TB Begin Hobbs: 4772.8 End Hobbs: 4774.7 Total: 1.9 Pilot: Cory Stevenson Co-Pilot: Tech: Gaertner

Dep Apt: KUNV Dep Time (Lcl): 1512 (Z): 1812 Arr Apt: KABE Arr Time (Local): 310 (Z): 2110 Tot Time Aloft: 1:58

CORS: (Y) N Sta 1: PSU1 Sta 2: Flyovers: Y / N If Y, times: Sta1) static Sta2)

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

Gd Temp beg: 11 °c End: °c OAT beg: °c End: °c Altimeter begin: 29.94 end:

LiDAR	Type	Serial #	Alt AGL	Alt ArtSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Images Numbering
	AL570	7161	4780'	6830'	1938'	150kt	.61	Beg 246
	FOV 36°	Scan Freq 56Hz	Mpl/A (Y) / N	Pulse Rate 212	Pulse Rate 274kHz	Power 100%	PPSM 2.73	End 2268
								Tot 22

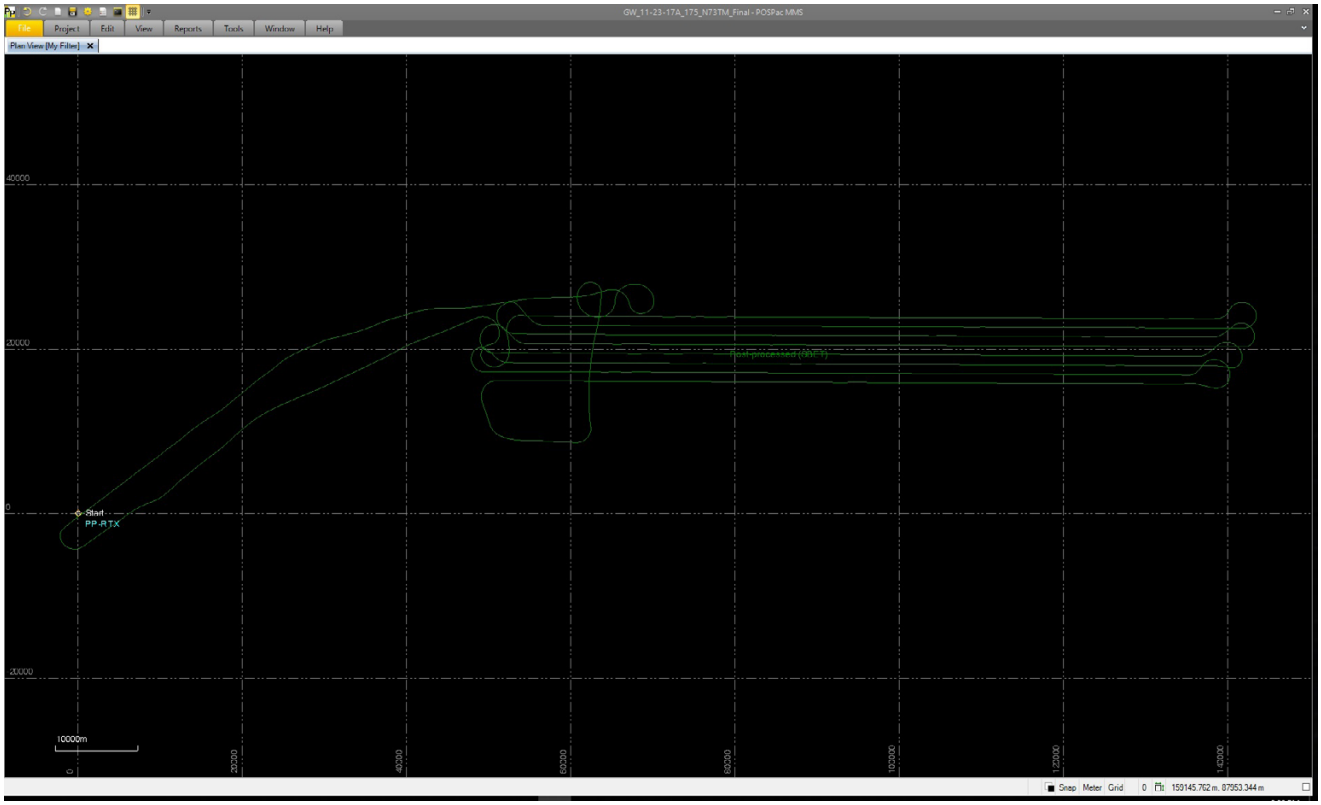
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	RDDP+Ins	GPS Altitude	Crab	Tide (0,-,+)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc
									Some Statics per Forrest @ KUNV/Psu1 CORS
1076	E	18:17	18:20						pausing Statics, abit fast @ start of 1077 (winds around 50 kt tailwind); Pilot having difficulty maintaining config
1076	E	18:31	18:49	150kt	1/18	6886'	0°	+	
1077	W	18:53	19:13	118	1-1/18	6860'	0°	−	58kt headwind, 2 leg
1078	E	19:17	19:37	150kt	1/3/17	6800'	0°	0	clear
									* Pilot calling mission due to winds
1100	S	19:39	19:42	140kt	1-2/18	6800'	0		Cross Tie
		19:42	19:46						Close out Stats
									RTB KABE

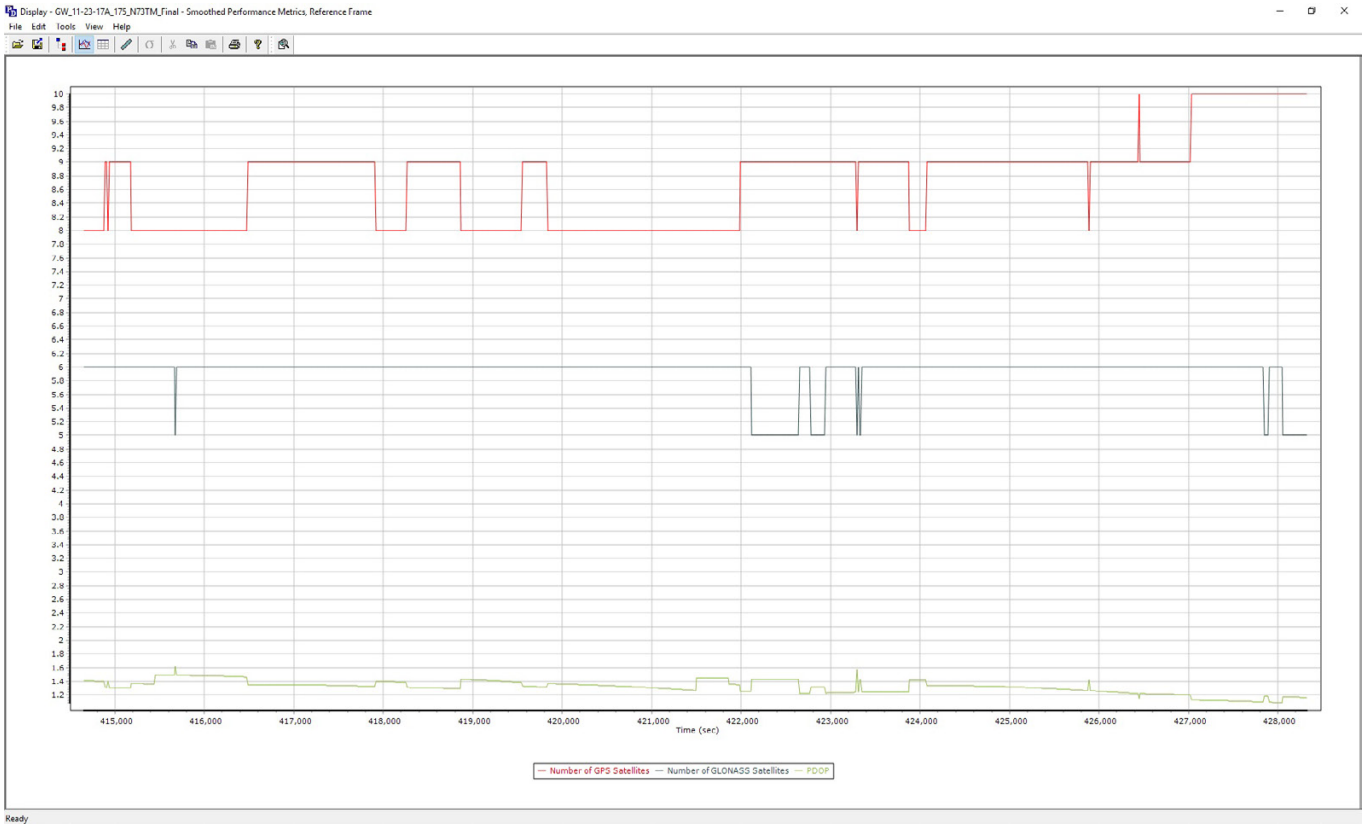
Total Proj Lines: Lines Flown: 3 Lines Remain: Online Time: 1,5 Mob Time: .4 Notes:

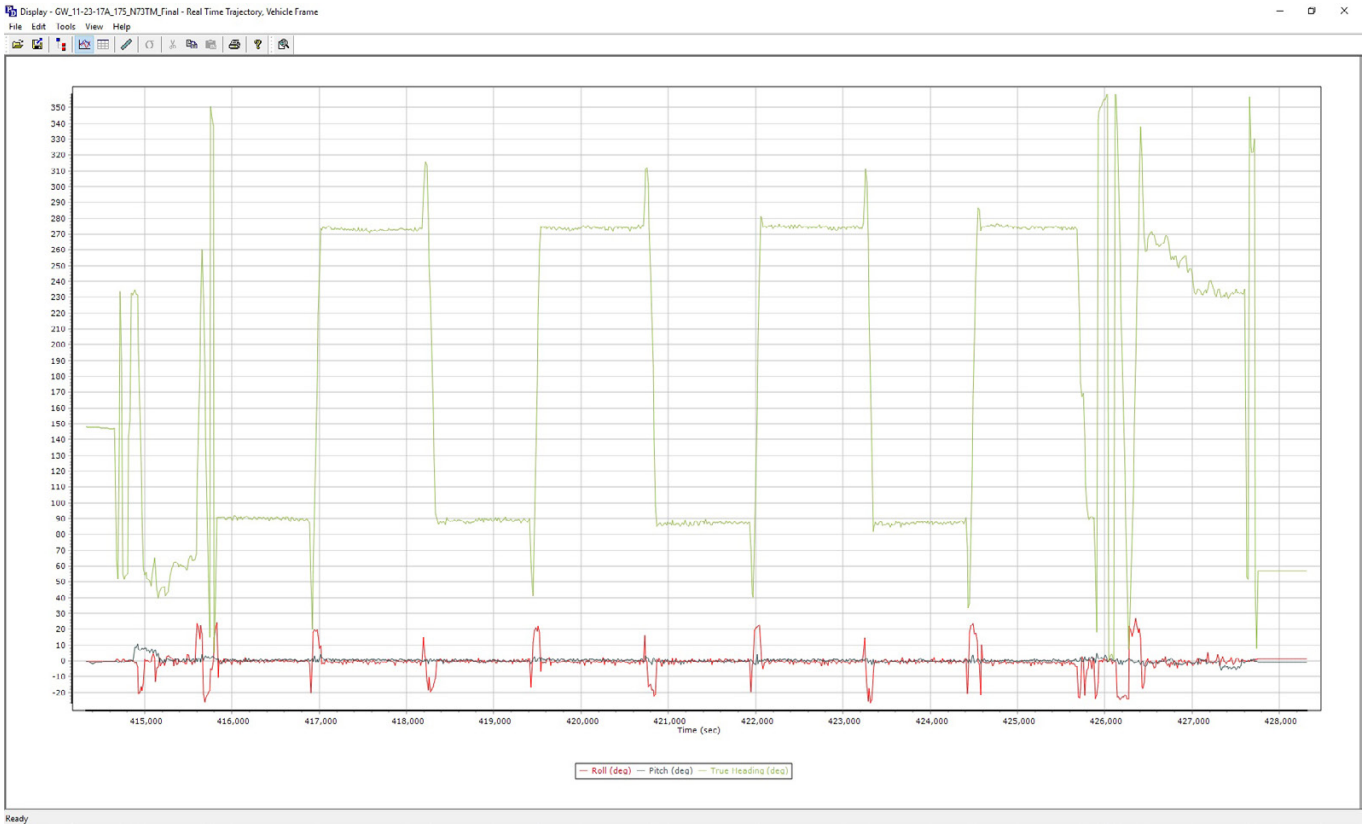
A570 Lines

Scanned by CamScanner

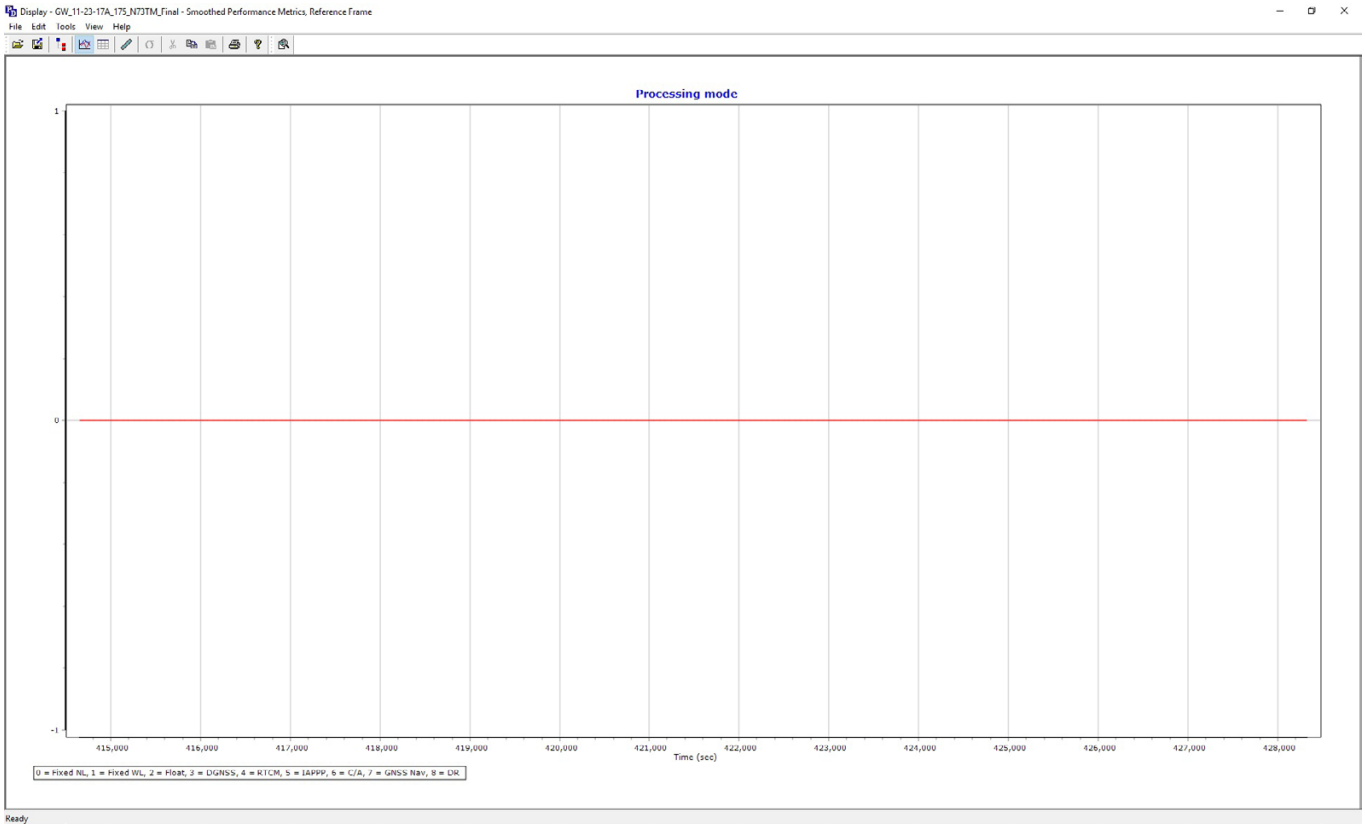
November 23, 2017-A (N73TM, SN175)


GW_11-23-17A_175_N73TM_Final - POSPac MMS
File
Project
Edit
View
Reports
Tools
Window
Help
Plan View [My Files]
40000
20000
0
-20000
Start -
PP-RTX
10000m
0
20000
40000
60000
80000
100000
120000
140000
Snap Meter Grid
159145.762 m, 87953.344 m

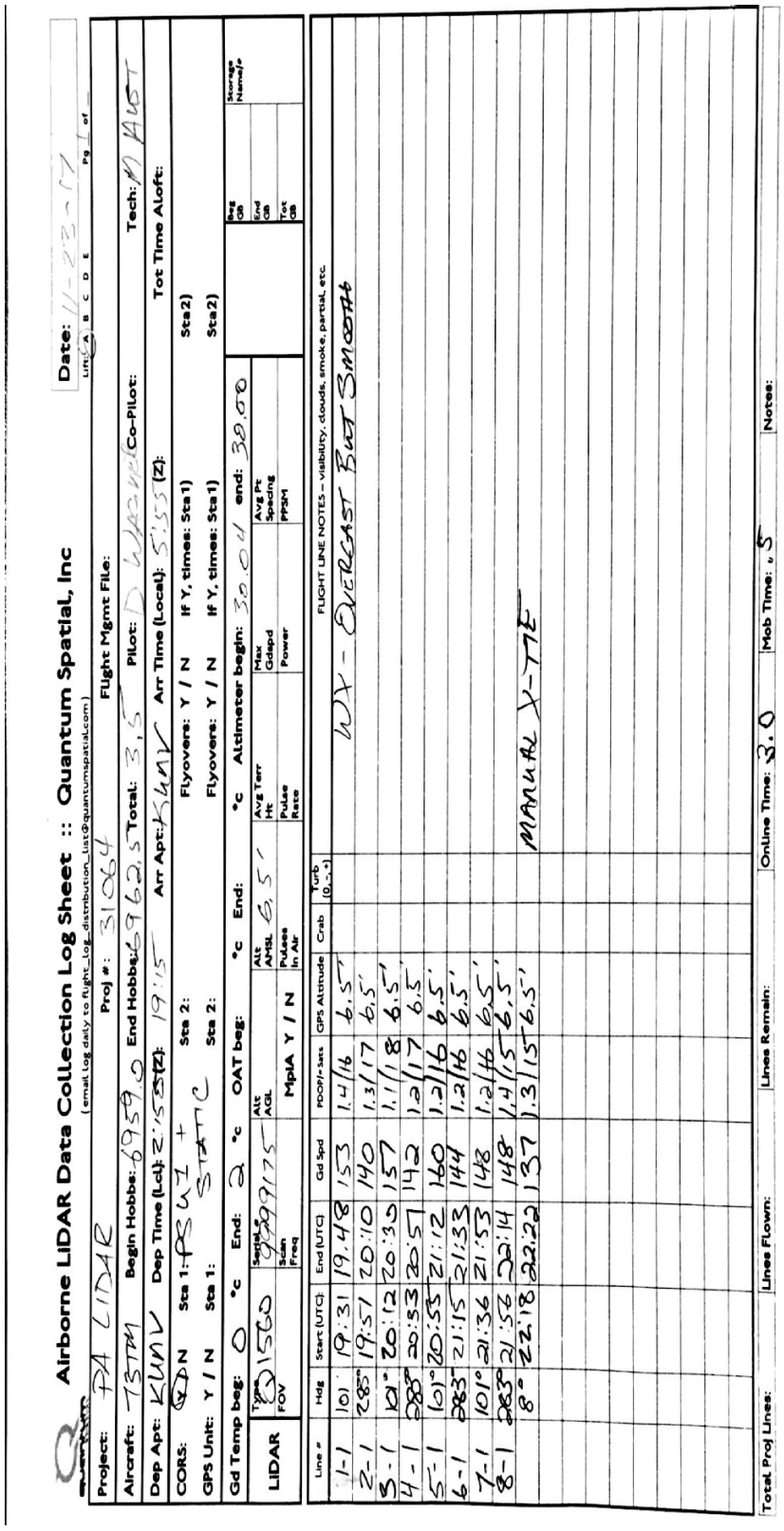

Display - GW_11-23-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
10
9.8
9.6
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
415,000
416,000
417,000
418,000
419,000
420,000
421,000
422,000
423,000
424,000
425,000
426,000
427,000
428,000
Time (sec)
Number of GPS Satellites
Number of GLONASS Satellites
PDOP
Ready


Display - GW_11-23-17A_175_N73TM_Final - Real Time Trajectory, Vehicle Frame
File Edit Tools View Help
Time (sec)
Roll (deg) Pitch (deg) True Heading (deg)
Ready


Display - GW_11-23-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Time (sec)
North Position Error RMS (m) East Position Error RMS (m) Down Position Error RMS (m)
Ready


Display - GW_11-23-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Processing mode
1
0
-1
415,000
416,000
417,000
418,000
419,000
420,000
421,000
422,000
423,000
424,000
425,000
426,000
427,000
428,000
Time (sec)
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav, 8 = DR
Ready

Flight Log



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

(email Log daily to flight_log_distribution_List@quantumspatial.com)

Date: 11-23-17

Project: PA LIDAR | Proj #: 31084 | Flight Mgmt File:

Aircraft: 737M | Begin Hobbs: 6959.0 | End Hobbs: 6962.5 | Total: 3.5 | Pilot: D. Wheaton | Co-Pilot: | Tech: M. Hust

Dep Apt: KUNV | Dep Time (Lcl): 17:15 | Arr Apt: KUNV | Arr Time (Local): 5:55 (Z): | Tot Time Aloft:

CORS: Y / N | Sta 1: PSU7 | Sta 2: | Flyovers: Y / N | If Y, times: Sta 1) | Sta 2)

GPS Unit: Y / N | Sta 1: START | Sta 2: | Flyovers: Y / N | If Y, times: Sta 1) | Sta 2)

Gd Temp beg: 0 °c | End: 2 °c | OAT beg: °c | End: °c | Altimeter begin: 30.04 end: 30.00

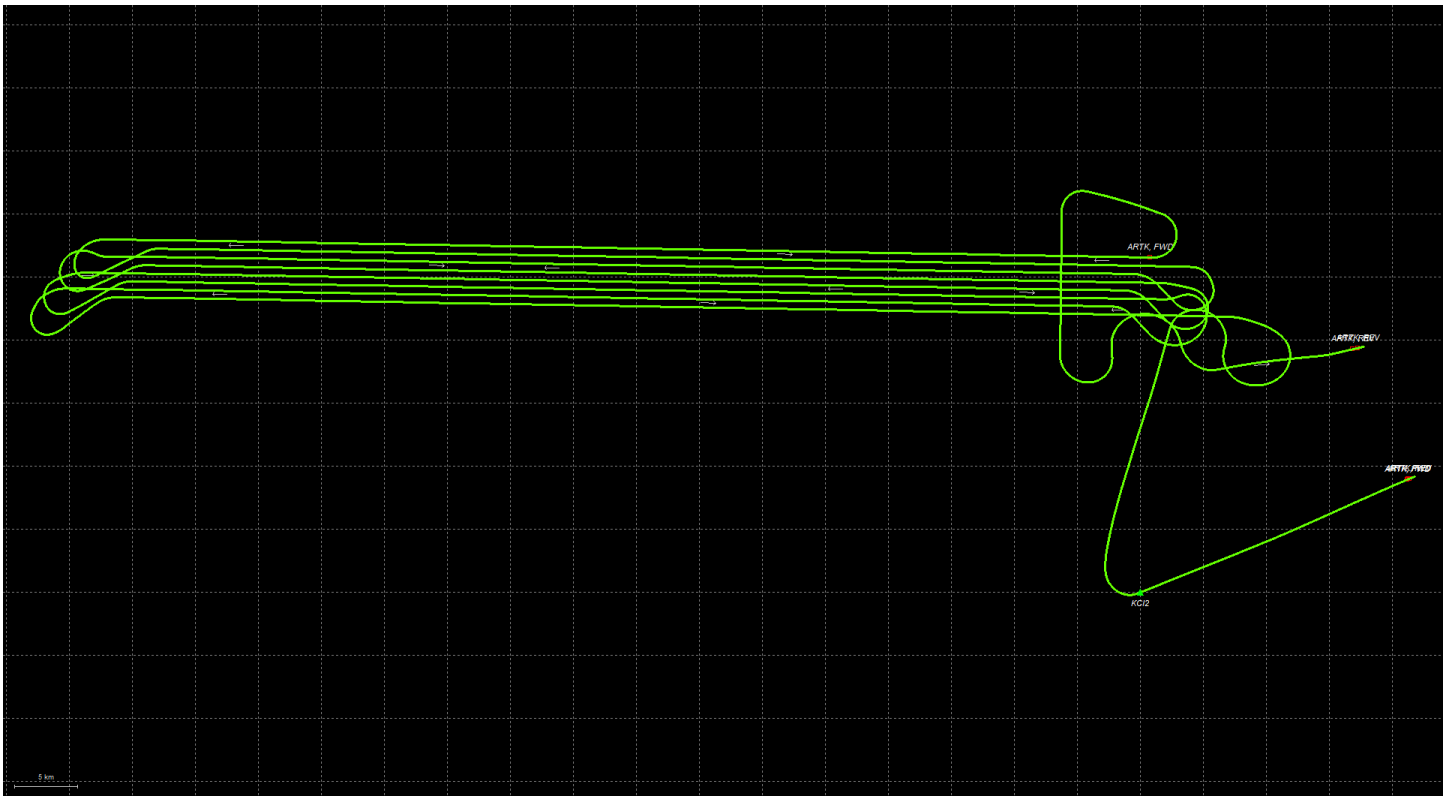
LiDAR: Type Q1560 | Serial 9991175 | Scan Freq | FOV | Alt AGL | MpIA Y / N | Alt ASL 6,5' | PulAes In Air | Crab | Turb (0,-,+) | Avg Terr Ht | PulAse Rate | Max Gdspd | Power | Avg Pt Spacing | PPSM

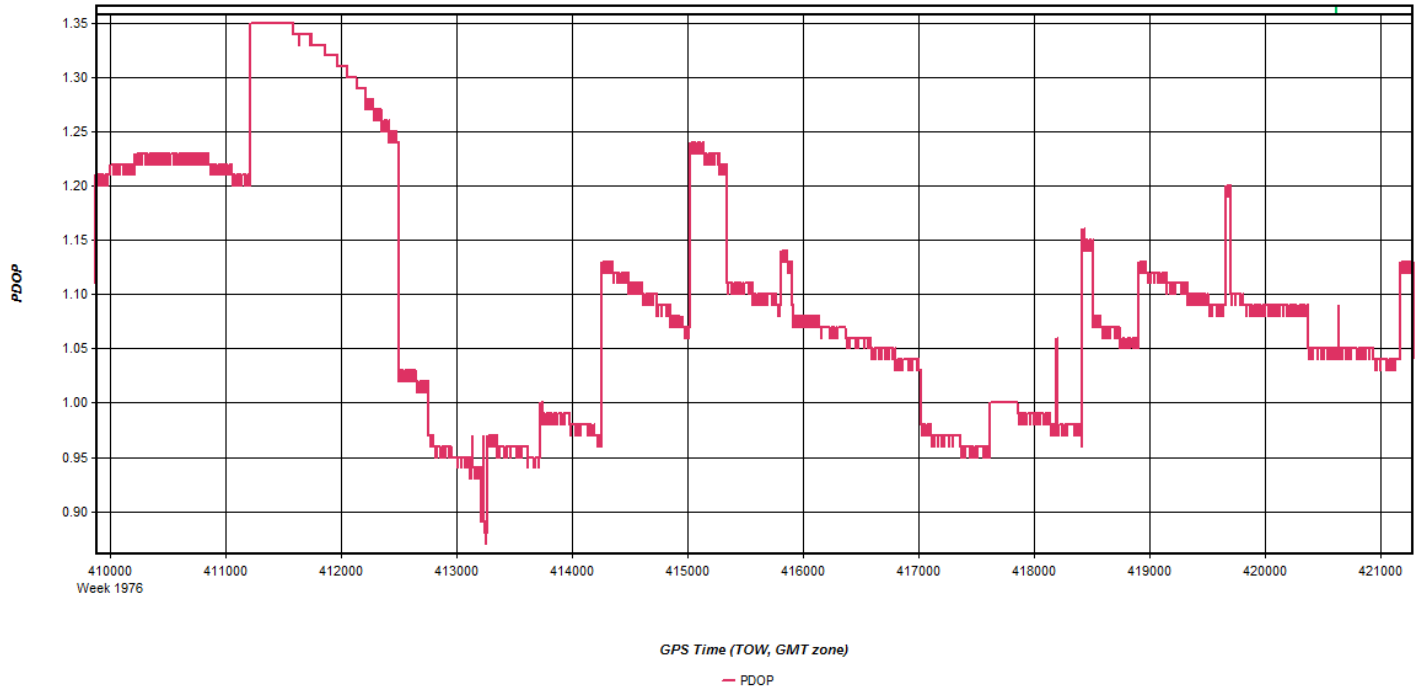
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POOP/+sec	GPS Altitude	Crab	Turb (0,-,+)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
1-1	101°	19:31	19:48	153	1.4/16	6,5'			NOX - OVERCAST But Smooth
2-1	281°	19:51	20:10	140	1.3/17	6,5'			
3-1	101°	20:12	20:30	157	1.1/18	6,5'			
4-1	281°	20:33	20:51	142	1.2/17	6,5'			
5-1	(01)°	20:55	21:12	160	1.2/16	6,5'			
6-1	283°	21:15	21:33	144	1.2/16	6,5'			
7-1	101°	21:36	21:53	148	1.2/16	6,5'			
8-1	283°	21:58	22:14	148	1.4/15	6,5'			MANUAL X-TIE
	8°	22:18	22:22	137	1.3/15	6,5'			

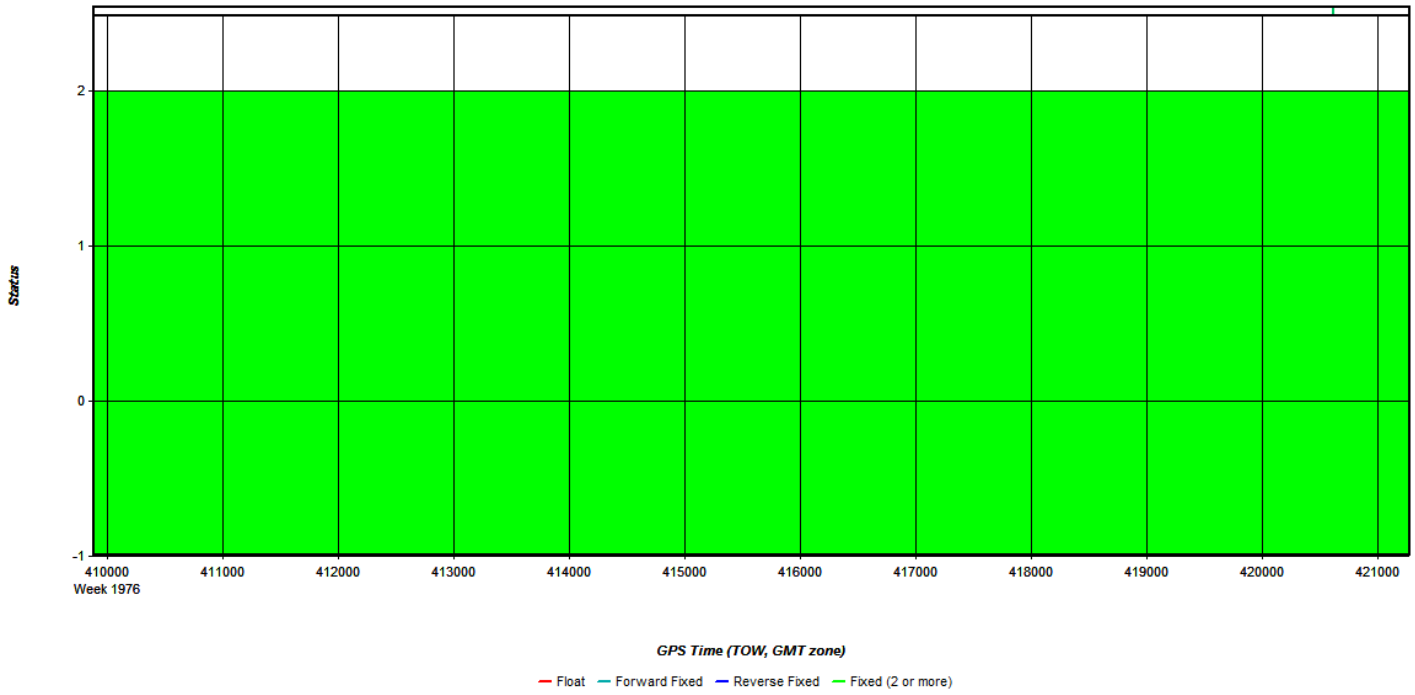
Total Proj Lines: | Lines Flown: | Lines Remain: | Online Time: 3.0 | Mob Time: .5 | Notes:

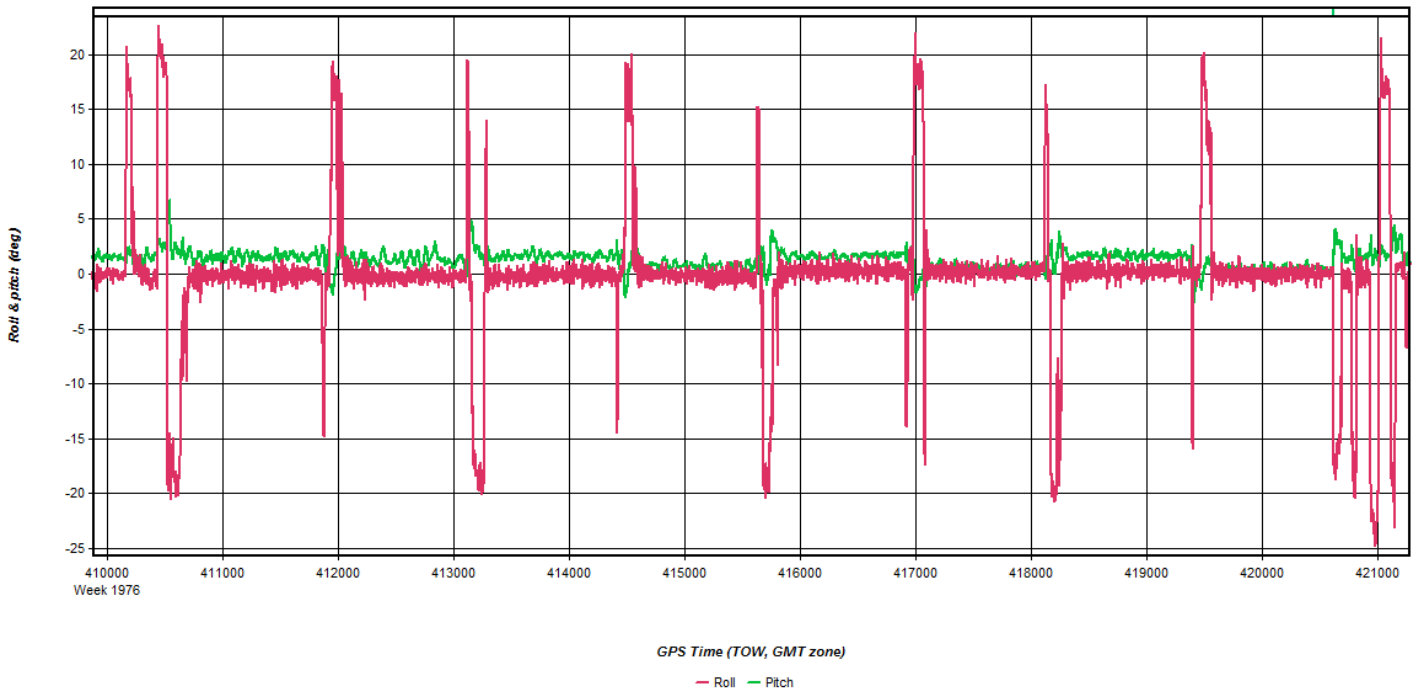
Scanned by CamScanner

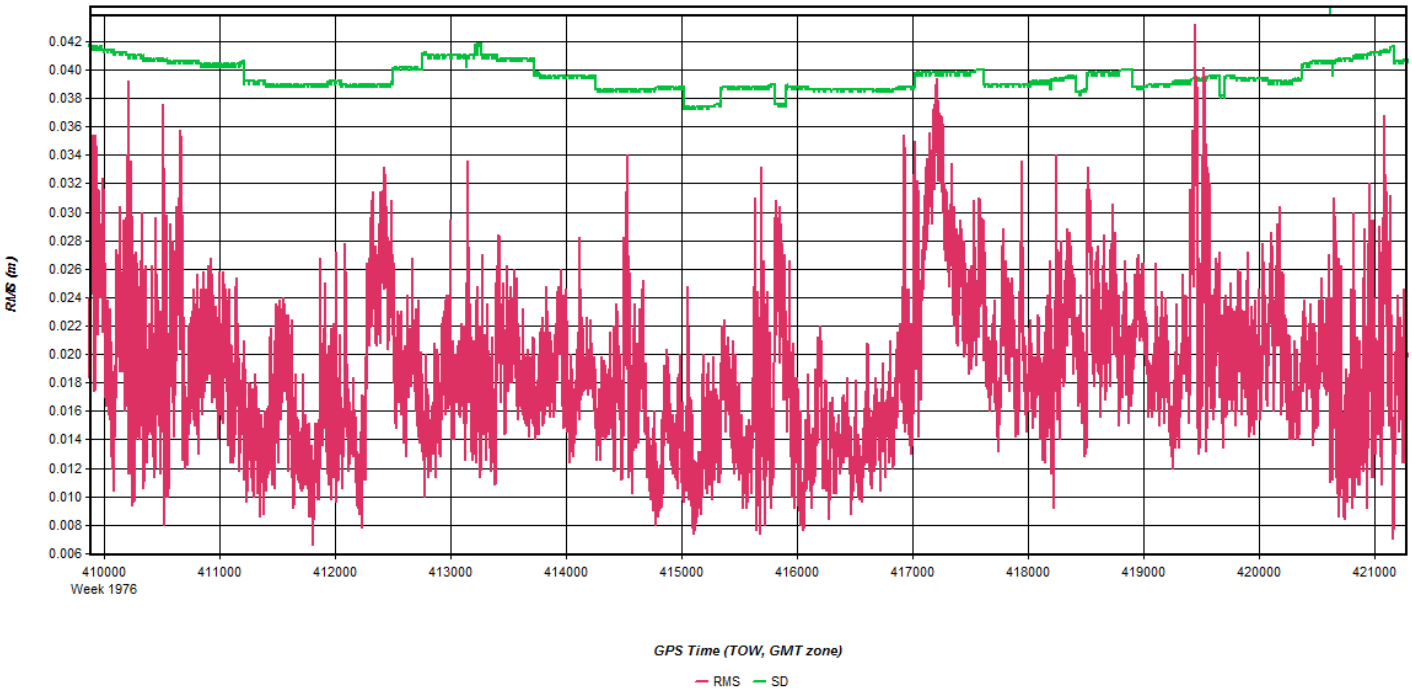
November 23, 2017-A (N812TB, SN7161)

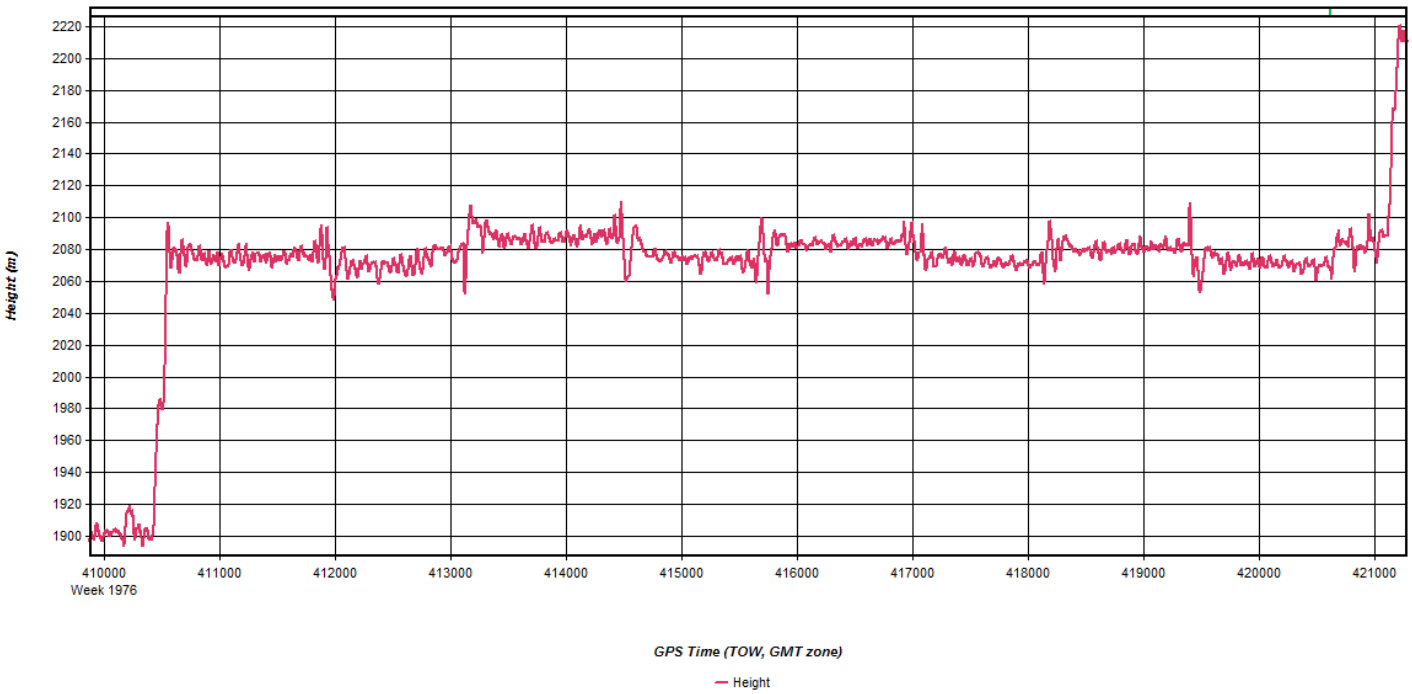

ARTK_FWD
ARTK_RBV
ARTK_FWD
KCI2

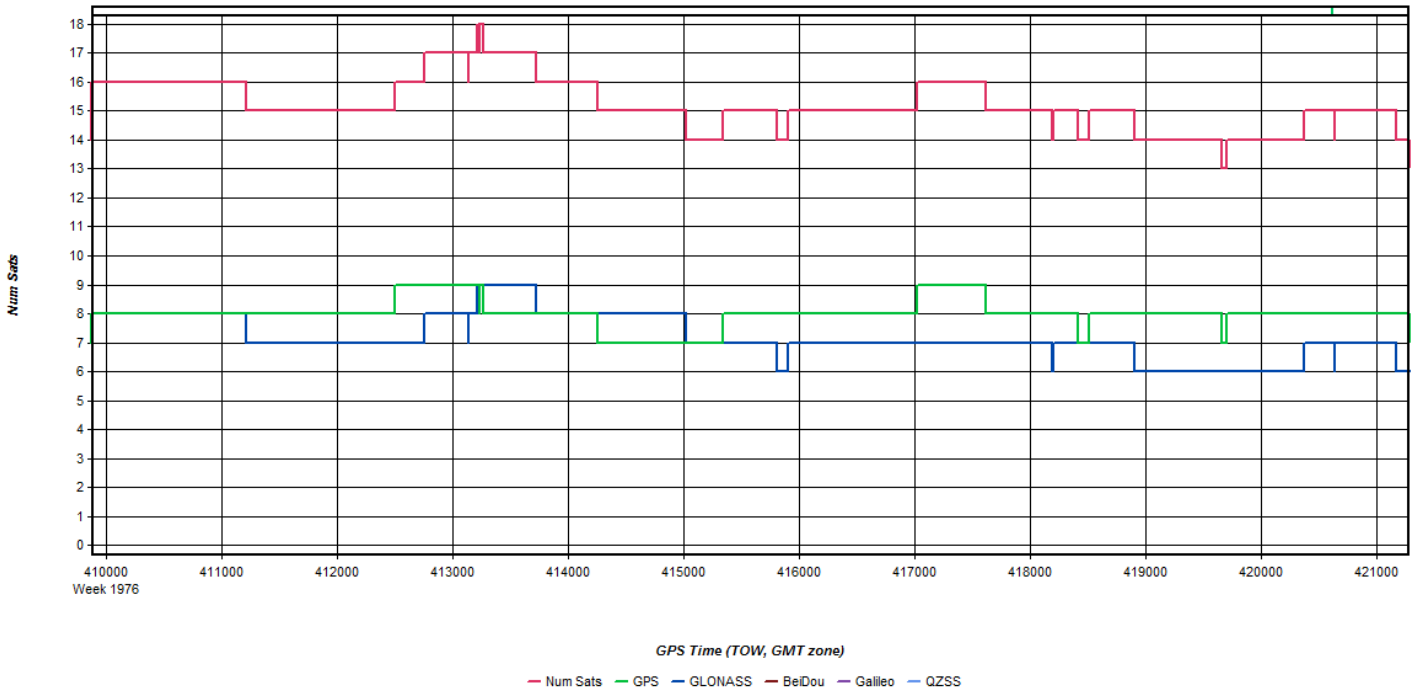

PDOP
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
PDOP

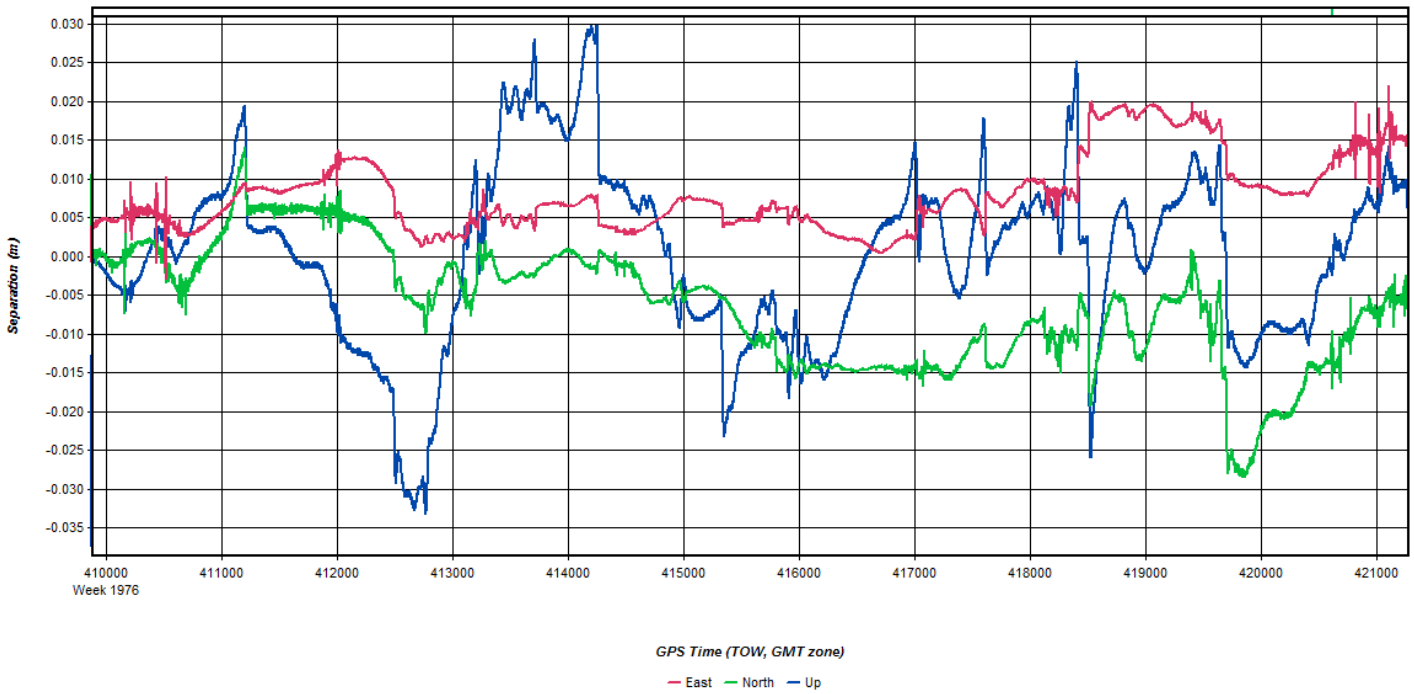

Status
2
1
0
-1
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

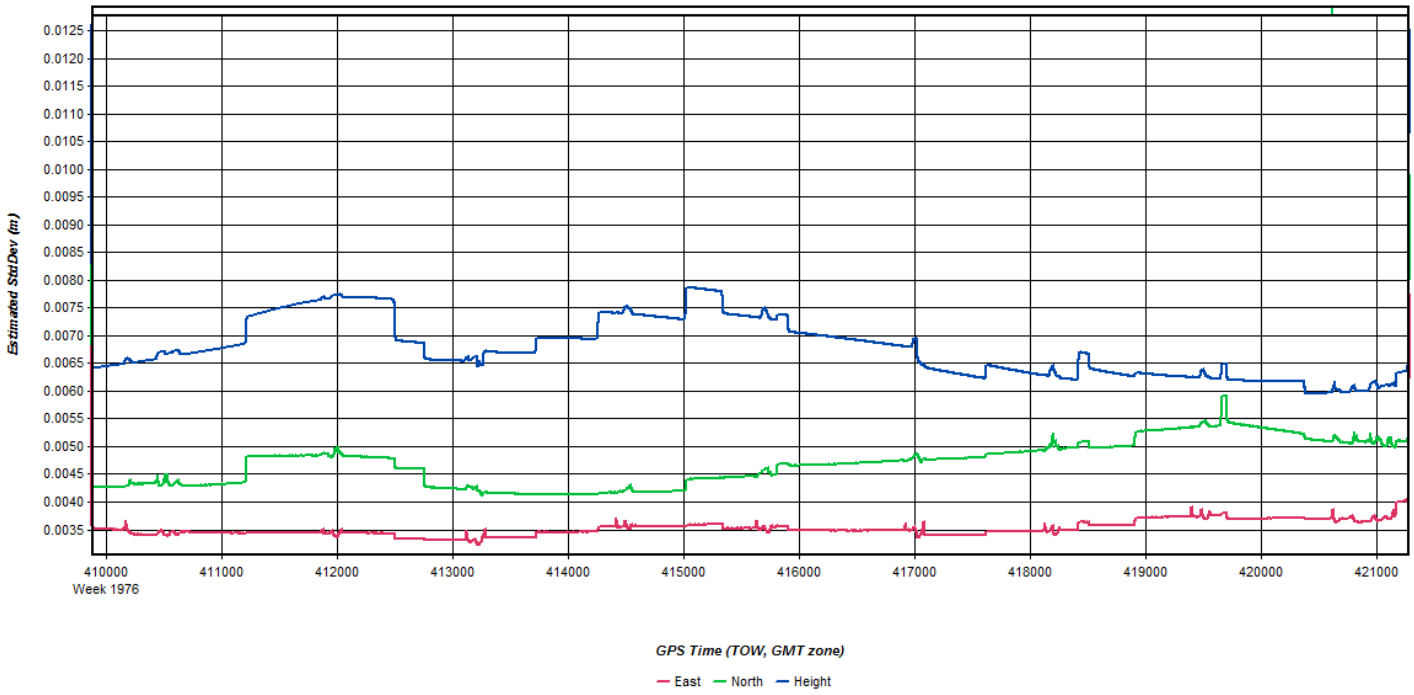

Roll & pitch (deg)
20
15
10
5
0
-5
-10
-15
-20
-25
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
Roll
Pitch

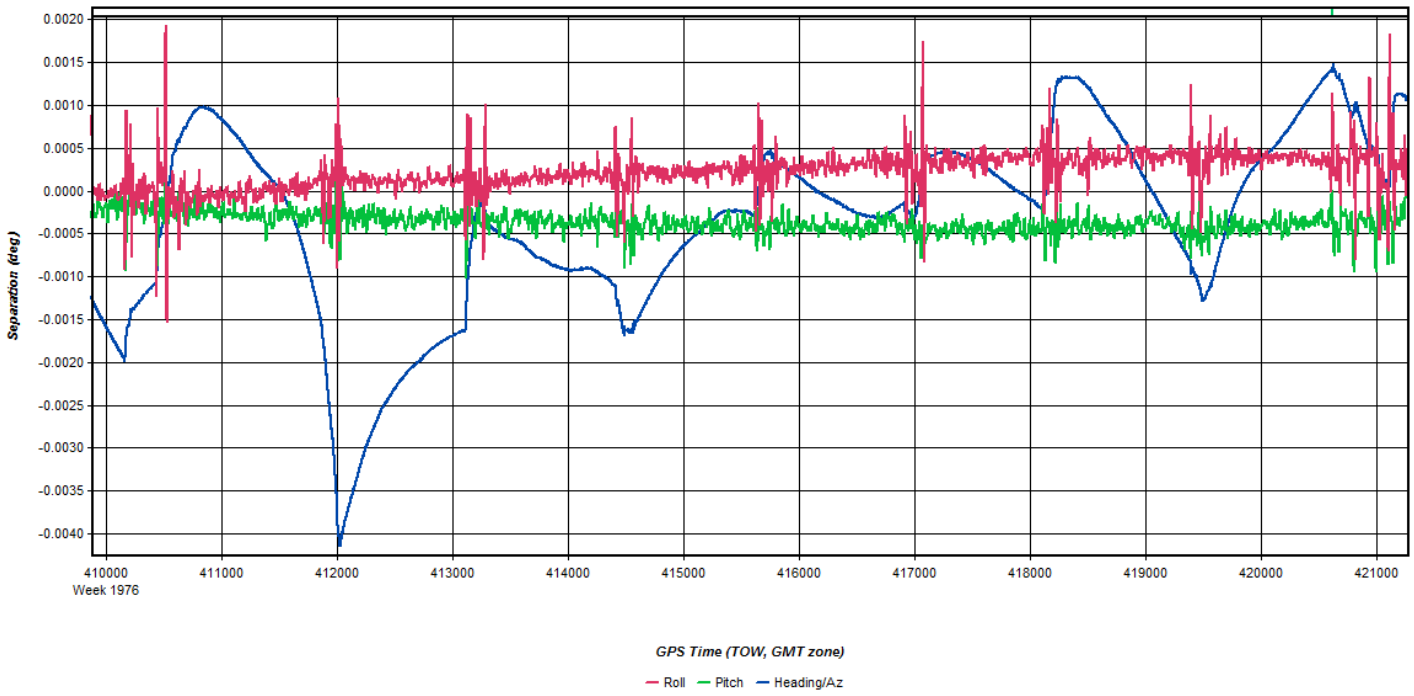

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
RMS
SD

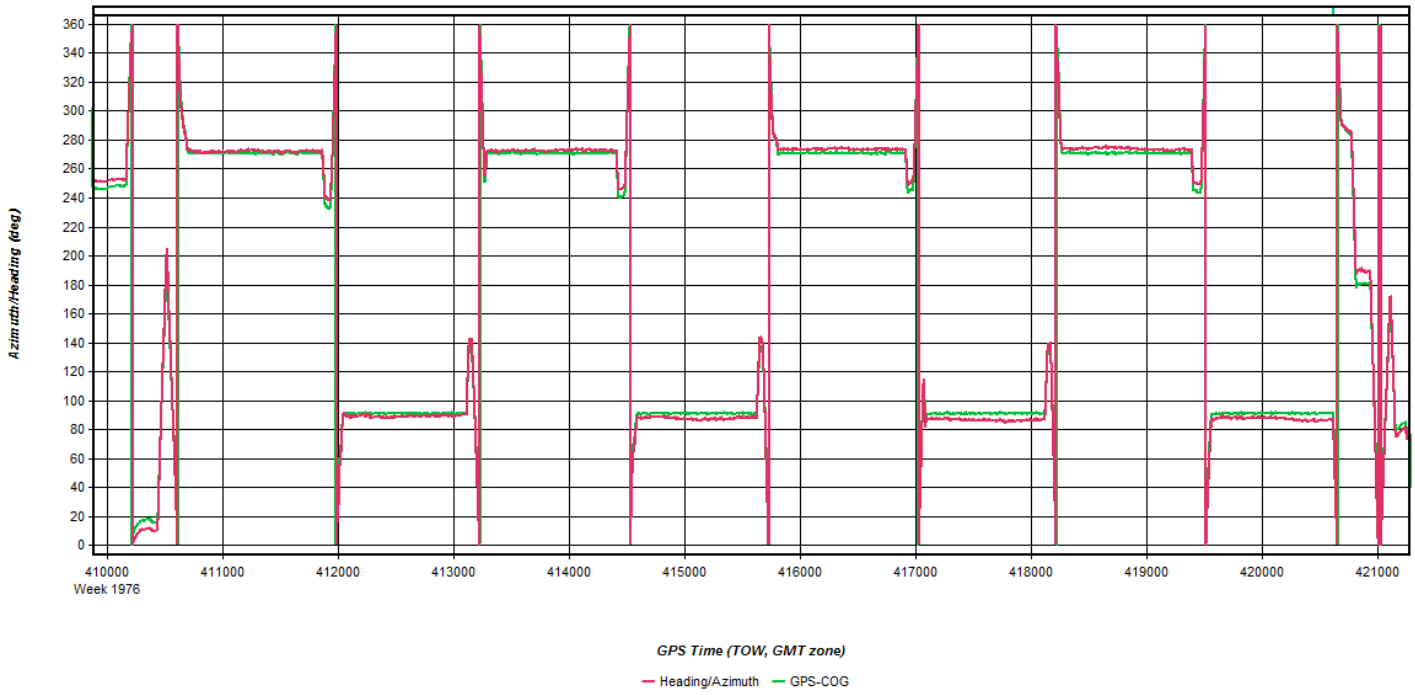

Height (m)
2220
2200
2180
2160
2140
2120
2100
2080
2060
2040
2020
2000
1980
1960
1940
1920
1900
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
Height

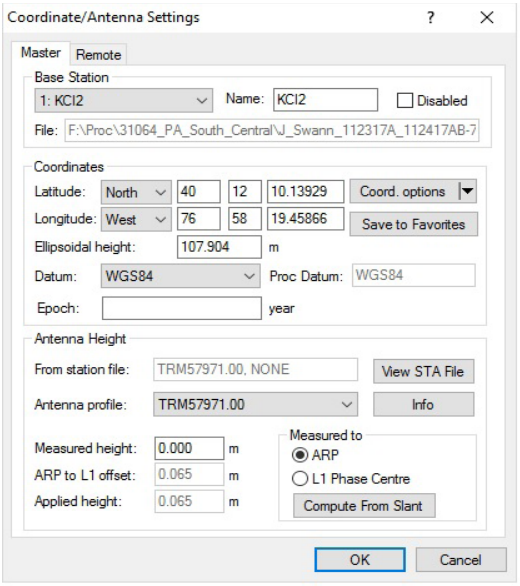

Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
-0.015
-0.020
-0.025
-0.030
-0.035
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
East
North
Up

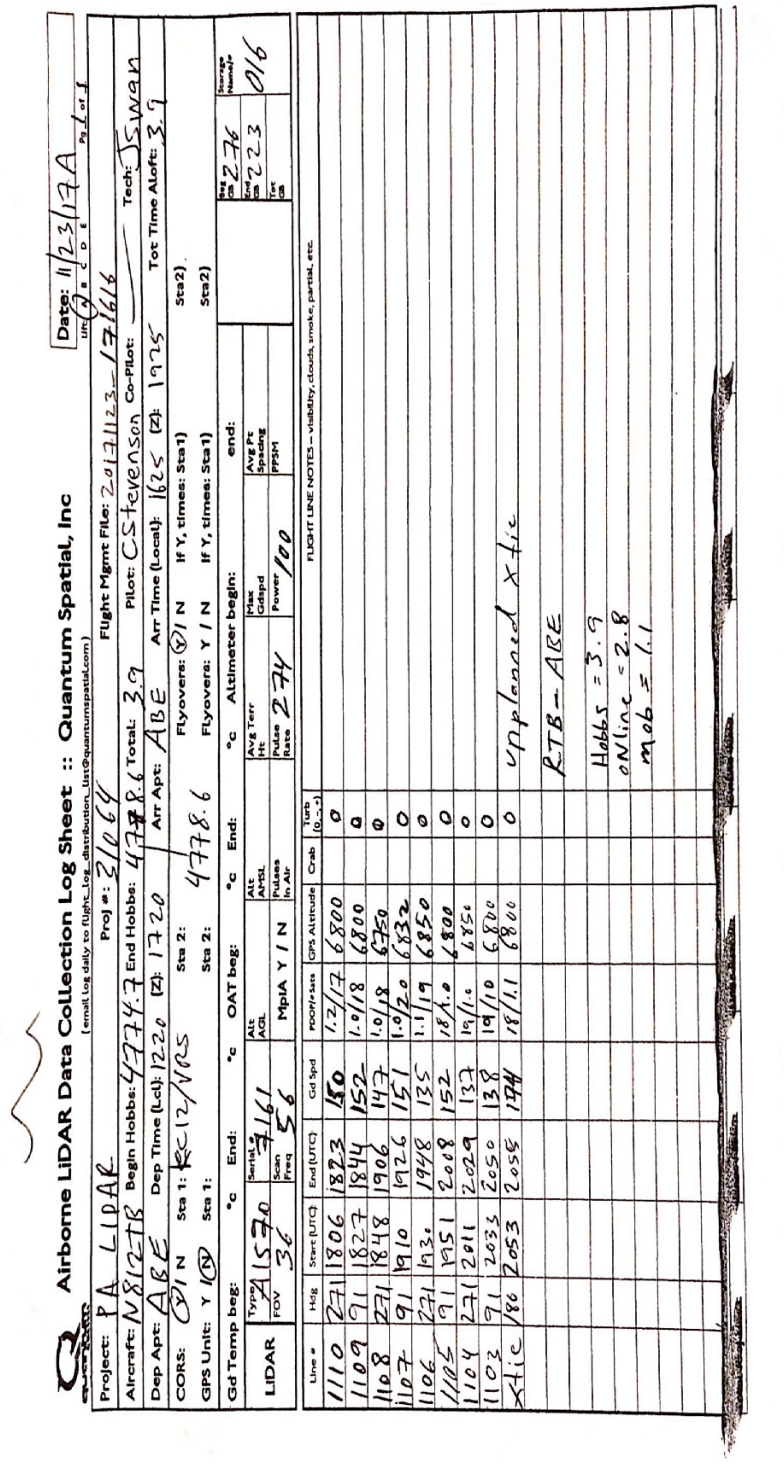

Estimated StdDev (m)
0.0125
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
-0.0025
-0.0030
-0.0035
-0.0040
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
410000
Week 1976
411000
412000
413000
414000
415000
416000
417000
418000
419000
420000
421000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: KCI2
Name: KCI2
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112317A_112417AB-7
Coordinates
Latitude: North 40 12 10.13929
Coord. options
Longitude: West 76 58 19.45866
Save to Favorites
Ellipsoidal height: 107.904 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

Flight Log



Airborne LiDAR Data Collection Log Sheet :: Quantum Spatial, Inc
(email log daily to flight_log_distribution_list@quantumspatial.com)

Date: 11/23/17A (UTC / D E) Pg 1 of 1

Project: PA LIDAR — Proj #: 21064 — Flight Mgmt File: 20171123-171616

Aircraft: N812TB — Begin Hobbs: 4774.7 — End Hobbs: 4778.6 — Total: 3.9 — Pilot: CStevenson — Co-Pilot: — Tech: JSwan

Dep Apt: ABE — Dep Time (Lcl): 1220 (Z): 1720 — Arr Apt: ABE — Arr Time (Local): 1625 (Z): 1925 — Tot Time Aloft: 3.9

CORS: (Y) N — Sta 1: KC12/VRS — Sta 2: — Flyovers: (Y) N — If Y, times: Sta1) — Sta2)

GPS Unit: Y (N) — Sta 1: — Sta 2: 4778.6 — Flyovers: Y / N — If Y, times: Sta1) — Sta2)

Gd Temp beg: °c — end: — °c — OAT beg: — °c — End: — °c — Altimeter begin: — end:

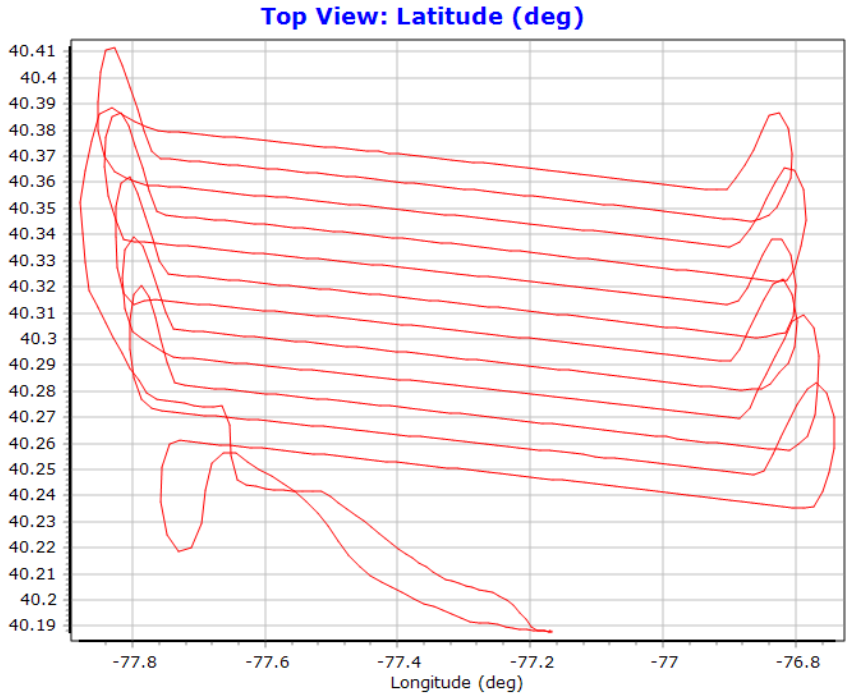
	Type	Serial #	Alt AGL	Alt ASFL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing
LiDAR	FOV	Scan Freq	MpiA Y / N	Pulses In Air	Pulse Rate	Power	PPSM
	36	58			274	100	

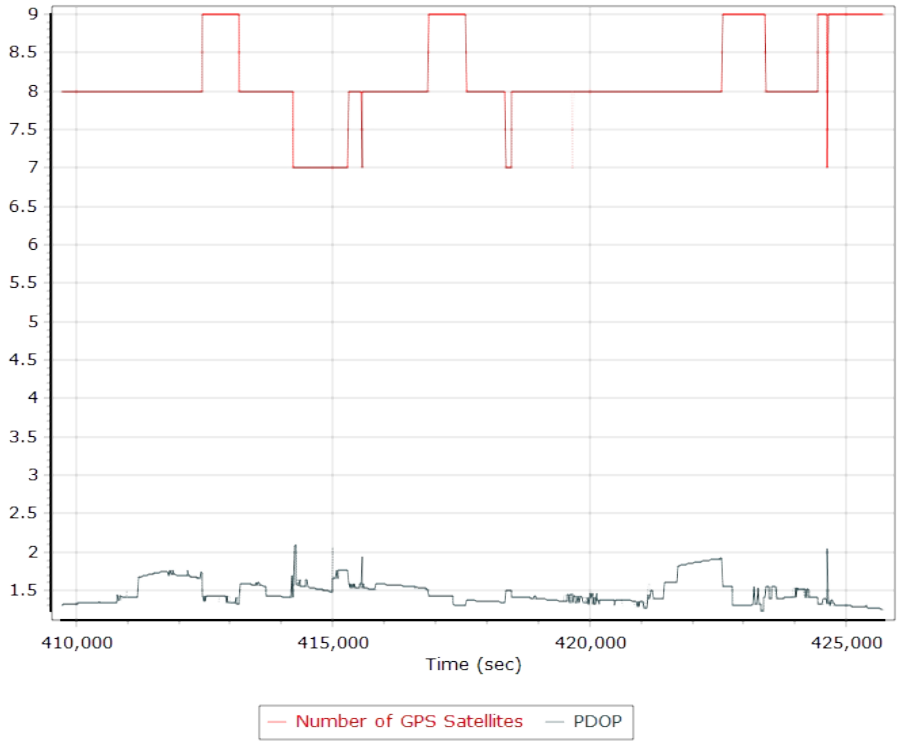
Beg DS 276 — End DS 223 — Tot DS — Storage Number 016

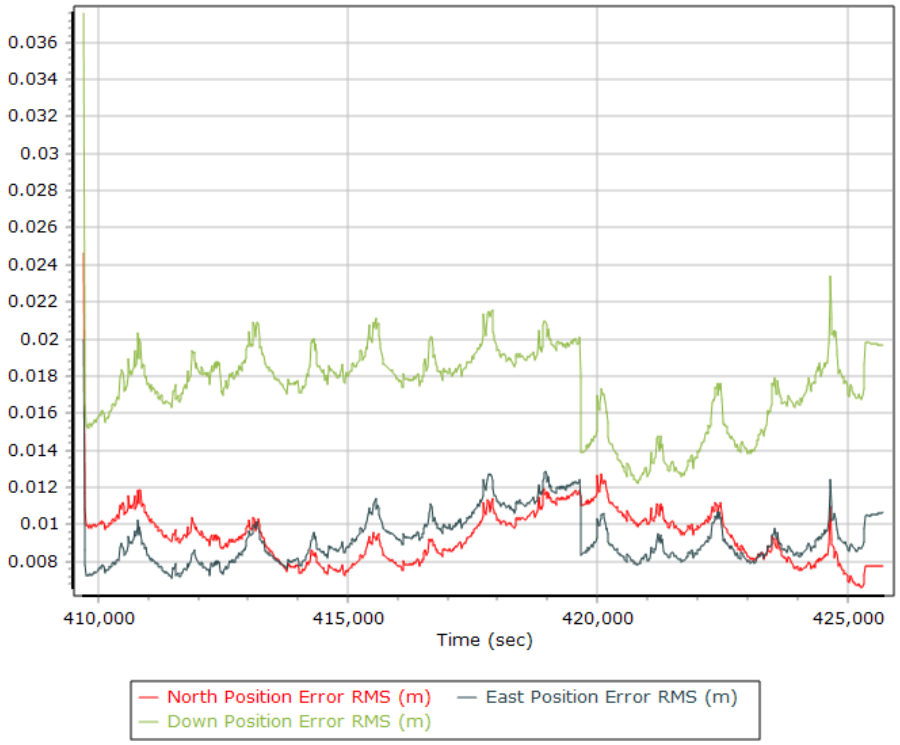
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PDOP/Sats	GPS Altitude	Crab	Turb (0,+)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
1110	271	1806	1823	150	1.2/17	6800		0	
1109	91	1827	1844	152	1.0/18	6800		0	
1108	271	1848	1906	147	1.0/18	6750		0	
1107	91	1910	1926	151	1.0/20	6832		0	
1106	271	1930	1948	135	1.1/19	6850		0	
1105	91	1951	2008	152	1.0/20	6800		0	
1104	271	2011	2029	137	1.0/19	6850		0	
1103	91	2033	2050	138	1.0/19	6800		0	
xtic	186	2053	2056	194	1.1/18	6800		0	unplanned xtic
									RTB – ABE
									Hobbs = 3.9
									eNline = 2.8
									mob = 1.1

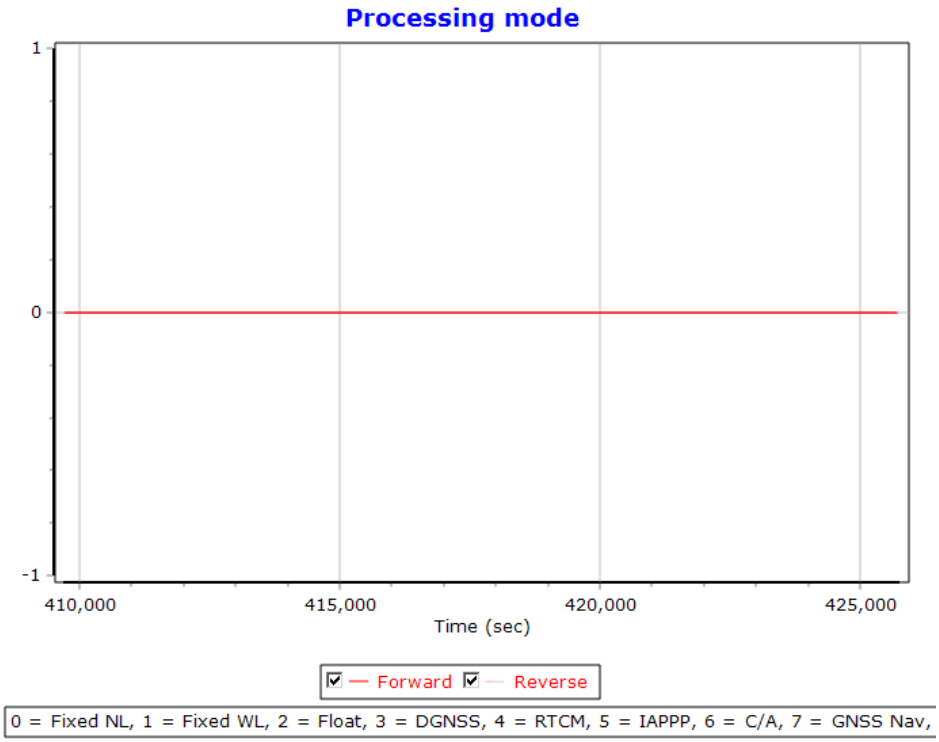
Scanned by CamScanner

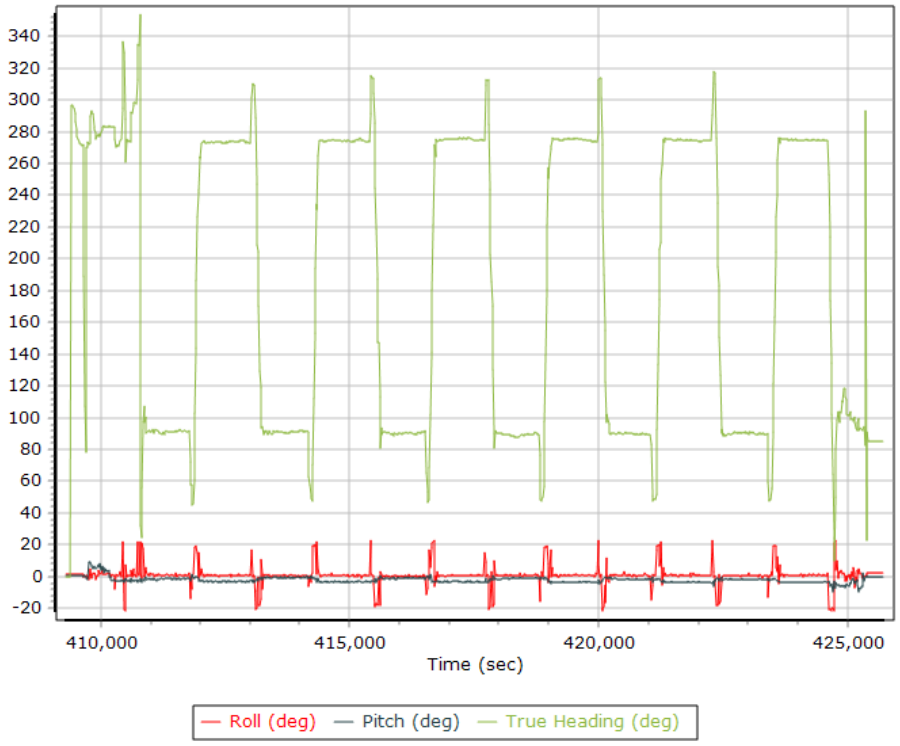
November 23, 2017-A (N1107Q, SN1256)

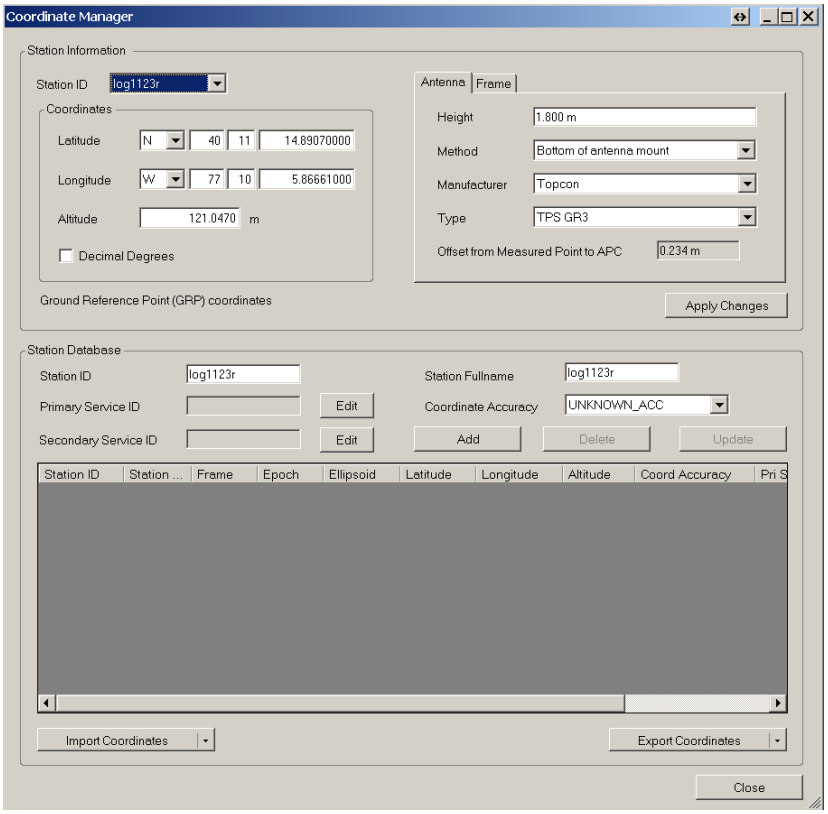

Top View: Latitude (deg)
40.41
40.4
40.39
40.38
40.37
40.36
40.35
40.34
40.33
40.32
40.31
40.3
40.29
40.28
40.27
40.26
40.25
40.24
40.23
40.22
40.21
40.2
40.19
-77.8
-77.6
-77.4
-77.2
-77
-76.8
Longitude (deg)


9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
410,000
415,000
420,000
425,000
Time (sec)
Number of GPS Satellites
PDOP


0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
410,000
415,000
420,000
425,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


Processing mode
1
0
-1
410,000
415,000
420,000
425,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
410,000
415,000
420,000
425,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Coordinate Manager
Station Information
Station ID
log1123r
Coordinates
Latitude
N
40
11
14.89070000
Longitude
W
77
10
5.86661000
Altitude
121.0470
m
Decimal Degrees
Ground Reference Point (GRP) coordinates
Antenna
Frame
Height
1.800 m
Method
Bottom of antenna mount
Manufacturer
Topcon
Type
TPS GR3
Offset from Measured Point to APC
0.234 m
Apply Changes
Station Database
Station ID
log1123r
Station Fullname
log1123r
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

Flight Log

Flight Log

Field Crew	Project #	GPS Information		Meteorological Conditions			
Jonathan	20170231:1	Base 1	N94A		Elevation	Temp	Pressure
Alex	Project Description	Base 2		Airport	508ft		
Travois		Base 3		@ Altitude			
	PA South LiDAR	Aero 2		@ Altitude		#REF!	

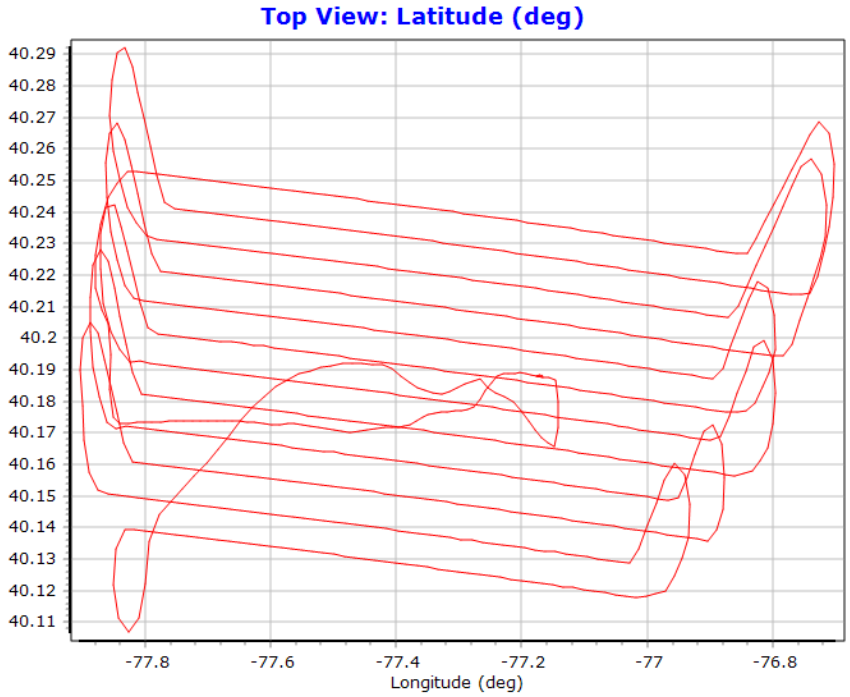
IMU Information		GPS Base Station Information			
Location			File Name	Ant Hgt	Ant Type
Carlisle, PA	Start Time	Base 1	log1123r.tps	1.8	GR3
Aircraft		Base 2			
N1107Q	Stop Time	Base 3			

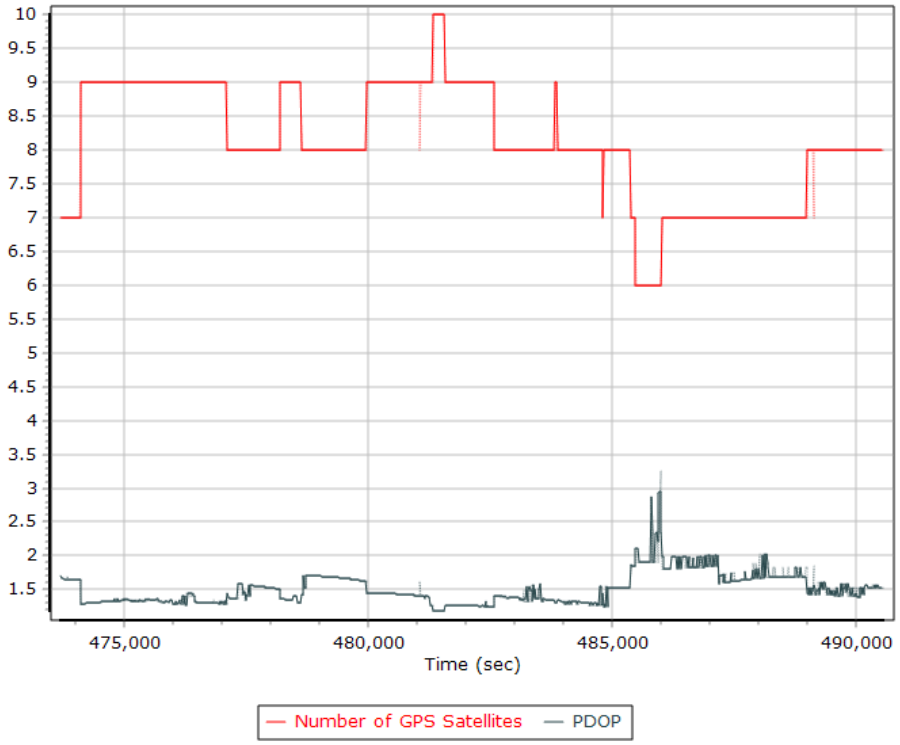
Flight Date	Pilot	Operator
11/23/2017	travois	Jonathan

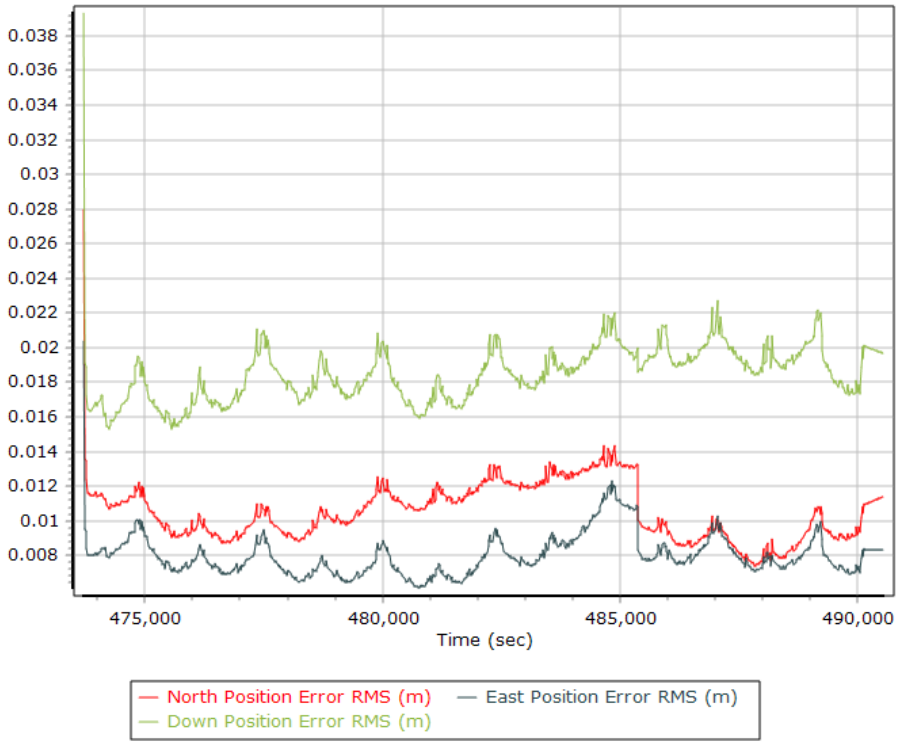
Line/Dir		Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed		Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
1	90°	0:27:35	0:42:08	0:14:33	6,234					160 kts	184 mph	44.65			
2	270°	0:46:52	1:02:42	0:15:50	6,234					160 kts	184 mph	48.59			
3	90°	1:06:58	1:21:55	0:14:57	6,234					160 kts	184 mph	45.88			
4	270°	1:26:37	1:42:36	0:15:59	6,234					160 kts	184 mph	49.05			
5	90°	1:46:47	2:01:17	0:14:30	6,234					160 kts	184 mph	44.50			
6	270°	2:05:29	2:21:00	0:15:31	6,234					160 kts	184 mph	47.62			
7	90°	2:24:54	2:39:20	0:14:26	6,234					160 kts	184 mph	44.29			
8	270°	2:43:40	2:58:54	0:15:14	6,234					160 kts	184 mph	46.75			
9	90°	3:02:32	3:16:47	0:14:15	6,234					160 kts	184 mph	43.73			
10	270°	3:21:38	3:37:03	0:15:25	6,234					160 kts	184 mph	47.31			
11	90°	3:40:51	3:55:39	0:14:48	6,234					160 kts	184 mph	45.42			
12	270°	4:00:24	4:16:02	0:15:38	6,234					160 kts	184 mph	47.97			

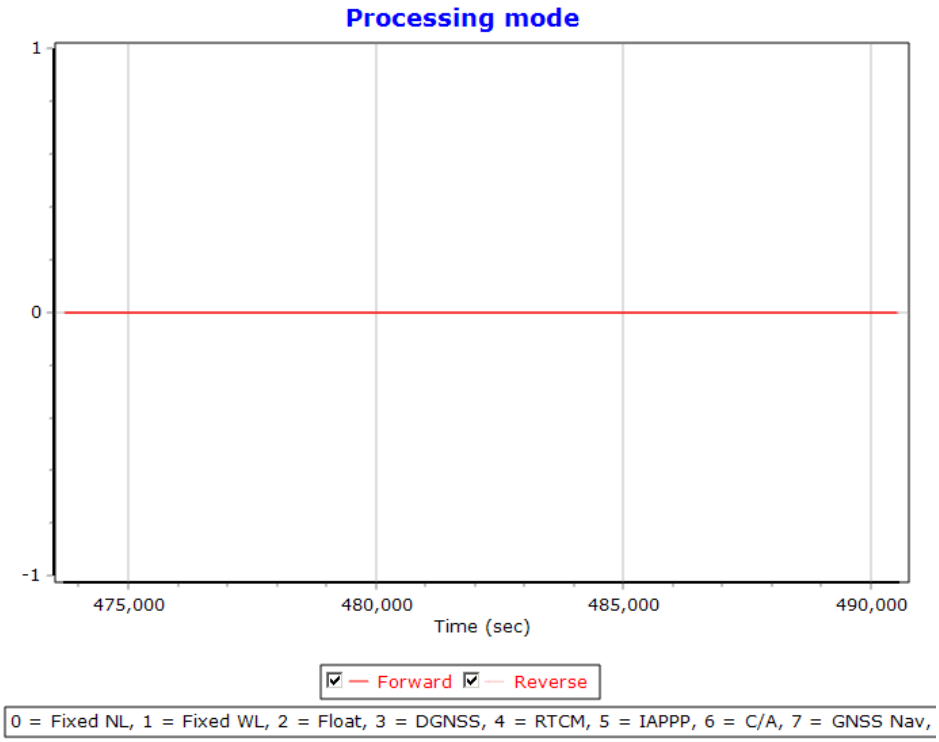
DMC FLIGHT SUMMARY				Data Collection		Comments	Weather
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0	Percent Complete	100.0%		☑ Clear
DMC Data Collection Time:	3:01:06	Miles Flown on Flights:	555.75	Total Flight Lines	1491		☐ Fair
Hobbs Start Time	1000			Lines Complete	1491		☐ Partly Cloudy
Hobbs Stop Time	1003.3	Hobbs Total Time	3.3	Lines Completed Today	1112		☐ Cloudy

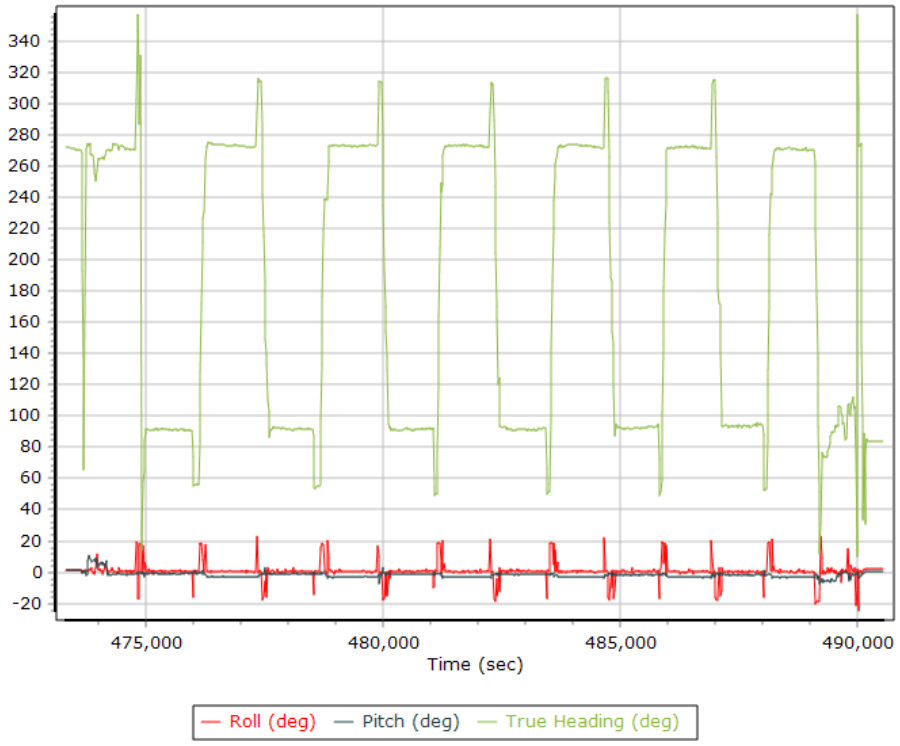
November 24, 2017-A (N1107Q, SN1256)

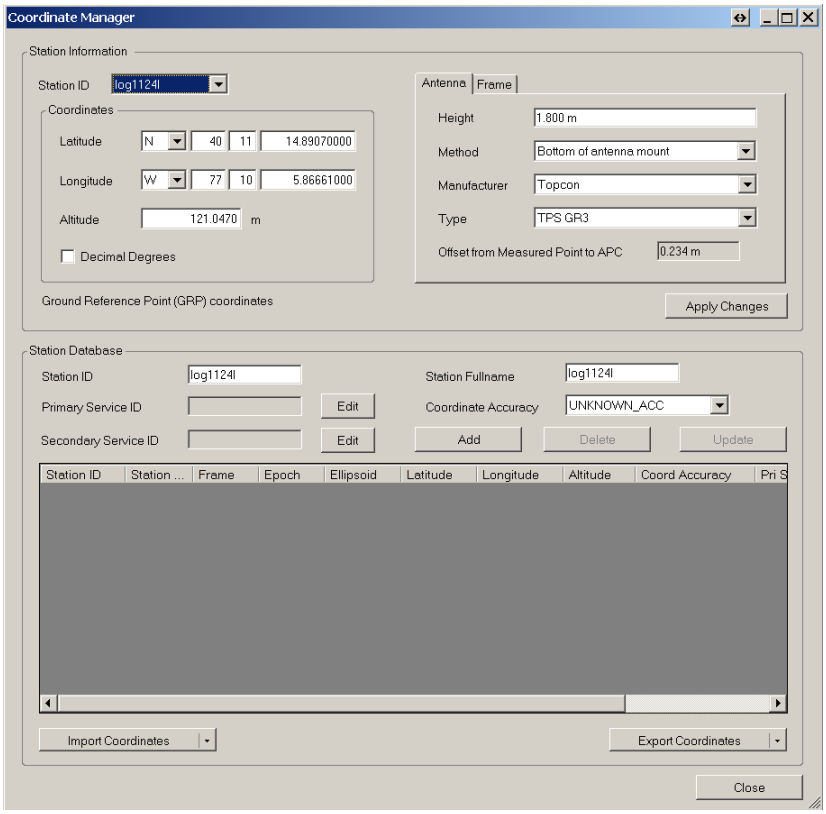

Top View: Latitude (deg)
40.29
40.28
40.27
40.26
40.25
40.24
40.23
40.22
40.21
40.2
40.19
40.18
40.17
40.16
40.15
40.14
40.13
40.12
40.11
-77.8
-77.6
-77.4
-77.2
-77
-76.8
Longitude (deg)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
475,000
480,000
485,000
490,000
Time (sec)
Number of GPS Satellites
PDOP


0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
475,000
480,000
485,000
490,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


Processing mode
1
0
-1
475,000
480,000
485,000
490,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
475,000
480,000
485,000
490,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Coordinate Manager
Station Information
Station ID
log1124l
Coordinates
Latitude
N
40
11
14.89070000
Longitude
W
77
10
5.86661000
Altitude
121.0470
m
Decimal Degrees
Ground Reference Point (GRP) coordinates
Antenna
Frame
Height
1.800 m
Method
Bottom of antenna mount
Manufacturer
Topcon
Type
TPS GR3
Offset from Measured Point to APC
0.234 m
Apply Changes
Station Database
Station ID
log1124l
Primary Service ID
Edit
Secondary Service ID
Edit
Station Fullname
log1124l
Coordinate Accuracy
UNKNOWN_ACC
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

Flight Log

Flight Log

Field Crew	Project #	GPS Information		Meteorological Conditions			
Jonathan	20170231:1	Base 1	N94A		Elevation	Temp	Pressure
Alex	Project Description	Base 2		Airport	508ft		
Travois		Base 3		@ Altitude			
	Pa South LiDAR	Aero 2		@ Altitude		#REF!	

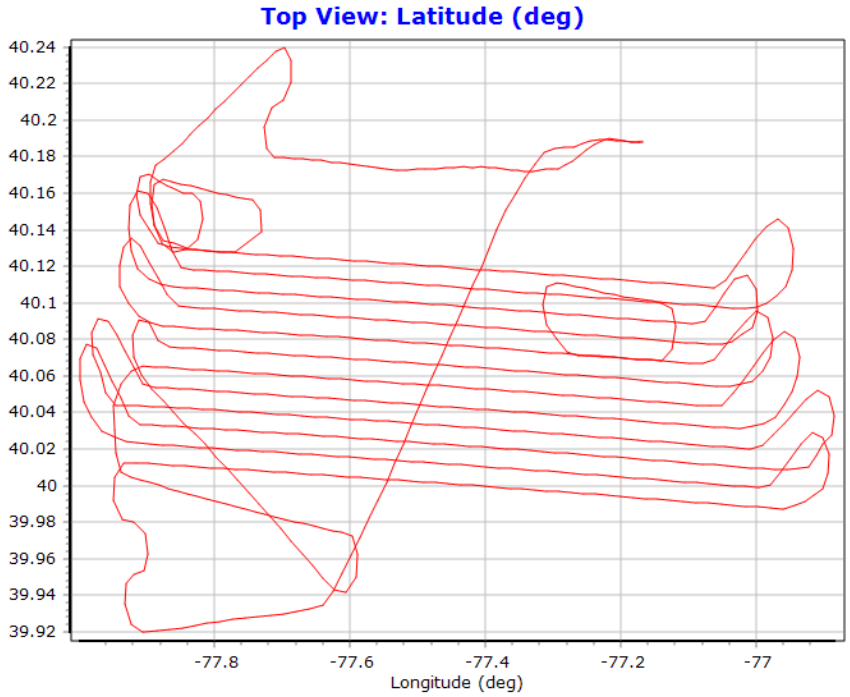
IMU Information		GPS Base Station Information			
Location			File Name	RNX File	Ant Hgt	Ant Type
Carlisle	Start Time	Base 1	log1124l.tps		1.8	GR3
Aircraft		Base 2				
N1107Q	Stop Time	Base 3				

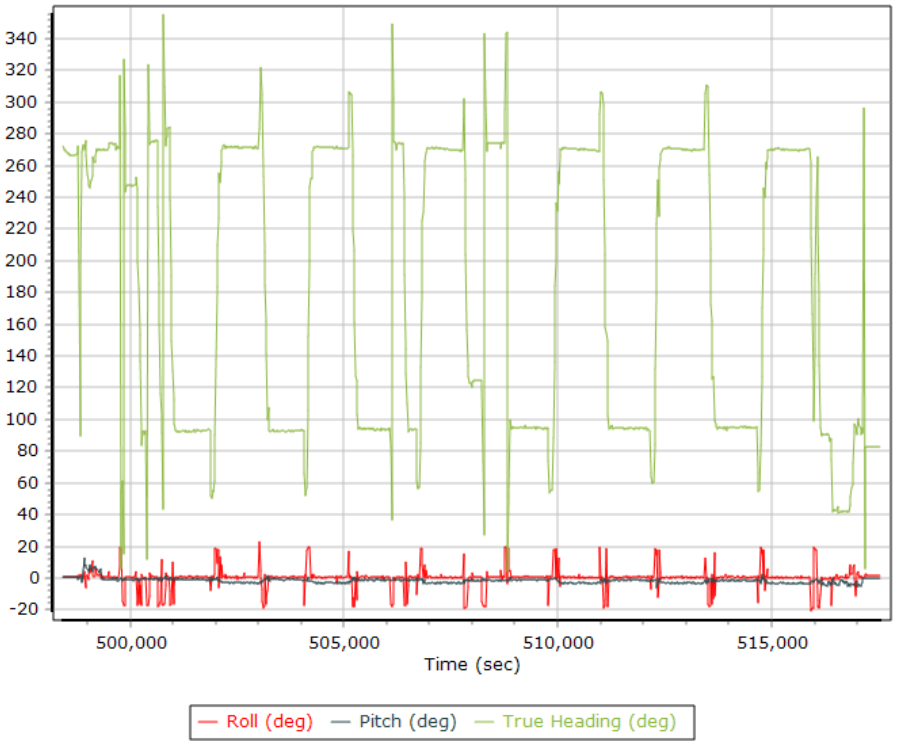
Flight Date	Pilot	Operator
11/24/2017	Travois	Jonathan

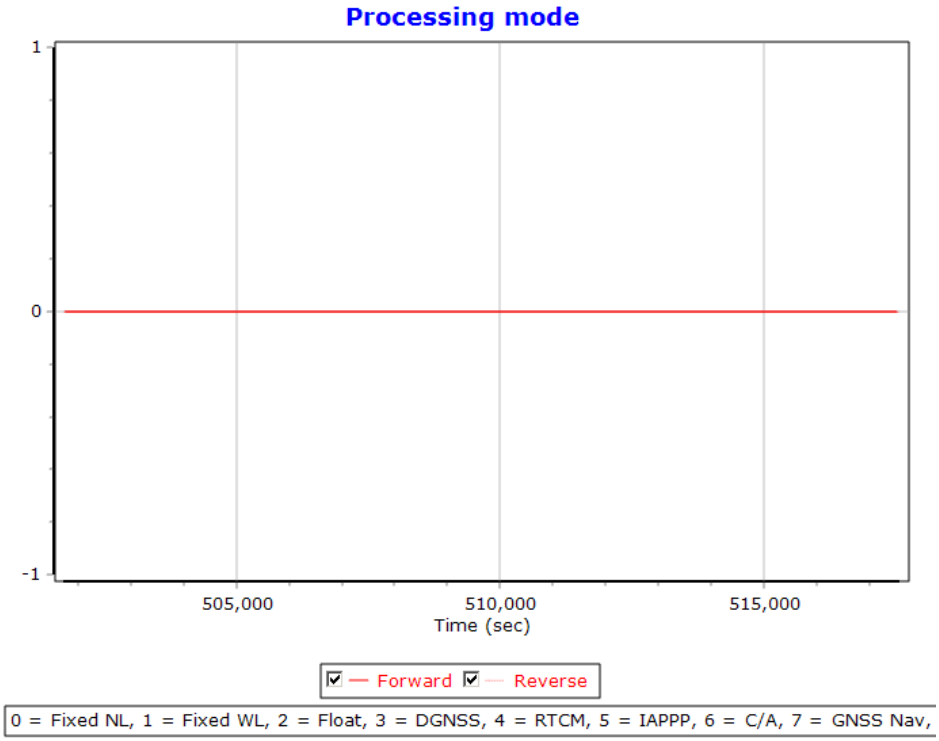
Line/Dir		Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed		Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
13	90°	11:57:33	12:13:05	0:15:32	6,234					160 kts	184 mph	47.67			
14	270°	12:19:23	12:35:25	0:16:02	6,234					160 kts	184 mph	49.20			
15	90°	12:40:12	12:55:29	0:15:17	6,234					160 kts	184 mph	46.90			
16	270°	13:02:42	13:18:01	0:15:19	6,234					160 kts	184 mph	47.00			
17	90°	13:22:24	13:37:40	0:15:16	6,234					160 kts	184 mph	46.85			
18	270°	13:42:00	13:57:24	0:15:24	6,234					160 kts	184 mph	47.26			
19	90°	14:01:28	14:17:14	0:15:46	6,234					160 kts	184 mph	48.38			
20	270°	14:21:44	14:37:33	0:15:49	6,234					160 kts	184 mph	48.54			
21	90°	14:41:56	14:56:47	0:14:51	6,234					160 kts	184 mph	45.57			
22	270°	15:01:11	15:15:19	0:14:08	6,234					160 kts	184 mph	43.37			
23	90°	15:19:42	15:33:31	0:13:49	6,234					160 kts	184 mph	42.40			
24	270°	15:38:02	15:51:37	0:13:35	6,234					160 kts	184 mph	41.68			

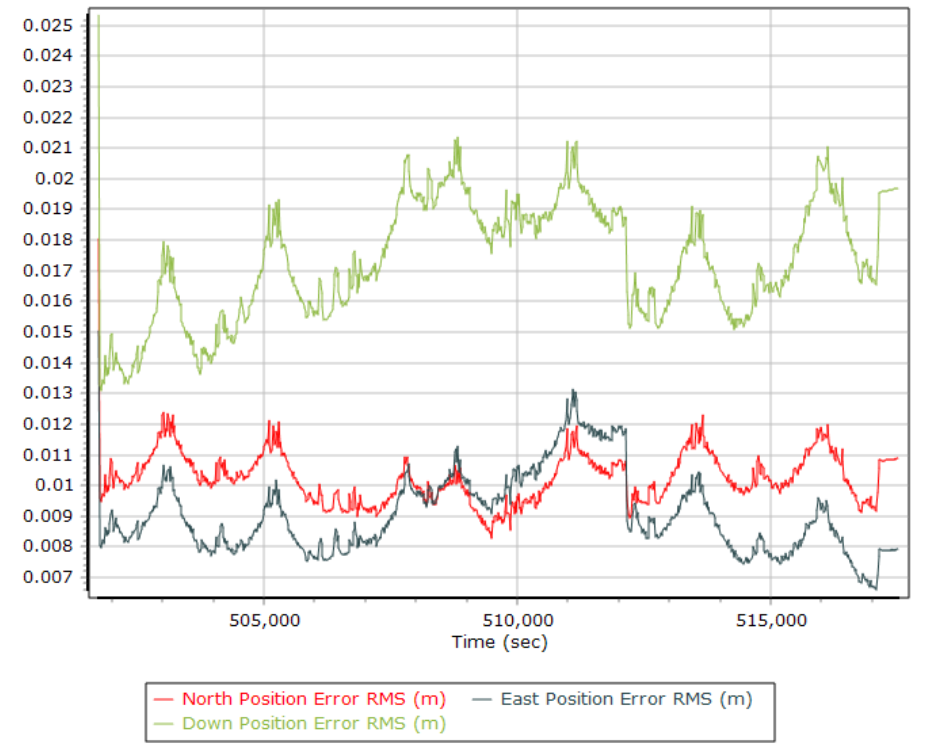
DMC FLIGHT SUMMARY				Data Collection		Comments	Weather
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0	Percent Complete	100.0%		☑ Clear
DMC Data Collection Time:	3:00:48	Miles Flown on Flights:	554.83	Total Flight Lines	1491		☐ Fair
Hobbs Start Time	1000			Lines Complete	1491		☐ Partly Cloudy
Hobbs Stop Time	1003.3	Hobbs Total Time	3.3	Lines Completed Today	1112		☐ Cloudy

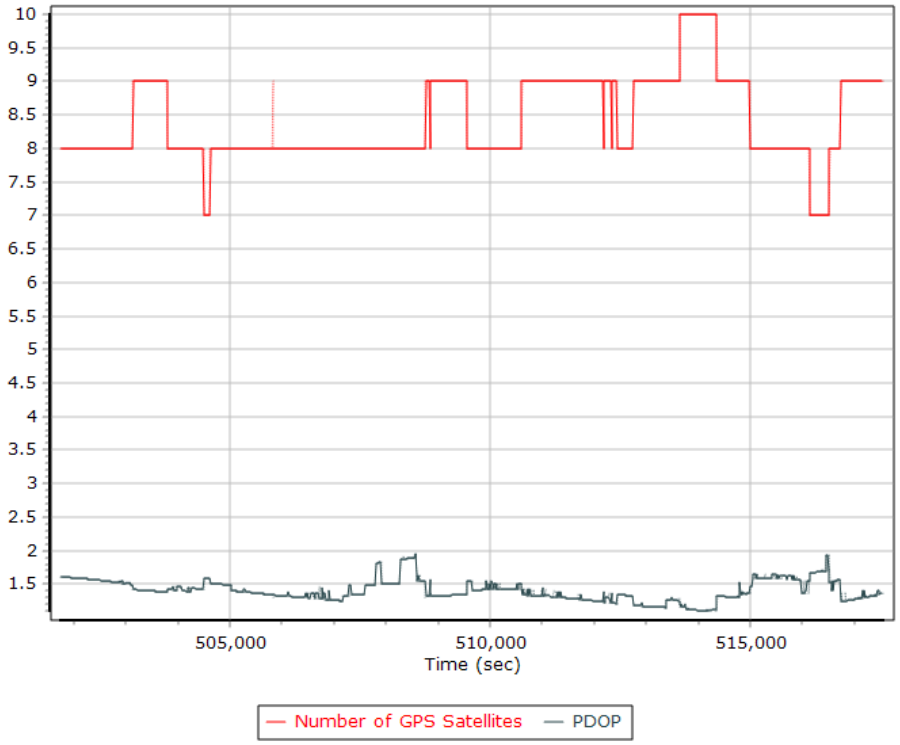
November 24, 2017-B (N1107Q, SN1256)

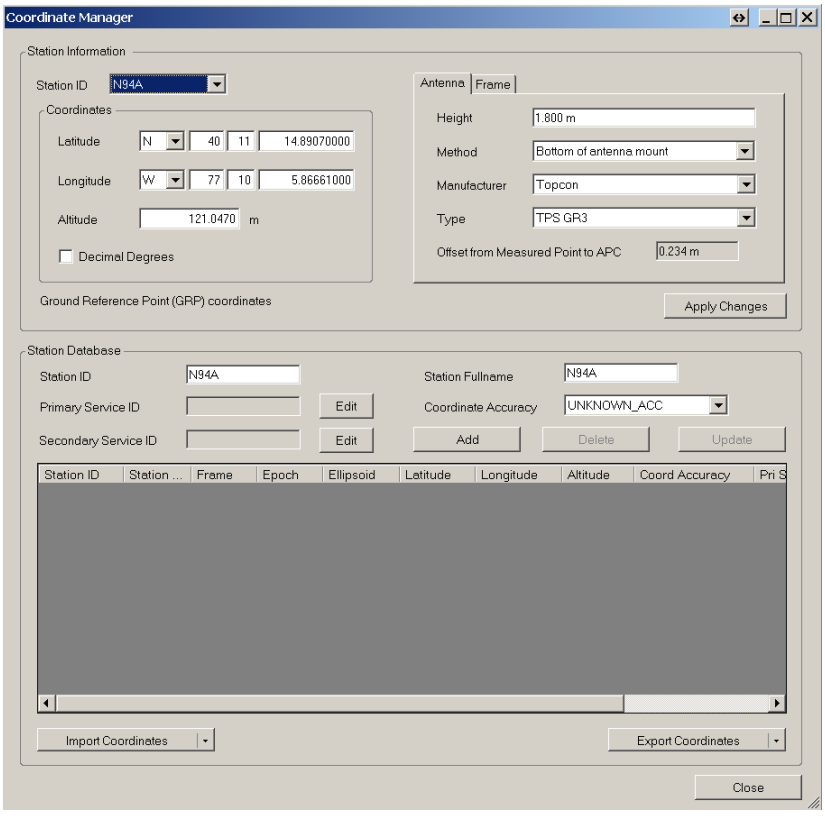

Top View: Latitude (deg)
40.24
40.22
40.2
40.18
40.16
40.14
40.12
40.1
40.08
40.06
40.04
40.02
40
39.98
39.96
39.94
39.92
-77.8
-77.6
-77.4
-77.2
-77
Longitude (deg)


340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
500,000
505,000
510,000
515,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Processing mode
1
0
-1
505,000
510,000
515,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
505,000
510,000
515,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
505,000
510,000
515,000
Time (sec)
Number of GPS Satellites
PDOP


Coordinate Manager
Station Information
Station ID
N94A
Coordinates
Latitude
N
40
11
14.89070000
Longitude
W
77
10
5.86661000
Altitude
121.0470
m
Decimal Degrees
Ground Reference Point (GRP) coordinates
Antenna
Frame
Height
1.800 m
Method
Bottom of antenna mount
Manufacturer
Topcon
Type
TPS GR3
Offset from Measured Point to APC
0.234 m
Apply Changes
Station Database
Station ID
N94A
Station Fullname
N94A
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

Flight Log

Flight Log

Field Crew	
Jonathan	
Alex	
Travois	

Project #	20170231:1
Project Description	
Pa South LiDAR	

GPS Information			
Base 1	N94A		
Base 2		Airport	508ft
Base 3		@ Altitude	
Aero 2		@ Altitude	

Meteorological Conditions		
	Temp	Pressure
Airport		
@ Altitude		
@ Altitude	#REF!	

IMU Information		
	Start Time	Stop Time
Base 1		
Base 2		
Base 3		

GPS Base Station Information			
	File Name	Ant Hgt	Ant Type
Base 1	log1124s.tps	1.8	GR3
Base 2			
Base 3			

Flight Date	Pilot	Operator
11/24/2017	Travois	Alex

Location
Carlisle, PA

Aircraft
N1107Q

Line/Dir		Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed	Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
25	90°	18:58:00	18:59:35	0:01:35	6,234					160 kts	184 mph	4.86		void
25	90°	19:05:48	19:05:55	0:00:07	6,234					160 kts	184 mph	0.36		void
25	90°	19:11:01	19:24:35	0:13:34	6,234					160 kts	184 mph	41.63		Line will be reflown
26	270°	19:30:00	19:43:36	0:13:36	6,234					160 kts	184 mph	41.73		
27	90°	19:47:37	20:01:00	0:13:23	6,234					160 kts	184 mph	41.07		
28	270°	20:05:07	20:18:23	0:13:16	6,234					160 kts	184 mph	40.71		
29	90°	20:22:22	20:34:01	0:11:39	6,234					160 kts	184 mph	35.75		Channel turned off about 10 nm left
29	90°	20:41:38	20:44:45	0:03:07	6,234					160 kts	184 mph	9.56		continued flying line. Line will be reflown
30	270°	20:49:01	21:03:02	0:14:01	6,234					160 kts	184 mph	43.01		
31	90°	21:21:40	21:36:14	0:14:34	6,234					160 kts	184 mph	44.70		
32	270°	21:41:09	21:56:16	0:15:07	6,234					160 kts	184 mph	46.39		
33	90°	22:00:14	22:15:57	0:15:43	6,234					160 kts	184 mph	48.23		
34	270°	22:20:58	22:37:13	0:16:15	6,234					160 kts	184 mph	49.87		
35	90°	22:41:23	22:57:40	0:16:17	6,234					160 kts	184 mph	49.97		
36	270°	23:02:00	23:18:29	0:16:29	6,234					160 kts	184 mph	50.58		

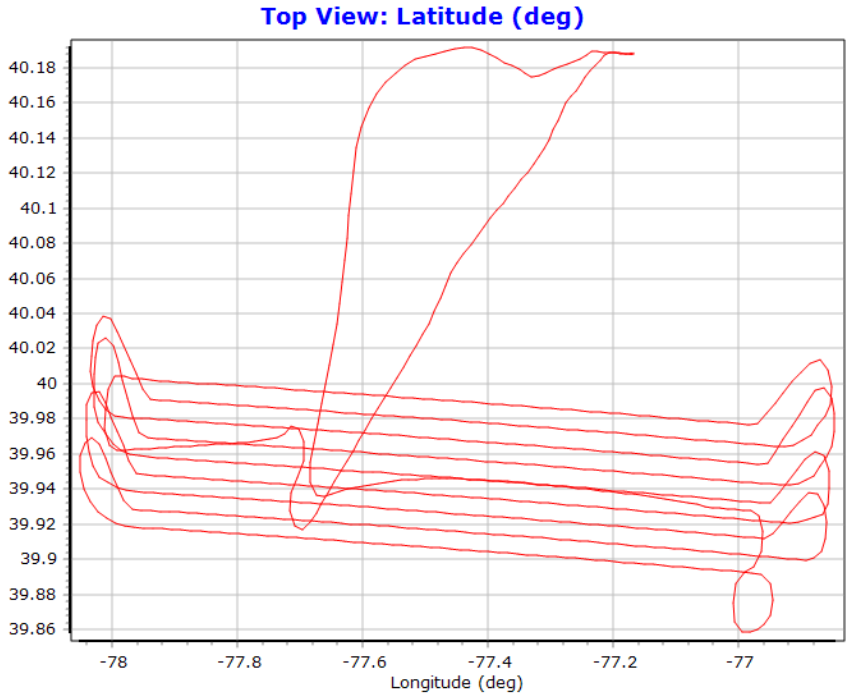
DMC FLIGHT SUMMARY			
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0
DMC Data Collection Time:	2:58:43	Miles Flown on Flights:	548.44
Hobbs Start Time	1000	Hobbs Total Time	3.3
Hobbs Stop Time	1003.3		

Data Collection	
Percent Complete	100.0%
Total Flight Lines	1491
Lines Complete	1491
Lines Completed Today	1112

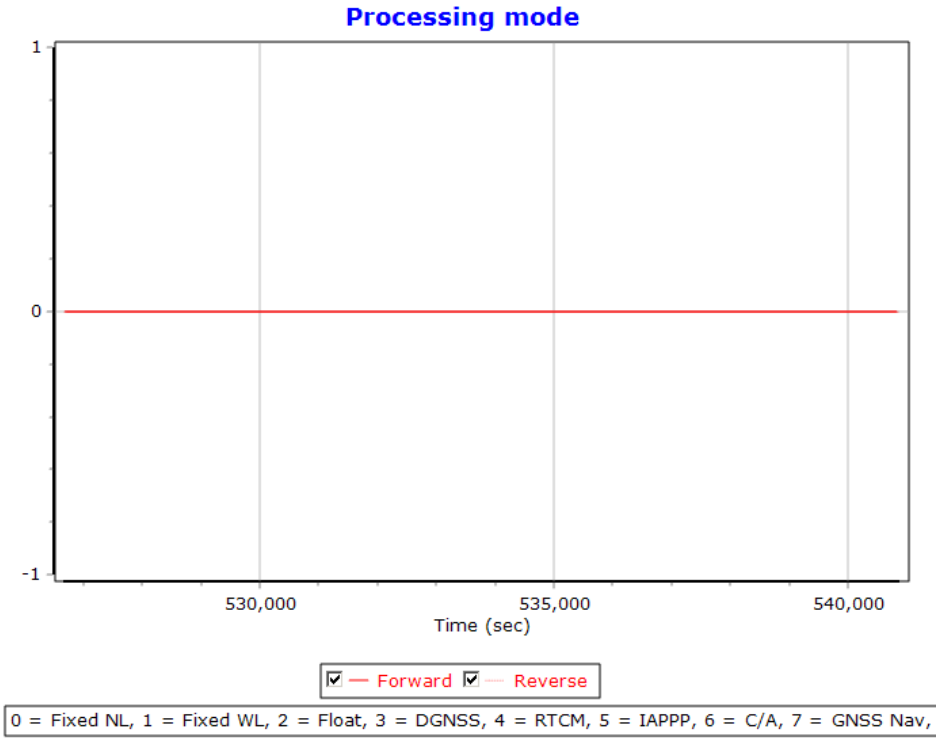
Comments

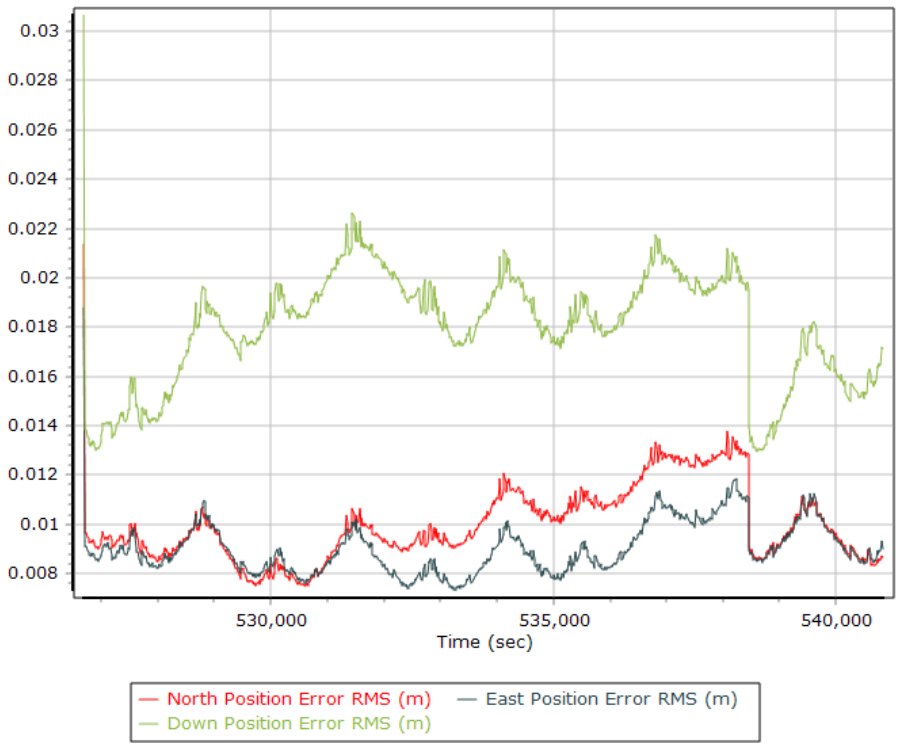
Weather
☑ Clear
☐ Fair
☐ Partly Cloudy
☐ Cloudy

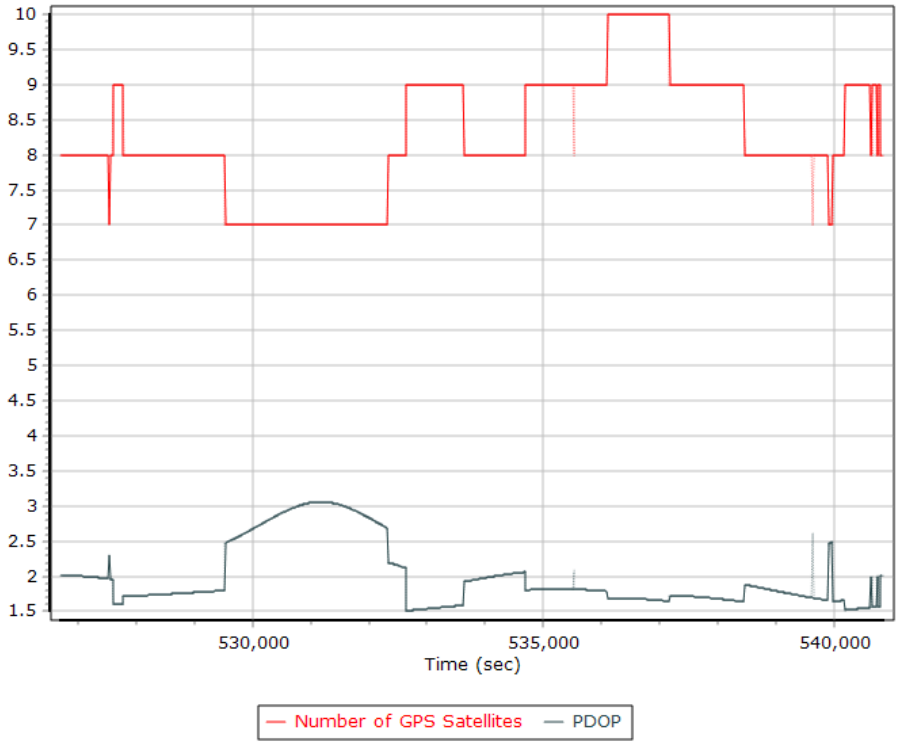
November 24, 2017-C (N1107Q, SN1256)

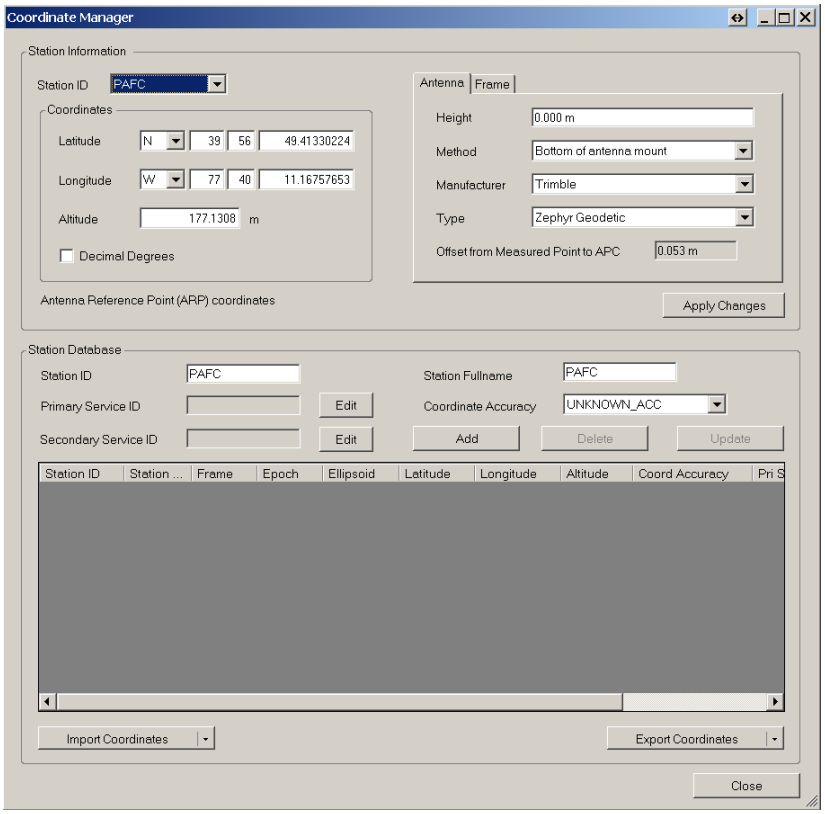

Top View: Latitude (deg)
40.18
40.16
40.14
40.12
40.1
40.08
40.06
40.04
40.02
40
39.98
39.96
39.94
39.92
39.9
39.88
39.86
-78
-77.8
-77.6
-77.4
-77.2
-77
Longitude (deg)


340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
530,000
535,000
540,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)

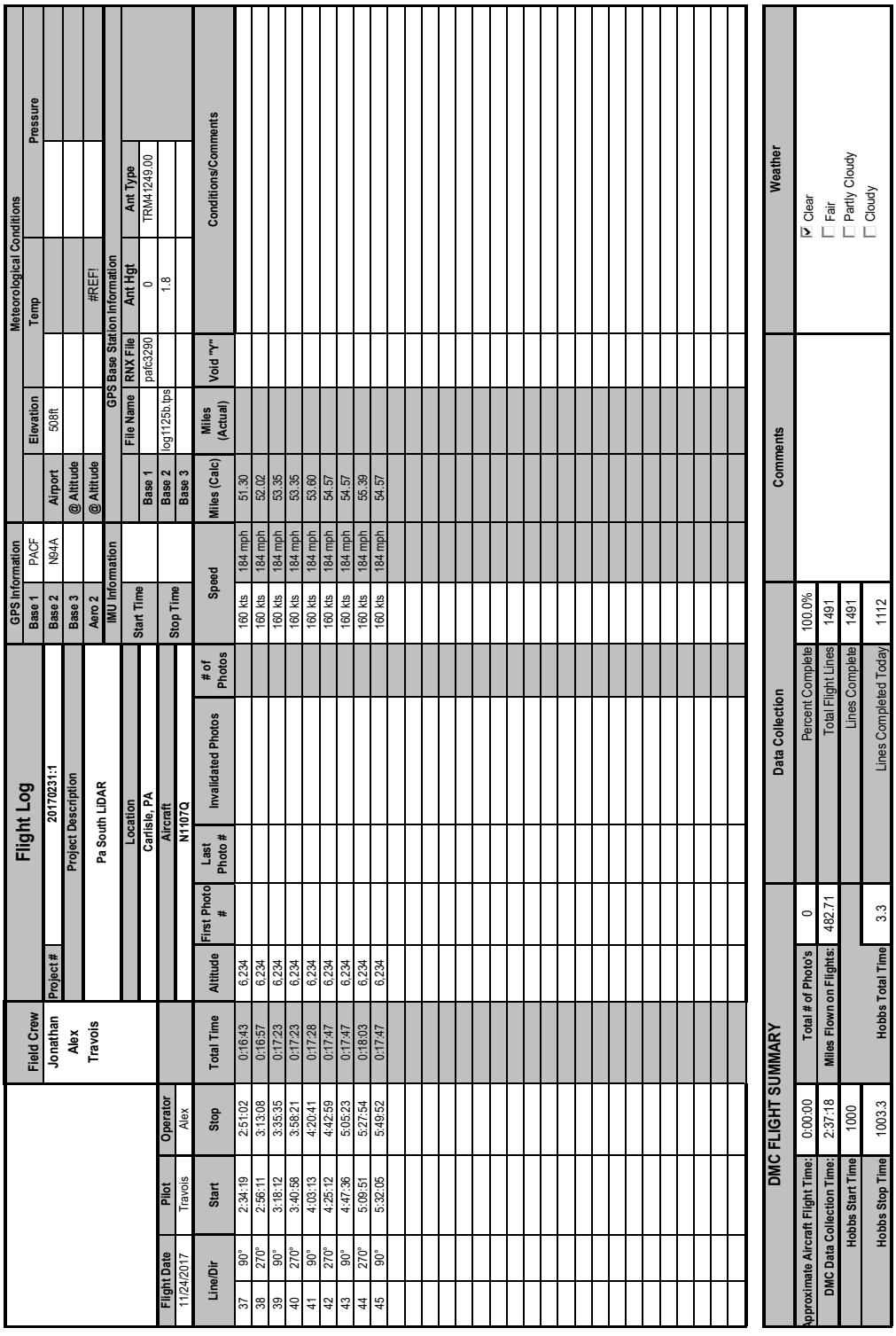

Processing mode
1
0
-1
530,000
535,000
540,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
530,000
535,000
540,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
530,000
535,000
540,000
Time (sec)
Number of GPS Satellites
PDOP


Coordinate Manager
Station Information
Station ID
PAFC
Coordinates
Latitude
N
39
56
49.41330224
Longitude
W
77
40
11.16757653
Altitude
177.1308
m
Decimal Degrees
Antenna Reference Point (ARP) coordinates
Antenna
Frame
Height
0.000 m
Method
Bottom of antenna mount
Manufacturer
Trimble
Type
Zephyr Geodetic
Offset from Measured Point to APC
0.053 m
Apply Changes
Station Database
Station ID
PAFC
Station Fullname
PAFC
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

Flight Log



Flight Log

Field Crew	Project #	GPS Information			Meteorological Conditions		
Jonathan	20170231:1	Base 1	PACF		Elevation	Temp	Pressure
Alex	Project Description	Base 2	N94A	Airport	508ft		
Travis		Base 3		@ Altitude			
	Pa South LiDAR	Aero 2		@ Altitude		#REF!	

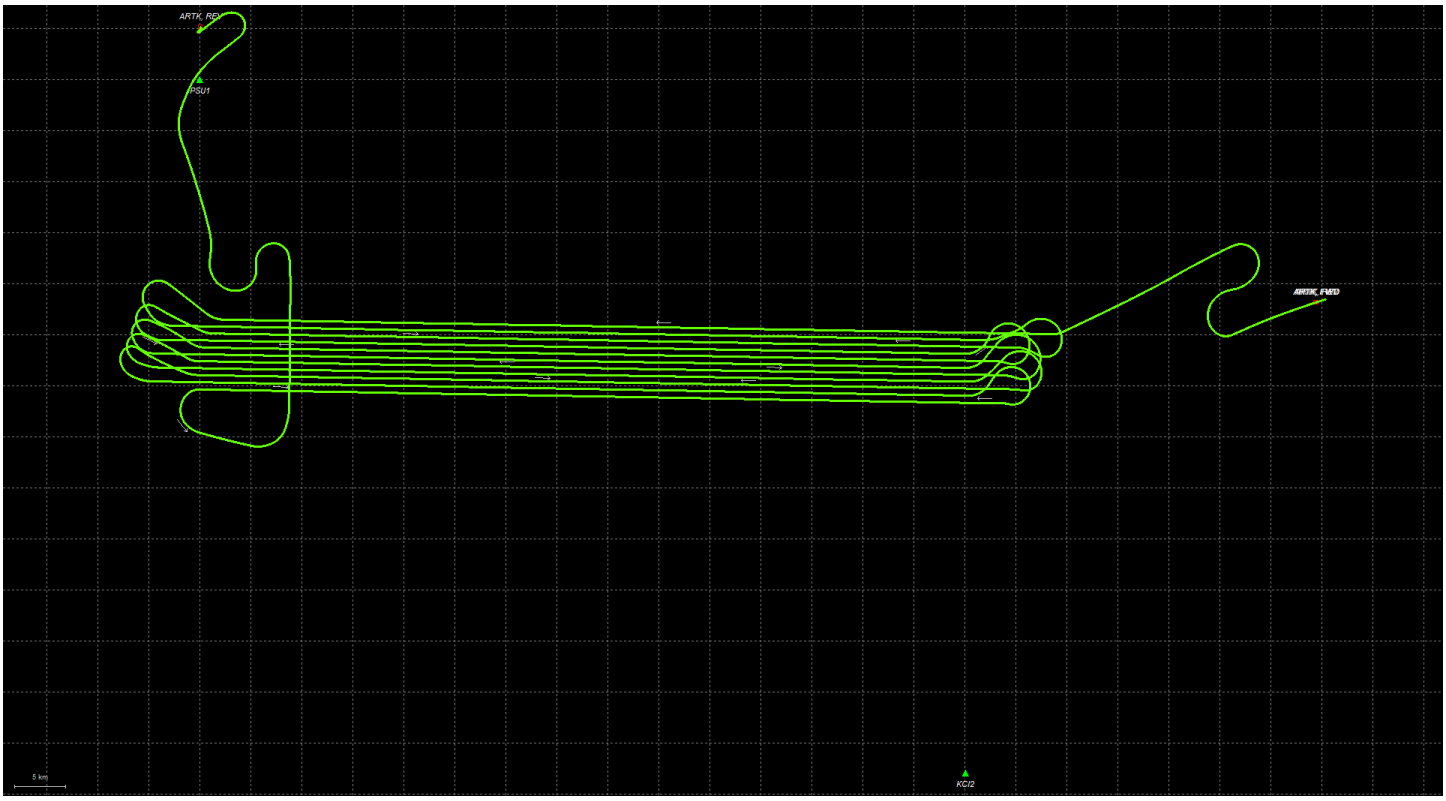
Location	IMU Information	GPS Base Station Information			
Carlisle, PA	Start Time		File Name	RNX File	Ant Hgt	Ant Type
Aircraft		Base 1		pafc3290	0	TRM41249.00
N1107Q	Stop Time	Base 2	log1125b.tps		1.8	
		Base 3				

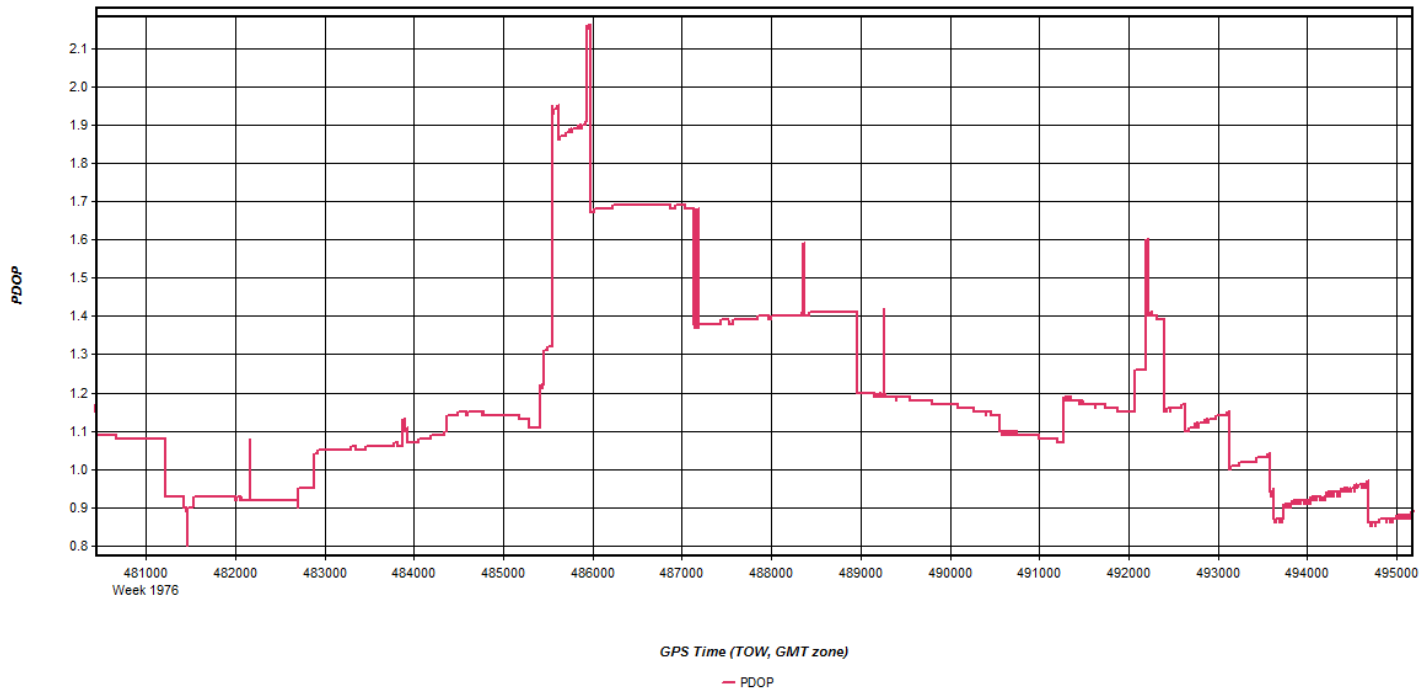
Flight Date	Pilot	Operator
11/24/2017	Travis	Alex

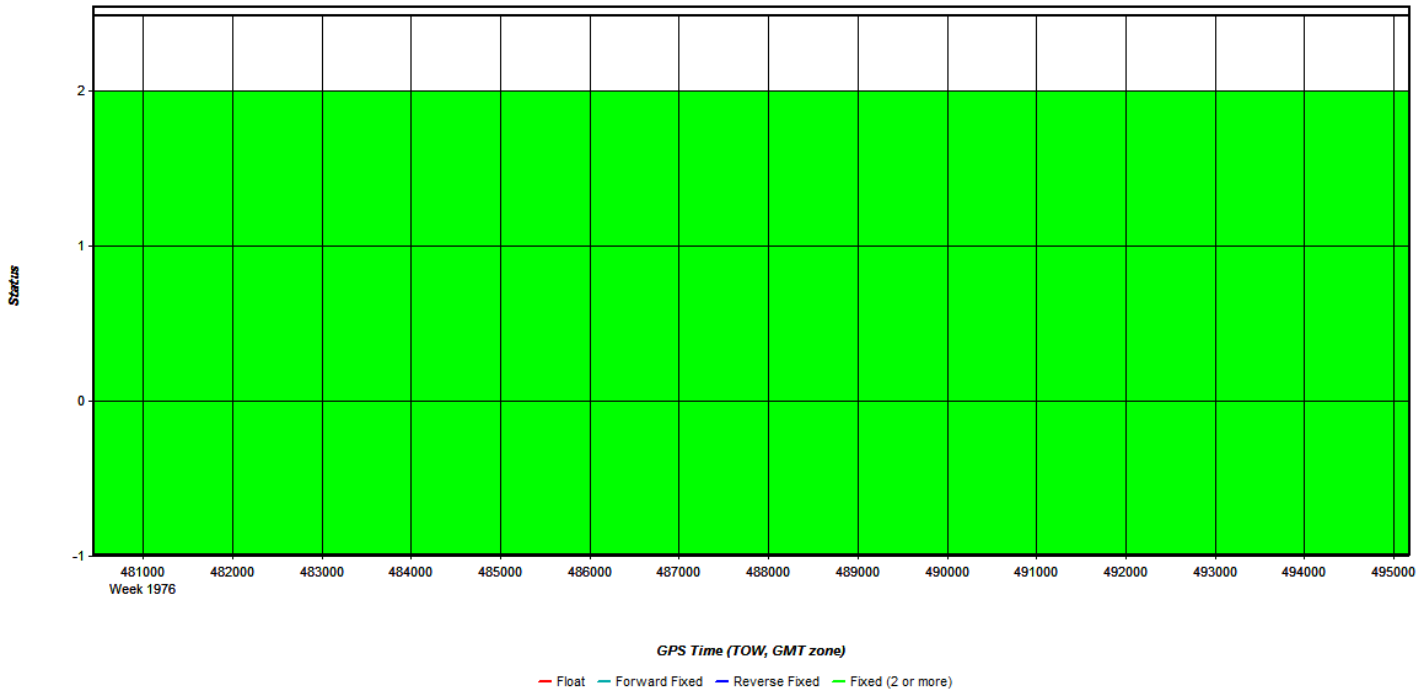
Line/Dir	Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed	Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
37 90°	2:34:19	2:51:02	0:16:43	6,234					160 kts 184 mph	51.30			
38 270°	2:56:11	3:13:08	0:16:57	6,234					160 kts 184 mph	52.02			
39 90°	3:18:12	3:35:35	0:17:23	6,234					160 kts 184 mph	53.35			
40 270°	3:40:58	3:58:21	0:17:23	6,234					160 kts 184 mph	53.35			
41 90°	4:03:13	4:20:41	0:17:28	6,234					160 kts 184 mph	53.60			
42 270°	4:25:12	4:42:59	0:17:47	6,234					160 kts 184 mph	54.57			
43 90°	4:47:36	5:05:23	0:17:47	6,234					160 kts 184 mph	54.57			
44 270°	5:09:51	5:27:54	0:18:03	6,234					160 kts 184 mph	55.39			
45 90°	5:32:05	5:49:52	0:17:47	6,234					160 kts 184 mph	54.57			

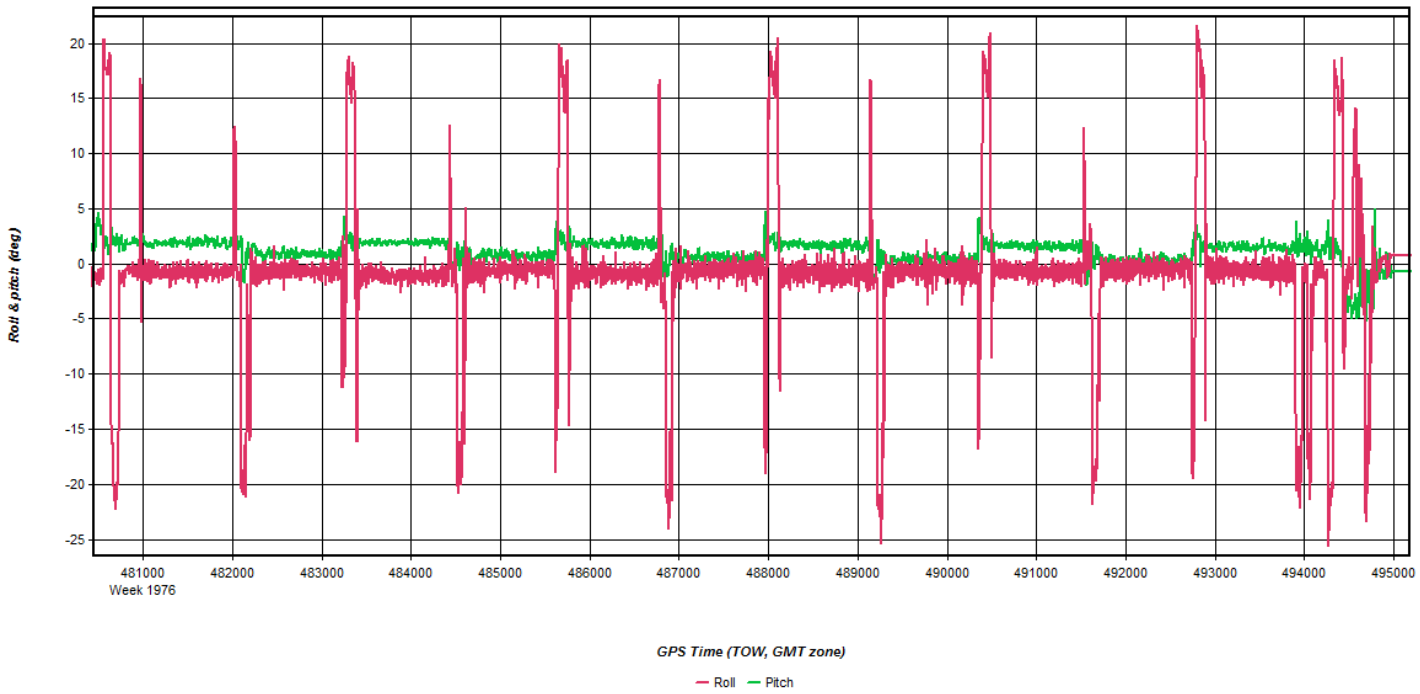
DMC FLIGHT SUMMARY					Data Collection		Comments	Weather
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0		Percent Complete	100.0%		☑ Clear
DMC Data Collection Time:	2:37:18	Miles Flown on Flights:	482.71		Total Flight Lines	1491		☐ Fair
Hobbs Start Time	1000				Lines Complete	1491		☐ Partly Cloudy
Hobbs Stop Time	1003.3	Hobbs Total Time	3.3		Lines Completed Today	1112		☐ Cloudy

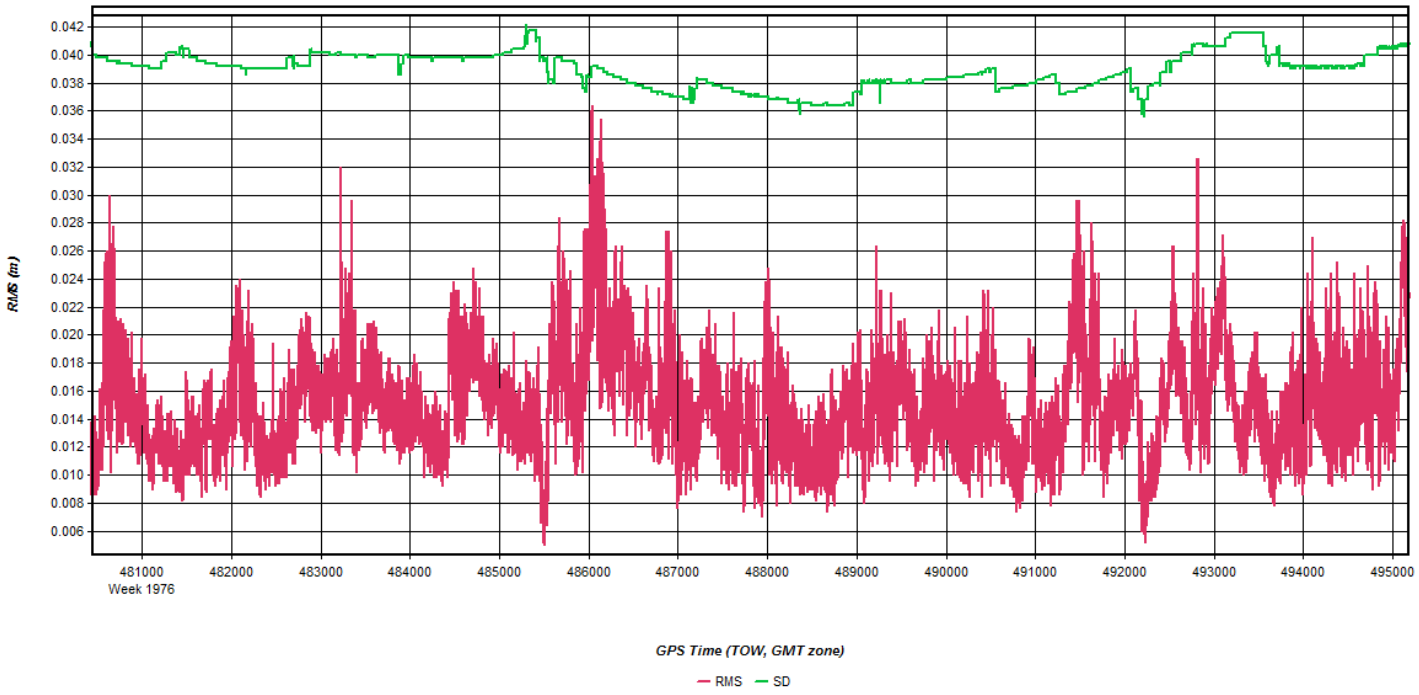
November 24, 2017-A (N812TB, SN7161)

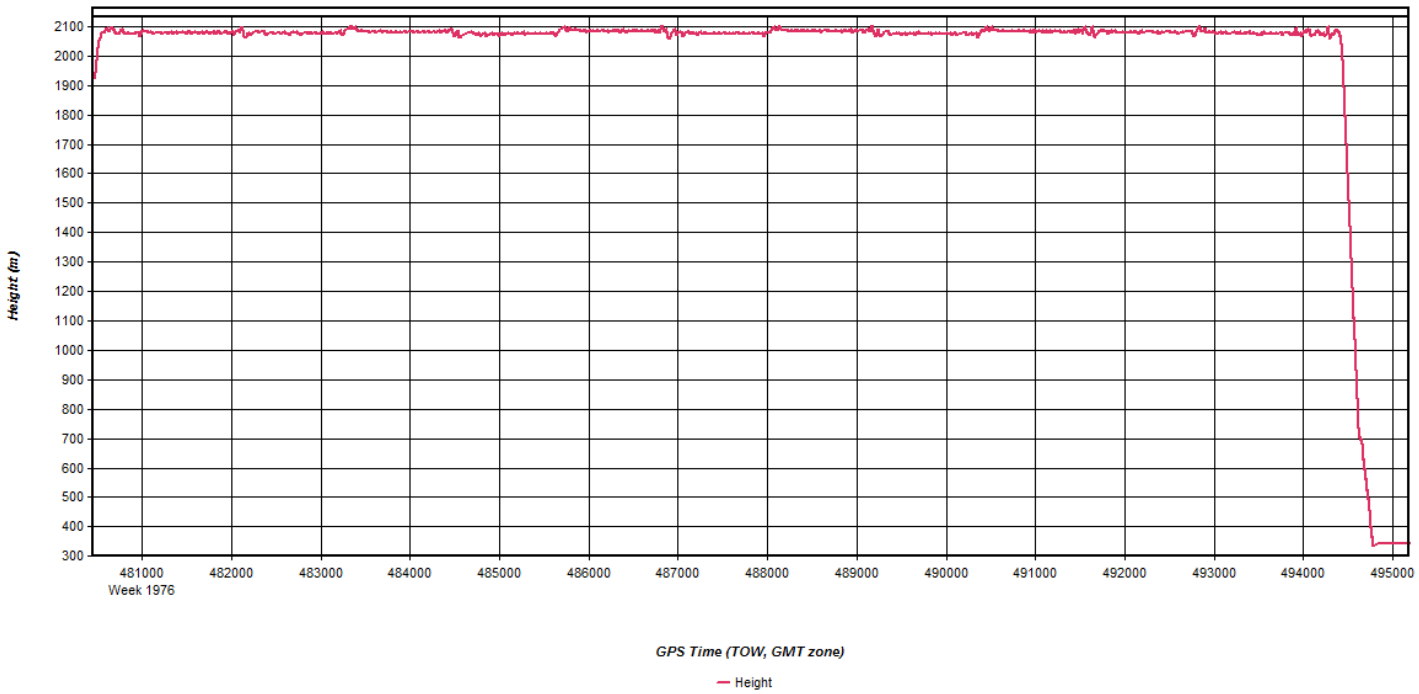

ARTK_RBV
RSU1
ARTK_FWD
KCI2
5 km

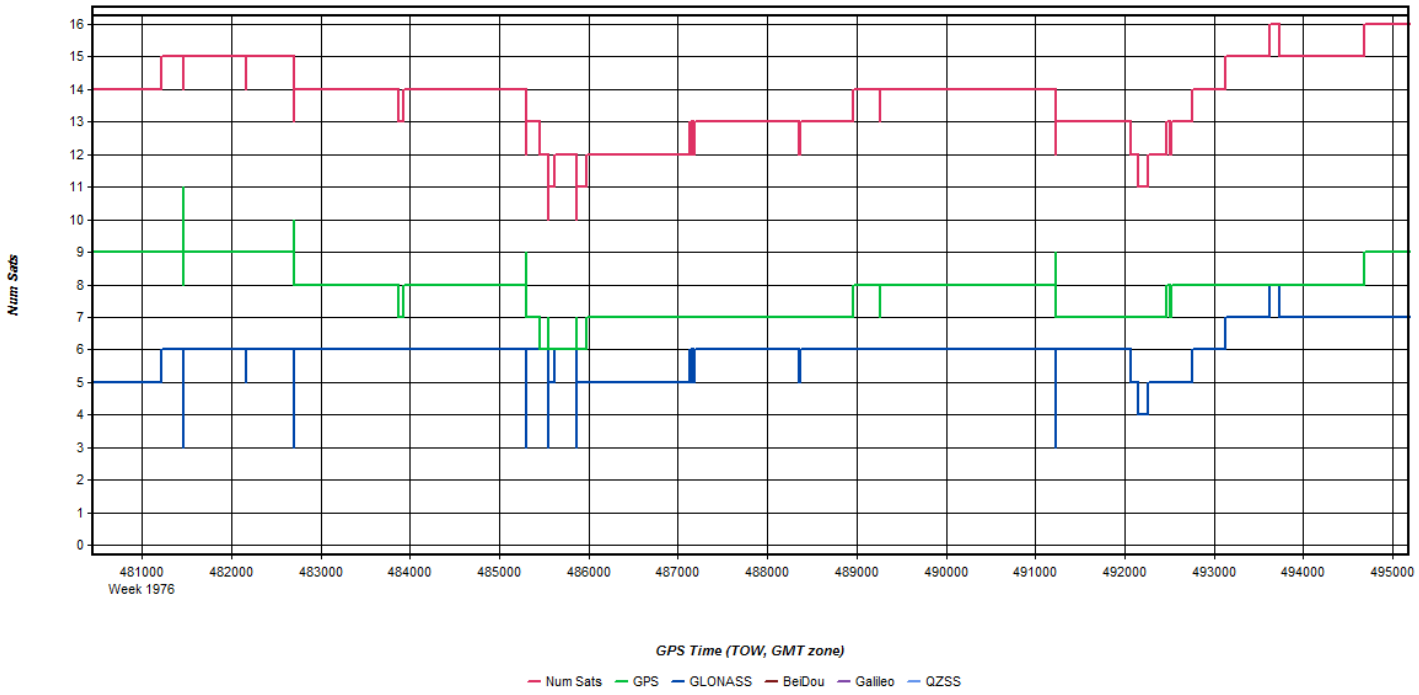

PDOP
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
PDOP

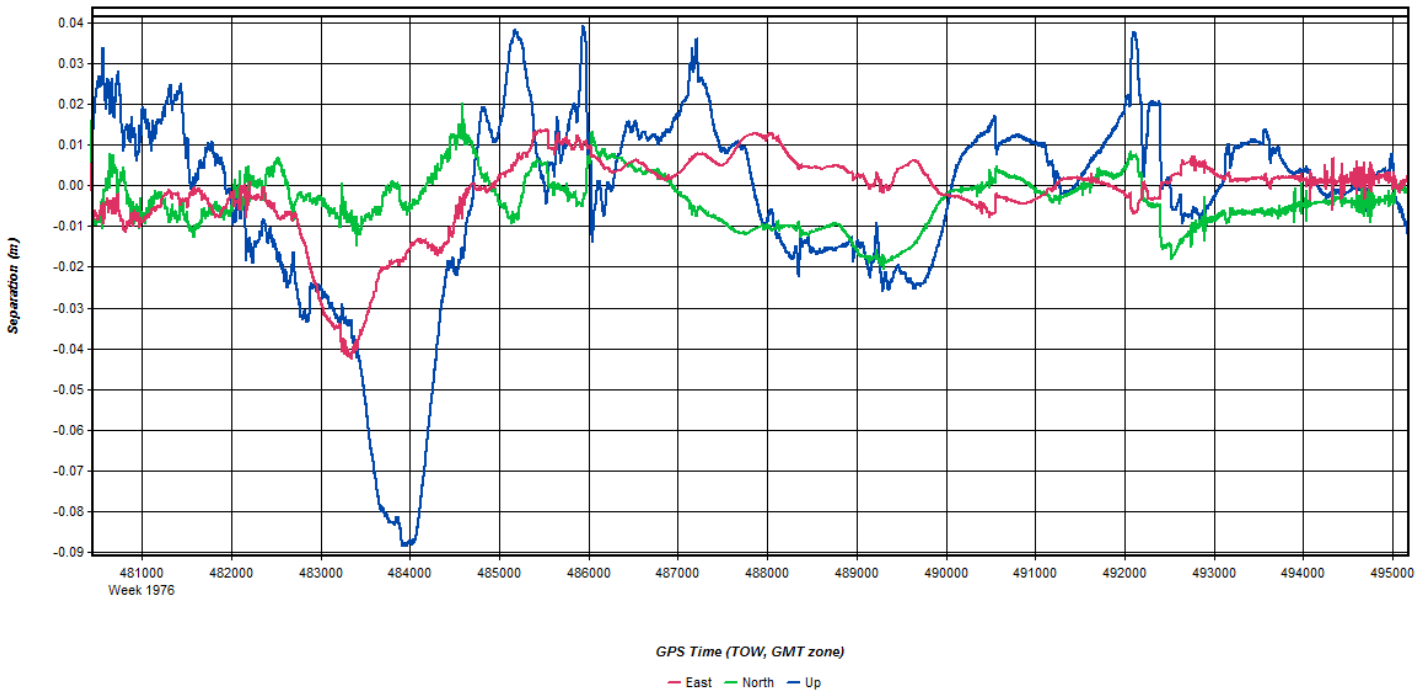

Status
2
1
0
-1
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

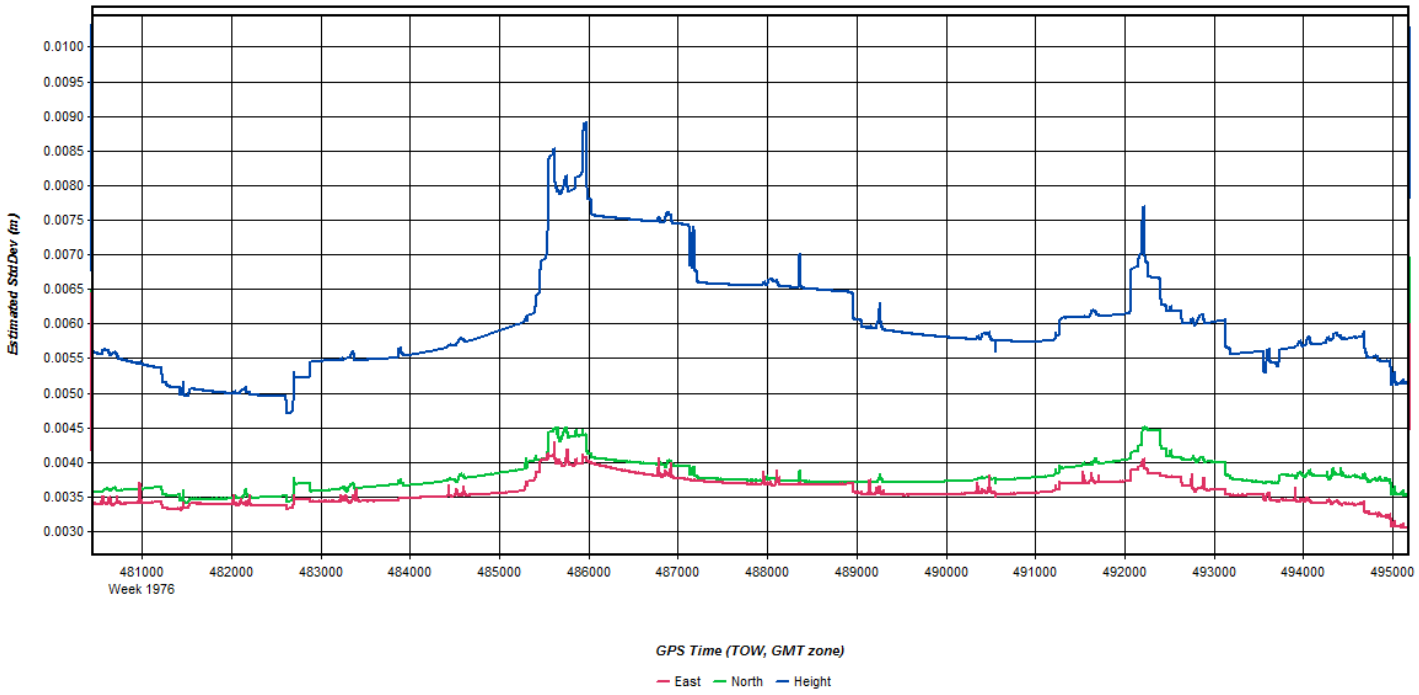

Roll & pitch (deg)
20
15
10
5
0
-5
-10
-15
-20
-25
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
Roll
Pitch

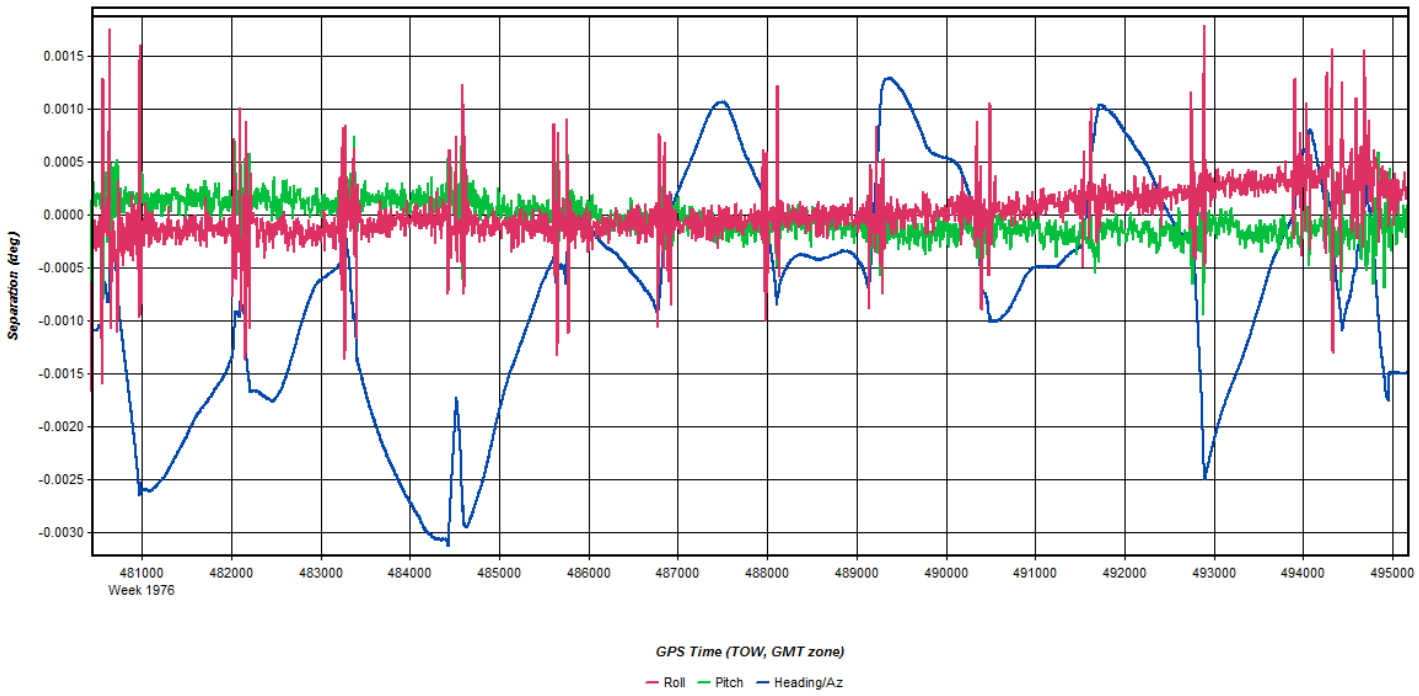

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
RMS
SD

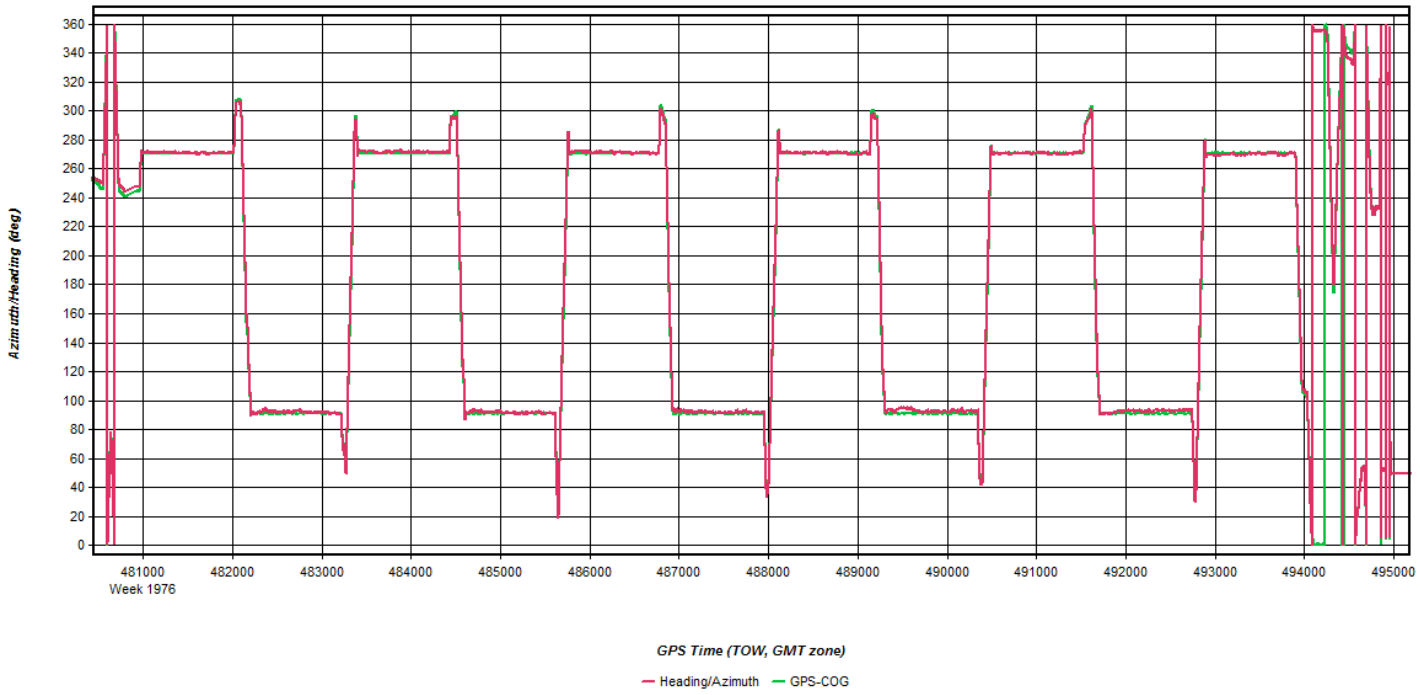

Height (m)
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
Height

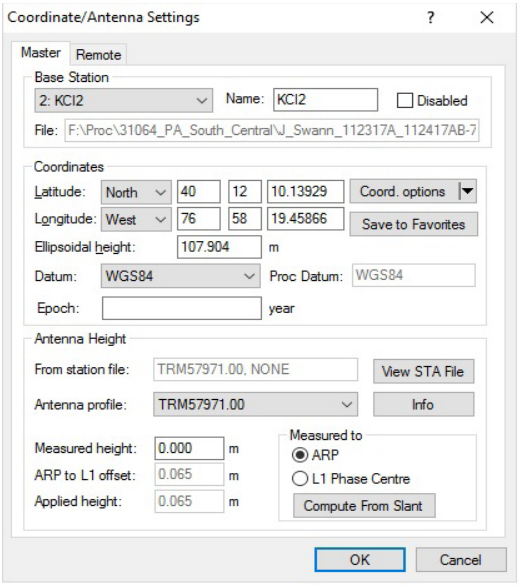

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

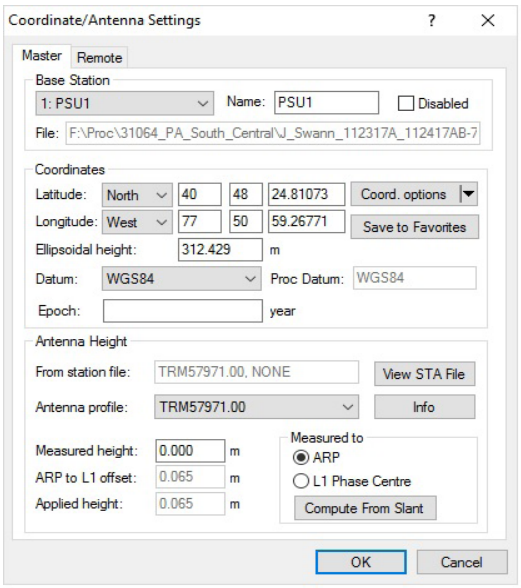

Separation (m)
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
-0.09
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
East
North
Height

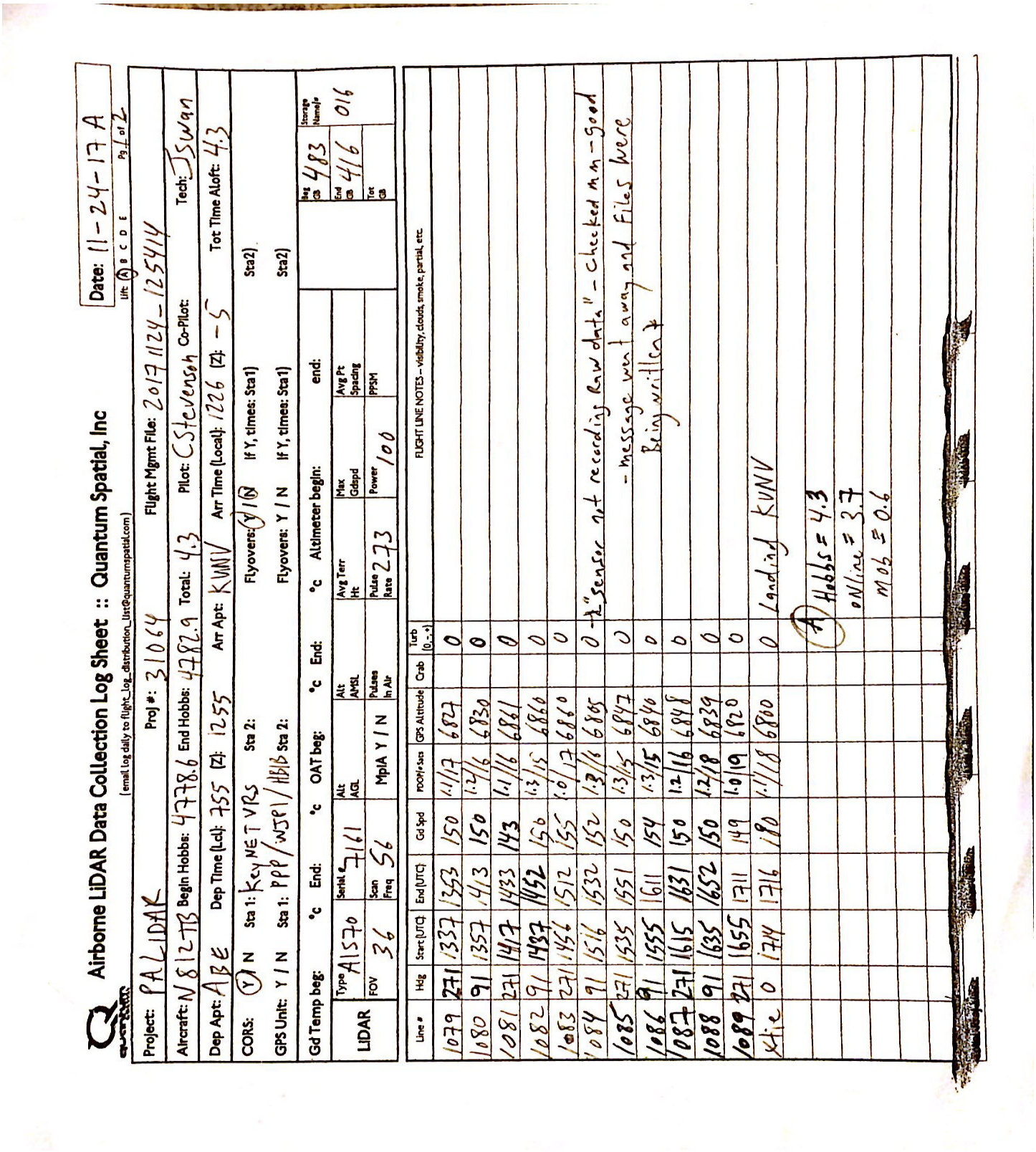

Separation (deg)
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
-0.0025
-0.0030
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
481000
Week 1976
482000
483000
484000
485000
486000
487000
488000
489000
490000
491000
492000
493000
494000
495000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
2: KCI2
Name: KCI2
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112317A_112417AB-7
Coordinates
Latitude: North 40 12 10.13929
Coord. options
Longitude: West 76 58 19.45866
Save to Favorites
Ellipsoidal height: 107.904 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
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112317A_112417AB-7
Coordinates
Latitude: North 40 48 24.81073 Coord. options
Longitude: West 77 50 59.26771 Save to Favorites
Ellipsoidal height: 312.429 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

Flight Log



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

(email Log daily to flight_log_distribution_List@quantumspatial.com)

Date: 11-24-17 A

Life: A B C D E Pg 1 of 2

Project: PALIDAR Proj #: 31064 Flight Mgmt File: 2017 1124-125414

Aircraft: N8127B Begin Hobbs: 4778.6 End Hobbs: 4782.9 Total: 4.3 Pilot: CStevenson Co-Pilot: Tech: JSwan

Dep Apt: ABE Dep Time (Lcl): 755 (Z): 1255 Arr Apt: KUNV Arr Time (Local): 1226 (Z): -5 Tot Time Aloft: 4.3

CORS: (Y) N Sta 1: KYNET VRS Sta 2: Flyovers: Y/N If Y, times: Sta1) Sta2)

GPS Unit: Y / N Sta 1: PPP/WSR1/HBB Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

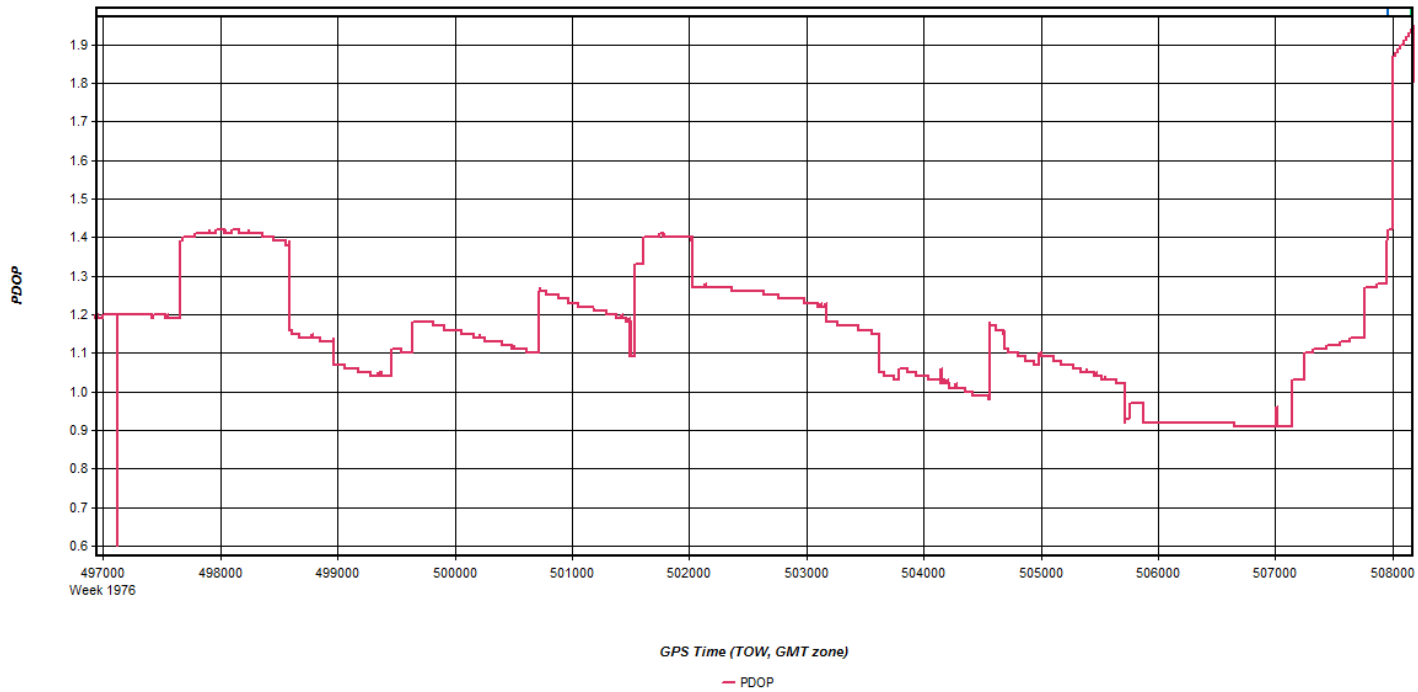
Gd Temp beg:	°c	End:	°c	OAT beg:	°c	End:	°c	Altimeter begin:	end:		Beg GB: 483	Storage Name/#: 016
LIDAR	Type: A1570	Serial #: 7161		Alt AGL		Alt AMSL		Avg Terr Ht	Max Gdspd	Avg Pt Spacing	End GB: 416	
	FOV: 36	Scan Freq: 56		MpiA Y / N		Pulses In Air		Pulse Rate: 273	Power: 100	PPSM	Tot GB:	

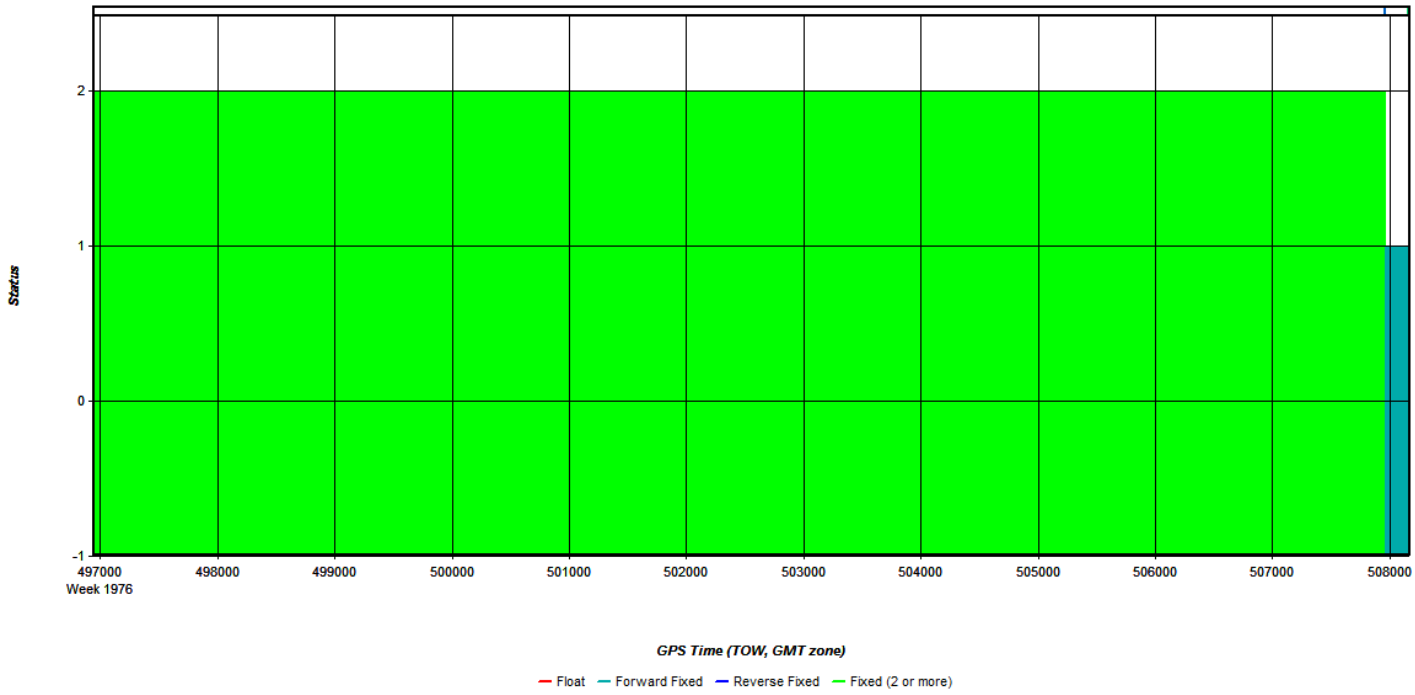
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	mode/sens	GPS Altitude	Crab	Turb (0, -, +)	FLIGHT LINE NOTES -- visibility, clouds, smoke, partial, etc.
1079	271	1337	1353	150	1.1/17	6827		0	
1080	91	1357	1413	150	1.2/16	6830		0	
1081	271	1417	1433	143	1.1/16	6861		0	
1082	91	1437	1452	156	1.3/15	6860		0	
1083	271	1456	1512	155	1.0/17	6880		0	
1084	91	1516	1532	152	1.3/16	6885		0	-2" sensor not recording raw data" - checked mm - good
1085	271	1535	1551	150	1.3/15	6847		0	- message went away and files here
1086	91	1555	1611	154	1.3/15	6840		0	being written
1087	271	1615	1631	150	1.2/16	6848		0	
1088	91	1635	1652	150	1.2/18	6839		0	
1089	271	1655	1711	149	1.0/19	6820		0	
etc	0	1714	1716	180	1.1/18	6800		0	Landing KUNV

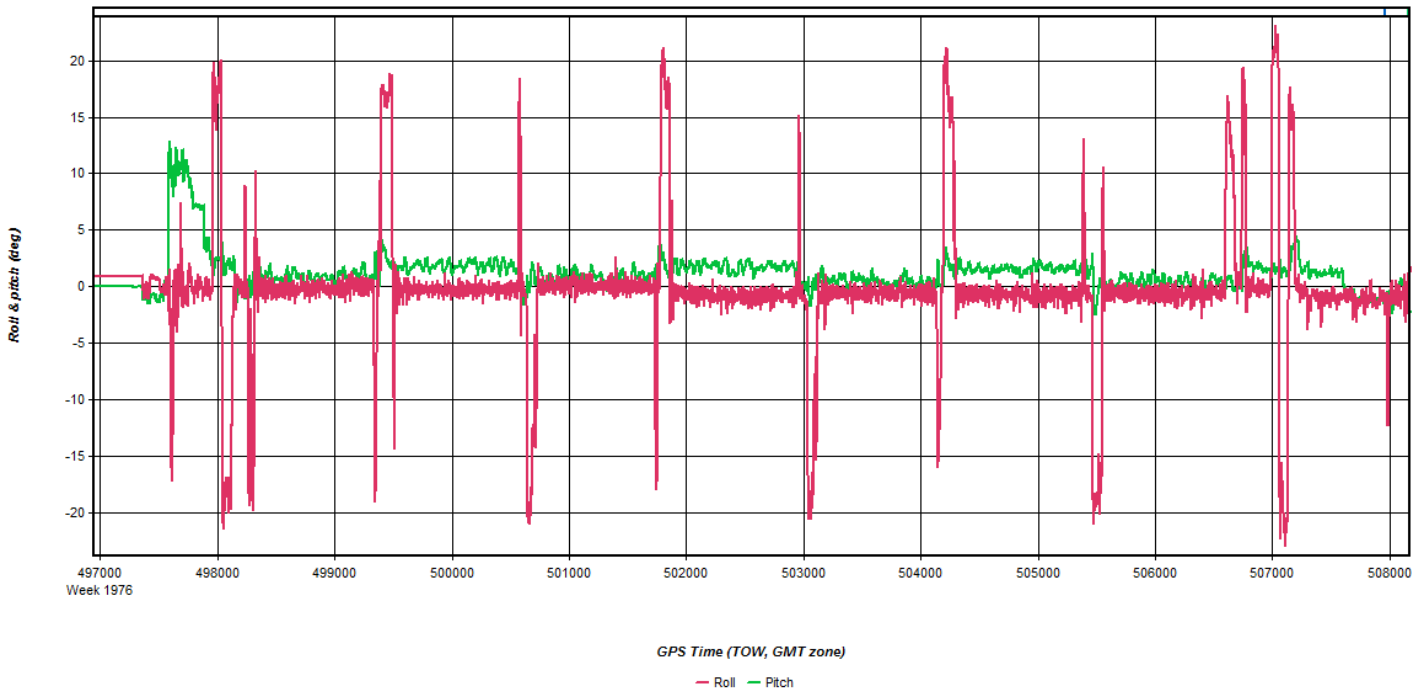
A Hobbs = 4.3
oNline = 3.7
MOS = 0.6

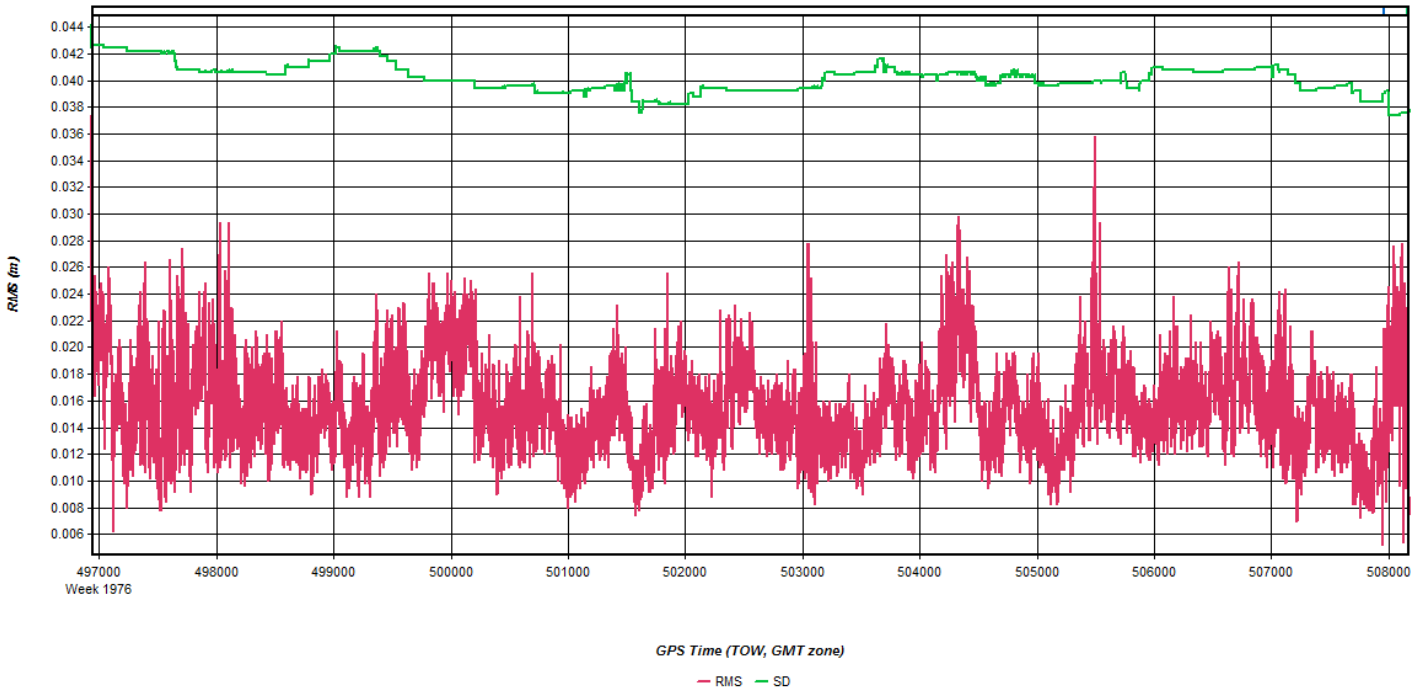
November 24, 2017-B (N812TB, SN7161)

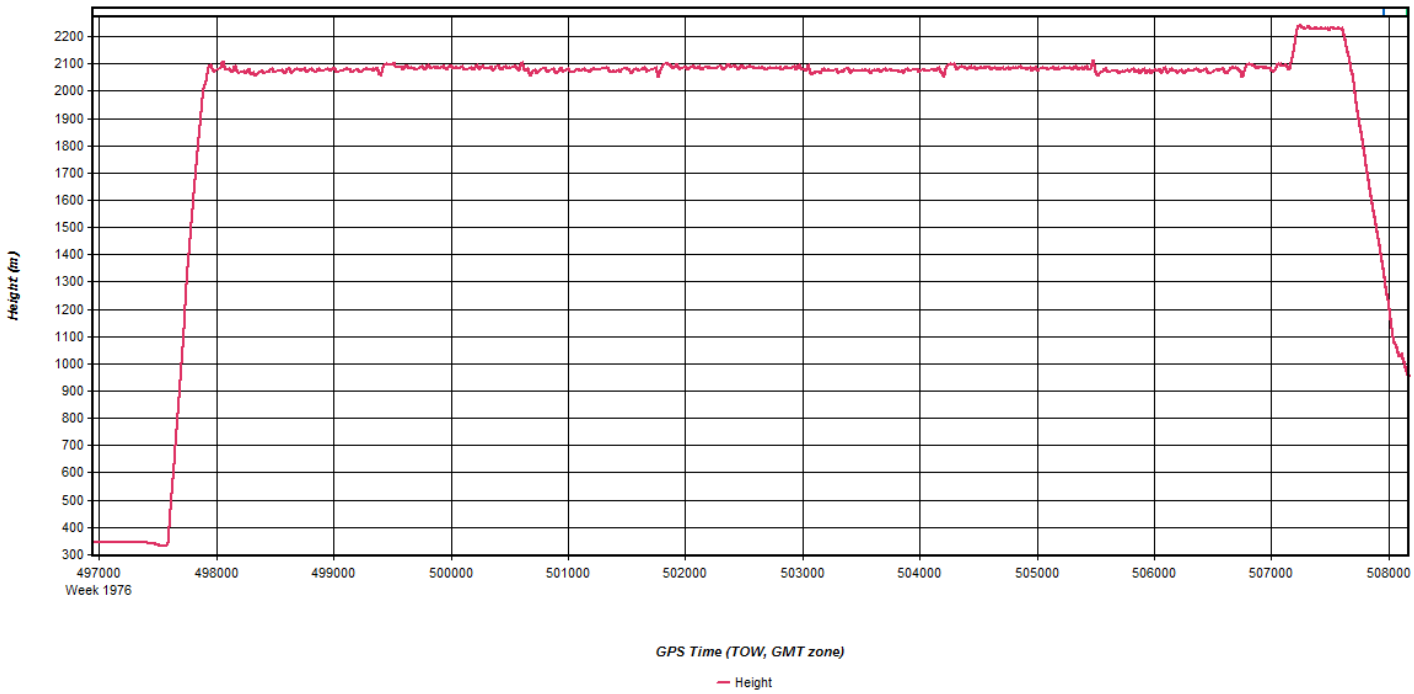

ARTK, FWD
PSU1
ARTK, FWD
ARTK, REV
PASS
10 km

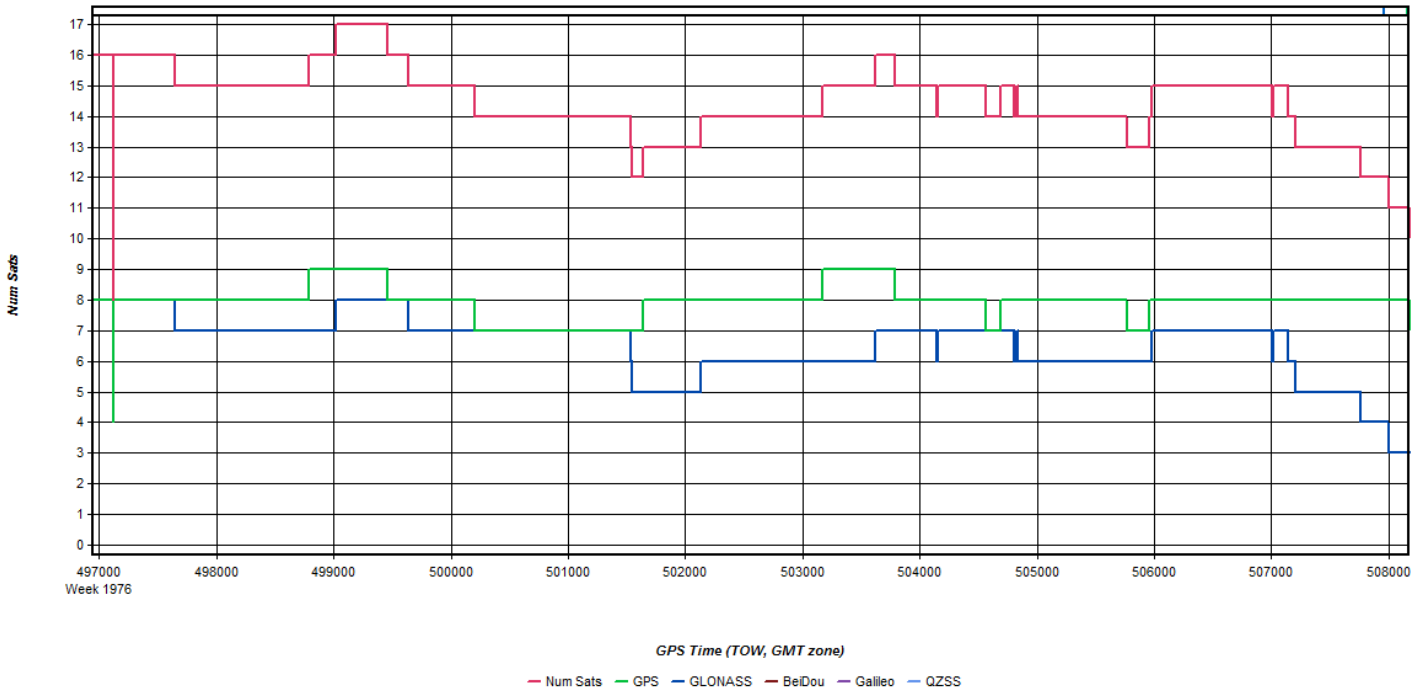

PDOP
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
PDOP

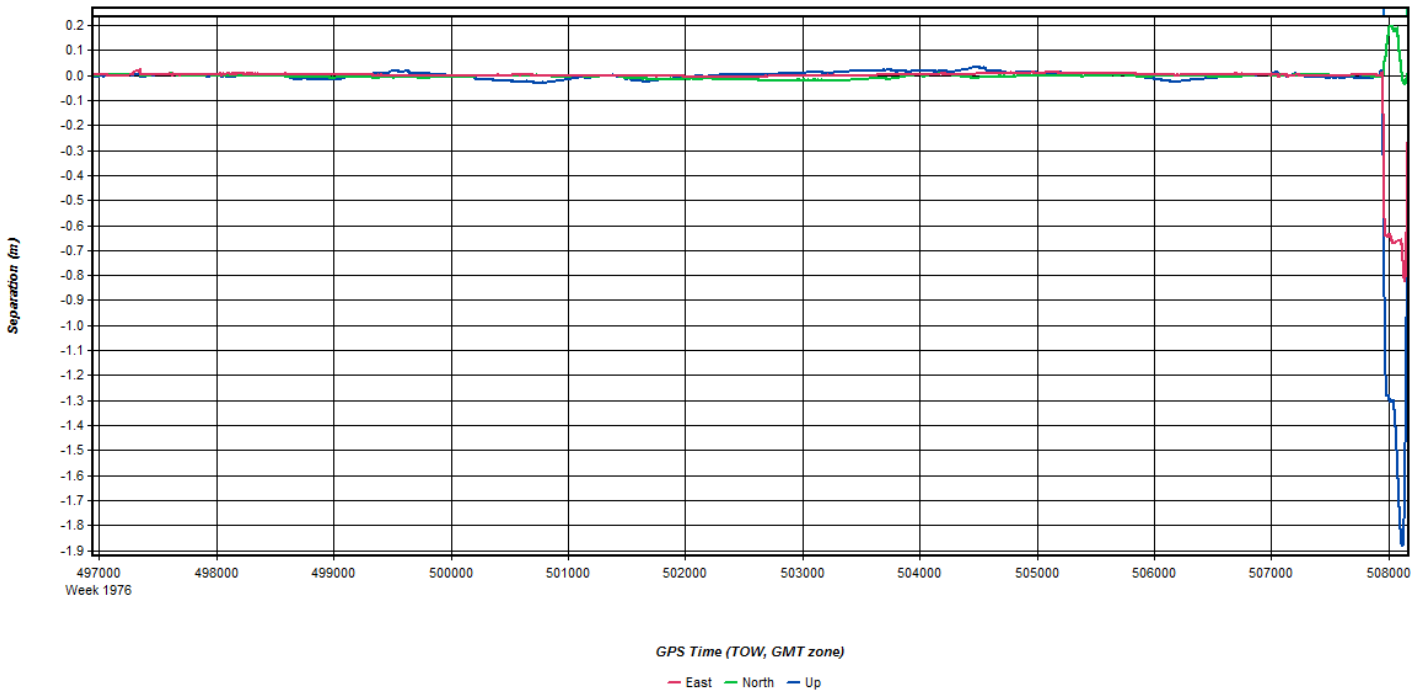

Status
2
1
0
-1
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

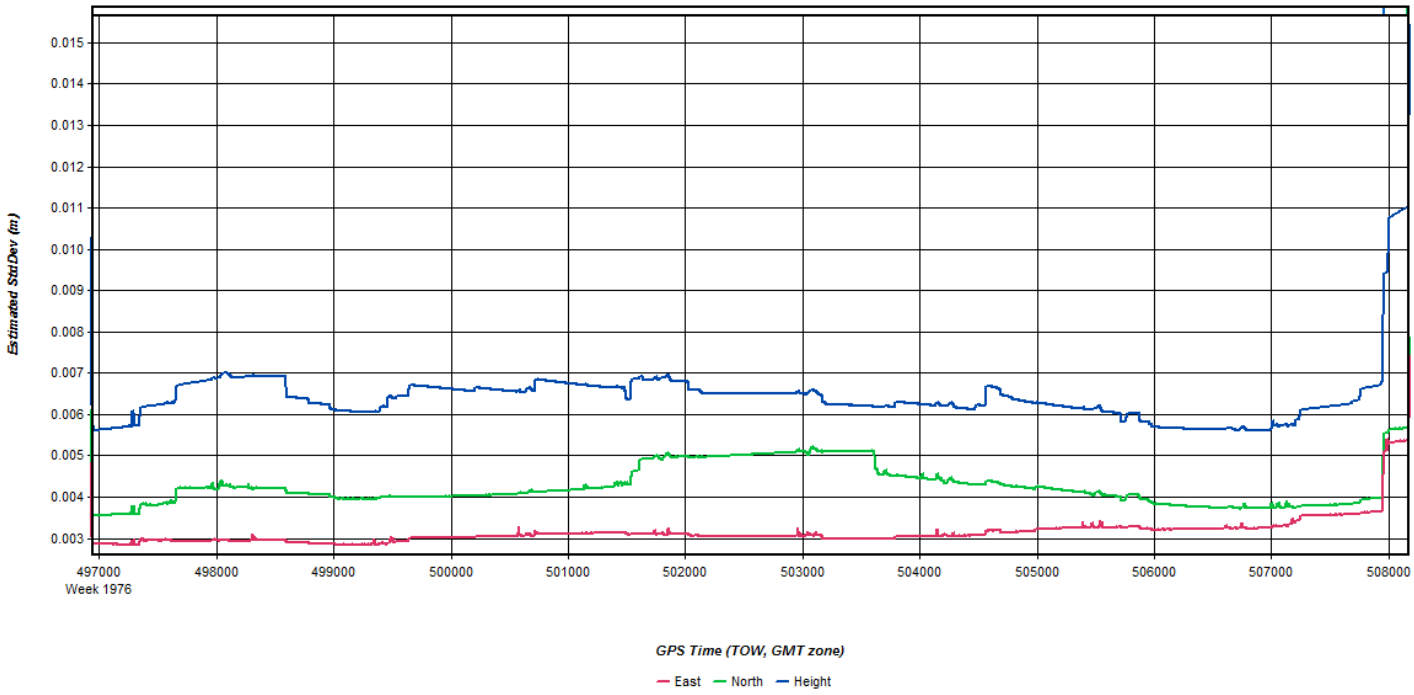

Roll & pitch (deg)
20
15
10
5
0
-5
-10
-15
-20
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
Roll
Pitch

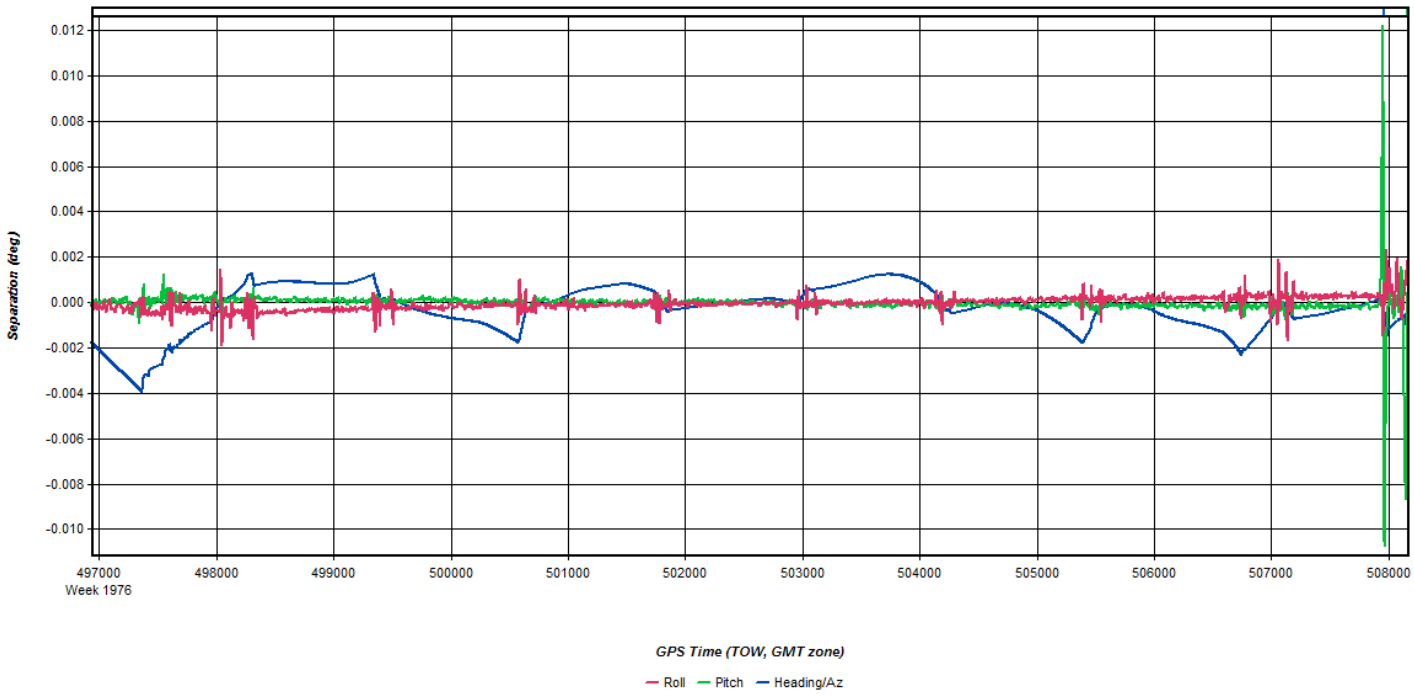

RMS (m)
0.044
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
RMS
SD

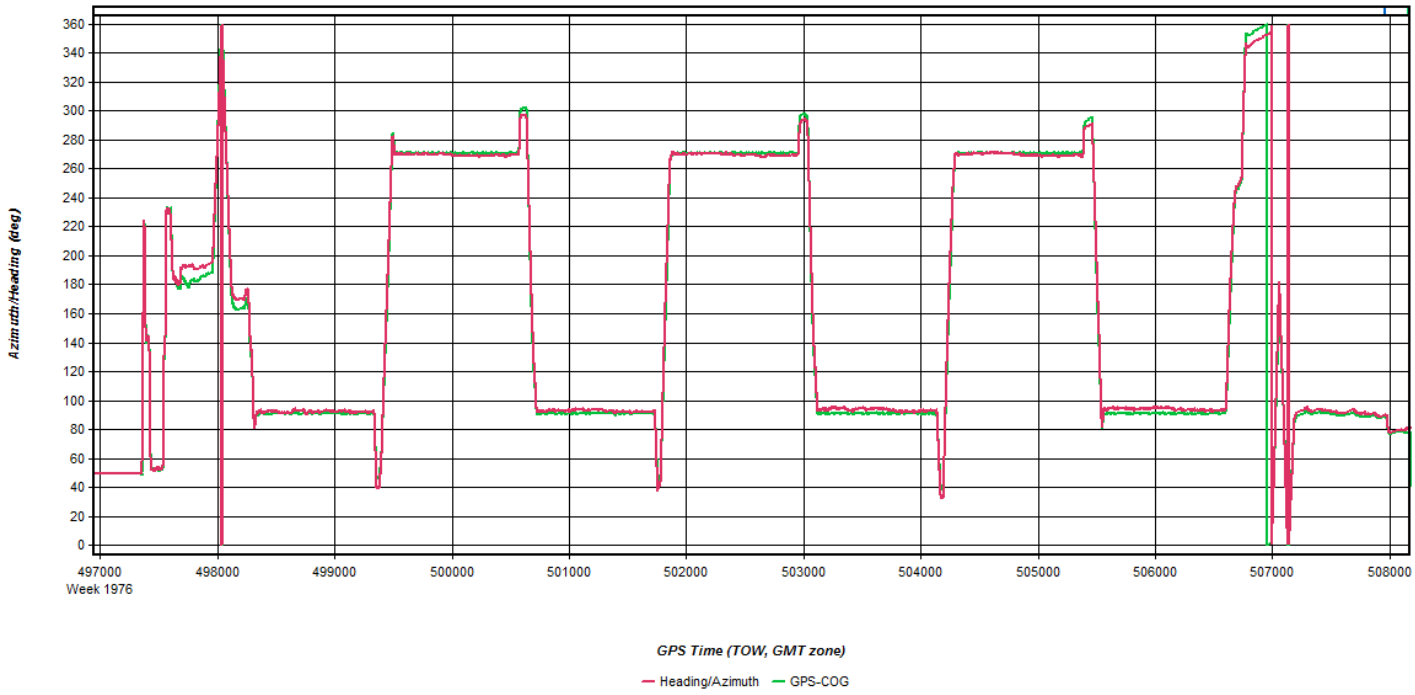

Height (m)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
Height

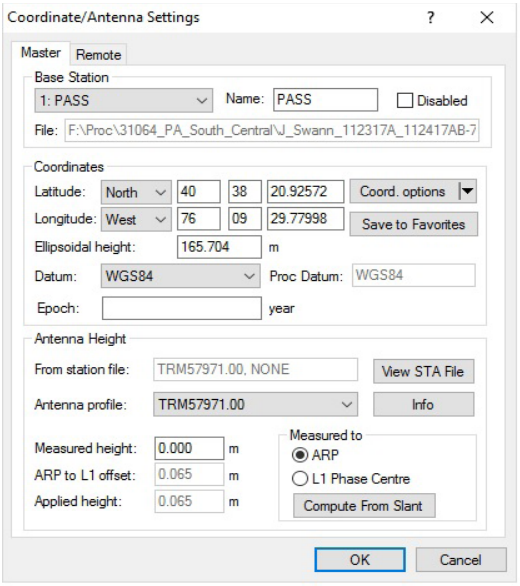

Num Sats
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

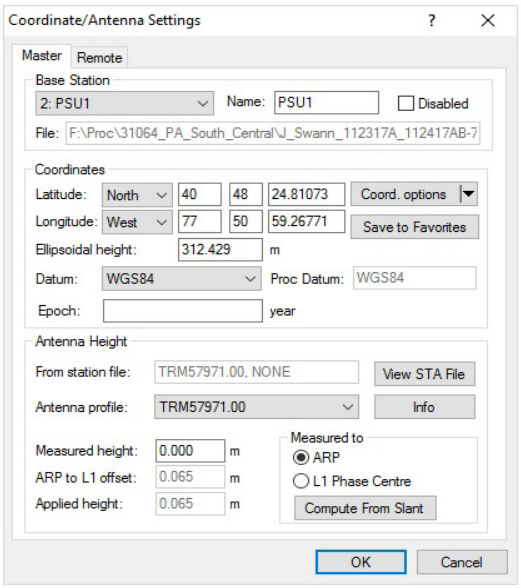

Separation (m)
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1.0
-1.1
-1.2
-1.3
-1.4
-1.5
-1.6
-1.7
-1.8
-1.9
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
East
North
Height

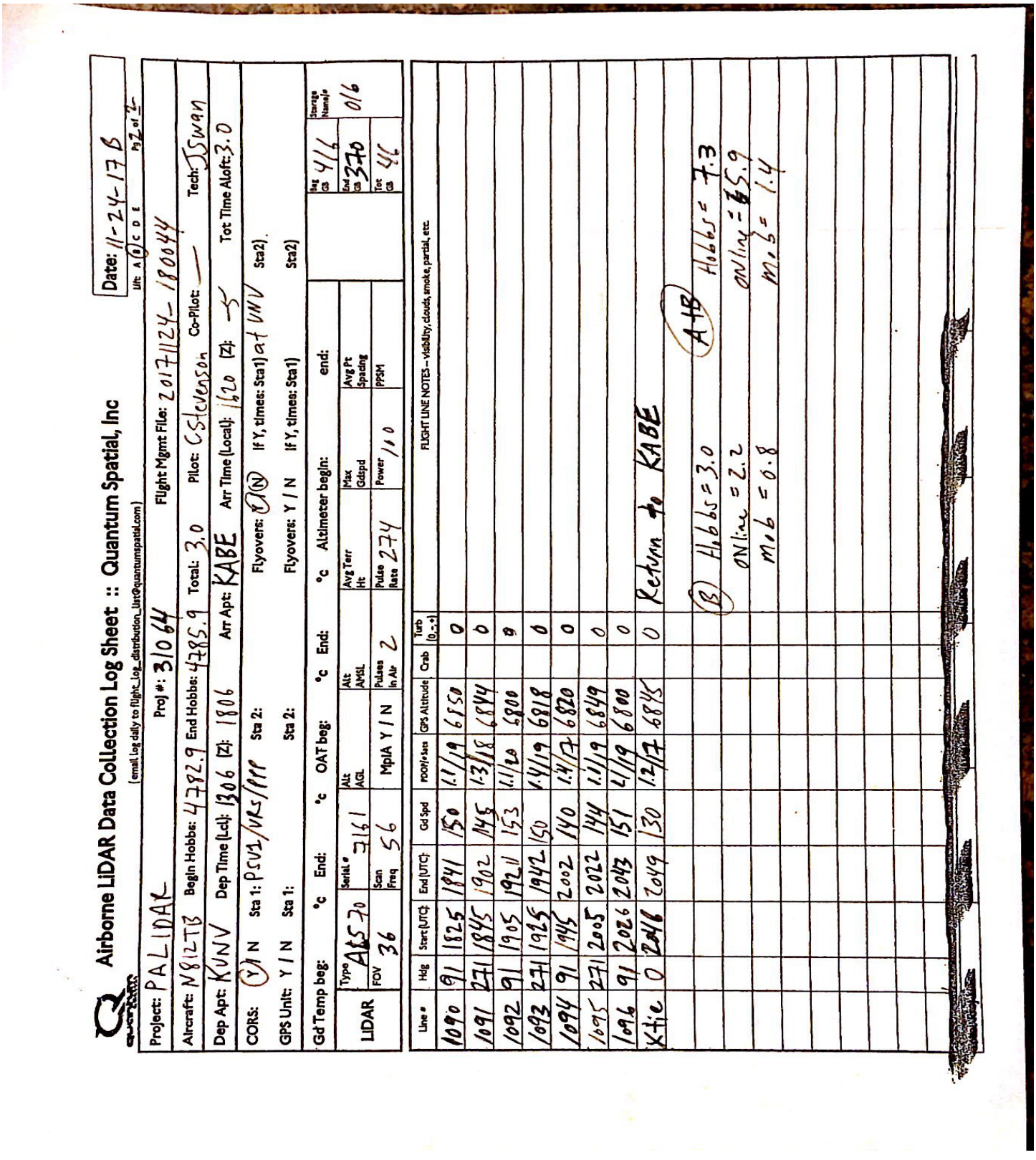

Separation (deg)
0.012
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
-0.010
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
497000
Week 1976
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: PASS
Name: PASS
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112317A_112417AB-7
Coordinates
Latitude: North 40 38 20.92572
Coord. options
Longitude: West 76 09 29.77998
Save to Favorites
Ellipsoidal height: 165.704 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
Master
Remote
Base Station
2: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112317A_112417AB-7
Coordinates
Latitude: North 40 48 24.81073 Coord. options
Longitude: West 77 50 59.26771 Save to Favorites
Ellipsoidal height: 312.429 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

Flight Log



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

(email.log daily to flight_log_distribution_list@quantumspatial.com)

Date: 11-24-17 B

Unit: A B C D E Pg 2 of 2

Project: PALIDAR Proj #: 31064 Flight Mgmt File: 20171124-180044

Aircraft: N812TB Begin Hobbs: 4782.9 End Hobbs: 4785.9 Total: 3.0 Pilot: CStevenson Co-Pilot: — Tech: JSwan

Dep Apt: KUNV Dep Time (Lcl): 1306 (Z): 1806 Arr Apt: KABE Arr Time (Local): 1620 (Z): ~ Tot Time Aloft: 3.0

CORS: (Y) N Sta 1: PSU1/VRS/??? Sta 2: Flyovers: (Y)N If Y, times: Sta1) at UNV Sta2).

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

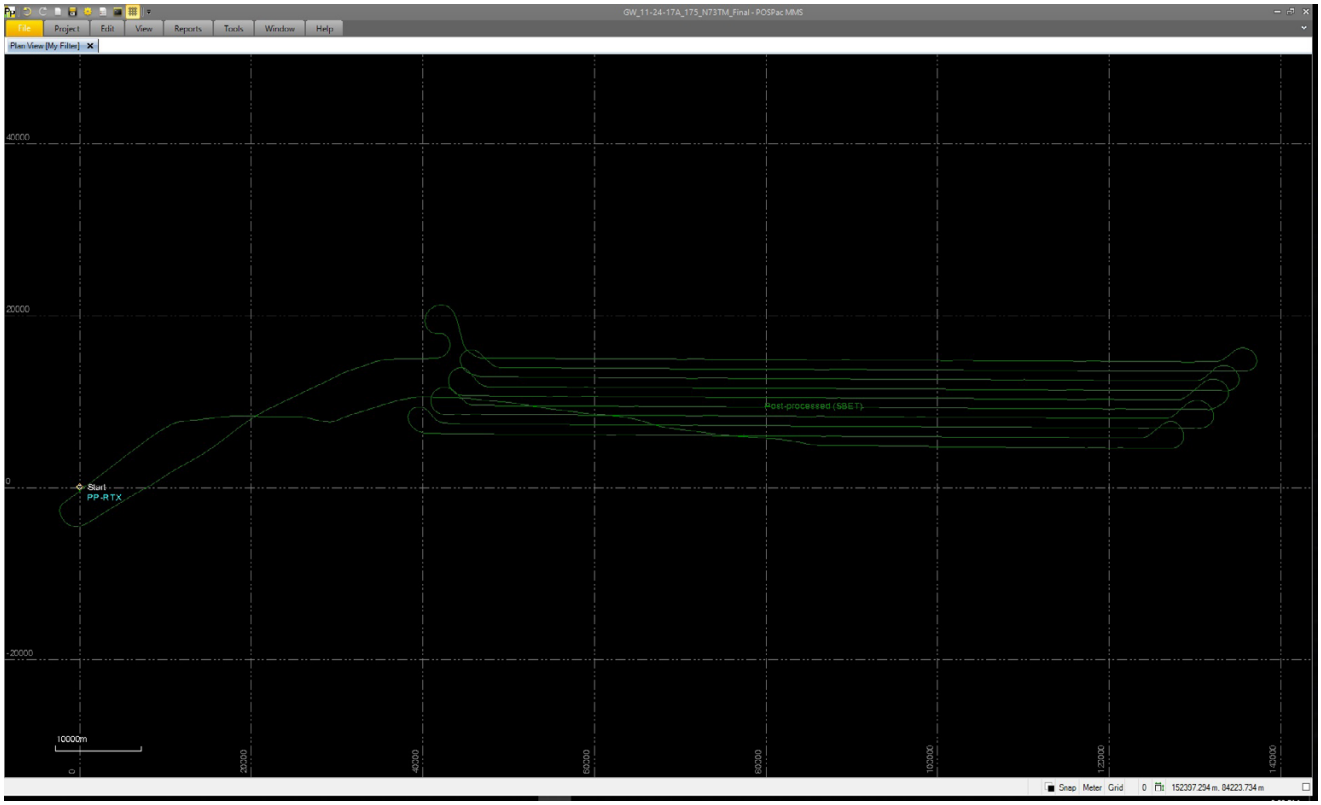
Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

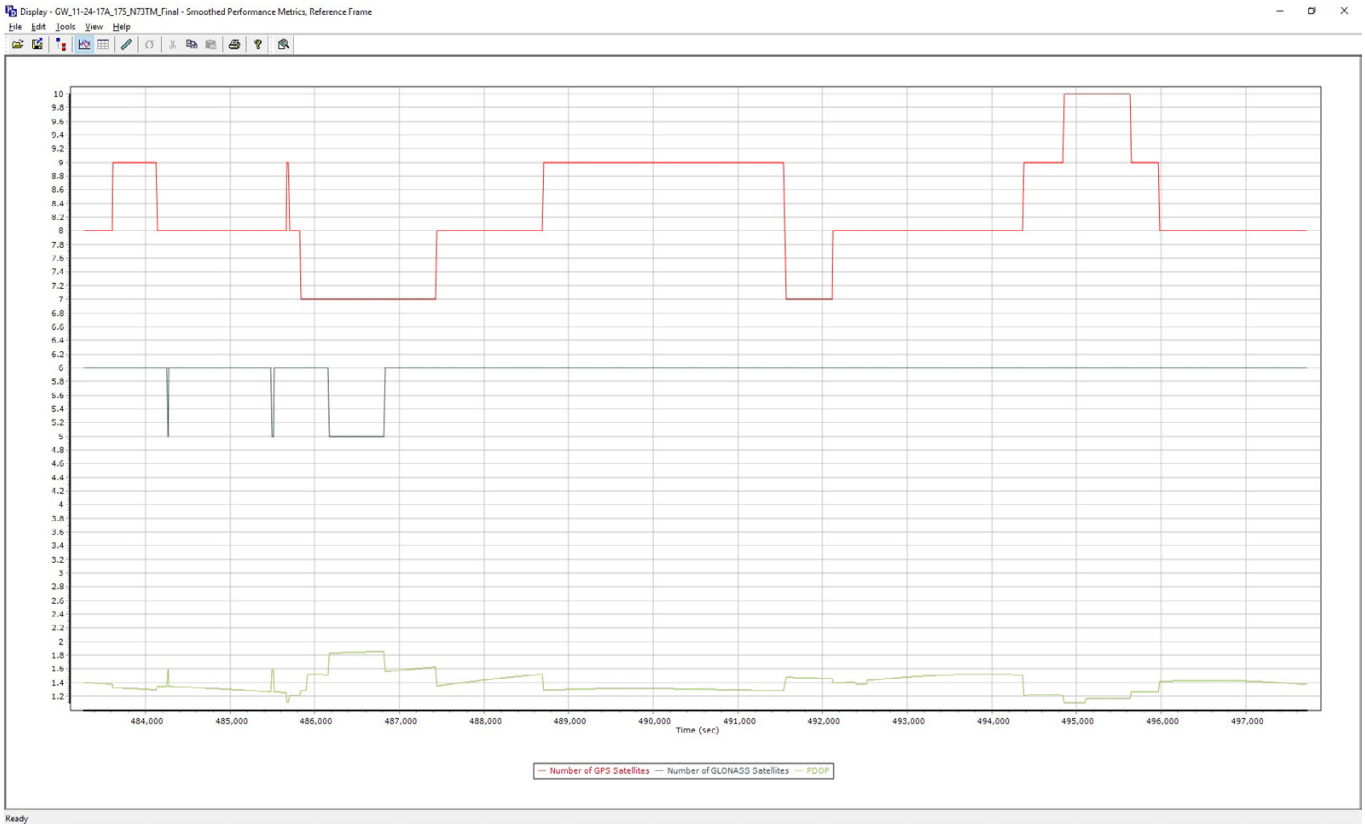
	Type	Serial #	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing
LIDAR	A|S|Q70	3161					
	FOV	Scan Freq	MpiA Y / N	Pulses In Air	Pulse Rate	Power	PPSM
	36	56		2	274	110	

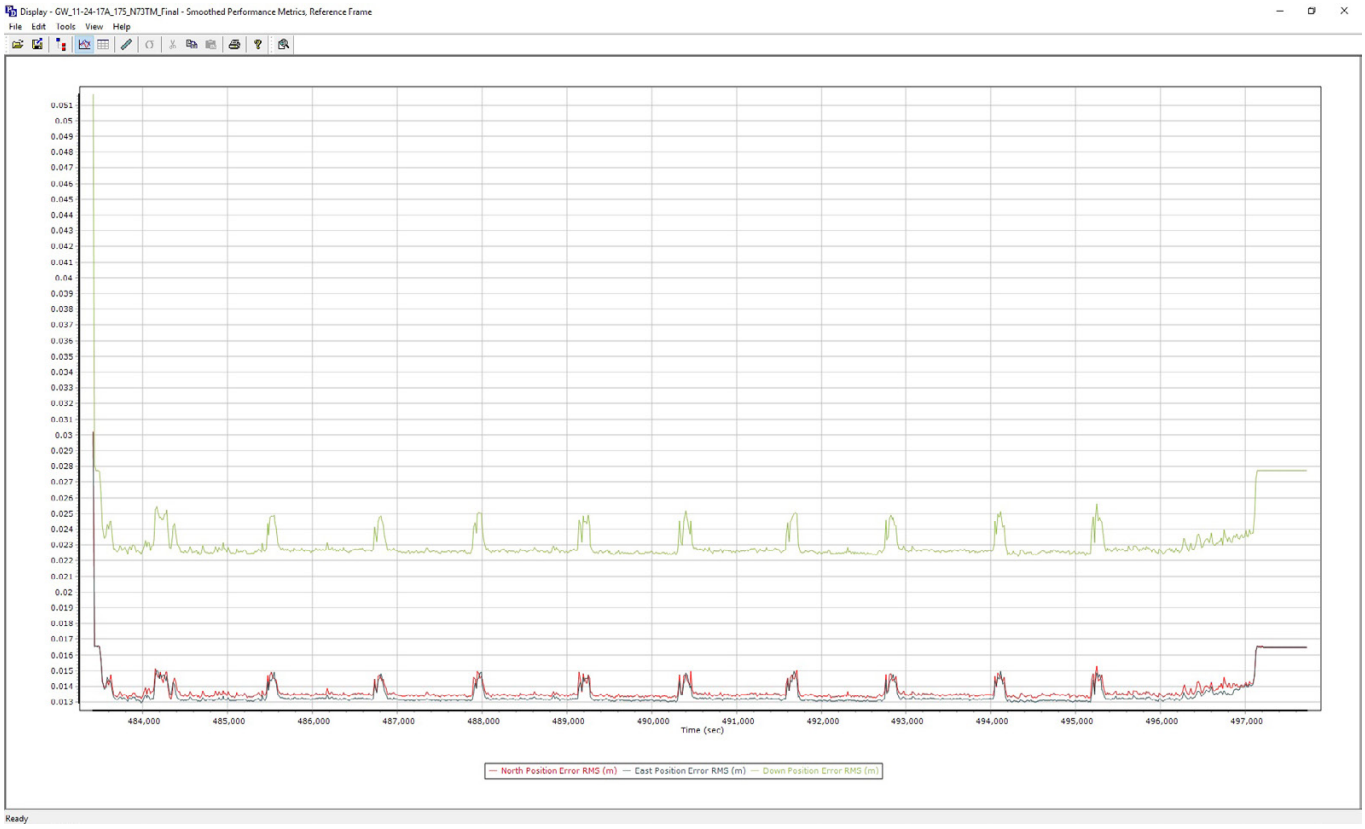
Mag GS 416 End GS 370 Tot GS 46 Sturge Humidity 0/6

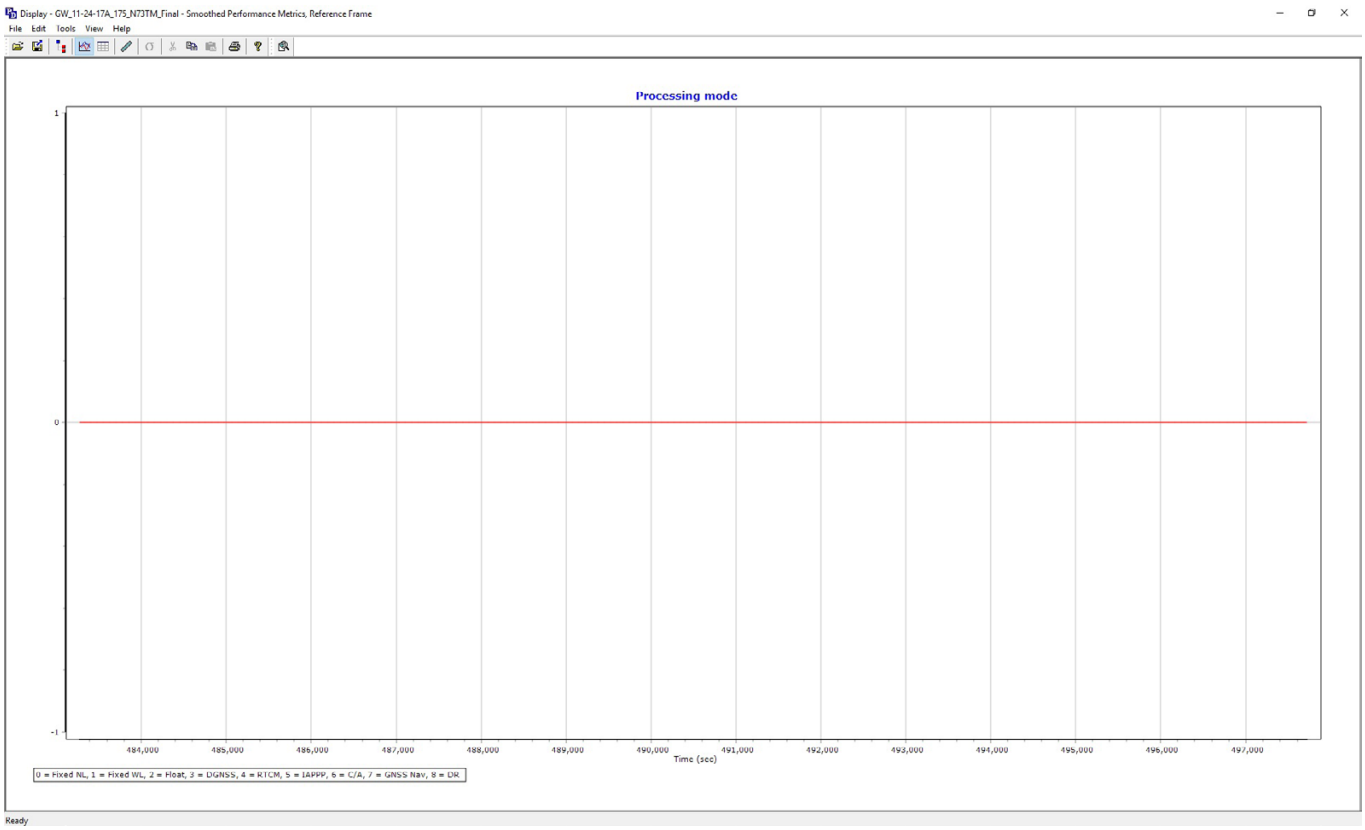
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	MM/DD/yy	GPS Altitude	Crab	Turb (0,+,-)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
1090	91	1825	1841	150	11/19	6550		0	
1091	271	1845	1902	145	11/18	6844		0	
1092	91	1905	1921	153	11/19	6800		0	
1093	271	1925	1942	150	11/19	6818		0	
1094	91	1945	2002	140	11/17	6820		0	
1095	271	2005	2022	144	11/19	6849		0	
1096	91	2026	2043	151	11/19	6800		0	
Ktie	0	2048	2049	130	12/17	6845		0	Return to KABE
									(B) Hobbs = 3.0 AHB Hobbs = 7.3
									ONline = 2.2 ONline = 5.9
									M.6 = 0.8 M.5 = 1.4

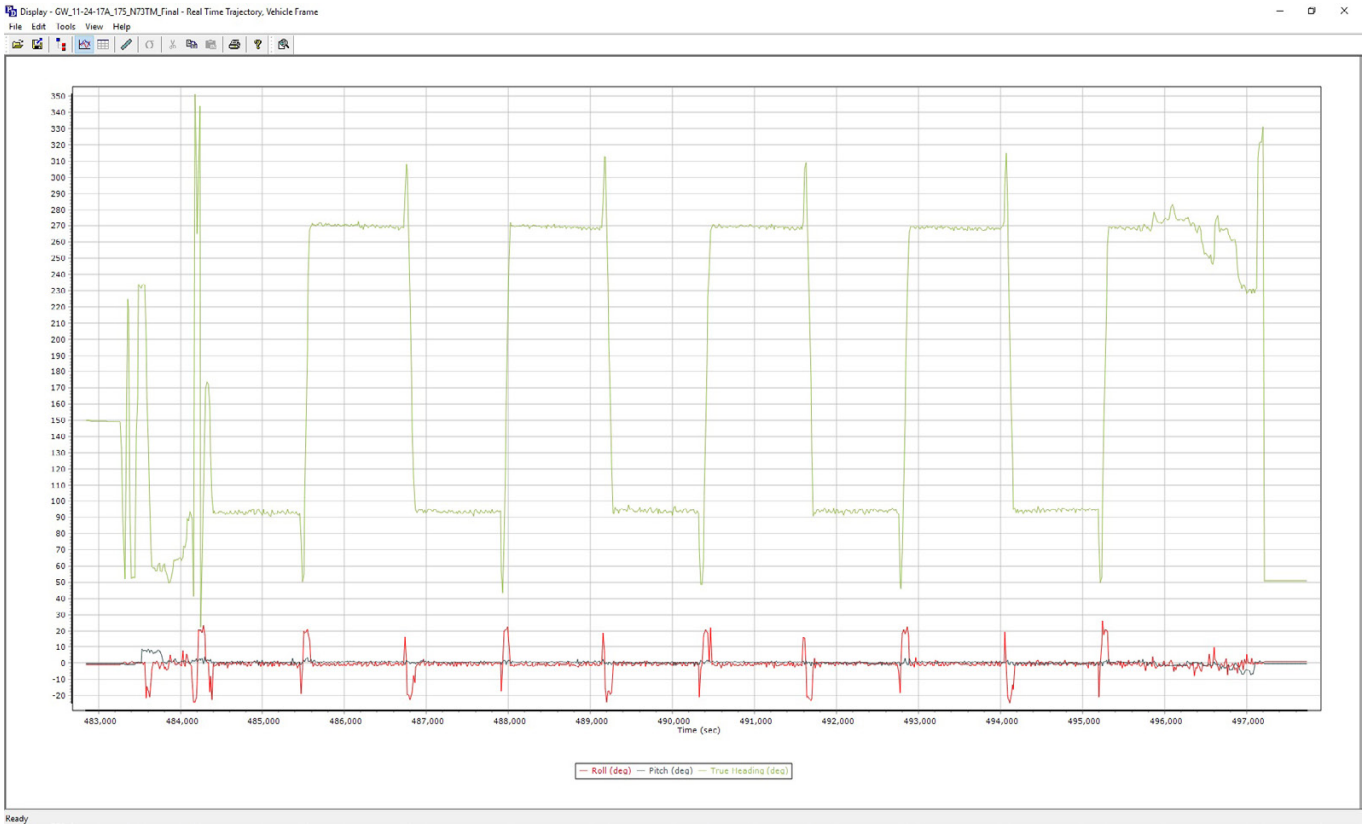
November 24, 2017-A (N73TM, SN175)


GW_11-24-17A_175_N73TM_Final - POSPac MMS
File
Project
Edit
View
Reports
Tools
Window
Help
Plan View [My Files]
40000
20000
0
-20000
Post-processed (SBET)
Start
PP-RTX
10000m
20000
40000
60000
80000
100000
120000
140000
Snap Meter Grid
0
152397.294 m, 84223.734 m

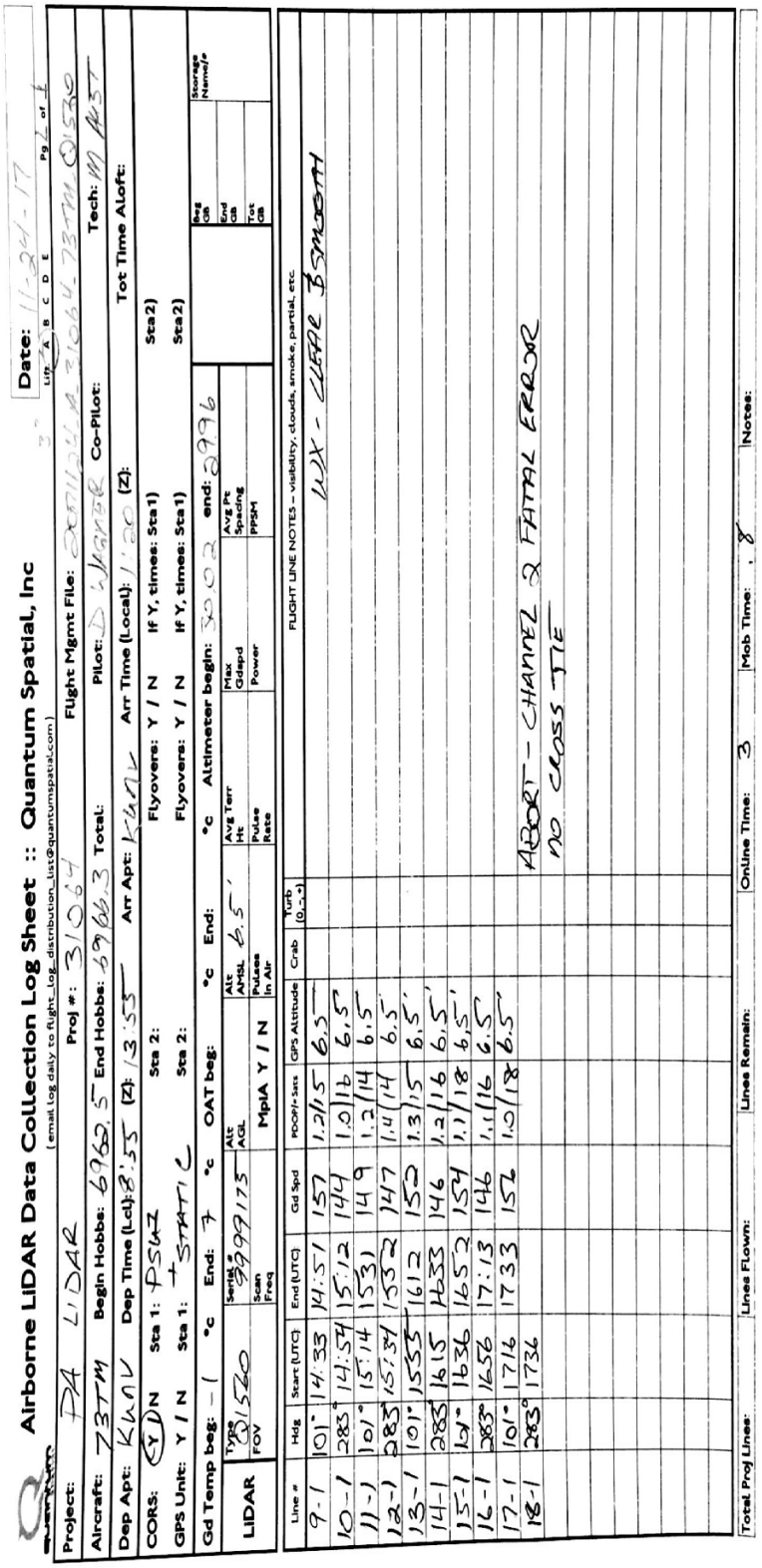

Display - GW_11-24-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
10
9.8
9.6
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
484,000
485,000
486,000
487,000
488,000
489,000
490,000
491,000
492,000
493,000
494,000
495,000
496,000
497,000
Time (sec)
Number of GPS Satellites
Number of GLONASS Satellites
PDOP
Ready


Display - GW_11-24-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
Ready


Display - GW_11-24-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Processing mode
Time (sec)
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav, 8 = DR
Ready


Display - GW_11-24-17A_175_N73TM_Final - Real Time Trajectory, Vehicle Frame
File Edit Tools View Help
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
483,000
484,000
485,000
486,000
487,000
488,000
489,000
490,000
491,000
492,000
493,000
494,000
495,000
496,000
497,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)
Ready

Flight Log



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

(email Log daily to Flight_Log_distribution_List@quantumspatial.com)

Date: 11-24-17 Pg 1 of 1

Project: PA LIDAR Proj #: 31084 Flight Mgmt File: 20171124a_31084_73rm_0530

Aircraft: 73RM Begin Hobbs: 6962.5 End Hobbs: 6966.3 Total: Pilot: D Harris Co-Pilot: Tech: MM MST

Dep Apt: KUNV Dep Time (Lcl): 8:55 (Z): 13:55 Arr Apt: KUNV Arr Time (Local): 11:20 (Z): Tot Time Aloft:

CORS: (Y) N Sta 1: PSUZ Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

GPS Unit: Y / N Sta 1: +START Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

Gd Temp beg: -1 °c End: 7 °c OAT beg: °c End: °c Altimeter begin: 30.02 end: 2996

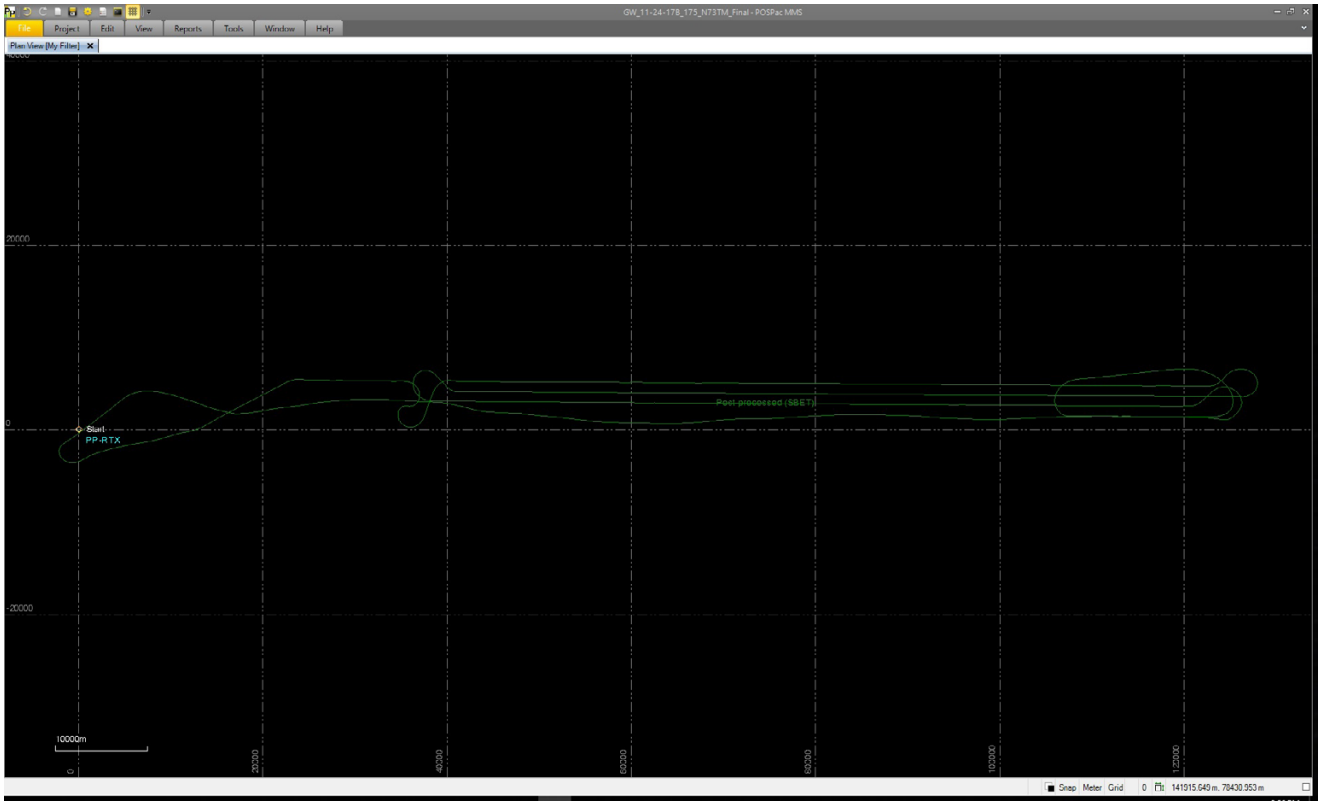
LiDAR	Type: Q1560	Serial #: 9999175	Alt AGL	Alt ASL 6.5'	Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Beg Cb	Storage Name/s
	FOV	Scan Freq	MpiA Y / N	Pulses In Air	Pulse Rate	Power	PPSM	End Cb	
								Tot Cb	

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POOP/-Sns	GPS Altitude	Crab	Turb (0,-,+)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
9-1	101°	14:33	14:51	157	1.2/15	6.5			LUX - CLEAR SMOOTH
10-1	283°	14:54	15:12	149	1.0/16	6.5			
11-1	101°	15:14	15:31	149	1.2/14	6.5			
12-1	283°	15:34	15:52	147	1.4/14	6.5'			
13-1	101°	15:55	16:12	152	1.3/15	6.5'			
14-1	283°	16:15	16:33	146	1.2/16	6.5'			
15-1	101°	16:36	16:52	154	1.1/18	6.5'			
16-1	283°	16:56	17:13	146	1.1/16	6.5'			
17-1	101°	17:16	17:33	152	1.0/18	6.5'			ABORT - CHANNEL 2 FATAL ERROR
18-1	283°	17:36							NO CROSS TIE

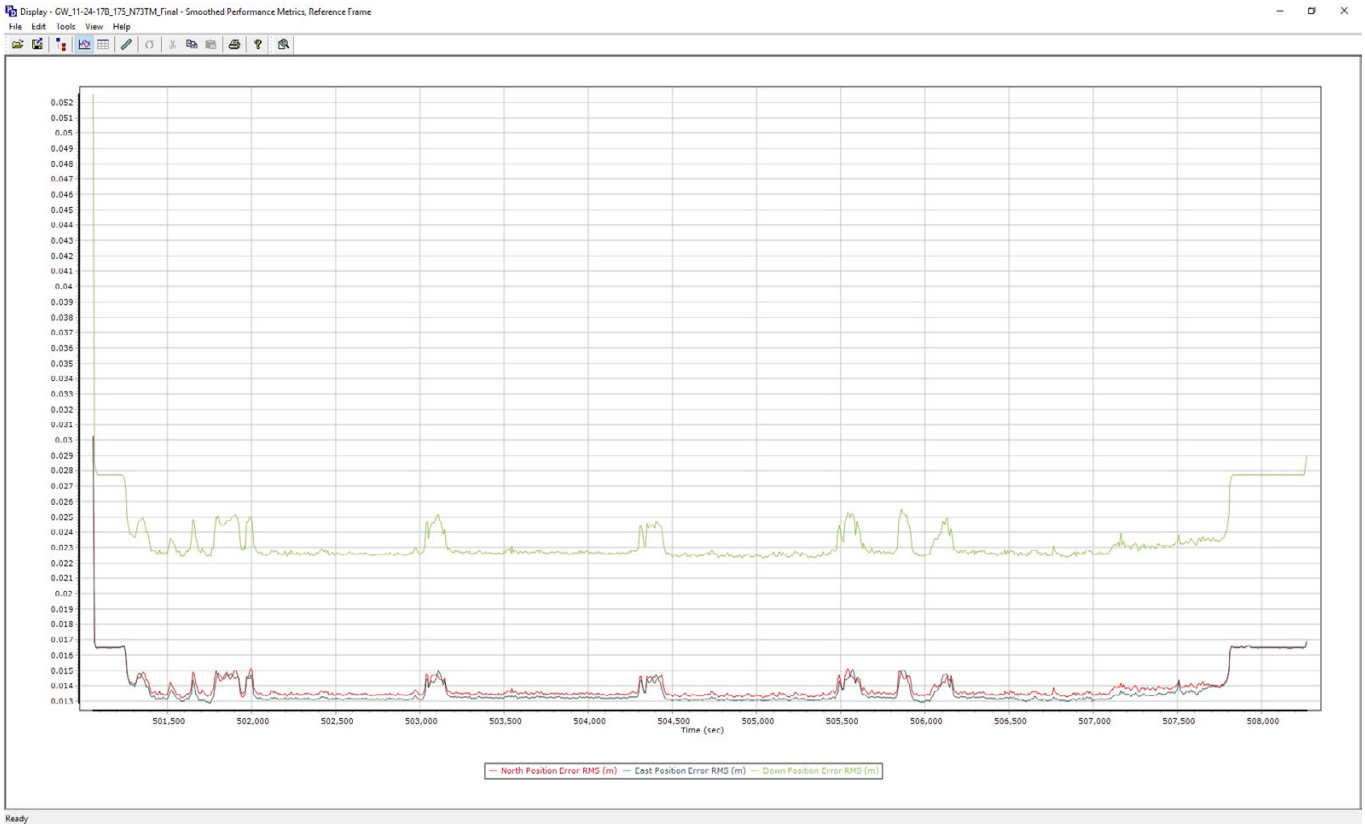
Total Proj Lines: Lines Flown: Lines Remain: Online Time: 3 Mob Time: .8 Notes:

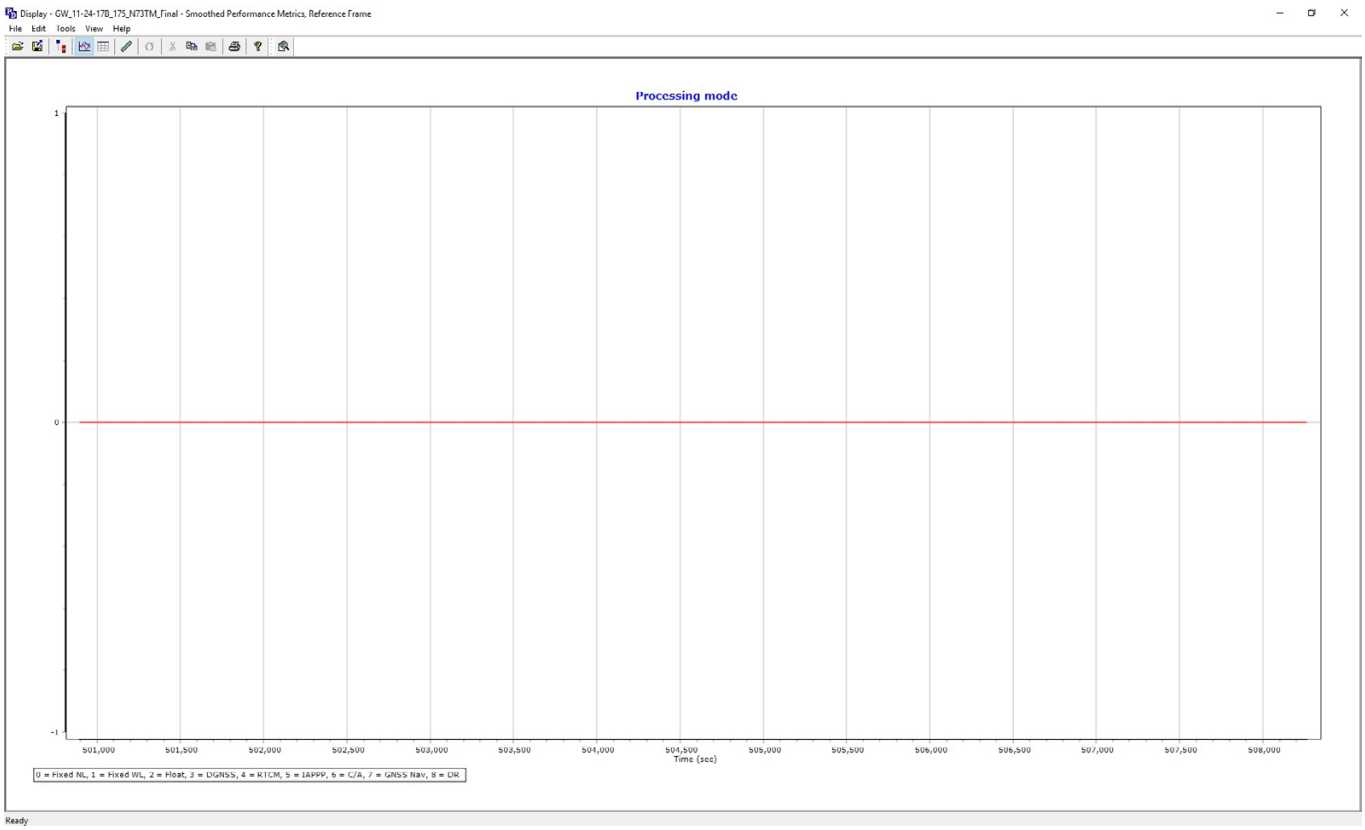
Scanned by CamScanner

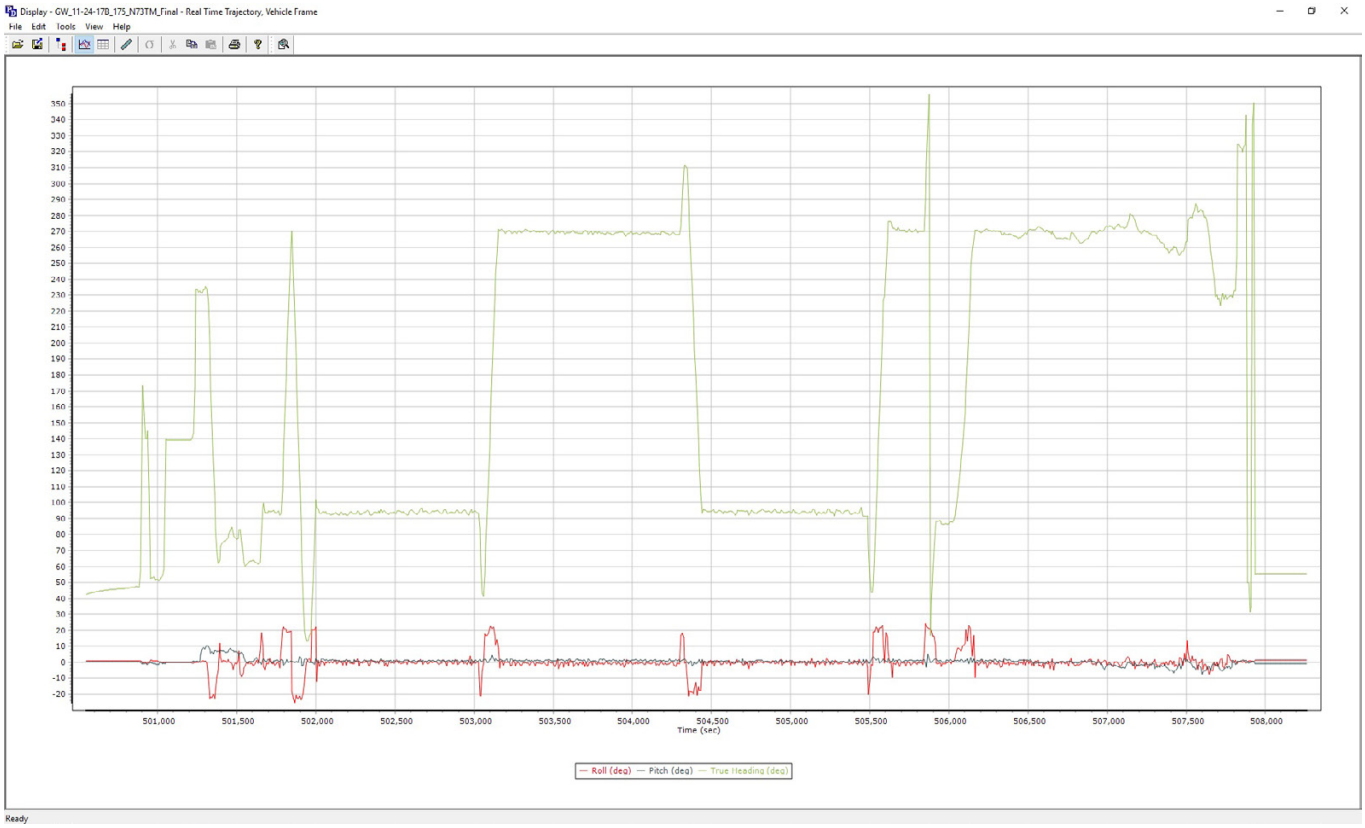
November 24, 2017-B (N73TM, SN175)


GW_11-24-17B_175_N73TM_Final - POSPac MMS
File
Project
Edit
View
Reports
Tools
Window
Help
Plan View [My Files]
20000
0
-20000
Post-processed (SBET)
Start
PP-RTX
10000m
0
20000
40000
60000
80000
100000
120000
Snap
Meter
Grid
141015.649 m, 78430.953 m

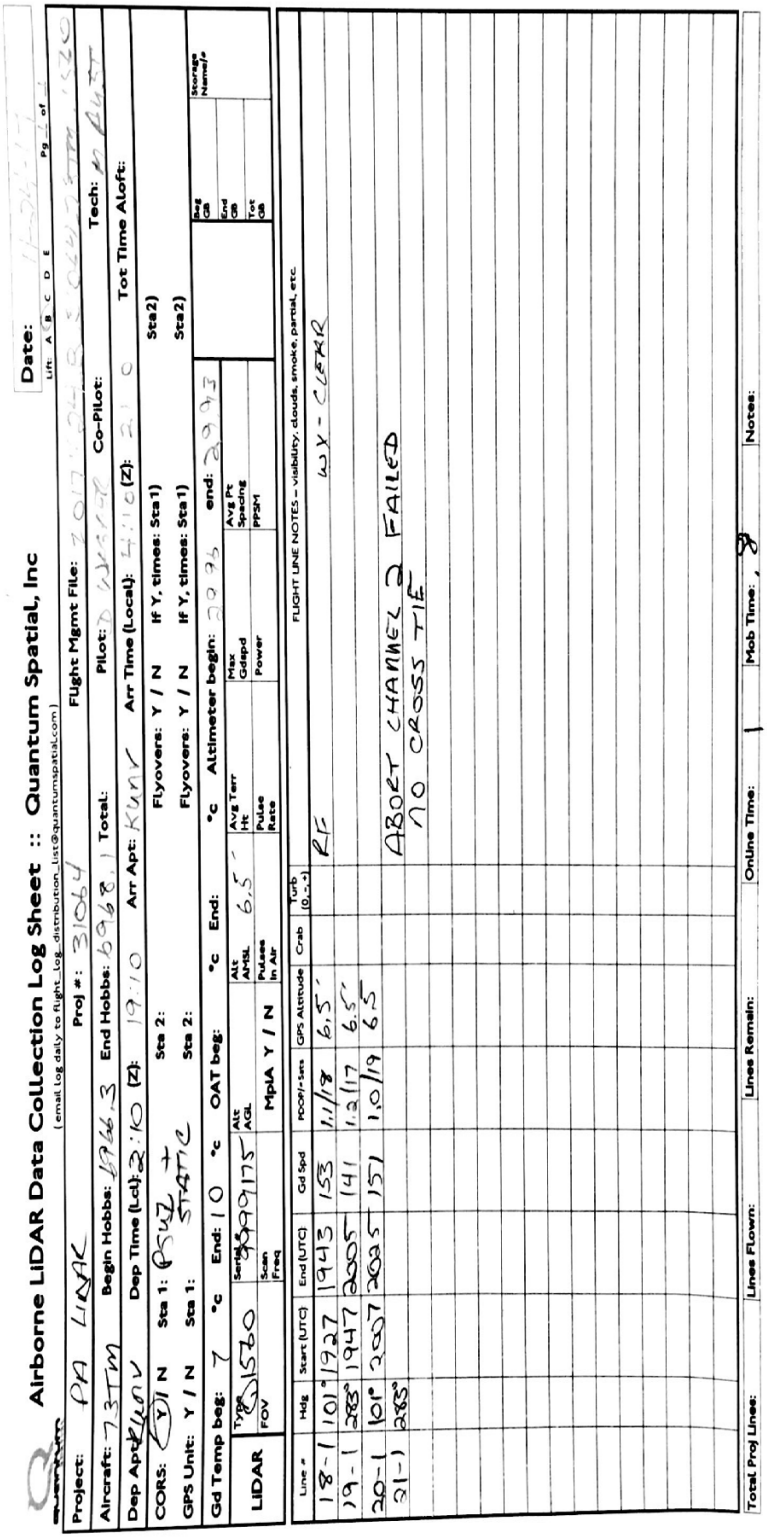

Display - GW_11-24-17B_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File
Edit
Tools
View
Help
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
501,000
501,500
502,000
502,500
503,000
503,500
504,000
504,500
505,000
505,500
506,000
506,500
507,000
507,500
508,000
Time (sec)
Number of GPS Satellites
Number of GLONASS Satellites
PDOP
Ready


Display - GW_11-24-17D_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
Ready


Display - GW_11-24-17D_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Processing mode
Time (sec)
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav, 8 = DR
Ready


Display - GW_11-24-17D_175_N73TM_Final - Real Time Trajectory, Vehicle Frame
File Edit Tools View Help
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)
Ready

Flight Log



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

(email Log daily to Flight_Log_distribution_list@quantumspatial.com)

Date: 10/24/17 Lift: A B C D E Pg 1 of 1

Project: PA LIDAR Proj #: 31054 Flight Mgmt File: 7017

Aircraft: 737TM Begin Hobbs: 8946.3 End Hobbs: 8968.1 Total: Pilot: [illegible] Co-Pilot: Tech: [illegible]

Dep Apt: KUNV Dep Time (Lcl): 12:10 (Z): 19:10 Arr Apt: KUNV Arr Time (Local): 5:11 (Z): 21:0 Tot Time Aloft:

CORS: Y / N Sta 1: PSU2 Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

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

Gd Temp beg: 7 °c End: 10 °c OAT beg: °c End: °c Altimeter begin: 29.95 end: 29.93

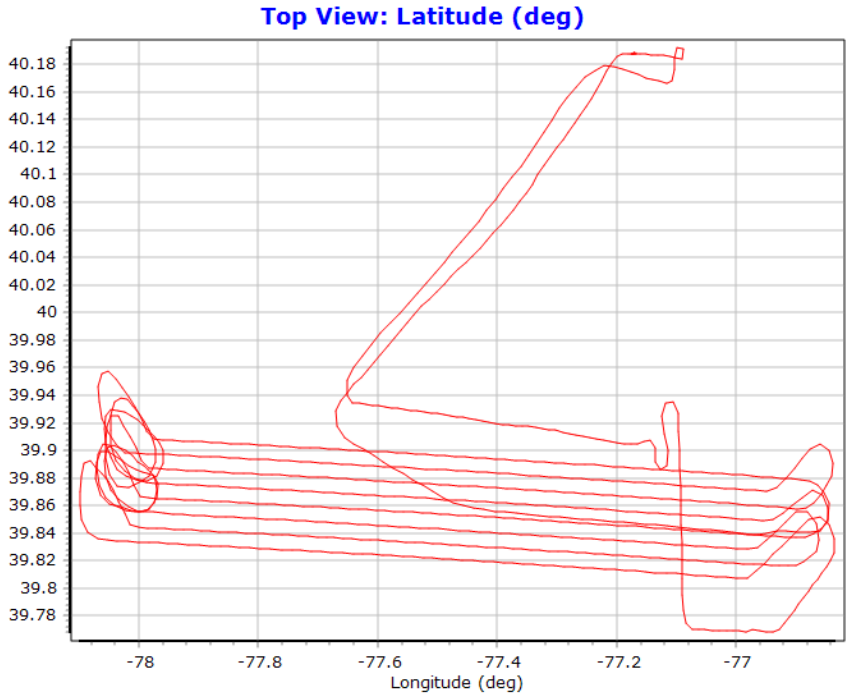
	Type	Serial #	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Beg GB	Storage Number
LiDAR		139760		6,5'					
	FOV	Scan Freq	MpIA Y / N	Pulses In Air	Pulse Rate	Power	PPSM	End GB	
								Tot GB	

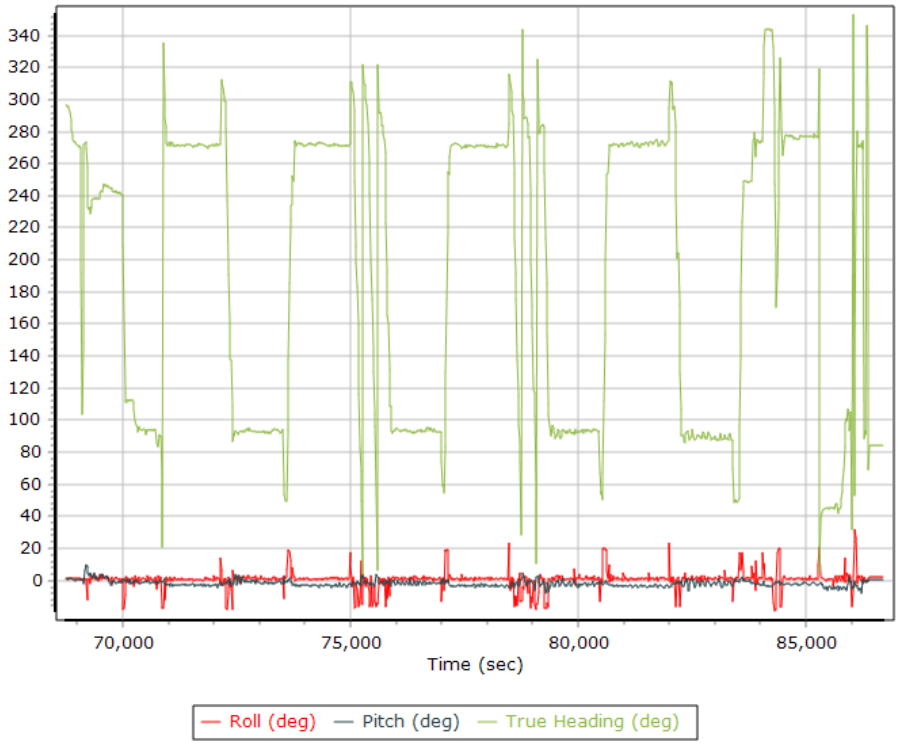
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POOF/-Sms	GPS Altitude	Crab	Turb (0-3)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
18-1	101°	19:27	19:43	153	1.1/18	6,5'			PC
19-1	288°	19:47	20:05	141	1.2/17	6.5'			WX - CLEAR
20-1	101°	20:07	20:25	151	1.0/19	6.5			
21-1	288°								ABORT CHANNEL 2 FAILED
									NO CROSS TIE

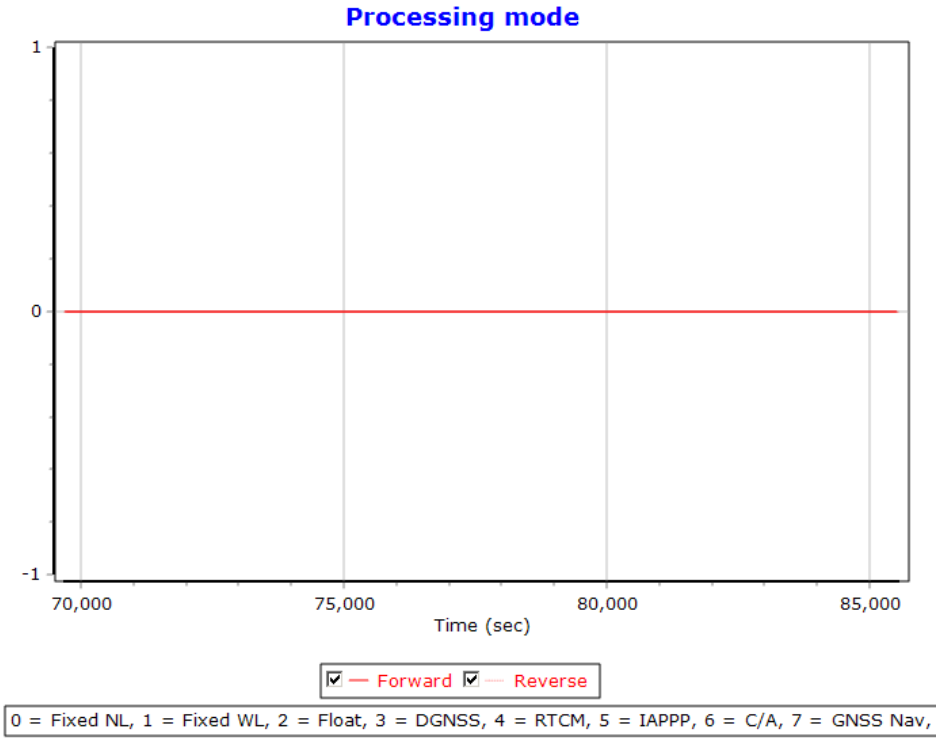
Total Proj Lines: Lines Flown: Lines Remain: Online Time: 1 Mob Time: 3 Notes:

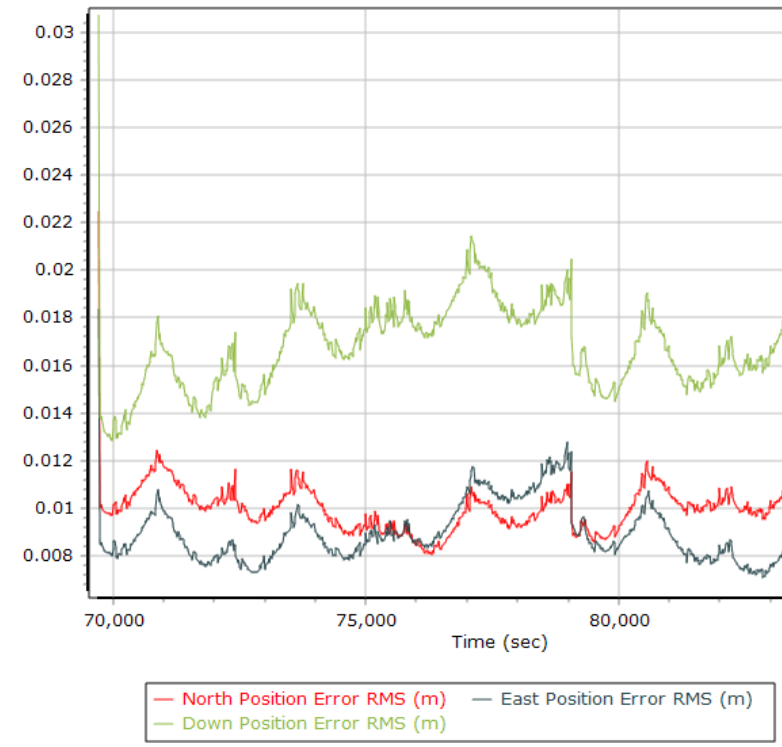
Scanned by CamScanner

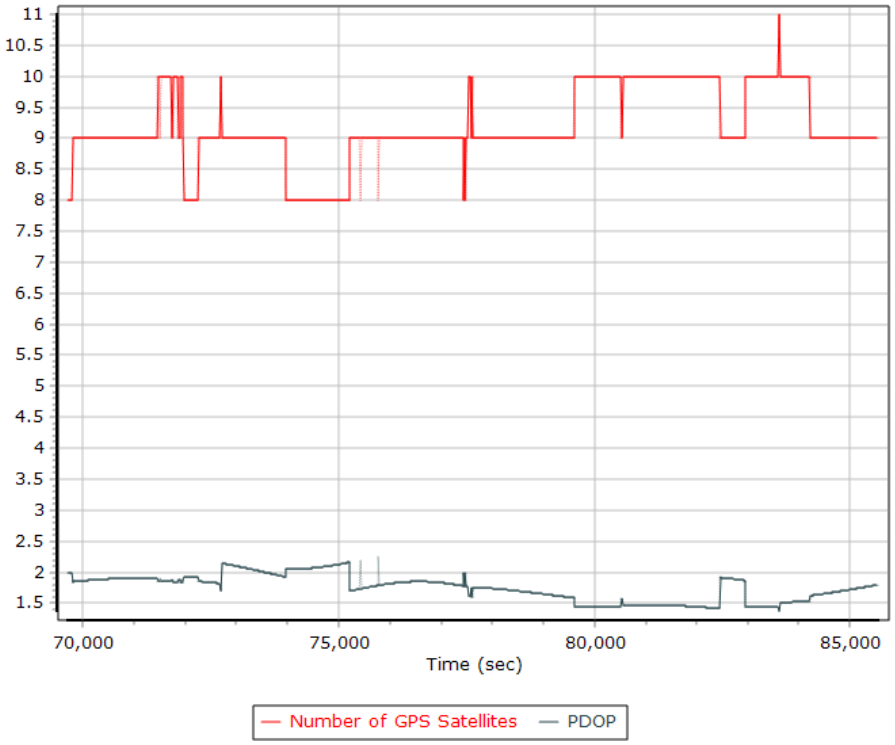
November 26, 2017-A (N1107Q, SN1256)

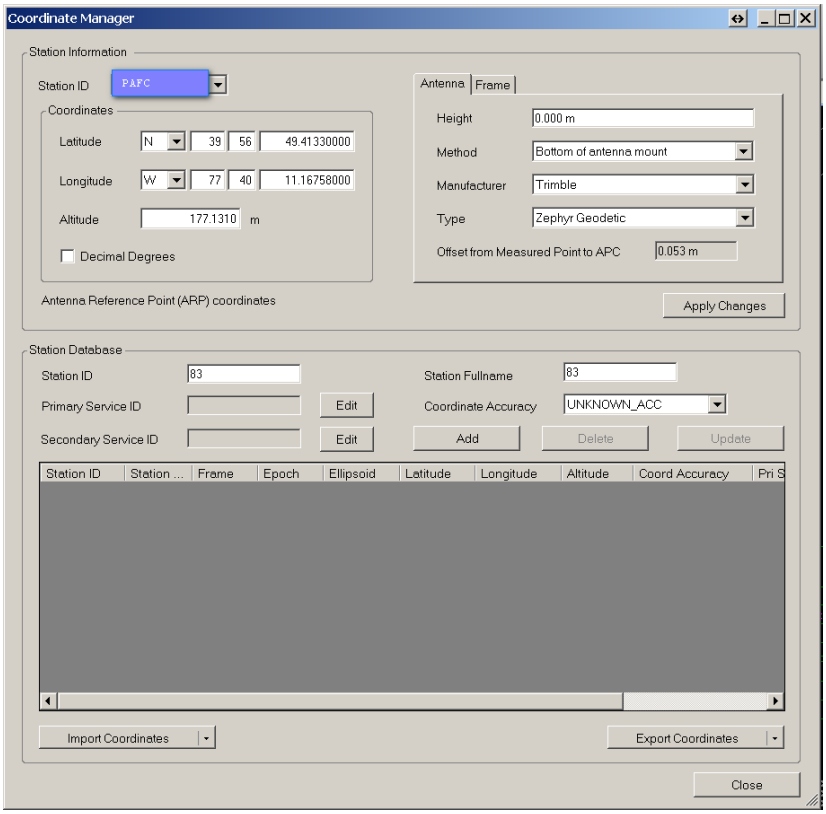

Top View: Latitude (deg)
40.18
40.16
40.14
40.12
40.1
40.08
40.06
40.04
40.02
40
39.98
39.96
39.94
39.92
39.9
39.88
39.86
39.84
39.82
39.8
39.78
-78
-77.8
-77.6
-77.4
-77.2
-77
Longitude (deg)


340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
70,000
75,000
80,000
85,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Processing mode
1
0
-1
70,000
75,000
80,000
85,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
70,000
75,000
80,000
85,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
70,000
75,000
80,000
85,000
Time (sec)
Number of GPS Satellites
PDOP

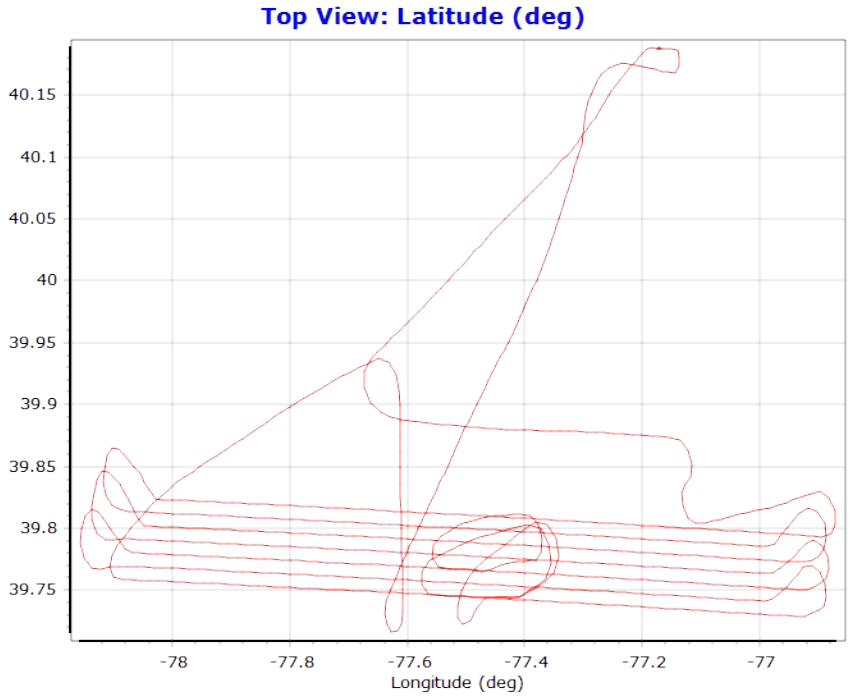

Coordinate Manager
Station Information
Station ID
PAFC
Coordinates
Latitude
N
39
56
49.41330000
Longitude
W
77
40
11.16758000
Altitude
177.1310
m
Decimal Degrees
Antenna Reference Point (ARP) coordinates
Antenna
Frame
Height
0.000 m
Method
Bottom of antenna mount
Manufacturer
Trimble
Type
Zephyr Geodetic
Offset from Measured Point to APC
0.053 m
Apply Changes
Station Database
Station ID
83
Station Fullname
83
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

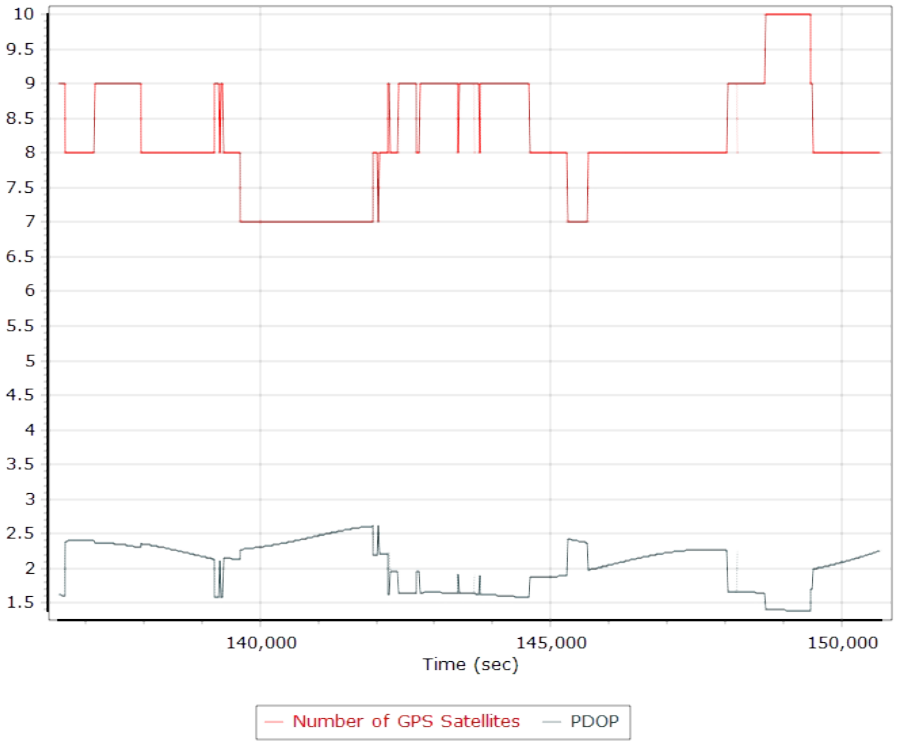
Flight Log

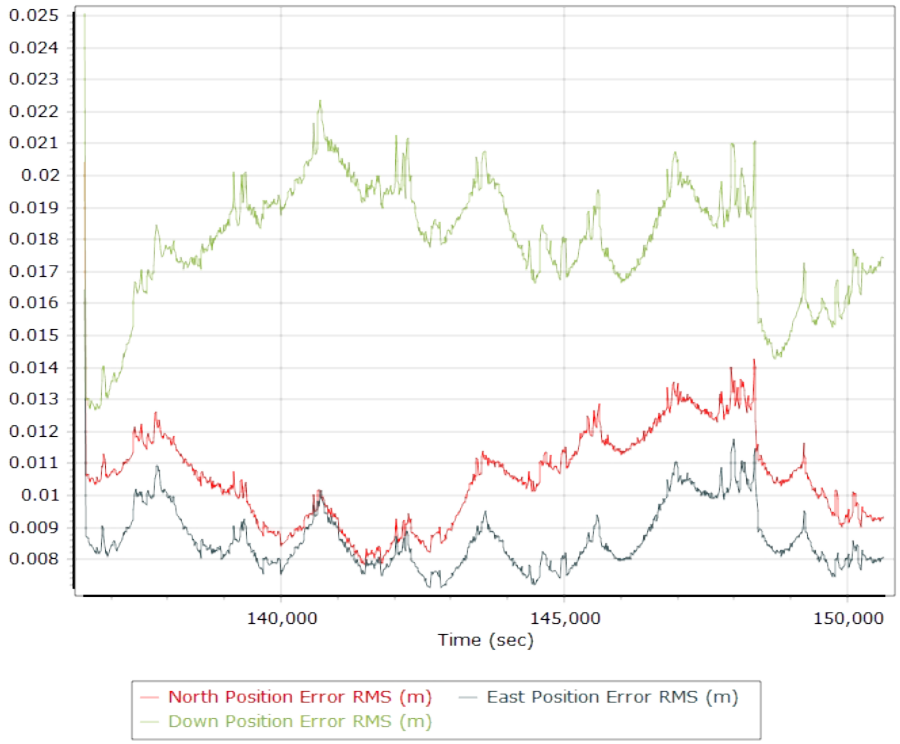
Flight Log

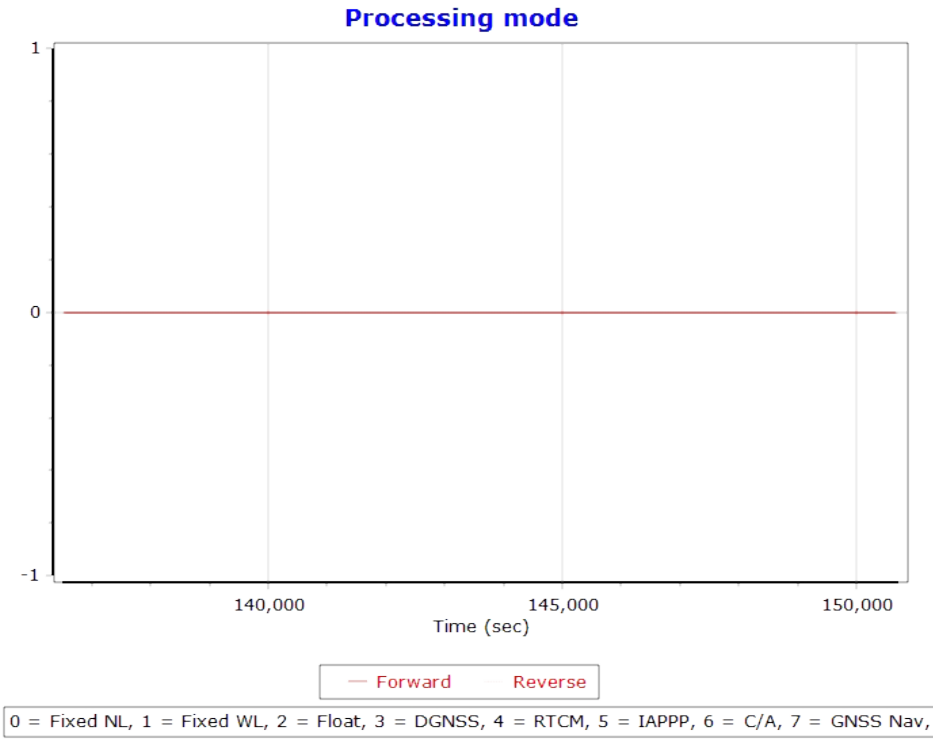
| Field Crew | | |

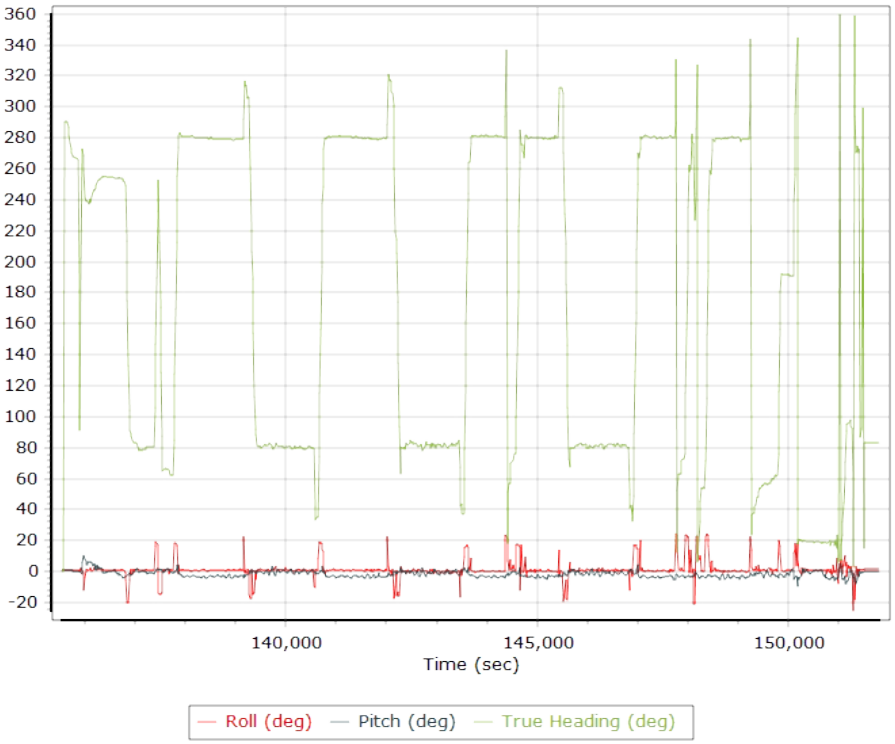
November 27, 2017-A (N1107Q, SN1256)

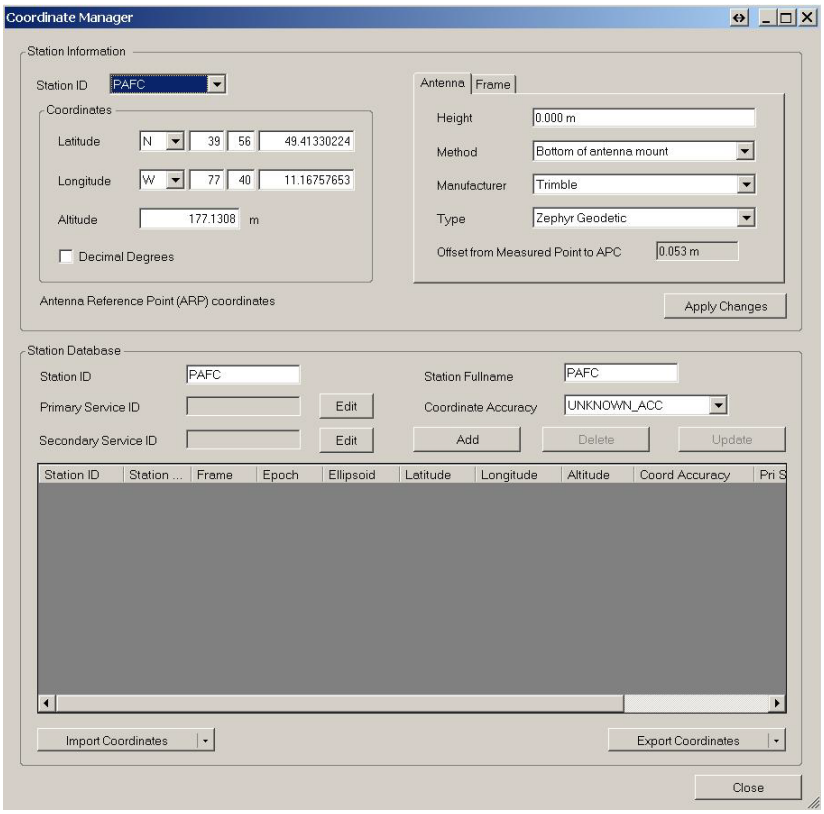

Top View: Latitude (deg)
40.15
40.1
40.05
40
39.95
39.9
39.85
39.8
39.75
-78
-77.8
-77.6
-77.4
-77.2
-77
Longitude (deg)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
140,000
145,000
150,000
Time (sec)
Number of GPS Satellites
PDOP


0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
140,000
145,000
150,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


Processing mode
1
0
-1
140,000
145,000
150,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
140,000
145,000
150,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)

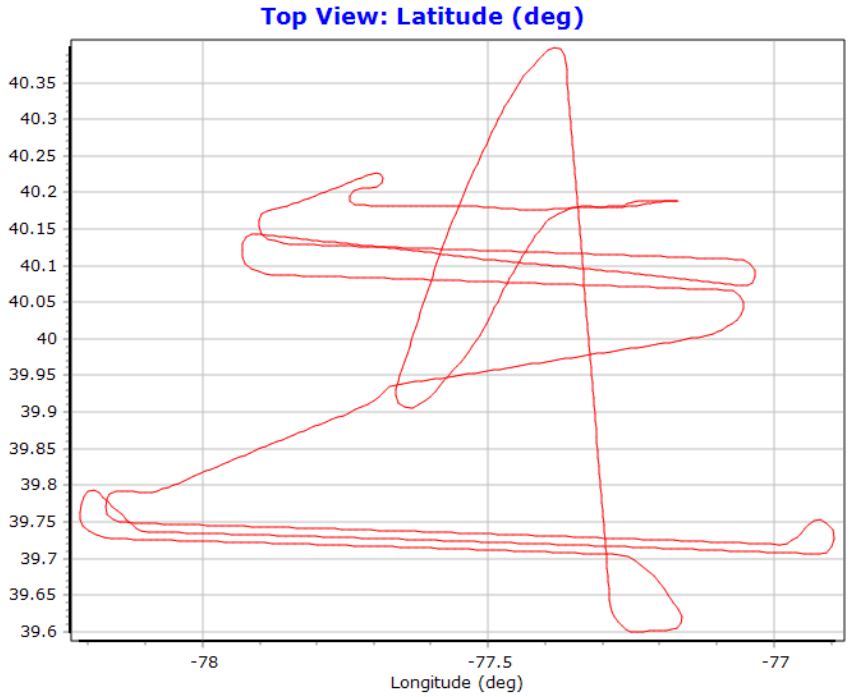

Coordinate Manager
Station Information
Station ID
PAFC
Coordinates
Latitude
N
39
56
49.41330224
Longitude
W
77
40
11.16757653
Altitude
177.1308
m
Decimal Degrees
Antenna Reference Point (ARP) coordinates
Antenna
Frame
Height
0.000 m
Method
Bottom of antenna mount
Manufacturer
Trimble
Type
Zephyr Geodetic
Offset from Measured Point to APC
0.053 m
Apply Changes
Station Database
Station ID
PAFC
Station Fullname
PAFC
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

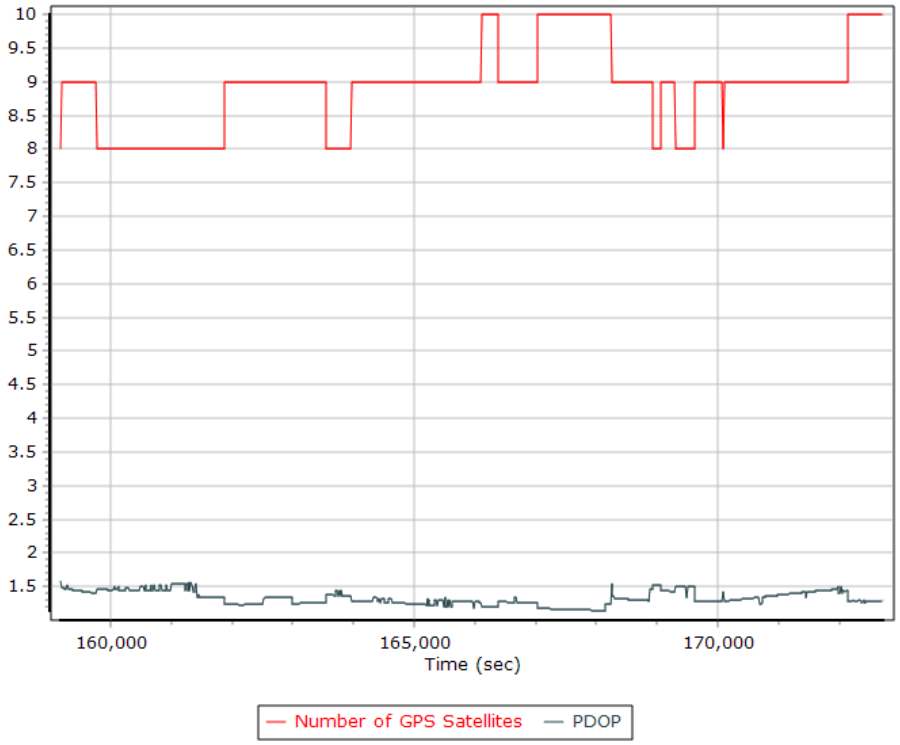
Flight Log

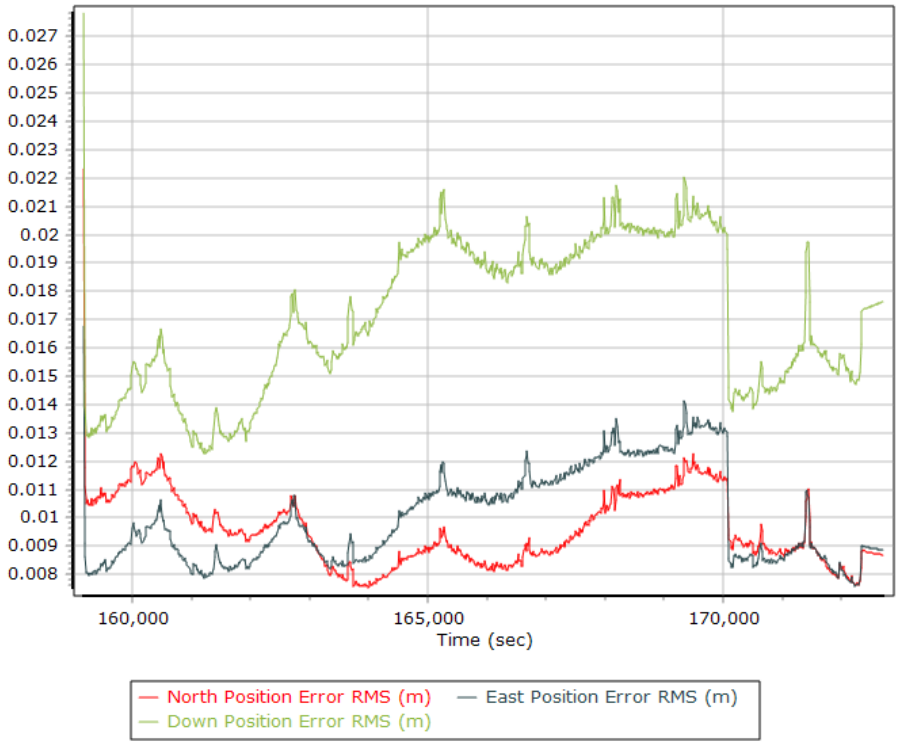
Flight Log

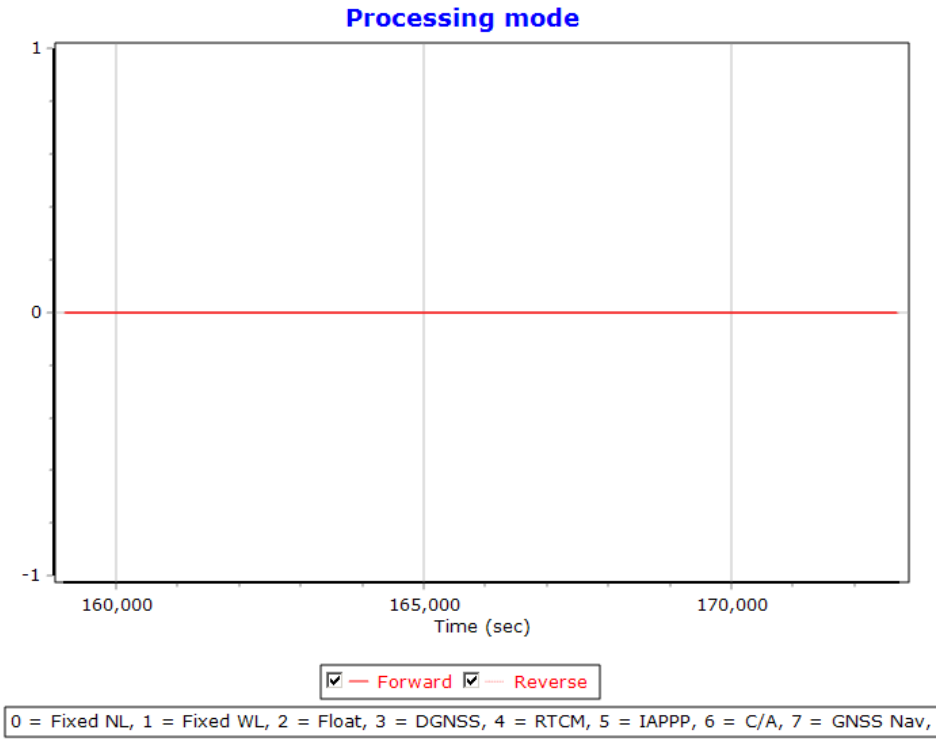
| Field Crew | | |

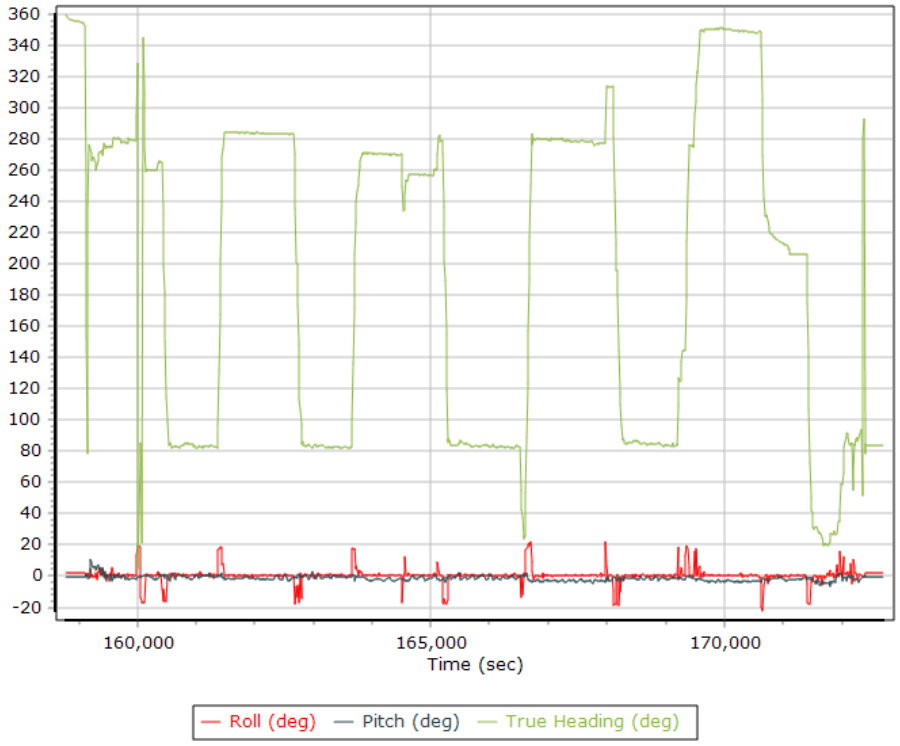
November 27, 2017-B (N1107Q, SN1256)

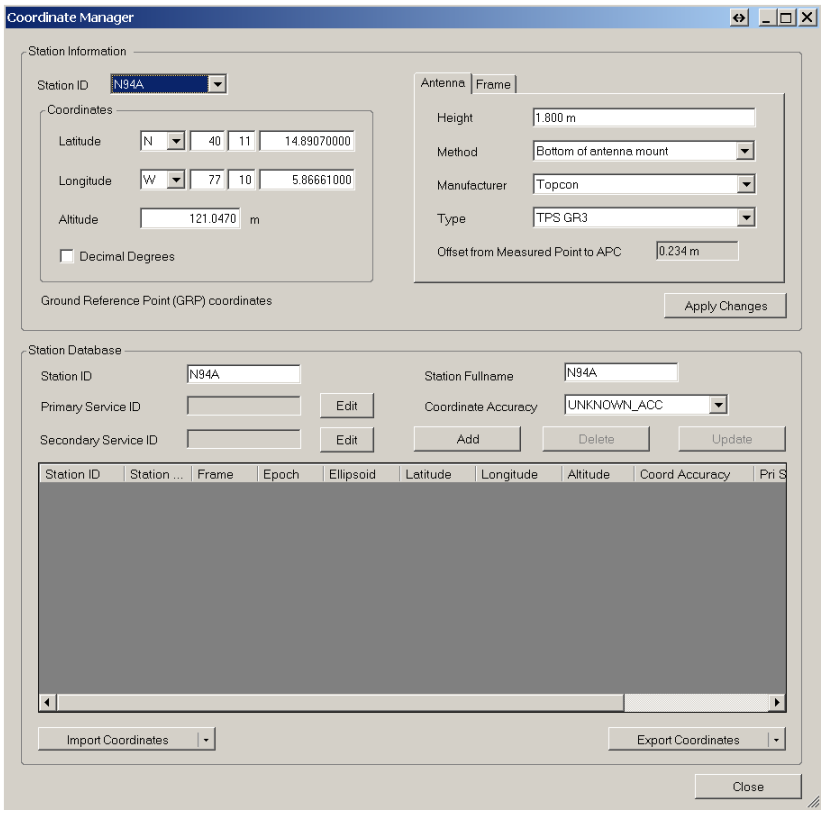

Top View: Latitude (deg)
40.35
40.3
40.25
40.2
40.15
40.1
40.05
40
39.95
39.9
39.85
39.8
39.75
39.7
39.65
39.6
-78
-77.5
-77
Longitude (deg)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
160,000
165,000
170,000
Time (sec)
Number of GPS Satellites
PDOP

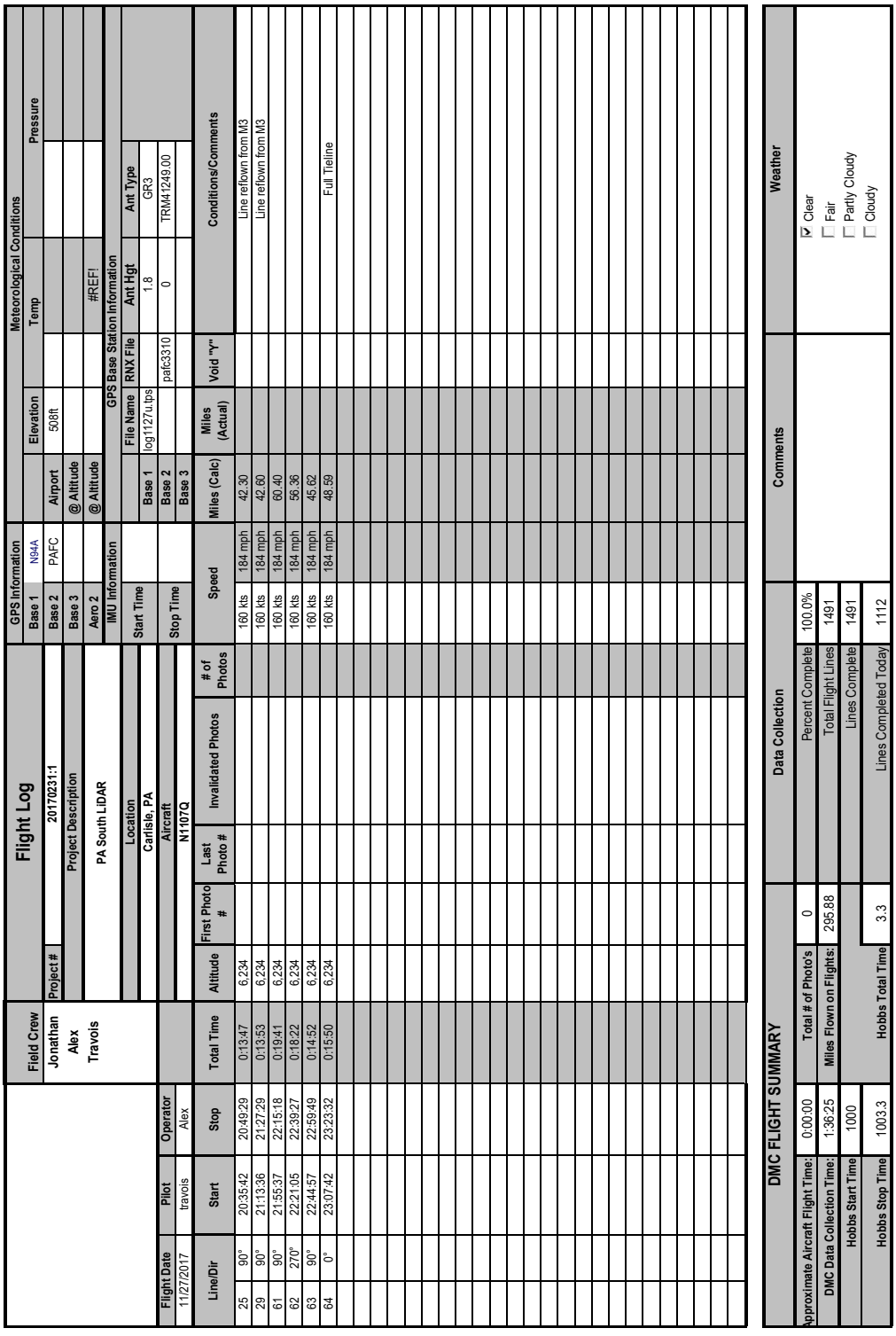

0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
160,000
165,000
170,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


Processing mode
1
0
-1
160,000
165,000
170,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
160,000
165,000
170,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Coordinate Manager
Station Information
Station ID
N94A
Coordinates
Latitude
N
40
11
14.89070000
Longitude
W
77
10
5.86661000
Altitude
121.0470
m
Decimal Degrees
Ground Reference Point (GRP) coordinates
Antenna
Frame
Height
1.800 m
Method
Bottom of antenna mount
Manufacturer
Topcon
Type
TPS GR3
Offset from Measured Point to APC
0.234 m
Apply Changes
Station Database
Station ID
N94A
Station Fullname
N94A
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

Flight Log



Flight Log

Field Crew	Project #	GPS Information			Meteorological Conditions		
Jonathan	20170231:1	Base 1	N94A		Elevation	Temp	Pressure
Alex	Project Description	Base 2	PAFC	Airport	508ft		
Travois		Base 3		@ Altitude			
	PA South LiDAR	Aero 2		@ Altitude		#REF!	

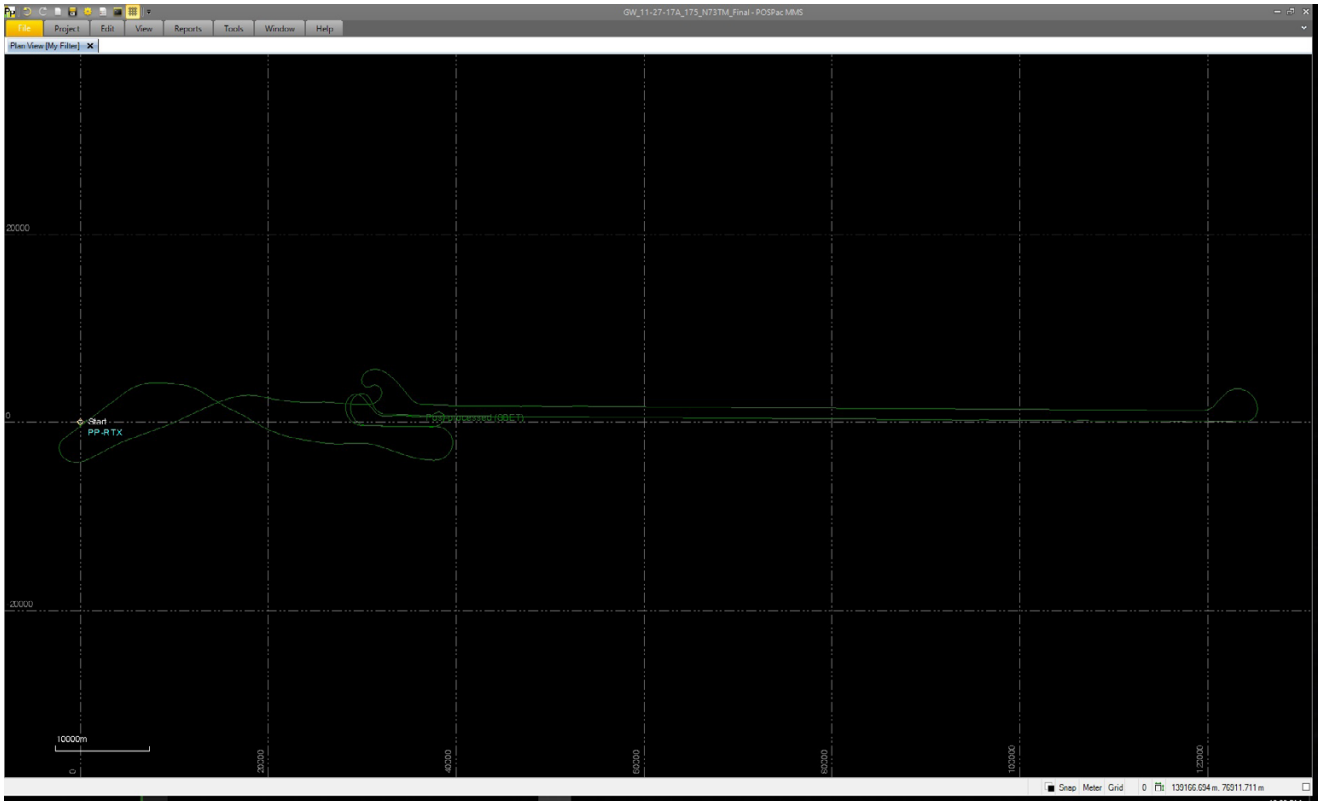
Location	IMU Information	GPS Base Station Information			
Carlisle, PA	Start Time		File Name	RNX File	Ant Hgt	Ant Type
Aircraft		Base 1	log1127u.tps		1.8	GR3
N1107Q	Stop Time	Base 2		pafc3310	0	TRM41249.00
		Base 3				

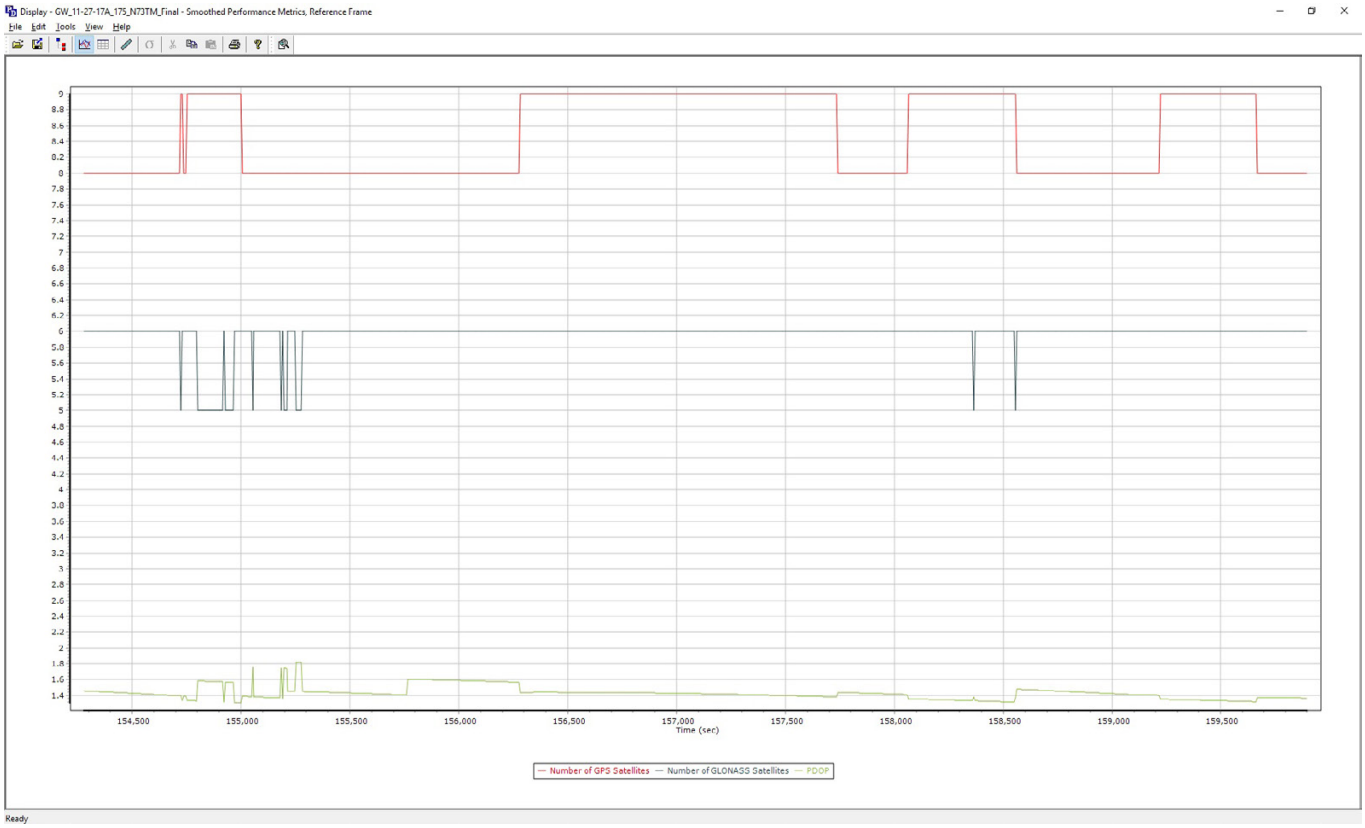
Flight Date	Pilot	Operator
11/27/2017	travois	Alex

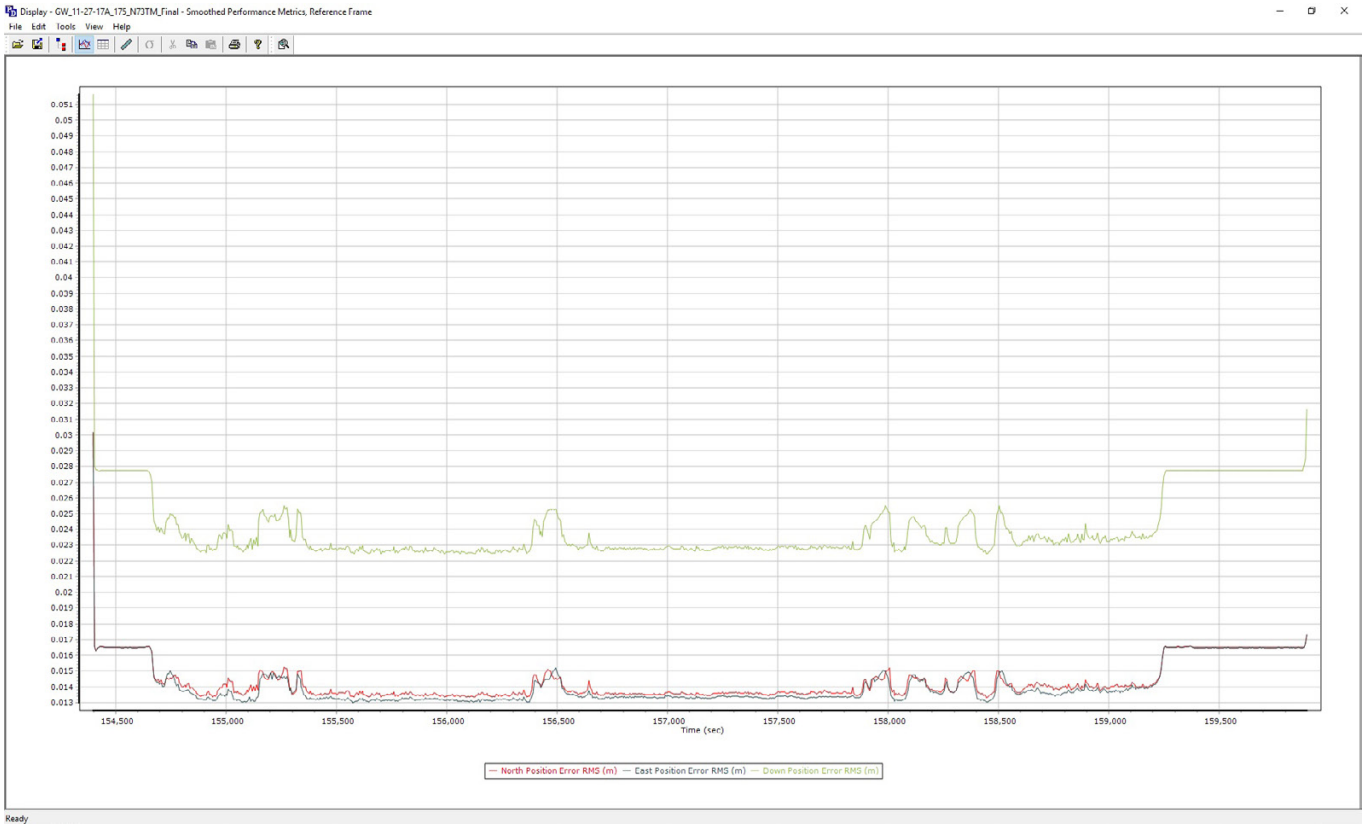
Line/Dir		Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed		Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
25	90°	20:35:42	20:49:29	0:13:47	6,234					160 kts	184 mph	42.30			Line reflown from M3
29	90°	21:13:36	21:27:29	0:13:53	6,234					160 kts	184 mph	42.60			Line reflown from M3
61	90°	21:55:37	22:15:18	0:19:41	6,234					160 kts	184 mph	60.40			
62	270°	22:21:05	22:39:27	0:18:22	6,234					160 kts	184 mph	56.36			
63	90°	22:44:57	22:59:49	0:14:52	6,234					160 kts	184 mph	45.62			
64	0°	23:07:42	23:23:32	0:15:50	6,234					160 kts	184 mph	48.59			Full Tieline

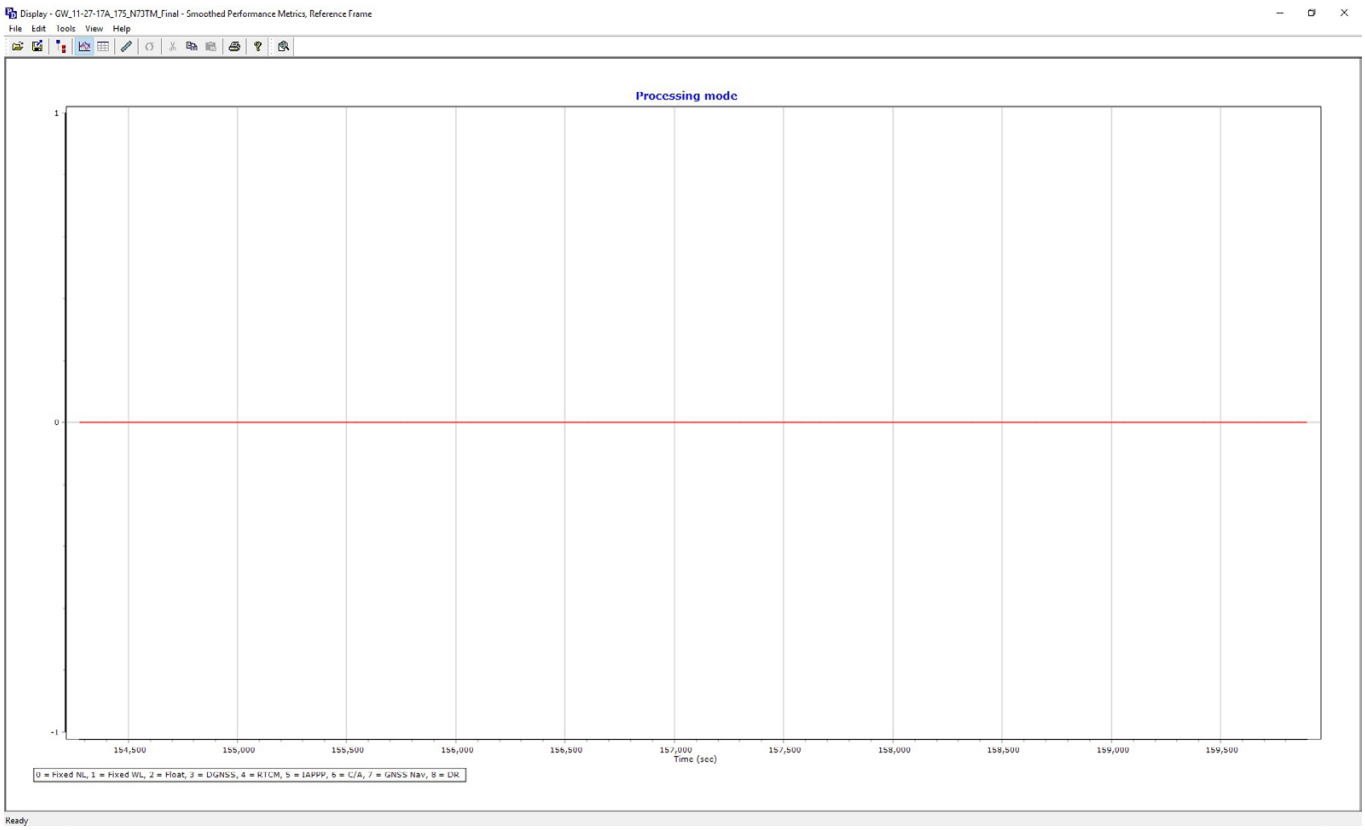
DMC FLIGHT SUMMARY				Data Collection			Comments	Weather
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0	Percent Complete	100.0%			☑ Clear
DMC Data Collection Time:	1:36:25	Miles Flown on Flights:	295.88	Total Flight Lines	1491			☐ Fair
Hobbs Start Time	1000			Lines Complete	1491			☐ Partly Cloudy
Hobbs Stop Time	1003.3	Hobbs Total Time	3.3	Lines Completed Today	1112			☐ Cloudy

November 27, 2017-A (N73TM, SN175)


GW_11-27-17A_175_N73TM_Final - POSPac MMS
File
Project
Edit
View
Reports
Tools
Window
Help
Plan View [My Files]
20000
0
-20000
Start
PP-RTX
10000m
20000
40000
60000
80000
100000
120000
Snap
Meter
Grid
139166.694 m, 76911.711 m


Display - GW_11-27-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File
Edit
Tools
View
Help
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
154,500
155,000
155,500
156,000
156,500
157,000
157,500
158,000
158,500
159,000
159,500
Time (sec)
Number of GPS Satellites
Number of GLONASS Satellites
PDOP
Ready


Display - GW_11-27-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
Ready


Display - GW_11-27-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Processing mode
Time (sec)
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav, 8 = DR
Ready


Display - GW_11-27-17A_175_N73TM_Final - Real Time Trajectory, Vehicle Frame
File Edit Tools View Help
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
154,000
154,500
155,000
155,500
156,000
156,500
157,000
157,500
158,000
158,500
159,000
159,500
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)
Ready

Flight Log

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

(email Log daily to flight_log_distribution_List@quantumspatial.com)

Date: 11-27-17 Lift: A B C D E Pg 1 of 1

Project: PA South Central L1 DAP Proj #: 31064 Flight Mgmt File: 20171127-N3064_73TM_01560

Aircraft: 73TM Begin Hobbs: 6968.1 End Hobbs: 6969.4 Total: 1.3 Pilot: D Wagner Co-Pilot: Tech: M Hust

Dep Apt: KMMV Dep Time (Lcl): 1155A (Z): 1855 Arr Apt: Arr Time (Local): (Z): Tot Time Aloft:

CORS: (Y) N Sta 1: PSU1 Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

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

Gd Temp beg: 8 °c End: 8 °c OAT beg: °c End: °c Altimeter begin: 30.11 end: 30.11

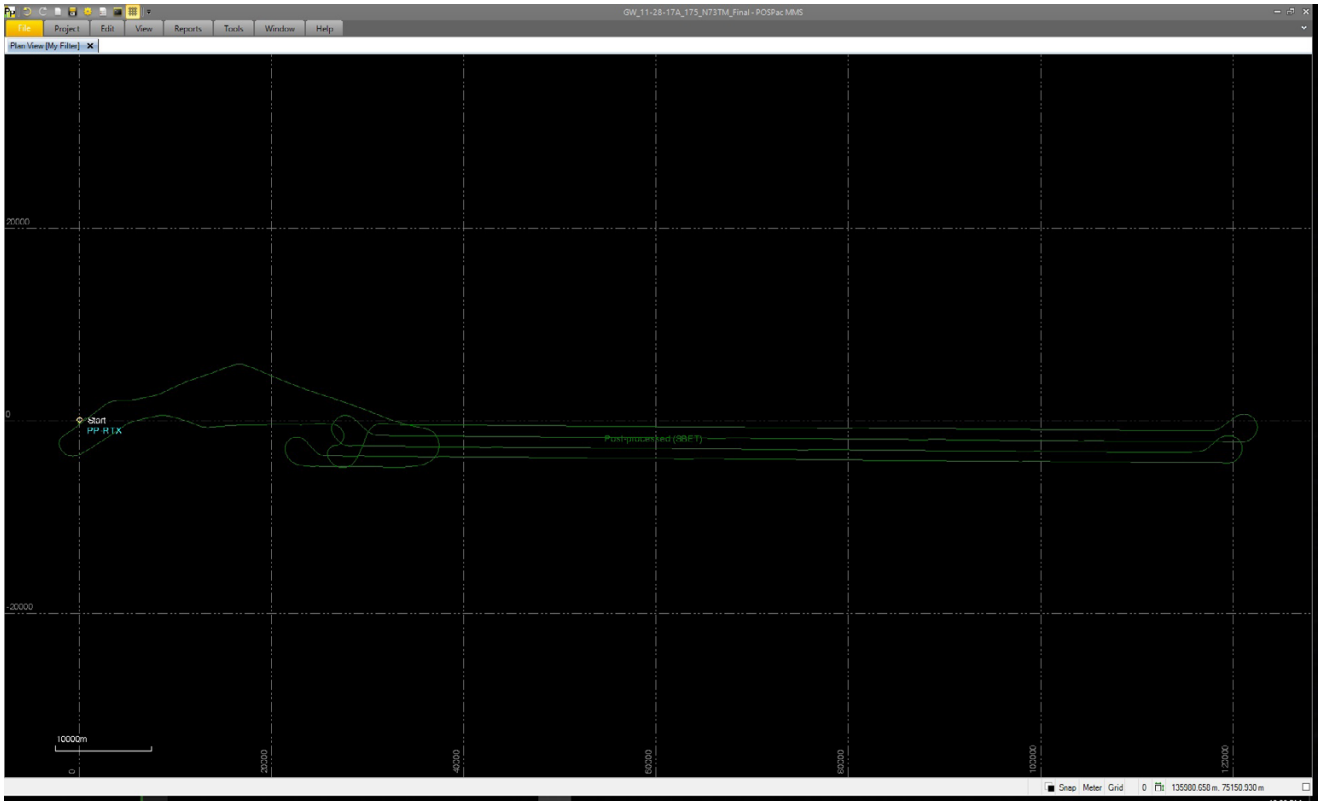
	Type	Serial #	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd 150	Avg Pt Spacing
LiDAR	Q1560	999175		6,5'		Power 50	PPSM 4.5
	FOV 58	Scan Freq	MpiA Y / N	Pulses In Air	Pulse Rate		

	Beg GB 10.41	Storage Name/#
GX I	End GB 10.57	SET
GX 2	Tot GB	

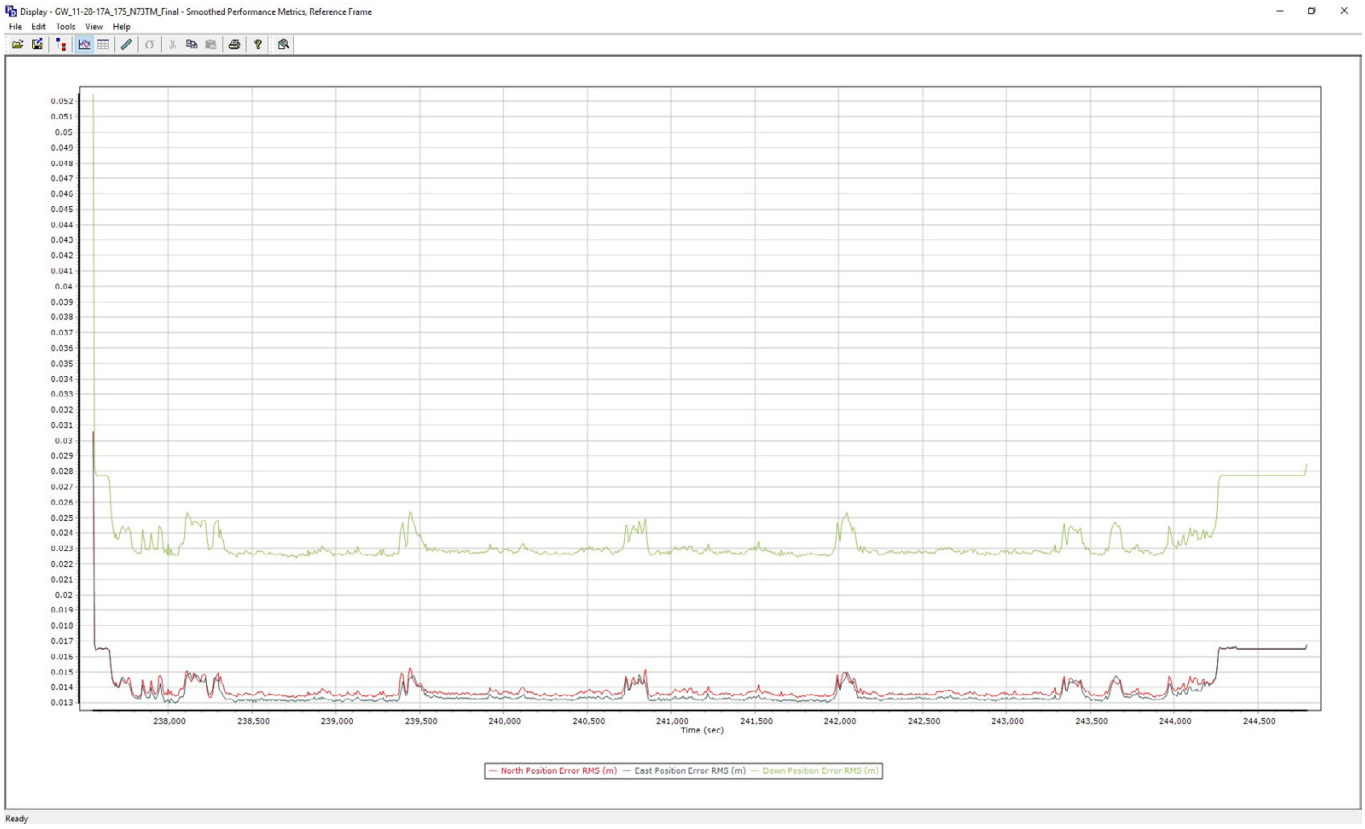
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	PDOP/# Sats	GPS Altitude	Crab	Turb (0, -, +)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
21-1	101°	1909	1926	148	1.1/18	6,5'			GX-CUBE BUT HEAVY WINDS
22-1	283°	1930	1950	135	1.2/17	6.5'		Yes	LASER DID NOT TURN OFF AFTER LINE - MANUAL
23-1	101°								CHANNEL 1 AND 2 WILL NOT FIRE - SHUT DOWN
									ETB

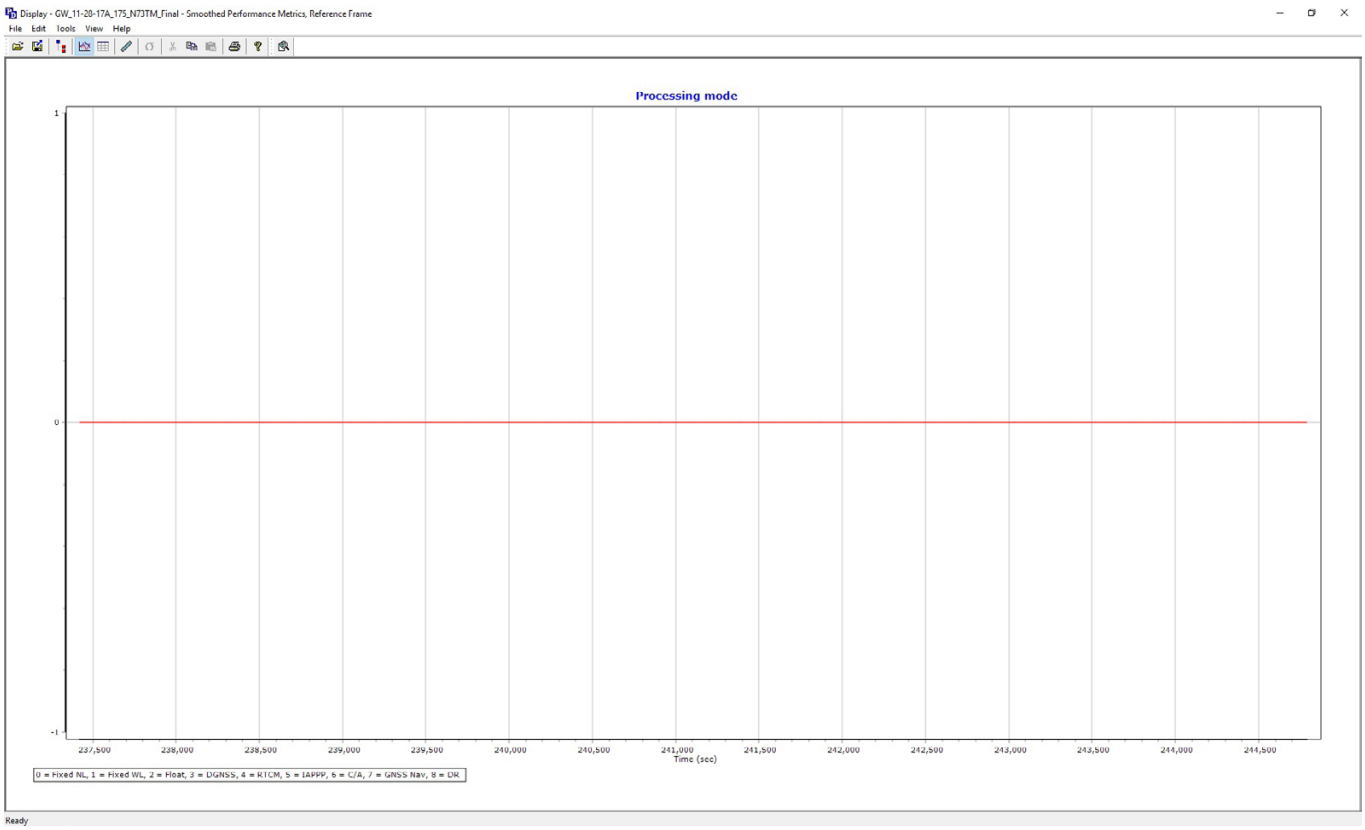
Total Proj Lines: Lines Flown: Lines Remain: Online Time: 1.75 Mob Time: .5 Notes:

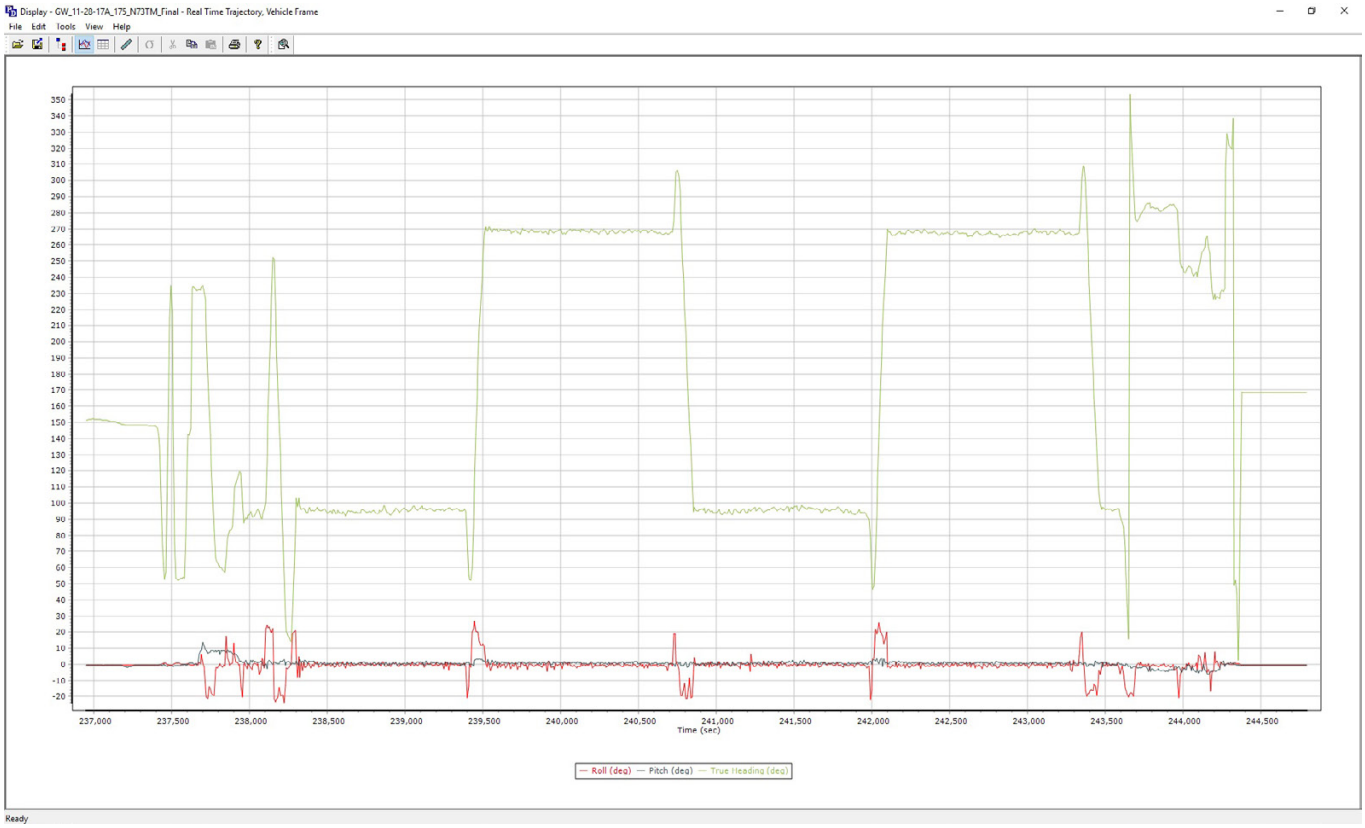
November 28, 2017-A (N73TM, SN175)


GW_11-28-17A_175_N73TM_Final - POSPac MMS
File
Project
Edit
View
Reports
Tools
Window
Help
Plan View [My Files]
20000
0
-20000
Start
PPRTX
Postprocessed (SBET)
10000m
20000
40000
60000
80000
100000
120000
Snap Meter Grid
135980.650 m, 75150.930 m

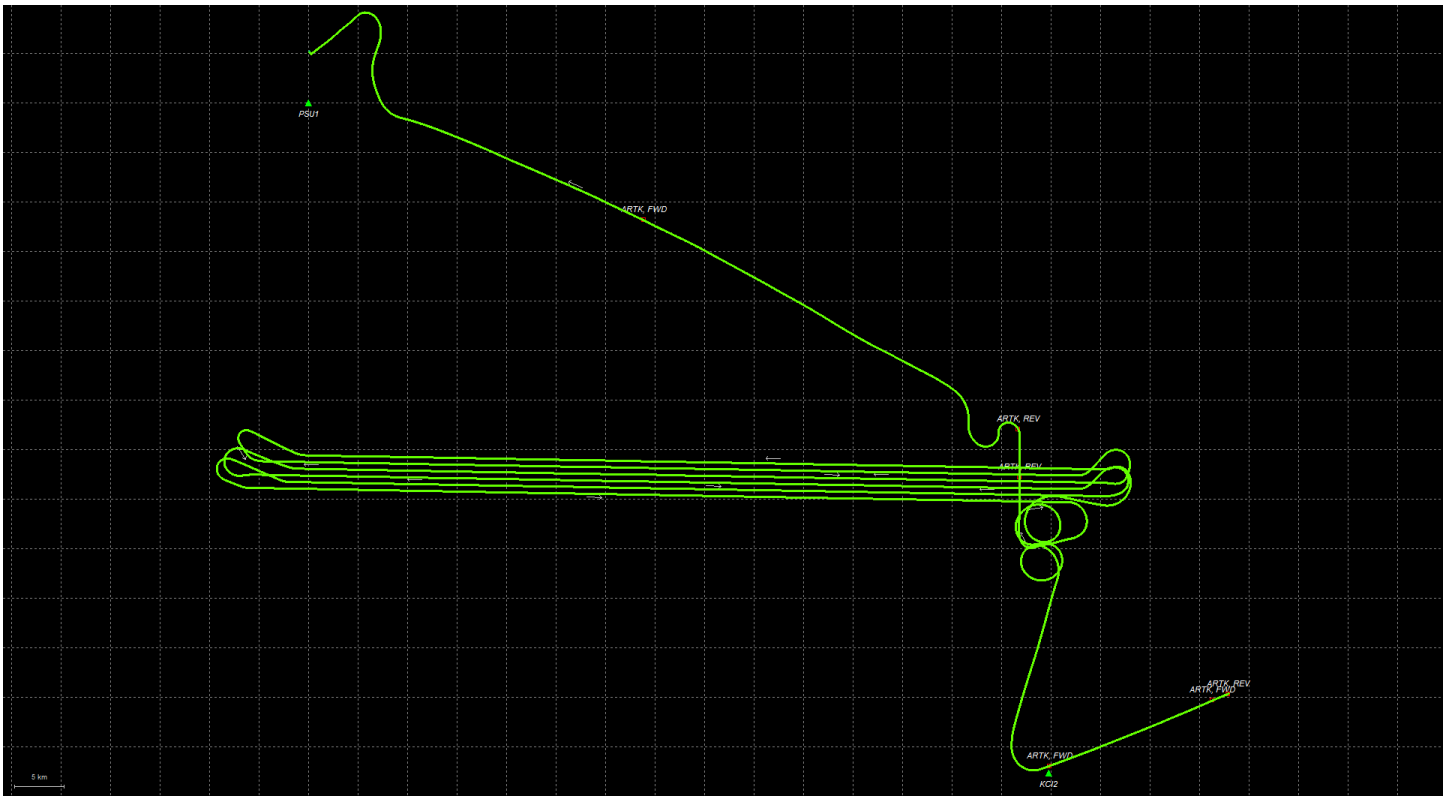

Display - GW_11-28-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
237,500
238,000
238,500
239,000
239,500
240,000
240,500
241,000
241,500
242,000
242,500
243,000
243,500
244,000
244,500
Time (sec)
Number of GPS Satellites
Number of GLONASS Satellites
PDOP
Ready

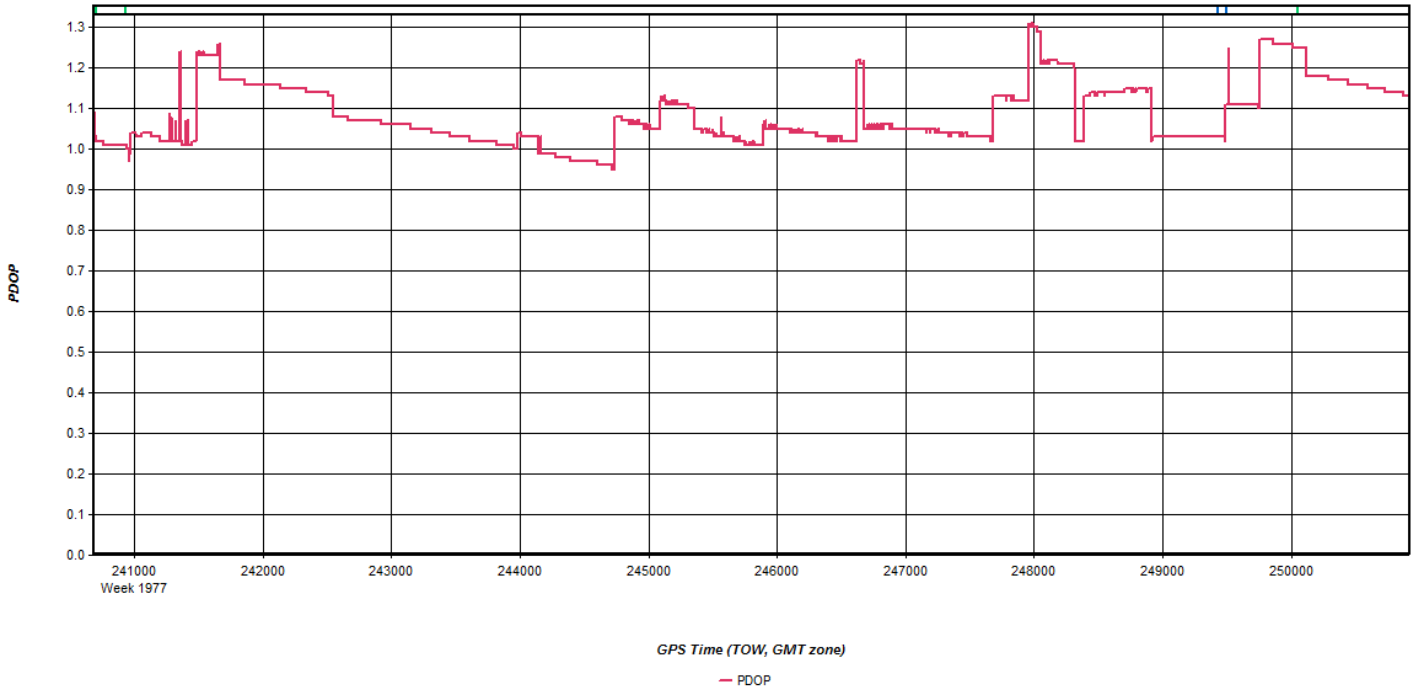

Display - GW_11-20-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
Ready

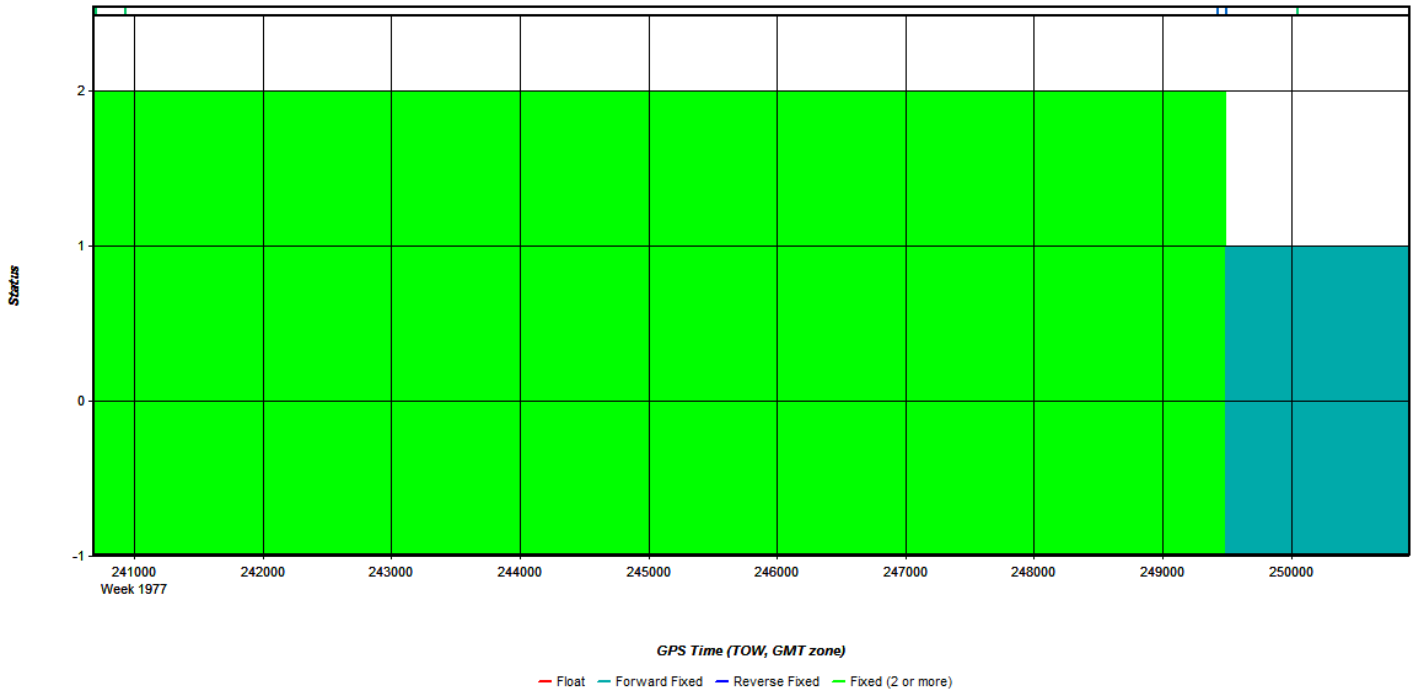

Display - GW_11-20-17A_175_N73TM_Final - Smoothed Performance Metrics, Reference Frame
File Edit Tools View Help
Processing mode
Time (sec)
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav, 8 = DR
Ready

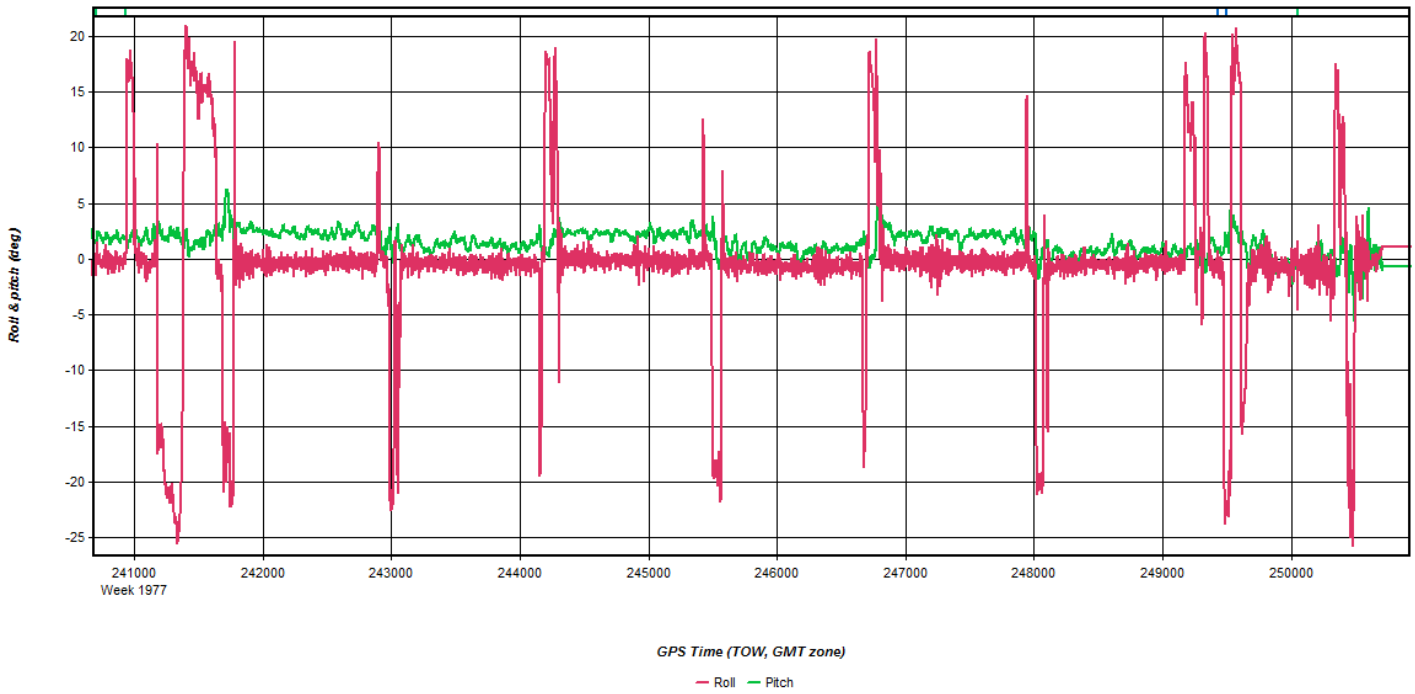

Display - GW_11-20-17A_175_N73TM_Final - Real Time Trajectory, Vehicle Frame
File Edit Tools View Help
350 340 330 320 310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
237,000 237,500 238,000 238,500 239,000 239,500 240,000 240,500 241,000 241,500 242,000 242,500 243,000 243,500 244,000 244,500
Time (sec)
Roll (deg) Pitch (deg) True Heading (deg)
Ready

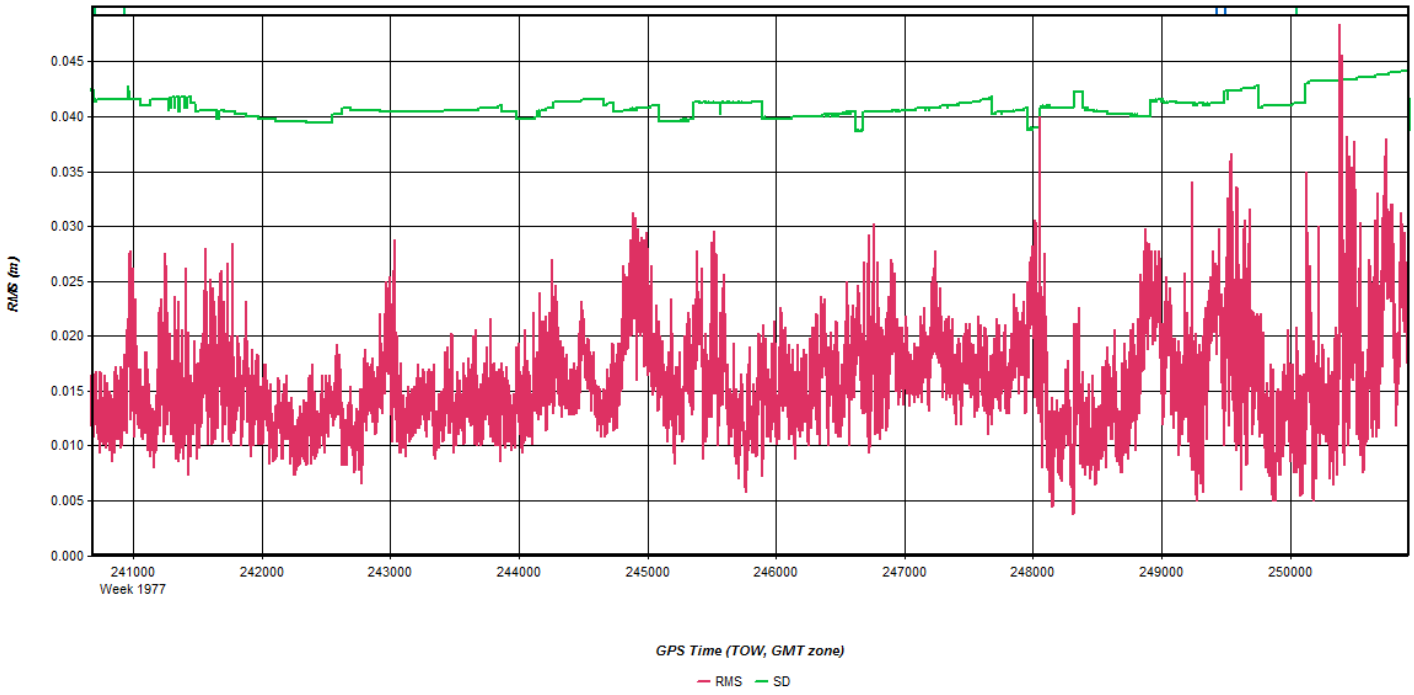
November 28, 2017-A (N812TB, SN7161)

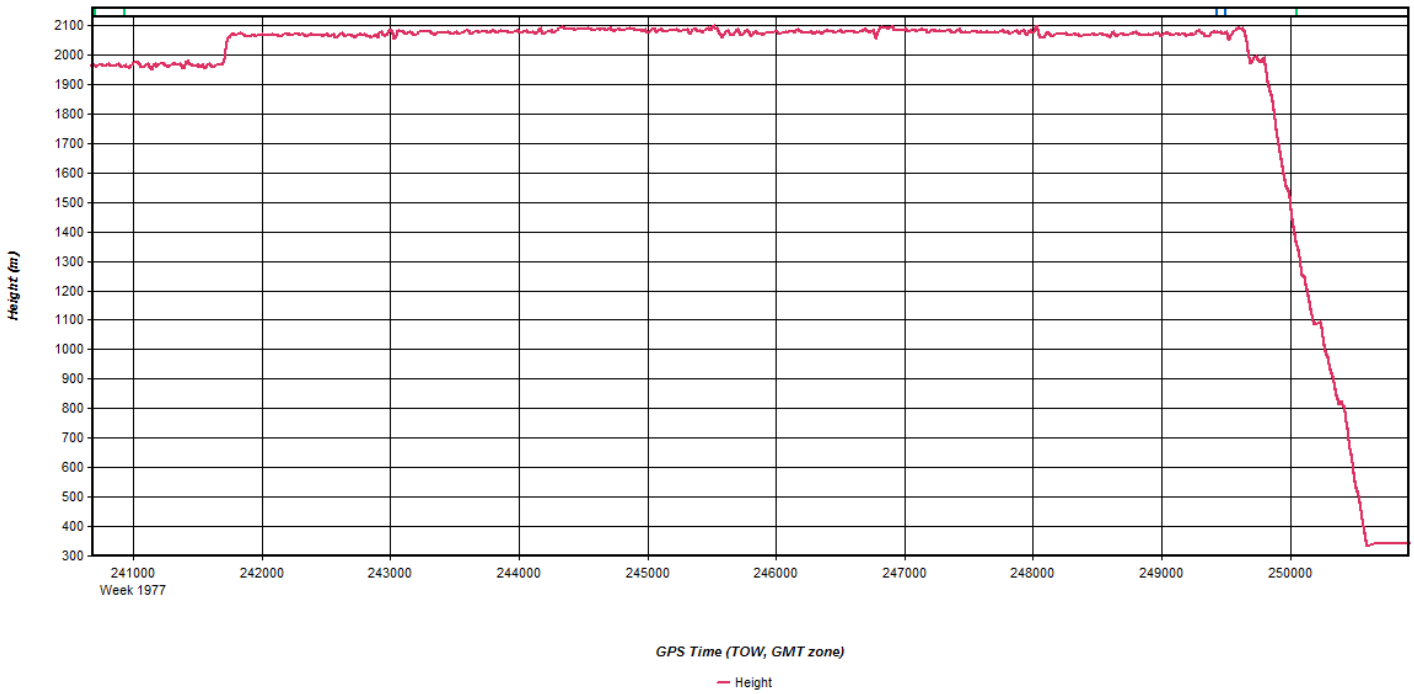

PSU1
ARTK, FWD
ARTK, REV
ARTK, REV
ARTK, FWD
ARTK, FWD
KCI2
5 km

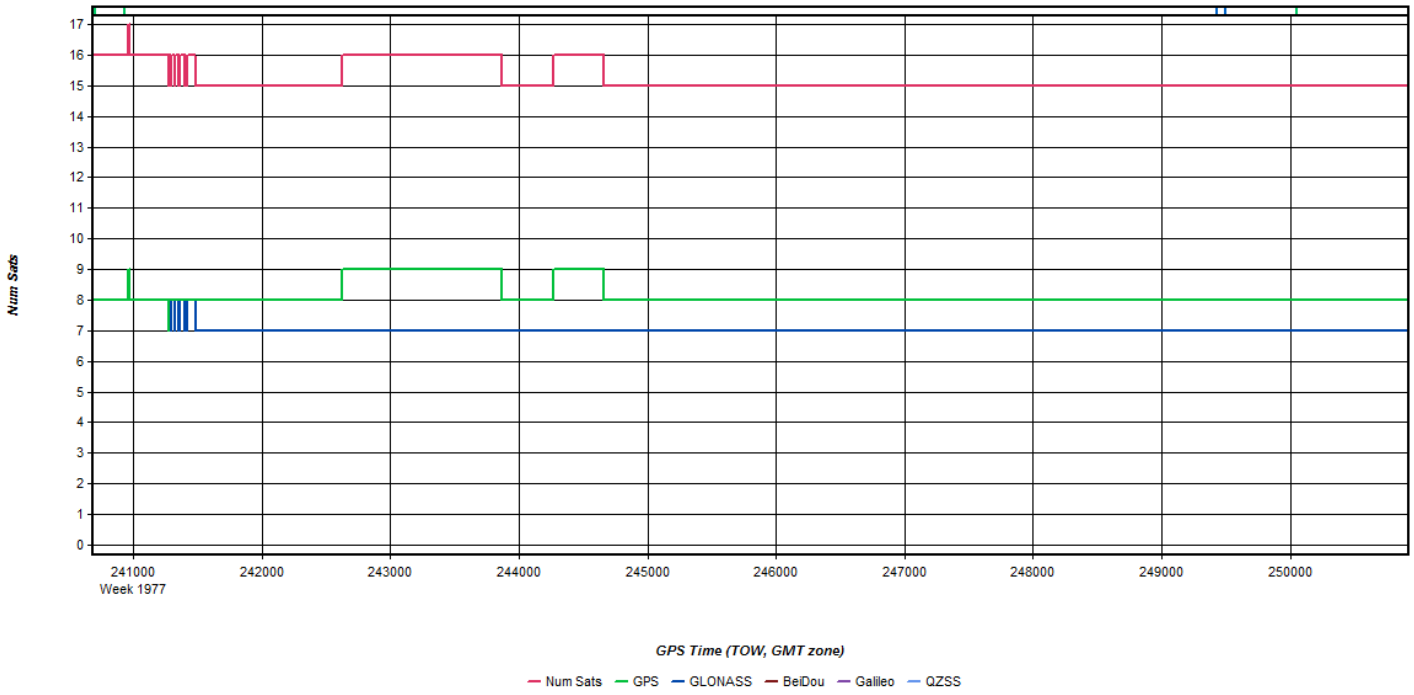

PDOP
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
PDOP

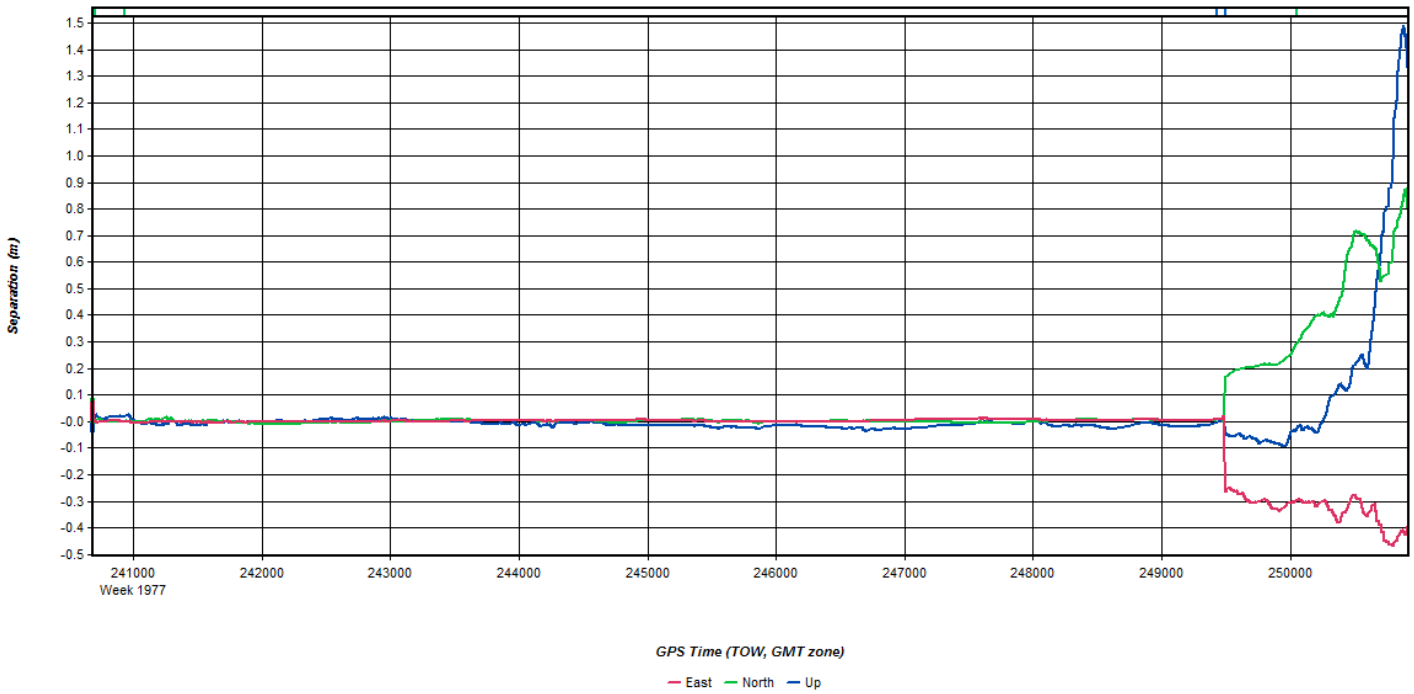

Status
2
1
0
-1
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

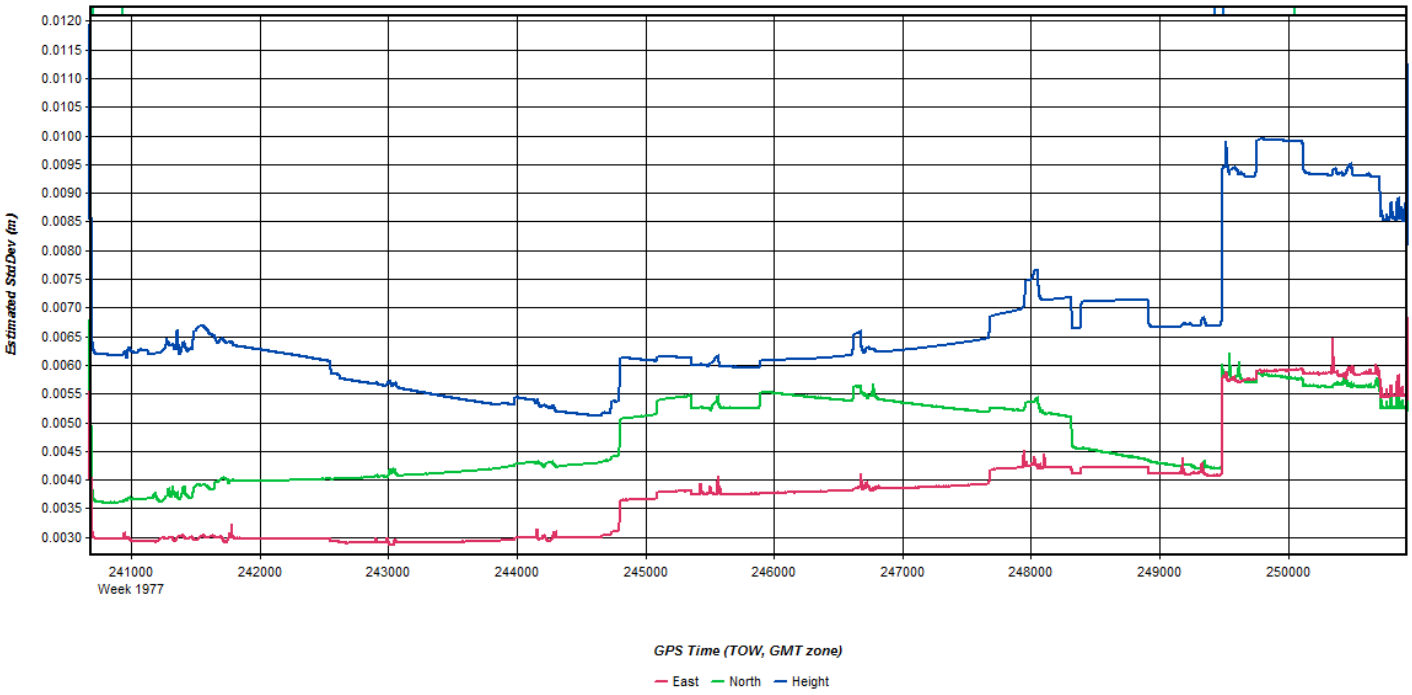

Roll & pitch (deg)
20
15
10
5
0
-5
-10
-15
-20
-25
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
Roll
Pitch

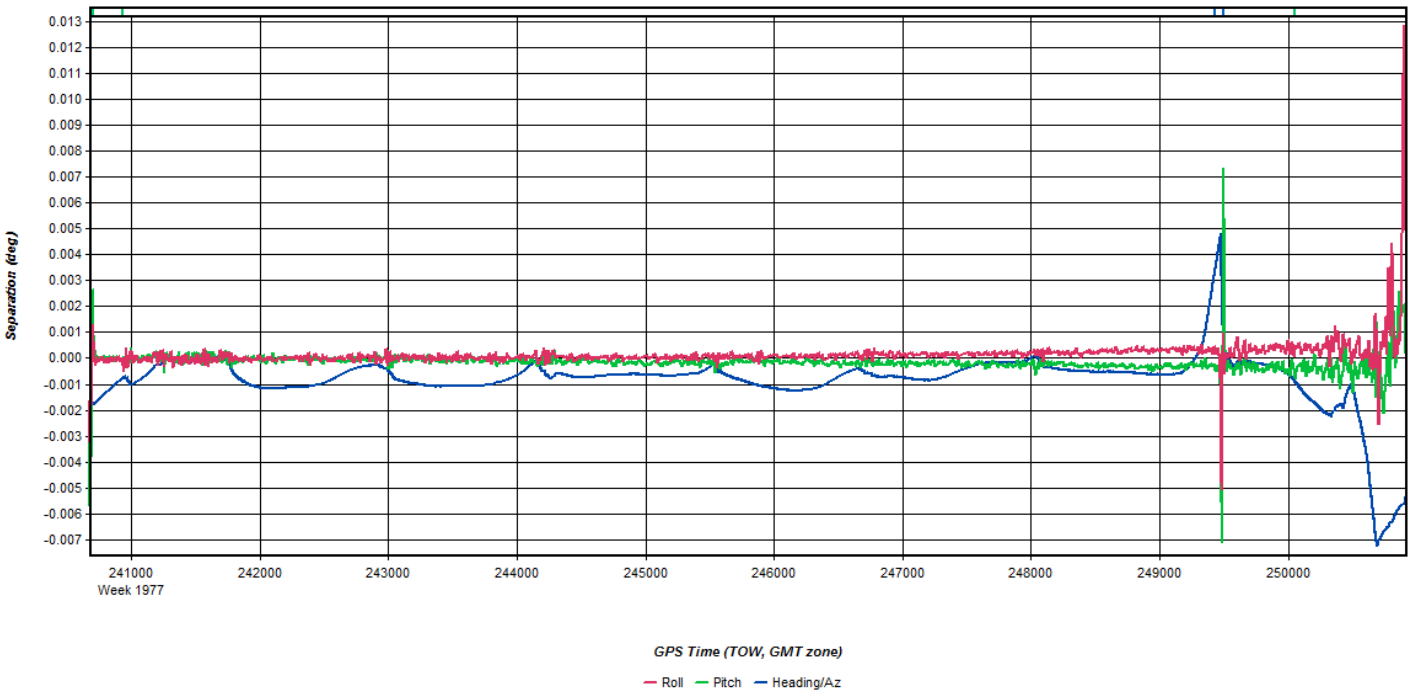

RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
RMS
SD

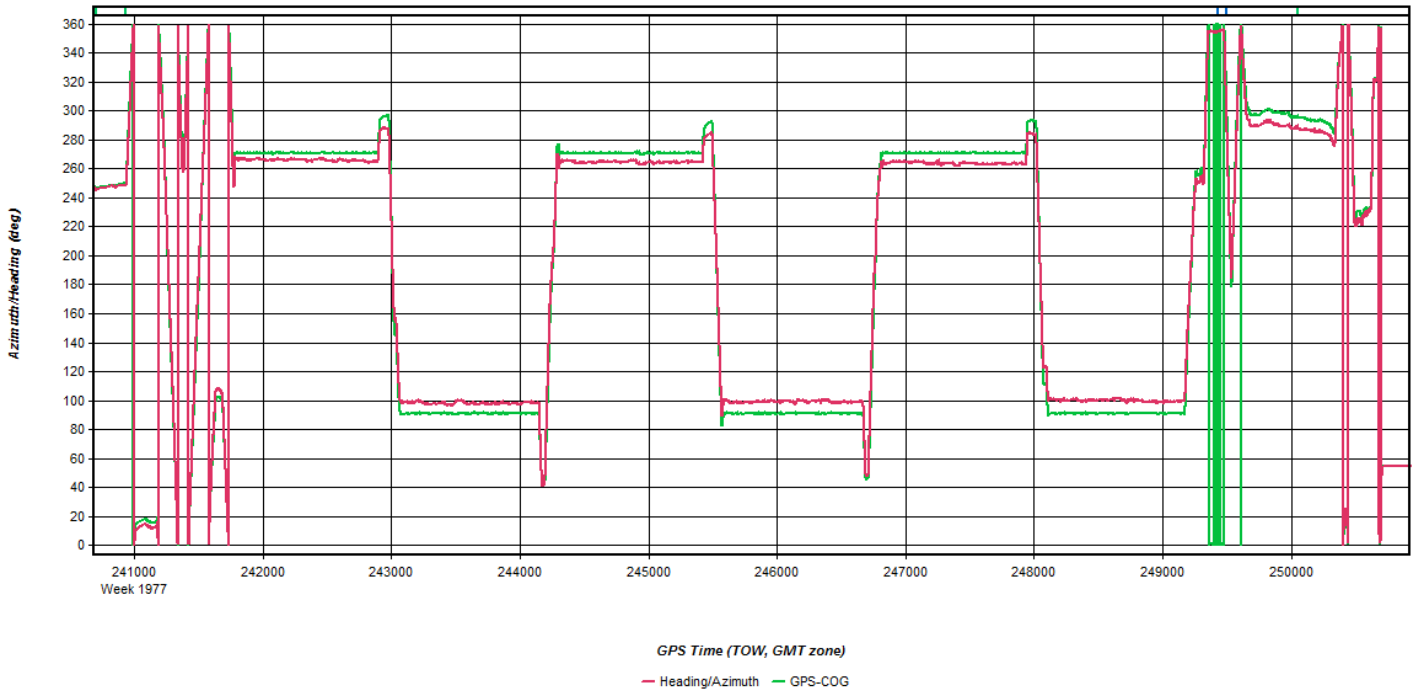

Height (m)
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
Height

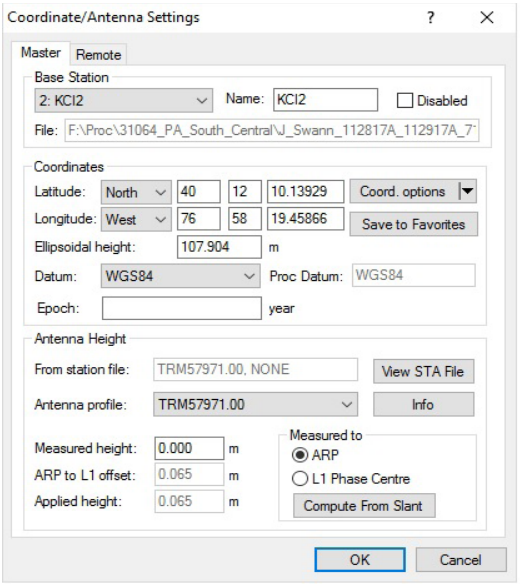

Num Sats
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

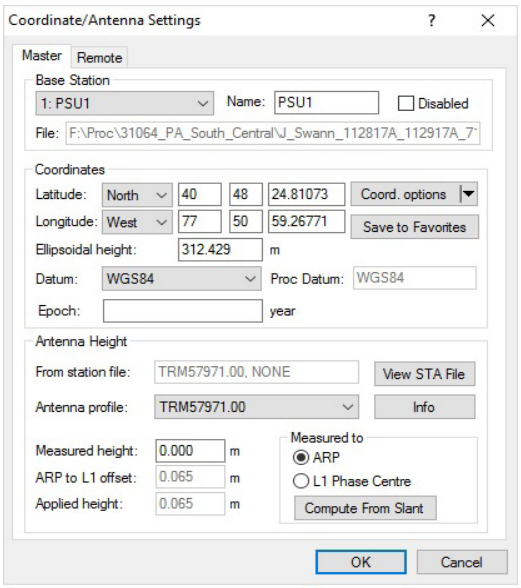

Separation (m)
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
-0.0
-0.1
-0.2
-0.3
-0.4
-0.5
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
East
North
Height

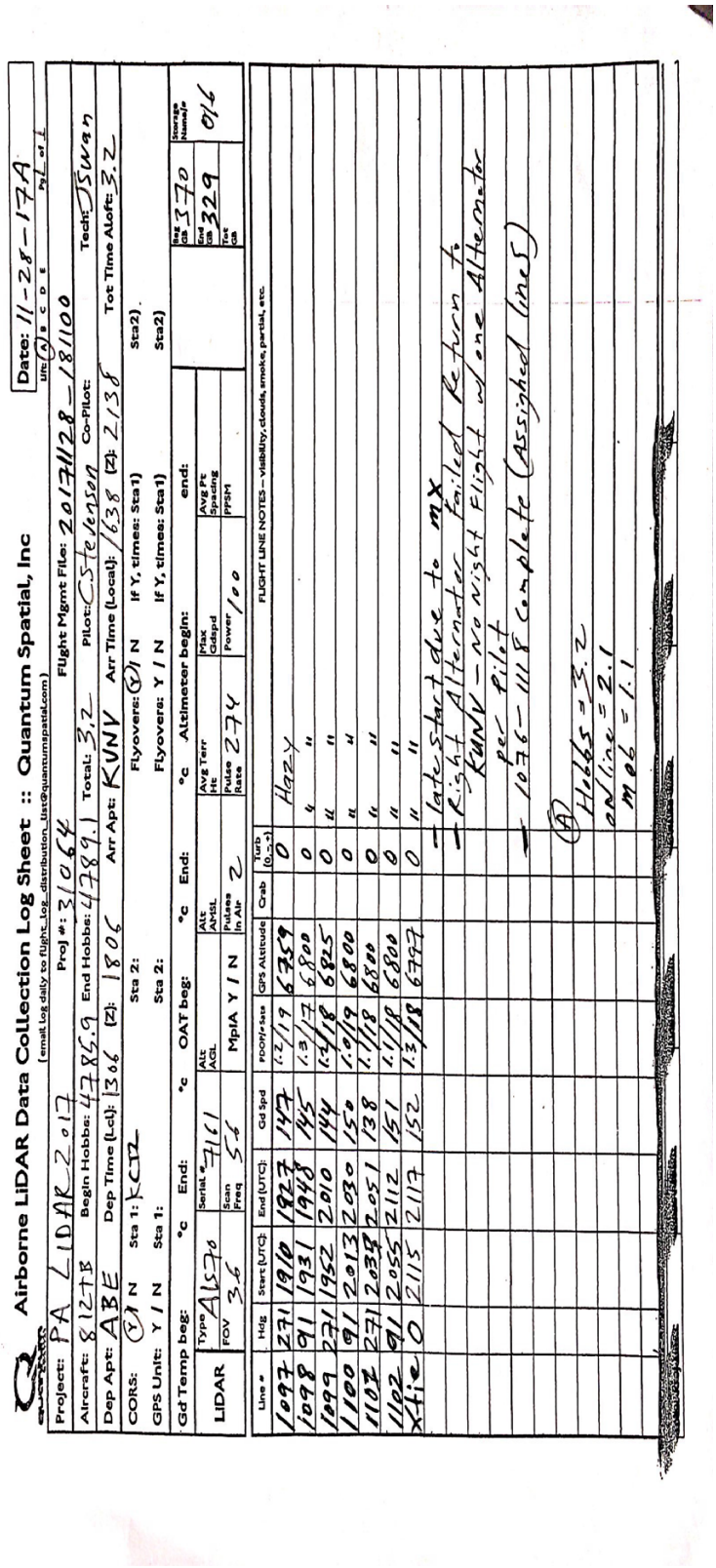

Separation (deg)
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
-0.007
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
241000
Week 1977
242000
243000
244000
245000
246000
247000
248000
249000
250000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
2: KCI2
Name: KCI2
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112817A_112917A_7
Coordinates
Latitude: North 40 12 10.13929
Coord. options
Longitude: West 76 58 19.45866
Save to Favorites
Ellipsoidal height: 107.904 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
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swann_112817A_112917A_7
Coordinates
Latitude: North 40 48 24.81073 Coord. options
Longitude: West 77 50 59.26771 Save to Favorites
Ellipsoidal height: 312.429 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

Flight Log



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

Date: 11-28-17A

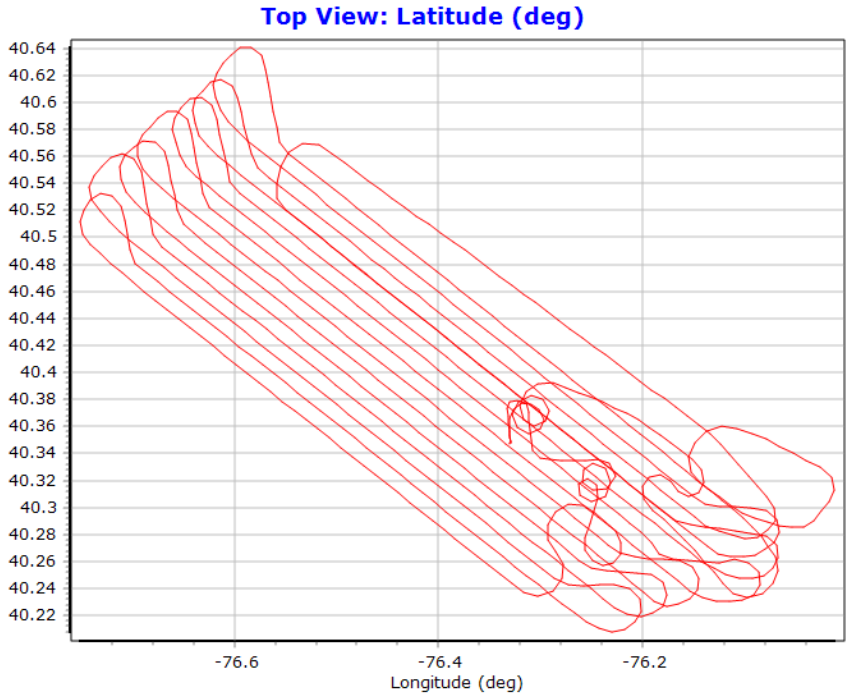
Project: PA LIDAR 2017 Proj #: 31064 Flight Mgmt File: 20171128_181100

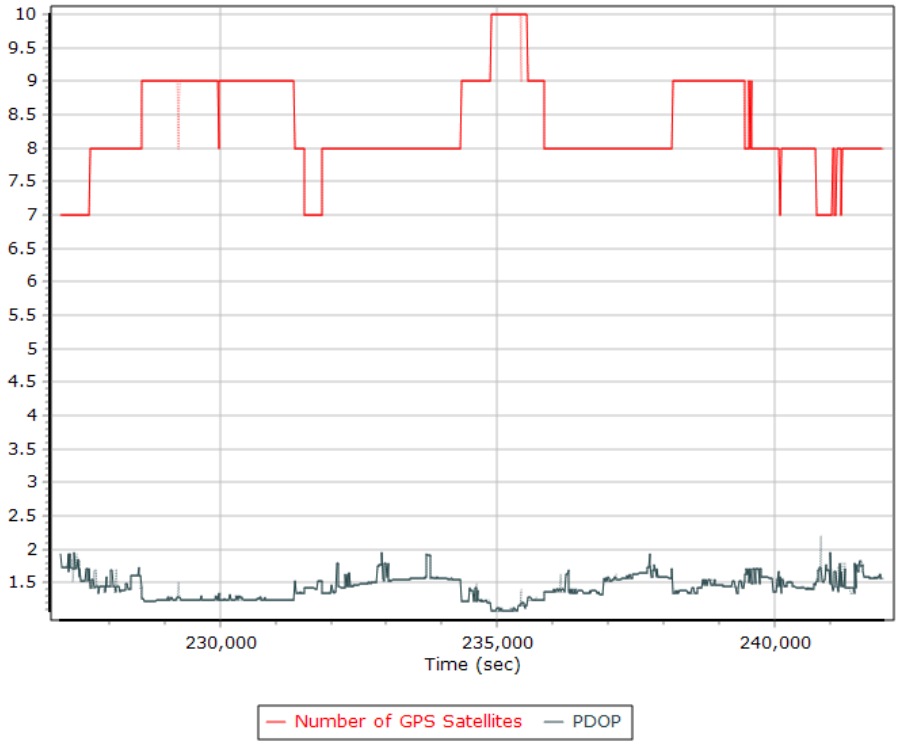
Aircraft: 8127B Begin Hobbs: 4785.9 End Hobbs: 4789.1 Total: 3.2 Pilot: Stevenson Co-Pilot: Tech: JSwan

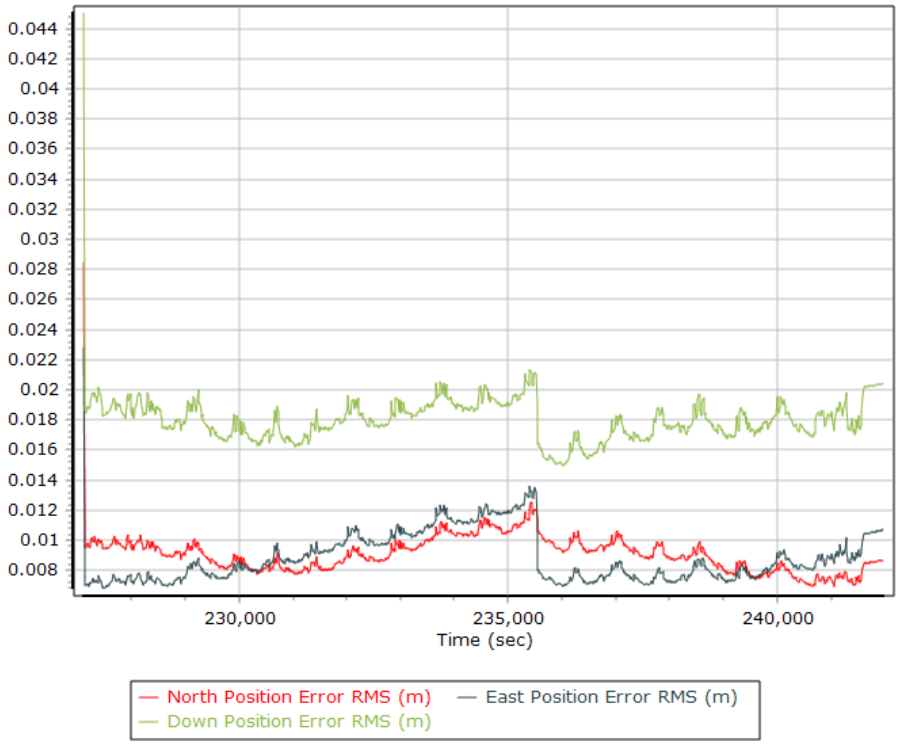
Dep Apt: ABE Dep Time (Lcl): 1306 (Z): 1805 Arr Apt: KUNV Arr Time (Local): 1638 (Z): 2138 Tot Time Aloft: 3.2

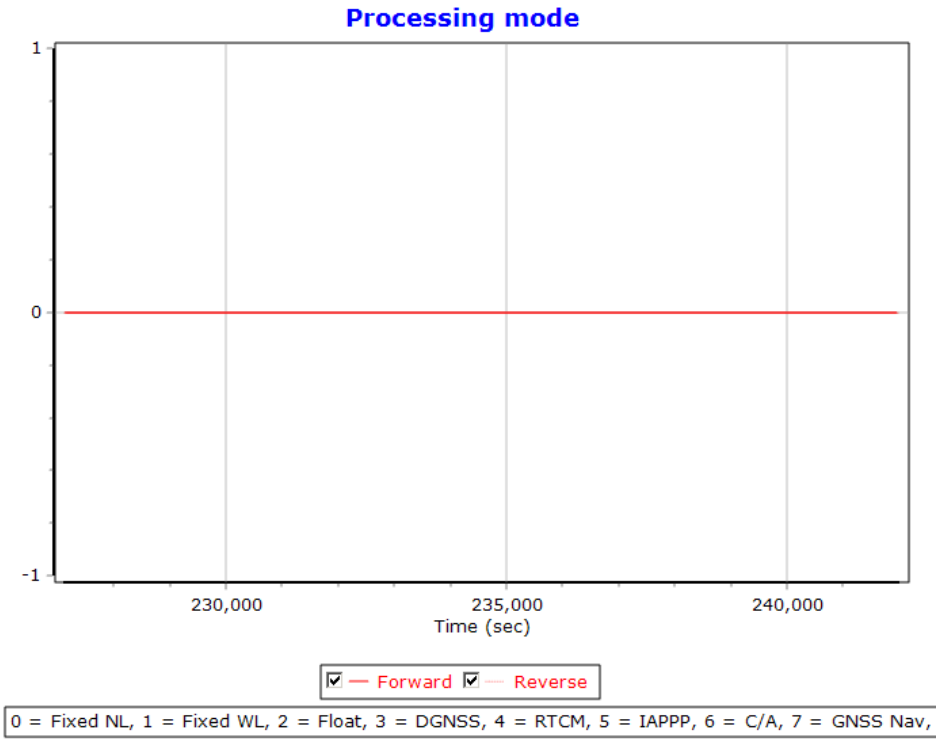
| | | |

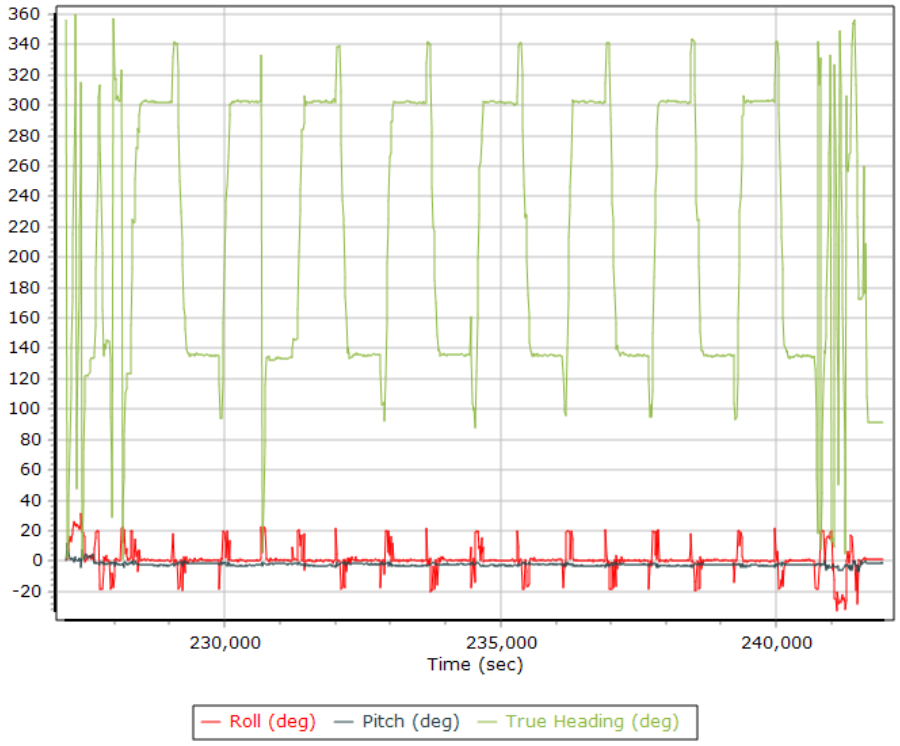
November 28, 2017-A (N1107Q, SN1256)

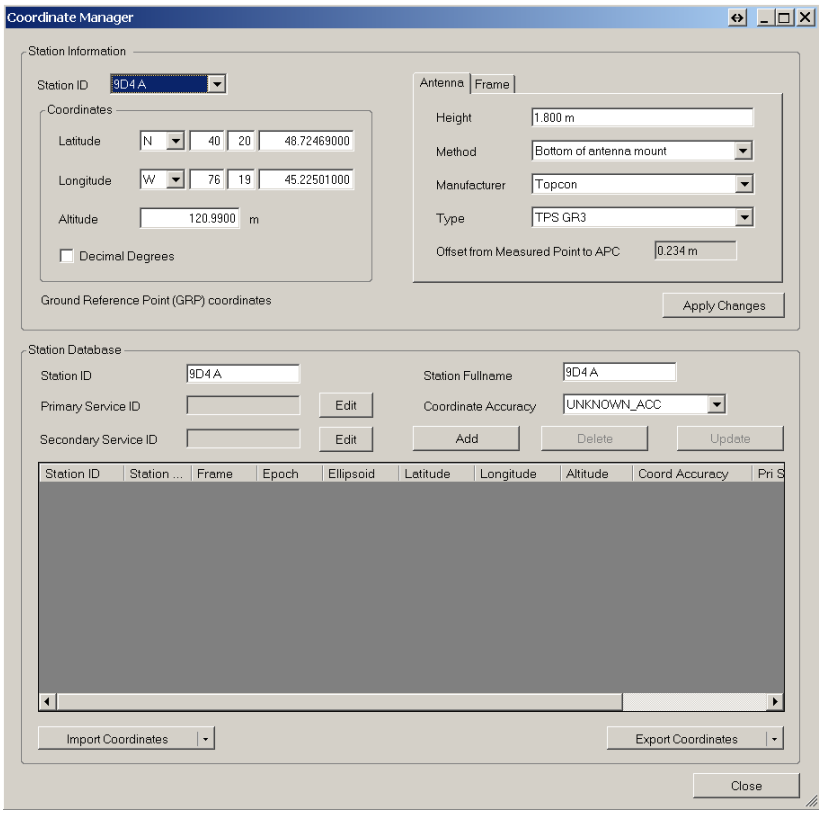

Top View: Latitude (deg)
40.64
40.62
40.6
40.58
40.56
40.54
40.52
40.5
40.48
40.46
40.44
40.42
40.4
40.38
40.36
40.34
40.32
40.3
40.28
40.26
40.24
40.22
-76.6
-76.4
-76.2
Longitude (deg)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
230,000
235,000
240,000
Time (sec)
Number of GPS Satellites
PDOP


0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
230,000
235,000
240,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


Processing mode
1
0
-1
230,000
235,000
240,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
230,000
235,000
240,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Coordinate Manager
Station Information
Station ID
9D4 A
Coordinates
Latitude
N
40
20
48.72469000
Longitude
W
76
19
45.22501000
Altitude
120.9900
m
Decimal Degrees
Ground Reference Point (GRP) coordinates
Antenna
Frame
Height
1.800 m
Method
Bottom of antenna mount
Manufacturer
Topcon
Type
TPS GR3
Offset from Measured Point to APC
0.234 m
Apply Changes
Station Database
Station ID
9D4 A
Station Fullname
9D4 A
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Import Coordinates
Export Coordinates
Close

Flight Log

Flight Log

Field Crew		GPS Information		Meteorological Conditions		
Jonathan	Project # 20170231:1	Base 1 904 A	Airport	Elevation 510.6ft	Temp	Pressure
Alex	Project Description	Base 2	@ Altitude			
Travois		Base 3	@ Altitude			
	PA South Addon LiDAR	Aero 2	@ Altitude		#REF!	

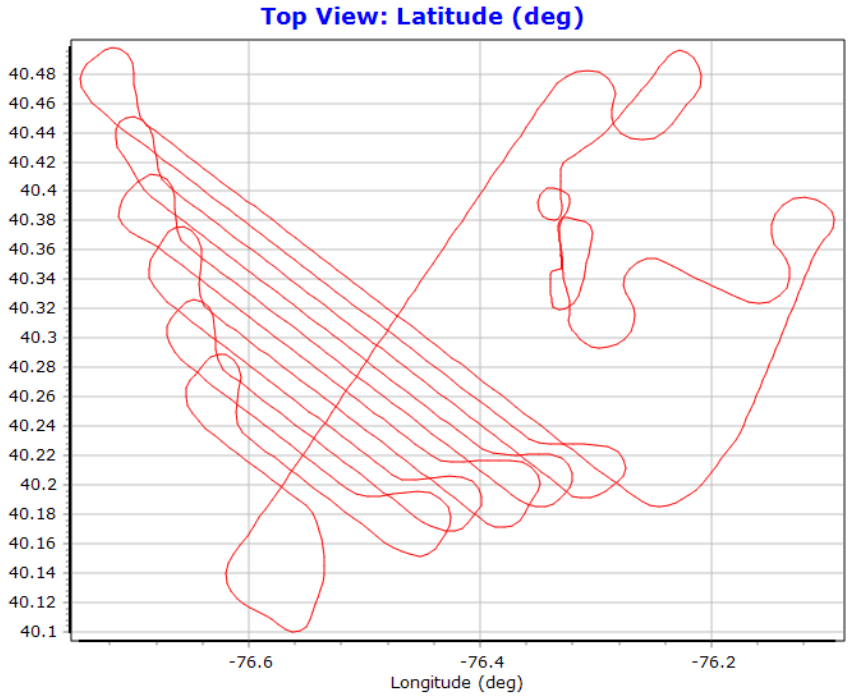
Location	IMU Information	GPS Base Station Information			Ant Type
Lebanon, PA	Start Time		File Name	RNX File	Ant Hgt	
Aircraft		Base 1	log1128o.tps		1.8	GR3
N1107Q	Stop Time	Base 2				
		Base 3				

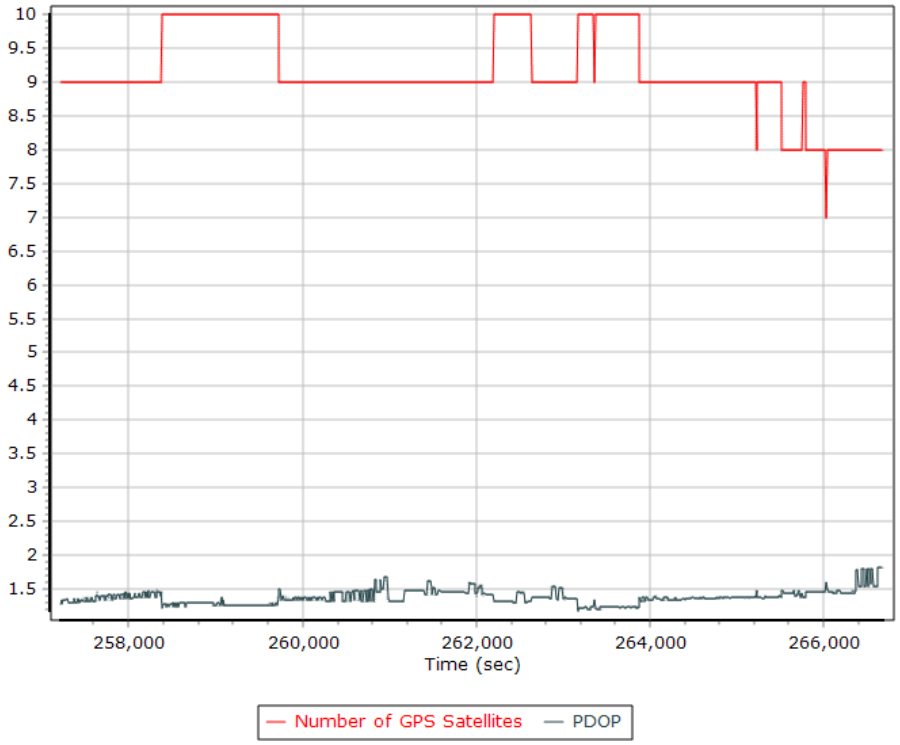
Flight Date	Pilot	Operator
11/28/2017	Travois	Alex

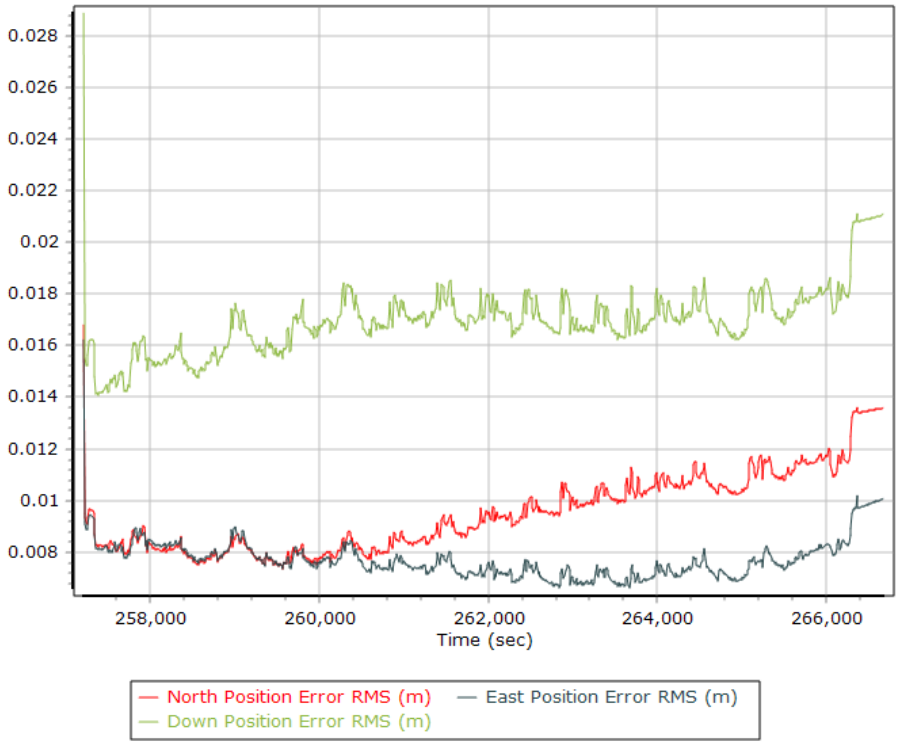
Line/Dir	Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed		Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
3000	15:28:13	15:37:28	0:09:15	6,324					160 kts	184 mph	28.39			
3001	15:42:24	15:51:39	0:09:15	6,324					160 kts	184 mph	28.39			
3002	16:17:37	16:26:50	0:09:13	6,324					160 kts	184 mph	28.28			
3003	16:31:12	16:40:27	0:09:15	6,324					160 kts	184 mph	28.39			
3004	16:45:02	16:54:12	0:09:10	6,324					160 kts	184 mph	28.13			
3005	16:58:22	17:07:34	0:09:12	6,324					160 kts	184 mph	28.23			
3006	17:12:38	17:21:47	0:09:09	6,324					160 kts	184 mph	28.08			
3007	17:26:31	17:35:36	0:09:05	6,324					160 kts	184 mph	27.87			
3008	17:39:29	17:48:28	0:08:59	6,324					160 kts	184 mph	27.57			
3009	17:52:35	18:01:33	0:08:58	6,324					160 kts	184 mph	27.52			
3010	18:05:14	18:14:02	0:08:48	6,324					160 kts	184 mph	27.00			
3011	18:18:19	18:27:10	0:08:51	6,324					160 kts	184 mph	27.16			
3012	18:31:00	18:39:40	0:08:40	6,324					160 kts	184 mph	26.60			
3013	18:43:31	18:51:49	0:08:18	6,324					160 kts	184 mph	25.47			

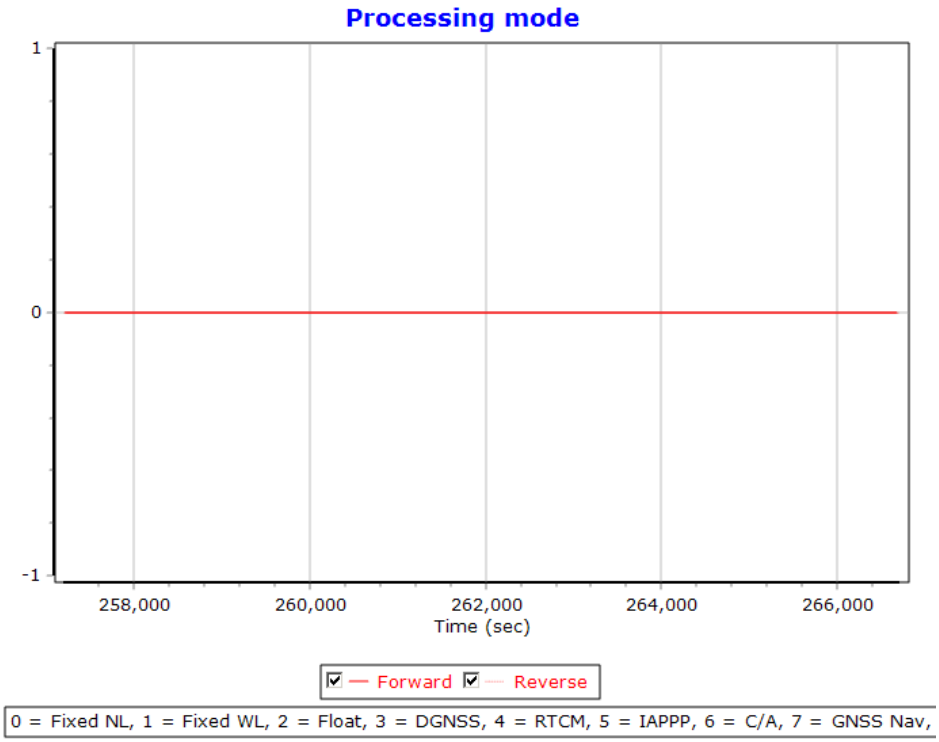
DMC FLIGHT SUMMARY				Data Collection		Comments	Weather
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0	Percent Complete	100.0%		☑ Clear
DMC Data Collection Time:	2:06:08	Miles Flown on Flights:	387.07	Total Flight Lines	1491		☐ Fair
Hobbs Start Time	1000			Lines Complete	1491		☐ Partly Cloudy
Hobbs Stop Time	1003.3	Hobbs Total Time	3.3	Lines Completed Today	1112		☐ Cloudy

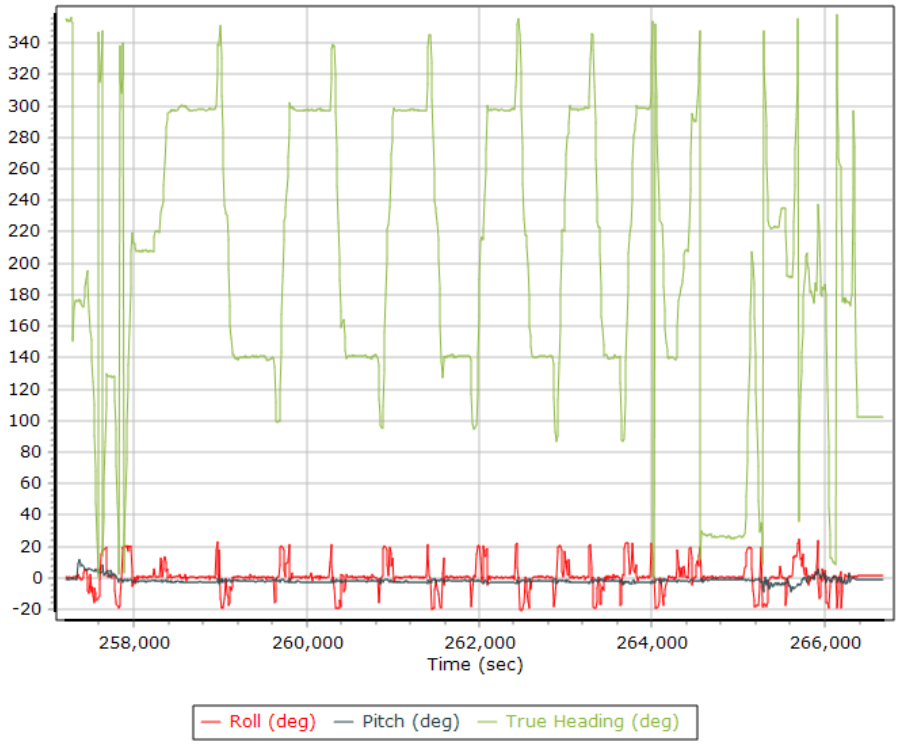
November 28, 2017-B (N1107Q, SN1256)

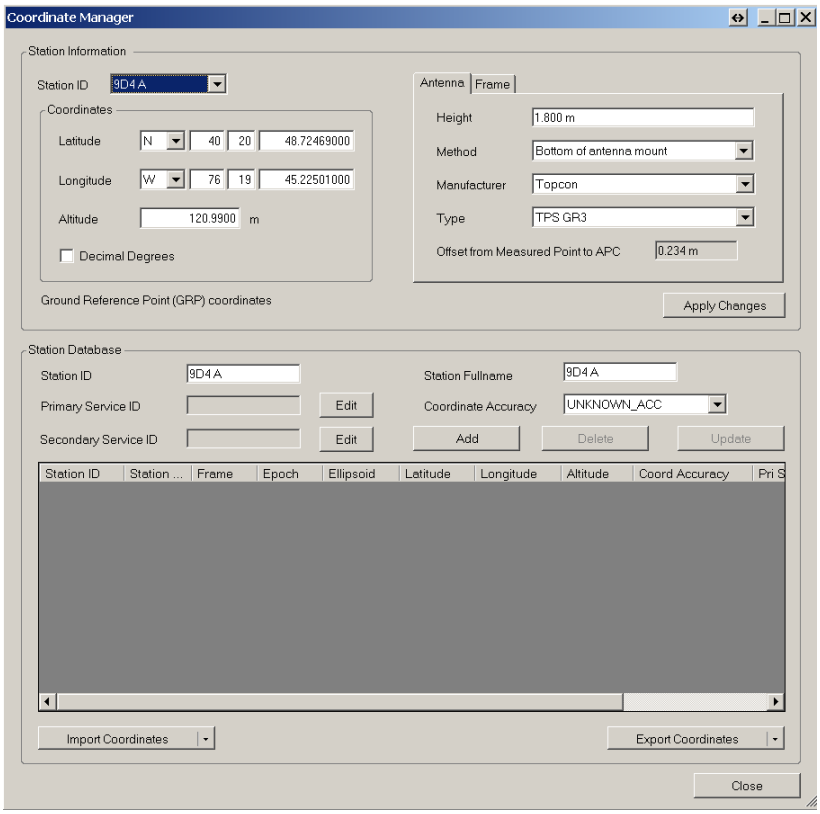

Top View: Latitude (deg)
40.48
40.46
40.44
40.42
40.4
40.38
40.36
40.34
40.32
40.3
40.28
40.26
40.24
40.22
40.2
40.18
40.16
40.14
40.12
40.1
-76.6
-76.4
-76.2
Longitude (deg)


10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
258,000
260,000
262,000
264,000
266,000
Time (sec)
Number of GPS Satellites
PDOP


0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
258,000
260,000
262,000
264,000
266,000
Time (sec)
North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)


Processing mode
1
0
-1
258,000
260,000
262,000
264,000
266,000
Time (sec)
Forward
Reverse
0 = Fixed NL, 1 = Fixed WL, 2 = Float, 3 = DGNSS, 4 = RTCM, 5 = IAPPP, 6 = C/A, 7 = GNSS Nav,


340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
258,000
260,000
262,000
264,000
266,000
Time (sec)
Roll (deg)
Pitch (deg)
True Heading (deg)


Coordinate Manager
Station Information
Station ID
9D4 A
Coordinates
Latitude
N
40
20
48.72469000
Longitude
W
76
19
45.22501000
Altitude
120.9900
m
Decimal Degrees
Ground Reference Point (GRP) coordinates
Antenna
Frame
Height
1.800 m
Method
Bottom of antenna mount
Manufacturer
Topcon
Type
TPS GR3
Offset from Measured Point to APC
0.234 m
Apply Changes
Station Database
Station ID
9D4 A
Station Fullname
9D4 A
Primary Service ID
Edit
Coordinate Accuracy
UNKNOWN_ACC
Secondary Service ID
Edit
Add
Delete
Update
Station ID
Station ...
Frame
Epoch
Ellipsoid
Latitude
Longitude
Altitude
Coord Accuracy
Pri S
Import Coordinates
Export Coordinates
Close

Flight Log

Flight Log

Field Crew	
Jonathan	
Alex	
Travois	

Project #	20170231:1
Project Description	
PA South Addon LiDAR	

GPS Information	
Base 1	9D4 A
Base 2	
Base 3	
Aero 2	

Meteorological Conditions			
	Elevation	Temp	Pressure
Airport	510.6ft		
@ Altitude			
@ Altitude		#REF!	

IMU Information	
Start Time	
Stop Time	

GPS Base Station Information			
	File Name	RNX File	Ant Hgt
Base 1	log1128w.tps		1.8
Base 2			
Base 3			

Ant Type
GR3

Location
Lebanon, PA

Aircraft
N1107Q

Flight Date	Pilot	Operator
11/28/2017	Travois	Alex

Line/Dir	Start	Stop	Total Time	Altitude	First Photo #	Last Photo #	Invalidated Photos	# of Photos	Speed		Miles (Calc)	Miles (Actual)	Void "Y"	Conditions/Comments
3014	0:29:11	0:37:03	0:07:52	6,324					160 kts	184 mph	24.14			
3015	0:41:10	0:48:15	0:07:05	6,324					160 kts	184 mph	21.74			
3016	0:52:23	0:59:02	0:06:39	6,324					160 kts	184 mph	20.41			
3017	1:02:25	1:08:18	0:05:53	6,324					160 kts	184 mph	18.05			
3018	1:12:23	1:17:41	0:05:18	6,324					160 kts	184 mph	16.26			
3019	1:21:39	1:26:11	0:04:32	6,324					160 kts	184 mph	13.91			
3020	1:30:42	1:34:46	0:04:04	6,324					160 kts	184 mph	12.48			
3021	1:38:50	1:42:07	0:03:17	6,324					160 kts	184 mph	10.08			
3022	1:46:09	1:49:01	0:02:52	6,324					160 kts	184 mph	8.80			
3023	1:52:43	1:54:58	0:02:15	6,324					160 kts	184 mph	6.90			
3024	1:59:09	2:00:51	0:01:42	6,324					160 kts	184 mph	5.22			
3025	2:04:56	2:05:59	0:01:03	6,324					160 kts	184 mph	3.22			
3026	2:11:27	2:18:55	0:07:28	6,324					160 kts	184 mph	22.91			

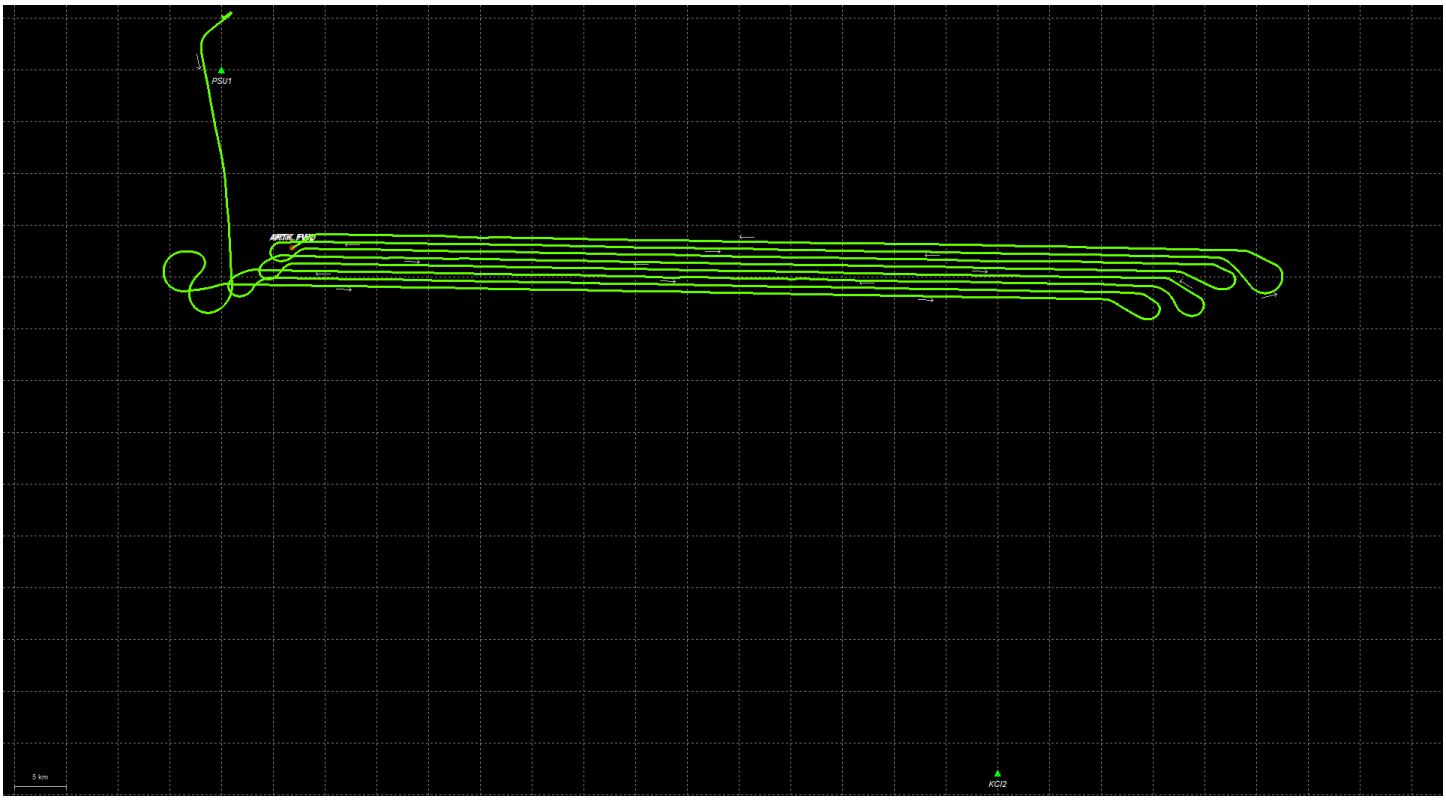
DMC FLIGHT SUMMARY							
Approximate Aircraft Flight Time:	0:00:00	Total # of Photo's	0	Percent Complete	100.0%	Lines Completed Today	1112
DMC Data Collection Time:	1:00:00	Miles Flown on Flights:	184.12	Total Flight Lines	1491		
Hobbs Start Time	1000	Hobbs Total Time	3.3	Lines Complete	1491		
Hobbs Stop Time	1003.3						

Data Collection

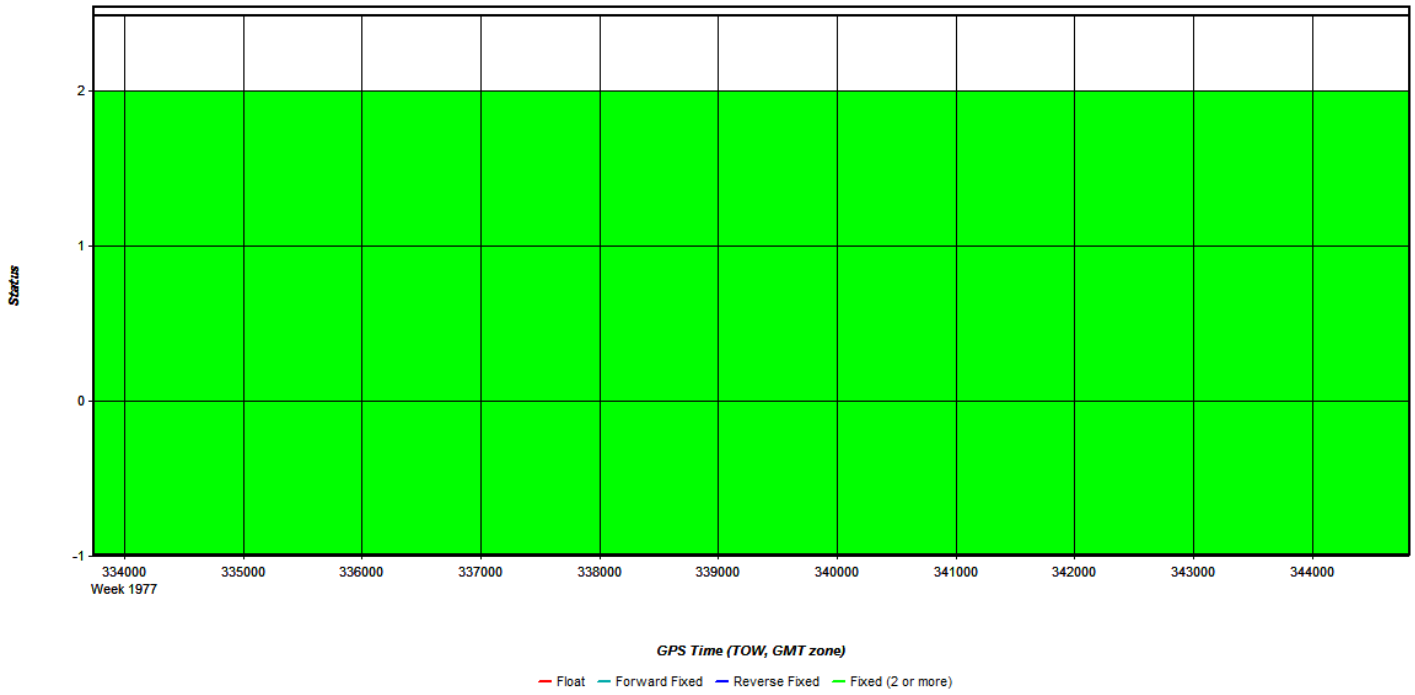
Comments

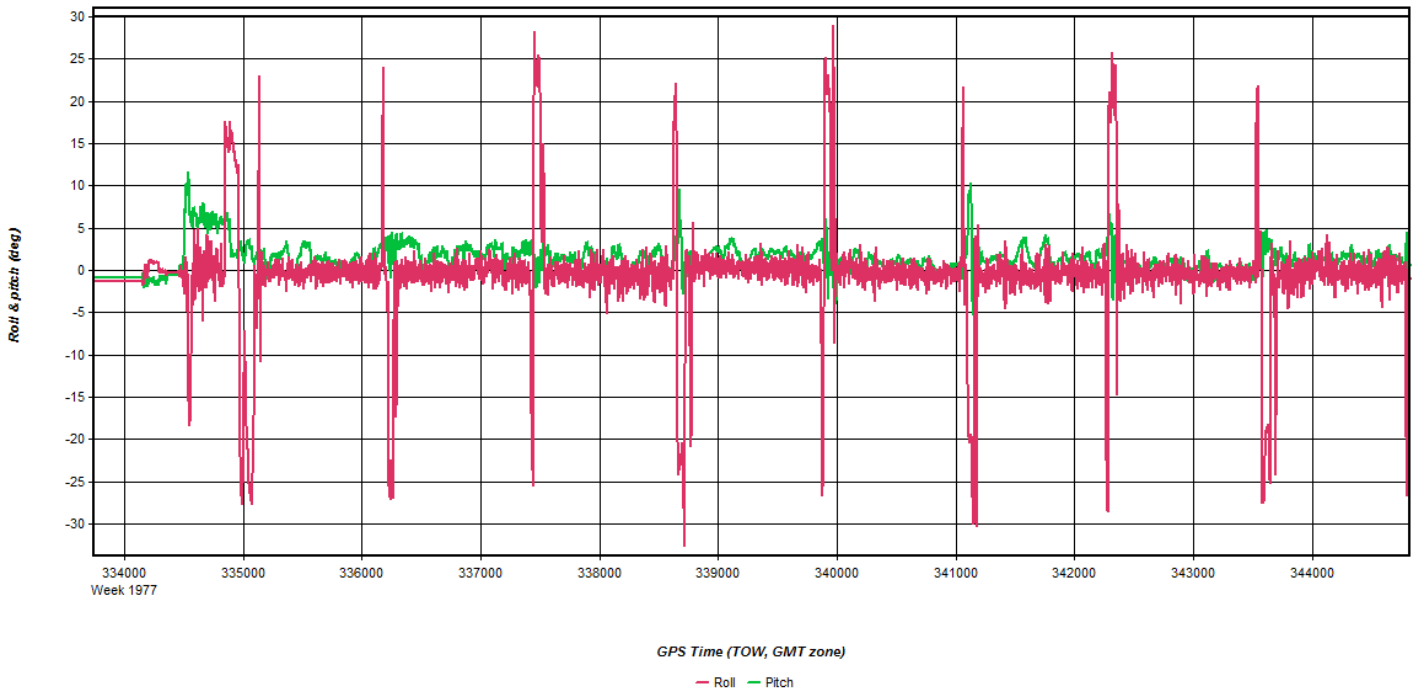
Weather
☑ Clear
☐ Fair
☐ Partly Cloudy
☐ Cloudy

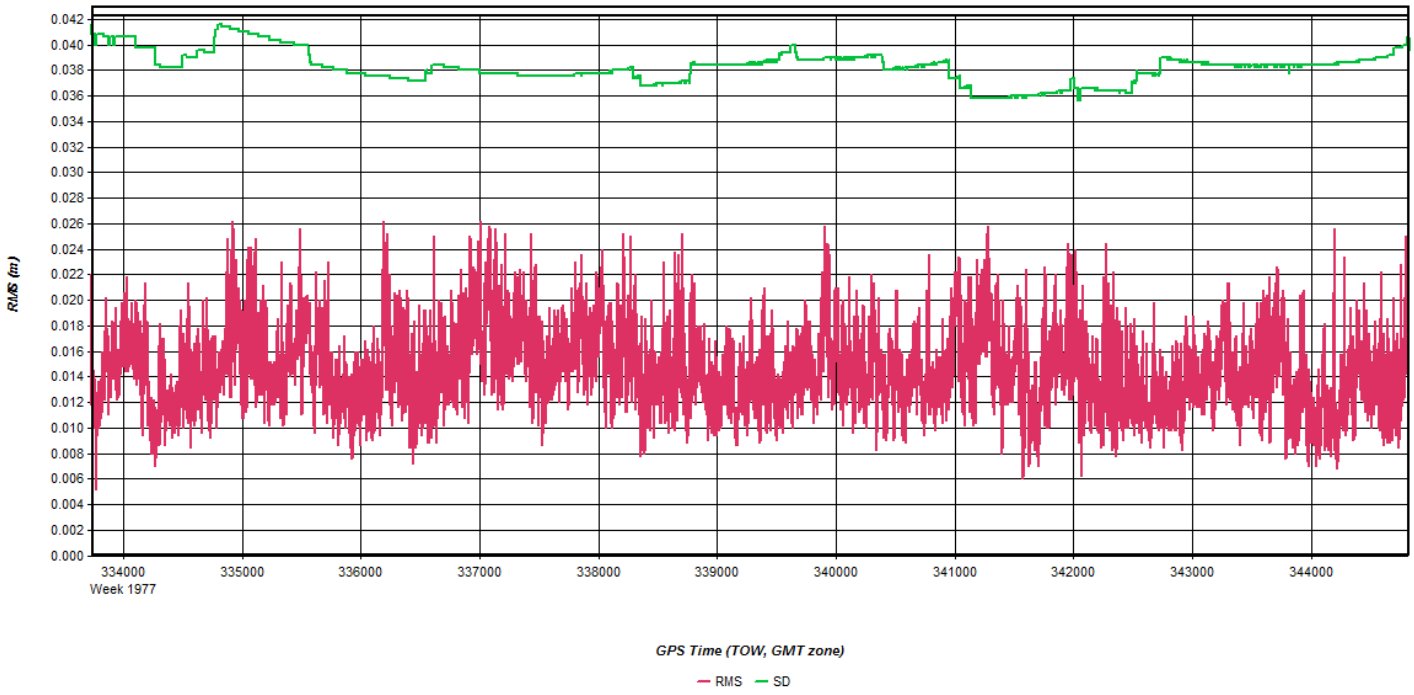
November 29, 2017-A (N812TB, SN7161)

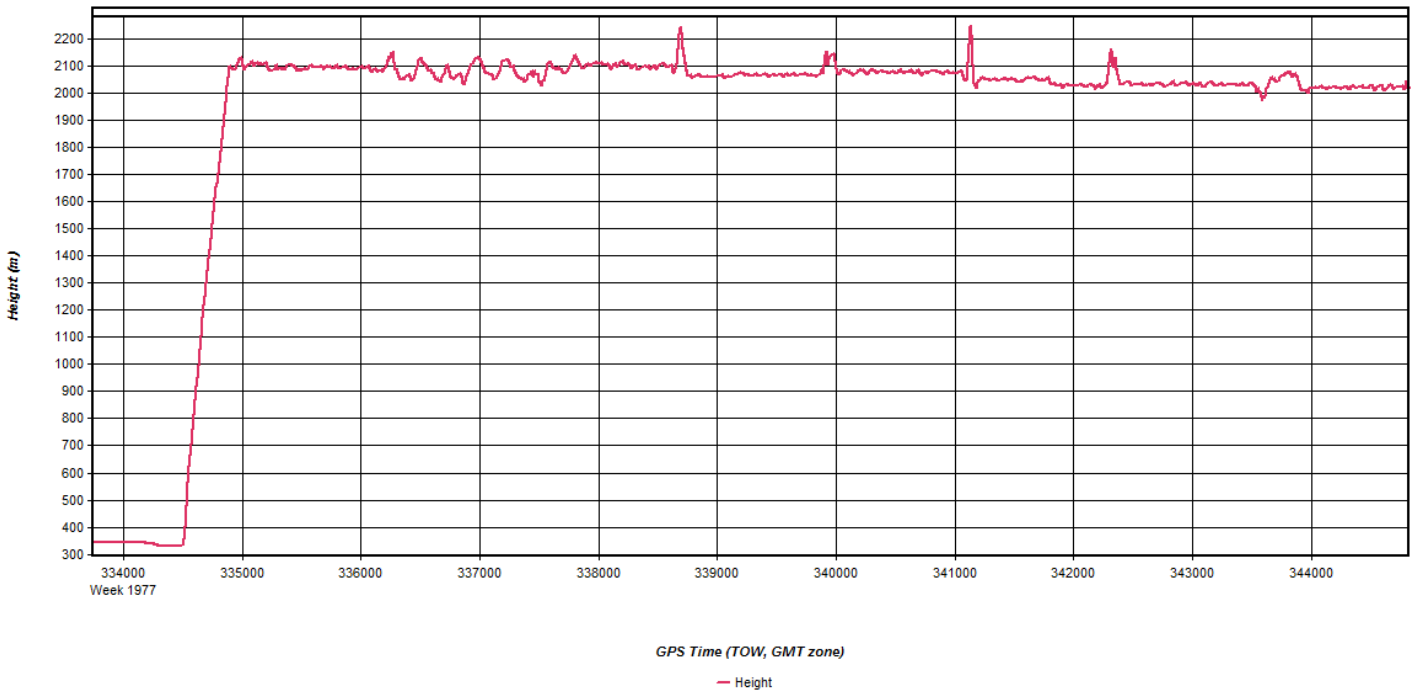

PSU1
KCI2
5 km

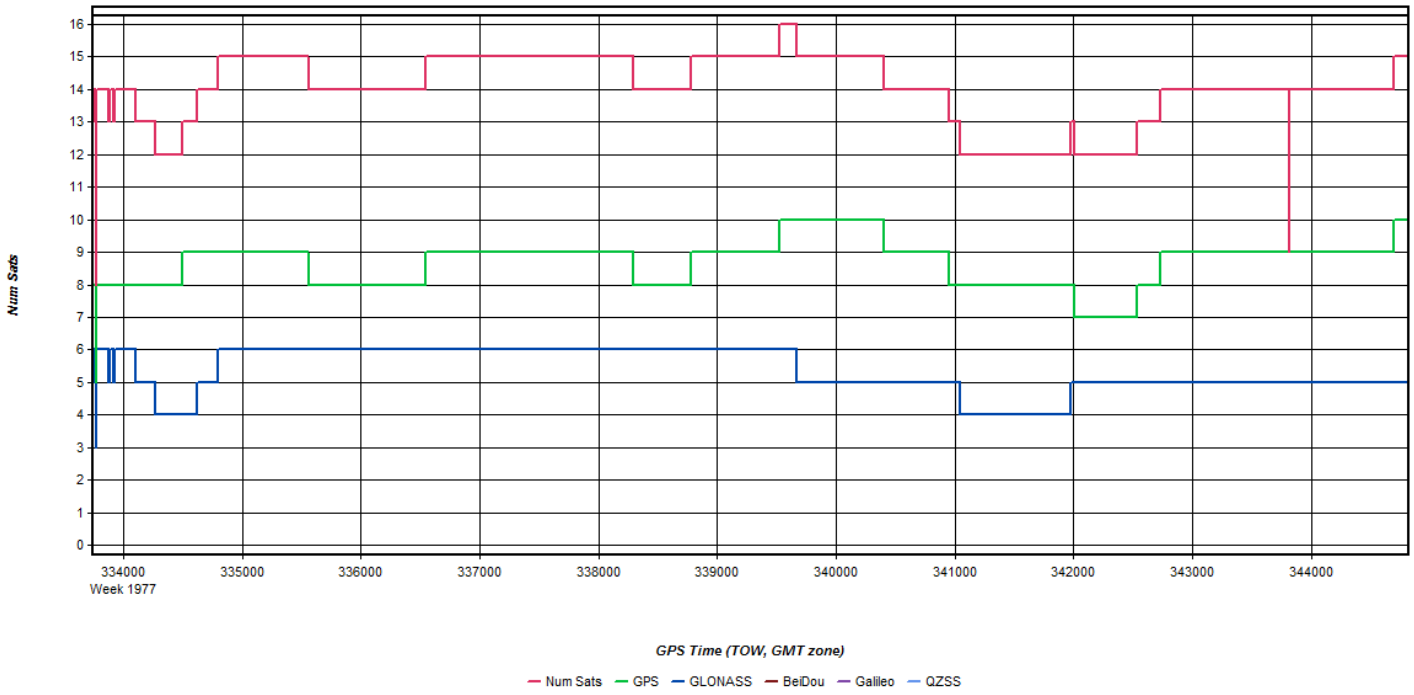

PDOP
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
PDOP

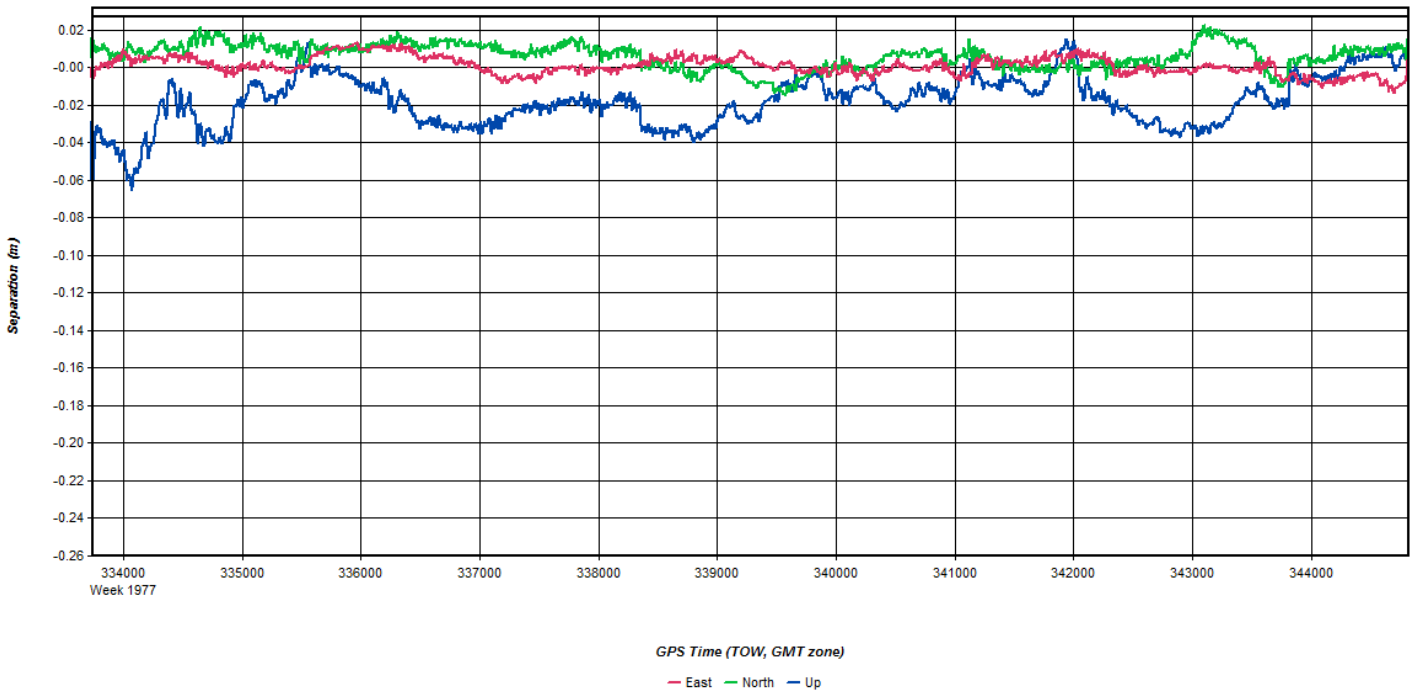

Status
2
1
0
-1
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

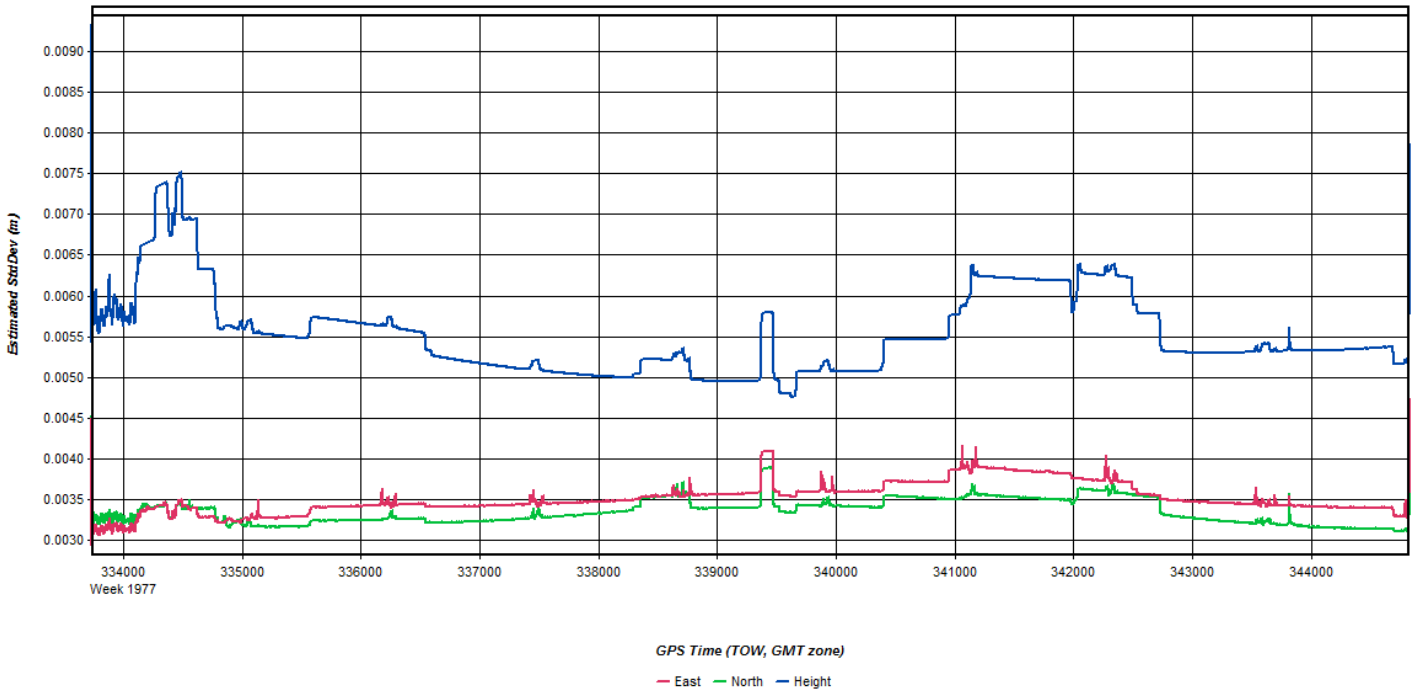

Roll & pitch (deg)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
Roll
Pitch

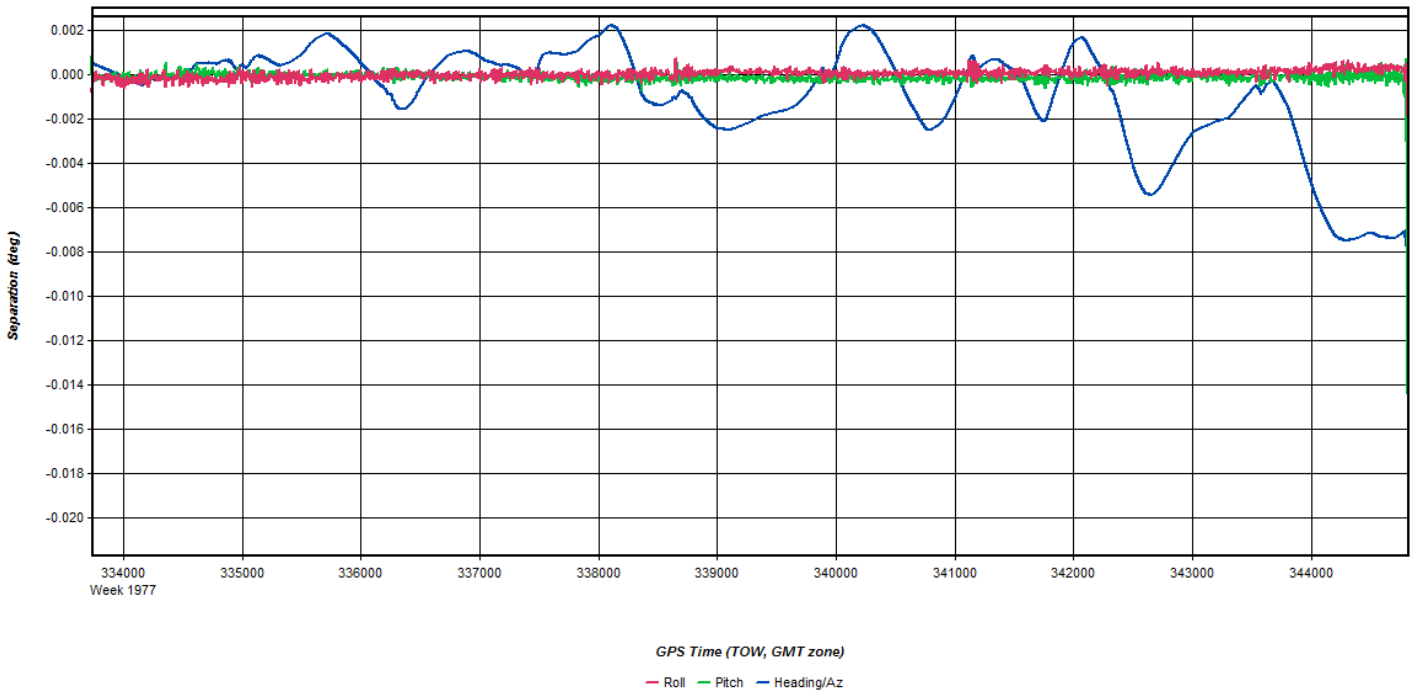

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
RMS
SD

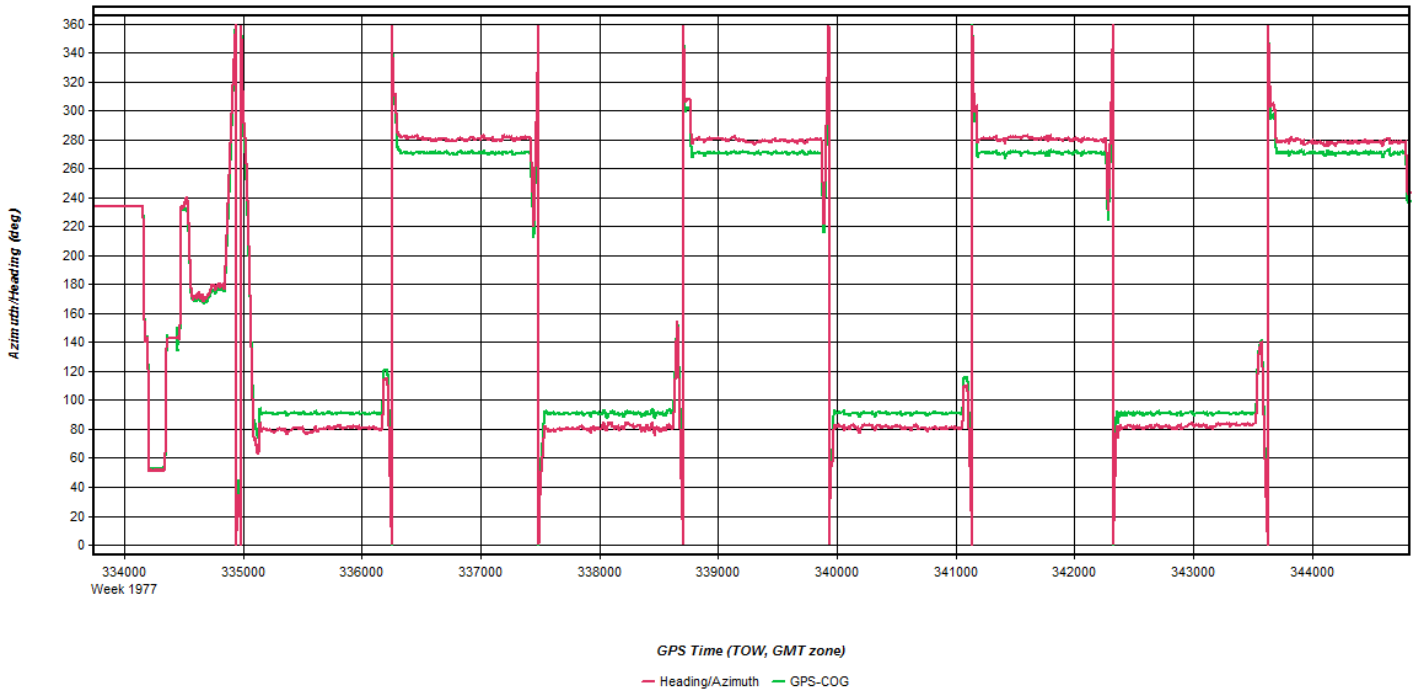

Height (m)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
Height

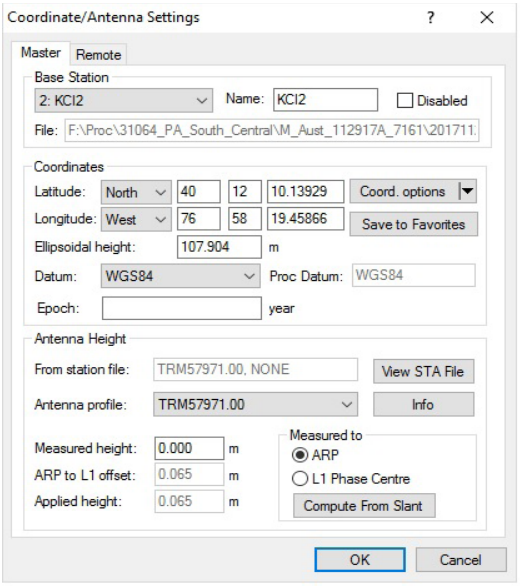

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

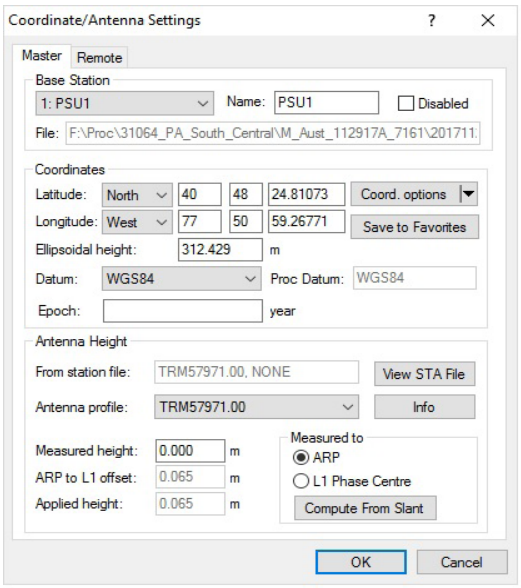

Separation (m)
0.02
-0.00
-0.02
-0.04
-0.06
-0.08
-0.10
-0.12
-0.14
-0.16
-0.18
-0.20
-0.22
-0.24
-0.26
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.002
0.000
-0.002
-0.004
-0.006
-0.008
-0.010
-0.012
-0.014
-0.016
-0.018
-0.020
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
334000
Week 1977
335000
336000
337000
338000
339000
340000
341000
342000
343000
344000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
2: KCI2
Name: KCI2
Disabled
File: F:\Proc\31064_PA_South_Central\M_Aust_112917A_7161\201711
Coordinates
Latitude: North 40 12 10.13929
Coord. options
Longitude: West 76 58 19.45866
Save to Favorites
Ellipsoidal height: 107.904 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
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\M_Aust_112917A_7161\201711
Coordinates
Latitude: North 40 48 24.81073 Coord. options
Longitude: West 77 50 59.26771 Save to Favorites
Ellipsoidal height: 312.429 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

Flight Log

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

(email log daily to flight_log_distribution_list@quantumspatial.com)

Date: 11/29/2017

Lift: A B C D E Pg 1 of __

Project: PA LIDAR Proj #: 31064 Flight Mgmt File:

Aircraft: N8127B Begin Hobbs: 47800 End Hobbs: 47937 Total: Pilot: Billingsley Co-Pilot: Tech: Swinford

Dep Apt: KUNV Dep Time (Lcl): 3:45 (Z): 20:45 Arr Apt: KUNV Arr Time (Local): 7:45 (Z): 00:45 Tot Time Aloft: 3.7

COR's: Y / N Sta 1: Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

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

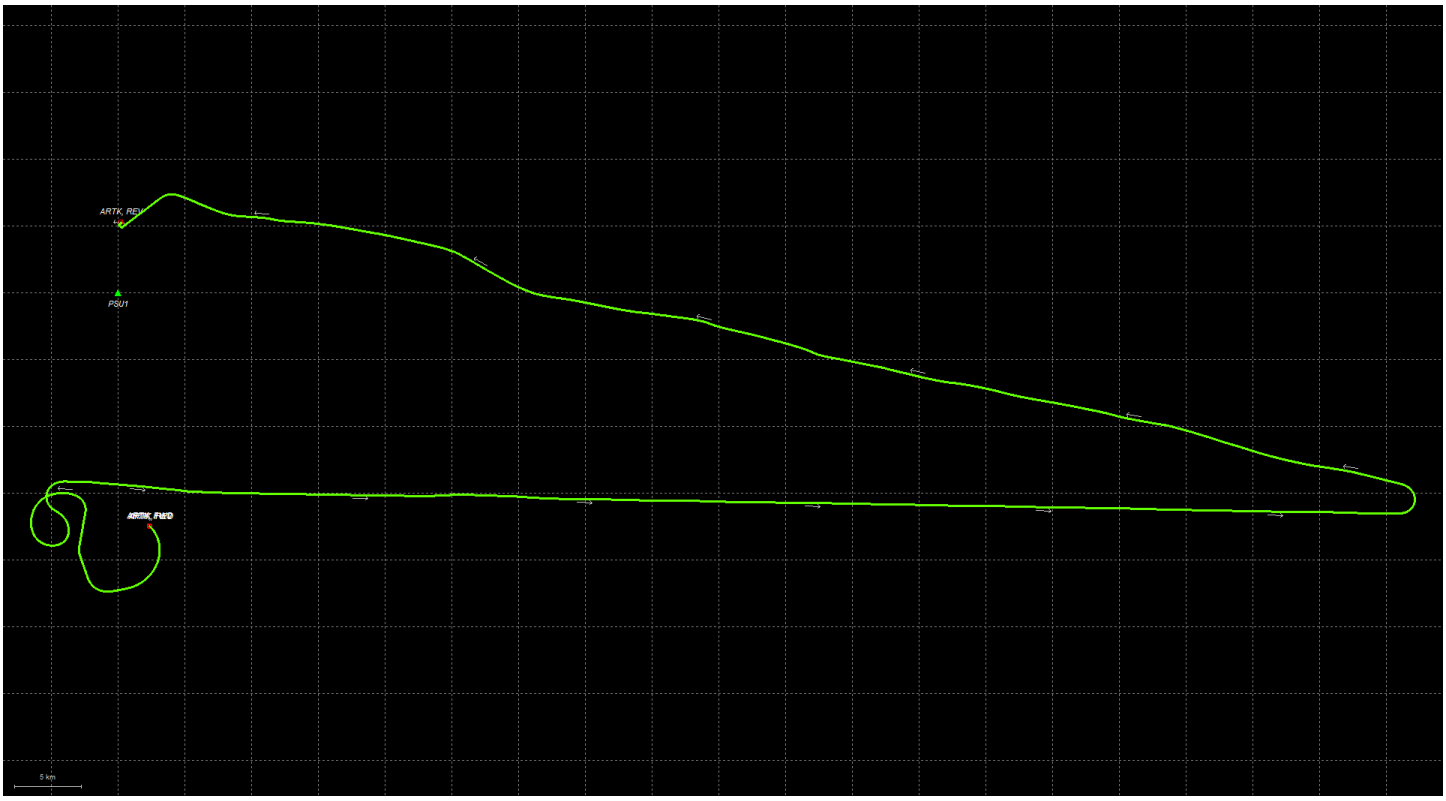
Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

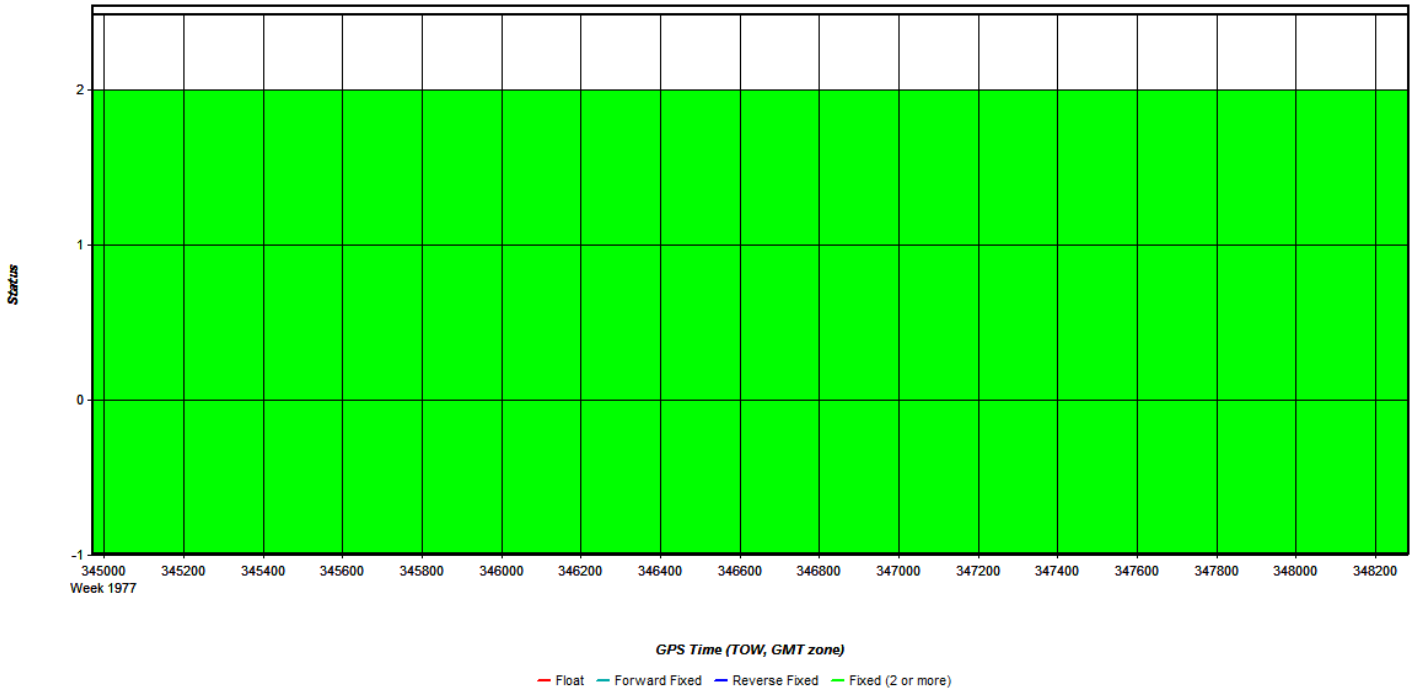
LIDAR	Type	Serial #	Alt AGL		Alt AMSL		Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Bag GB	End GB	Tot GB	Storage Name/s
	ALS 70	7161											
	FOV	Scan Freq	MpIA Y / N		Pulses in Air		Pulse Rate	Power	PRR				
	36	56			2		274	100					

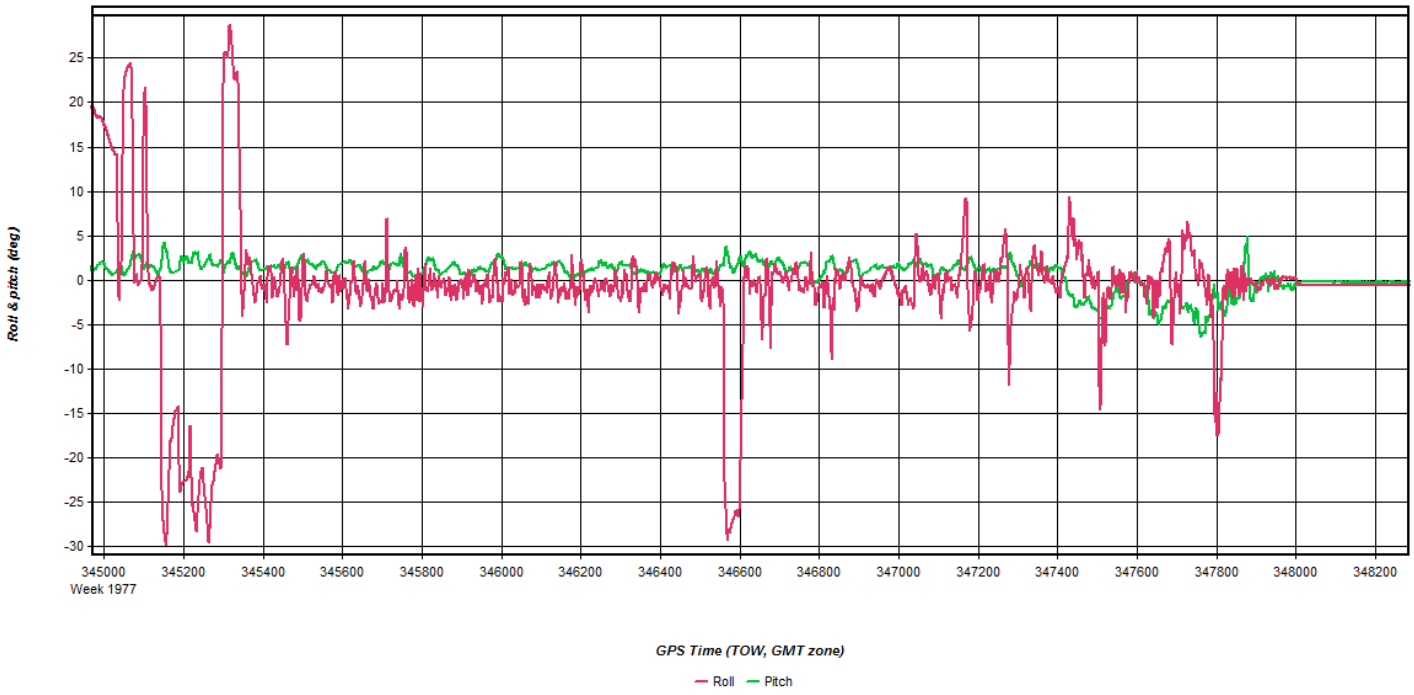
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	ROP/+sta	GPS Altitude	Crab	Turb (0, -, +)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc
1075	E	21:06	21:22	140	1.1/18	6900	0°	0	Fig 8 @2005 / +or- 20KTS, - MTN. WAVE / RETURN DROP
1074	W	21:25	21:43	135	1.2/18	6800	25°	0	+ 10KTS,
1073	E	21:46	22:04	155	1.2/16	6900	0°	0	+ or - 15 KTS
1072	W	22:06	22:24	150	1.1/17	6800	25°	0	
1071	E	22:27	22:44	150	1.1/17	6800	0°	0	
1070	W	22:46	23:05	148	1.0/18	6800	25°	0	
1069	E	23:07	23:25	142	1.1/17	6800	0°	0	FLIGHT PRO NEEDS to close DUE TO PROBLEM / PILOTS DISP. SHOWS THAT WE ARE STILL COLLECTING / RESTARTED AFTER END OF LINE NO CROSS TIE LINE
1068	W	23:28	23:46						SHOT WITH NO OCSZ DISPLAY
1067	E	23:59	00:	155	1.3/17	6800	0°	0	FIXED REBOOT / FIG 8 @ 23:57
X-TIE		00:							NO X-TIE DUE to FUEL SHORTAGE

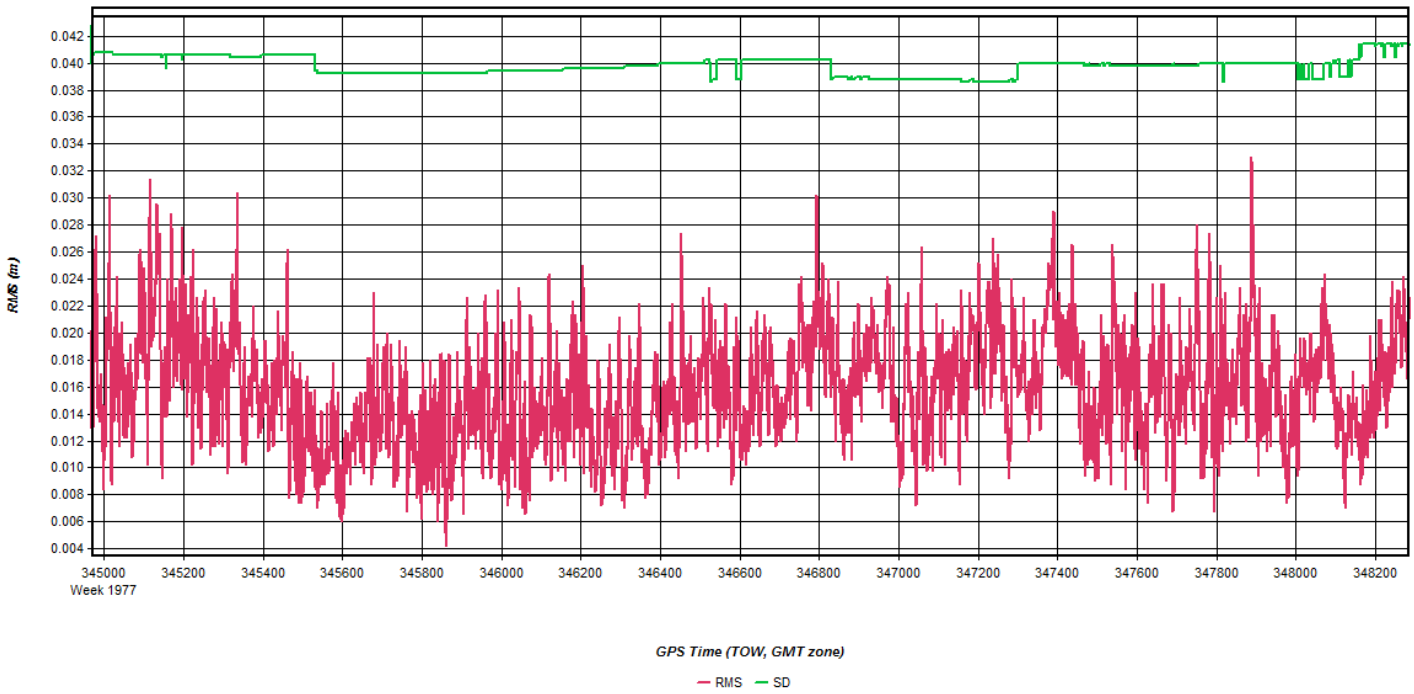
Total Proj Lines: Lines Flown: Lines Remain: On/Line Time: 3.0 Mob Time: .7 Notes:

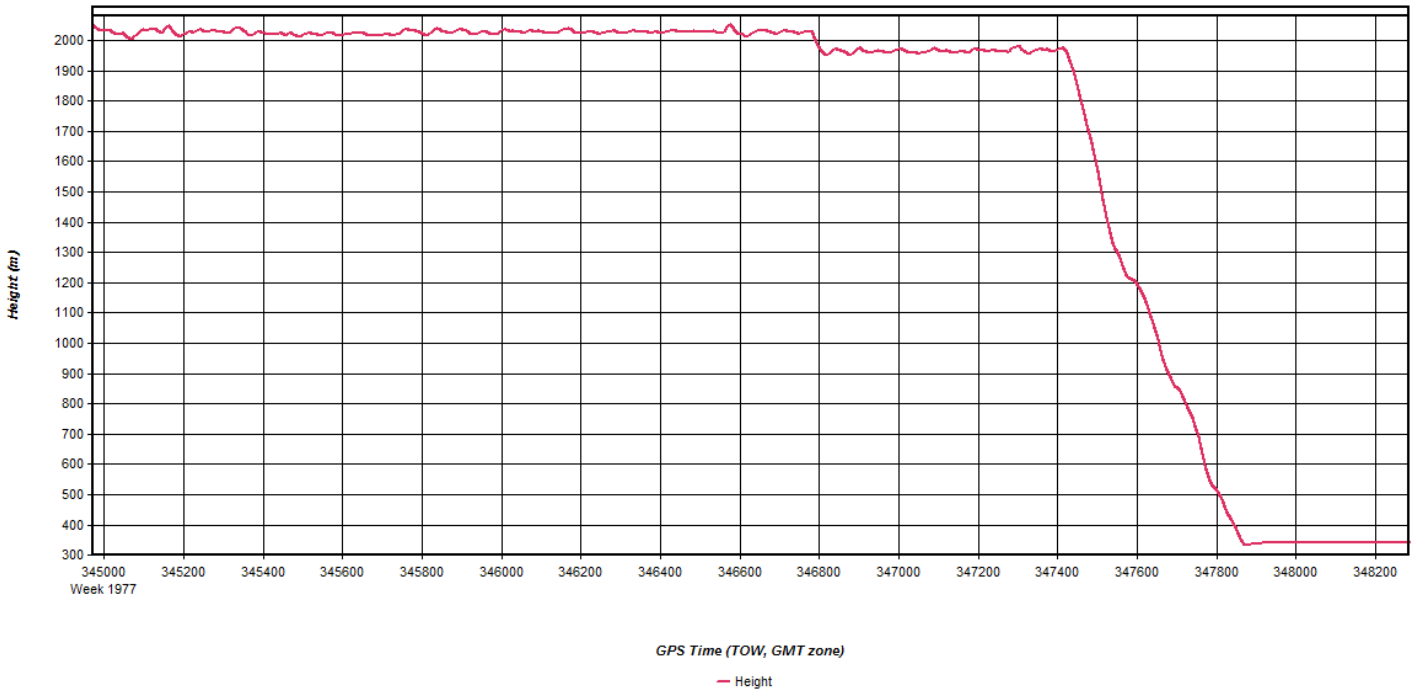
November 29, 2017-B (N812TB, SN7161)

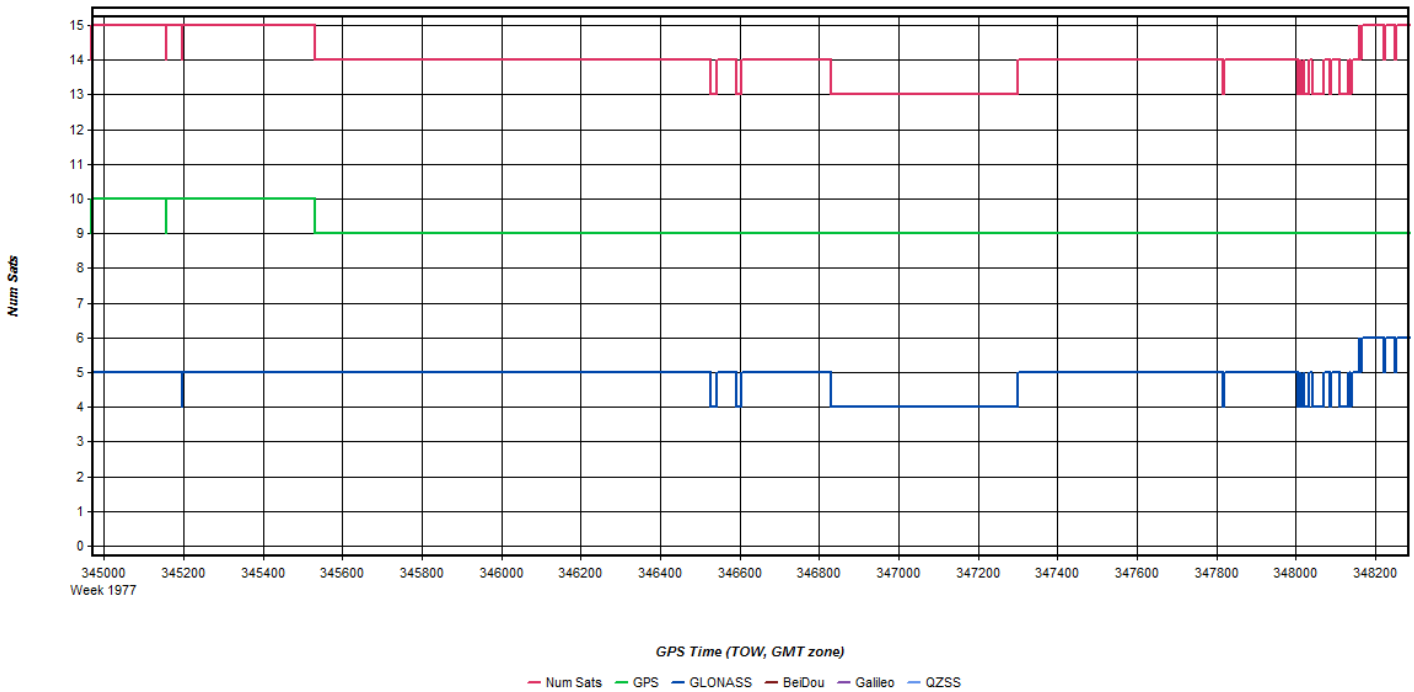

PSU1
5 km

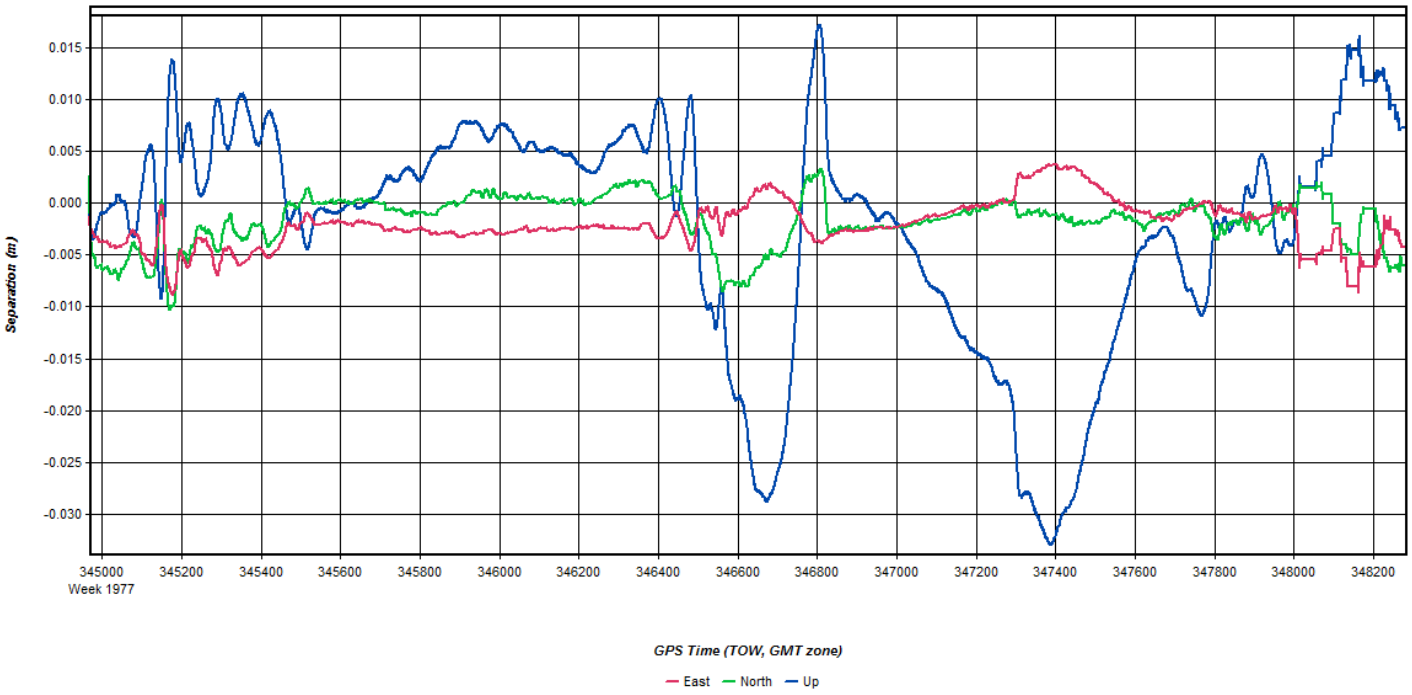

Status
2
1
0
-1
345000
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
Week 1977
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

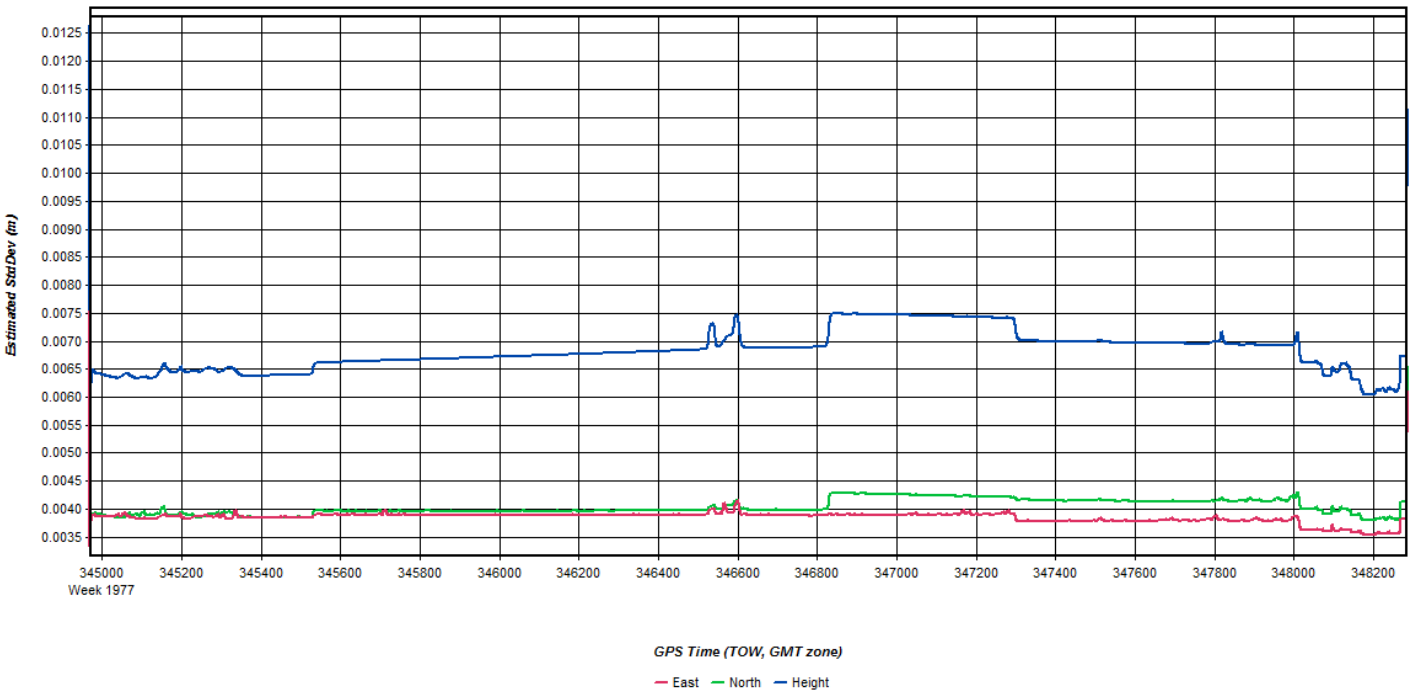

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
Roll
Pitch

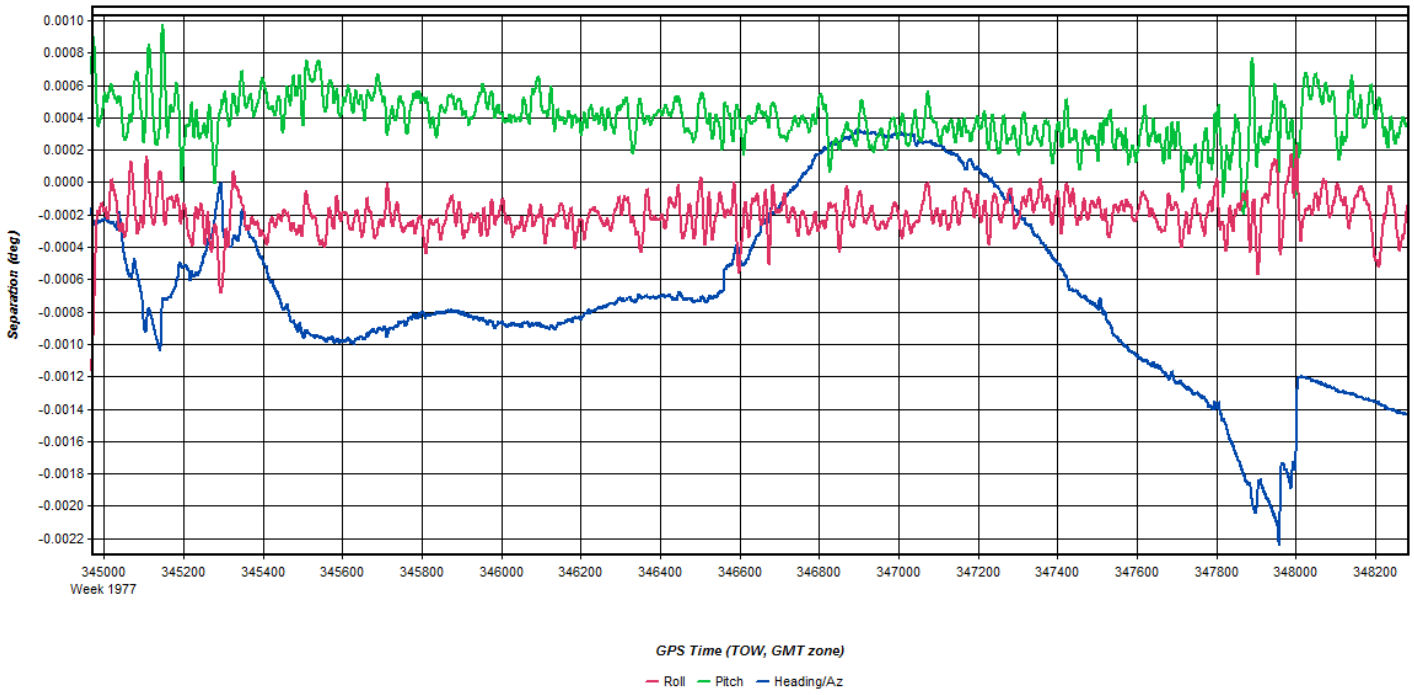

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
RMS
SD

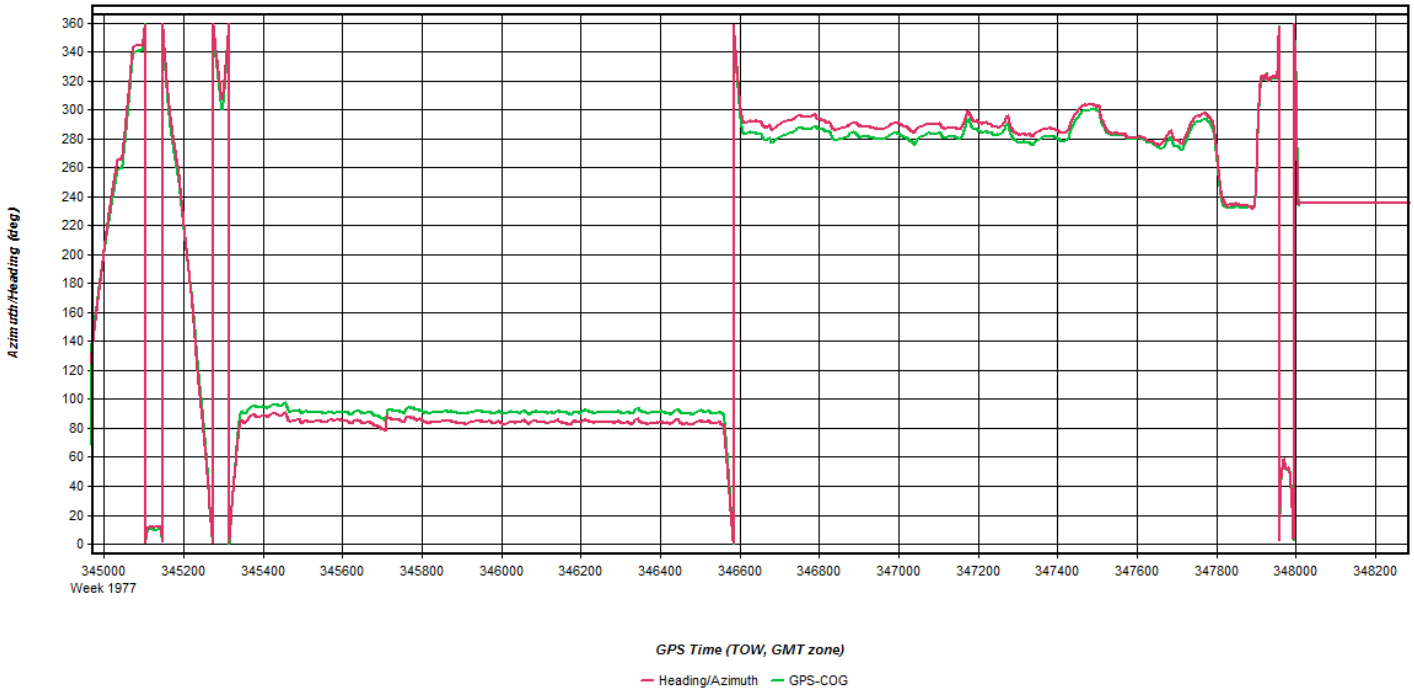

Height (m)
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
Height

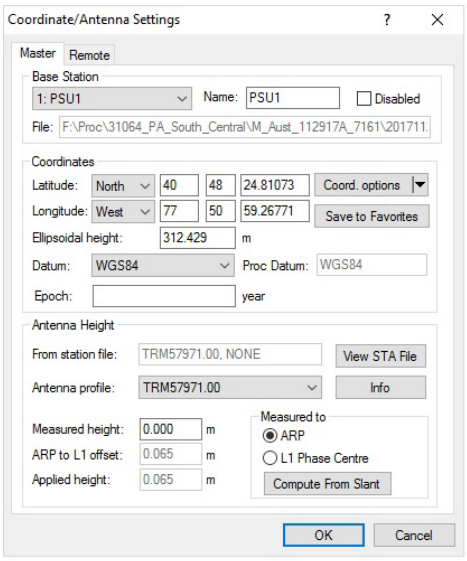

Num Sats
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.015
0.010
0.005
0.000
-0.005
-0.010
-0.015
-0.020
-0.025
-0.030
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
East
North
Up

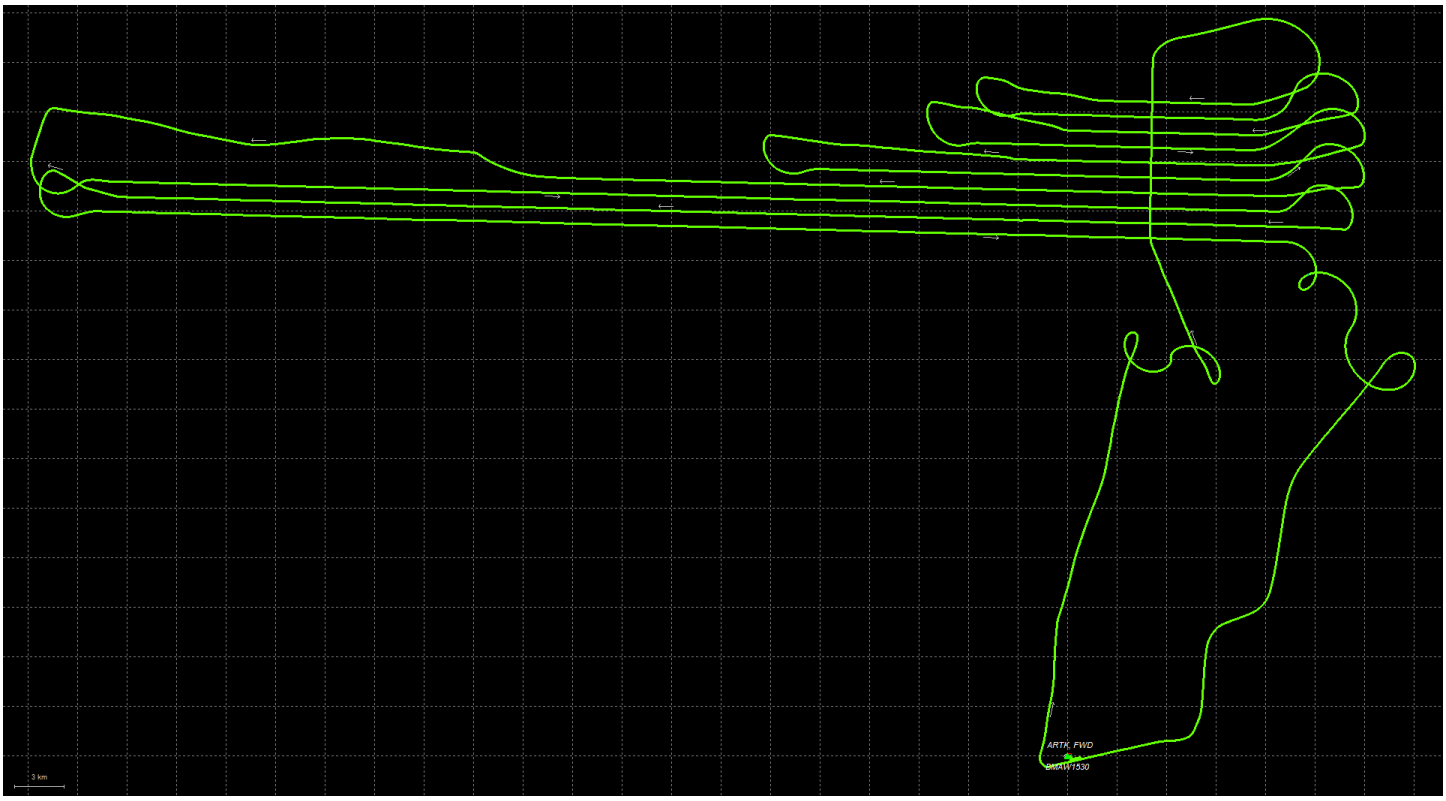

Estimated StdDev (m)
0.0125
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
East
North
Height

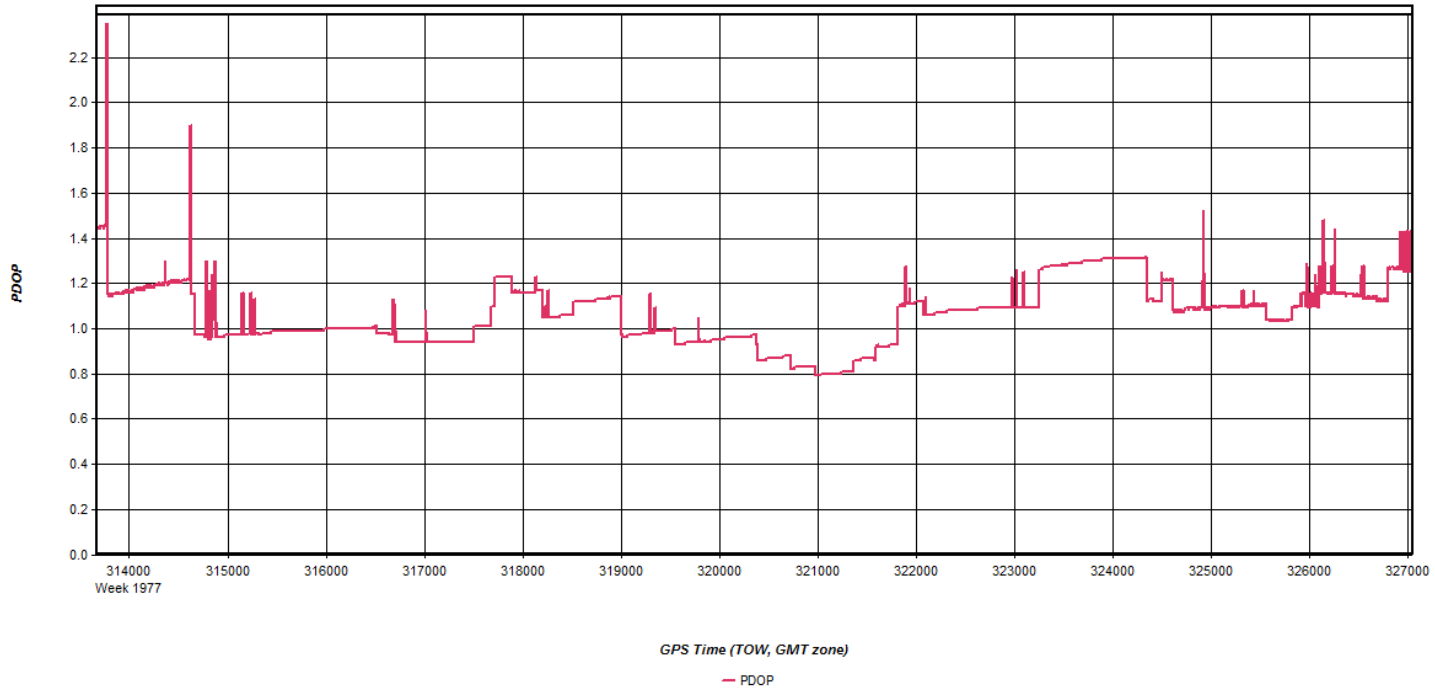

Separation (deg)
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
-0.0002
-0.0004
-0.0006
-0.0008
-0.0010
-0.0012
-0.0014
-0.0016
-0.0018
-0.0020
-0.0022
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az

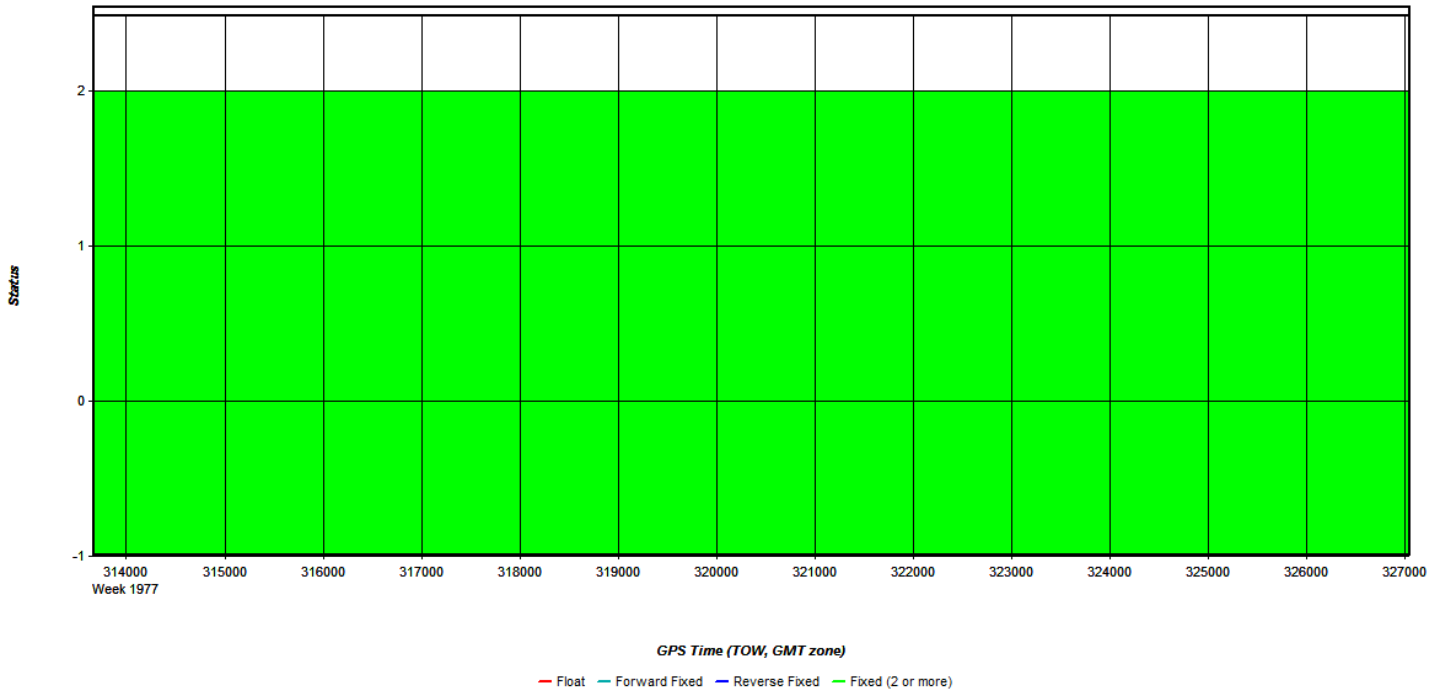

Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
345000
Week 1977
345200
345400
345600
345800
346000
346200
346400
346600
346800
347000
347200
347400
347600
347800
348000
348200
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG

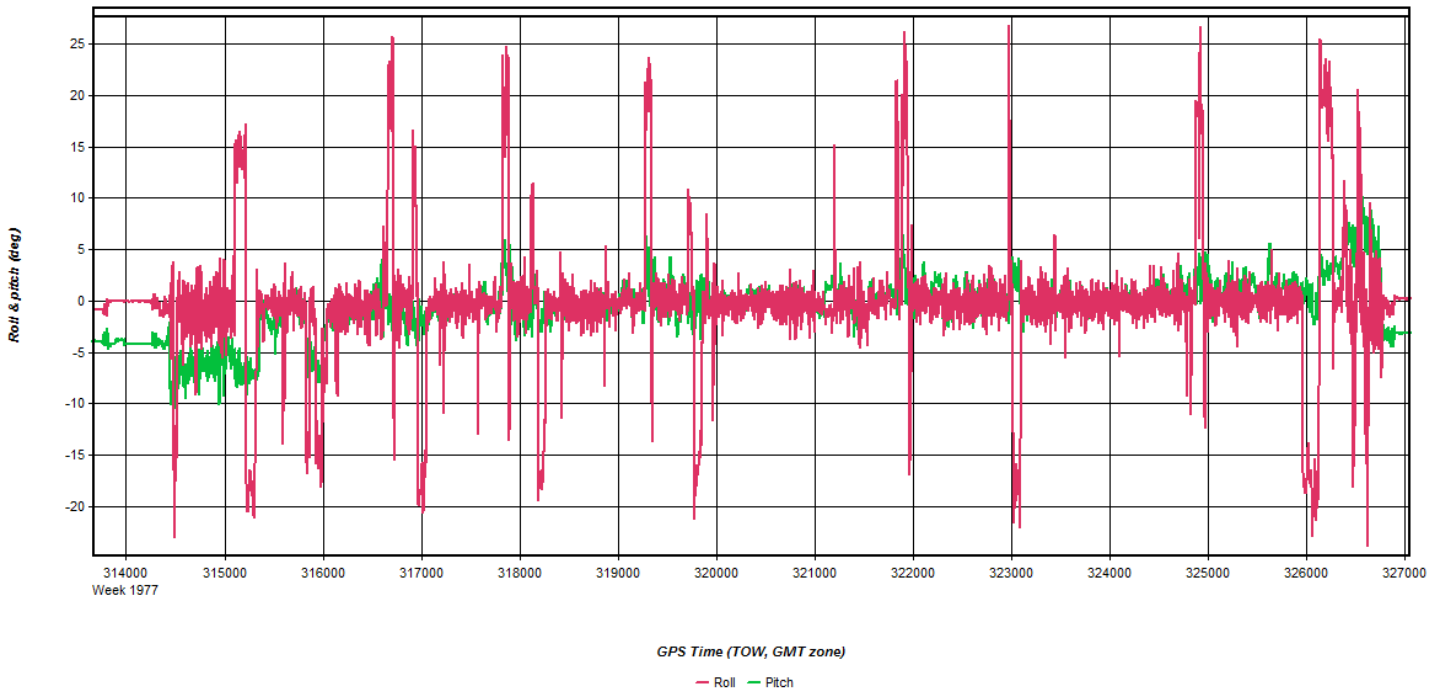

Coordinate/Antenna Settings
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\M_Aust_112917A_7161\201711
Coordinates
Latitude: North 40 48 24.81073 Coord. options
Longitude: West 77 50 59.26771 Save to Favorites
Ellipsoidal height: 312.429 m
Datum: WGS84 Proc 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

November 29, 2017-A (N916WC, SN8119)

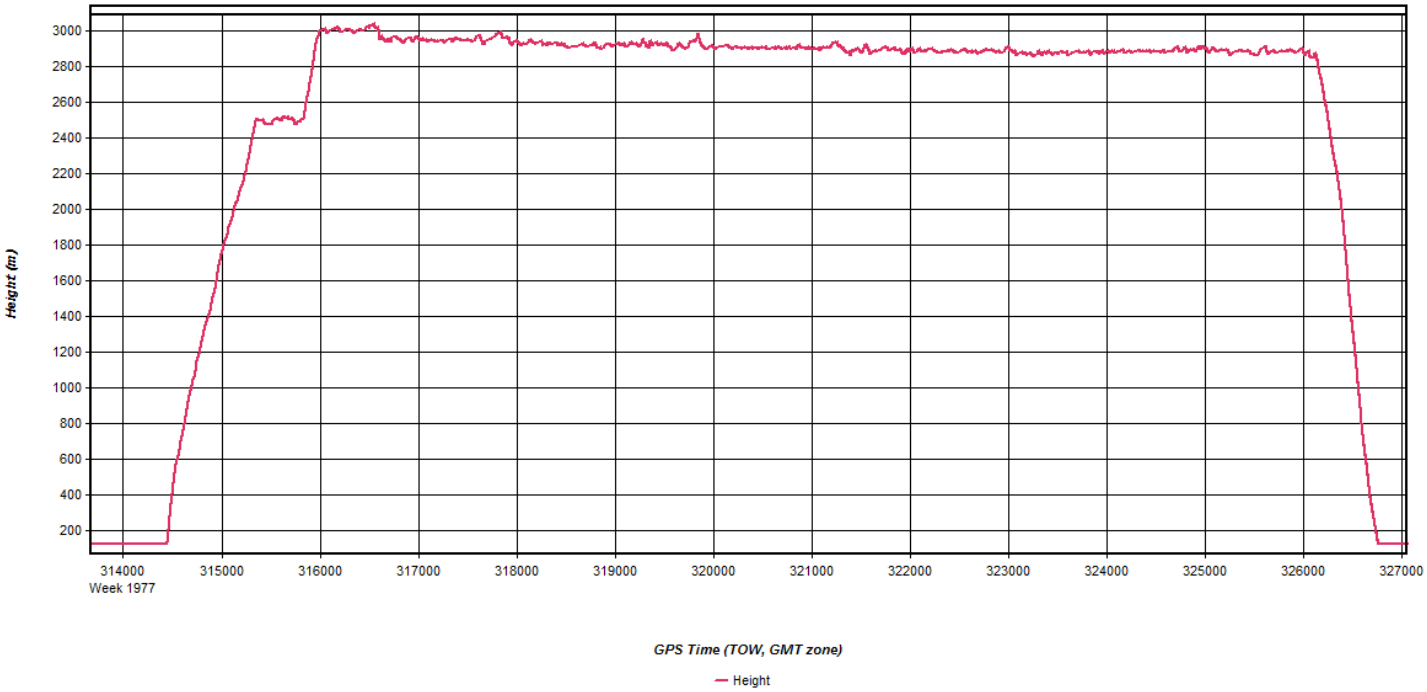

ARTK_FWD
3 km


PDOP
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
PDOP

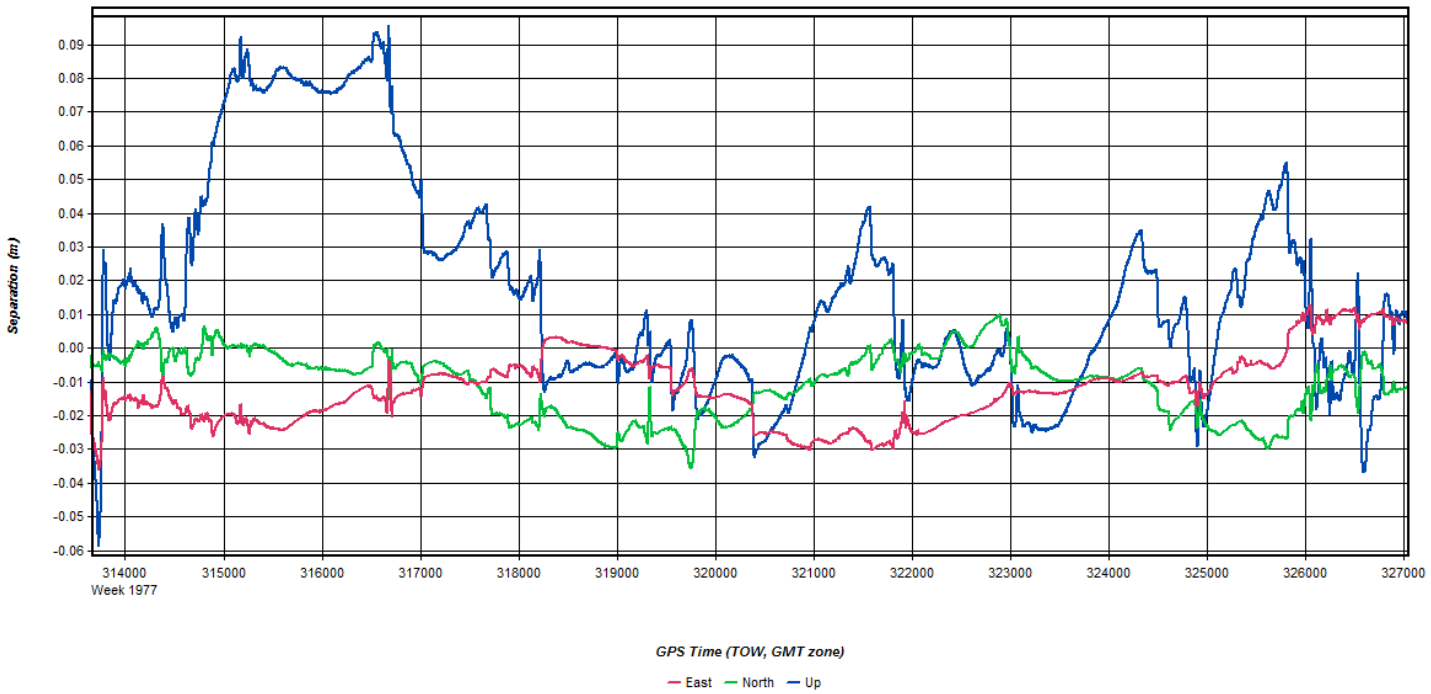

Status
2
1
0
-1
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

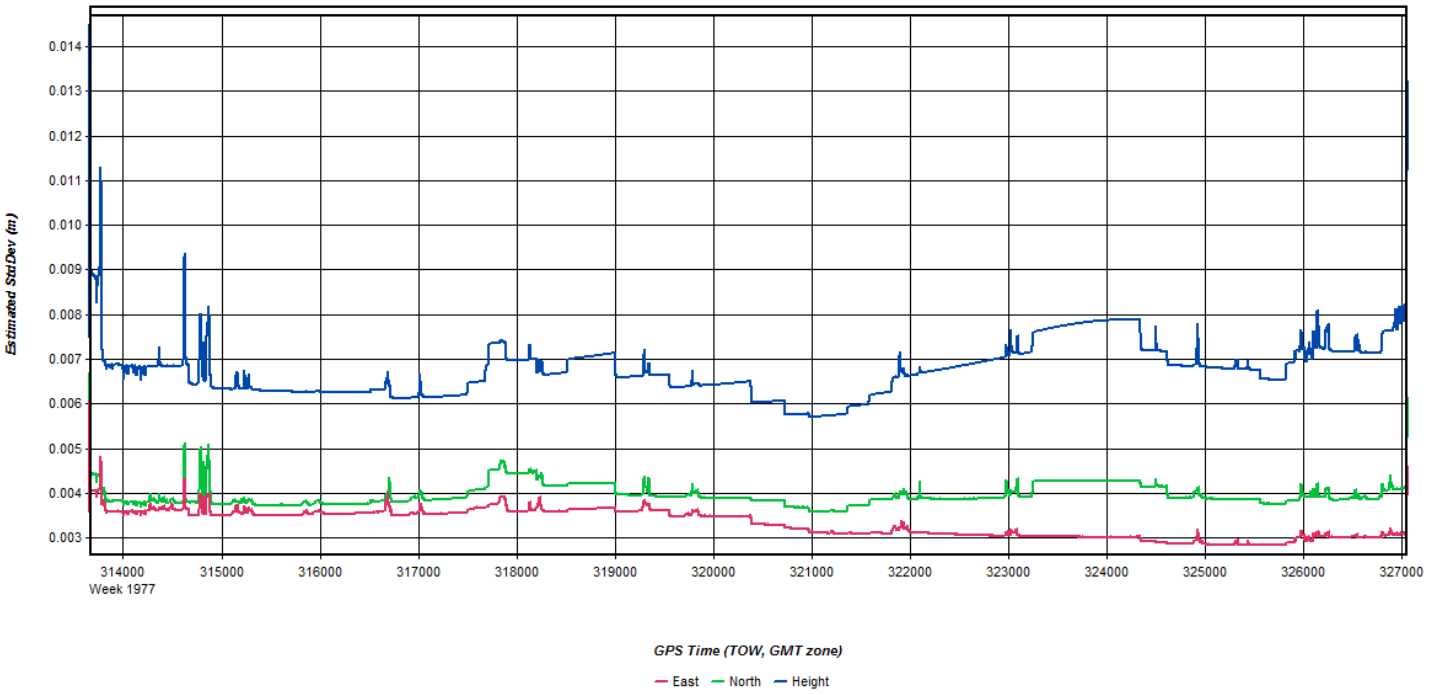

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Roll
Pitch

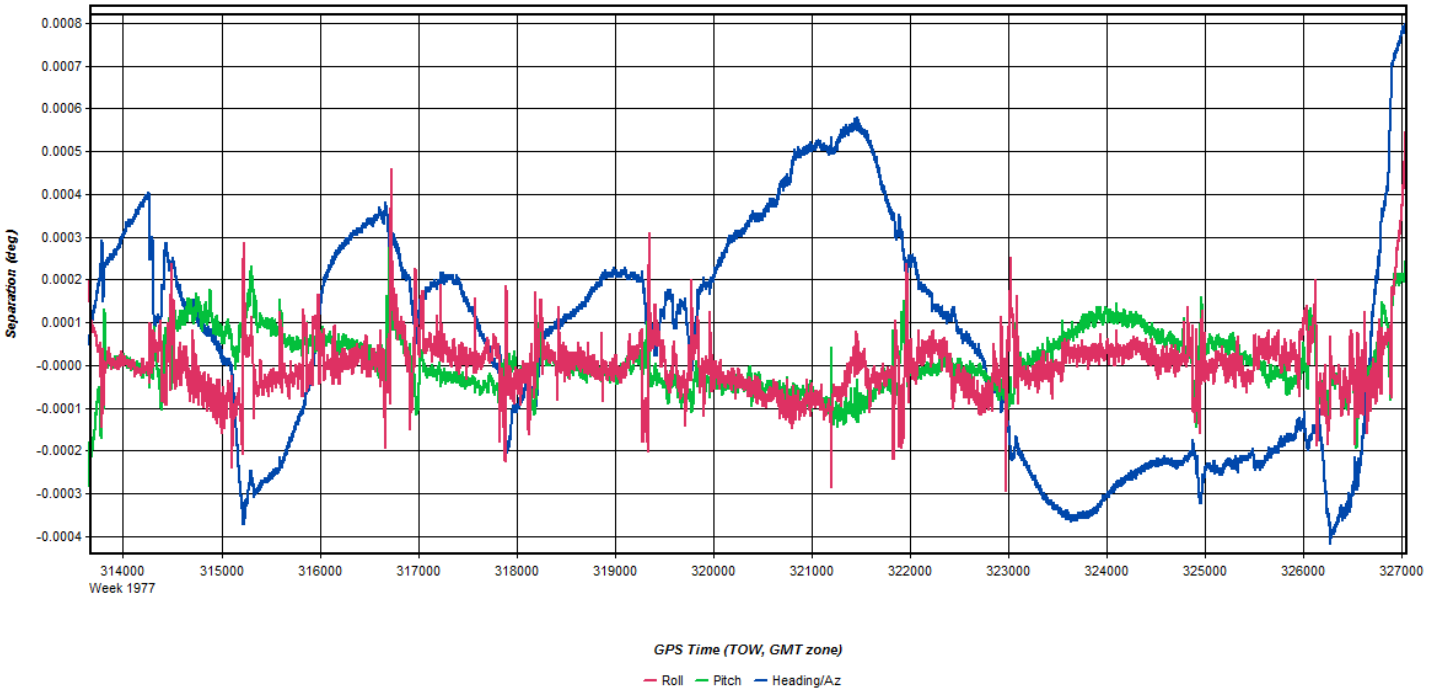

RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
RMS
SD


Height (m)
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Height

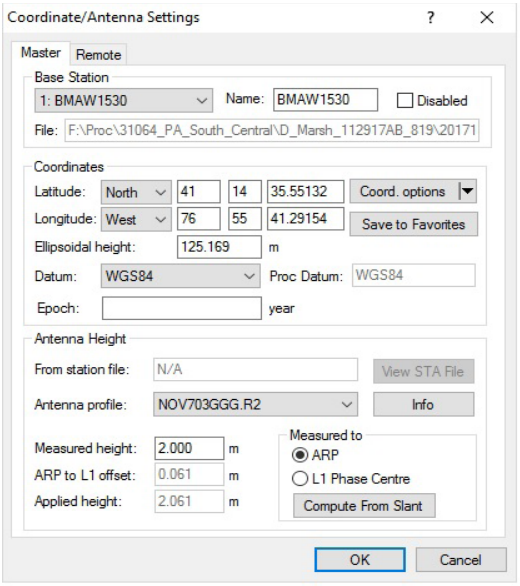

Num Sats
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
-0.0000
-0.0001
-0.0002
-0.0003
-0.0004
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: BMAW1530
Name: BMAW1530
Disabled
File: F:\Proc\31064_PA_South_Central\D_Marsh_112917AB_819\20171
Coordinates
Latitude: North 41 14 35.55132
Coord. options
Longitude: West 76 55 41.29154
Save to Favorites
Ellipsoidal height: 125.169 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: N/A
View STA File
Antenna profile: NOV703GGG.R2
Info
Measured height: 2.000 m
ARP to L1 offset: 0.061 m
Applied height: 2.061 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LIDAR

Revised Feb. 2014

KeyW Aeronautics

LIDAR FLIGHT REPORT

Pilot/Operator: Marsh | Tail Number: N816WC | AIRCRAFT | WEATHER: Clear Winds 59 kts fm 303 deg

Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.

CREW | UTC DATE: 11/29/2017 (mm/dd/yy)

Camera System: LiDAR S/N: 8119; fwd/aft: Fwd

Camera Location (Hole):

GPS: Source: Kappa 180

	Time	Location
Start-up	10:40 am local	Williamsport KIPT Pa
Shut-down	1:48 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

Lens cleaned	
Airpds uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

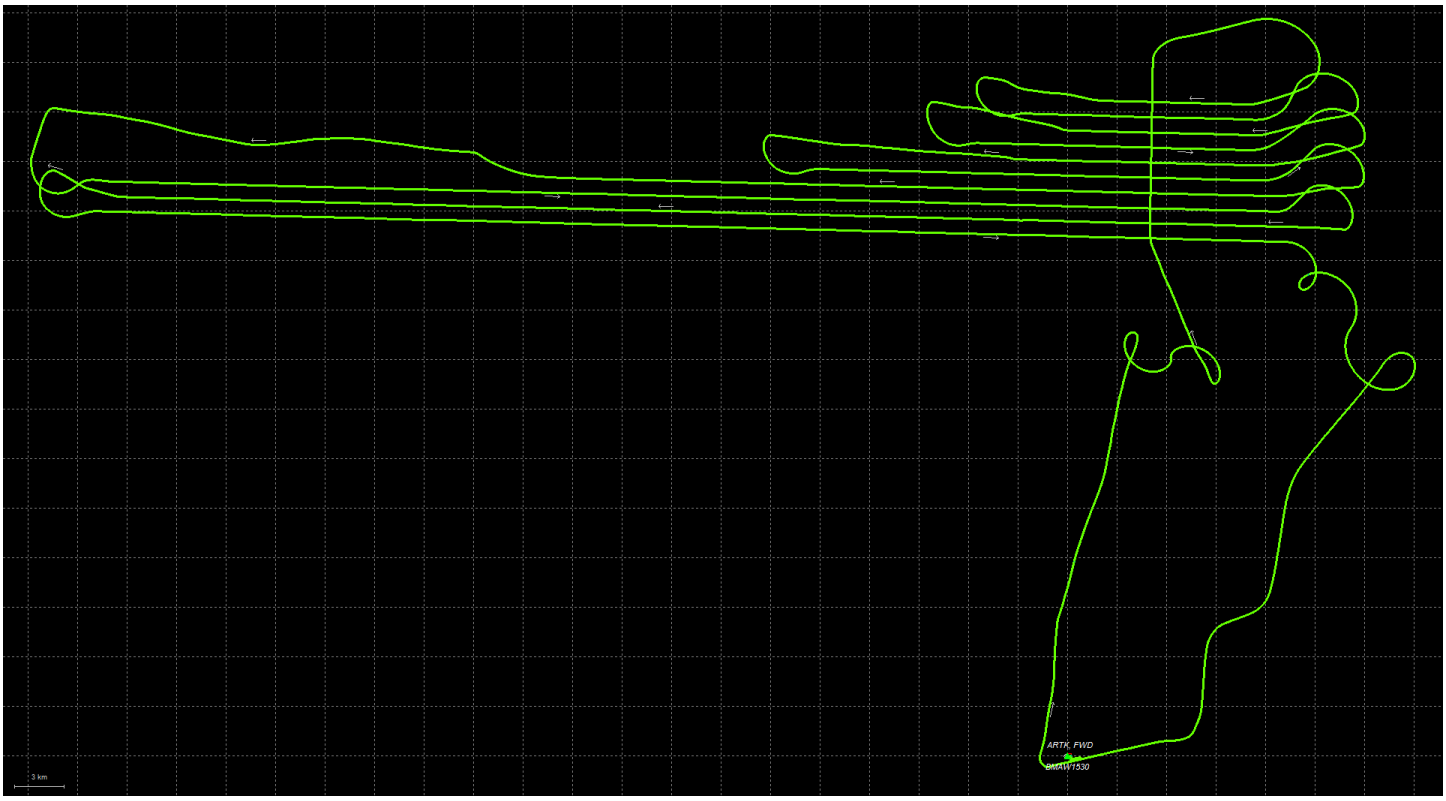
SSD

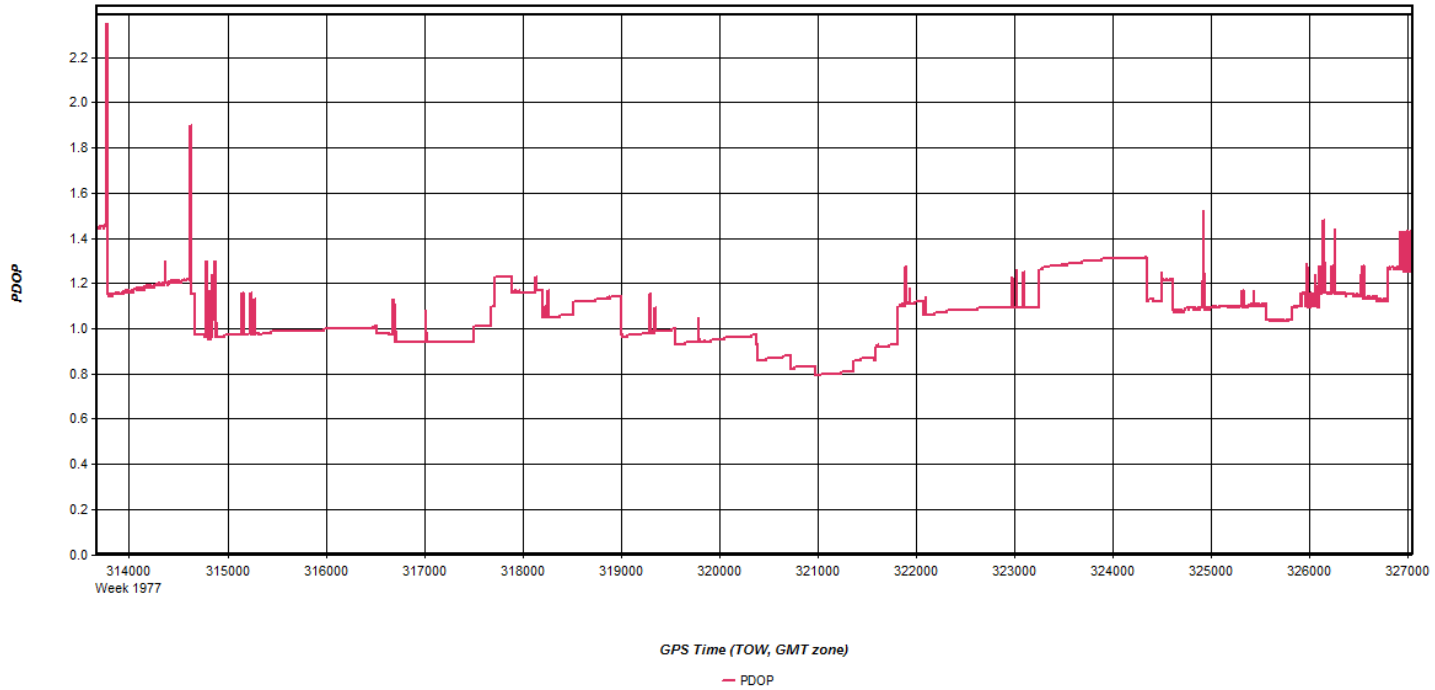
Drive #	8119_1
@ Beginning	
Space Used	1089
During Mission	64
Tot Space	1025
Remaining	

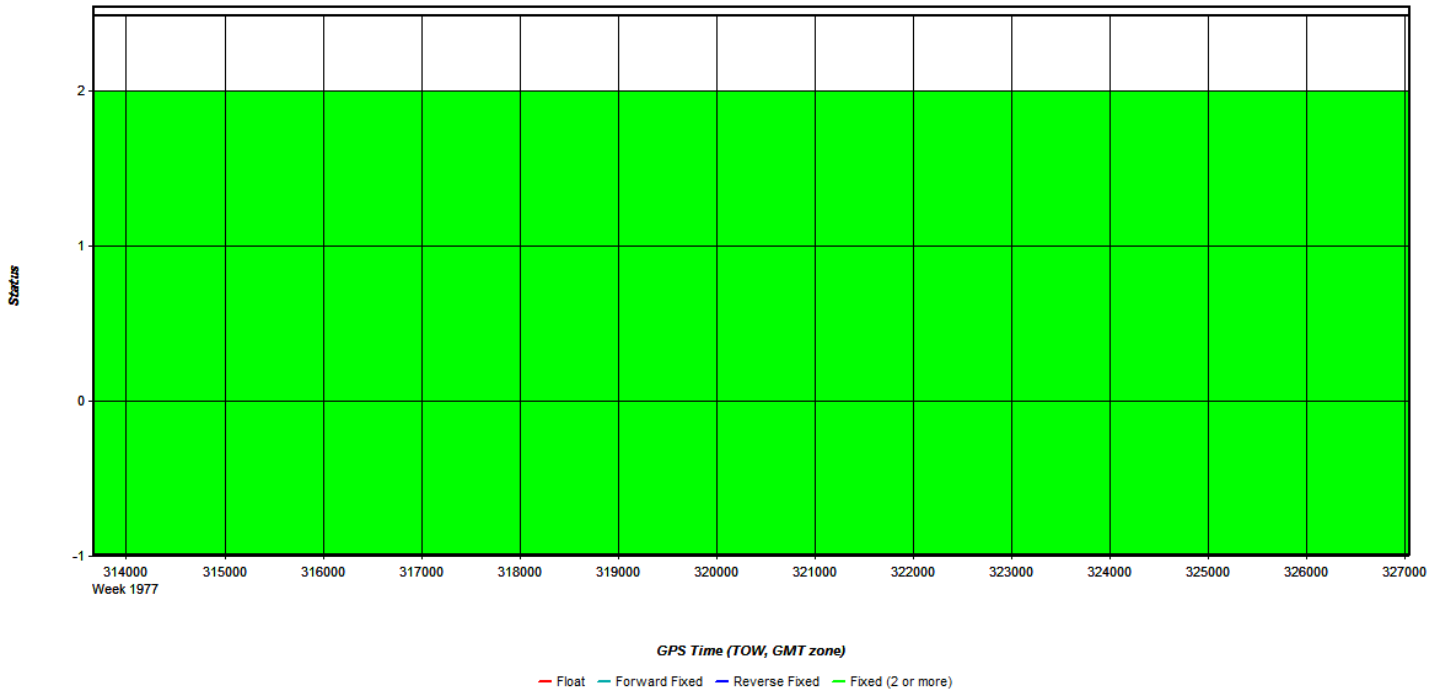
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	S	NX01	N		
		N001	W		
		N002	E		
		N003	W		
		N004	E		
		N005	W		
		N006	E		
		N007	W		
		N008	E		
		N009	W		
		N010	E		

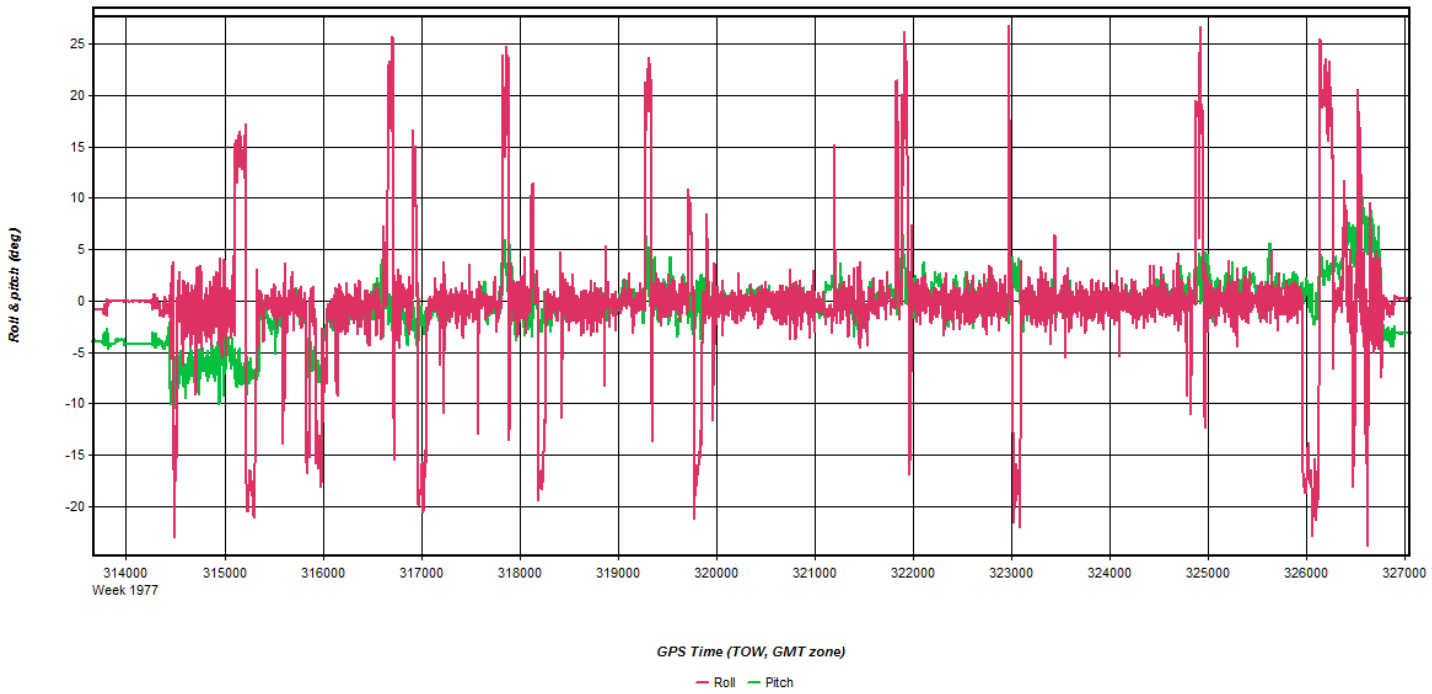
Page 1

November 29, 2017-B (N916WC, SN8119)

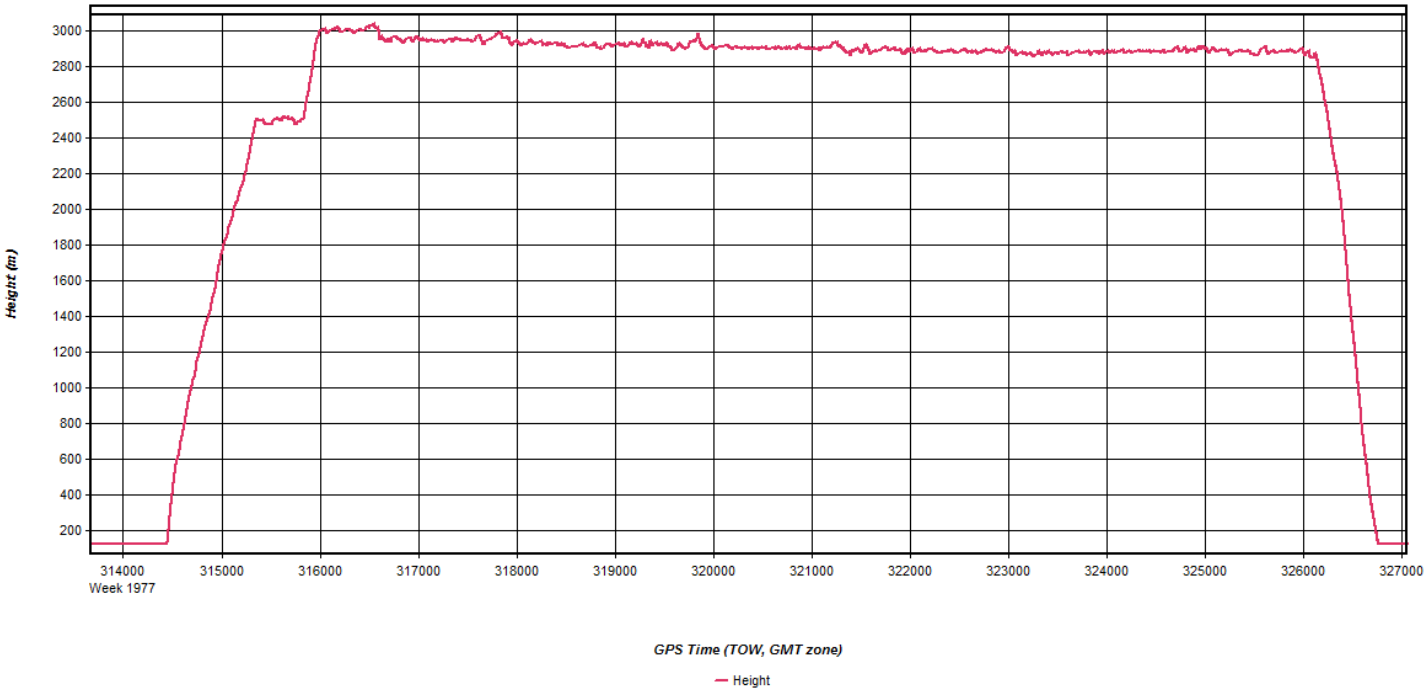

ARTK_FWD
3 km


PDOP
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
PDOP

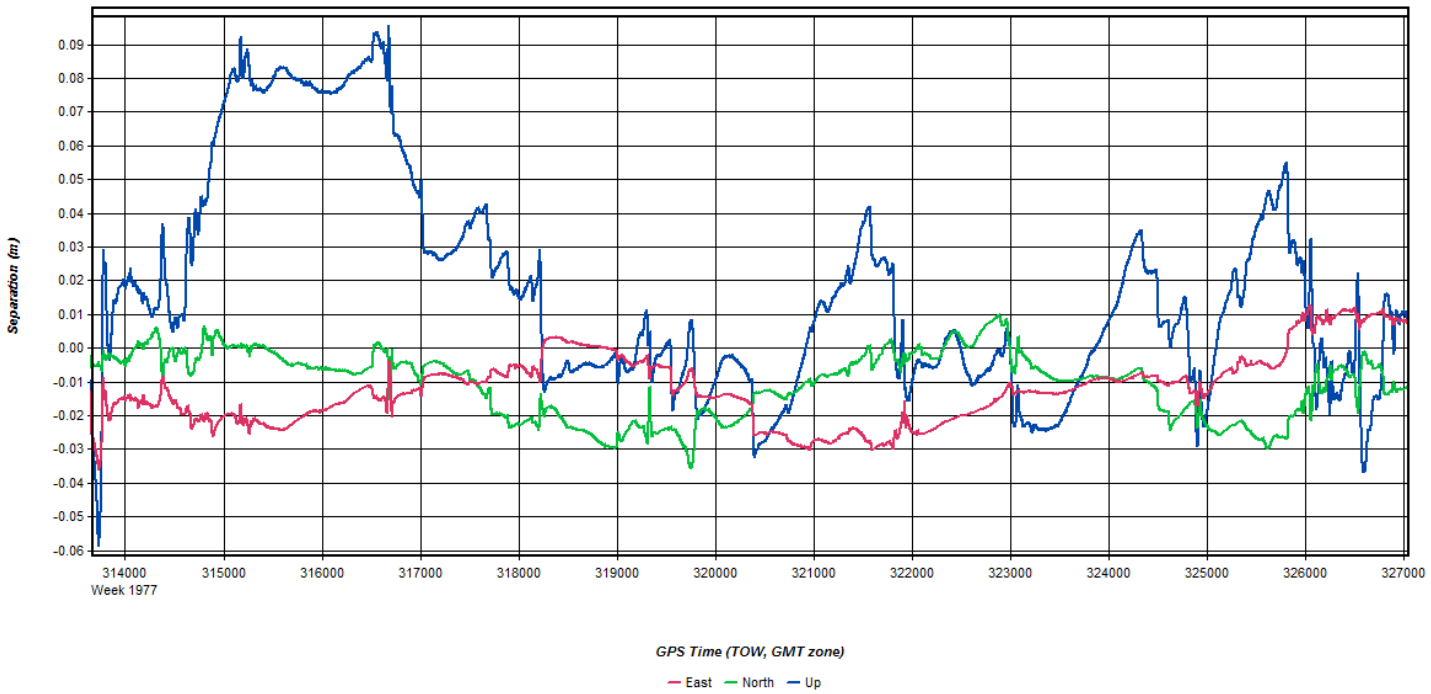

Status
2
1
0
-1
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

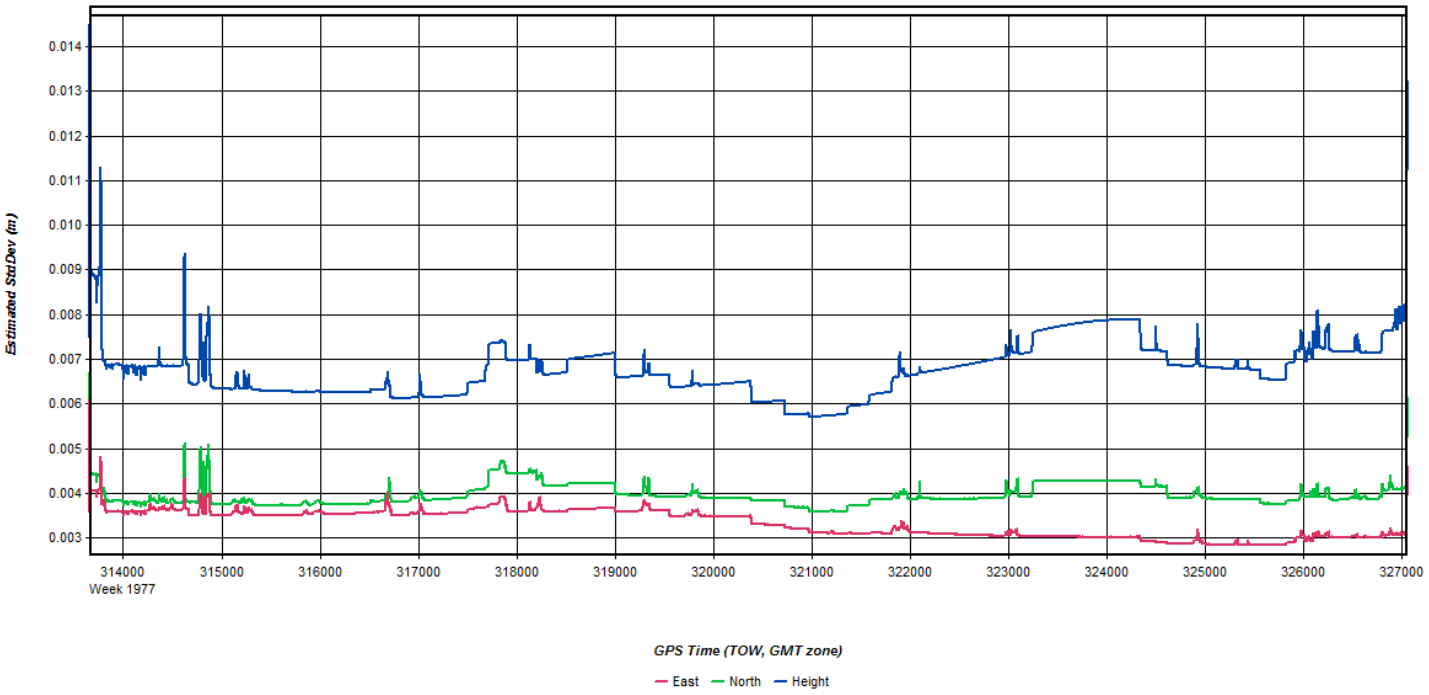

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Roll
Pitch

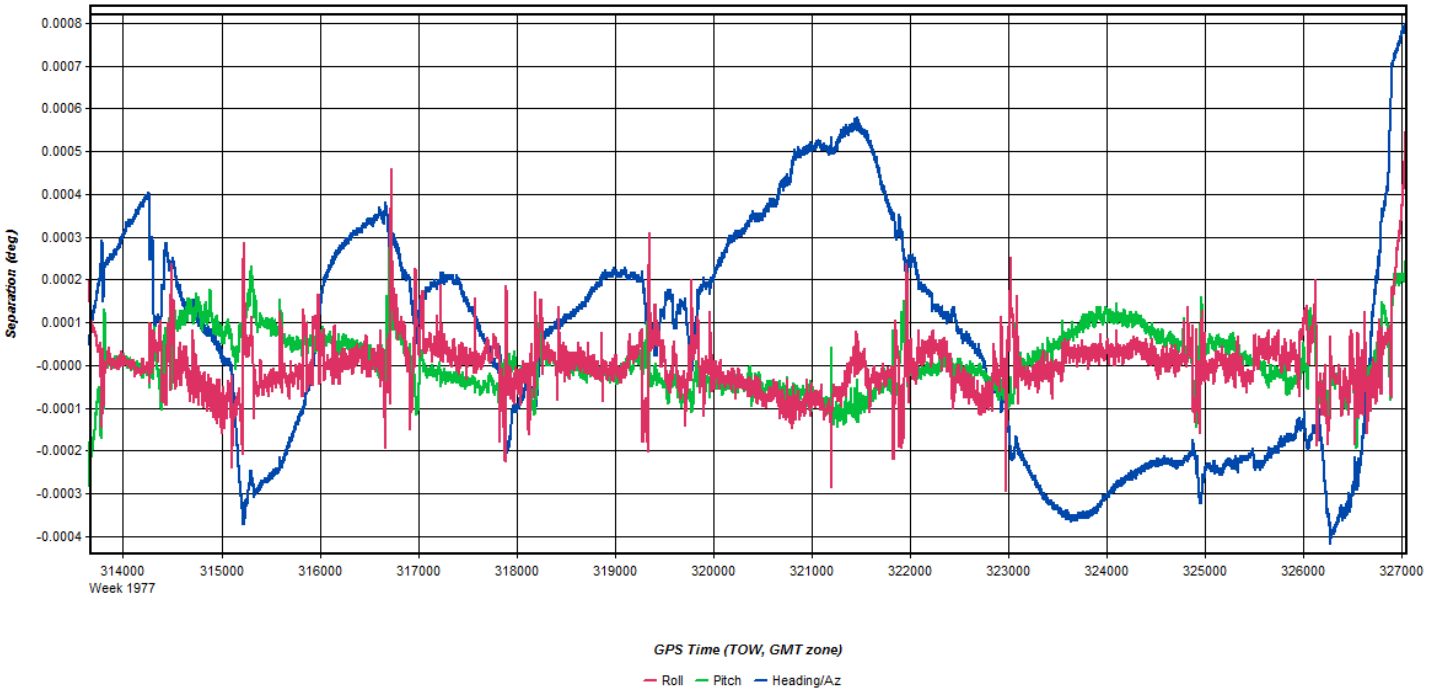

RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
RMS
SD


Height (m)
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Height

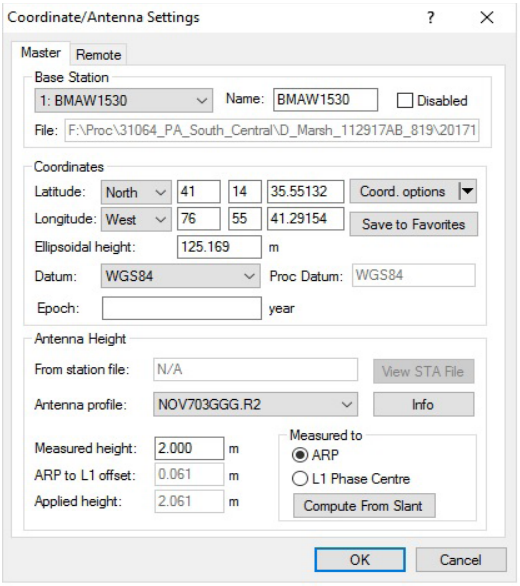

Num Sats
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
-0.0000
-0.0001
-0.0002
-0.0003
-0.0004
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
314000
Week 1977
315000
316000
317000
318000
319000
320000
321000
322000
323000
324000
325000
326000
327000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: BMAW1530
Name: BMAW1530
Disabled
File: F:\Proc\31064_PA_South_Central\D_Marsh_112917AB_819\20171
Coordinates
Latitude: North 41 14 35.55132
Coord. options
Longitude: West 76 55 41.29154
Save to Favorites
Ellipsoidal height: 125.169 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: N/A
View STA File
Antenna profile: NOV703GGG.R2
Info
Measured height: 2.000 m
ARP to L1 offset: 0.061 m
Applied height: 2.061 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LIDAR

KeyW Aerotus
LIDAR FLIGHT REPORT

Revised Feb. 2014

CREW: Pilot/Operator: Marsh | Tail Number: N816WC | AIRCRAFT | WEATHER: Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: Clear Winds 45 kts fm 333 deg

UTC DATE: mm/dd/yy 11/29/2017

Camera System: LiDAR S/N 8119

Camera Location (Hole): fwd/aft Fwd

GPS: Source Kappa 180

	Time	Location
Start-up	2:40 pm local	Williamsport KIPT Pa
Shut-down	5:48 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

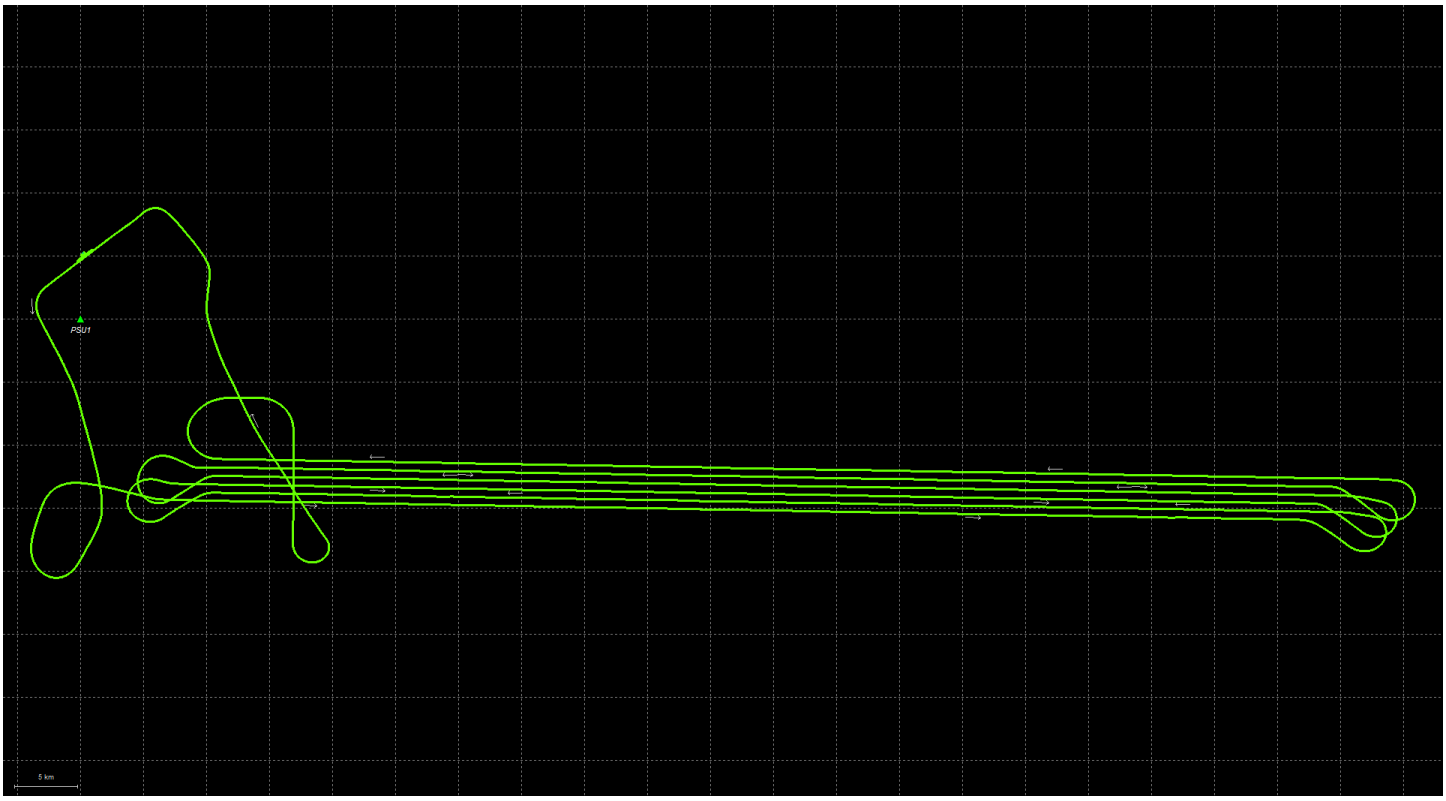
Lens cleaned	
AIRpds uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

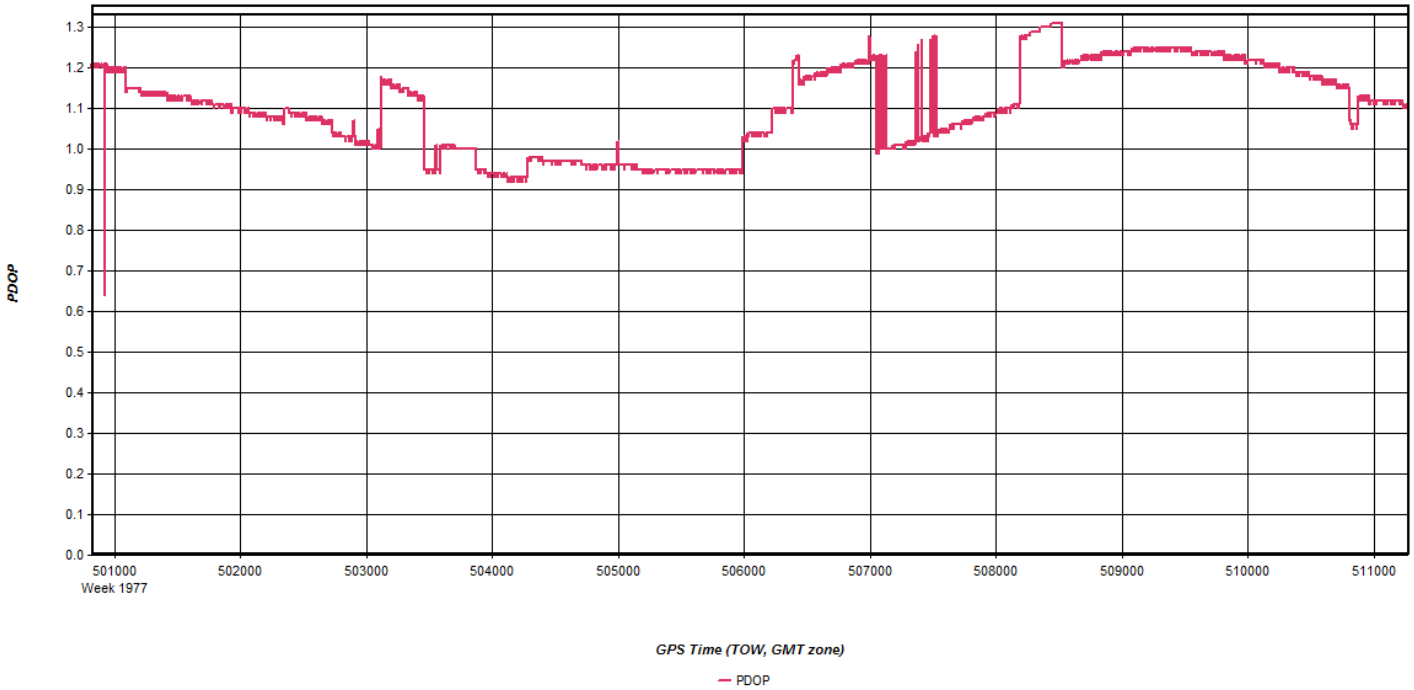
SSD

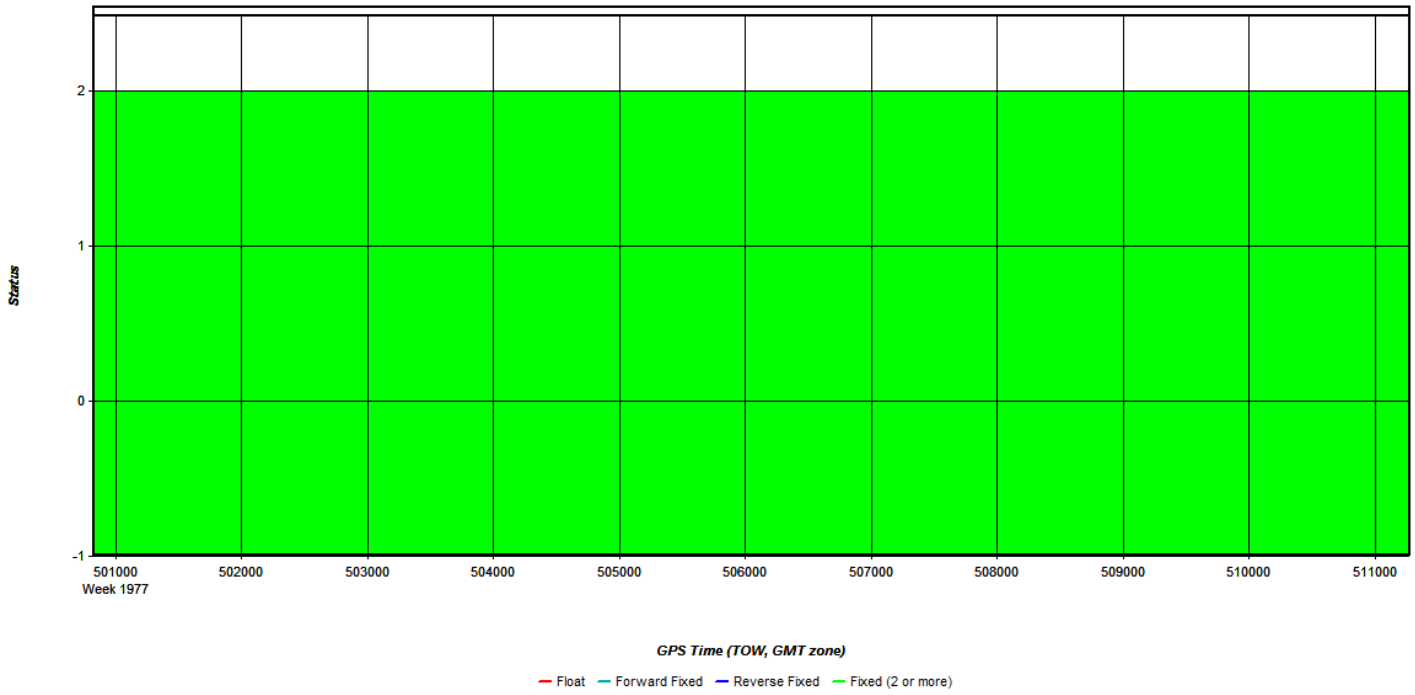
Drive #	
	8119_1
@ Beginning	
Space Used	1038
During Mission	60
Space Used	978
Space Used	Remaining
During Mission	Tot Space

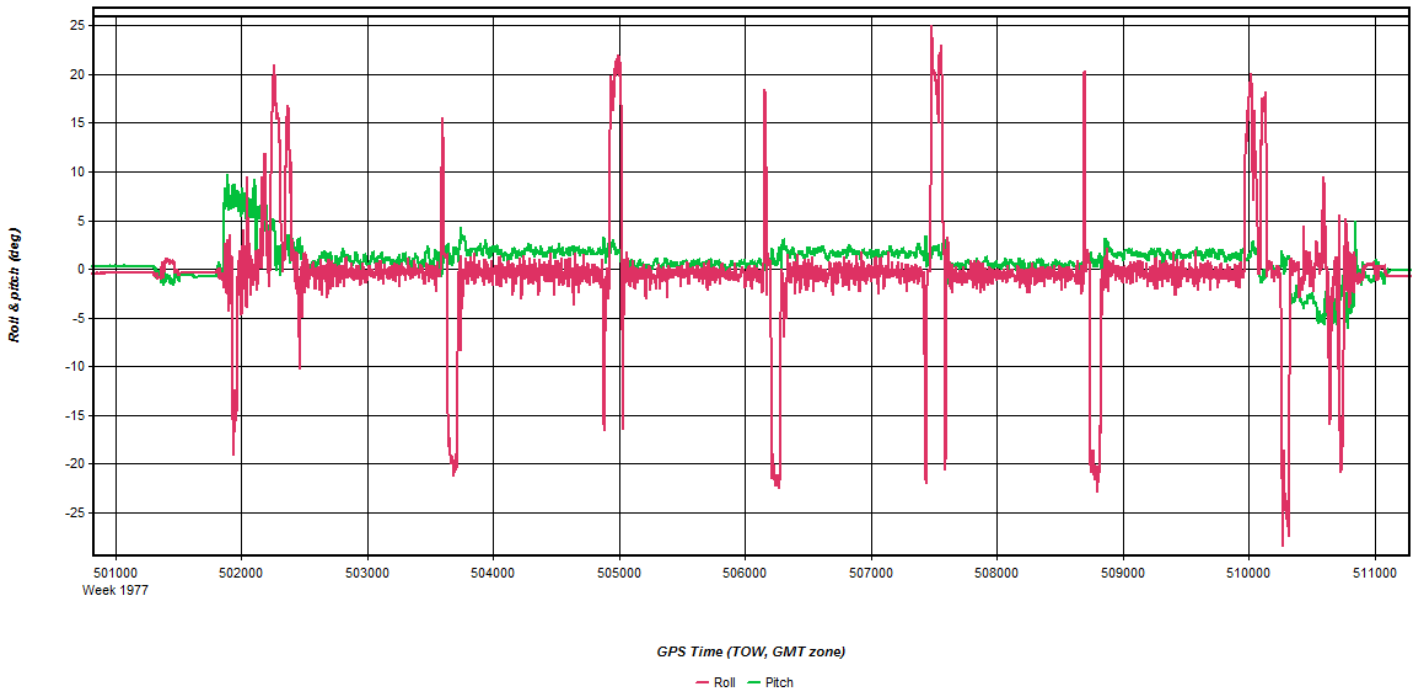
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	S	AdHoc	N		
		N011	W		
		N012	E		
		N013	W		
		N014	E		
		N015	W		
		N016	E		

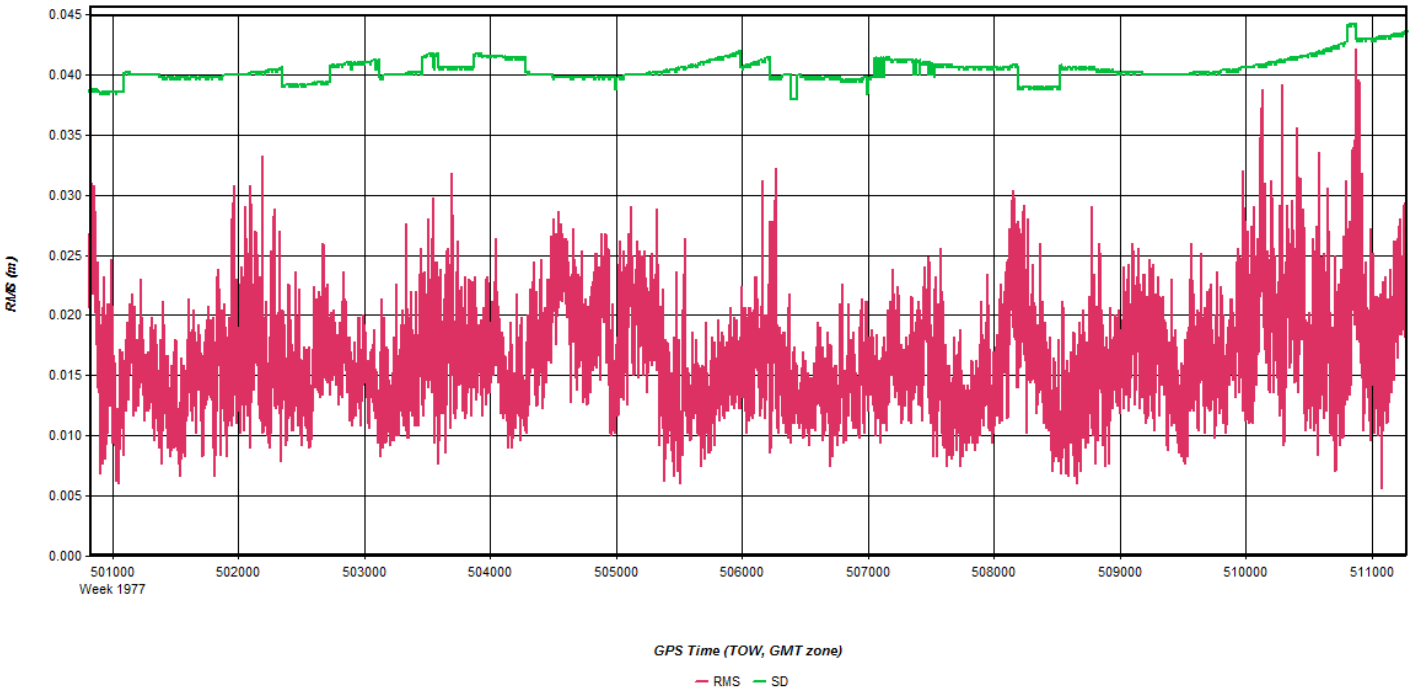
December 1, 2017-A (N812TB, SN7161)

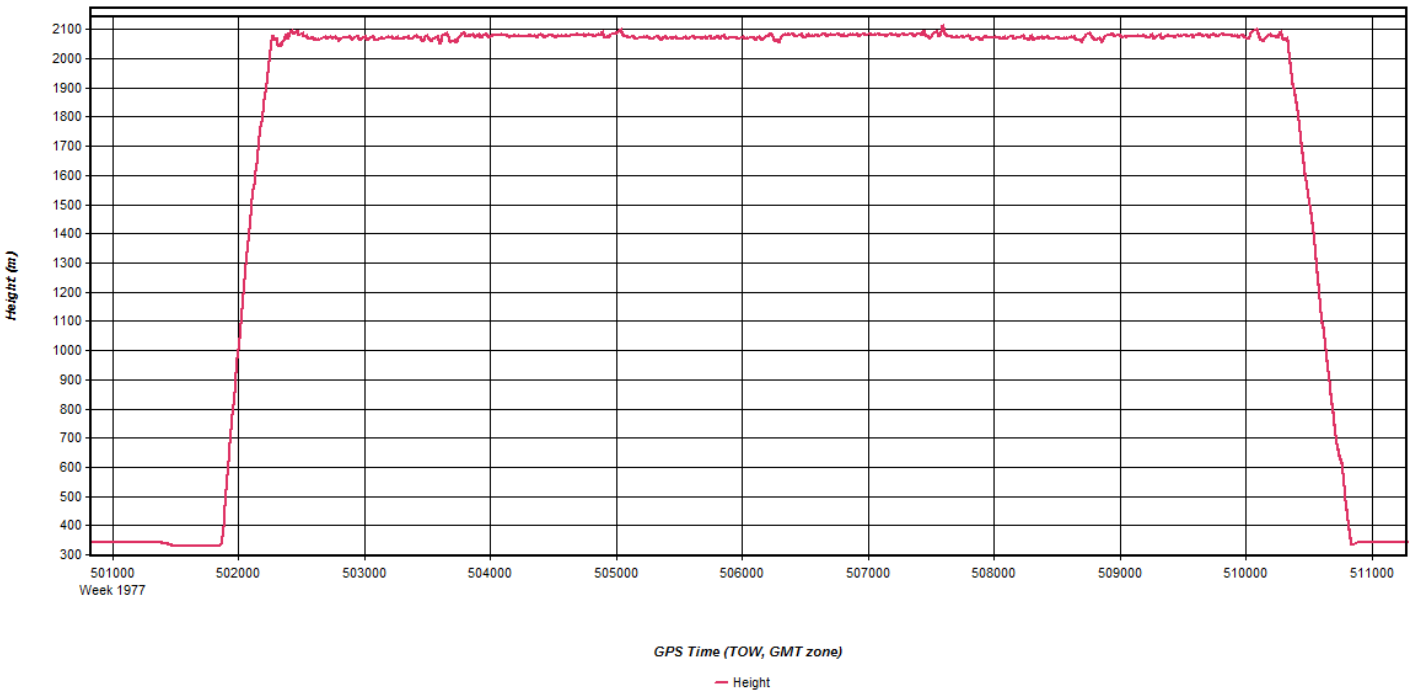

PSU1
5 km

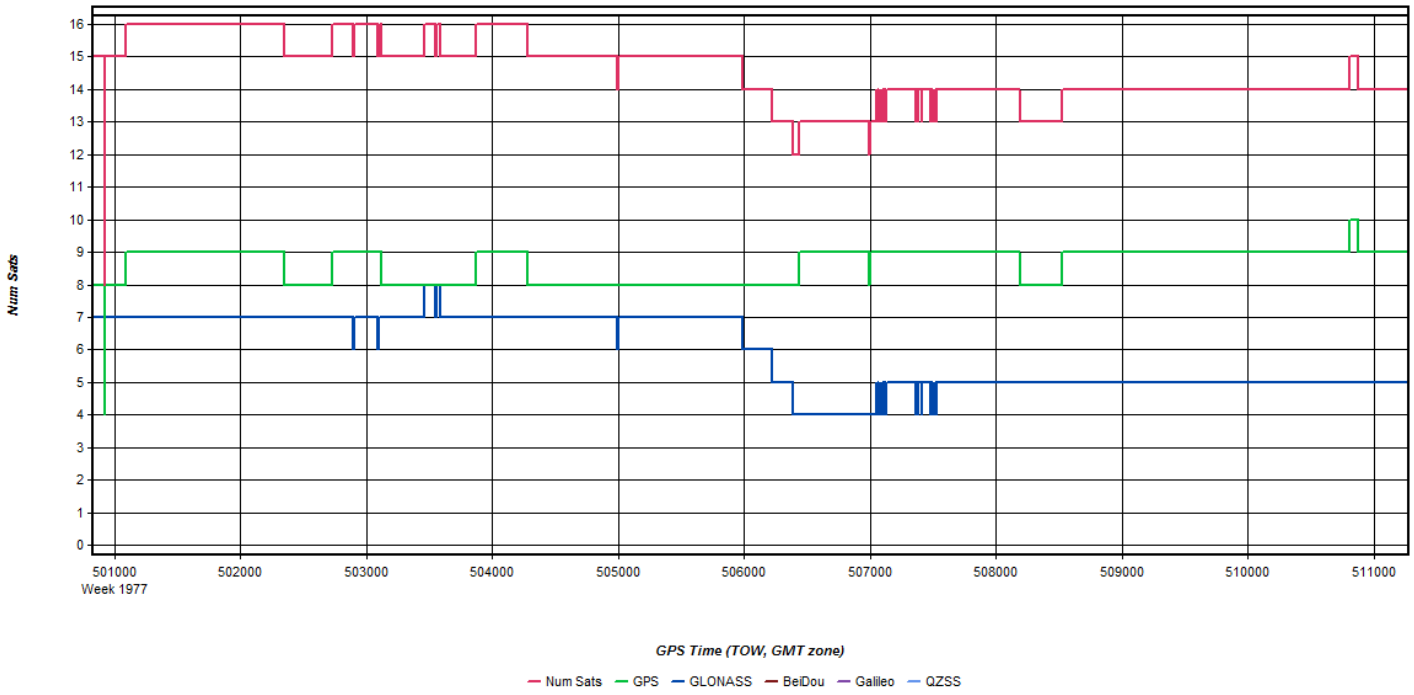

PDOP
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
PDOP

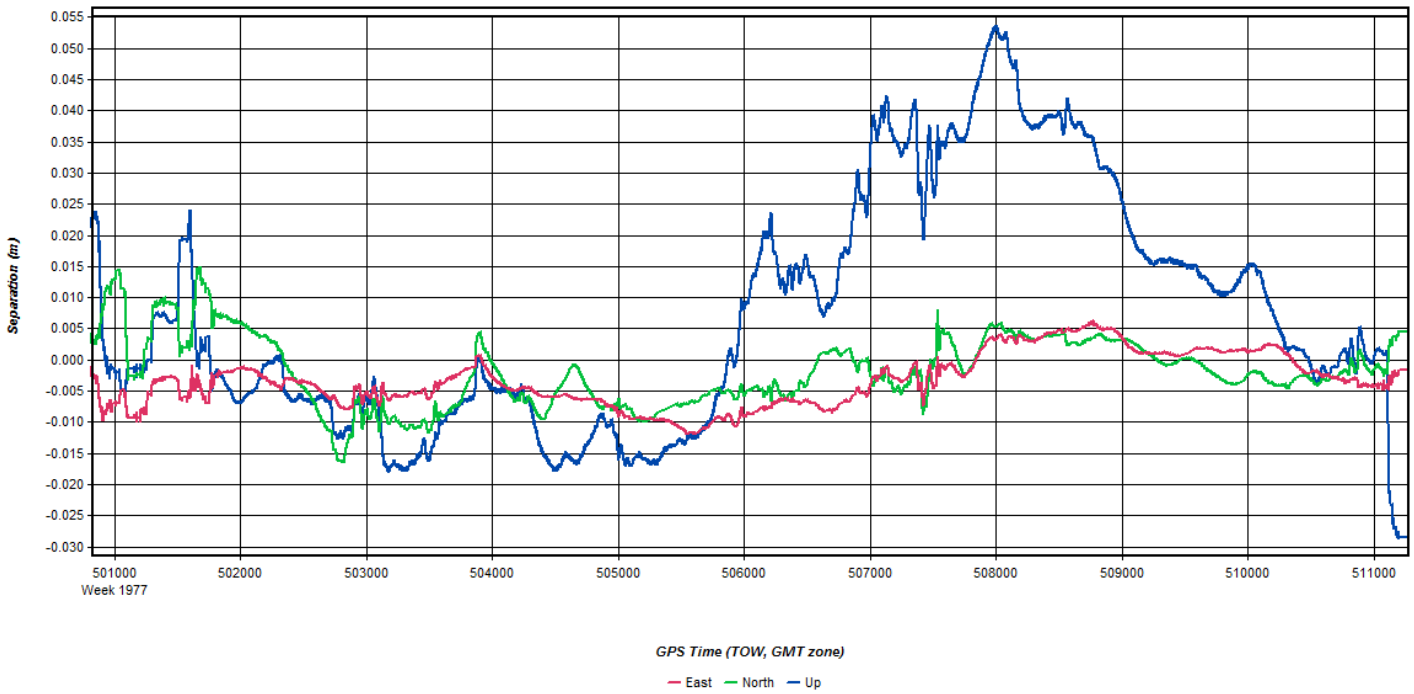

Status
2
1
0
-1
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

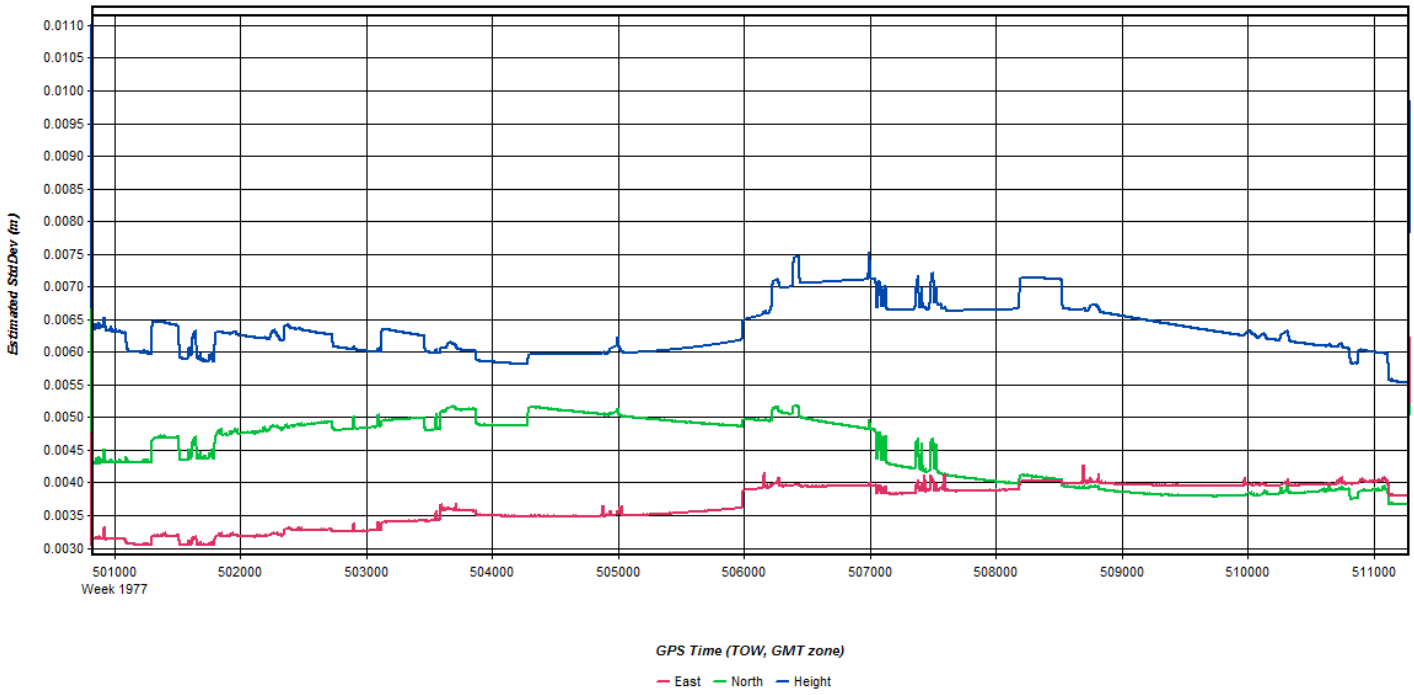

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
Roll
Pitch

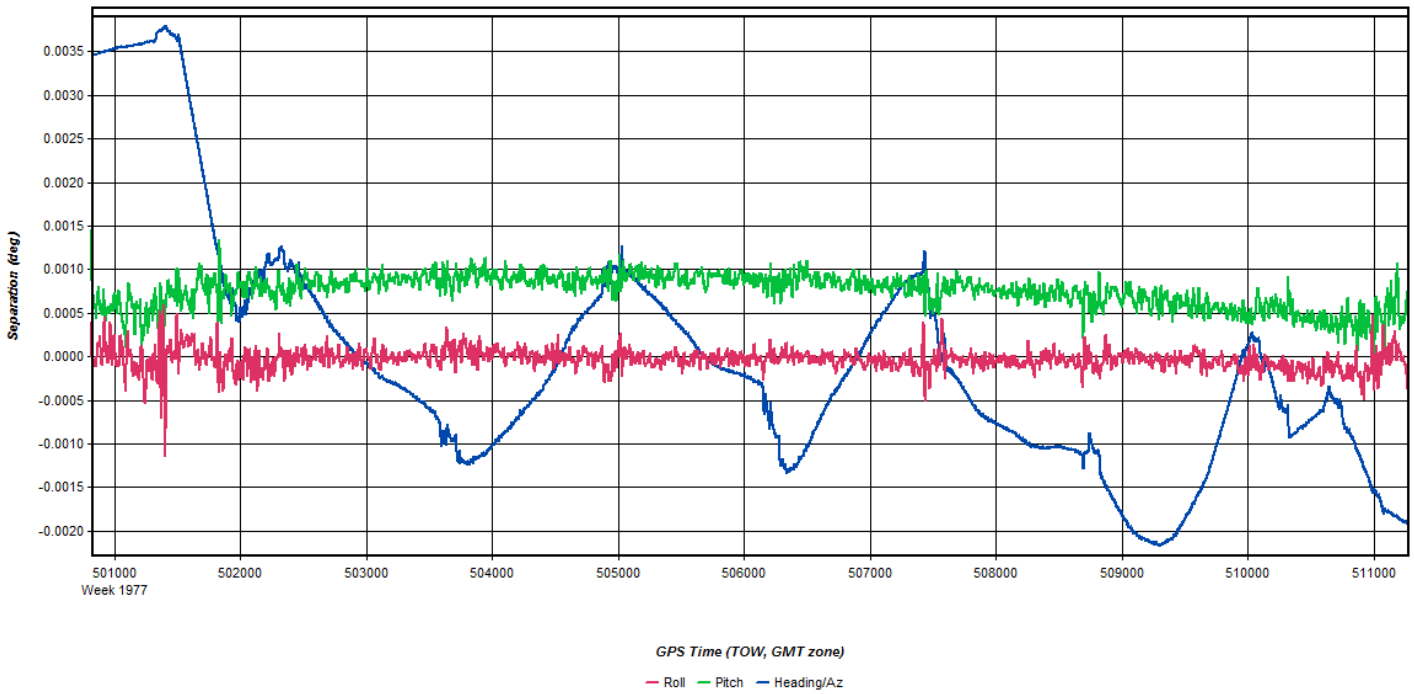

RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
RMS
SD

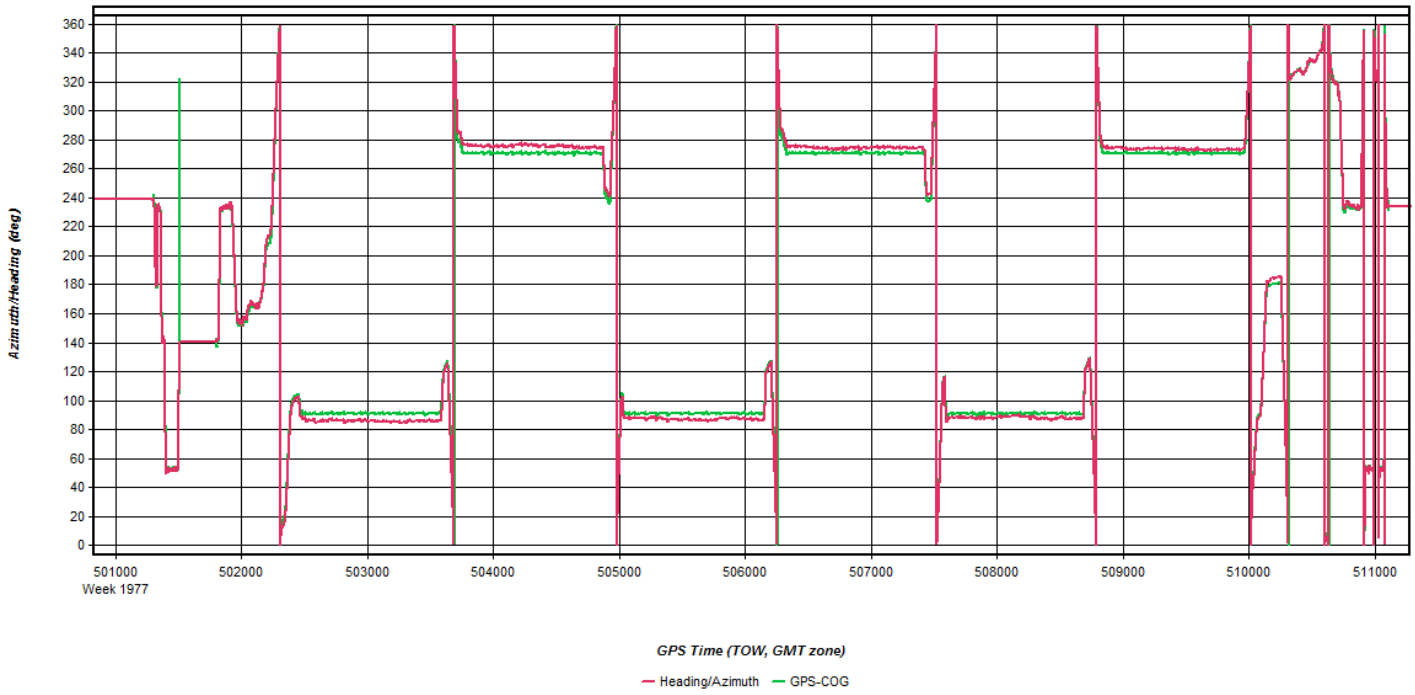

Height (m)
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
Height

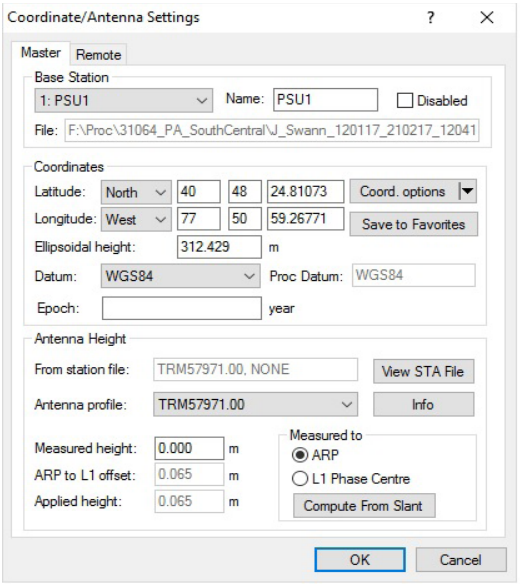

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
-0.015
-0.020
-0.025
-0.030
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
East
North
Up

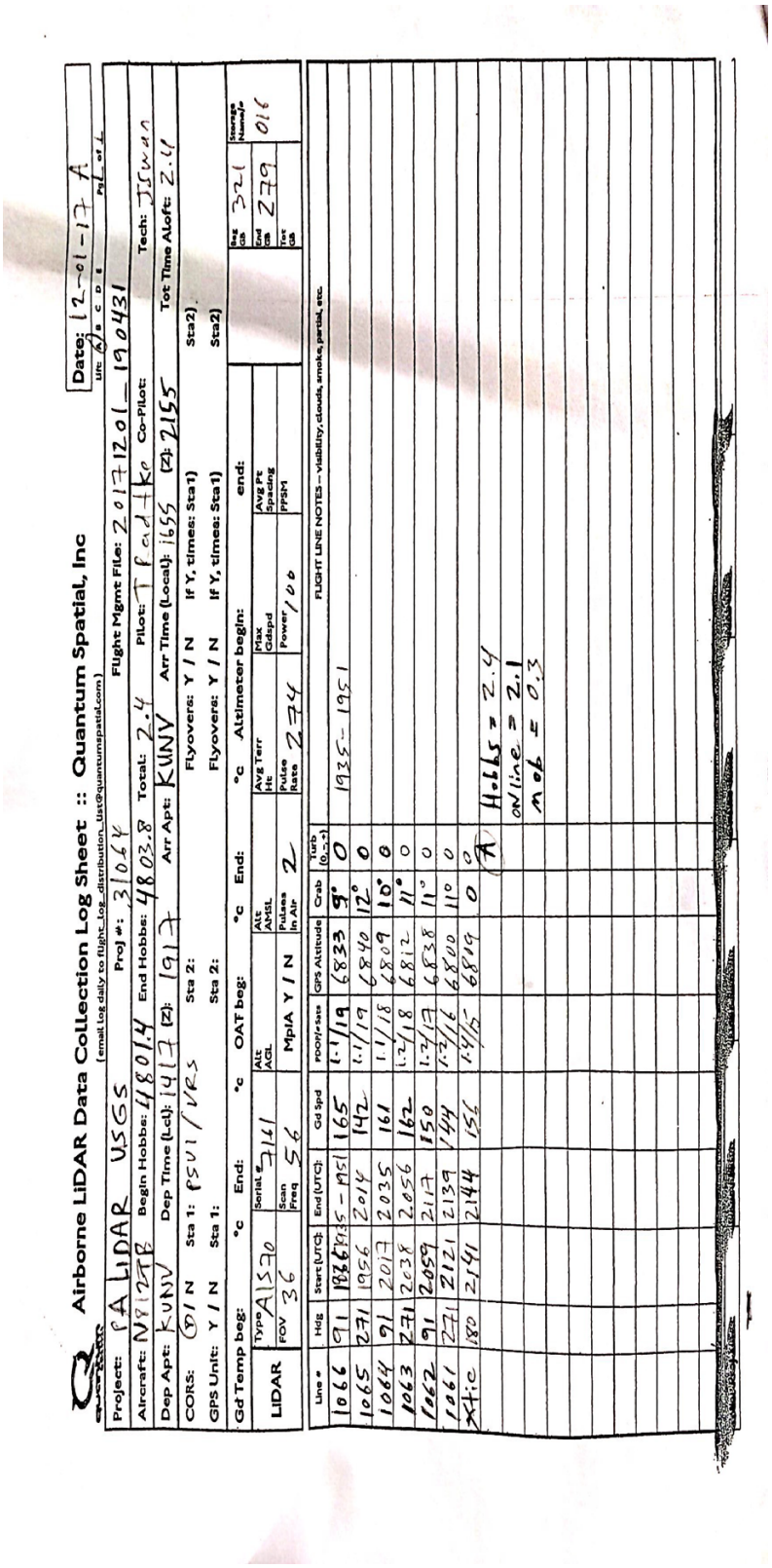

Estimated StdDev (m)
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
501000
Week 1977
502000
503000
504000
505000
506000
507000
508000
509000
510000
511000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_SouthCentral\J_Swann_120117_210217_12041
Coordinates
Latitude: North 40 48 24.81073
Coord. options
Longitude: West 77 50 59.26771
Save to Favorites
Ellipsoidal height: 312.429 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

Flight Log



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

(email Log daily to flight_log_distribution_List@quantumspatial.com)

Date: 12-01-17 A

Ufc: A B C D E Pg 1 of 1

Project: PA LiDAR USGS — Proj #: 31064 — Flight Mgmt File: 20171201_190431

Aircraft: N81278 — Begin Hobbs: 48014 — End Hobbs: 48038 — Total: 2.4 — Pilot: Todd Ke — Co-Pilot: — Tech: Jensen

Dep Apt: KUNV — Dep Time (Lcl): 1413 (Z): 1917 — Arr Apt: KUNV — Arr Time (Local): 1655 (Z): 2155 — Tot Time Aloft: 2.4

CORS: (circle) Y / N — Sta 1: PSU1 / VRS — Sta 2: — Flyovers: Y / N If Y, times: Sta1) Sta2)

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

Gd Temp beg: °c — End: °c — OAT beg: °c — End: °c — Altimeter begin: — end:

LiDAR: Type ALS70 — Serial # 7141 — Alt AGL — Alt AMSL — Avg Terr Ht — Max Gdspd — Avg Pt Spacing

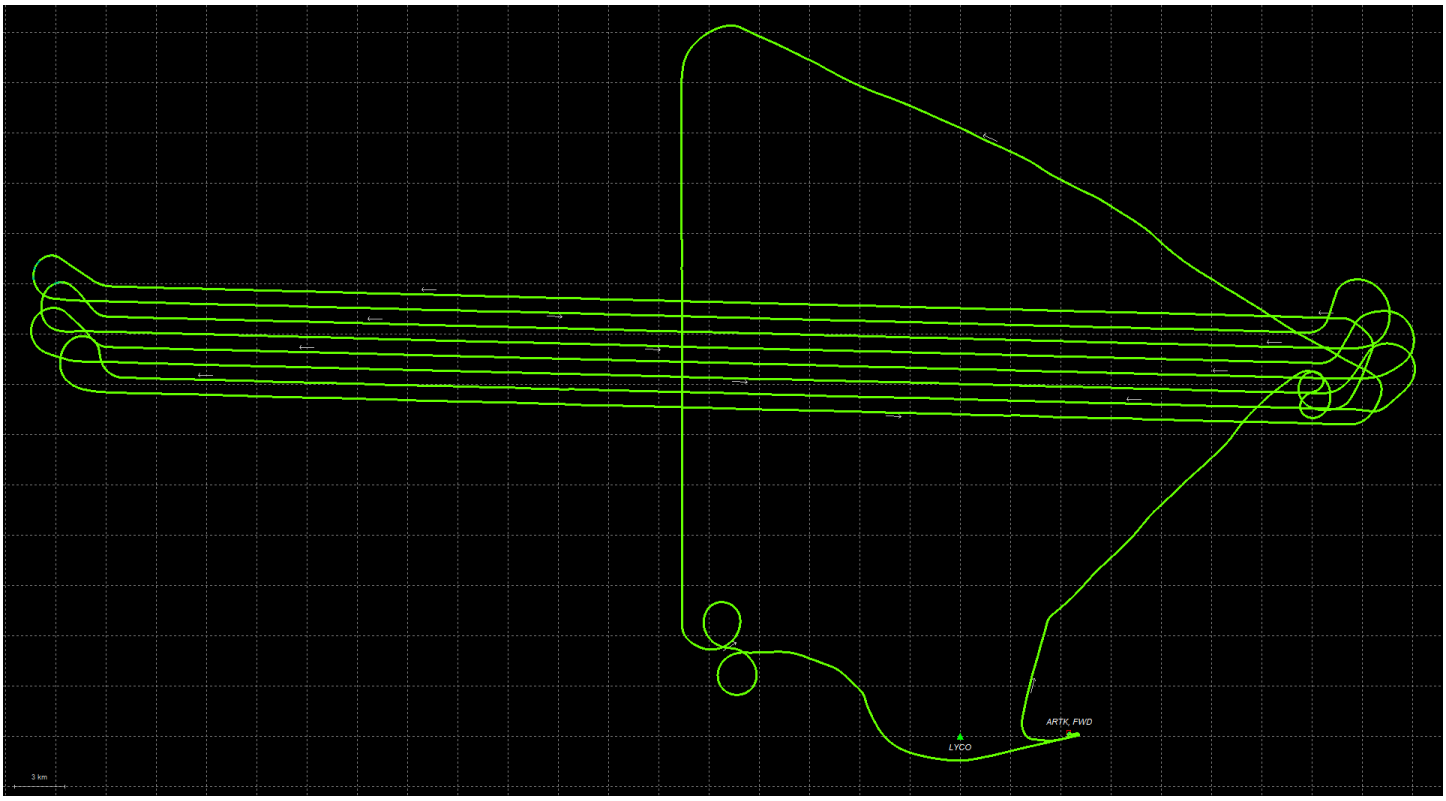
FOV 36 — Scan Freq 56 — MpiA Y / N — Pulses in Air 2 — Pulse Rate 234 — Power 100 — PFSM

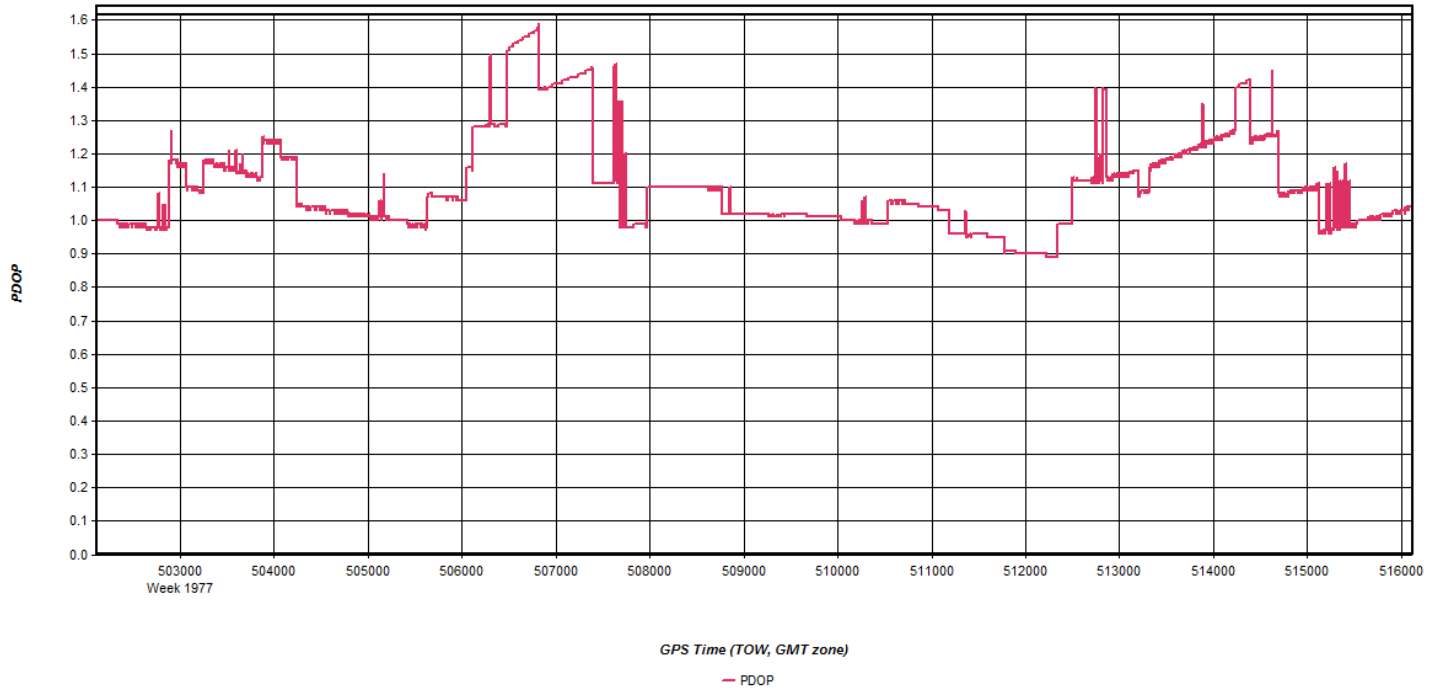
Beg Gb 321 — End Gb 279 — Tot Gb — Image Numbers 018

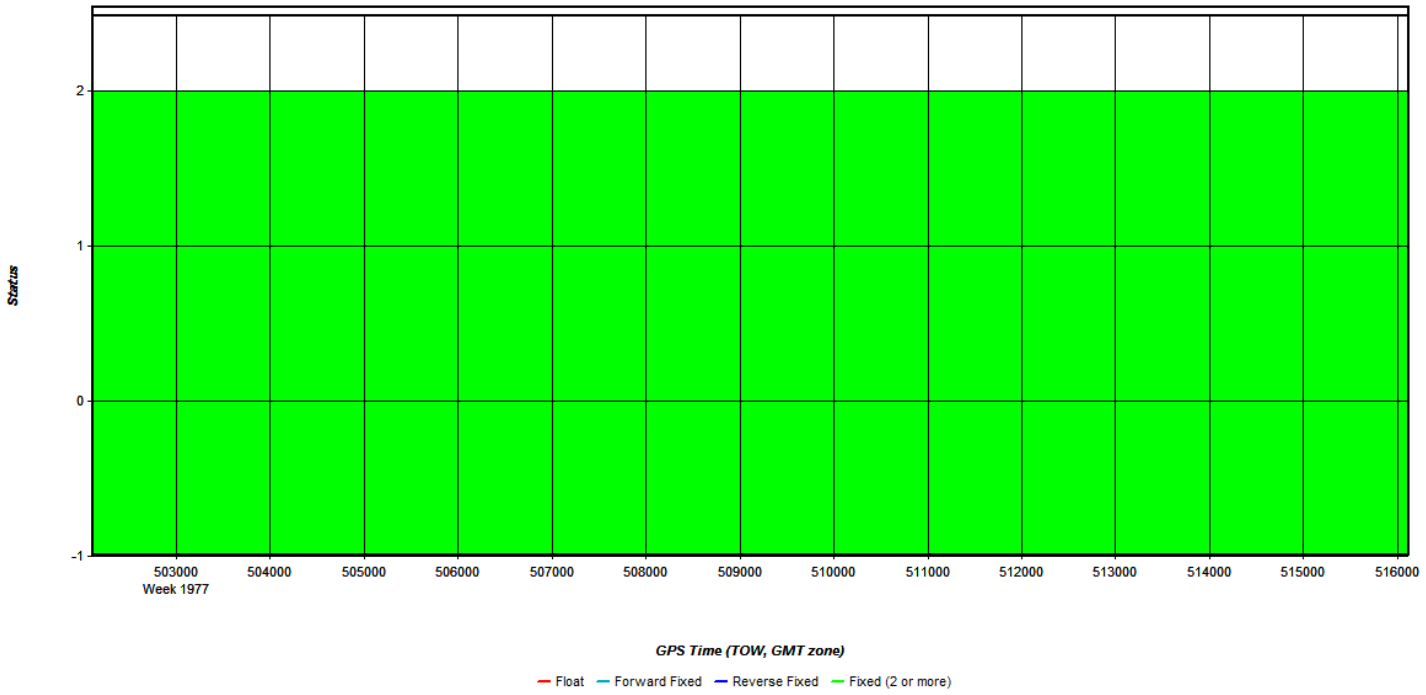
Line #	Hdg	Start (UTC):	End (UTC):	Gd Spd	POQ? +sec	GPS Altitude	Crab	Turb (0-5)	FLIGHT LINE NOTES -- visibility, clouds, smoke, partial, etc.
1066	91	1836	1935 - MSL	165	1.1/19	6833	9°	0	1935 - 1951
1065	271	1956	2014	142	1.1/19	6840	12°	0	
1064	91	2013	2035	161	1.1/18	6809	10°	0	
1063	271	2038	2056	162	1.2/18	6812	11°	0	
1062	91	2059	2117	150	1.2/19	6838	11°	0	
1061	271	2121	2139	144	1.2/16	6800	11°	0	
Xtie	180	2141	2144	154	1.4/15	6819	0	A	Hobbs = 2.4
									online = 2.1
									mob = 0.3

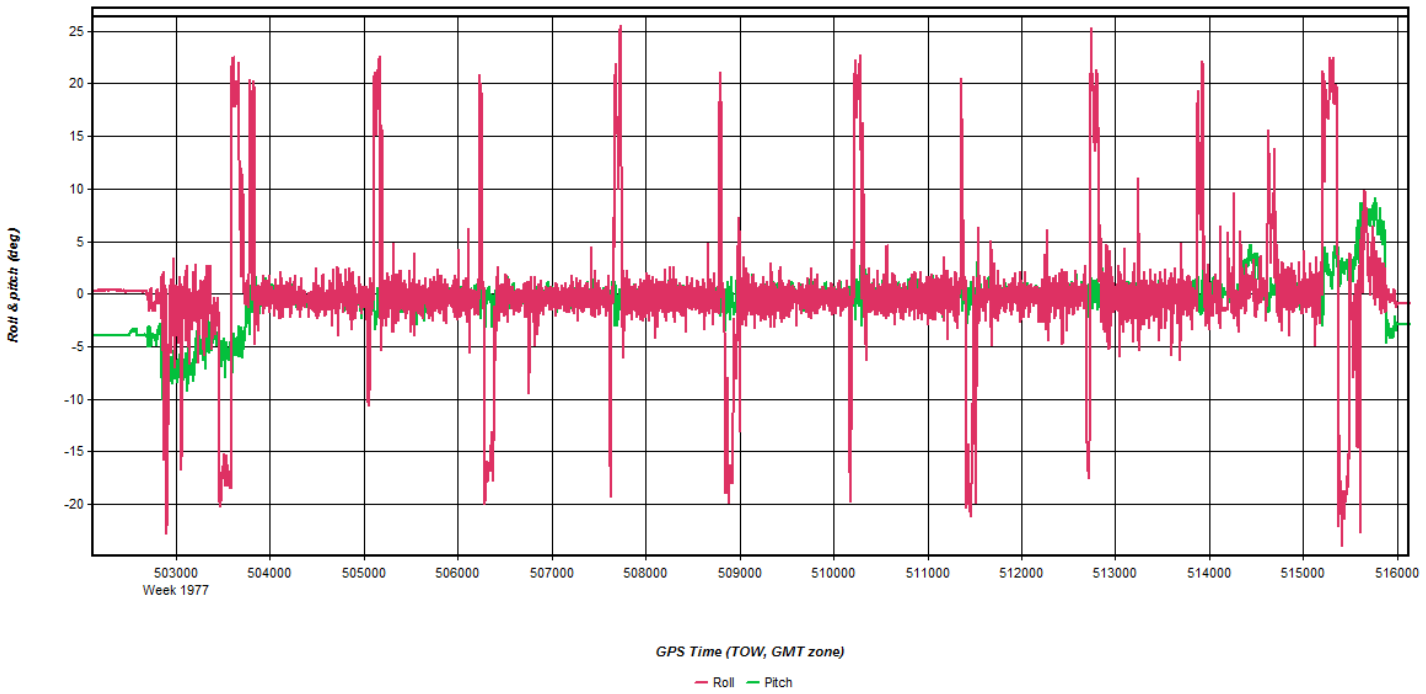
Scanned by CamScanner

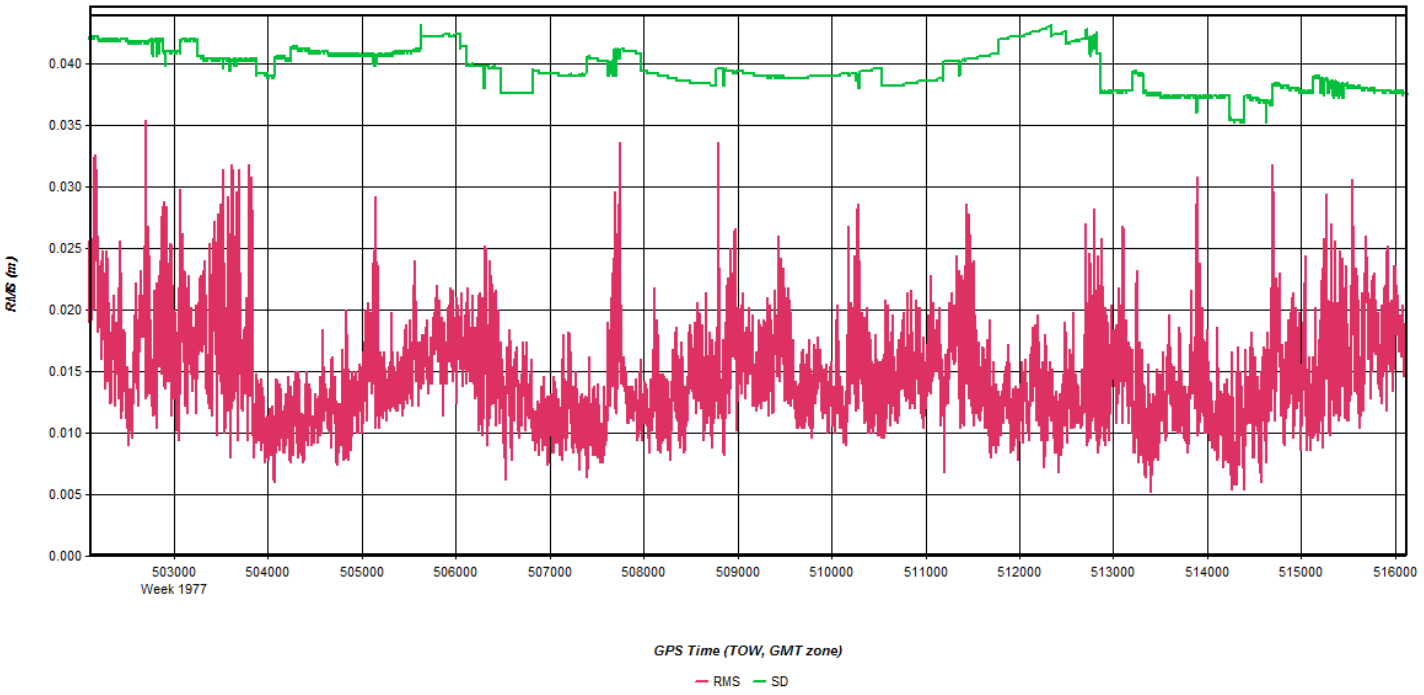
December 1, 2017-A (N916WC, SN8119)

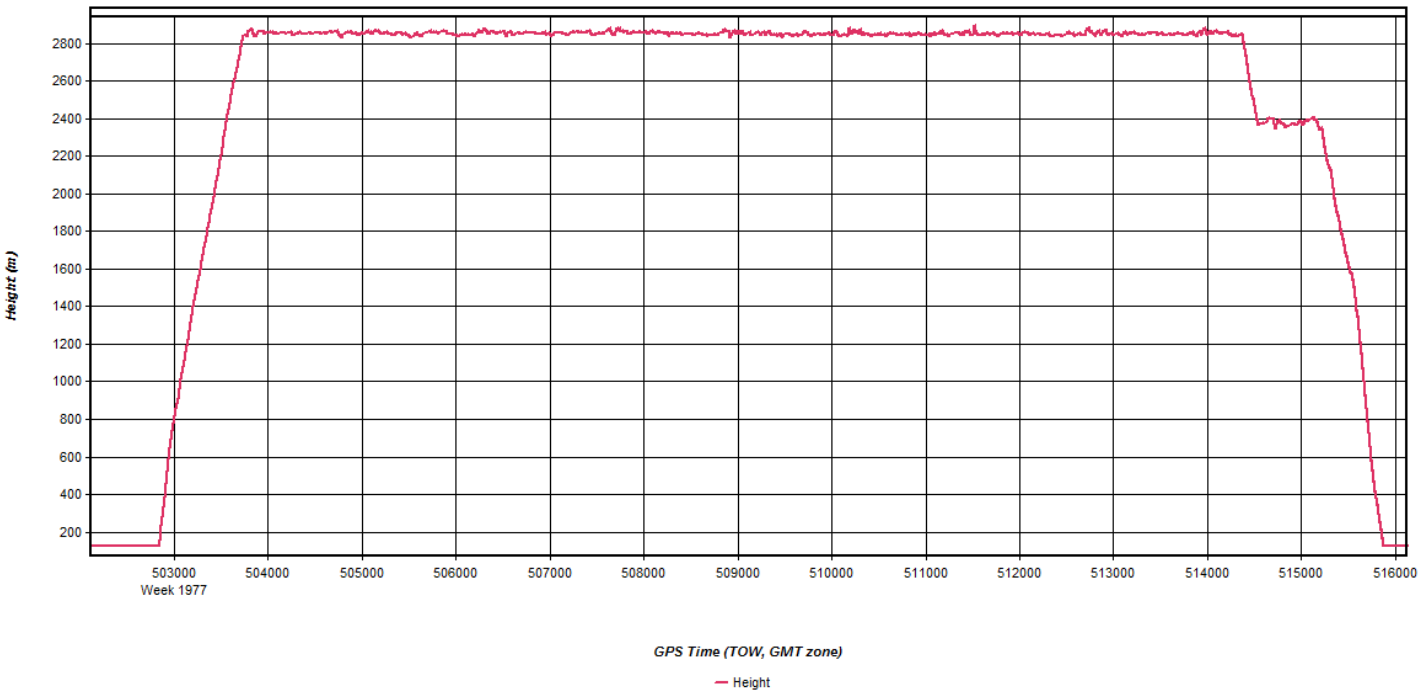

ARTK_FWD
LYCO
3 km

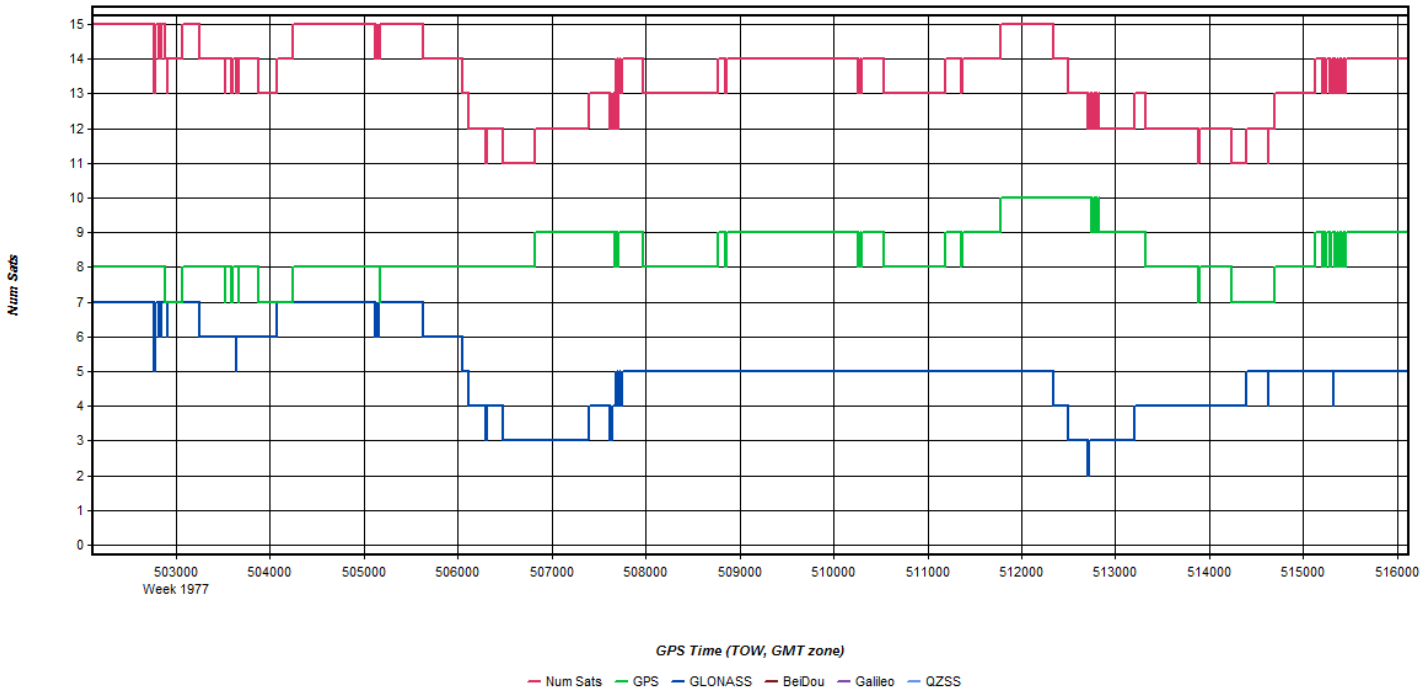

PDOP
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
PDOP

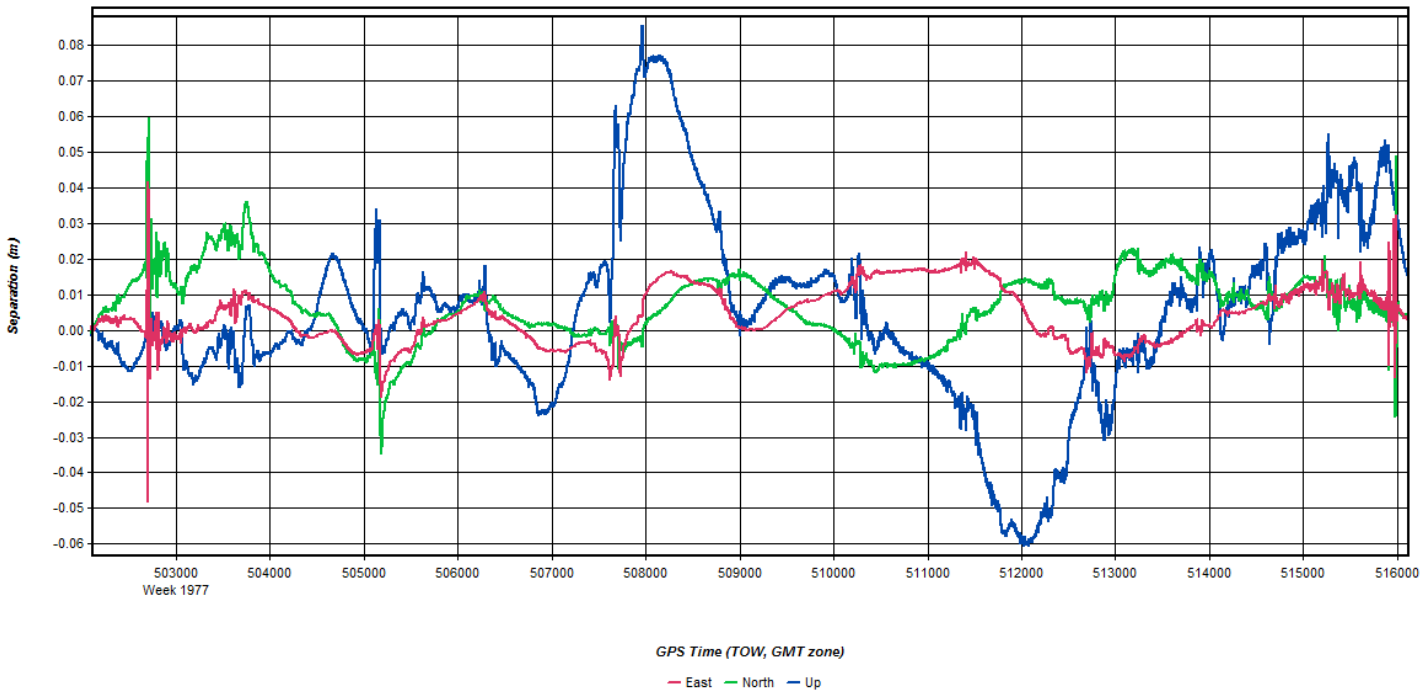

Status
2
1
0
-1
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)


Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
Roll
Pitch

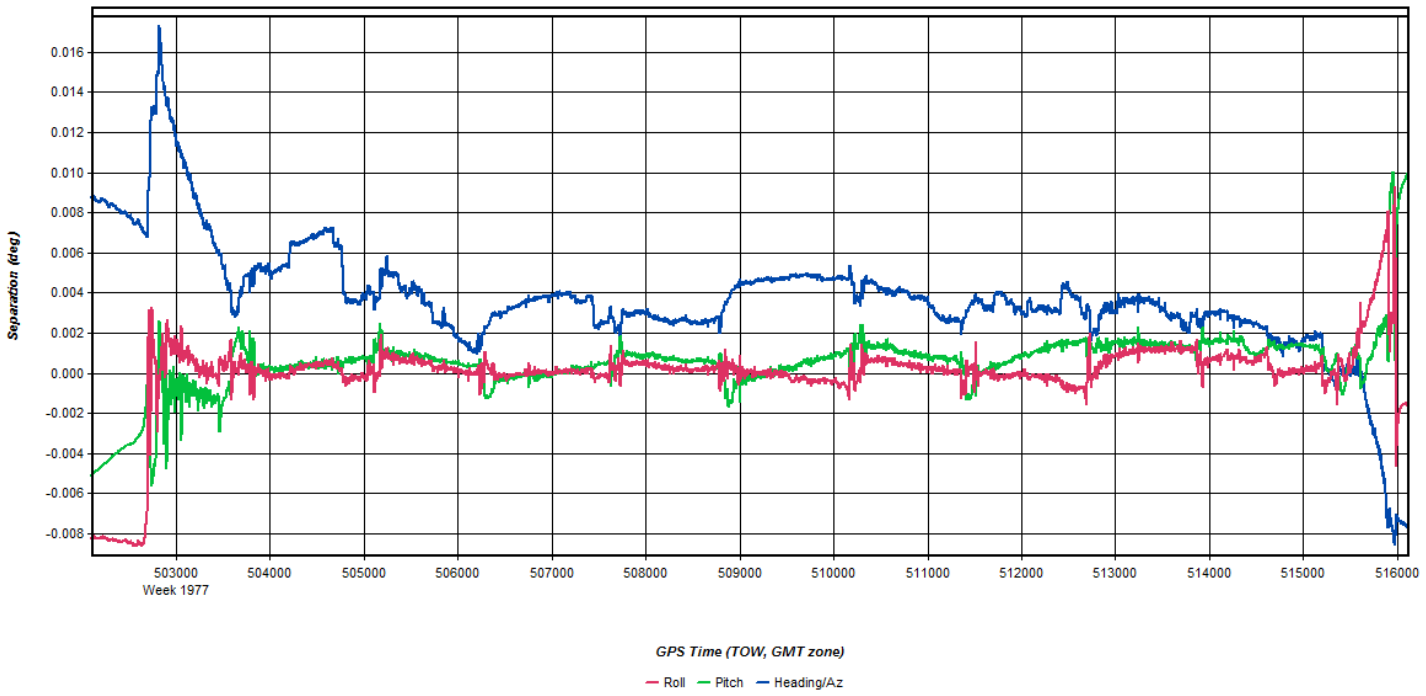

RMS (m)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
RMS
SD

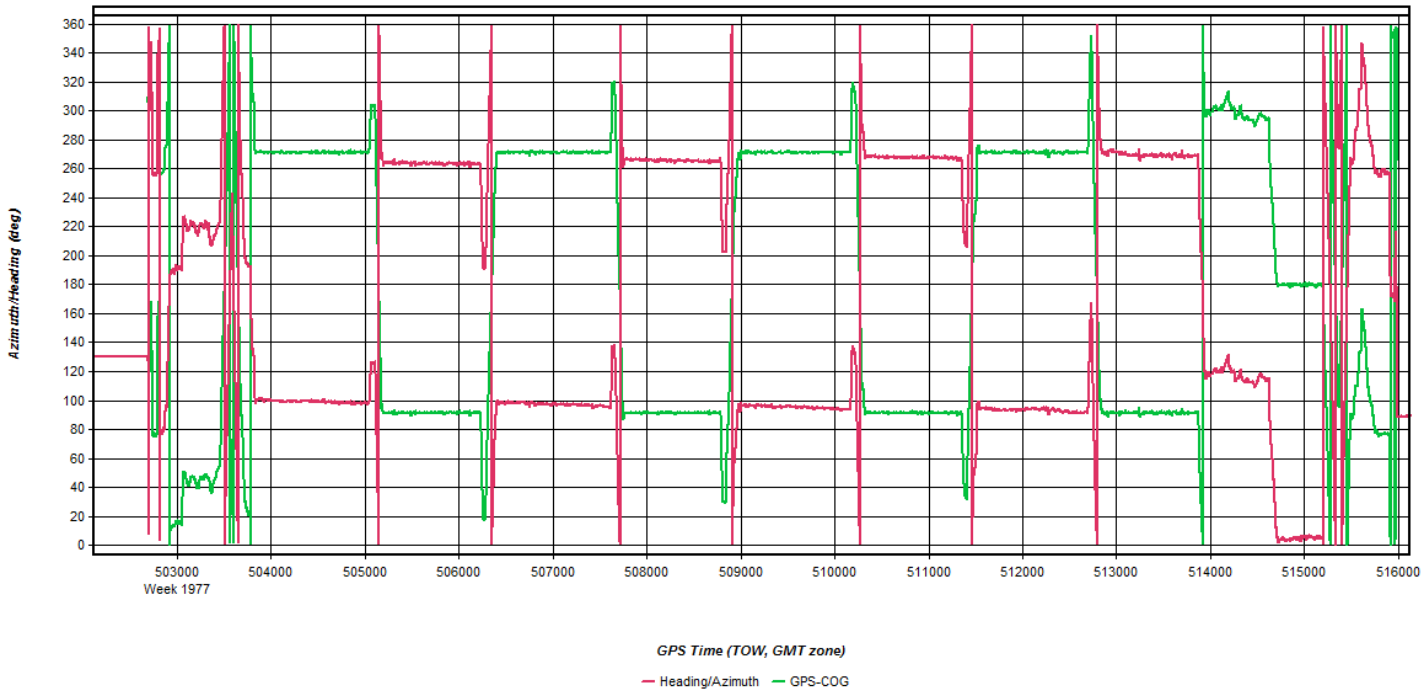

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
Height

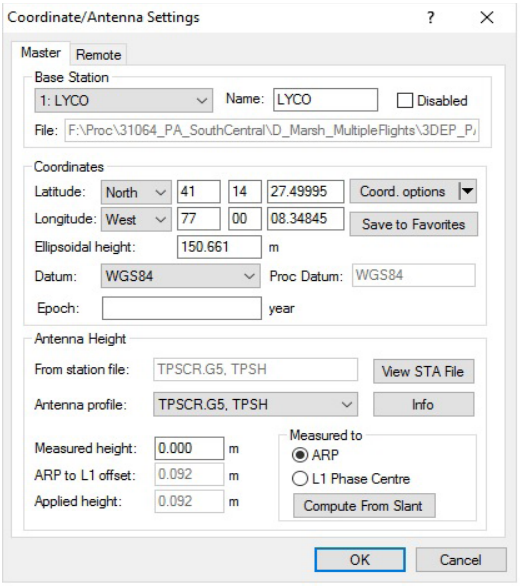

Num Sats
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0125
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
503000
Week 1977
504000
505000
506000
507000
508000
509000
510000
511000
512000
513000
514000
515000
516000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_MultipleFlights\3DEP_P
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aerotus
LIDAR FLIGHT REPORT

Revised Feb. 2014

CREW: Pilot/Operator: Scott A. / Don M. | AIRCRAFT: Tail Number: N816WC | WEATHER: Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: Clear Winds 15 kts fm 325 deg

UTC DATE: 12/01/2017 (mm/dd/yy)

Camera System: LiDAR S/N: 8119

Camera Location (Hole): fwd/aft: Fwd

GPS: Source: Kappa 180

	Time	Location
Start-up	2:25 pm local	Williamsport KIPT Pa
Shut-down	6:20 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

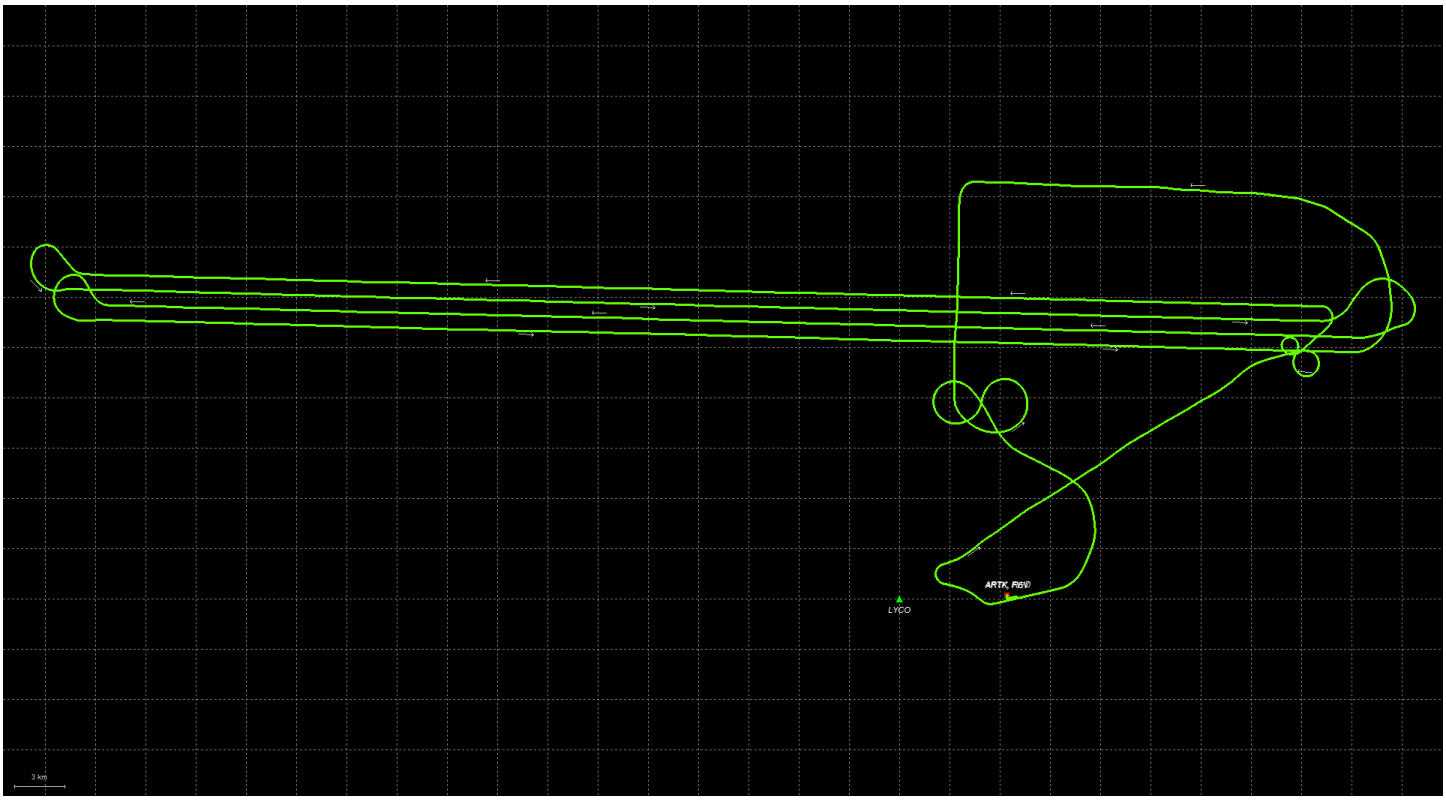
Lens cleaned	
AIRpds uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

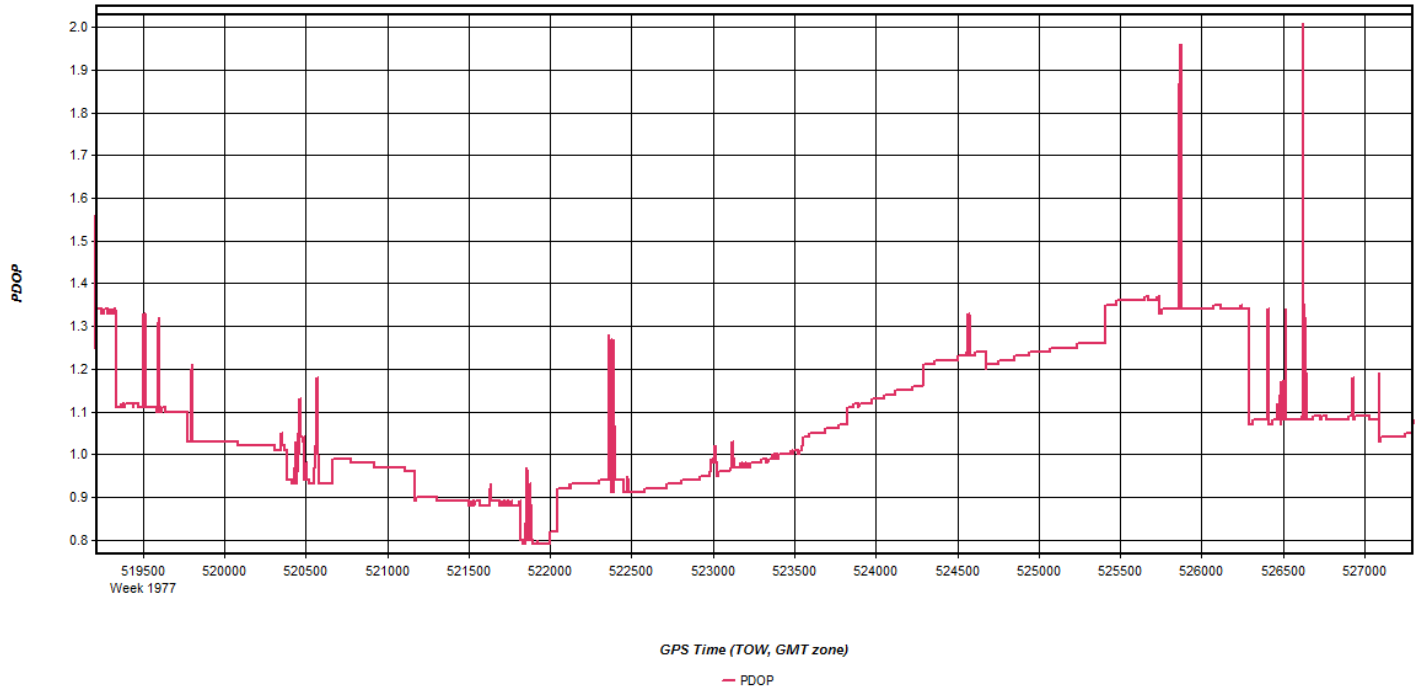
SSD

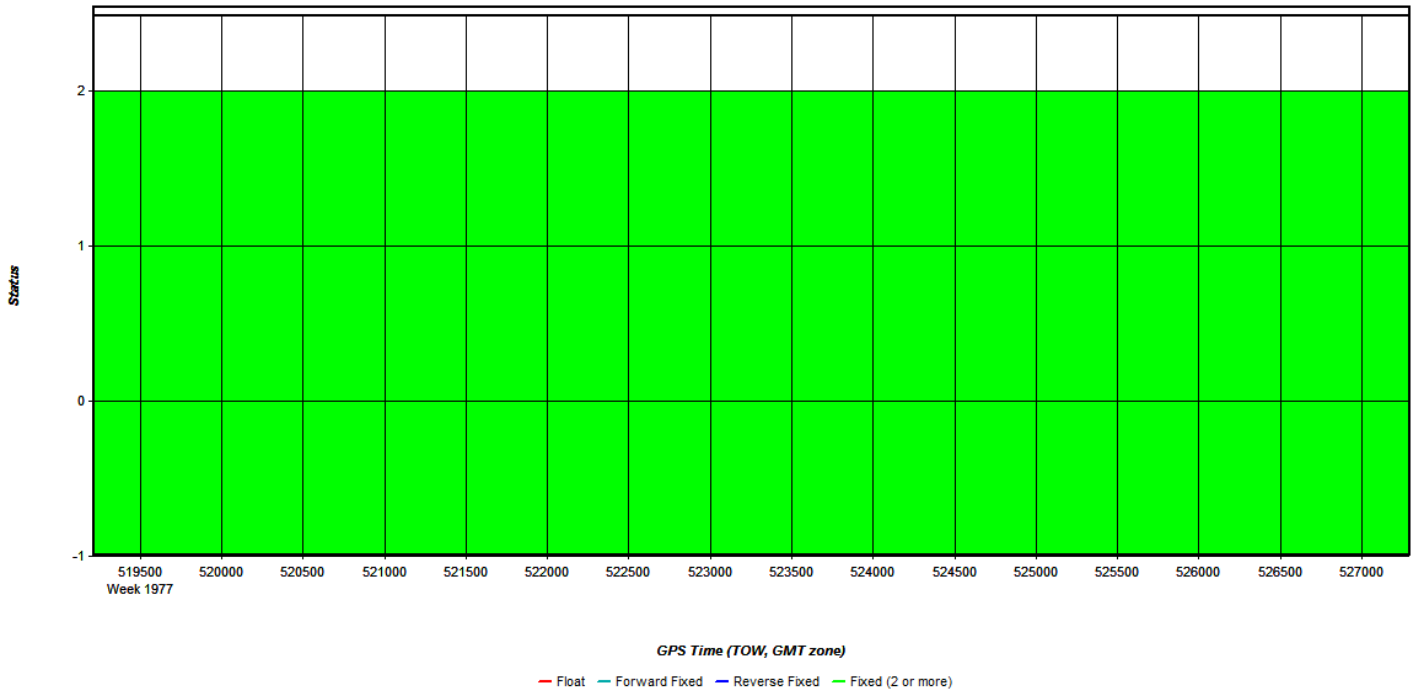
Drive #	8119_1
@ Beginning	
Space Used	0
During Mission	74
Space Used	1106
Remaining Tot Space	

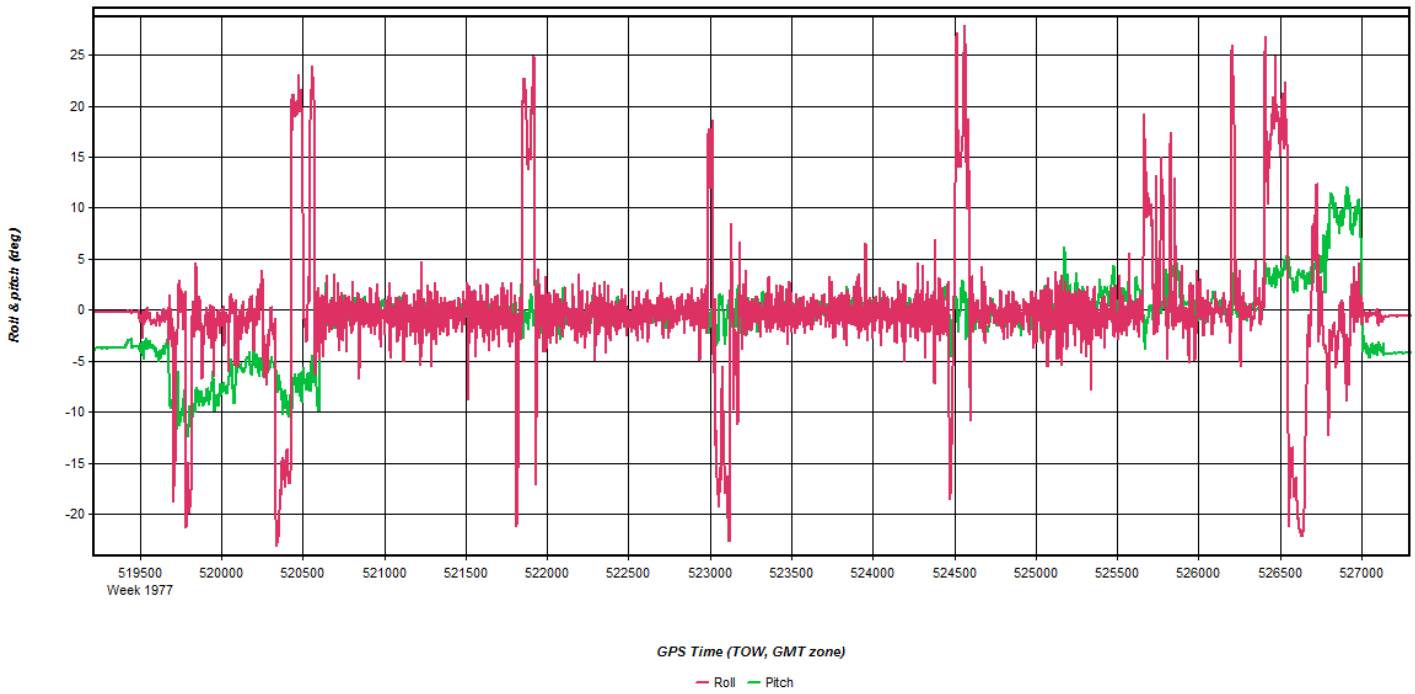
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N017	W		
		N018	E		
		N019	W		
		N020	E		
		N021	W		
		N022	E		
		N023	W		
		N024	E		
		NX02	S		

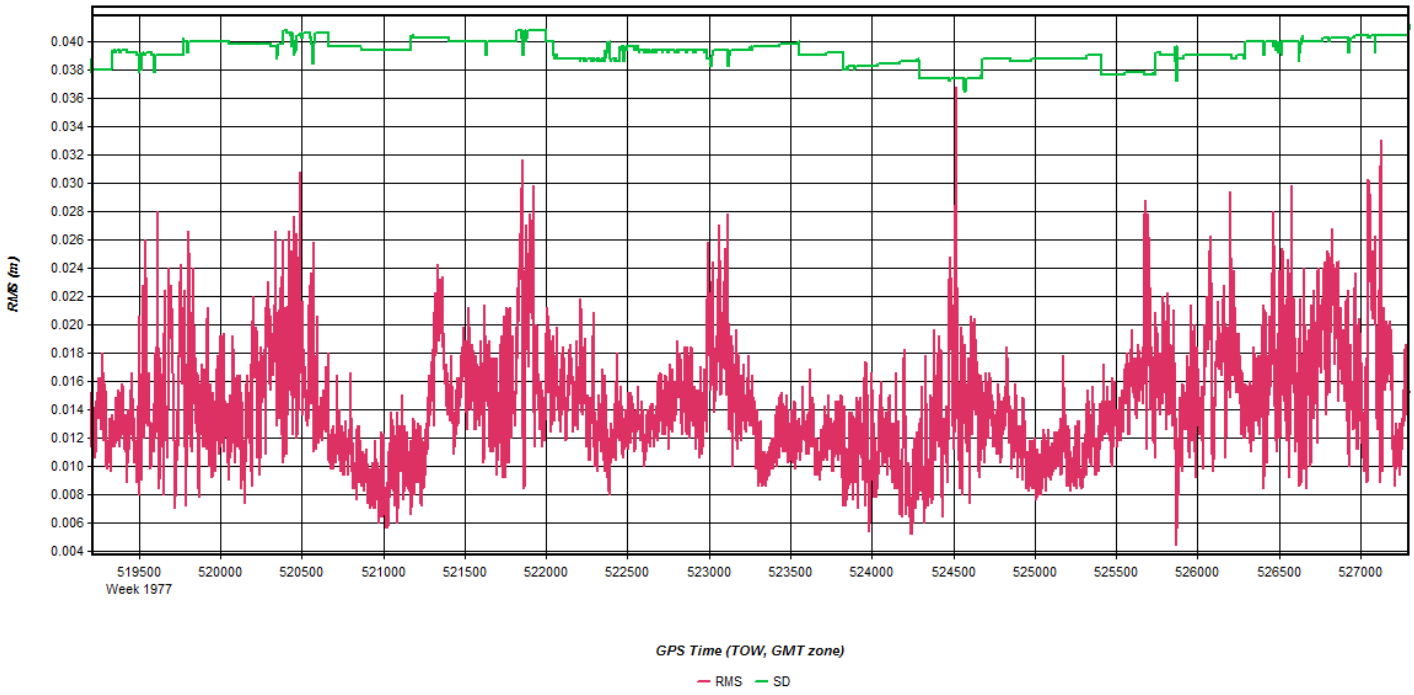
December 2, 2017-A (N916WC, SN8119)

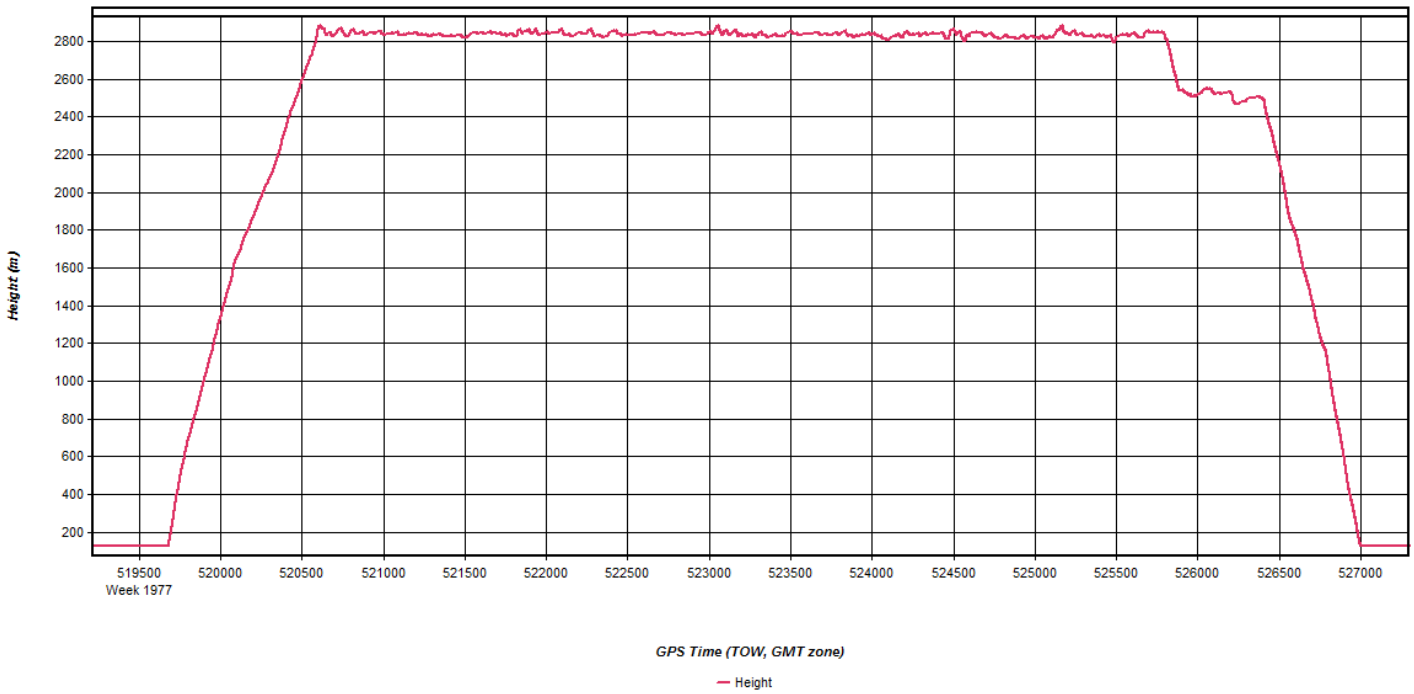

ARTK_REF
LYCO

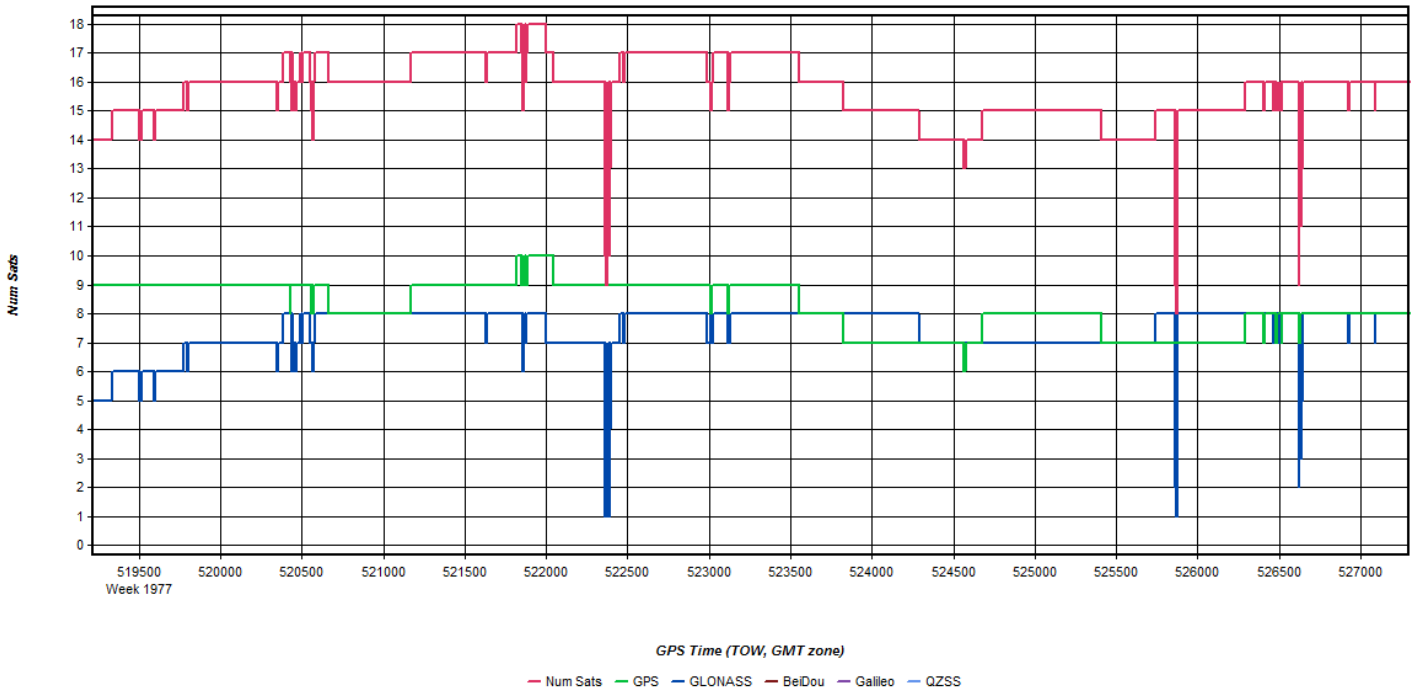

PDOP
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
PDOP

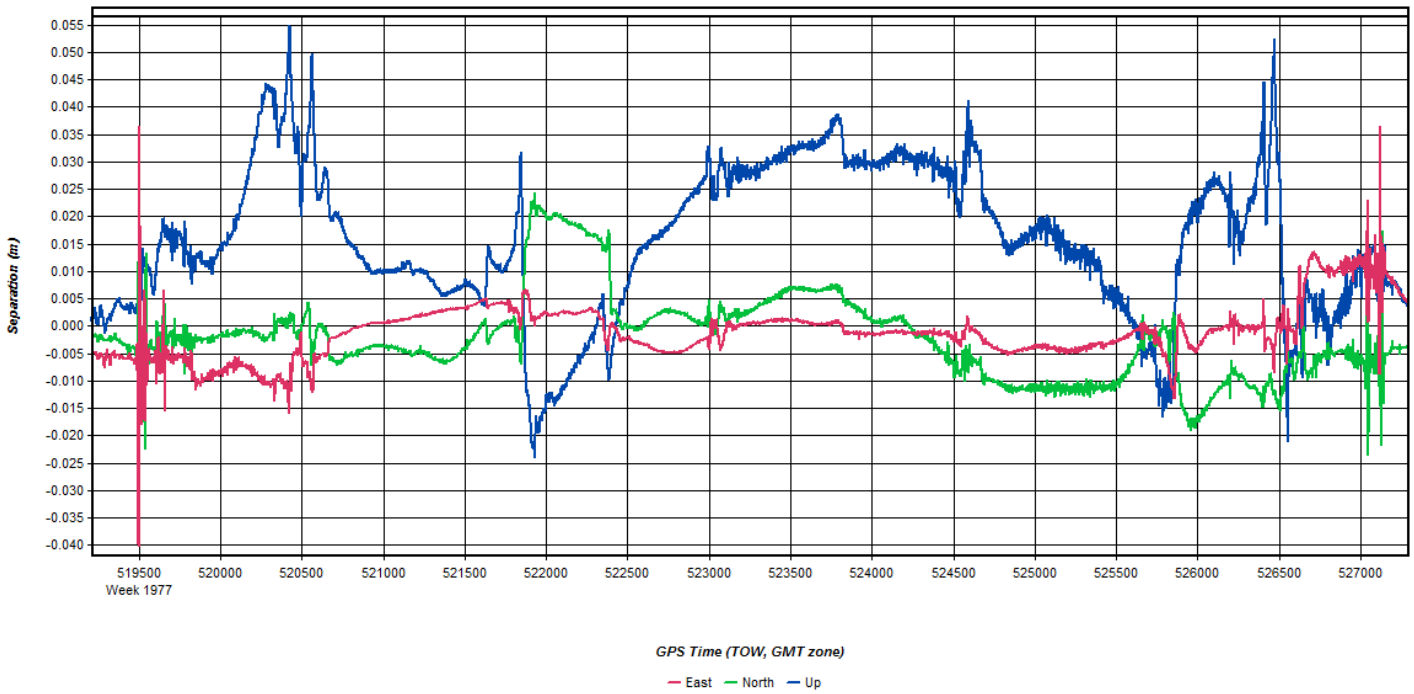

Status
2
1
0
-1
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

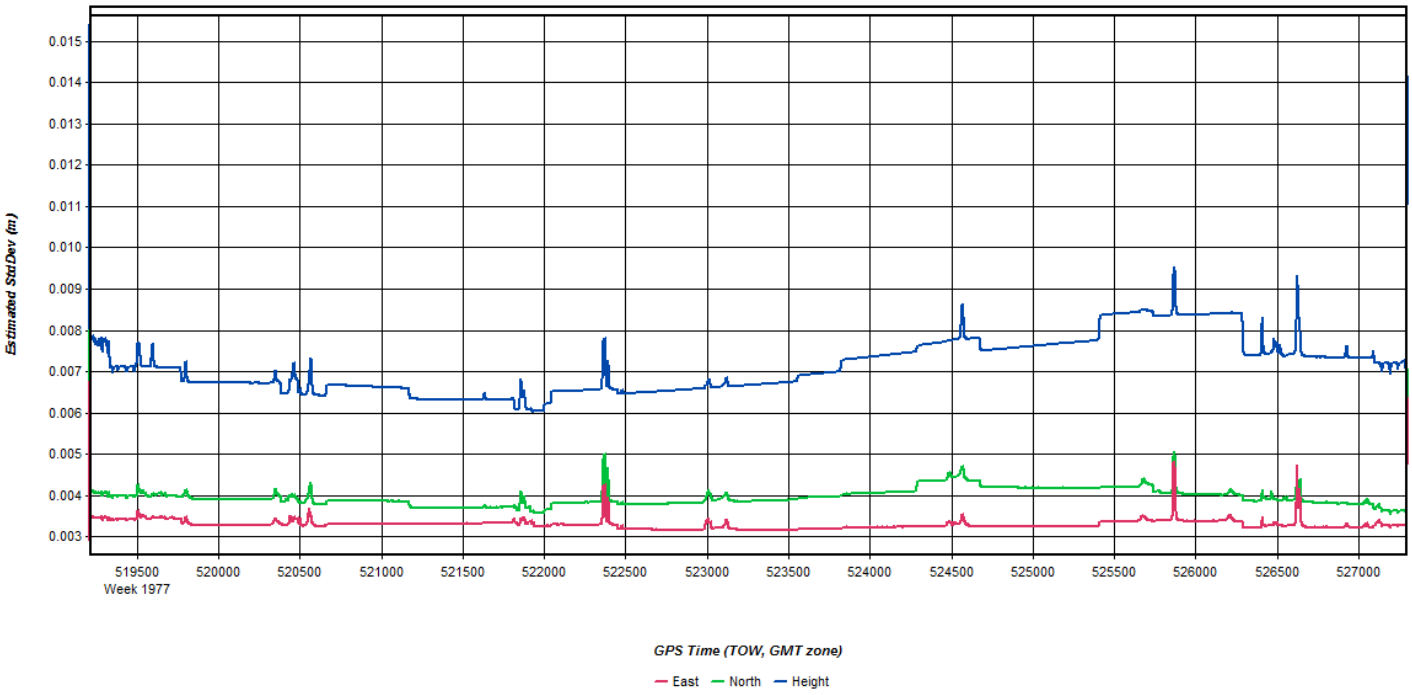

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
Roll
Pitch


RMS (m)
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
RMS
SD

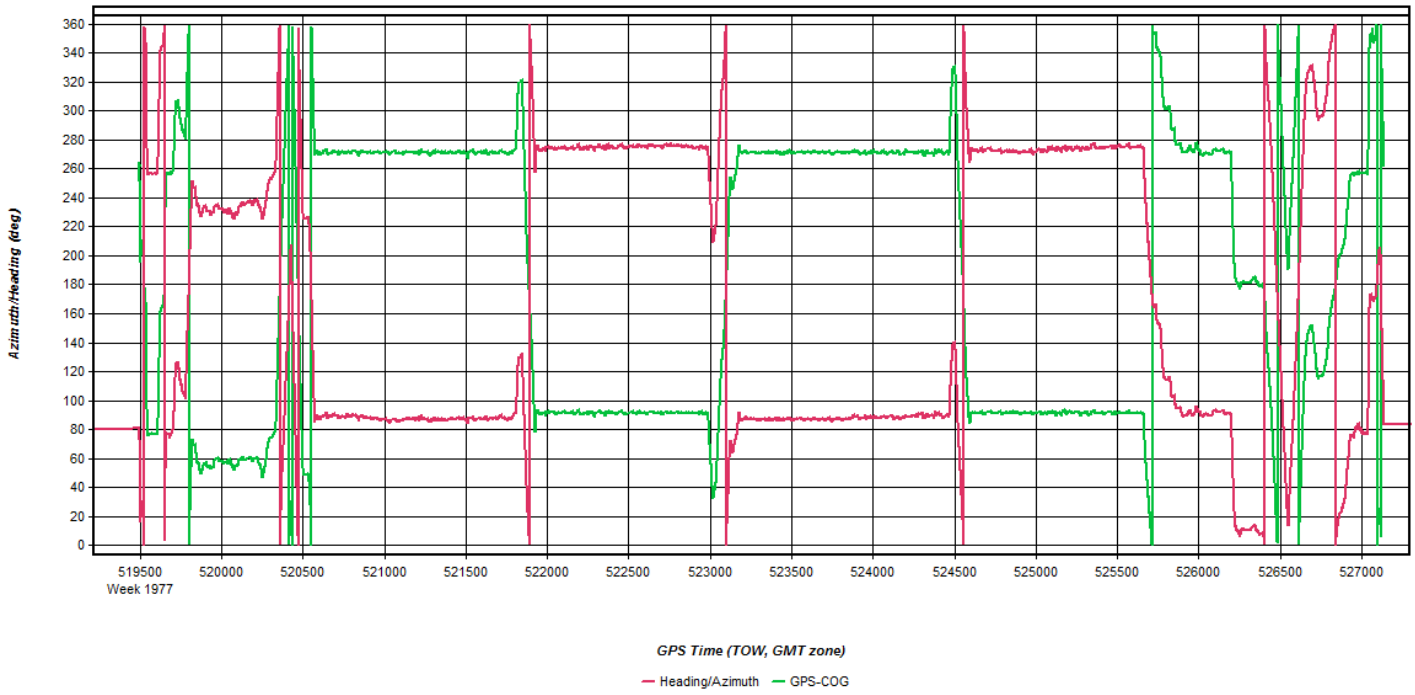

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
Height

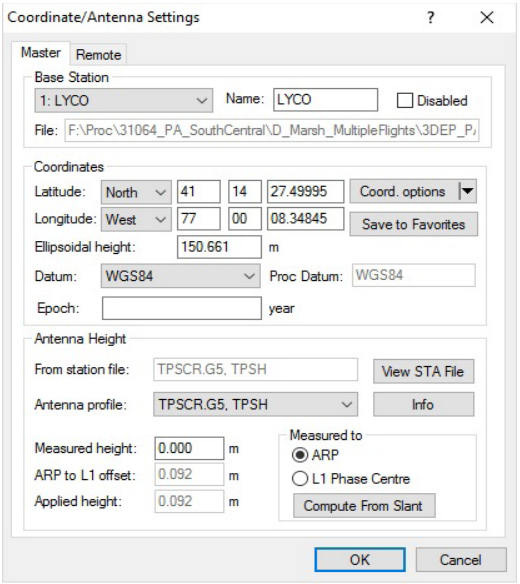

Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
-0.015
-0.020
-0.025
-0.030
-0.035
-0.040
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
519500
Week 1977
520000
520500
521000
521500
522000
522500
523000
523500
524000
524500
525000
525500
526000
526500
527000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_MultipleFlights\3DEP_P
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aeronautics
LIDAR FLIGHT REPORT

Revised Feb. 2014

Pilot/Operator	Tail Number	WEATHER	Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.
CREW: Scott A. / Don M	AIRCRAFT: N916WC		Clear Winds 22 kts fm 283 deg

UTC DATE: 12/01/2017 (mm/dd/yy)

Camera System: LiDAR S/N 8119
Camera Location (Hole): fwd/aft Fwd

GPS: Source Kappa 180

	Time	Location
Start-up	7:10 pm local	Williamsport KIPT Pa
Shut-down	9:25 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

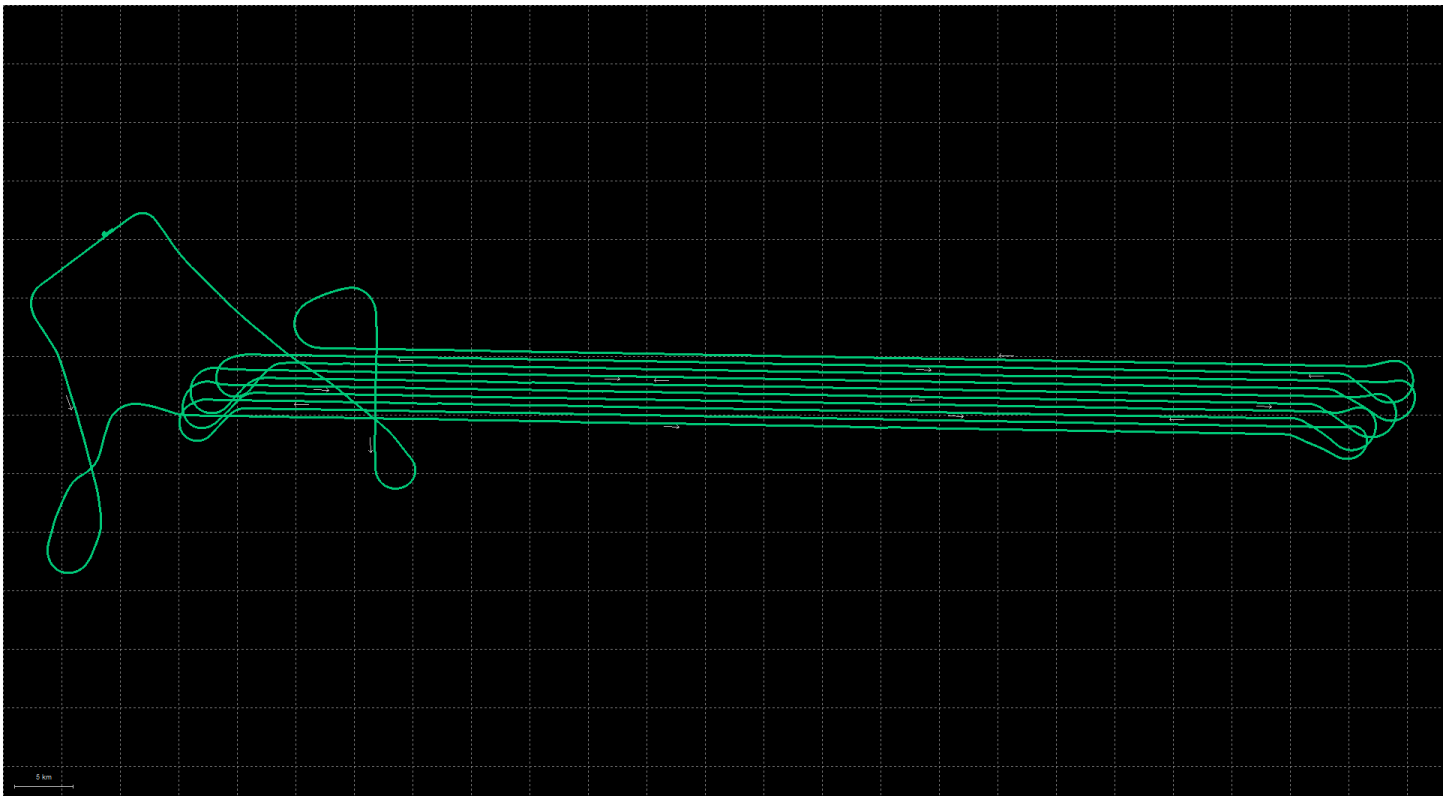
Lens cleaned	
AIRpds uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

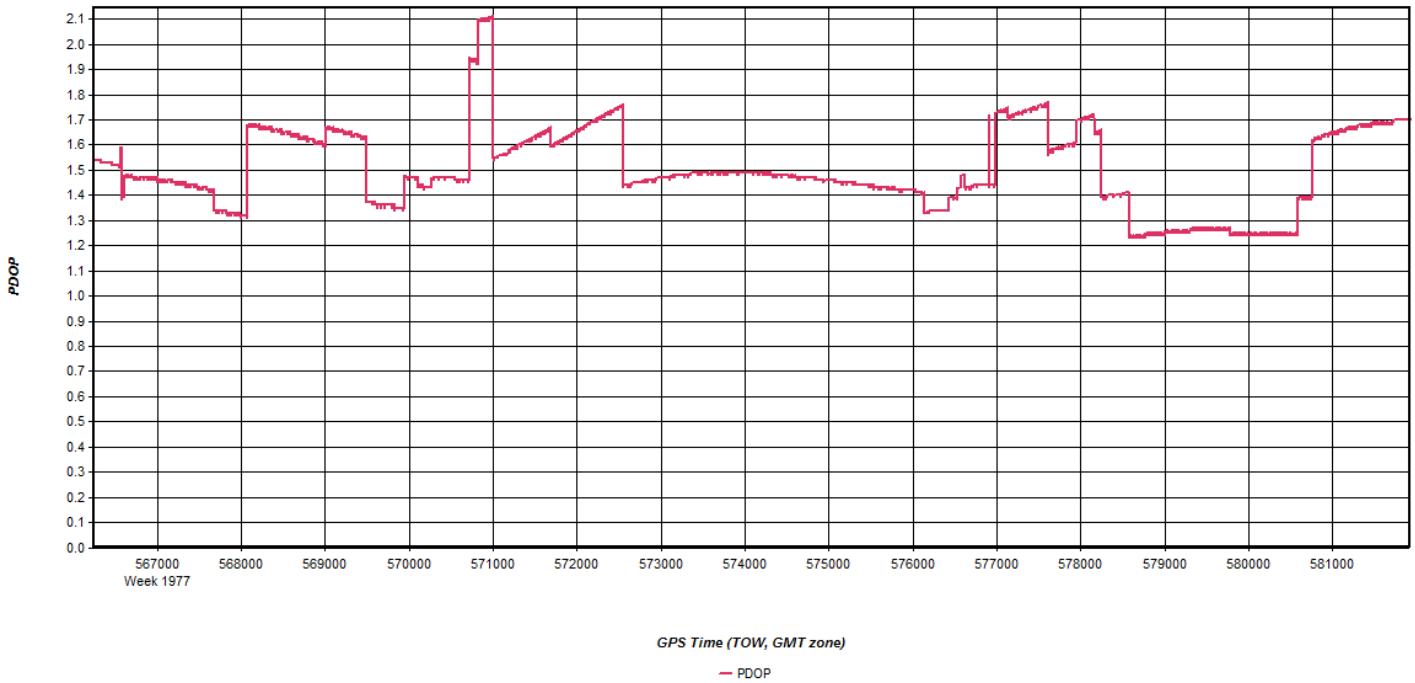
SSD

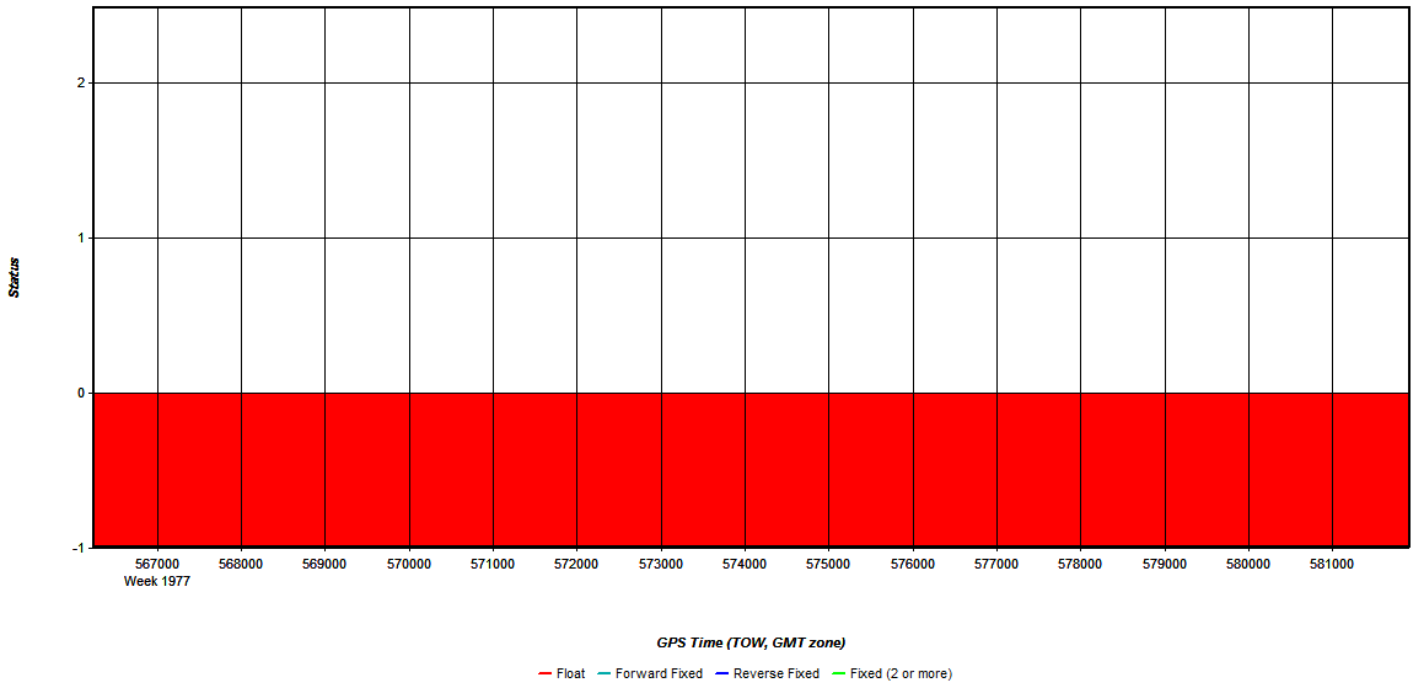
Drive #	8119_1
@ Beginning	
Space Used	74
During Mission	39
Space Used	1141
Remaining Tot Space	

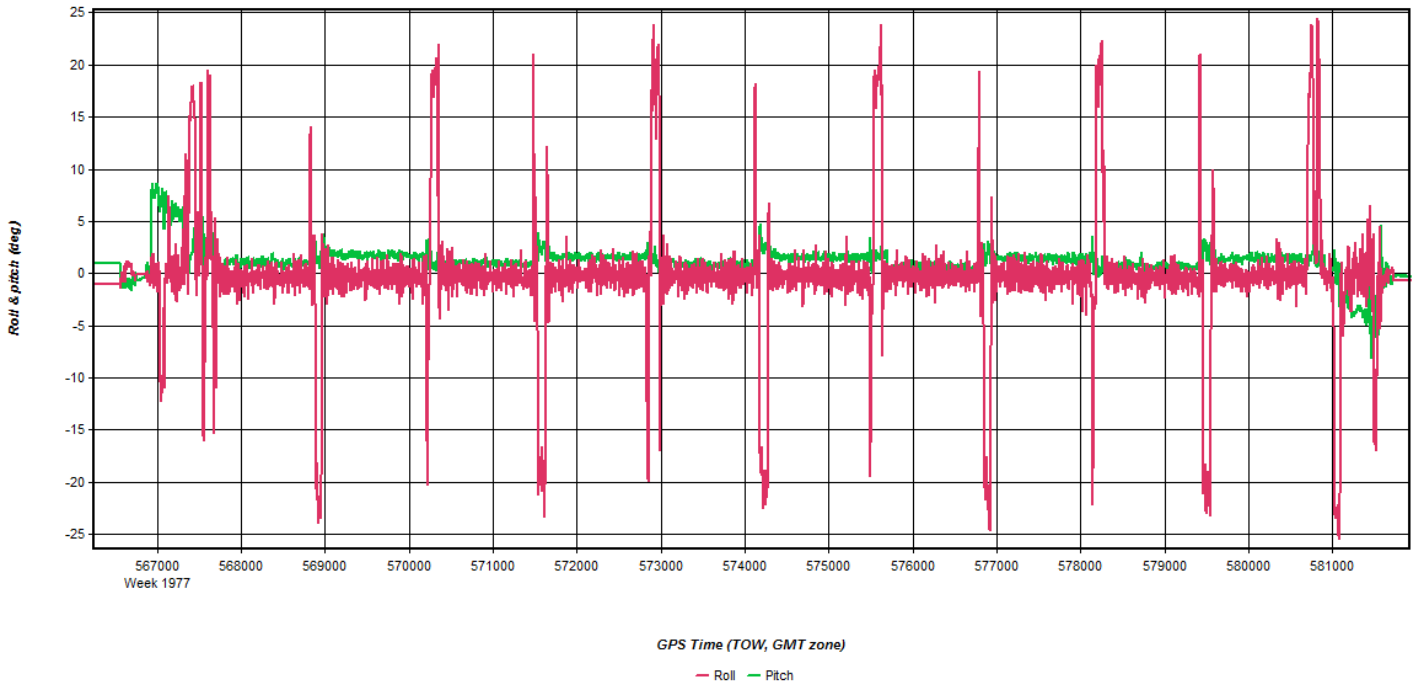
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N025	W		
		N026	E		
		N027	W		
		N028	E		
		Ad-Hoc	S		

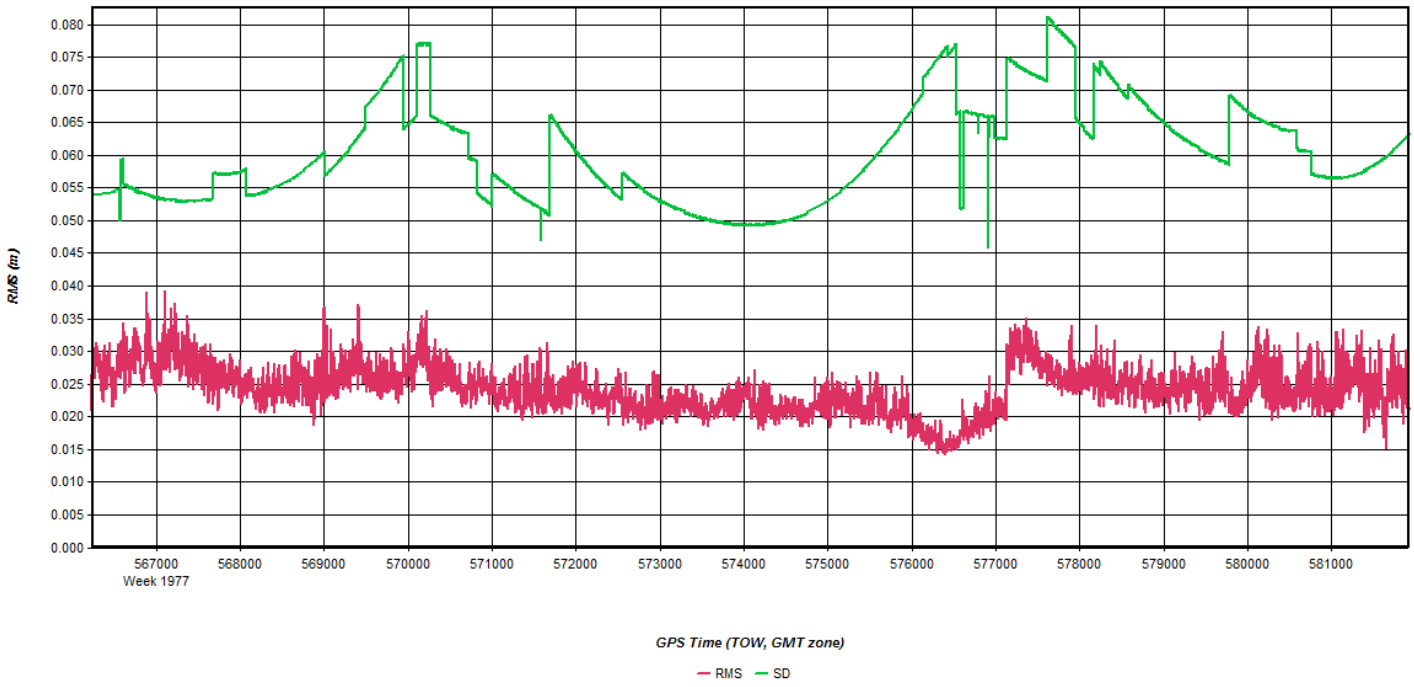
December 2, 2017-A (N812TB, SN7161)

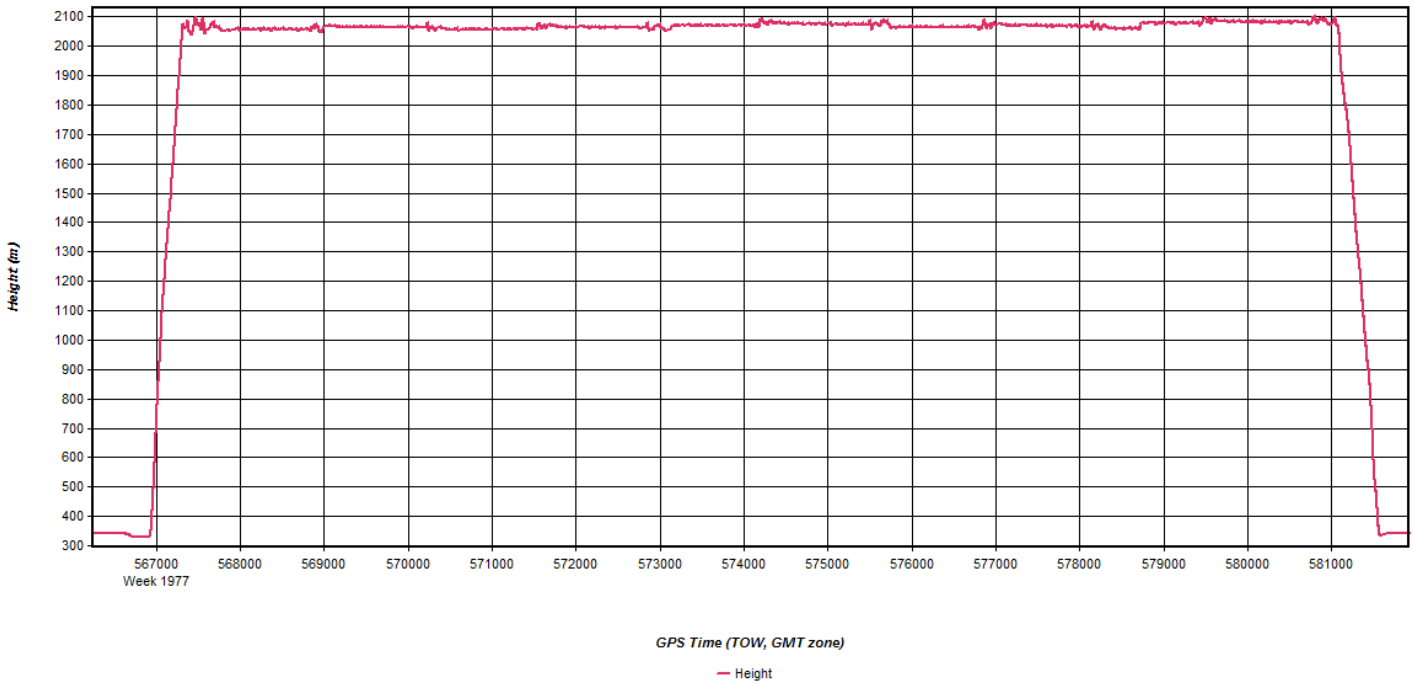

5 km


PDOP
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
PDOP

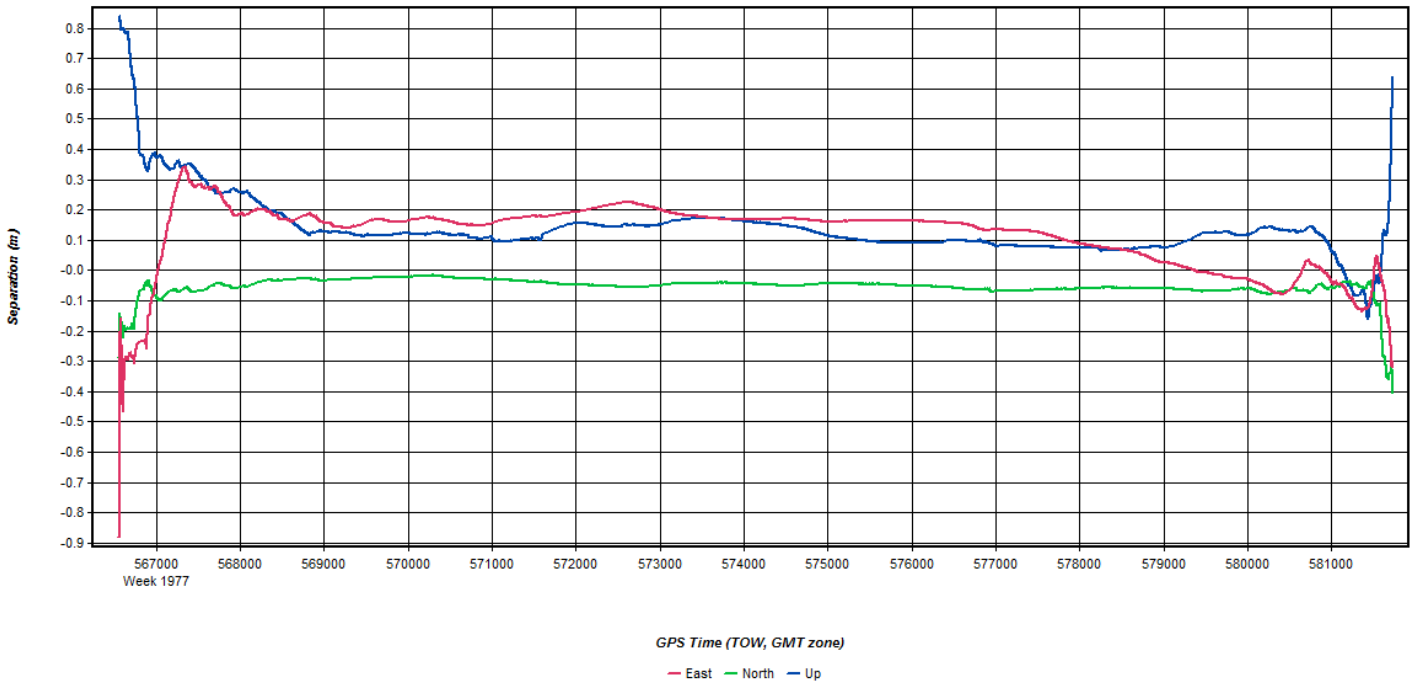

Status
2
1
0
-1
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)


Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
Roll
Pitch

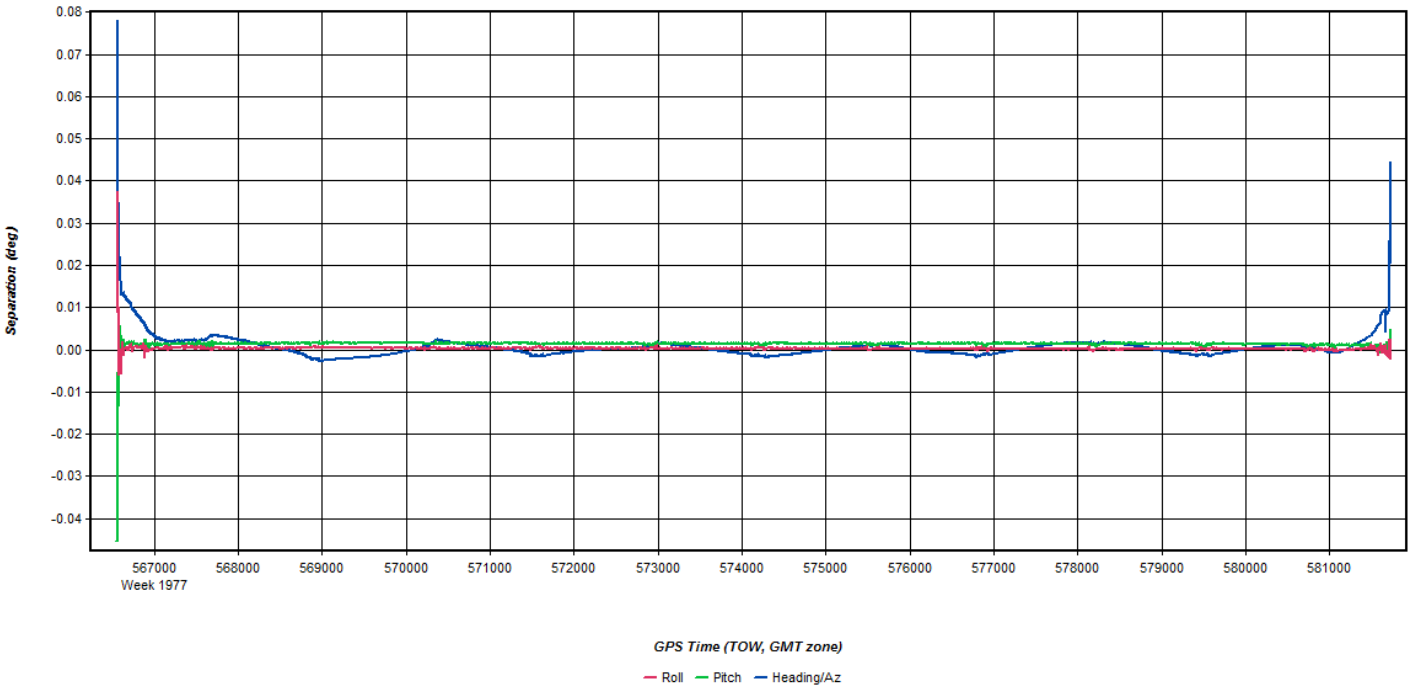

RMS (m)
0.080
0.075
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
RMS
SD

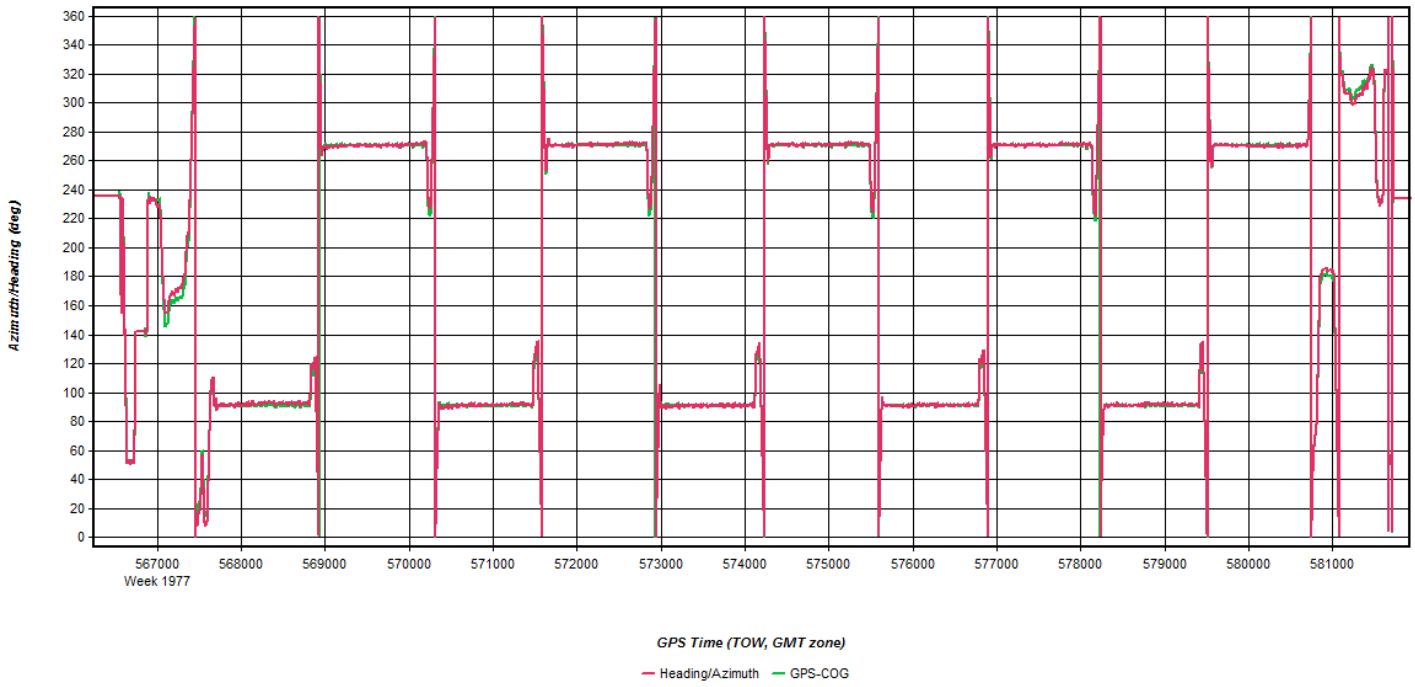

Height (m)
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
Height


Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

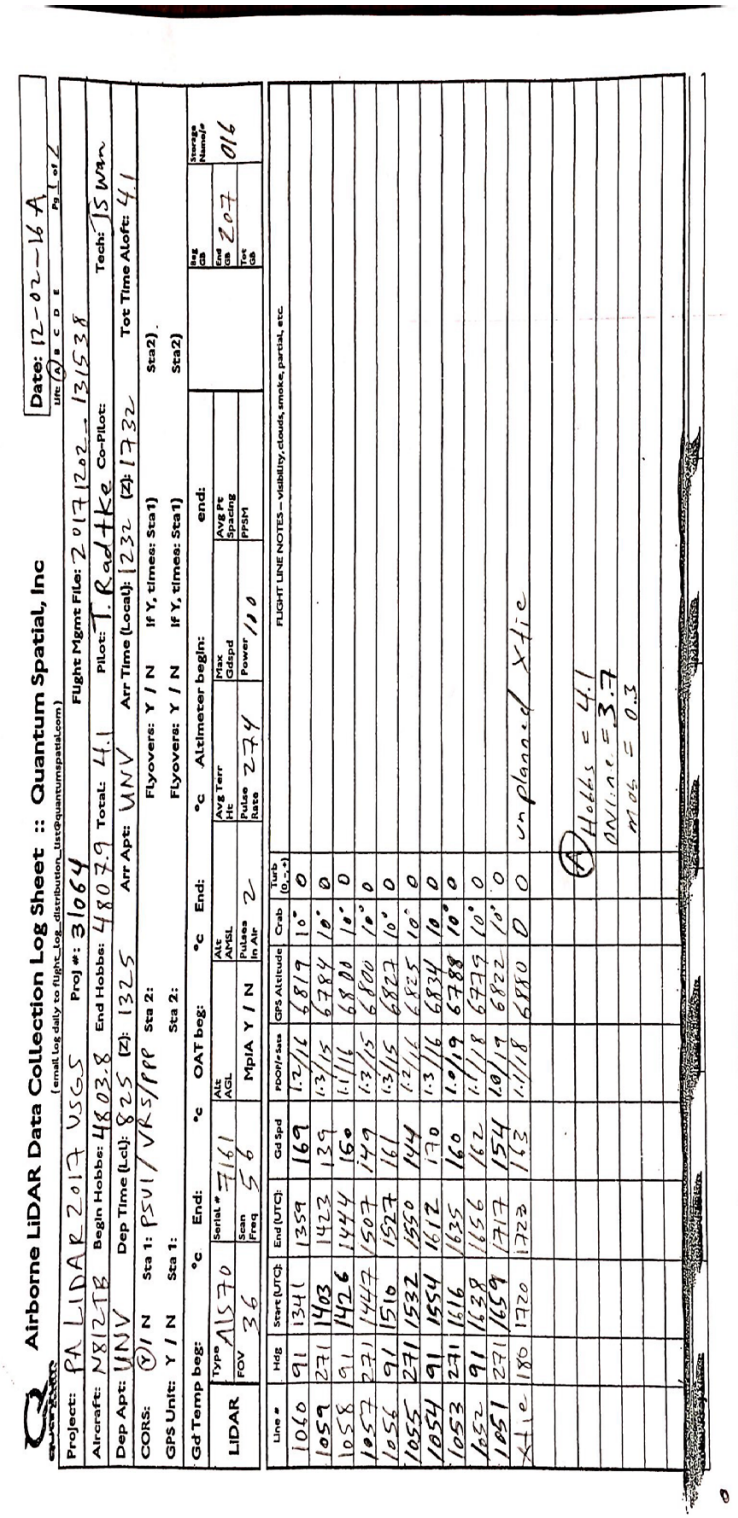

Separation (m)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
-0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
567000
Week 1977
568000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG

Flight Log



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

(email Log daily to flight_log_distribution_list@quantumspatial.com)

Date: 12-02-16 A

Life (A) B C D E

Pg 1 of 2

Project: PA LIDAR 2017 USGS Proj #: 31064 Flight Mgmt File: 2017 12 02 - 131538

Aircraft: N812TB Begin Hobbs: 4803.8 End Hobbs: 4807.9 Total: 4.1 Pilot: T. Radtke Co-Pilot: Tech: Isom

Dep Apt: UNV Dep Time (Lcl): 825 (Z): 1325 Arr Apt: UNV Arr Time (Local): 1232 (Z): 1732 Tot Time Aloft: 4.1

CORS: (Y) / N Sta 1: PSU1 / VRS/FPP Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

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

Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

LiDAR: Type ALS70 Serial # 7161 Alt AGL MpIA Y / N Alt ASL Pulse Rate 274 Avg Terr Ht Pulse Freq 2 Max Gdspd Power 100 Avg Pt Spacing PSR

FOV 36 Scan Freq 58

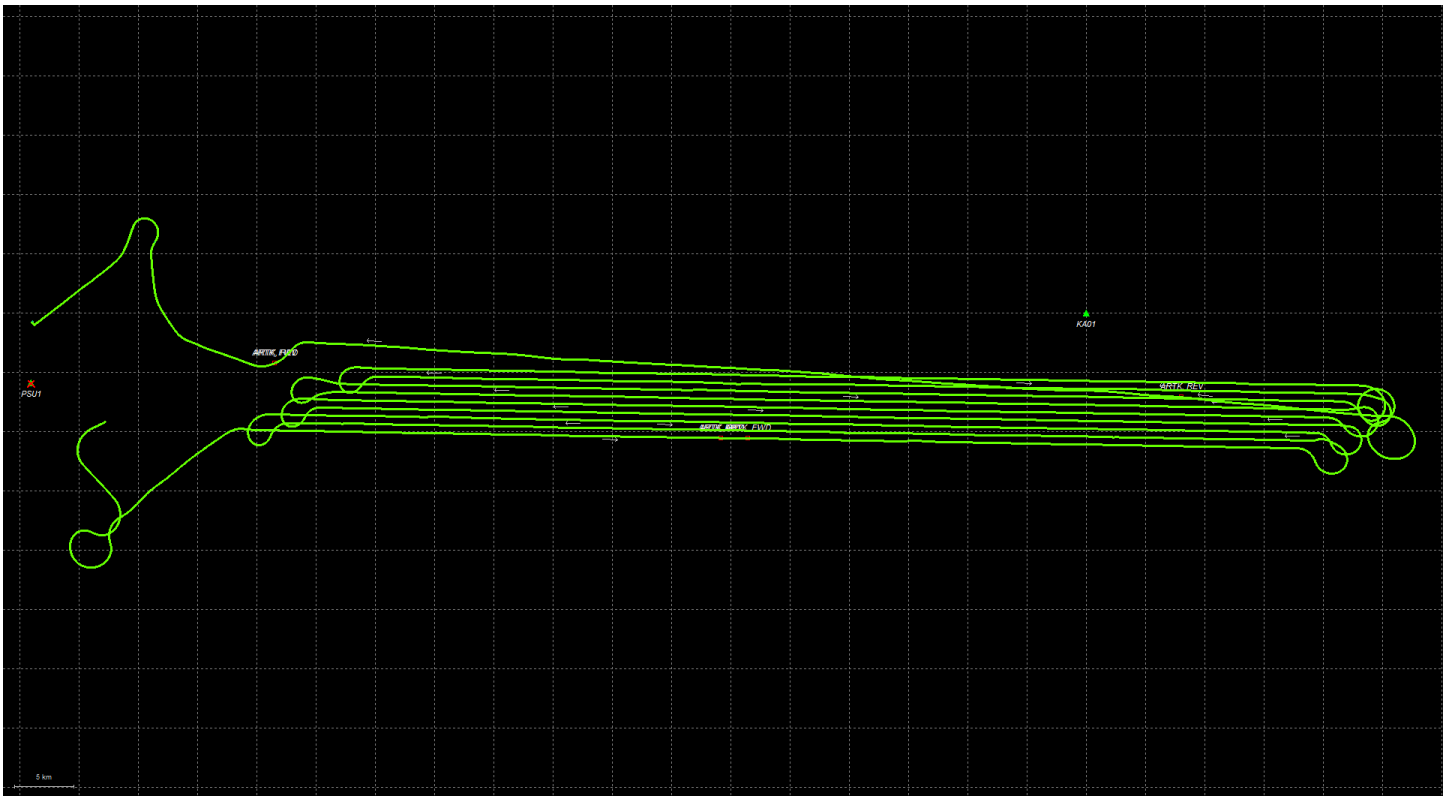
Mag Gb: Grid Gb: 207 Tm Gb: Storage Number 016

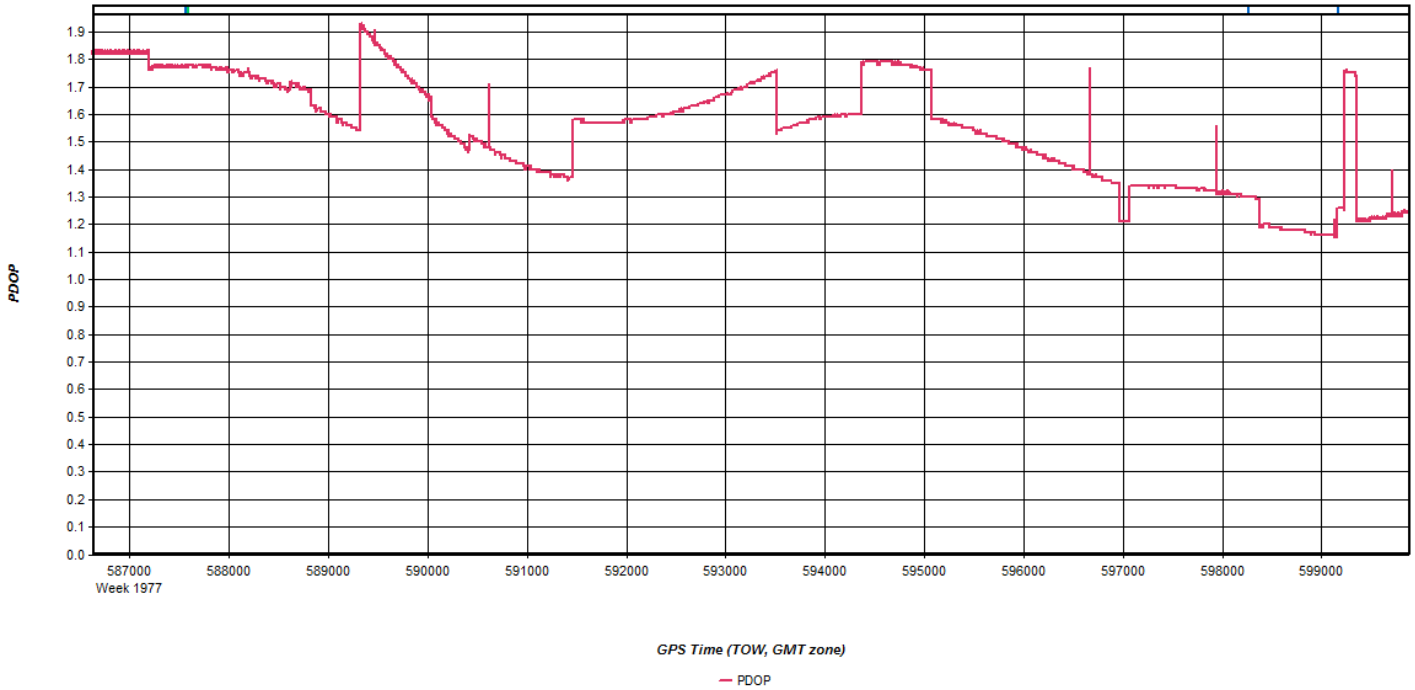
Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POO/+Sea	GPS Altitude	Crab	Turb (0-5)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
1040	91	1341	1359	169	12/16	4819	10°	0	
1059	271	1403	1423	139	13/15	6784	10°	0	
1058	91	1426	1444	160	11/16	6801	10°	0	
1057	271	1447	1507	149	13/15	6800	10°	0	
1056	91	1510	1527	161	13/15	6822	10°	0	
1055	271	1532	1550	144	12/14	6825	10°	0	
1054	91	1554	1612	170	13/16	6834	10°	0	
1053	271	1616	1635	160	10/19	6788	10°	0	
1052	91	1638	1656	162	11/18	6775	10°	0	
1051	271	1659	1717	154	10/19	6822	10°	0	
Title	180	1720	1723	113	11/18	6880	0	0	unplanned Xtie

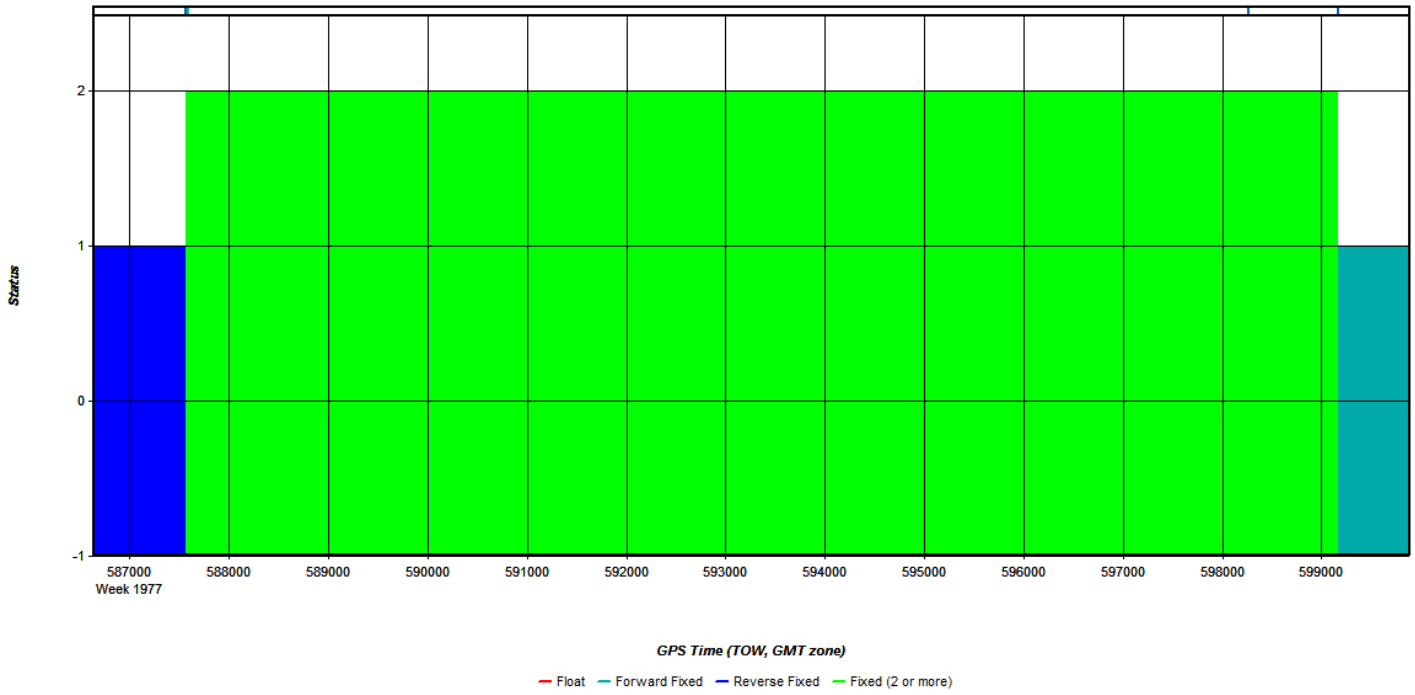
(A) Hobbs = 4.1
ANIMAR = 3.7
Mob = 0.3

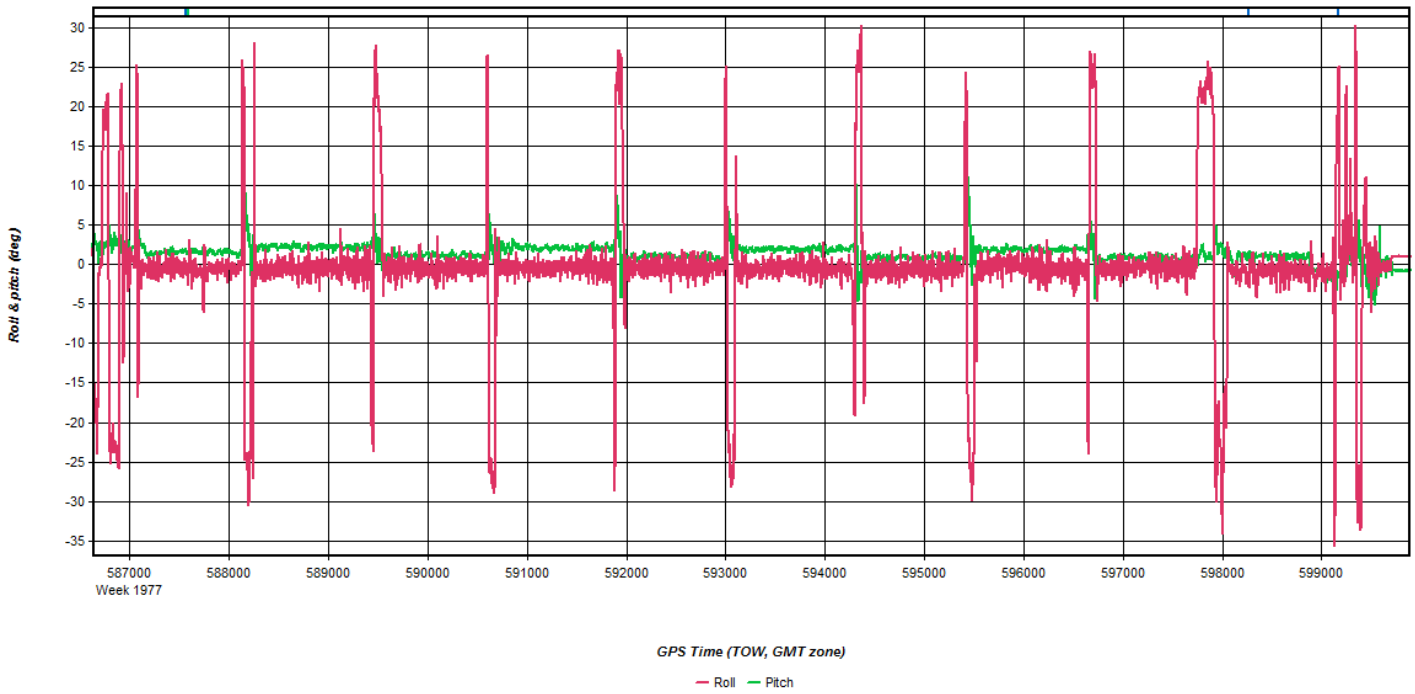
Scanned by CamScanner

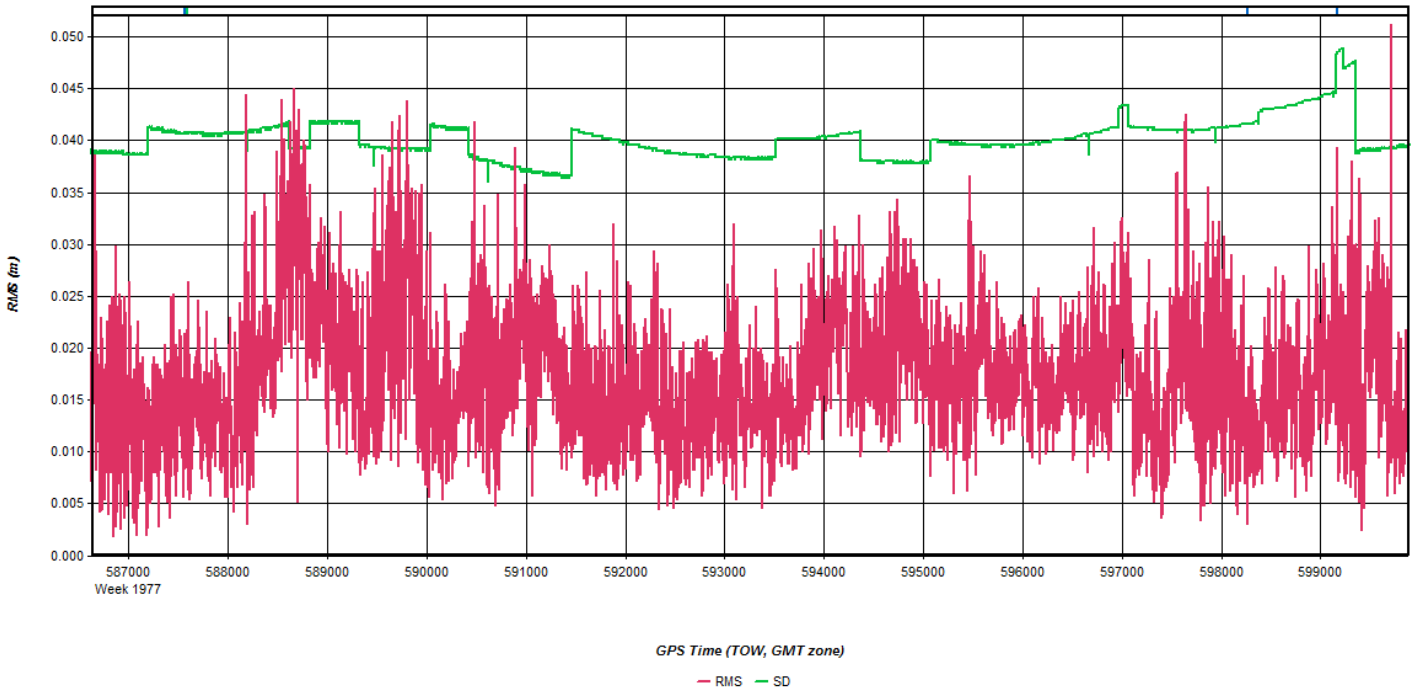
December 2, 2017-B (N812TB, SN7161)

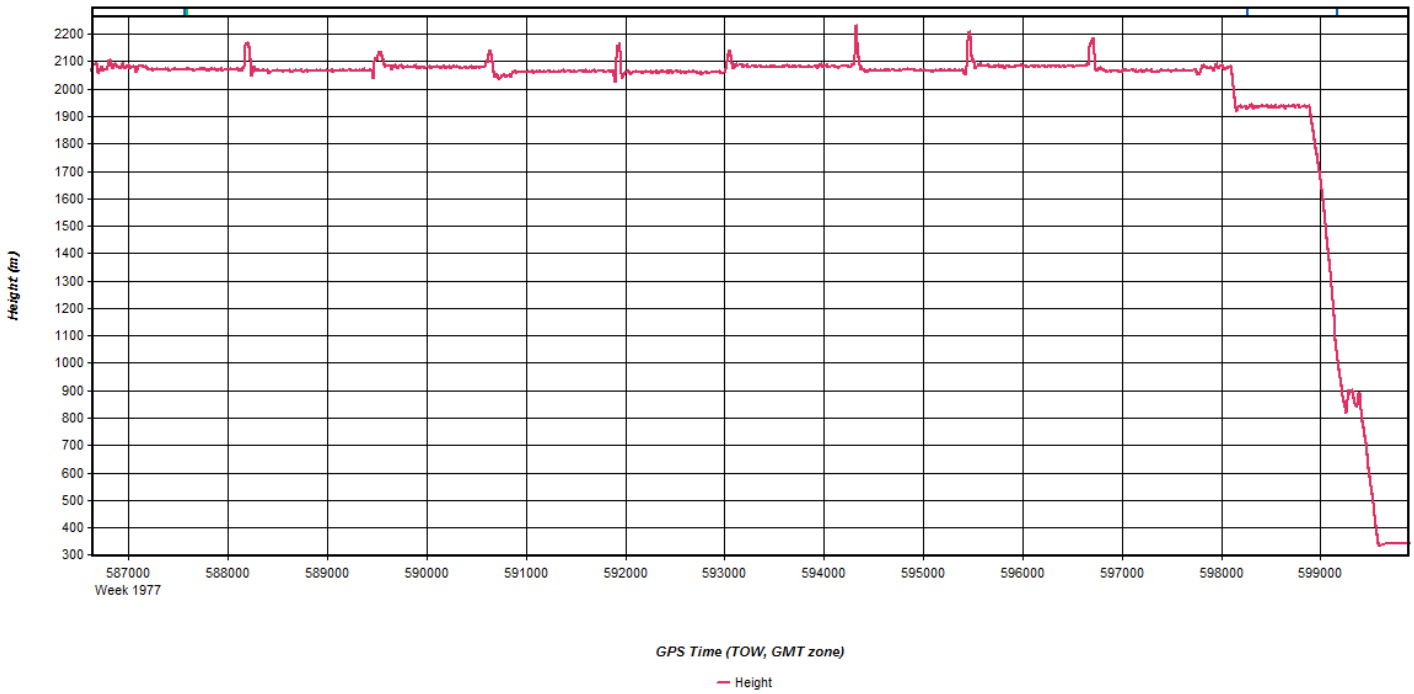

KA01
ARTIK_FWD
PSU1
ARTIK_REV
5 km

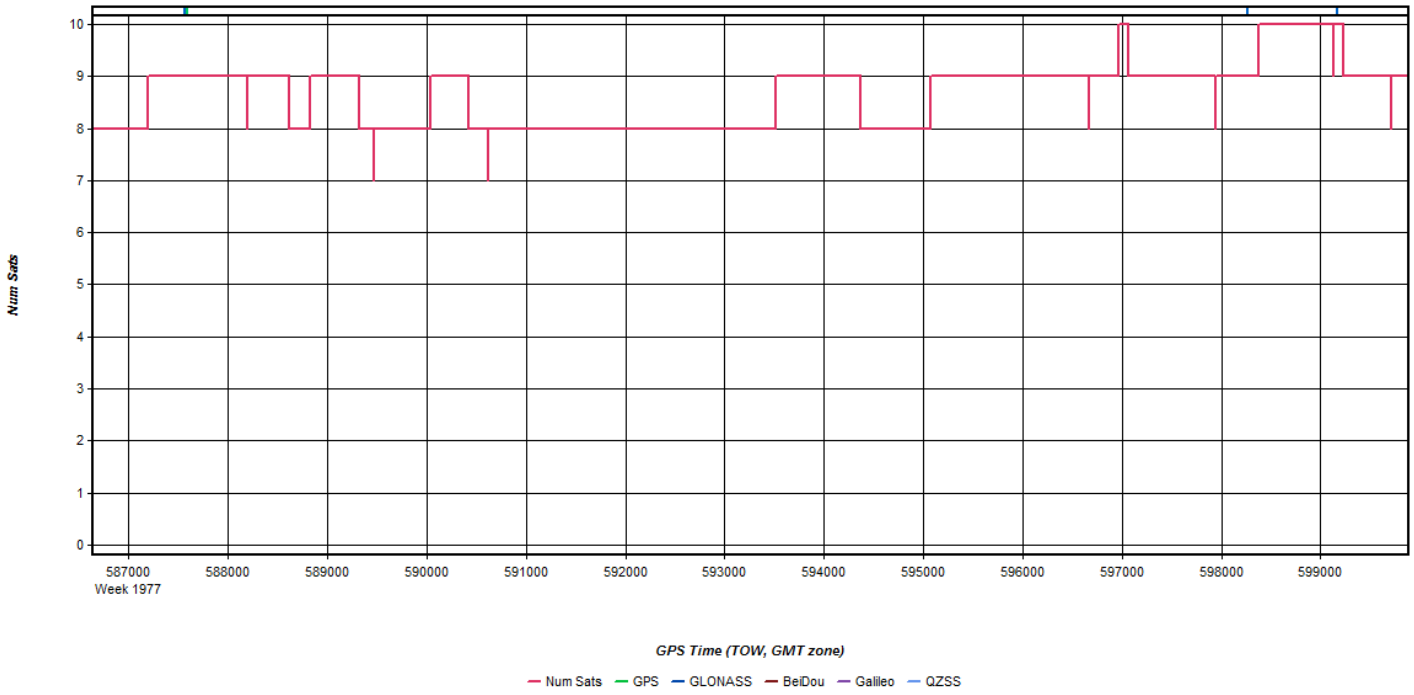

PDOP
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
PDOP

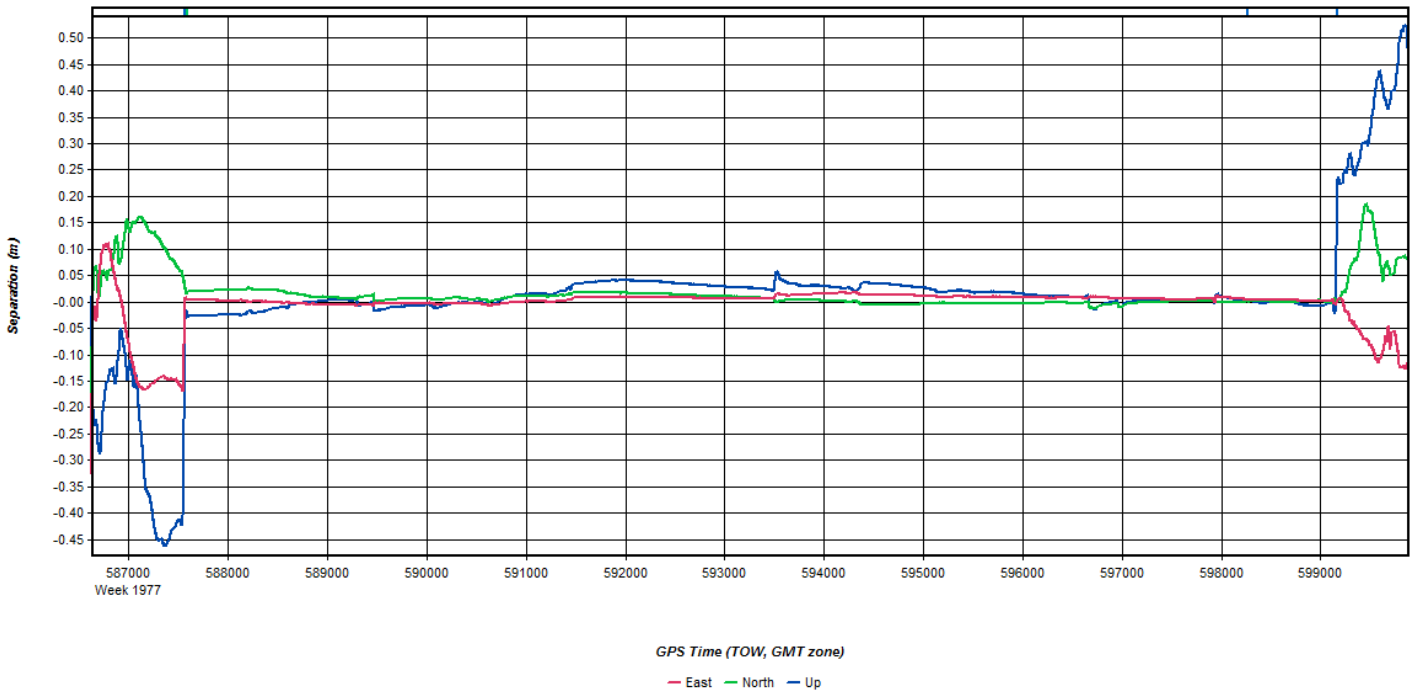

Status
2
1
0
-1
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

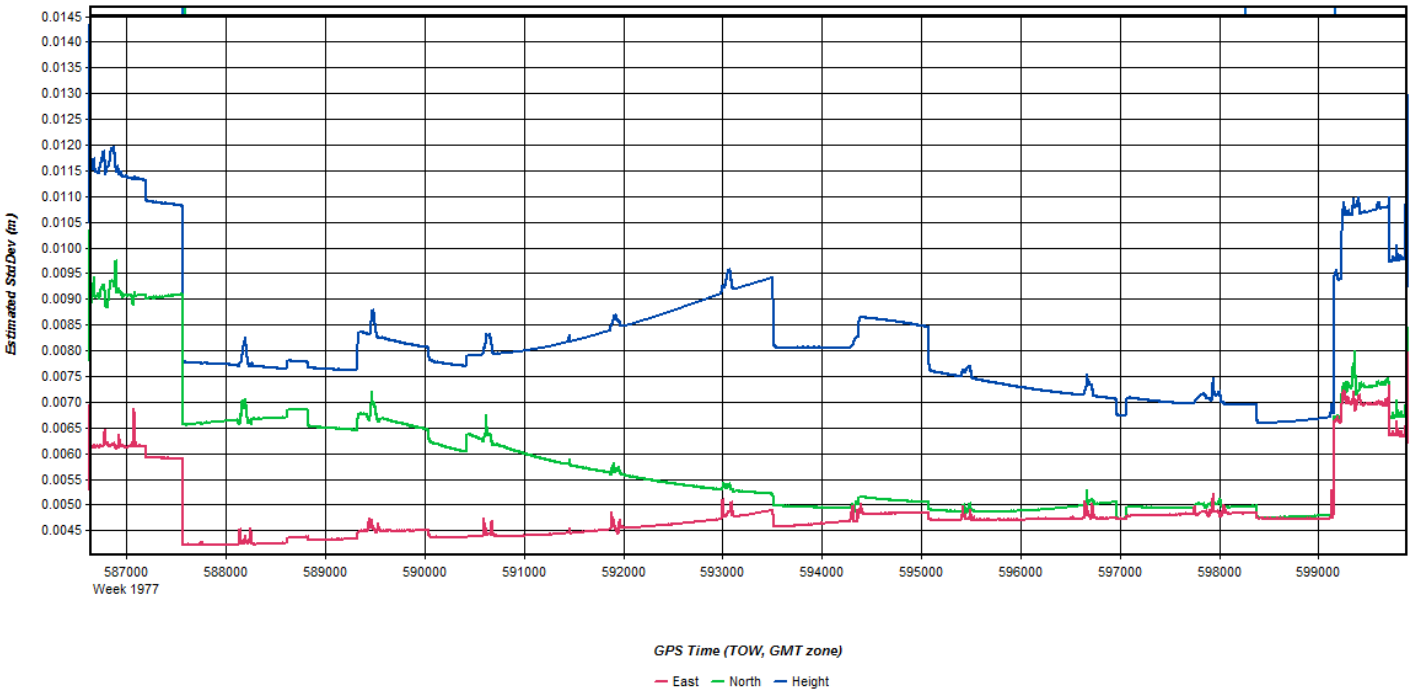

Roll & pitch (deg)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
Roll
Pitch

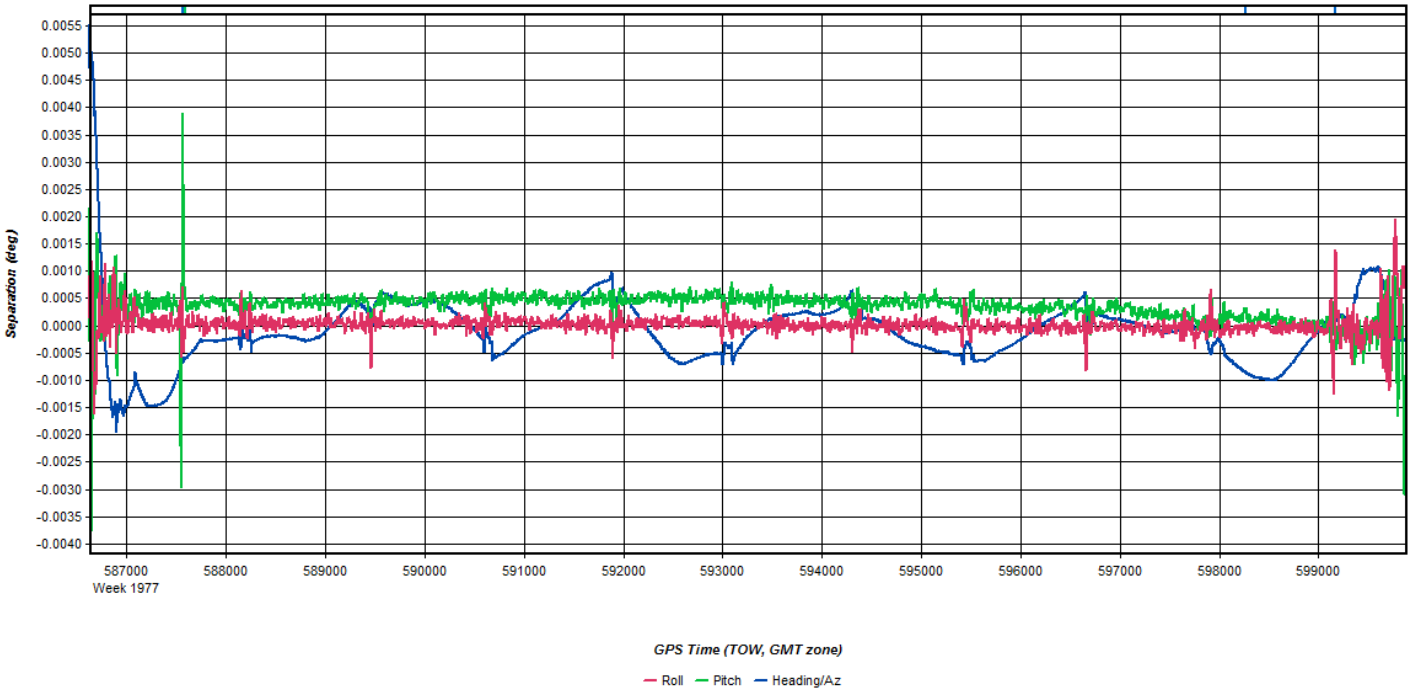

RMS (m)
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
RMS
SD

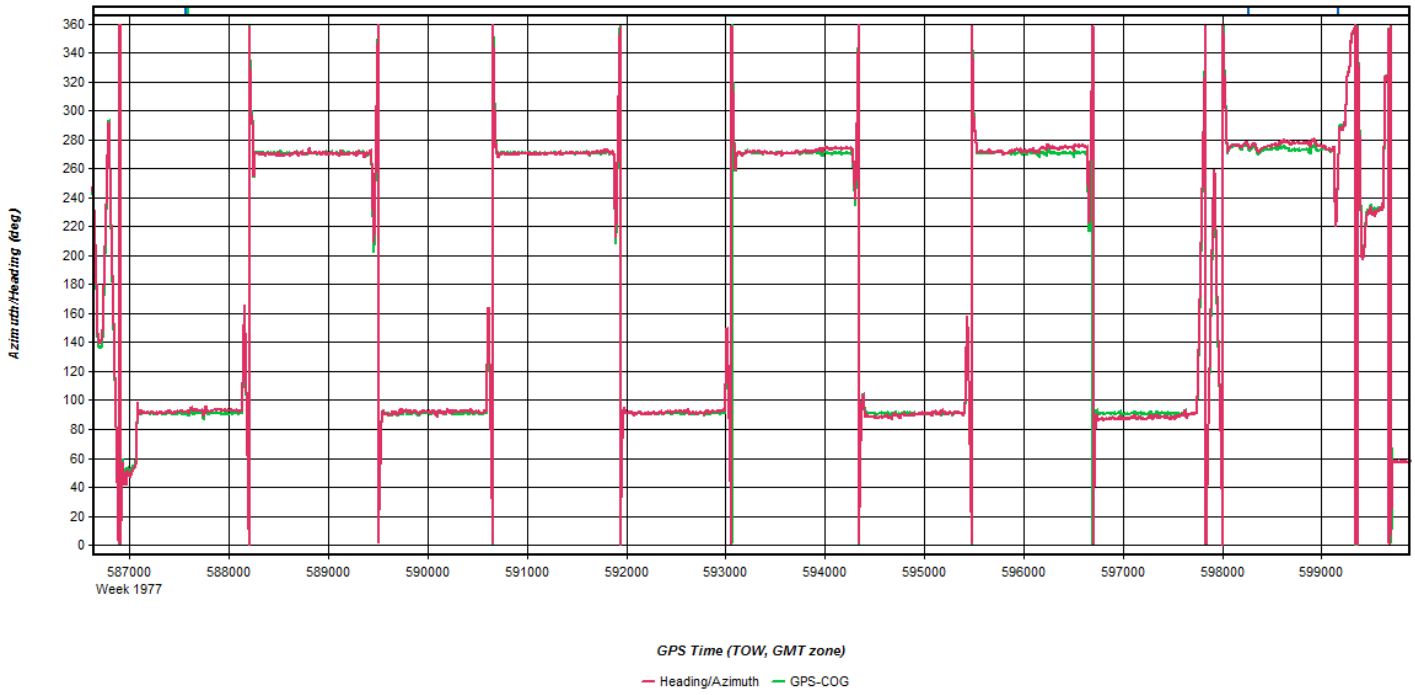

Height (m)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
Height

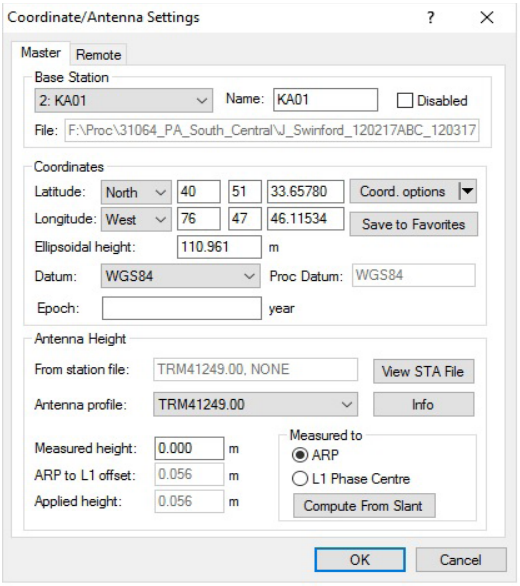

Num Sats
10
9
8
7
6
5
4
3
2
1
0
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
-0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
-0.35
-0.40
-0.45
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0145
0.0140
0.0135
0.0130
0.0125
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
-0.0025
-0.0030
-0.0035
-0.0040
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
587000
Week 1977
588000
589000
590000
591000
592000
593000
594000
595000
596000
597000
598000
599000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
2: KA01
Name: KA01
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swinford_120217ABC_120317
Coordinates
Latitude: North 40 51 33.65780
Coord. options
Longitude: West 76 47 46.11534
Save to Favorites
Ellipsoidal height: 110.961 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TRM41249.00, NONE
View STA File
Antenna profile: TRM41249.00
Info
Measured height: 0.000 m
ARP to L1 offset: 0.056 m
Applied height: 0.056 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: 12/02/2017

Lift: A (B) C D E Pg 1 of 1

Project: PA LiDAR Proj #: 31064 Flight Mgmt File:

Aircraft: N812TB Begin Hobbs: 4807.9 End Hobbs: 4811.9 Total: 3.8 Pilot: Billington Co-Pilot: Tech: Swinford

Dep Apt: KUNV Dep Time (Lcl): 1:30 (Z): 18:30 Arr Apt: KUNV Arr Time (Local): 5:30 (Z): 22:30 Tot Time Aloft: 3.8

CORS: (Y) / N Sta 1: Sta 2: Flyovers: Y / (N) If Y, times: Sta1) Sta2)

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

Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

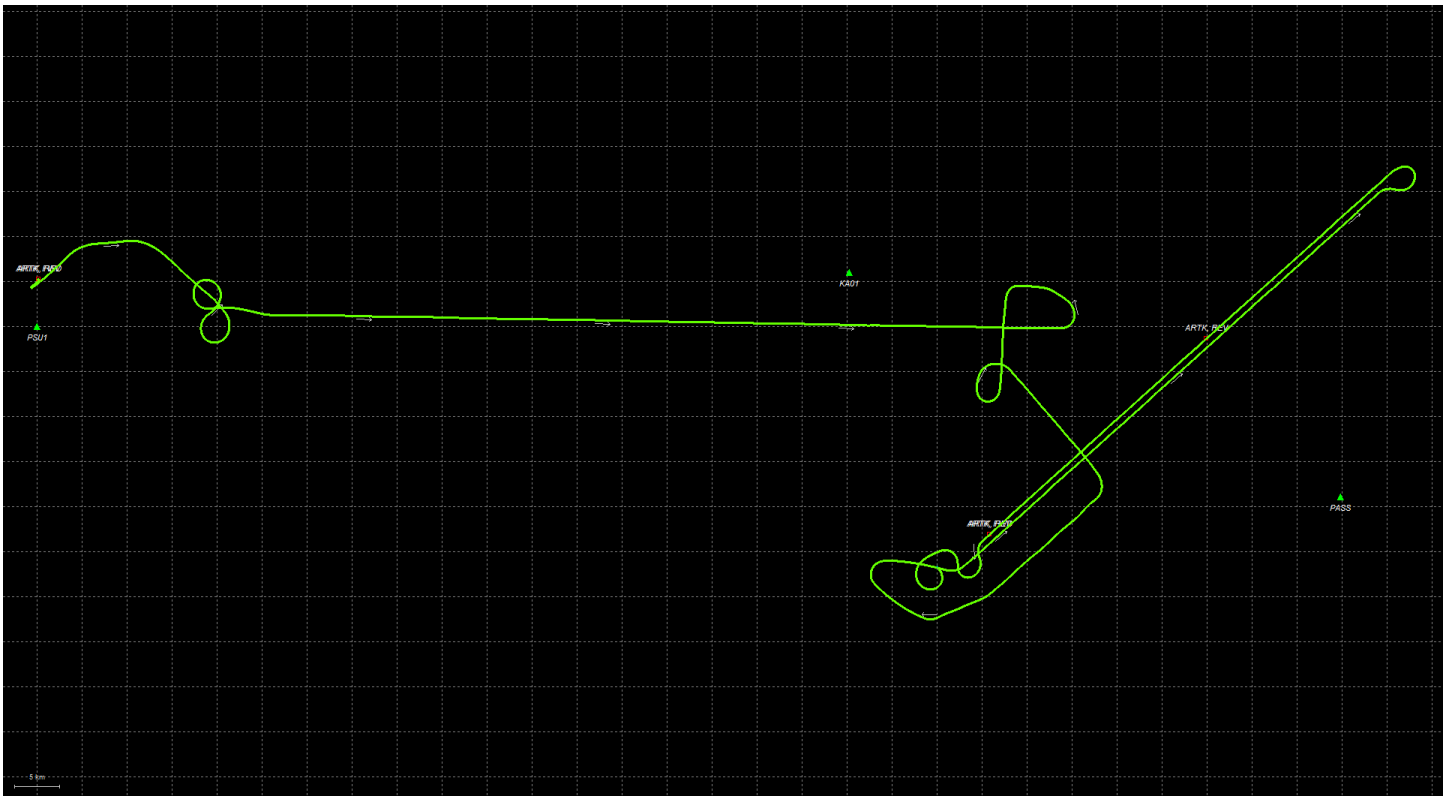
LiDAR	Type ALS70	Serial # 7161	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing
	FOV 36	Scan Freq 56	MpIA Y / N	Pulses In Air 2	Pulse Rate 274	Power 100%	PPSM

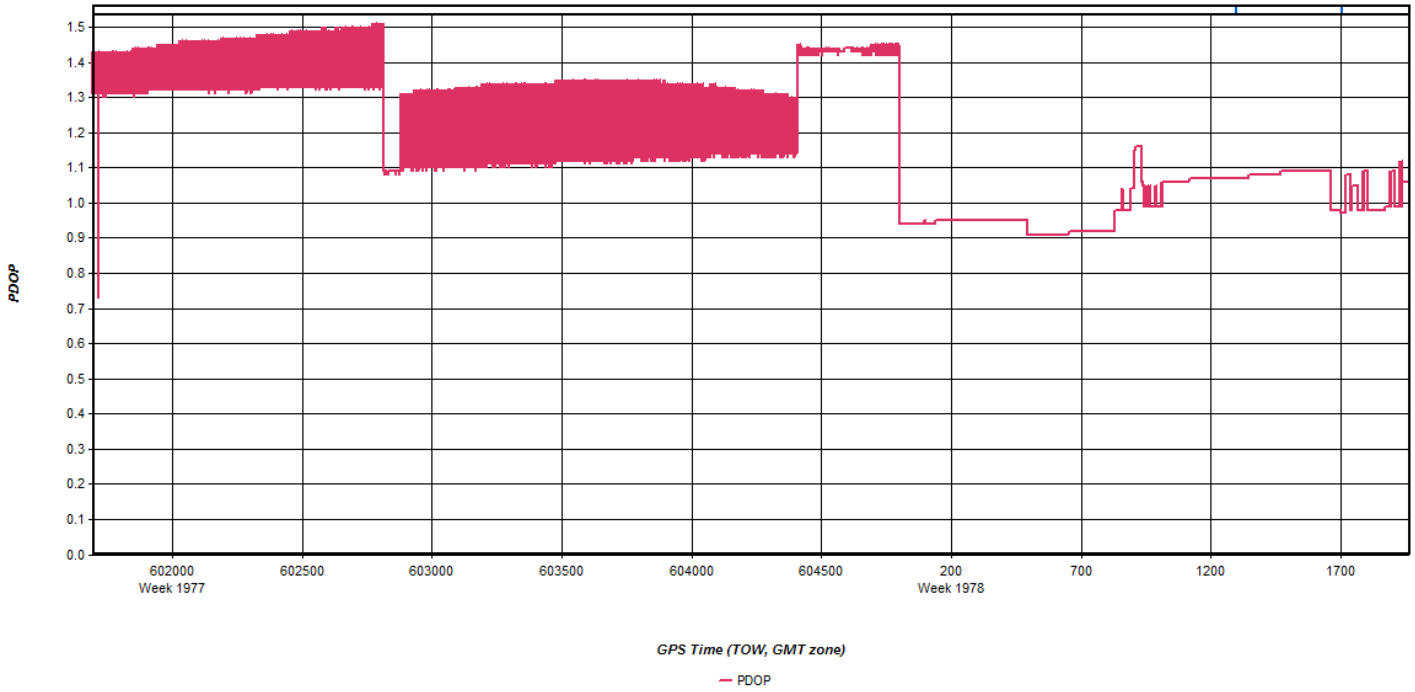
Beg GB	205	Storage Name/#
End GB	145	016
Tot GB	60	

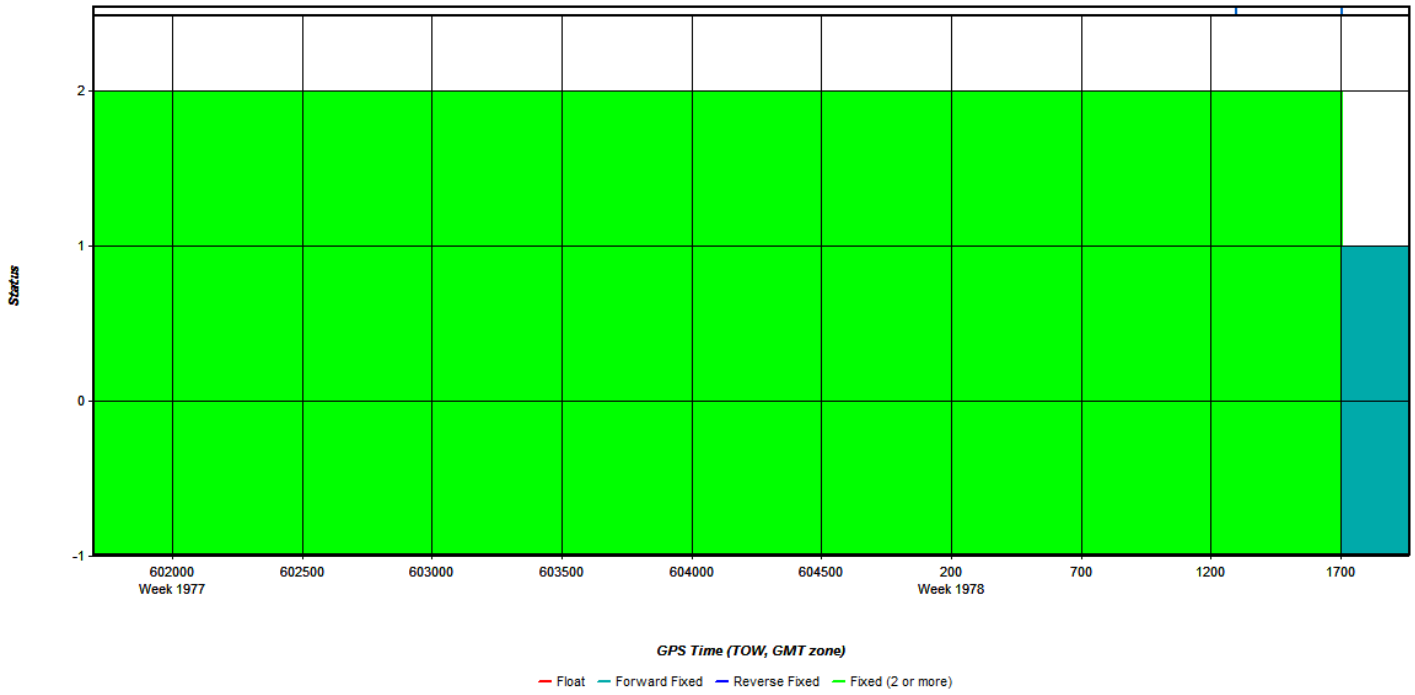
Line #	Hdg	Start (UTC):	End (UTC):	Gd Spd	PDOP/# Sats	GPS Altitude	Crab	Turb (0, -, +)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
1050	091	19:04	19:22	166	1.4/16	6800	15°	0	FIG 8 @ 18:42 / REBOOT / FIG 8 @ 19:02 / FEE 14 mi. - RETURNS DROP
1049	271	19:24	19:43	146	1.1/19	6800	15°	0	FEE 14 mi. RETURNS DROPPED DUE to RIVER
1048	091	19:46	20:03	167	1.1/19	6800	15°	0	"
1047	271	20:05	20:24	141	1.2/17	6800	15°	0	"
1046	091	20:26	20:43	160	1.1/18	6800	15°	0	"
1045	271	20:45	21:05	141	1.4/17	6900	15°	0	FEE 15 mi. LOWER RETURNS DUE to RIVER
1044	091	21:07	21:24	161	1.3/18	6900	15°	0	"
1043	271	21:26	21:43	144	1.5/15	6800	15°	0	FEE 16 mi. RETURNS DROP to 14%
1042	091	21:46	22:05	160	1.3/16	6800	15°	0	" / OC52-LOCKED UP LINE OK / FIG 8 @ 22:07
									Will REFLY 1042 ON SECOND LIFT
ALS ERROR			TDC	RAN	OUT	OF	BUFFER		

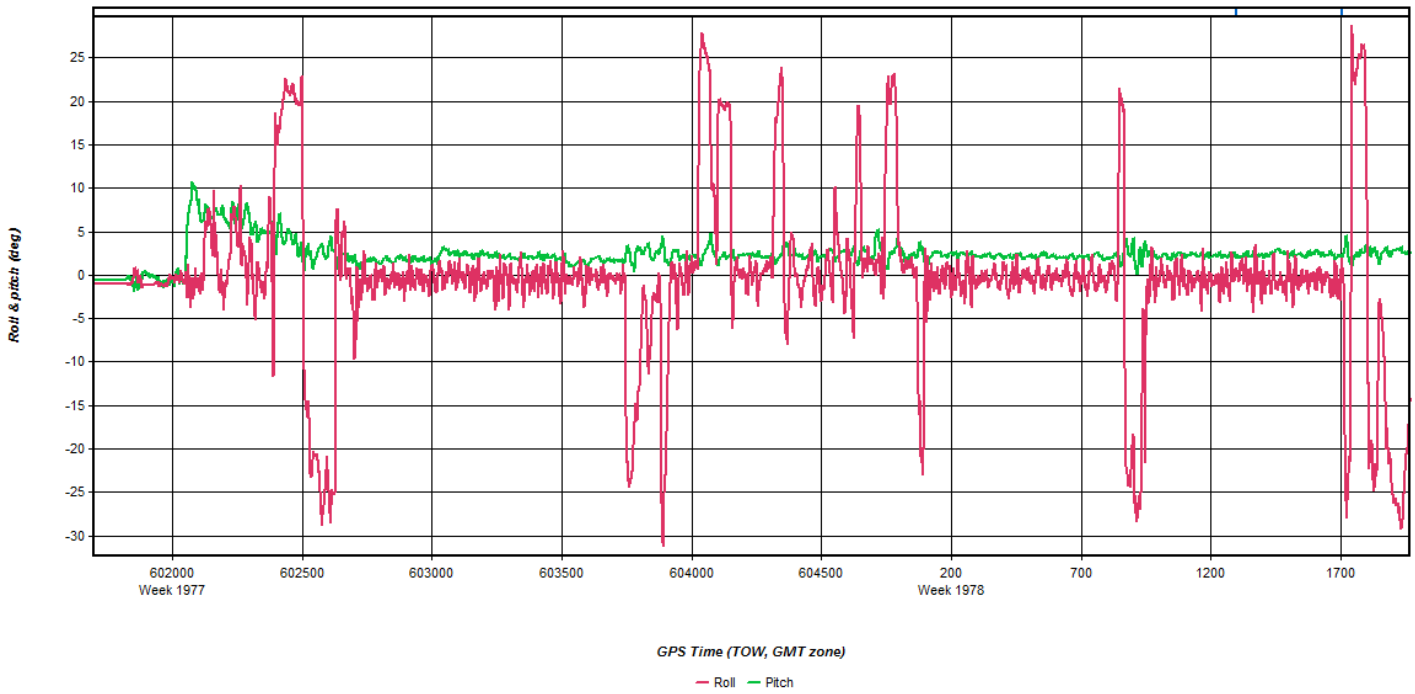
Total Proj Lines:	Lines Flown:	Lines Remain:	OnLine Time: 3.0	Mob Time: .75	Notes:

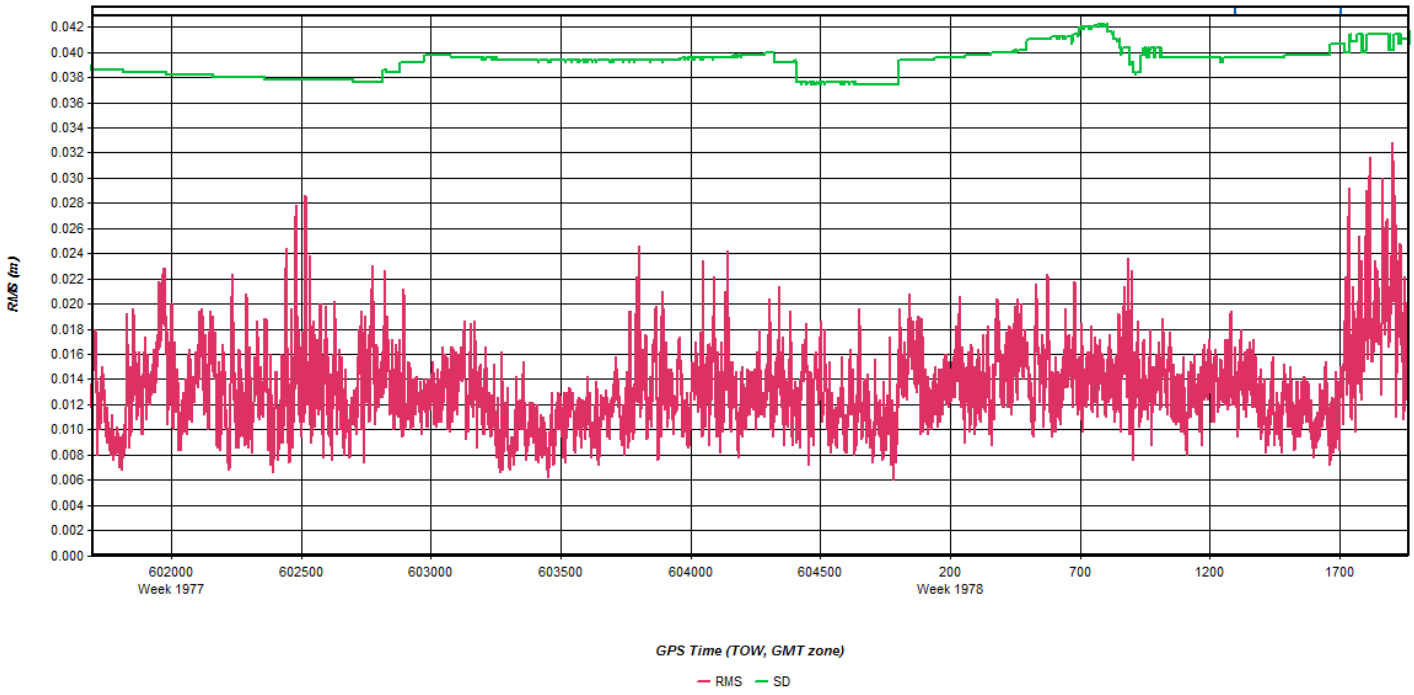
December 2, 2017-C (N812TB, SN7161)

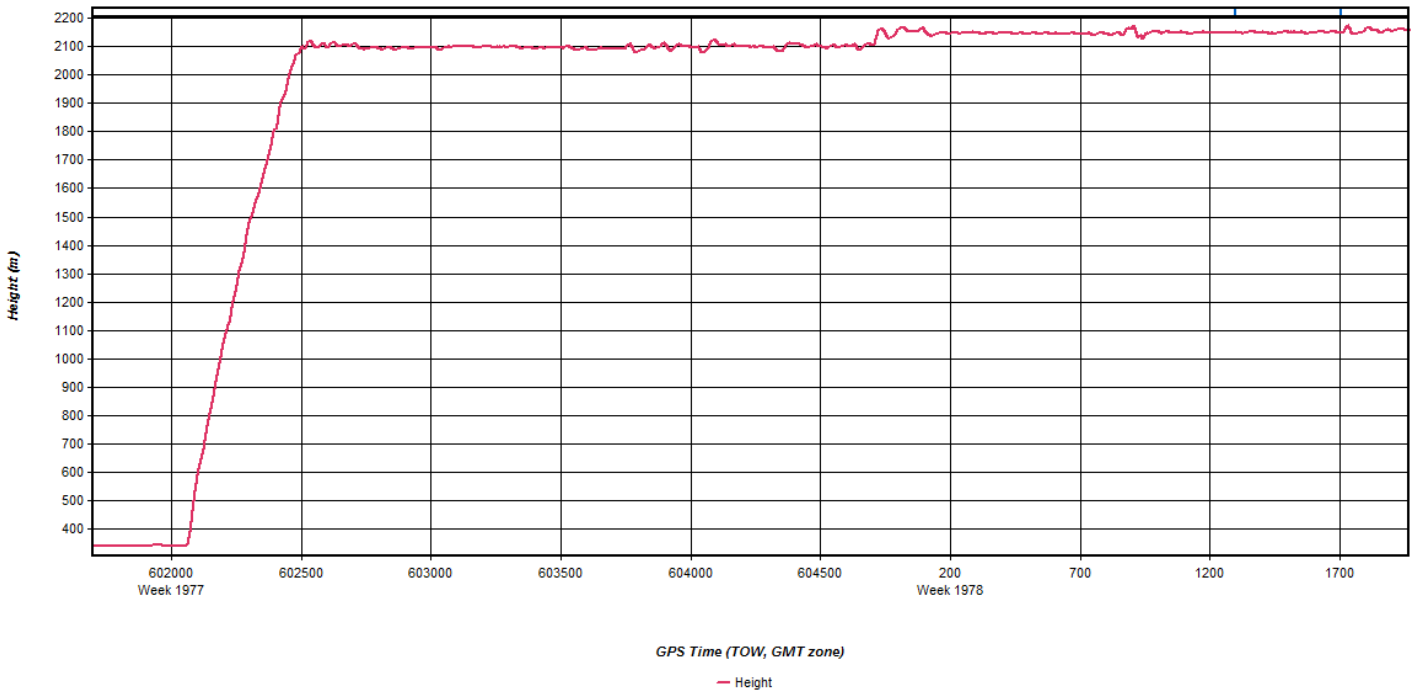

ARTK_FIX2
PSU1
KAD1
ARTK_BCN
ARTK_FIX3
PASS
5 km

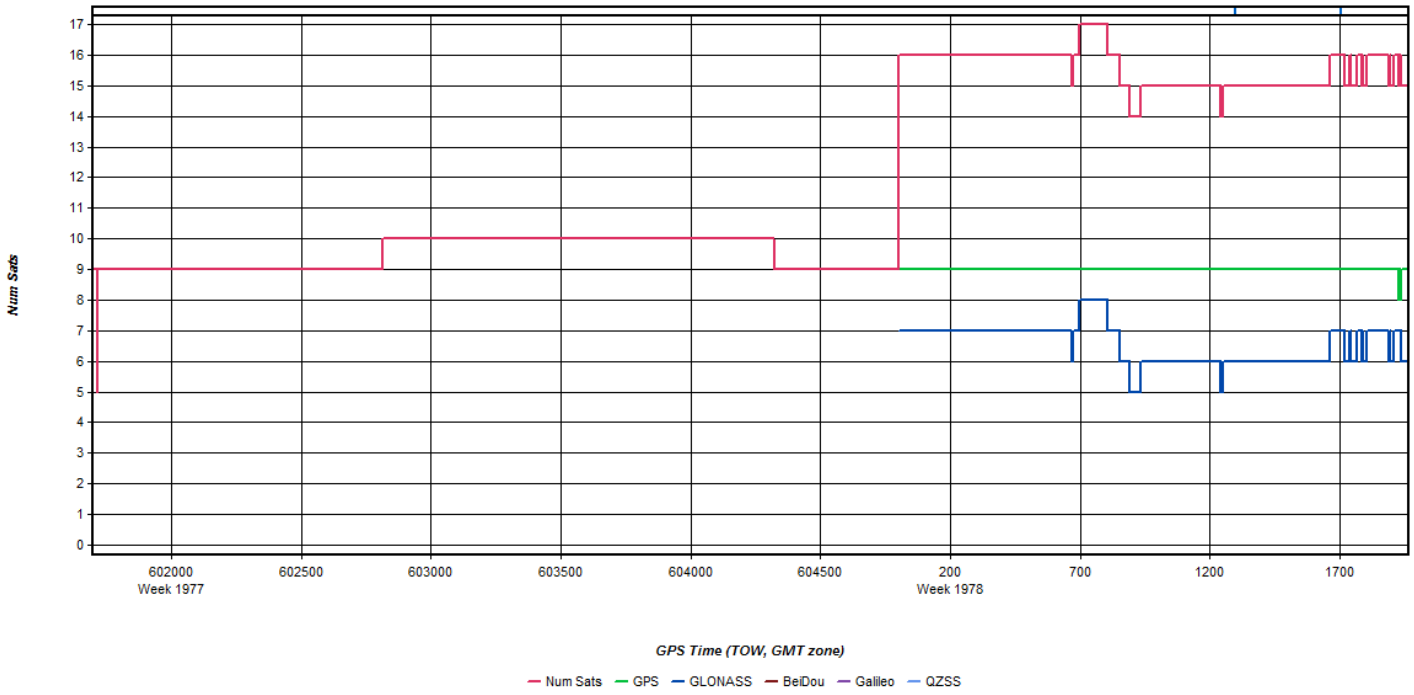

PDOP
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
PDOP

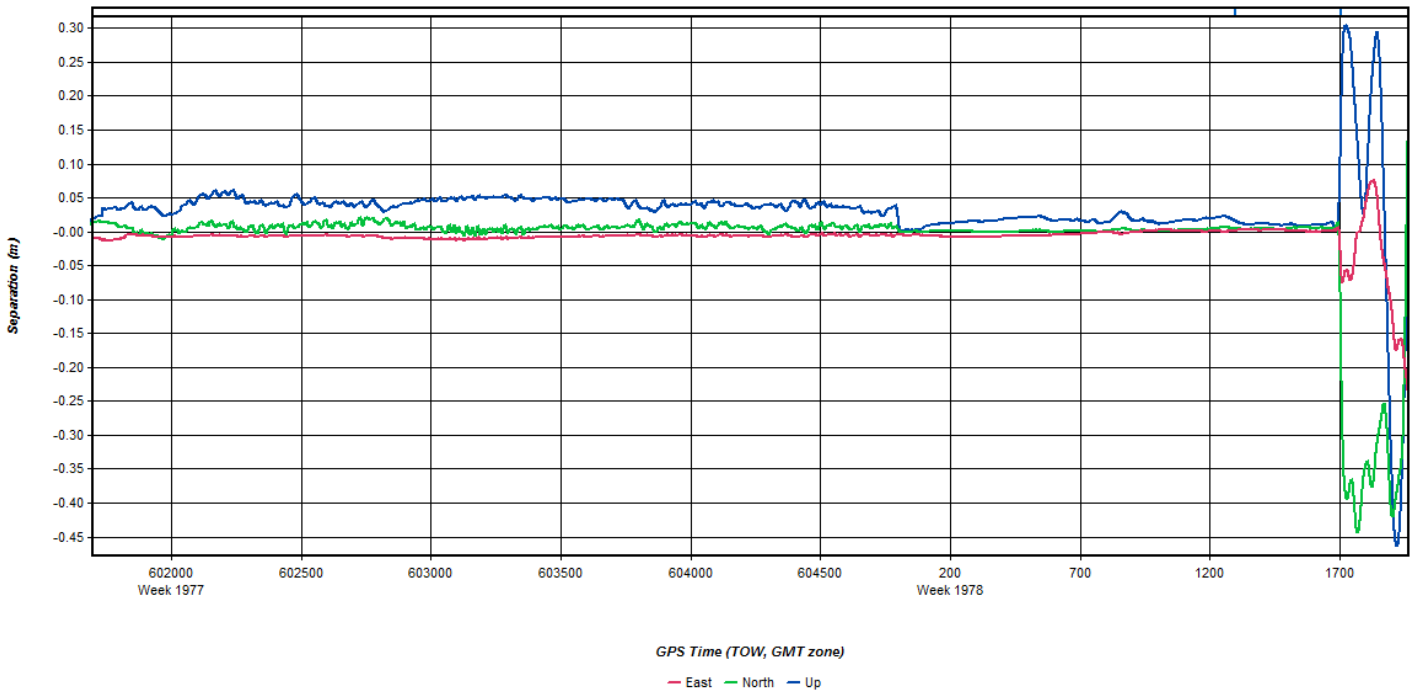

Status
2
1
0
-1
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

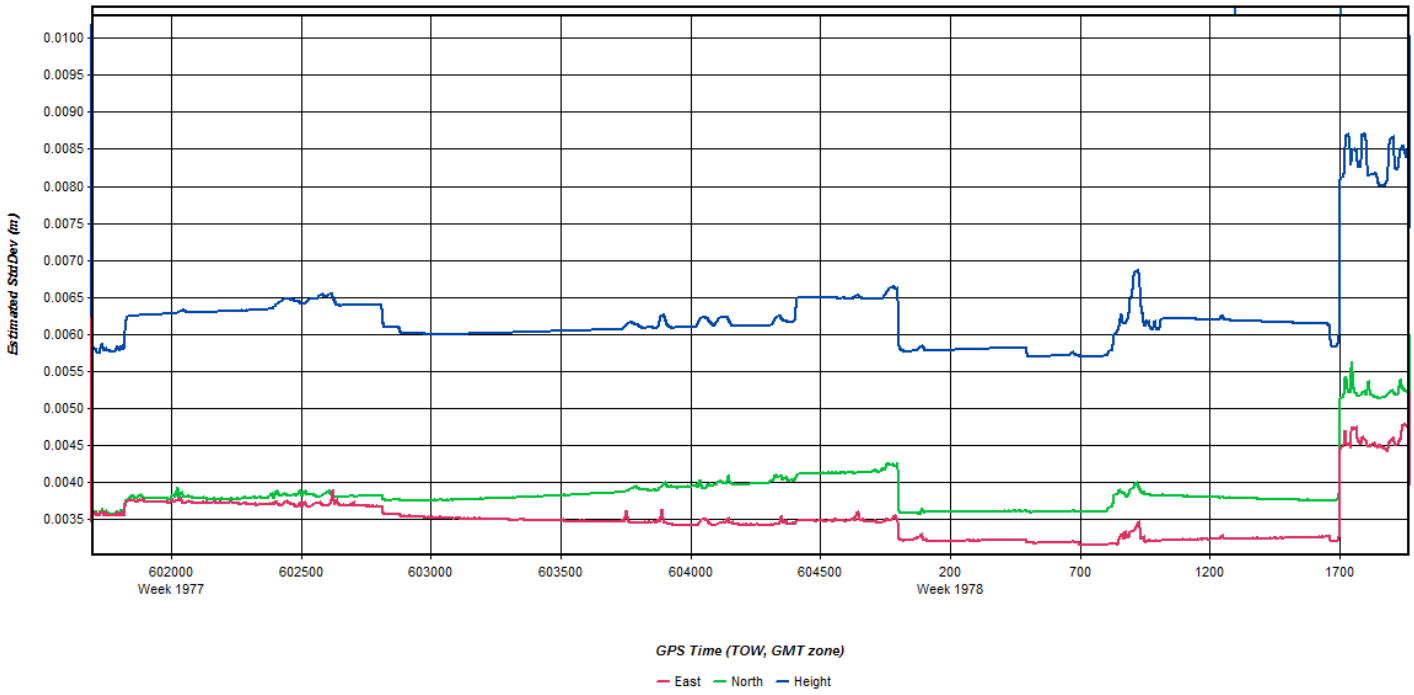

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
Roll
Pitch

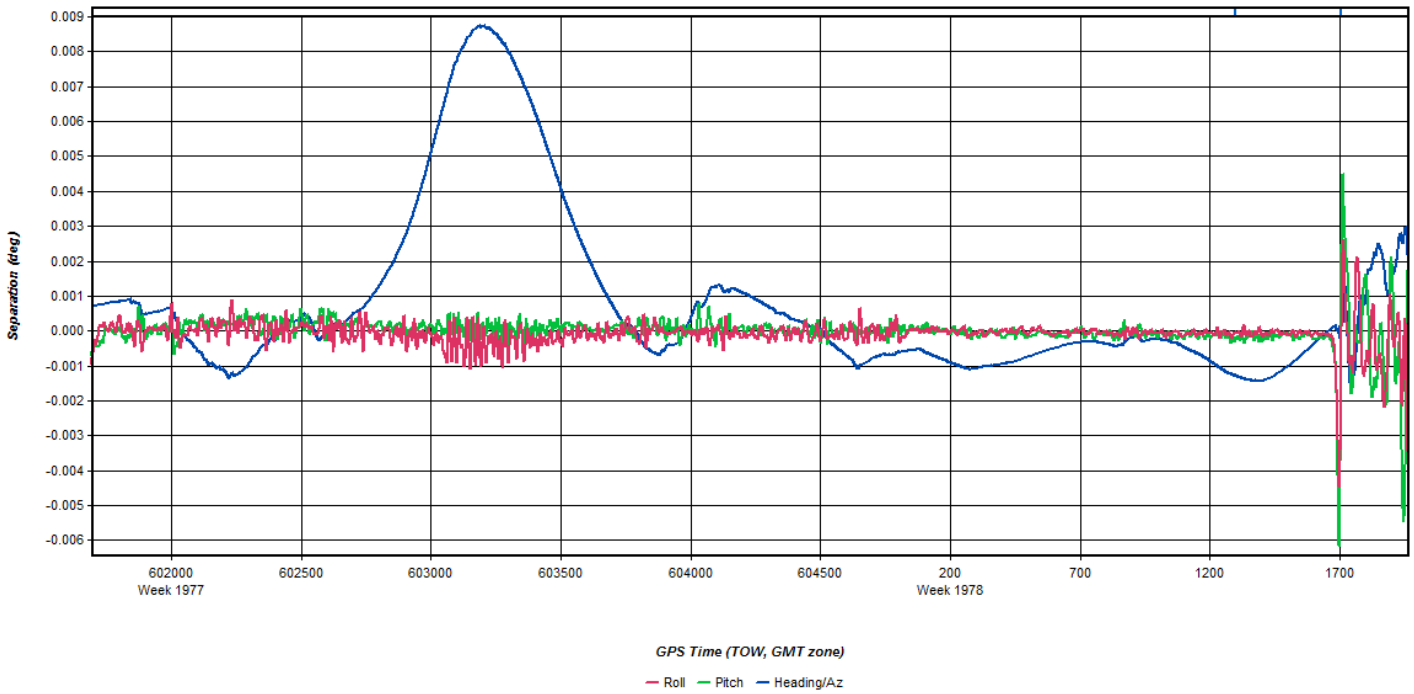

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
RMS
SD

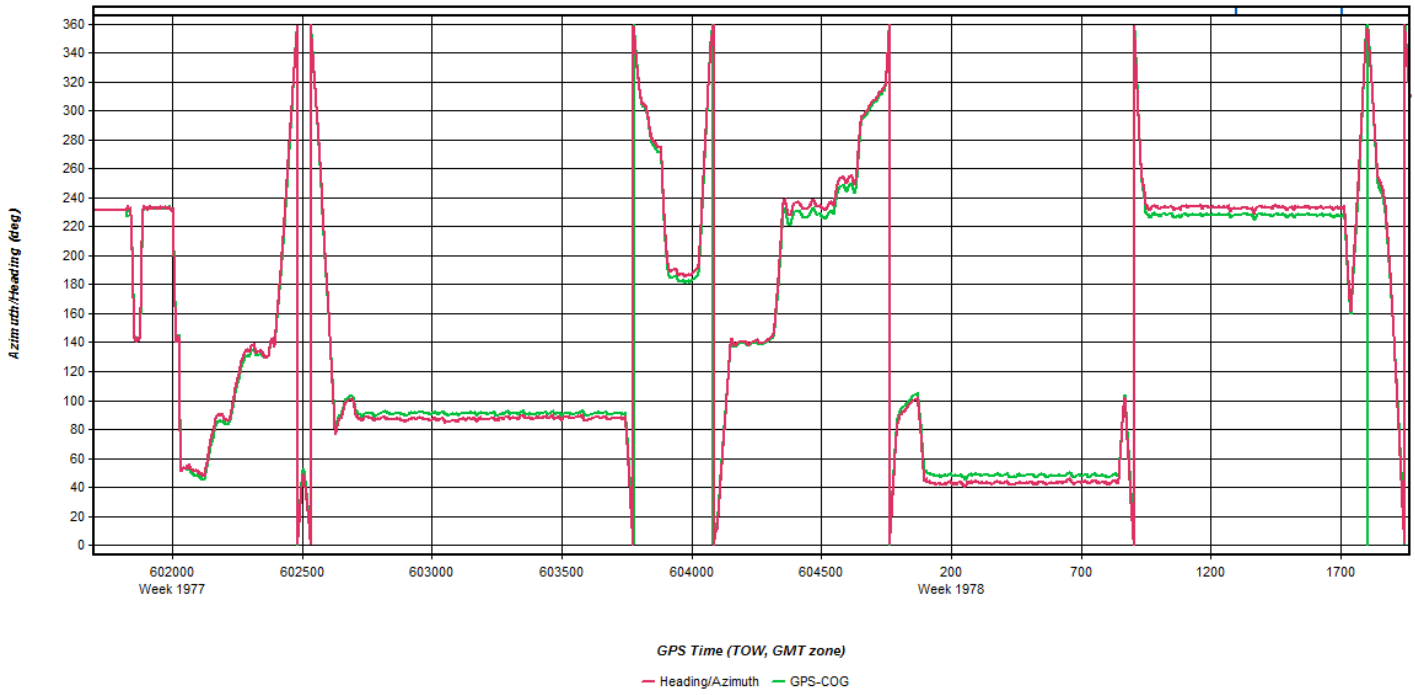

Height (m)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
Height

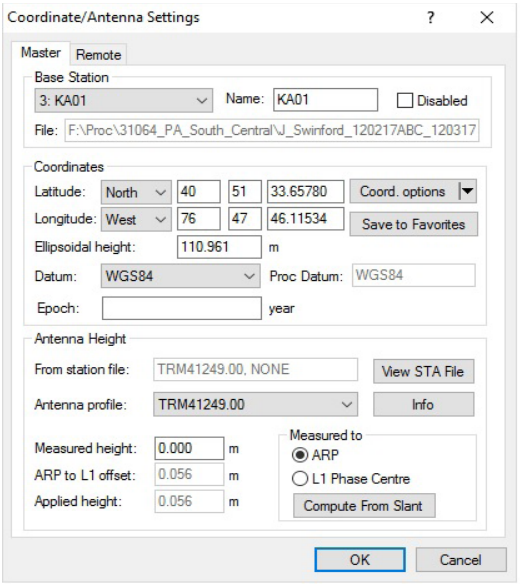

Num Sats
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

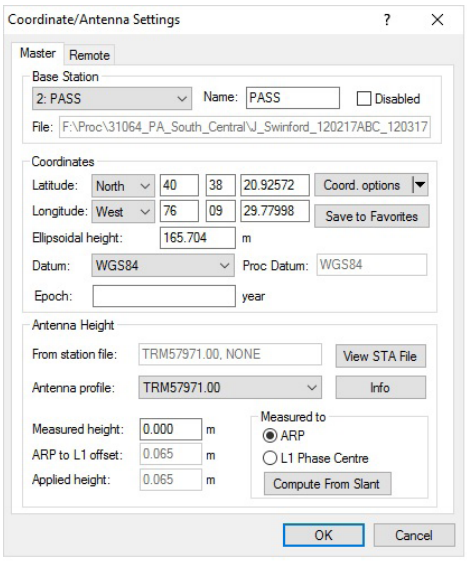

Separation (m)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
-0.35
-0.40
-0.45
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
East
North
Up

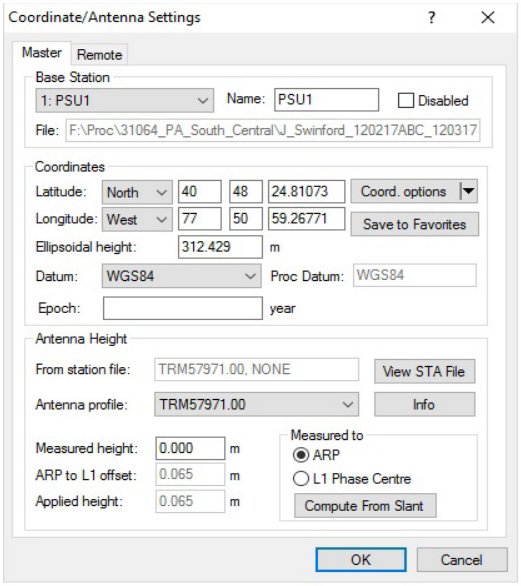

Estimated StdDev (m)
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
602000
Week 1977
602500
603000
603500
604000
604500
200
Week 1978
700
1200
1700
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
3: KA01
Name: KA01
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swinford_120217ABC_120317
Coordinates
Latitude: North 40 51 33.65780
Coord. options
Longitude: West 76 47 46.11534
Save to Favorites
Ellipsoidal height: 110.961 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TRM41249.00, NONE
View STA File
Antenna profile: TRM41249.00
Info
Measured height: 0.000 m
ARP to L1 offset: 0.056 m
Applied height: 0.056 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel


Coordinate/Antenna Settings
Master
Remote
Base Station
2: PASS
Name: PASS
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swinford_120217ABC_120317
Coordinates
Latitude: North 40 38 20.92572 Coord. options
Longitude: West 76 09 29.77998 Save to Favorites
Ellipsoidal height: 165.704 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
Master
Remote
Base Station
1: PSU1
Name: PSU1
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swinford_120217ABC_120317
Coordinates
Latitude: North 40 48 24.81073 Coord. options
Longitude: West 77 50 59.26771 Save to Favorites
Ellipsoidal height: 312.429 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

Flight Log

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

(email log daily to flight_log_distribution_list@quantumspatial.com)

Date: 12/02/2017 Lift: A B (C) D E Pg 1 of 2

Project: PA LiDAR Proj #: 31064 Flight Mgmt File:

Aircraft: N812TB Begin Hobbs: 4811.9 End Hobbs: 4813.7 Total: 1.8 Pilot: BILLINGTON Co-Pilot: Tech: SWINFORD

Dep Apt: KUNV Dep Time (Lcl): 6:15 (Z): 23:15 Arr Apt: KUNV Arr Time (Local): (Z): Tot Time Aloft: 1.8

CORS: (Y) / N Sta 1: Sta 2: Flyovers: Y / (N) If Y, times: Sta1) Sta2)

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

Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

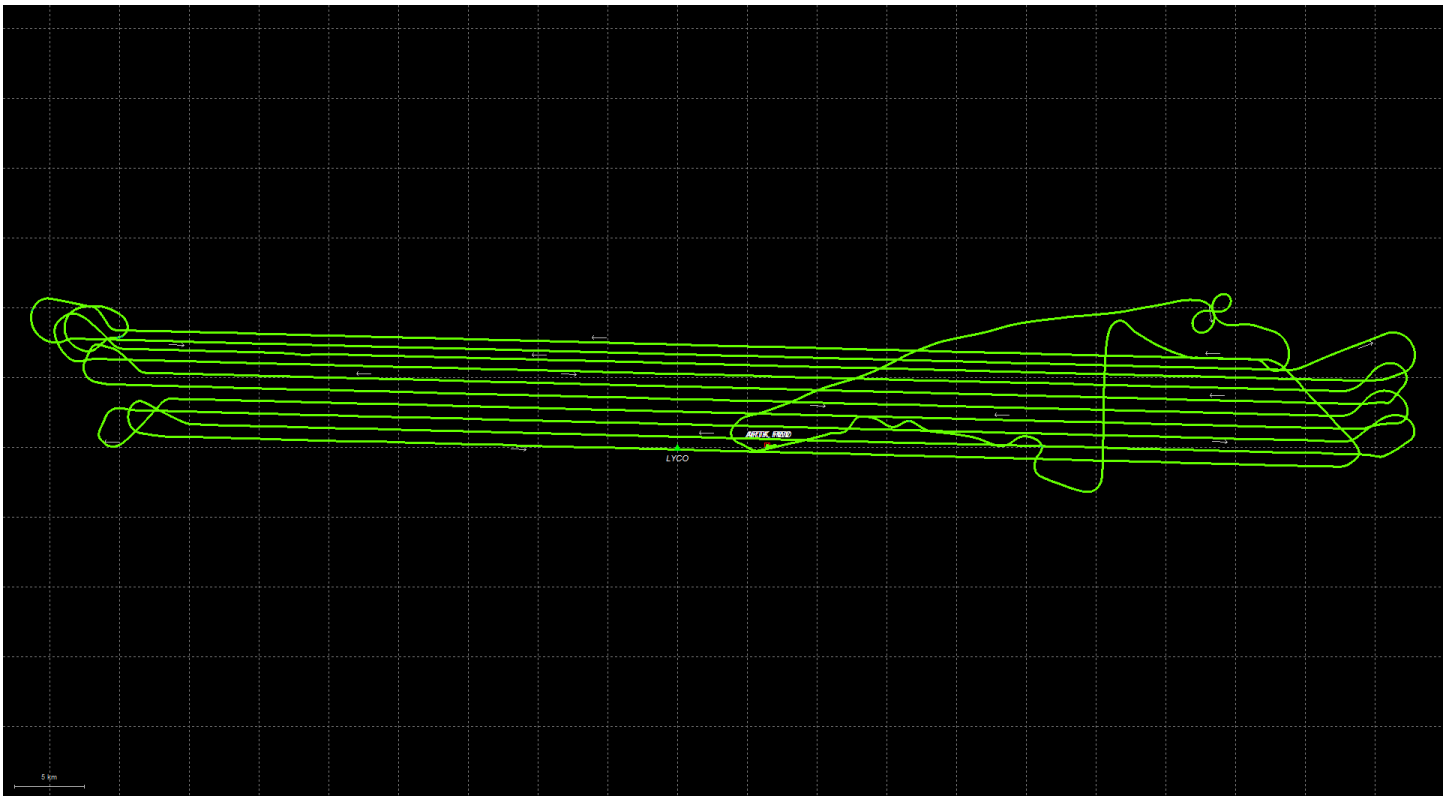
LiDAR	Type ALS 70	Serial # 7161	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing
	FOV 36	Scan Freq 56	MpiA Y / N	Pulses In Air 2	Pulse Rate 274	Power 100 %	PPSM

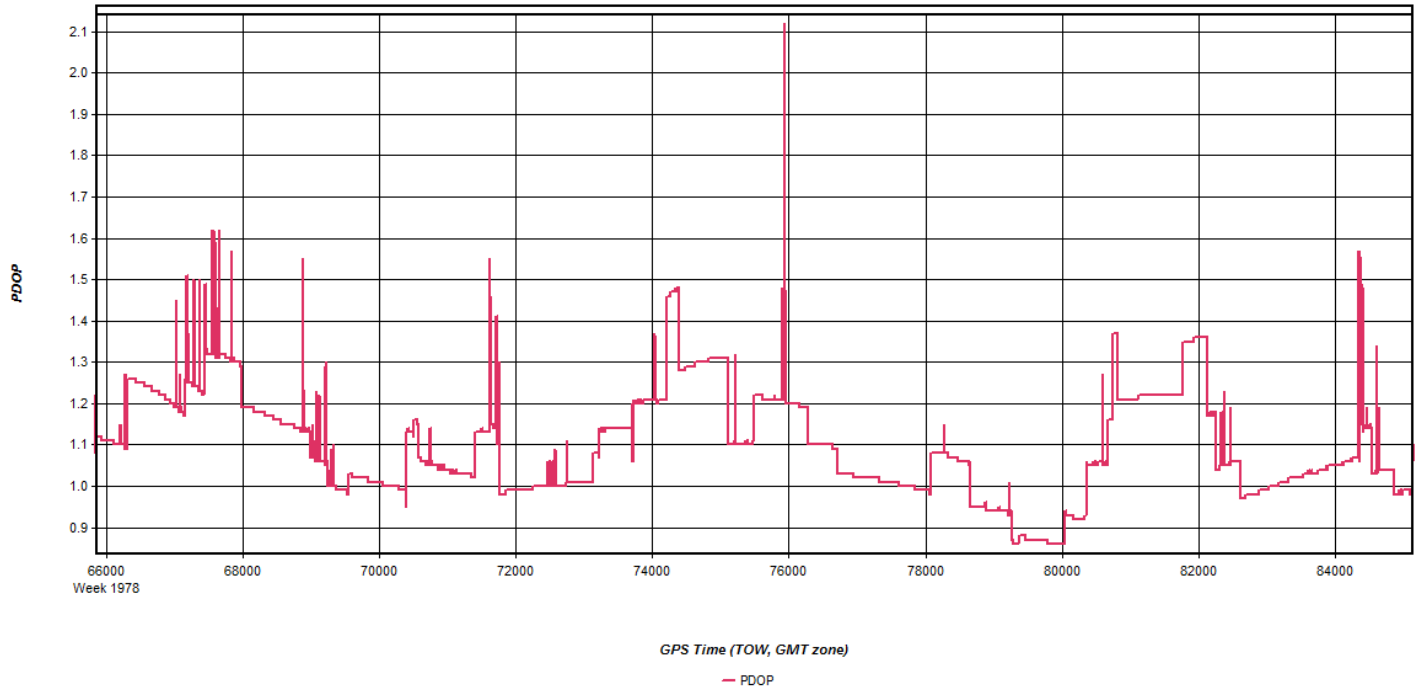
Beg GB	145	Storage Name/#
End GB	128	016
Tot GB	17	

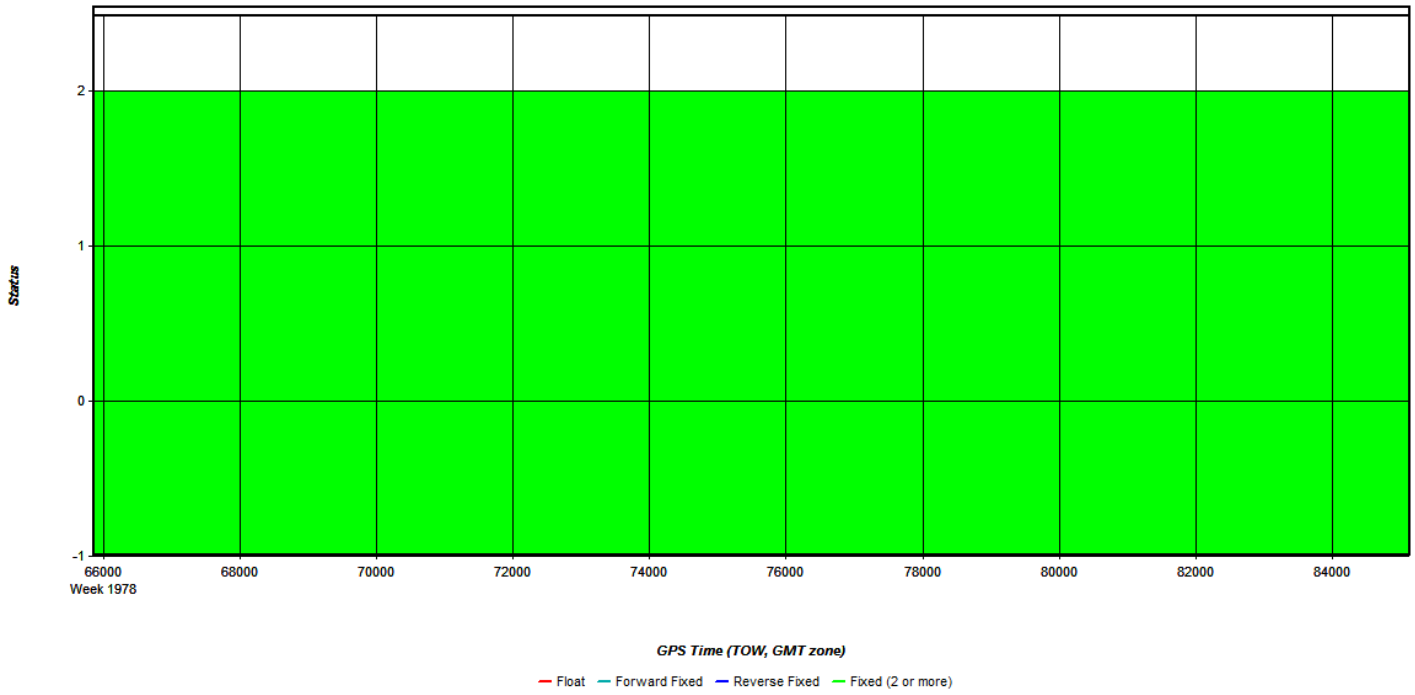
Line #	Hdg	Start (UTC):	End (UTC):	Gd Spd	PDOP/# Sats	GPS Altitude	Crab	Turb (0, -, +)	FLIGHT LINE NOTES – visibility, clouds, smoke, partial, etc.
1042	091	23:26	23:42	158	1.3/18	6800	10	0	FIG 8 @ 23:22 / REFLIGHT OF 1042
XTIE	180	23:45	23:47	161	1.4/17	6800	0	0	UNPLANNED LINE
XTIE	142	23:49	23:51	169	1.4/17	6800	0	0	UNPLANNED LINE / GPS MID-NIGHT
2023	048	00:02	00:14	155	1.4/18	7100	8	0	
2022	228	00:16	00:28	151	1.1/18	7100	8	0	AFTER END OF LINE (ALS ERROR - TDC RAN OUT OF BUFFER / REBOOT & ERROR CAME BACK)
									RTB
									ALS WARNING - TDC DATA FETCH TIMEOUT ERROR DUE TO NO MEM SWITCH SIGNAL ON I/O AUX 1 CONNECTION to TDC

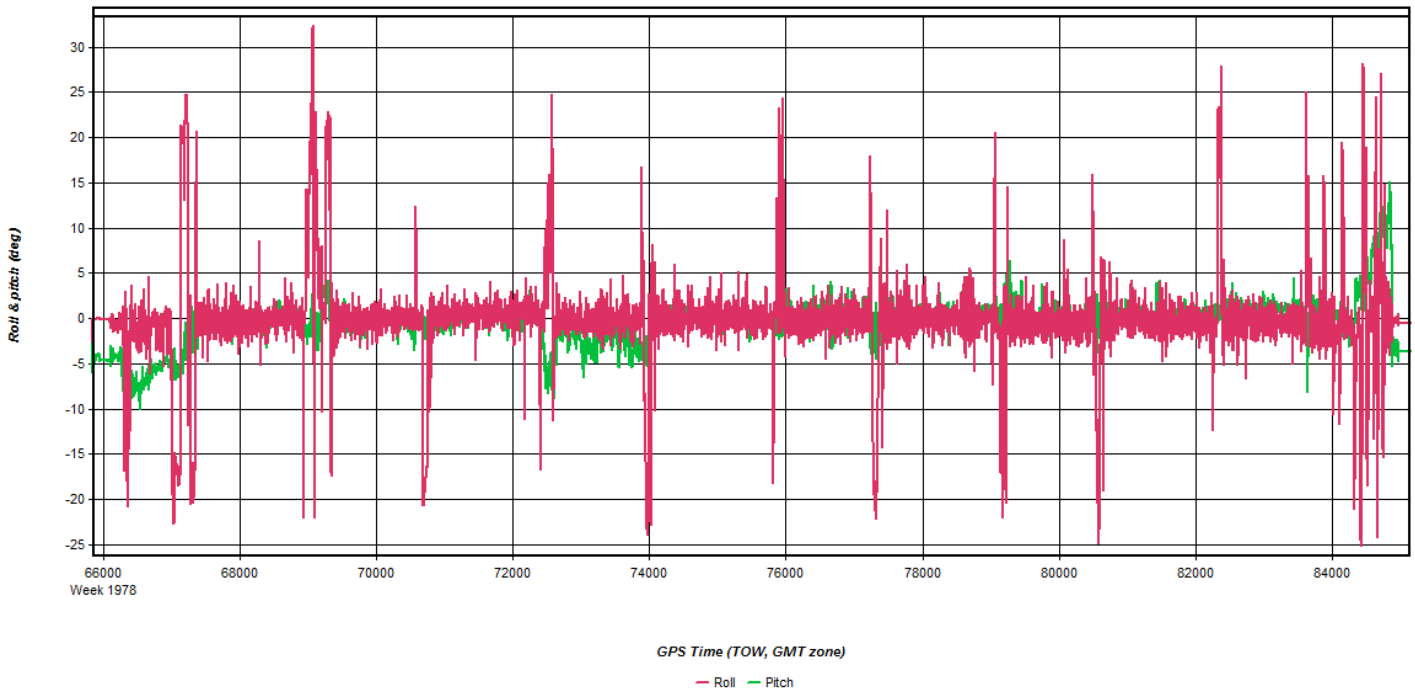
Total Proj Lines: Lines Flown: Lines Remain: Online Time: 1.0 Mob Time: .75 Notes:

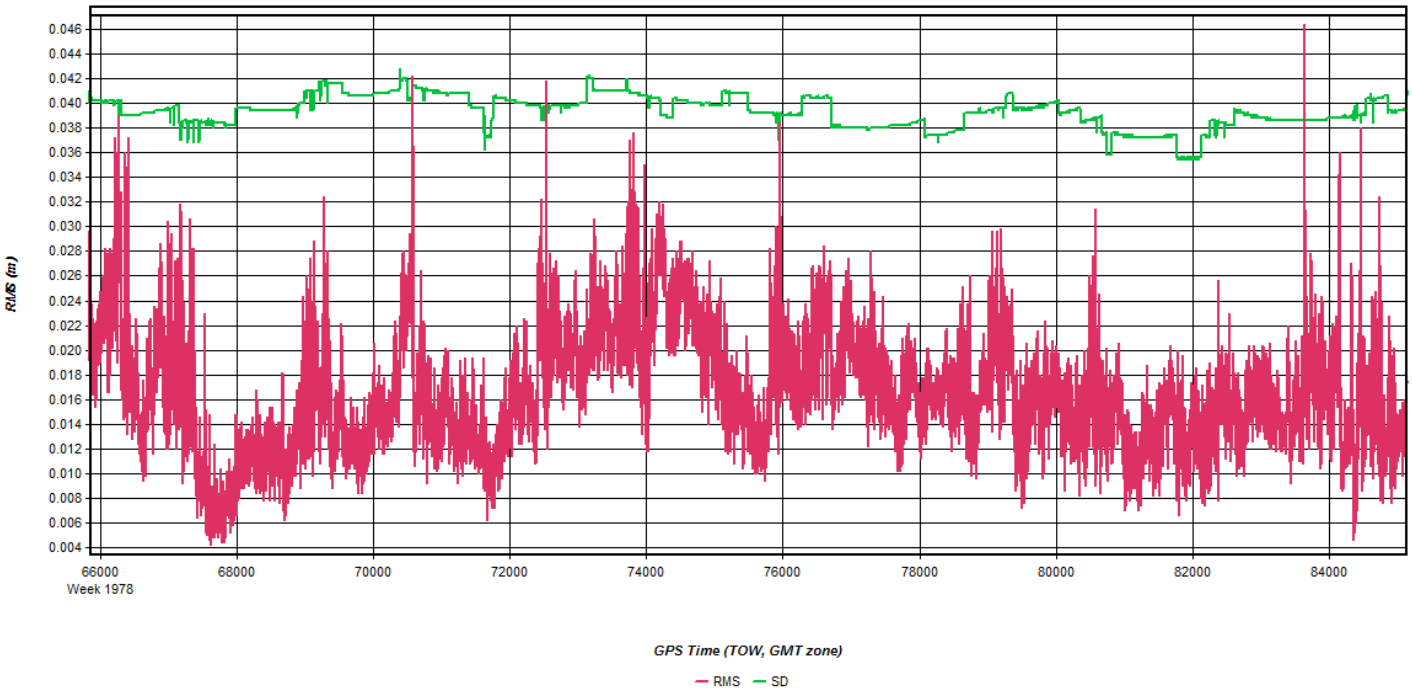
December 3, 2017-A (N916WC, SN8119)

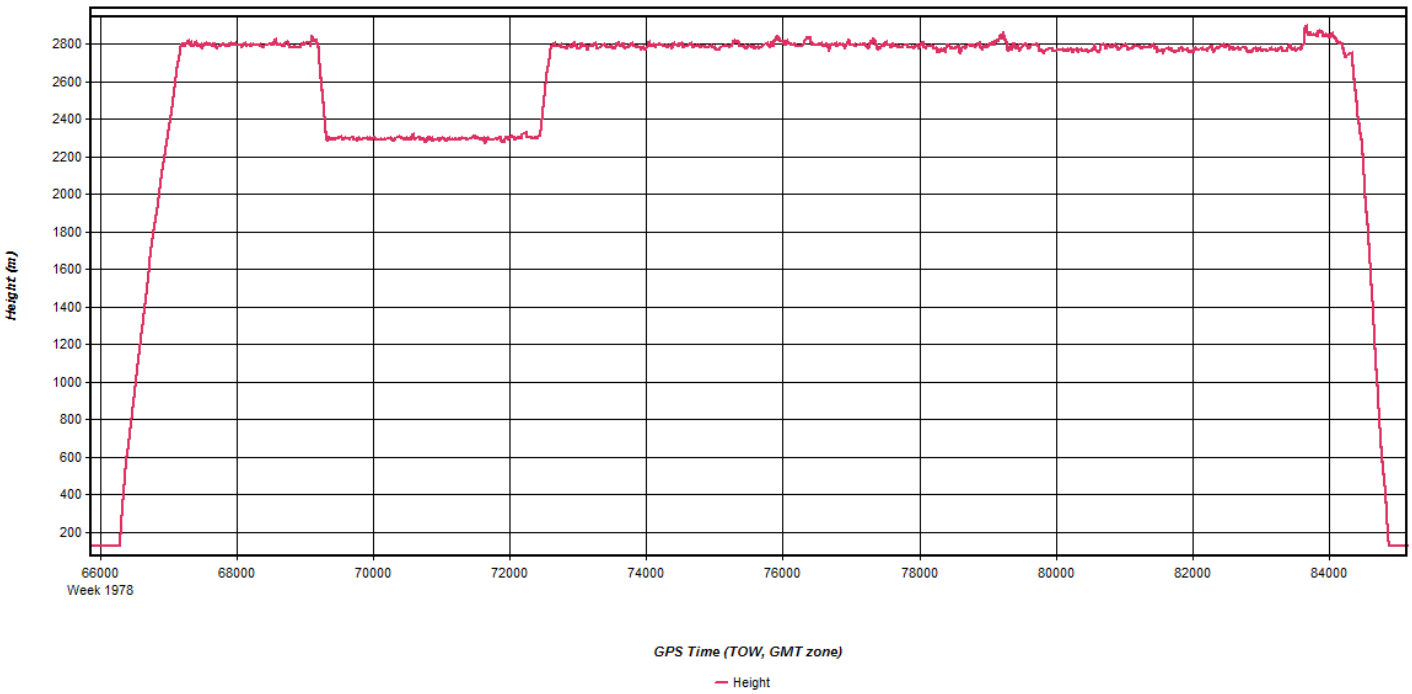

ARTIK_F800
LYCO
5 km

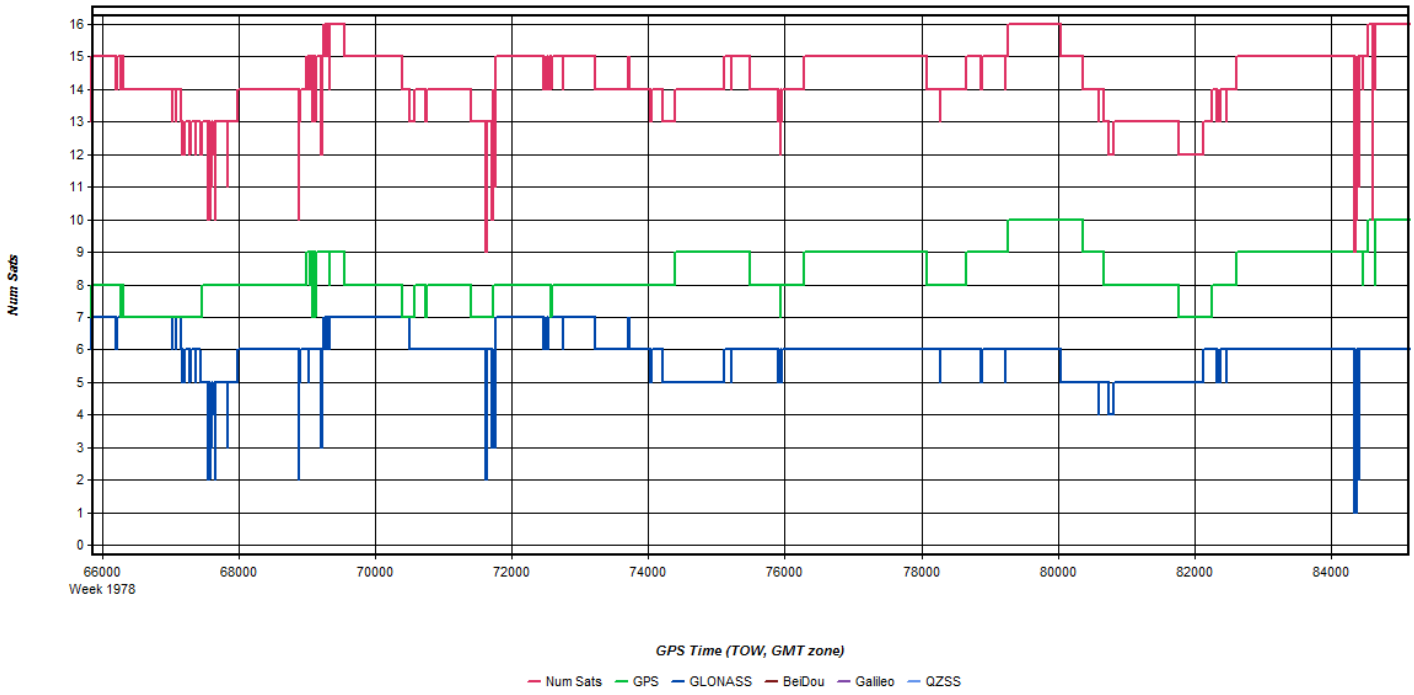

PDOP
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
PDOP


Status
2
1
0
-1
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

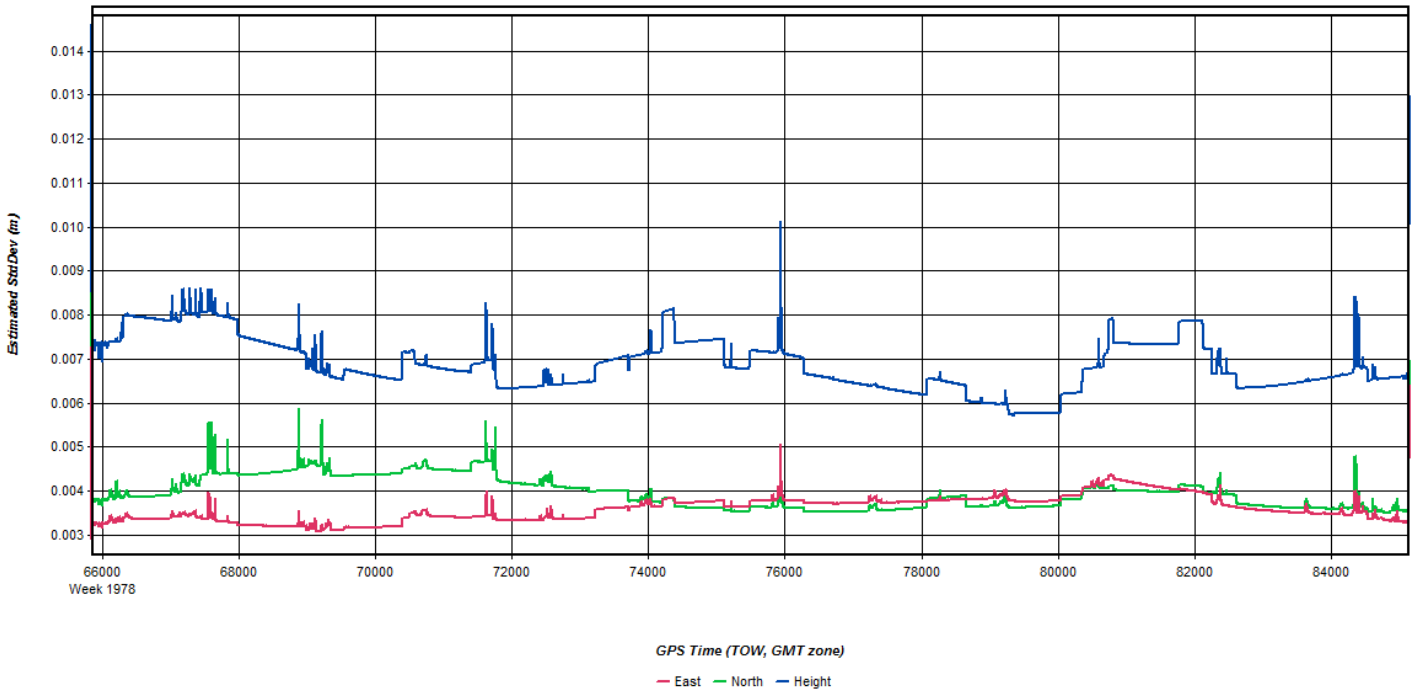

Roll & pitch (deg)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
Roll
Pitch

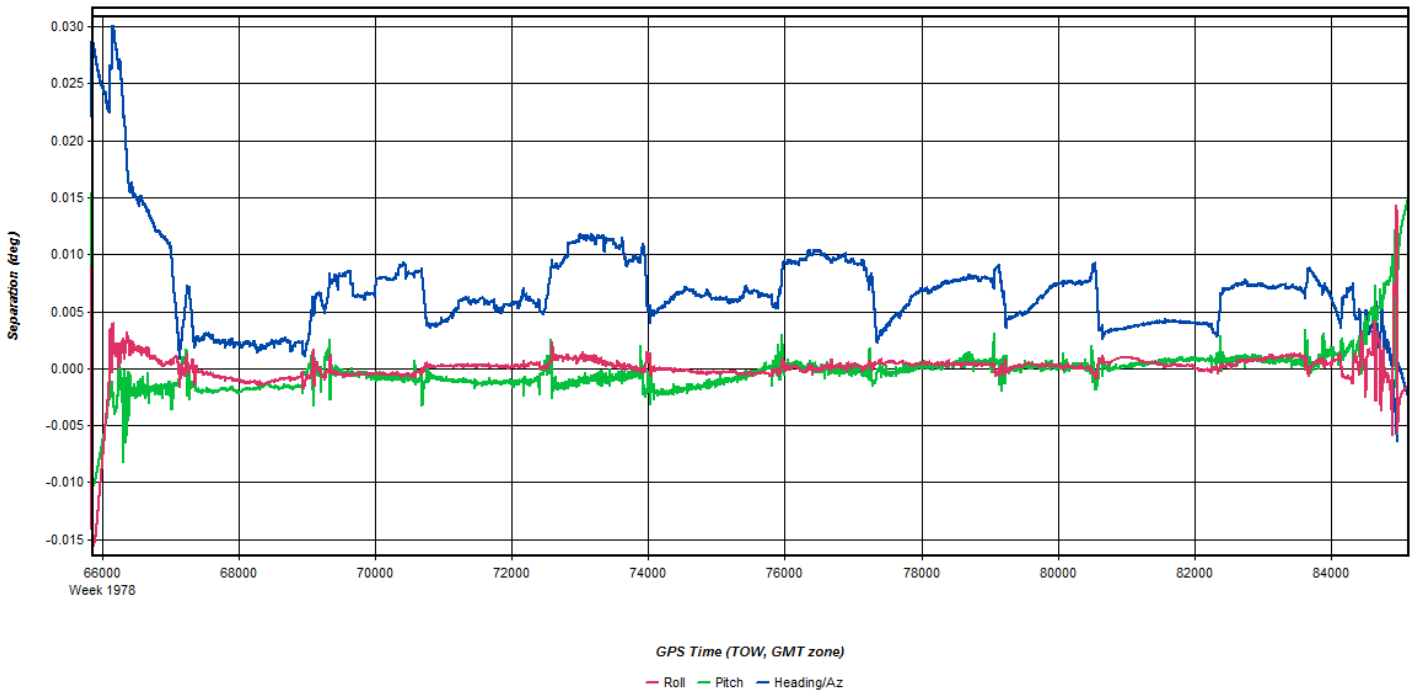

RMS (m)
0.046
0.044
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
RMS
SD

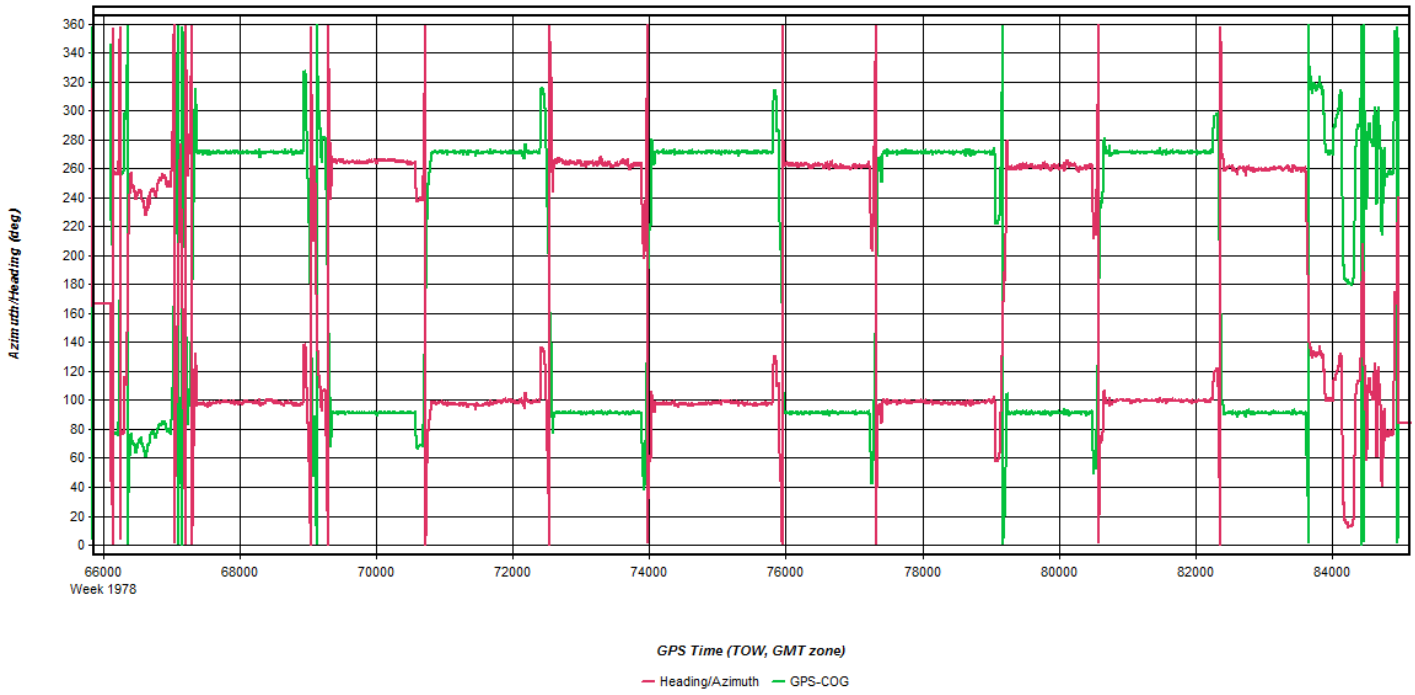

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
Height

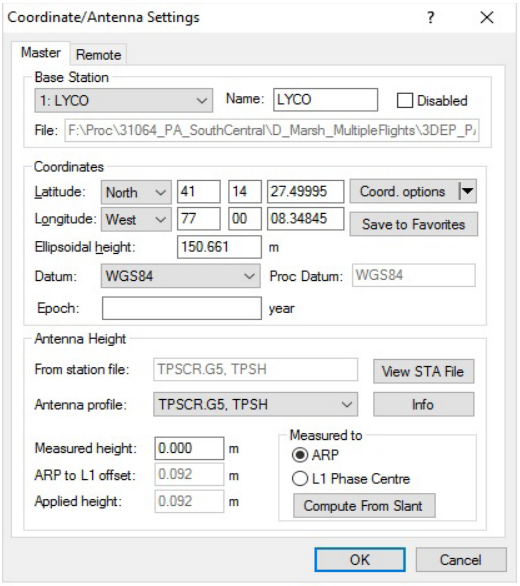

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
-0.015
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
66000
Week 1978
68000
70000
72000
74000
76000
78000
80000
82000
84000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_MultipleFlights\3DEP_P
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aerotrio
LIDAR FLIGHT REPORT

Revised Feb. 2014

CREW	Pilot/Operator	Tail Number	AIRCRAFT	WEATHER
	Scott A / Don M	N916WC		Clear Winds 22 kts fm 283 deg

Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.

UTC DATE 12/01/2017 *mm/dd/yy*

GPS Source: Kappa 180

Camera System	LiDAR S/N
	8119
	fwd/aft
Camera Location (Hole)	Fwd

	Time	Location
Start-up	7:10 pm local	Williamsport KIPT Pa
Shut-down	9:25 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

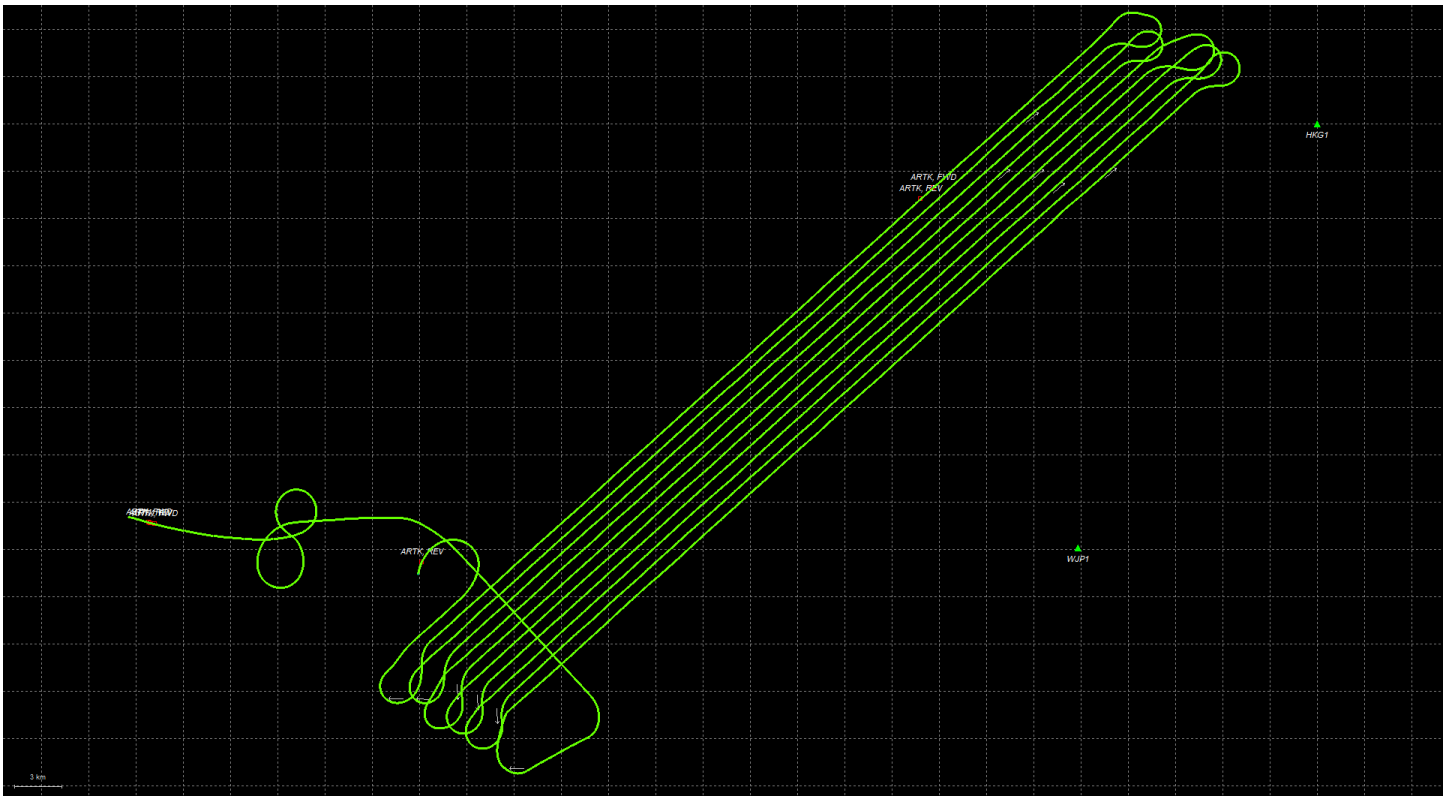
Lens cleaned	
AIRpds uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

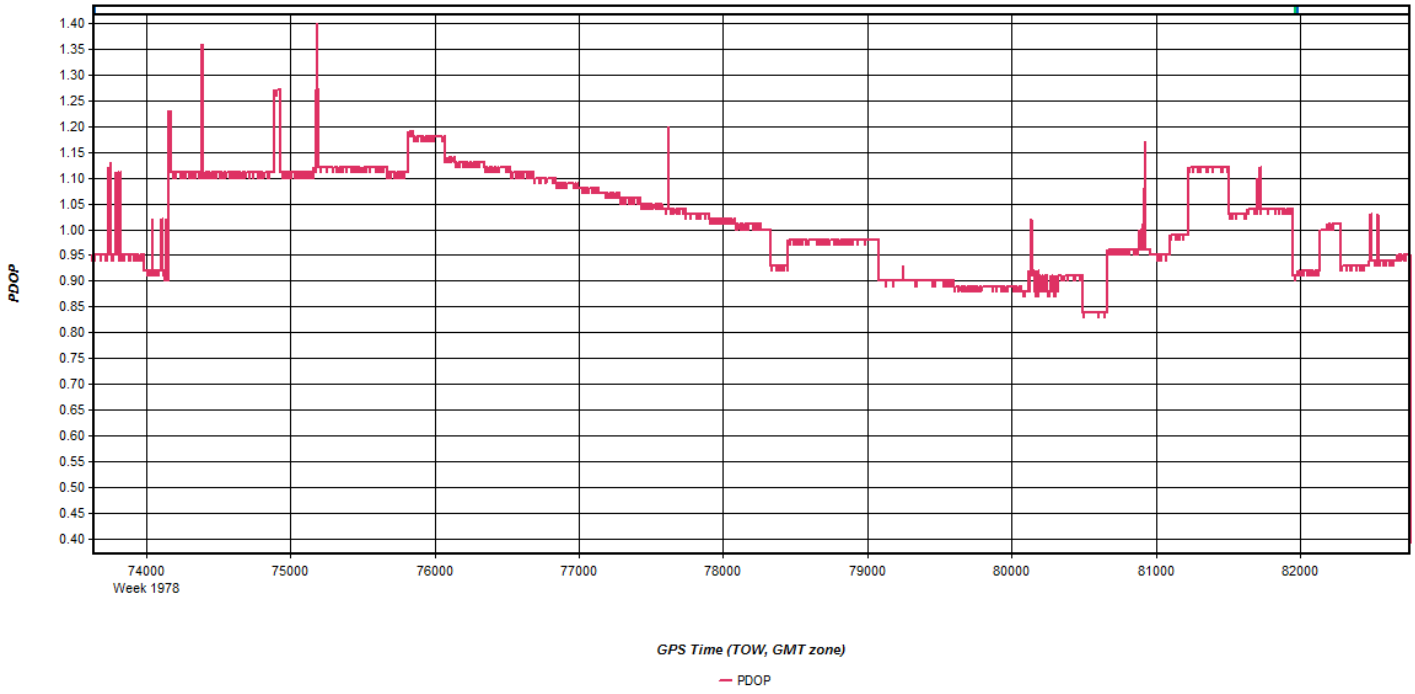
SSD

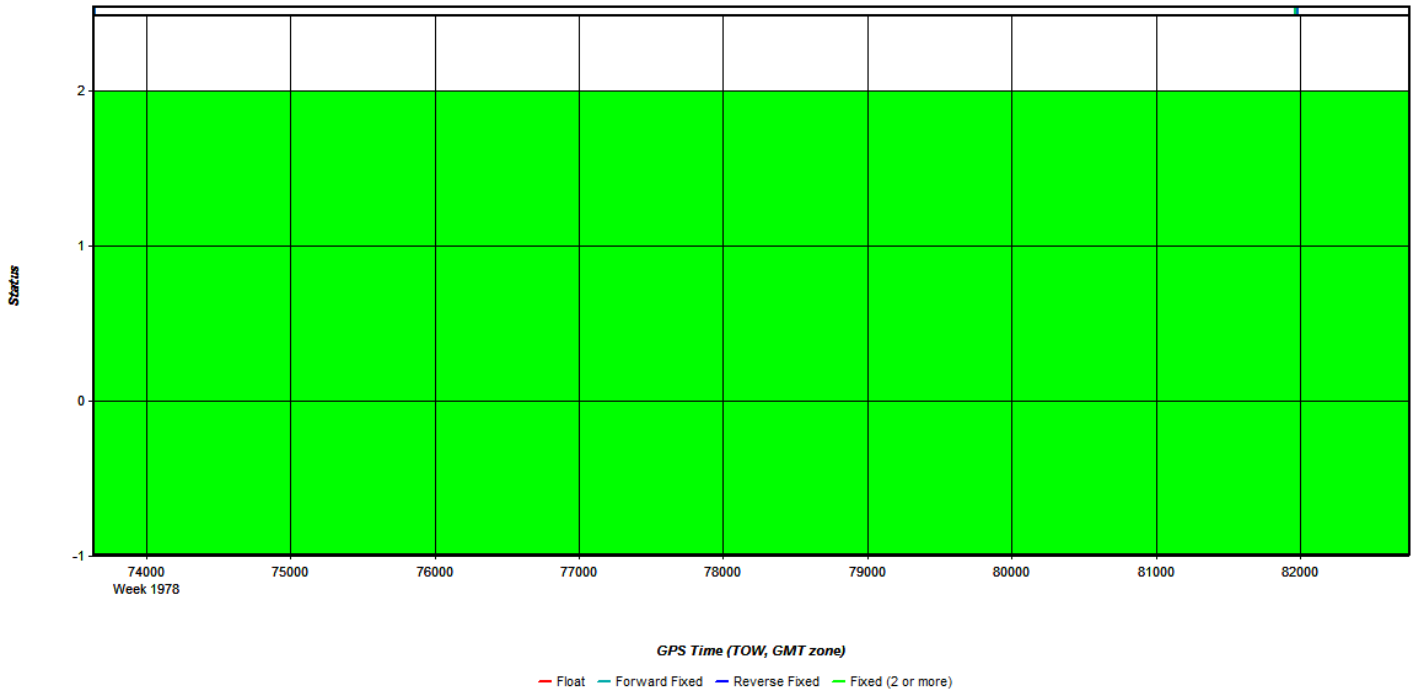
Drive #	
	8119_1
@ Beginning	
Space Used	74
During Mission	39
Space Used	
Remaining Tot Space	1141

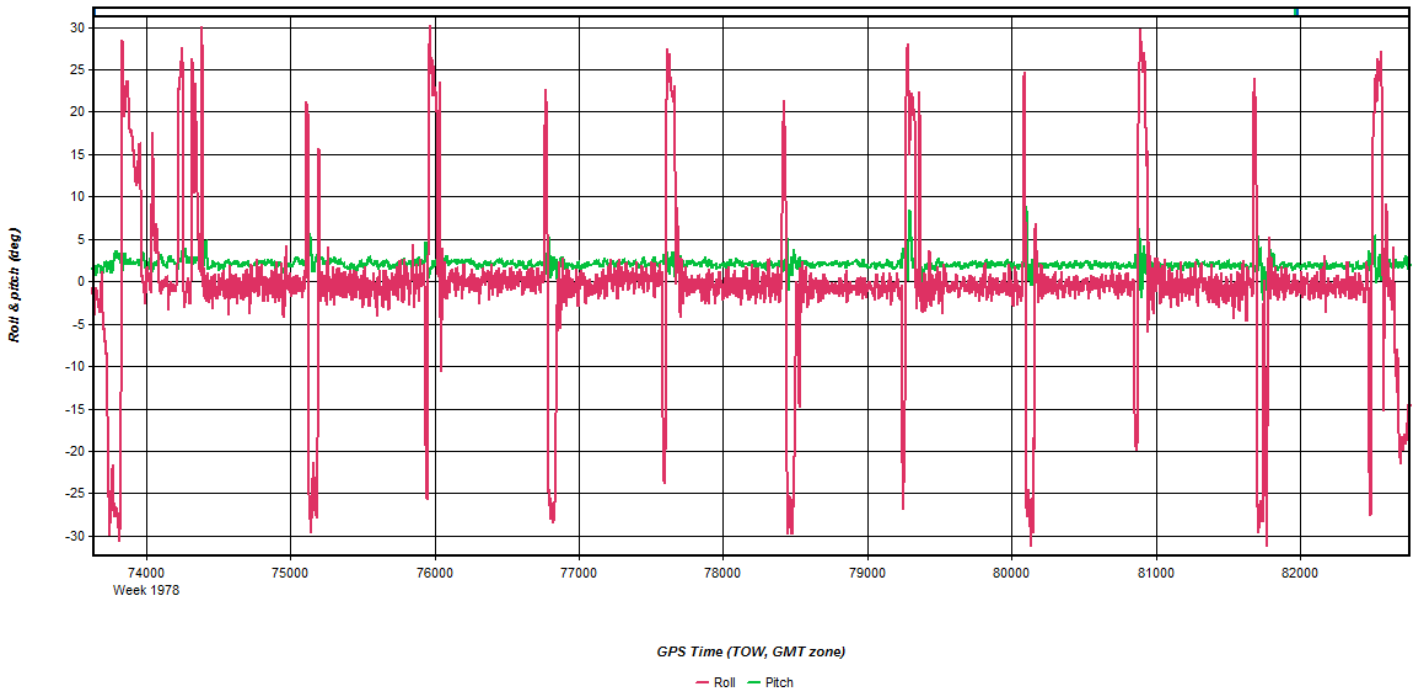
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N025	W		
		N026	E		
		N027	W		
		N028	E		
		Ad-Hoc	S		

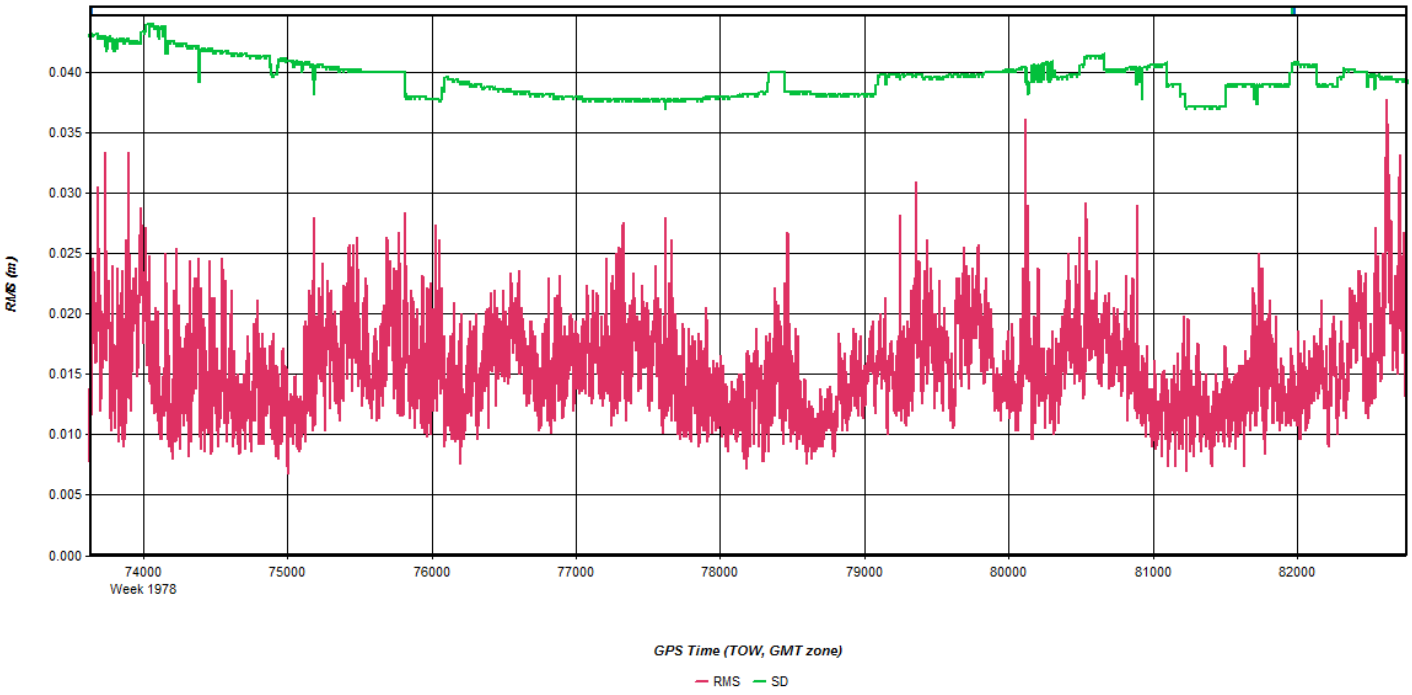
December 3, 2017-B (N812TB, SN7161)

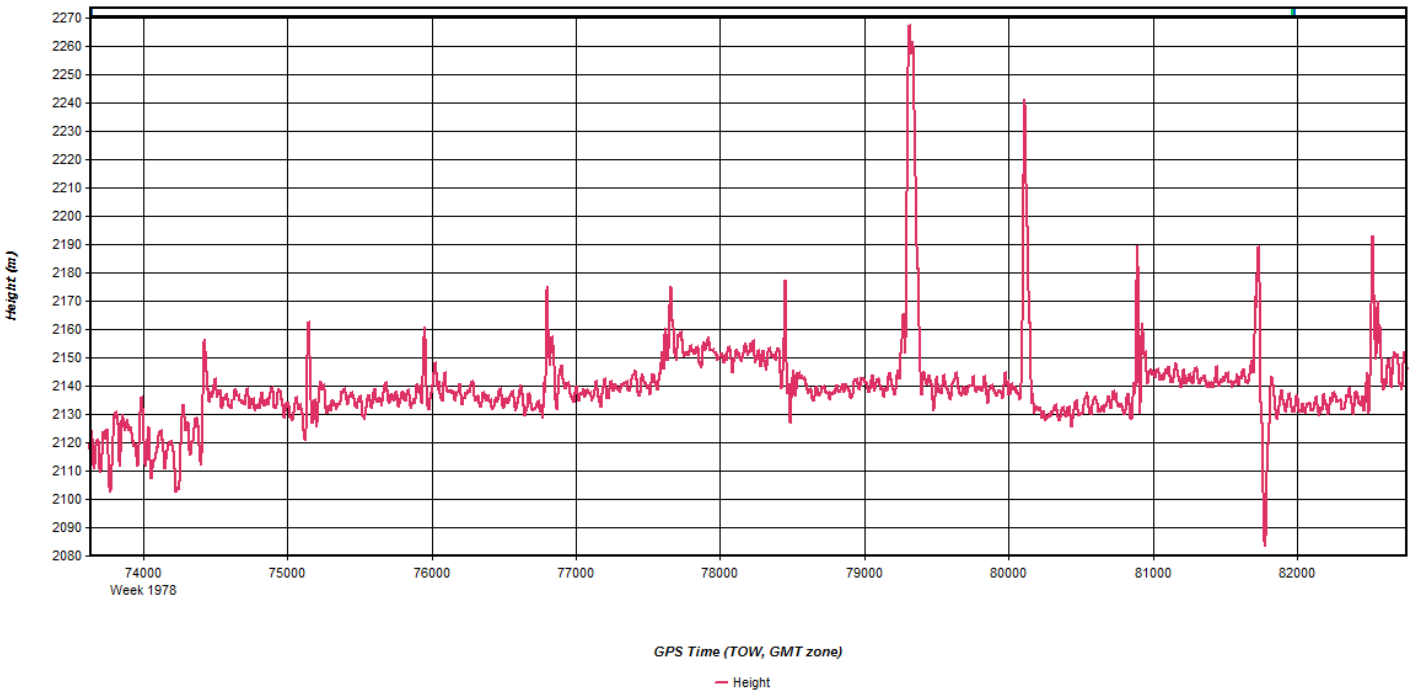

HKG1
ARTK_FWD
ARTK_REV
WJP1
ARTK_REV
3 km

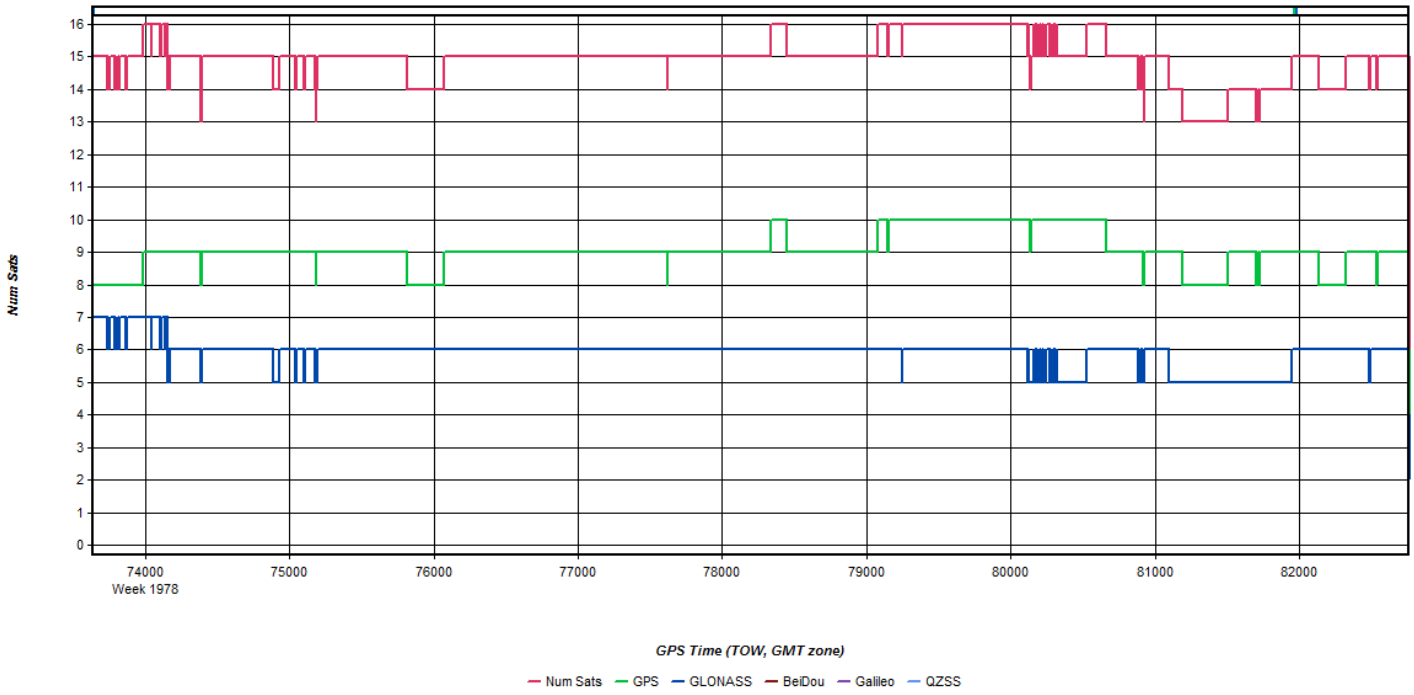

PDOP
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
PDOP

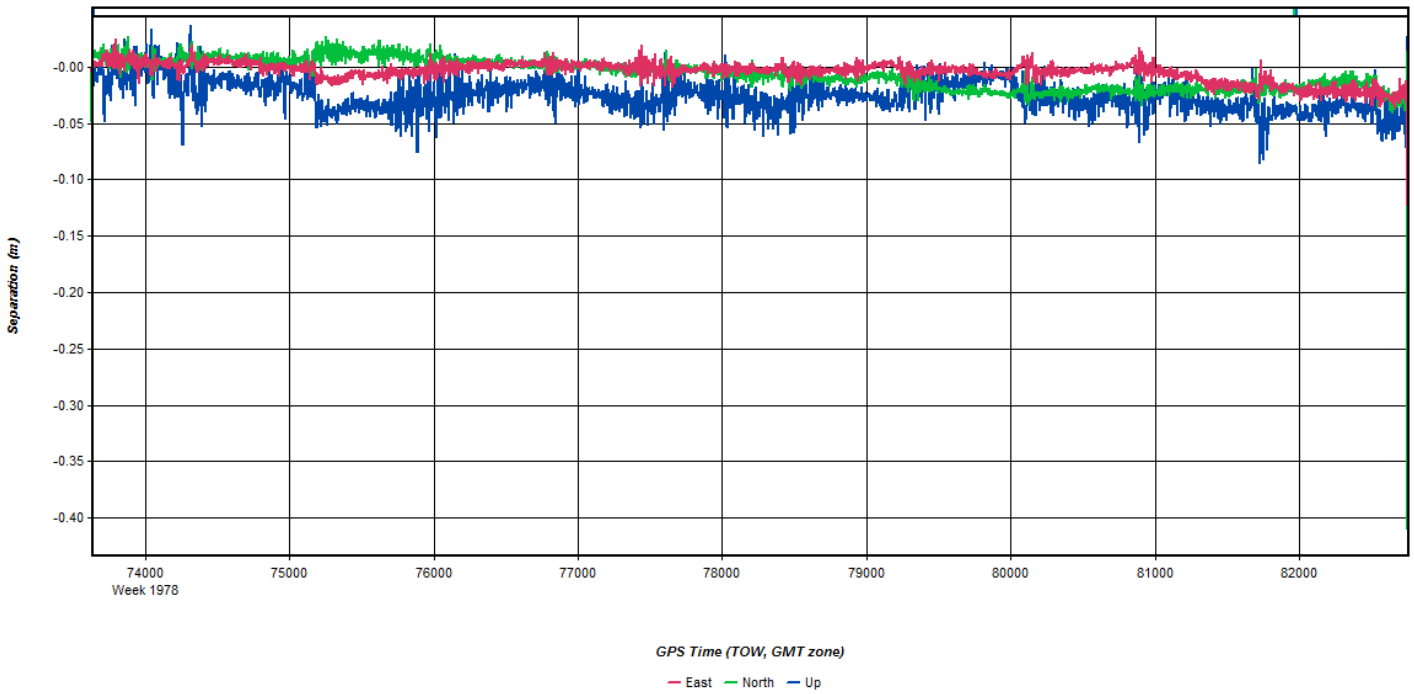

Status
2
1
0
-1
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

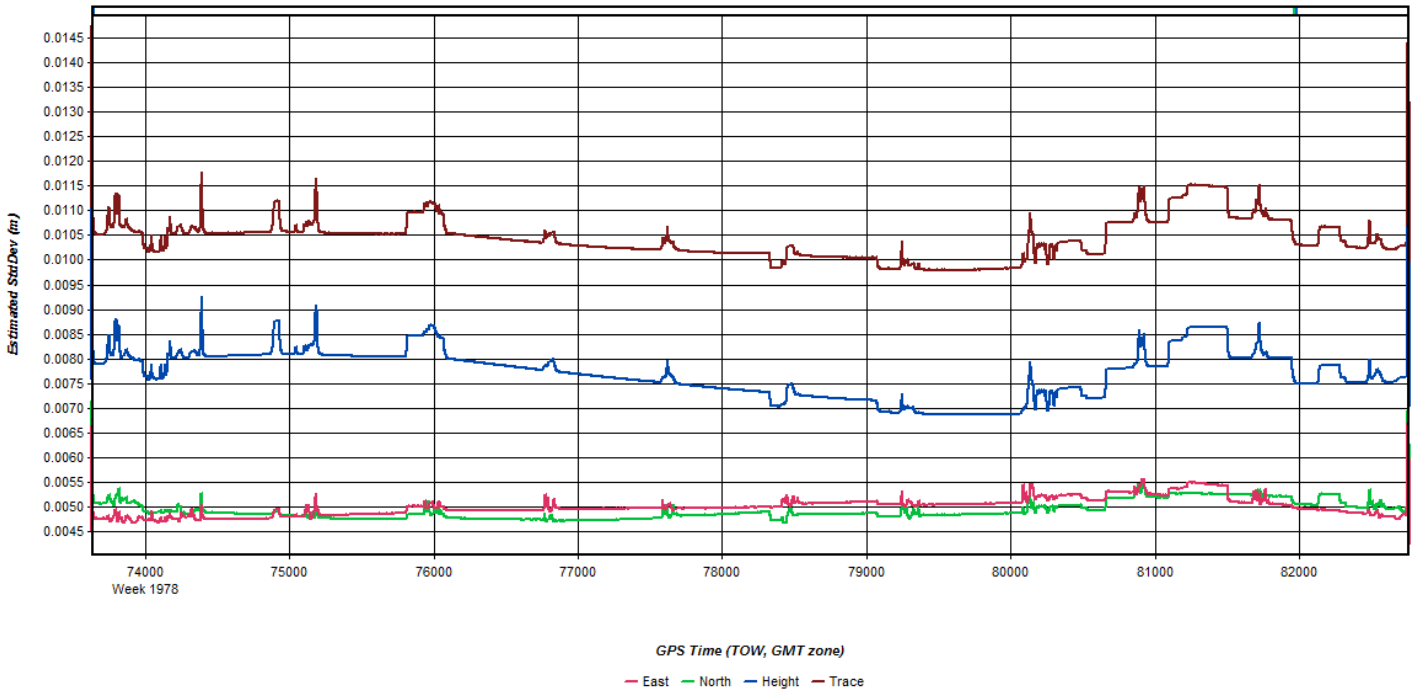

Roll & pitch (deg)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
Roll
Pitch

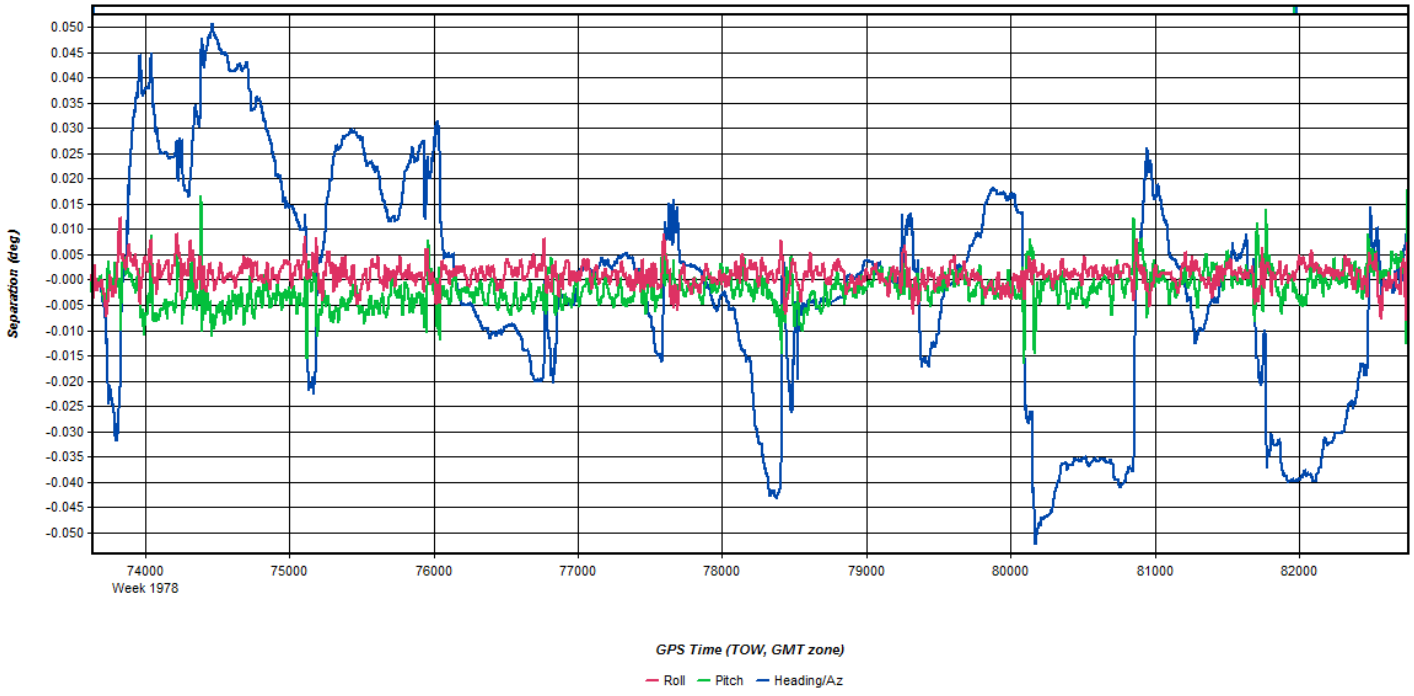

RMS (m)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
RMS
SD

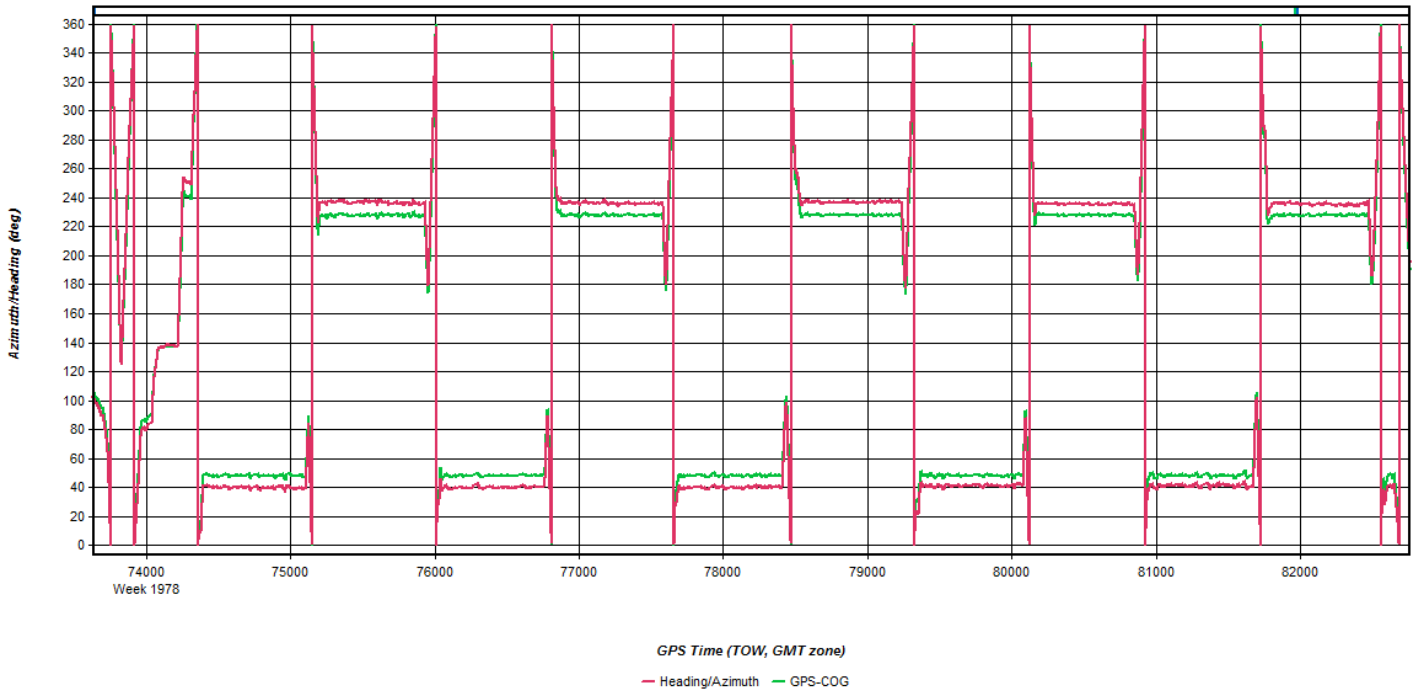

Height (m)
2270
2260
2250
2240
2230
2220
2210
2200
2190
2180
2170
2160
2150
2140
2130
2120
2110
2100
2090
2080
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
Height

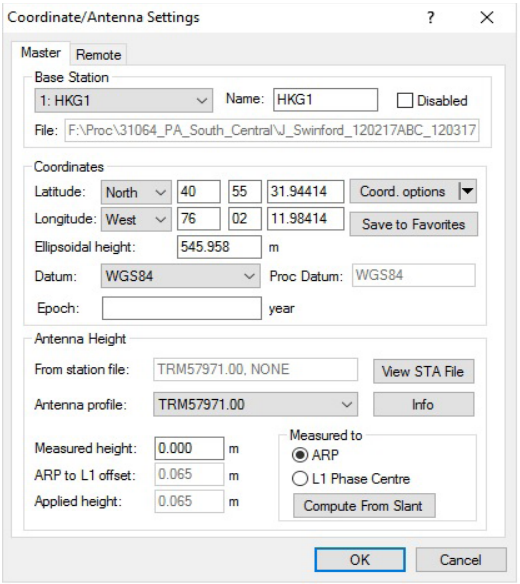

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

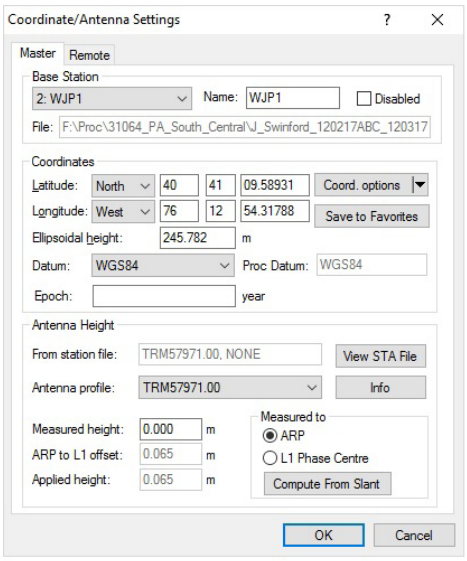

Separation (m)
-0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
-0.35
-0.40
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0145
0.0140
0.0135
0.0130
0.0125
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
East
North
Height
Trace


Separation (deg)
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
-0.000
-0.005
-0.010
-0.015
-0.020
-0.025
-0.030
-0.035
-0.040
-0.045
-0.050
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
74000
Week 1978
75000
76000
77000
78000
79000
80000
81000
82000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: HKG1
Name: HKG1
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swinford_120217ABC_120317
Coordinates
Latitude: North 40 55 31.94414
Coord. options
Longitude: West 76 02 11.98414
Save to Favorites
Ellipsoidal height: 545.958 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
Master
Remote
Base Station
2: WJP1
Name: WJP1
Disabled
File: F:\Proc\31064_PA_South_Central\J_Swinford_120217ABC_120317
Coordinates
Latitude: North 40 41 09.58931 Coord. options
Longitude: West 76 12 54.31788 Save to Favorites
Ellipsoidal height: 245.782 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

Flight Log

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

Date: 12/03/2017

(email log daily to flight_log_distribution_list@quantumspatial.com)

Lift: A (B) C D E Pg 1 of 1

Project: PA LIDAR Proj #: 31064 Flight Mgmt File: 20171203_195226

Aircraft: N812TB Begin Hobbs: 4814.5 End Hobbs: 4818.0 Total: 3.5 Pilot: BILLINGTON Co-Pilot: Tech: SWINFORD

Dep Apt: KUNV Dep Time (Lcl): 3:00 (Z): 20:00 Arr Apt: KUNV Arr Time (Local): 7:00 (Z): 00:00 Tot Time Aloft: 3.5

CORS: (Y) / N Sta 1: Sta 2: Flyovers: Y / (N) If Y, times: Sta1) Sta2)

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

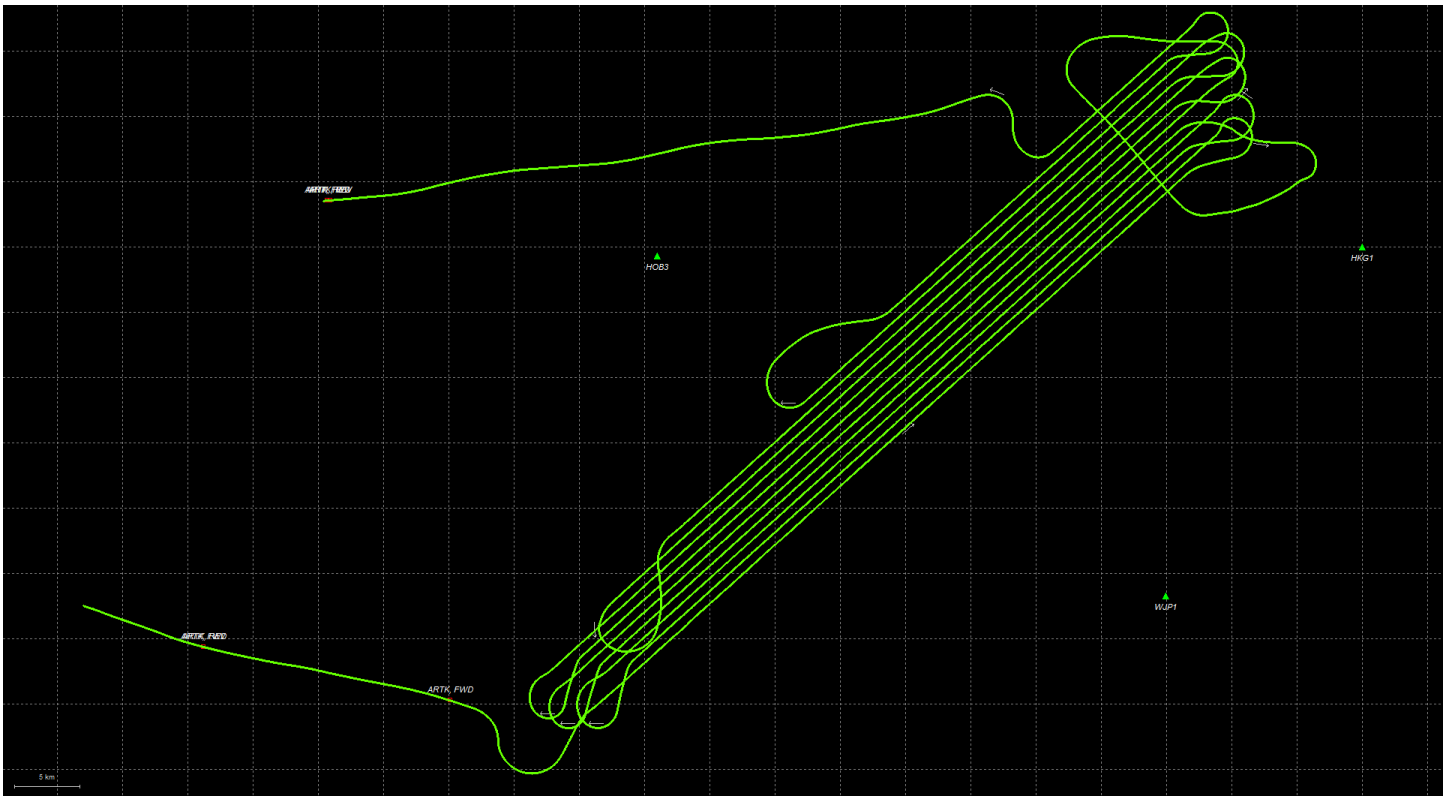
Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

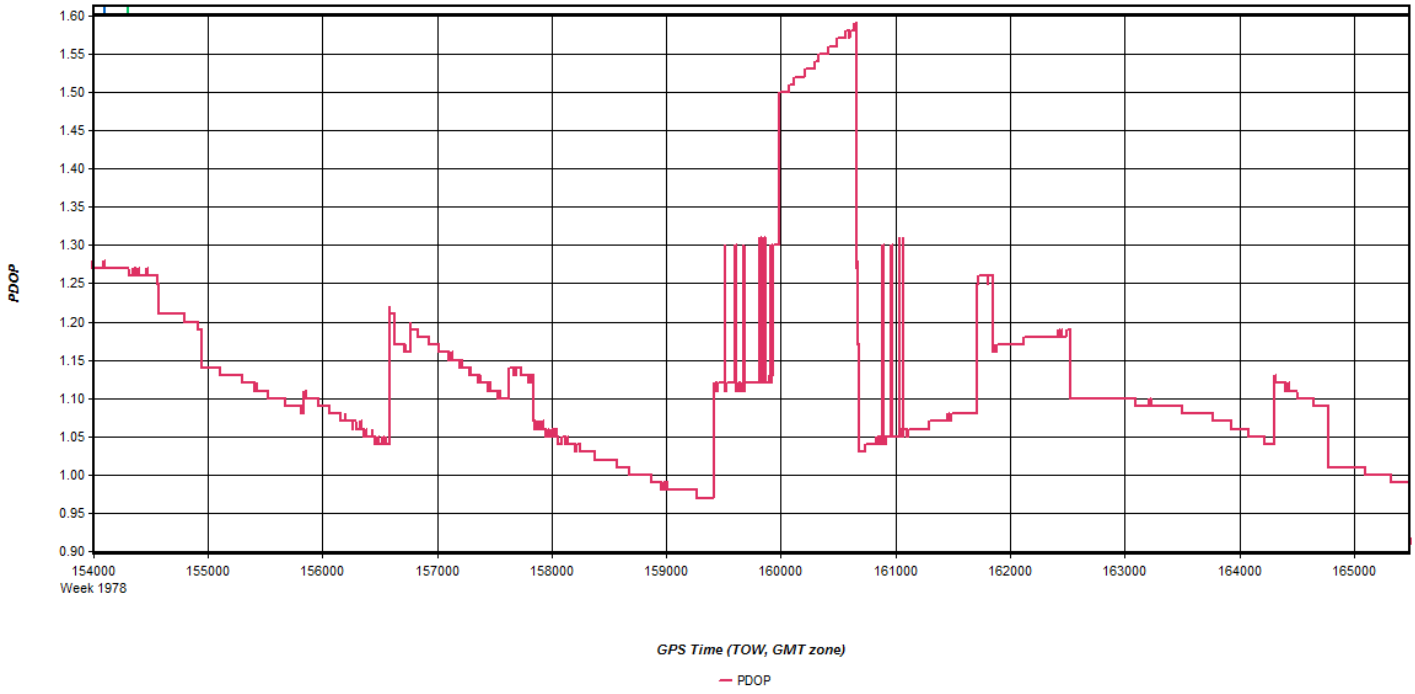
LiDAR	Type ALS70	Serial # 7161	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Beg GB 371	Storage Name/# 018
	FOV 36	Scan Freq 56	MpIA Y / N	Pulses in Air 2	Pulse Rate 274	Power 100%	PPSM	End GB 325	
								Tot GB 46	

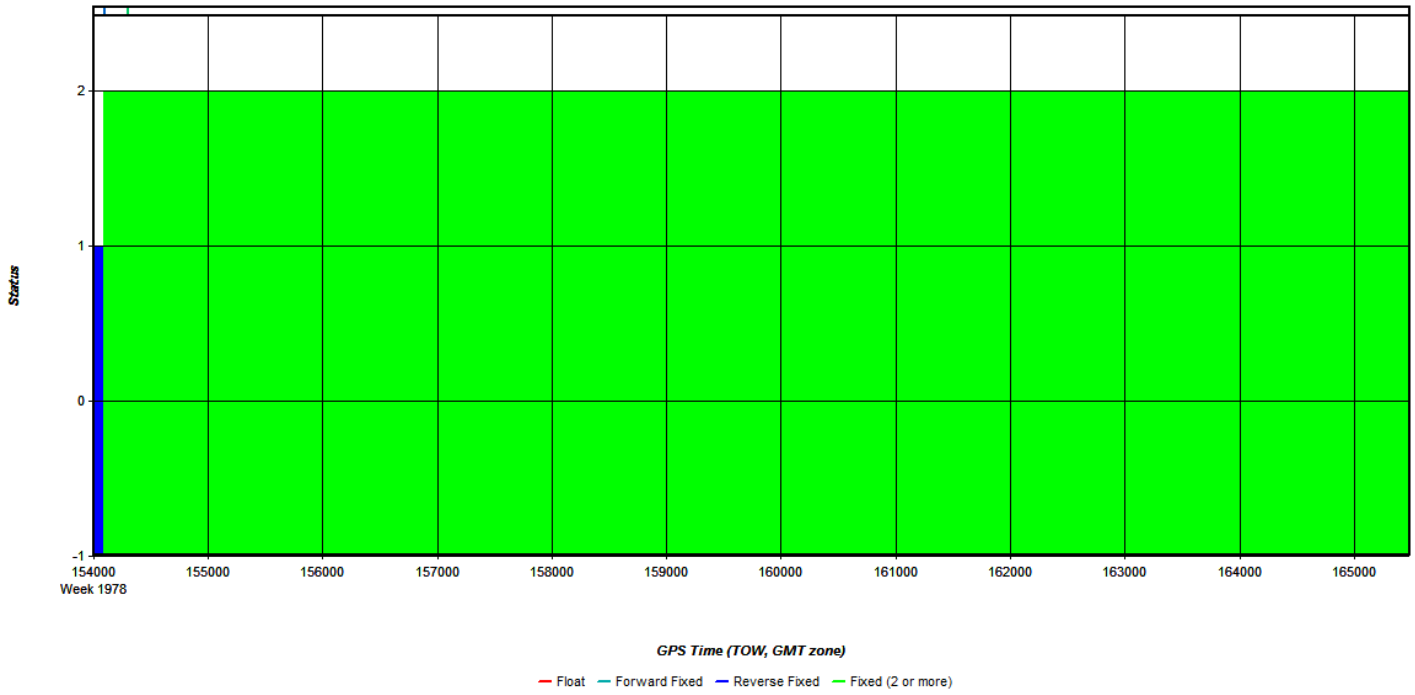
Line #	Hdg	Start (UTC):	End (UTC):	Gd Spd	PDOP/# Sats	GPS Altitude	Crab	Turb (0, -, +)	FLIGHT LINE NOTES – viability, clouds, smoke, partial, etc.
X-TIE	136	20:34	20:36	175	1.1/18	6900	0	0	FIG 8 @ 20:29 / UNPLANNED CROSS TIE LINE OVER 2009-2021
2021	048	20:39	20:52	158	1.1/18	7000	5	0	
2020	228	20:54	21:06	158	1.2/18	7000	5	0	
2019	048	21:08	21:19	154	1.2/17	7000	5	0	
2018	228	21:22	21:33	155	1.4/15	7000	5	0	
2017	048	21:35	21:47	155	1.2/16	7000	5	0	EXIT FILE + RELOAD
2016	228	21:49	22:00	160	1.1/17	7000	5	0	
2015	048	22:03	22:14	163	1.2/16	7000	5	0	
2014	228	22:16	22:27	160	1.1/17	7000	5	0	
2013	048	22:29	22:41	154	1.0/17	7000	5	0	
2012	228	22:43	22:54	160	1.1/17	7000	5	0	EXIT FILE + RELOAD
~~2011~~	~~048~~	~~22:56~~	23 ABORT			~~7000~~	~~5~~	~~0~~	ALS ERROR TDC BUFFER / SHUT DOWN + RESTART
~~2011~~	~~048~~	~~23:~~	ABORT			~~7000~~		~~0~~	ERROR CAME RIGHT BACK / RESTART / FAILED 3RD TIME
									RETURN TO BASE
									SELFTEST; LASER DATA RECORDING FAILED
1030	FOR TEST LINE / ERROR @ IP								INTER

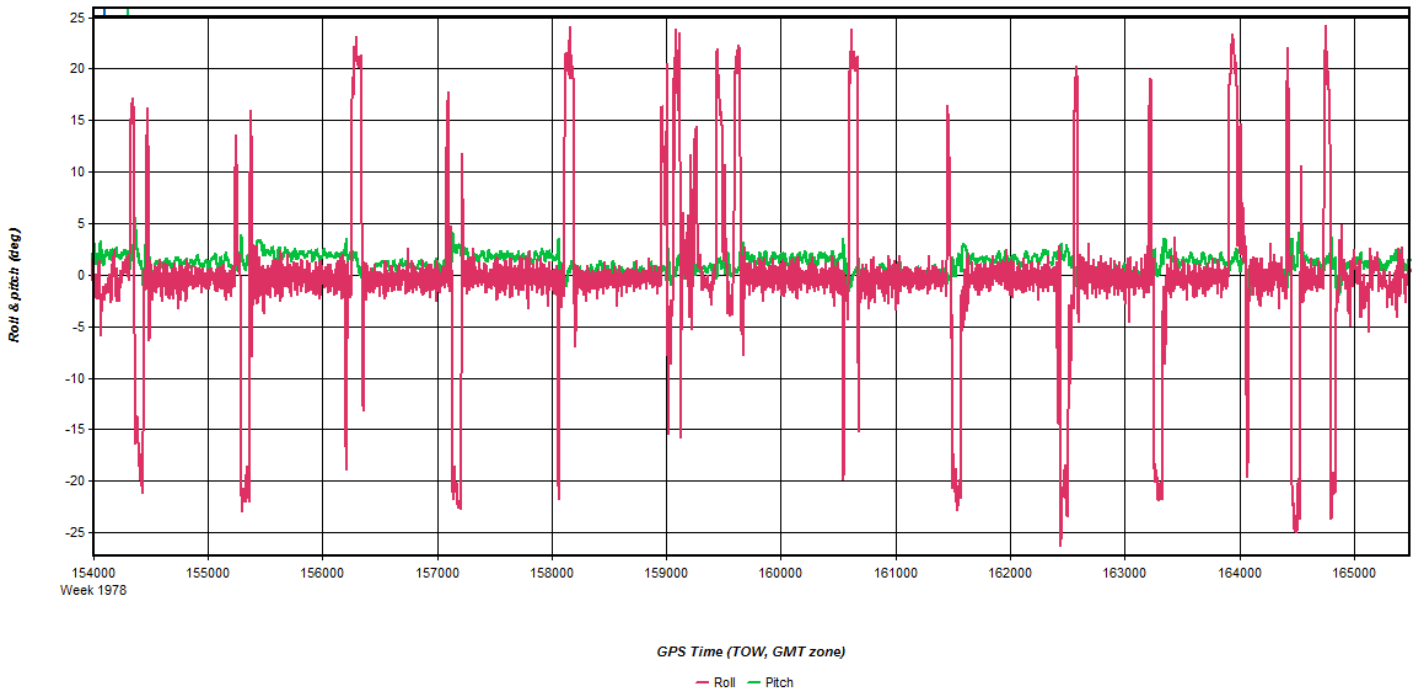
Total Proj Lines: Lines Flown: Lines Remain: OnLine Time: 3.0 Mob Time: .5 Notes:

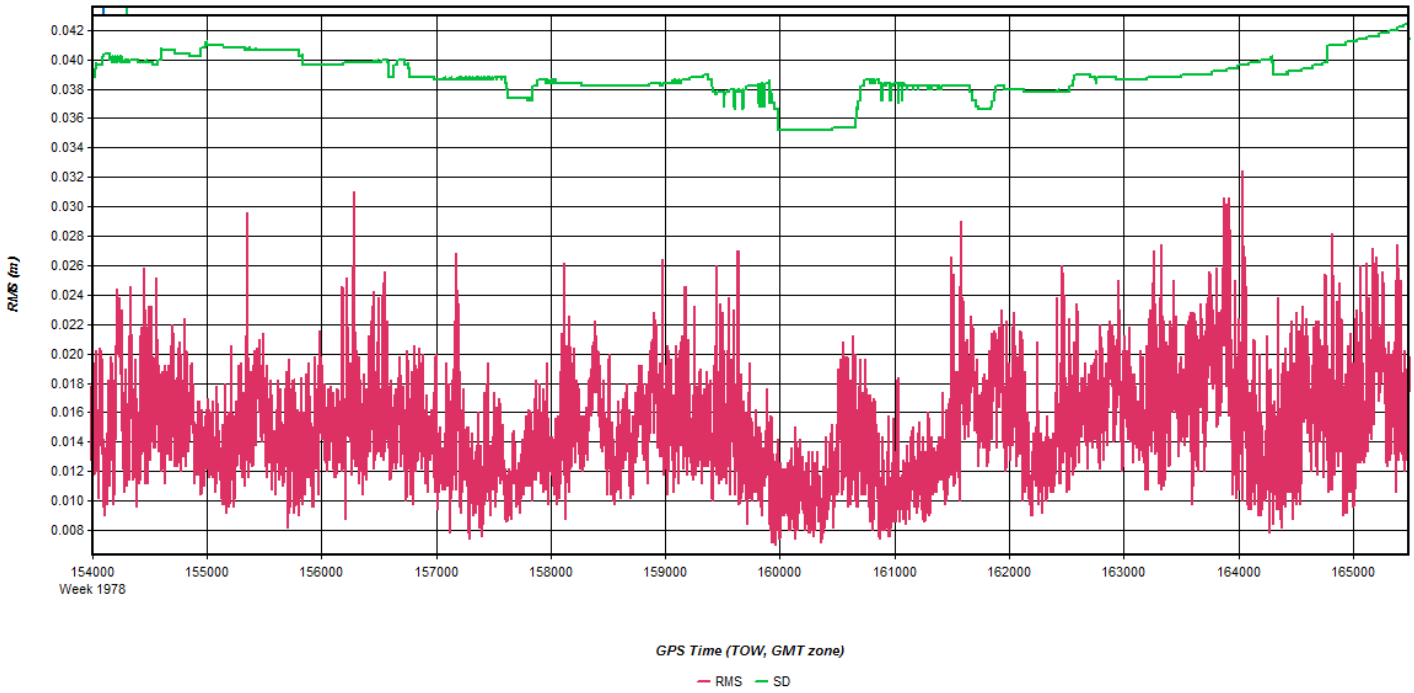
December 4, 2017-A (N812TB, SN7161)

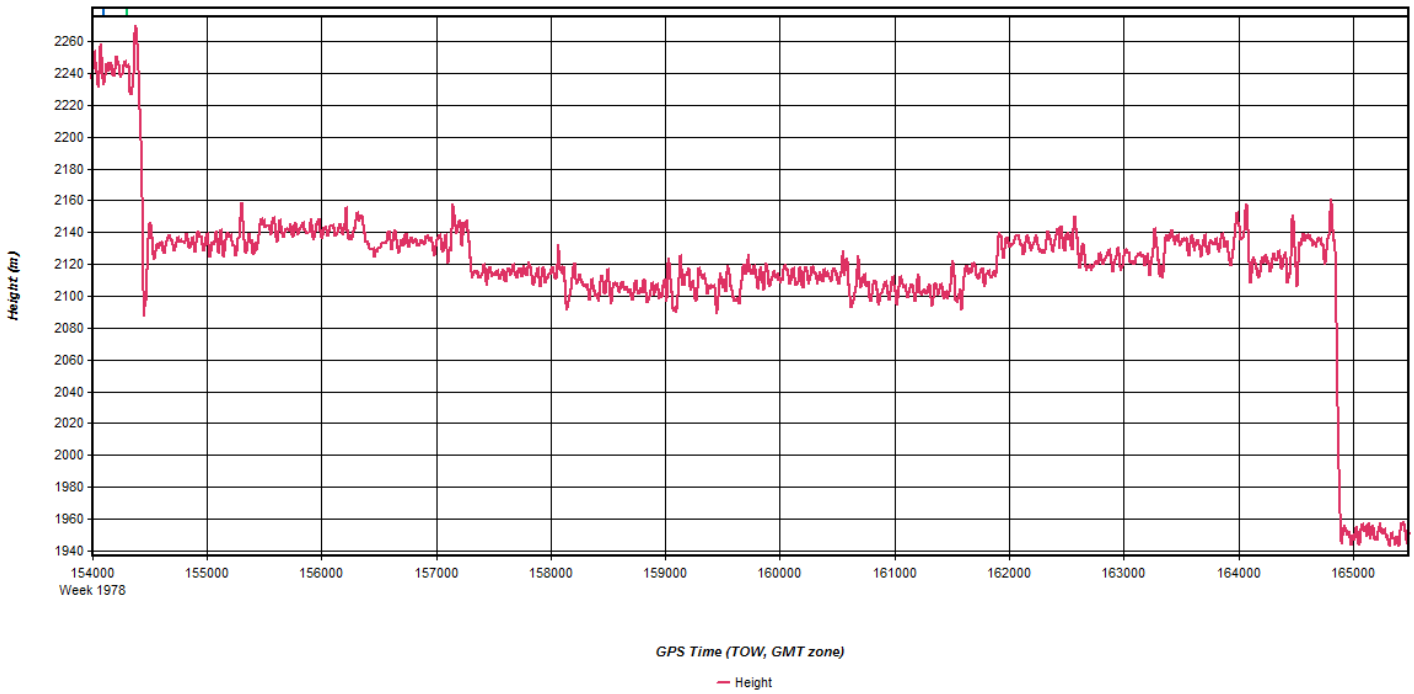

ARTK, FWD
HOB3
HKG1
WJP1
ARTK, FWD
ARTK, FWD
5 km

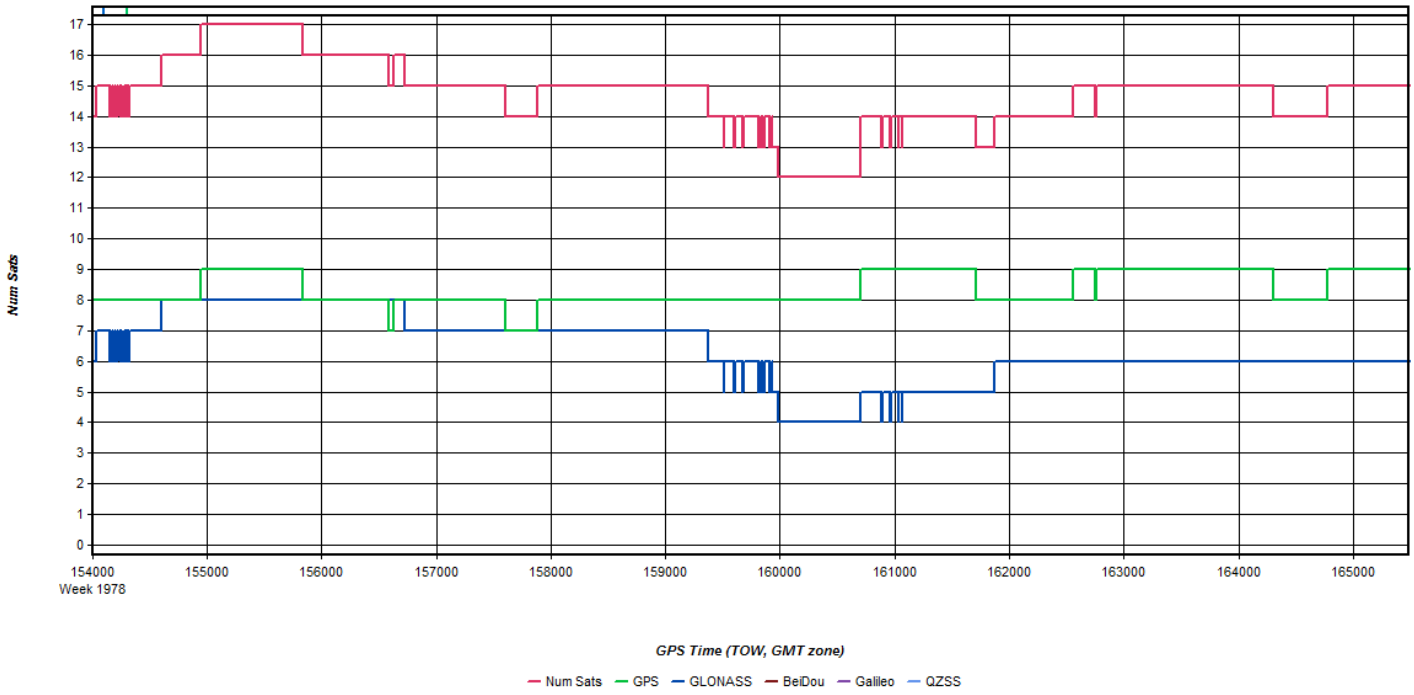

PDOP
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
PDOP

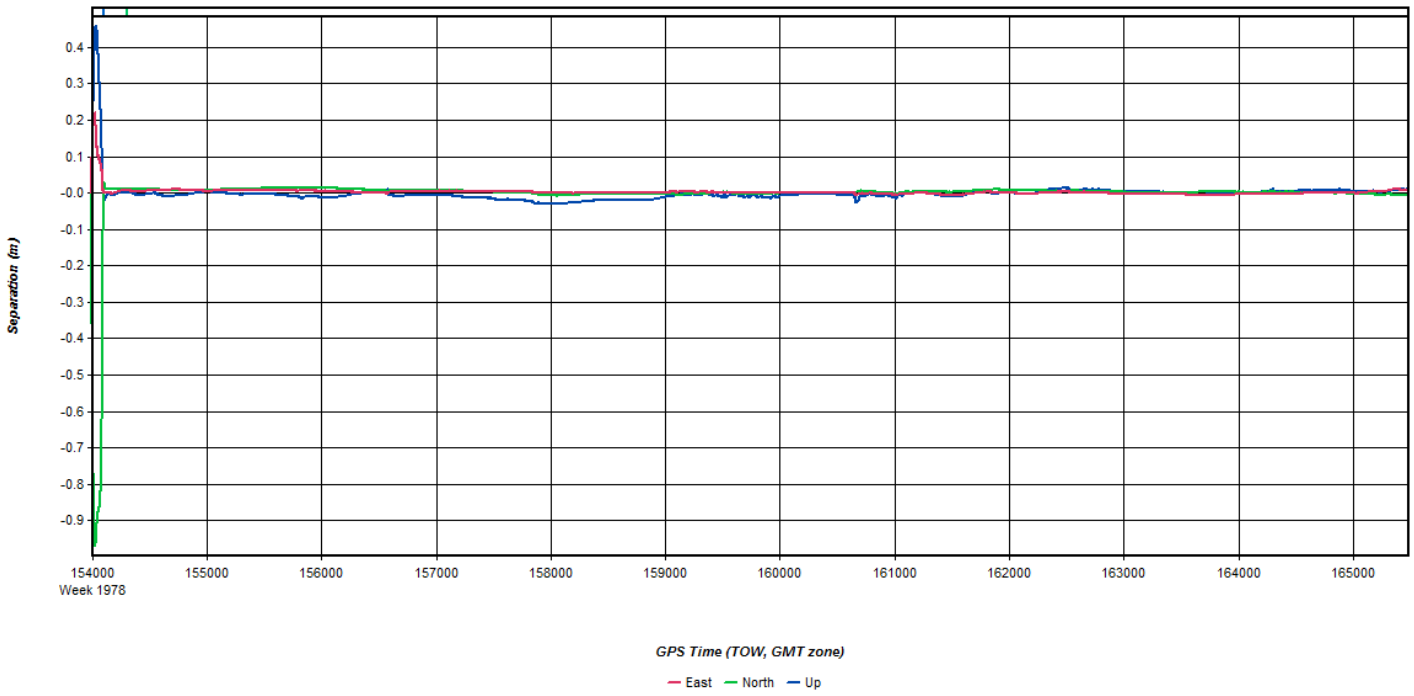

Status
2
1
0
-1
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

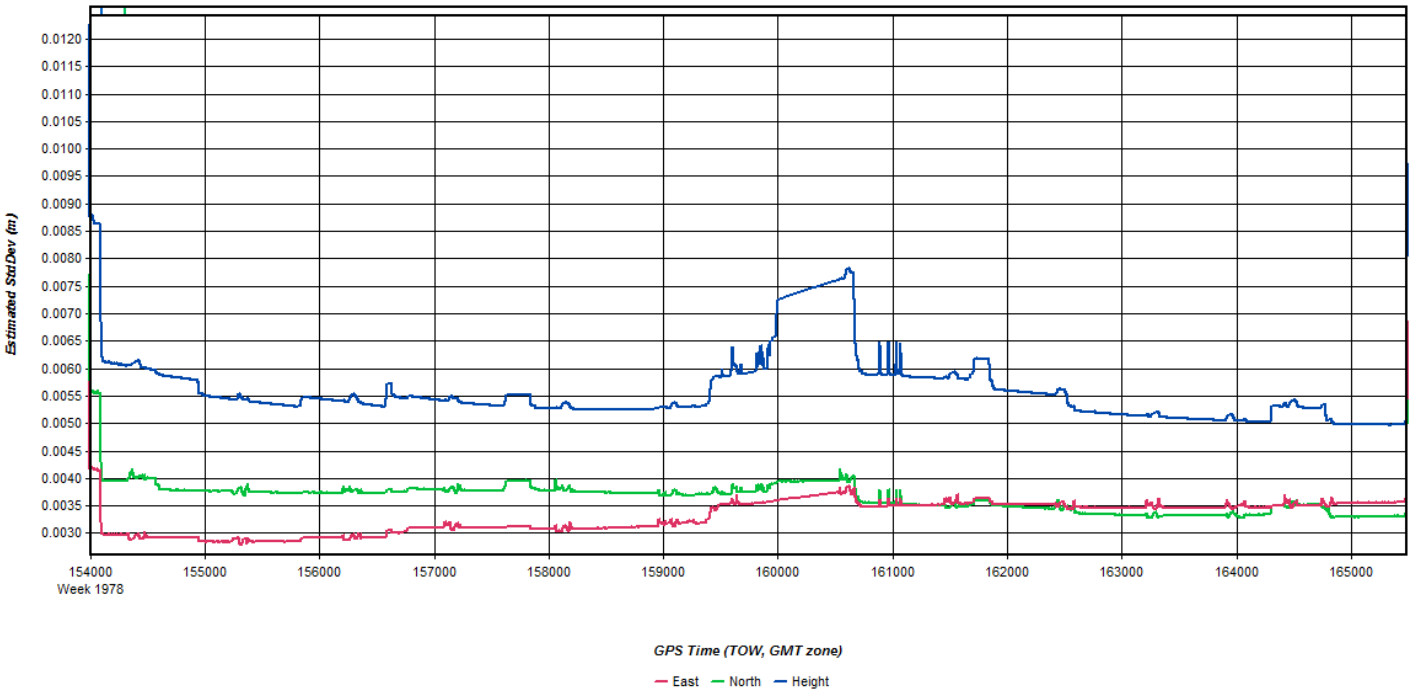

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
Roll
Pitch

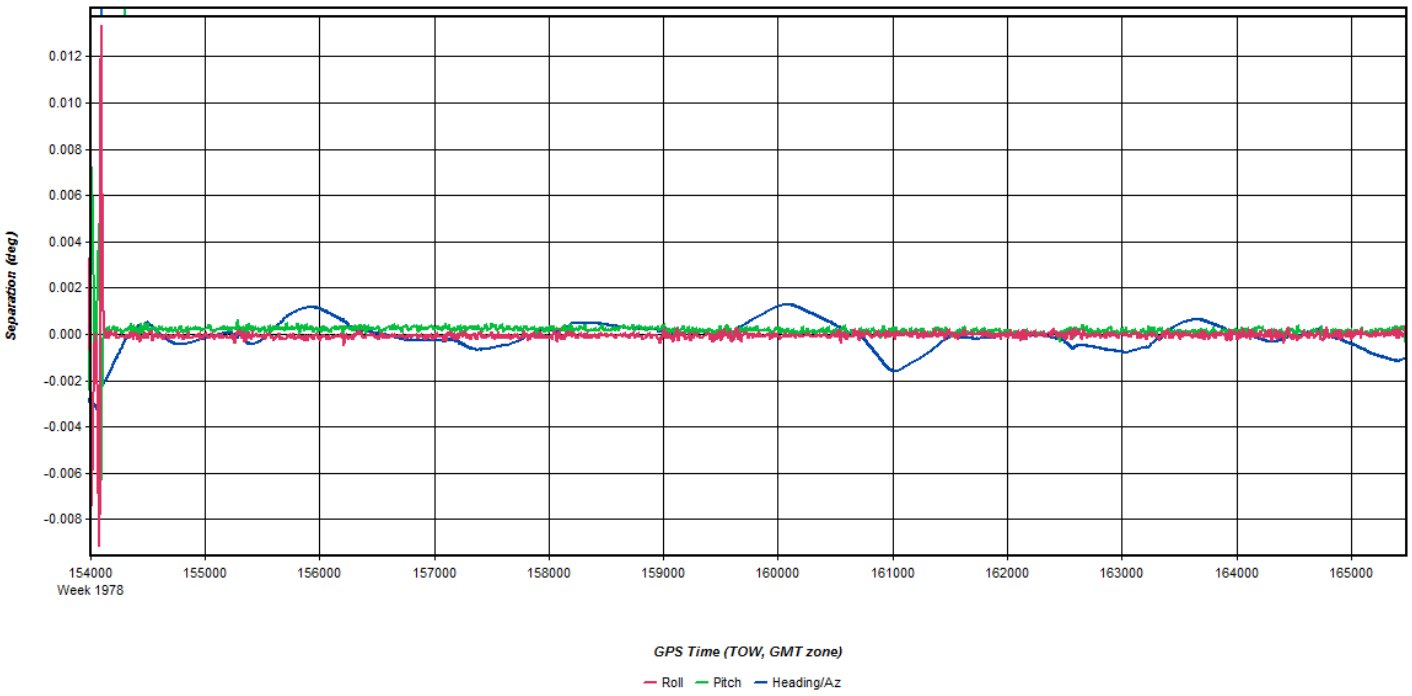

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
RMS
SD

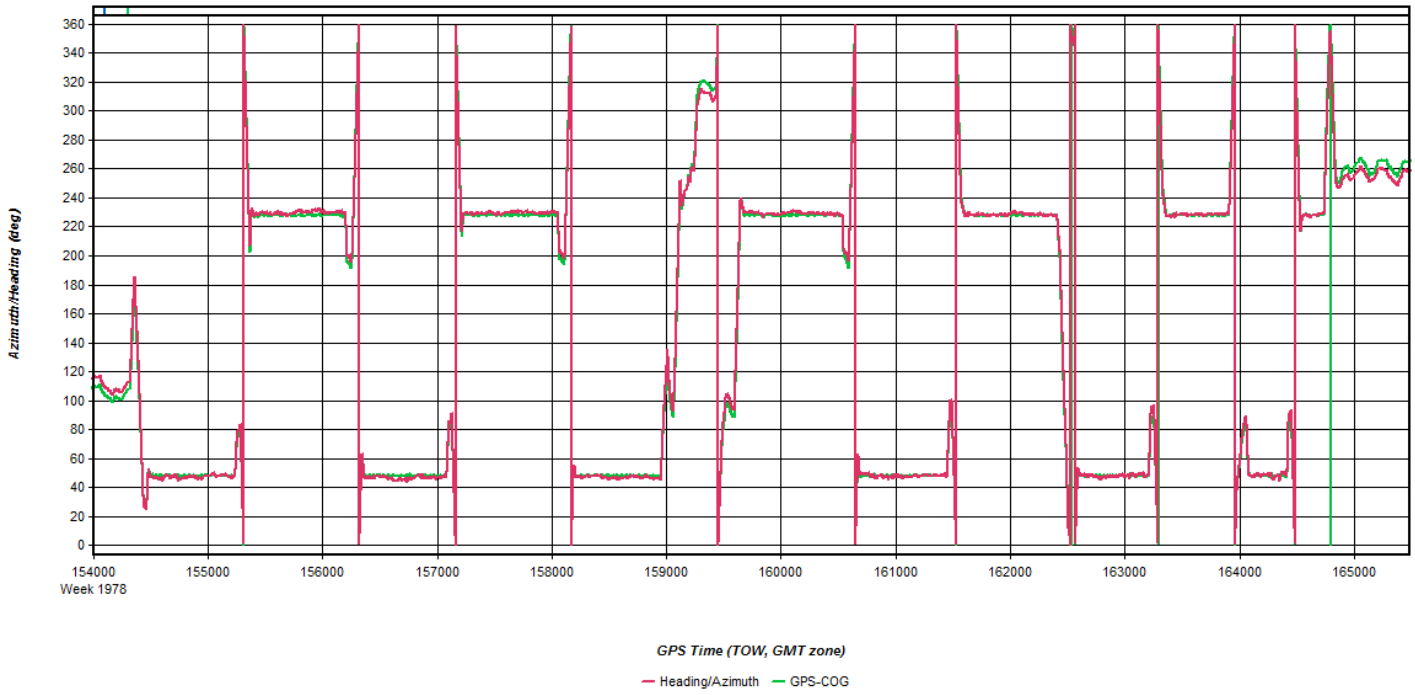

Height (m)
2260
2240
2220
2200
2180
2160
2140
2120
2100
2080
2060
2040
2020
2000
1980
1960
1940
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
Height

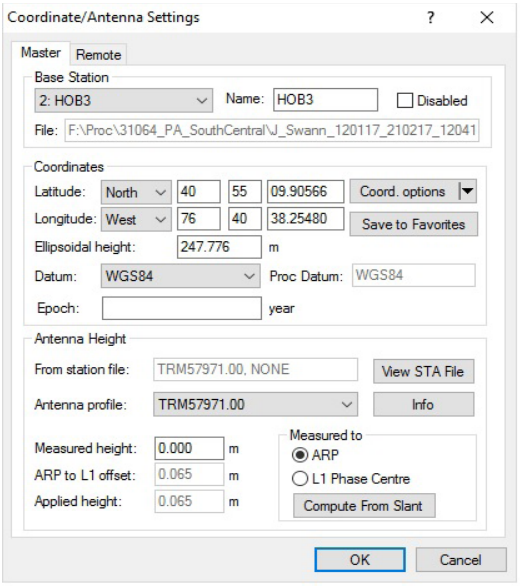

Num Sats
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

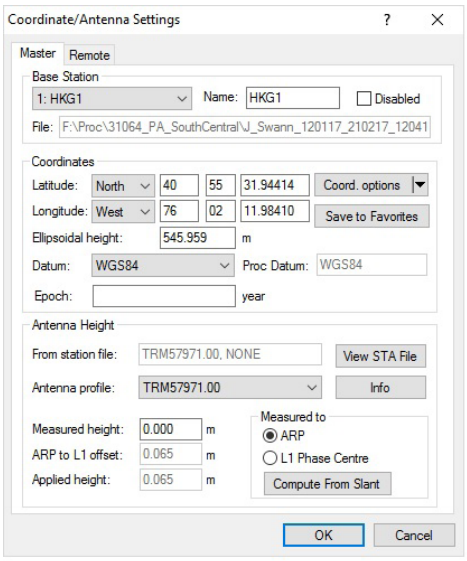

Separation (m)
0.4
0.3
0.2
0.1
-0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
East
North
Up

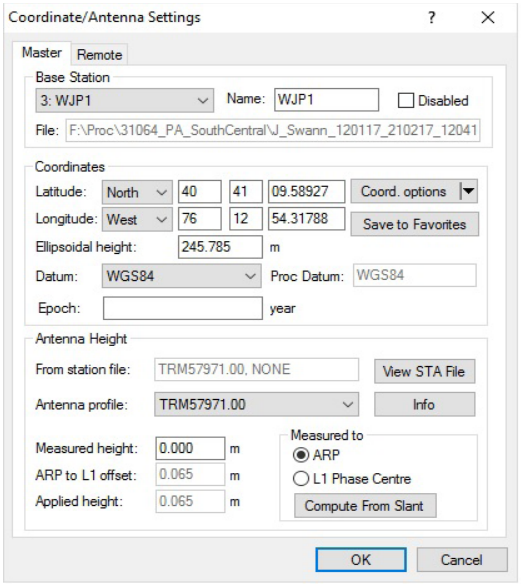

Estimated StdDev (m)
0.0120
0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.012
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az

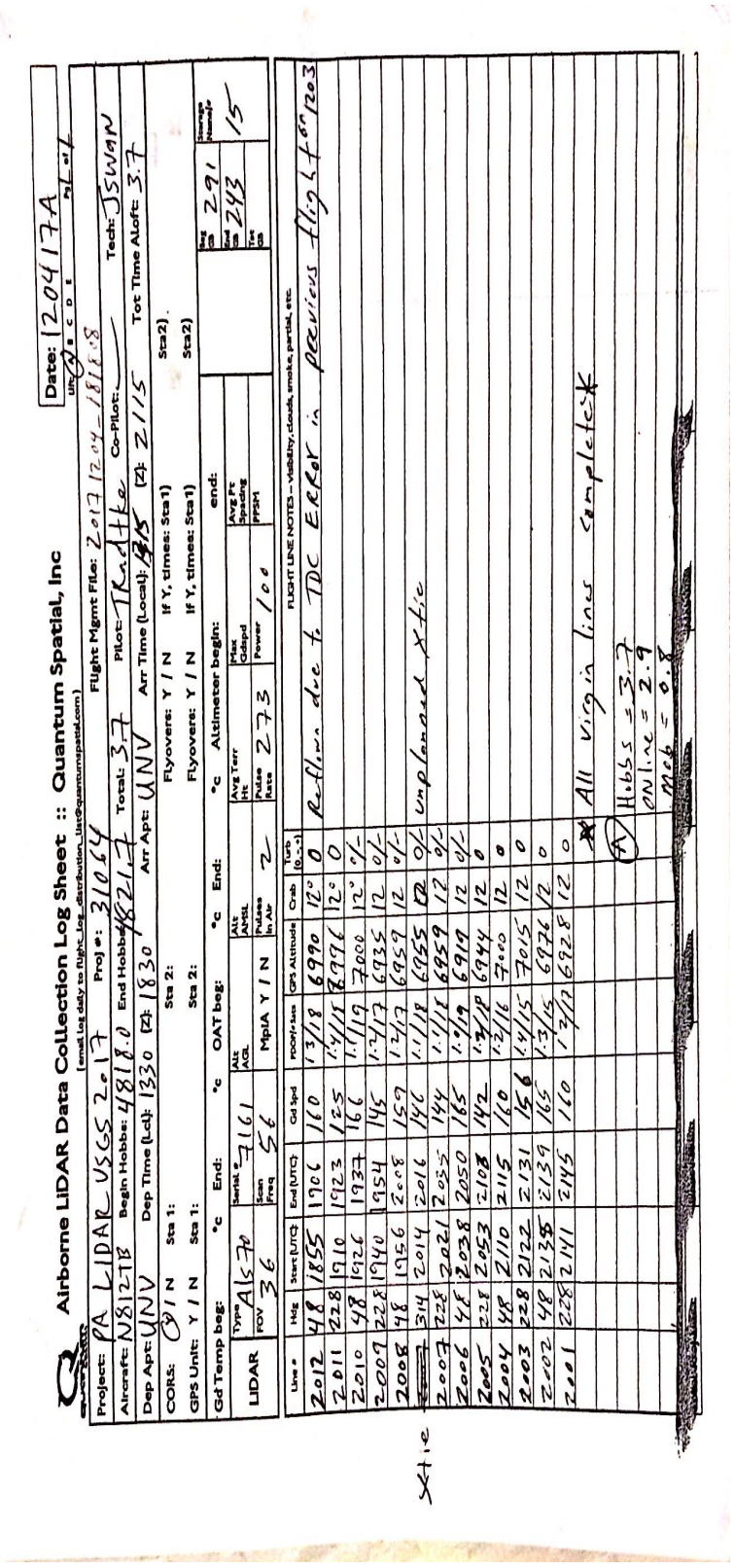

Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
154000
Week 1978
155000
156000
157000
158000
159000
160000
161000
162000
163000
164000
165000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
2: HOB3
Name: HOB3
Disabled
File: F:\Proc\31064_PA_SouthCentral\J_Swann_120117_210217_12041
Coordinates
Latitude: North 40 55 09.90566
Coord. options
Longitude: West 76 40 38.25480
Save to Favorites
Ellipsoidal height: 247.776 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
Master
Remote
Base Station
1: HKG1
Name: HKG1
Disabled
File: F:\Proc\31064_PA_SouthCentral\J_Swann_120117_210217_12041
Coordinates
Latitude: North 40 55 31.94414 Coord. options
Longitude: West 76 02 11.98410 Save to Favorites
Ellipsoidal height: 545.959 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
Master
Remote
Base Station
3: WJP1
Name: WJP1
Disabled
File: F:\Proc\31064_PA_SouthCentral\J_Swann_120117_210217_12041
Coordinates
Latitude: North 40 41 09.58927 Coord. options
Longitude: West 76 12 54.31788 Save to Favorites
Ellipsoidal height: 245.785 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

Flight Log



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

Date: 12/04/17A

Project: PA LIDAR USGS 2017 Proj #: 31054 Flight Mgmt File: 2017 12/04_181808

Aircraft: N8127B Begin Hobbs: 4818.0 End Hobbs: 4821.7 Total: 3.7 Pilot: TK Adkle Co-Pilot: Tech: JSwan

Dep Apt: UNV Dep Time (Lcl): 1330 (Z): 1830 Arr Apt: UNV Arr Time (Local): 1615 (Z): 2115 Tot Time Aloft: 3.7

CORS: Y / N Sta 1: Sta 2: Flyovers: Y / N If Y, times: Sta1) Sta2)

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

Gd Temp beg: °c End: °c OAT beg: °c End: °c Altimeter begin: end:

	Type	Serial #	Alt. AGL	Alt. ASL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing
LIDAR	A1S-HP	7161					
	FOV 36	Scan Freq 56	MpIA Y / N	Pulses In Air 2	Pulse Rate 273	Power 100	PPSM

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POS Error	GPS Altitude	Alt. ASSL	Crab	Turb (0...5)	FLIGHT LINE NOTES - Visibility, clouds, smoke, partial, etc.
2012	48	1855	1906	160	1.3/1.8	6990		12°	0	Reflew due to TDC Error in previous flightline
2011	228	1910	1923	125	1.4/1.1	6996		12°	0	
2010	48	1926	1937	166	1.1/1.9	7000		12°	0/-	
2009	228	1940	1954	145	1.4/1.2	6935		12	0/-	
2008	48	1956	2008	159	1.2/1.2	6959		12	0/-	
2007	314	2014	2016	142	1.1/1.8	6955		12	0/-	unplanned x-tie
2006	228	2021	2035	144	1.1/1.8	6959		12	0/-	
2005	48	2038	2050	165	1.1/1.9	6919		12	0/-	
2004	228	2053	2108	142	1.3/1.8	6944		12	0	
2003	48	2110	2115	160	1.2/1.6	7000		12	0	
2002	228	2122	2131	156	1.4/1.5	7015		12	0	
2001	48	2135	2139	165	1.3/1.5	6974		12	0	
	228	2141	2145	160	1.2/1.0	6928		12	0	

All lines complete

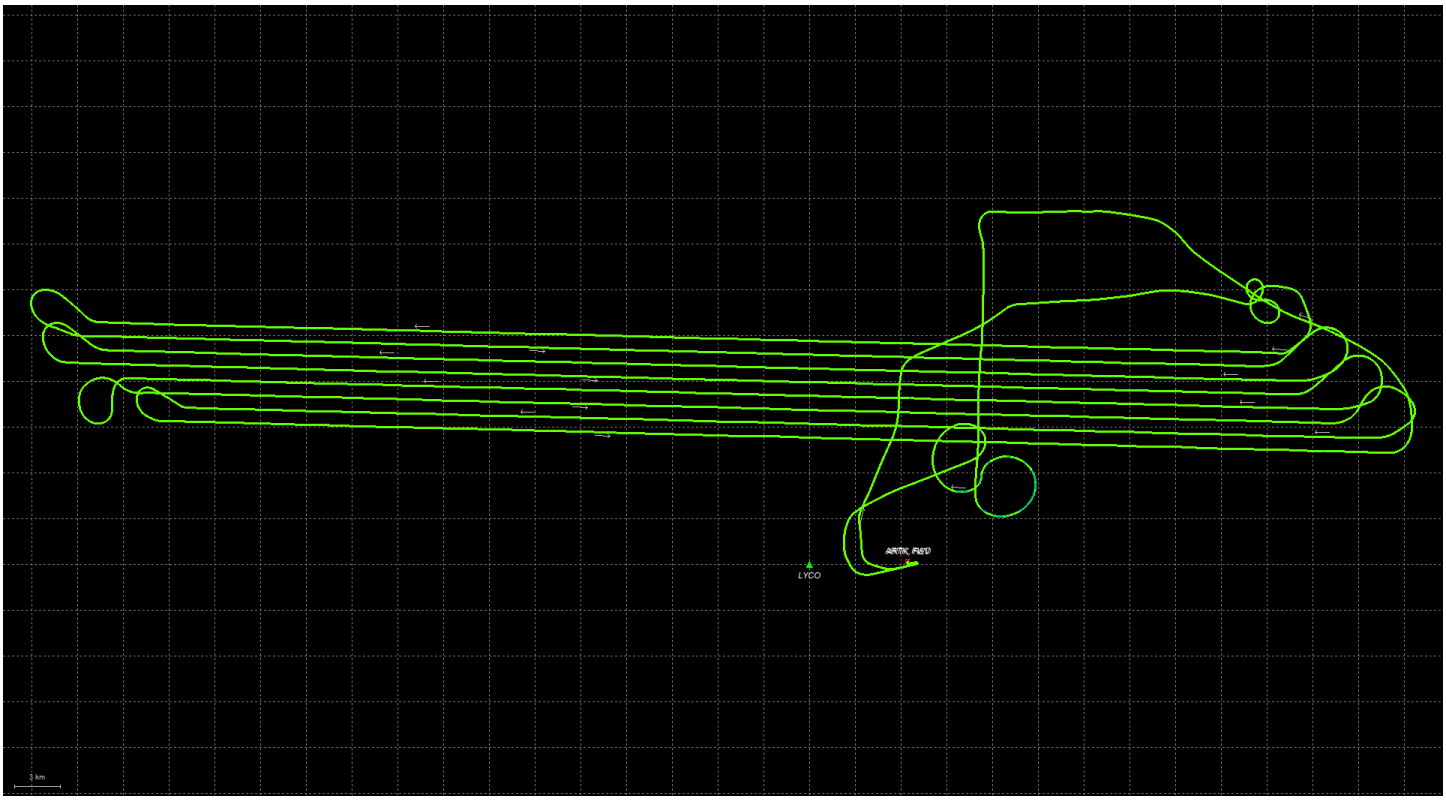
Hobbs = 3.7

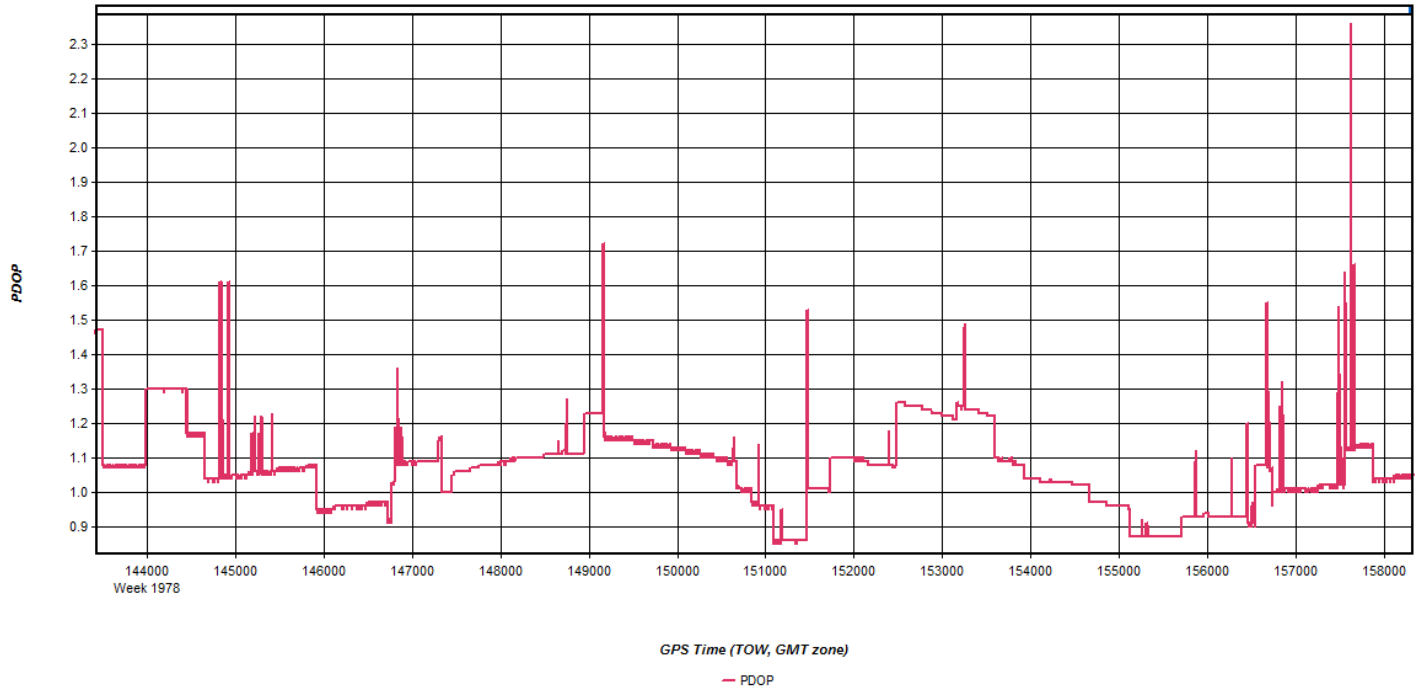
Online = 2.9

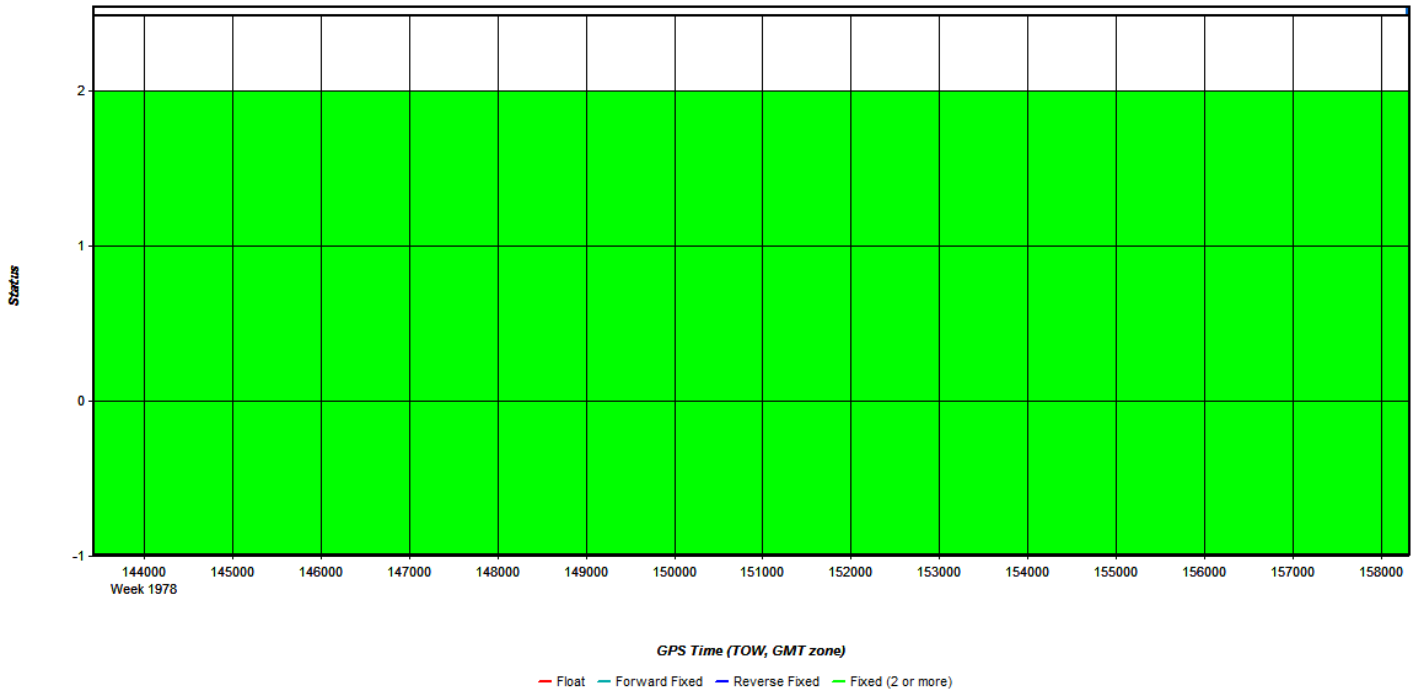
Mob = 0.8

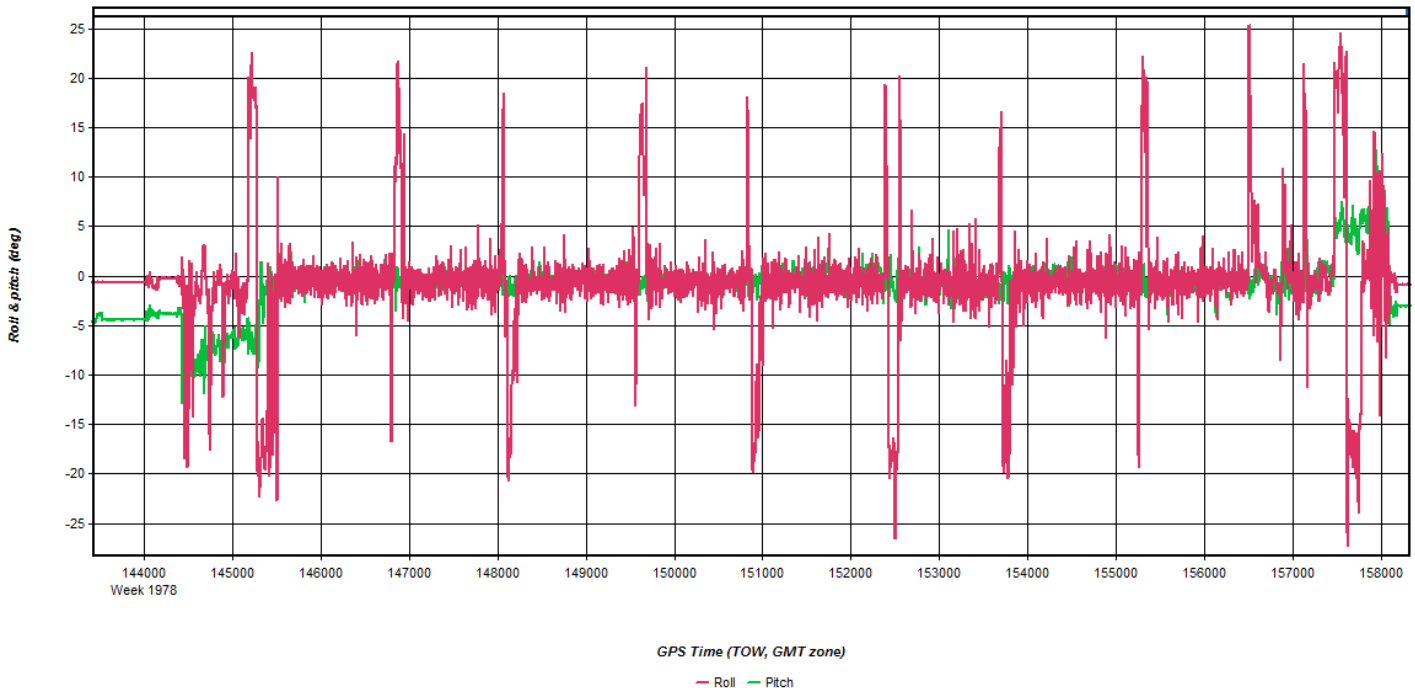
Scanned by CamScanner

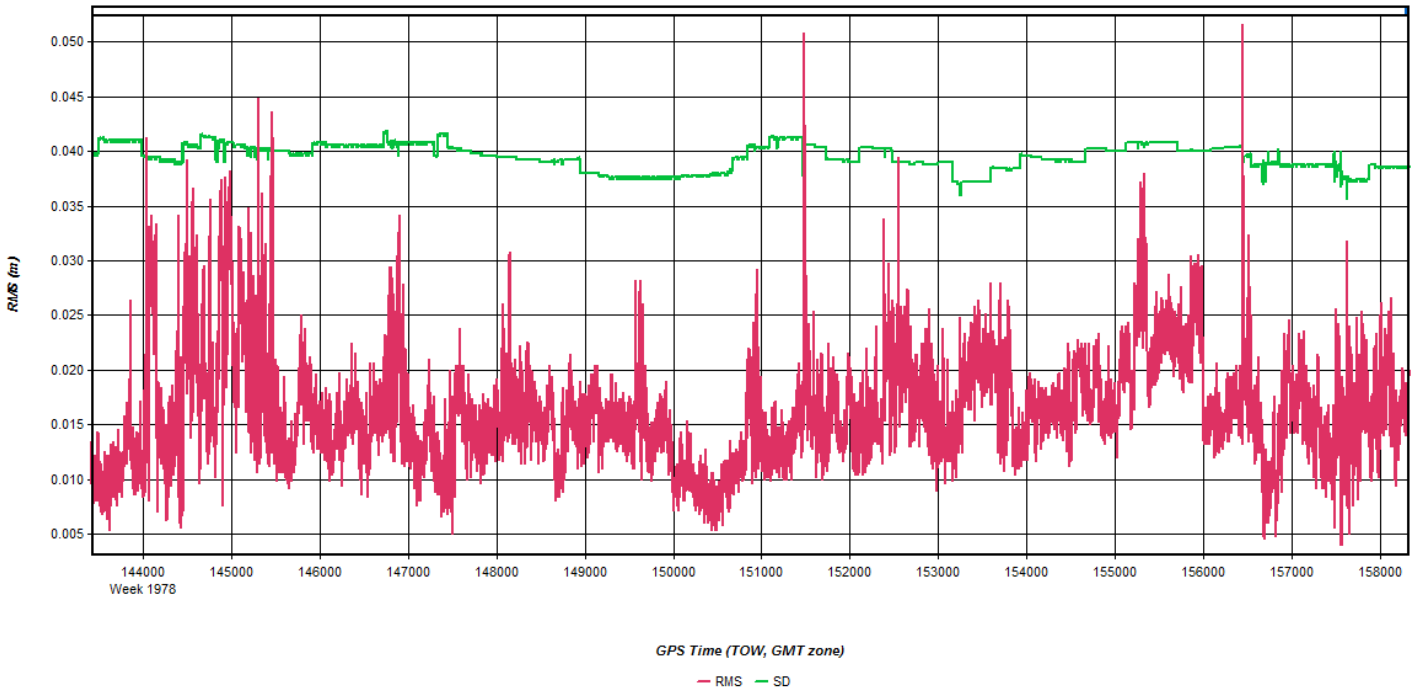
December 4, 2017-A (N916WC, SN8119)

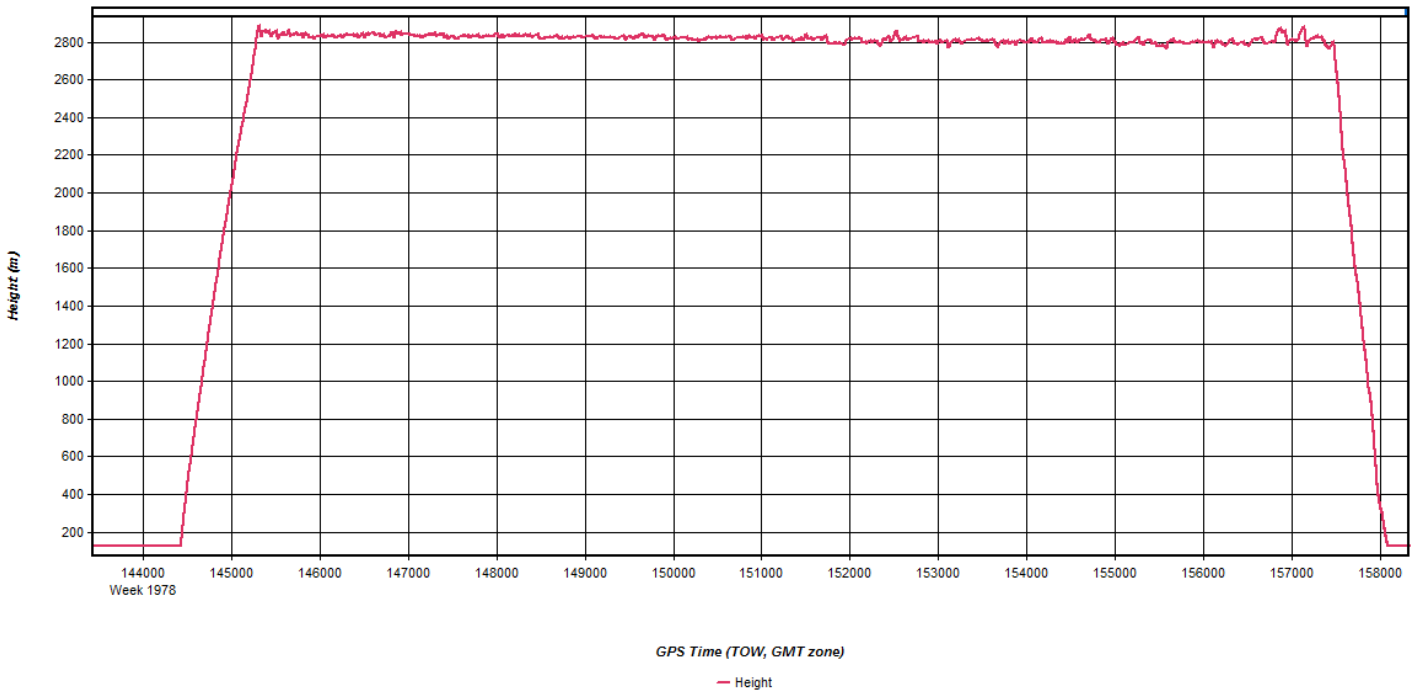

LYCO
ARTIK_RED

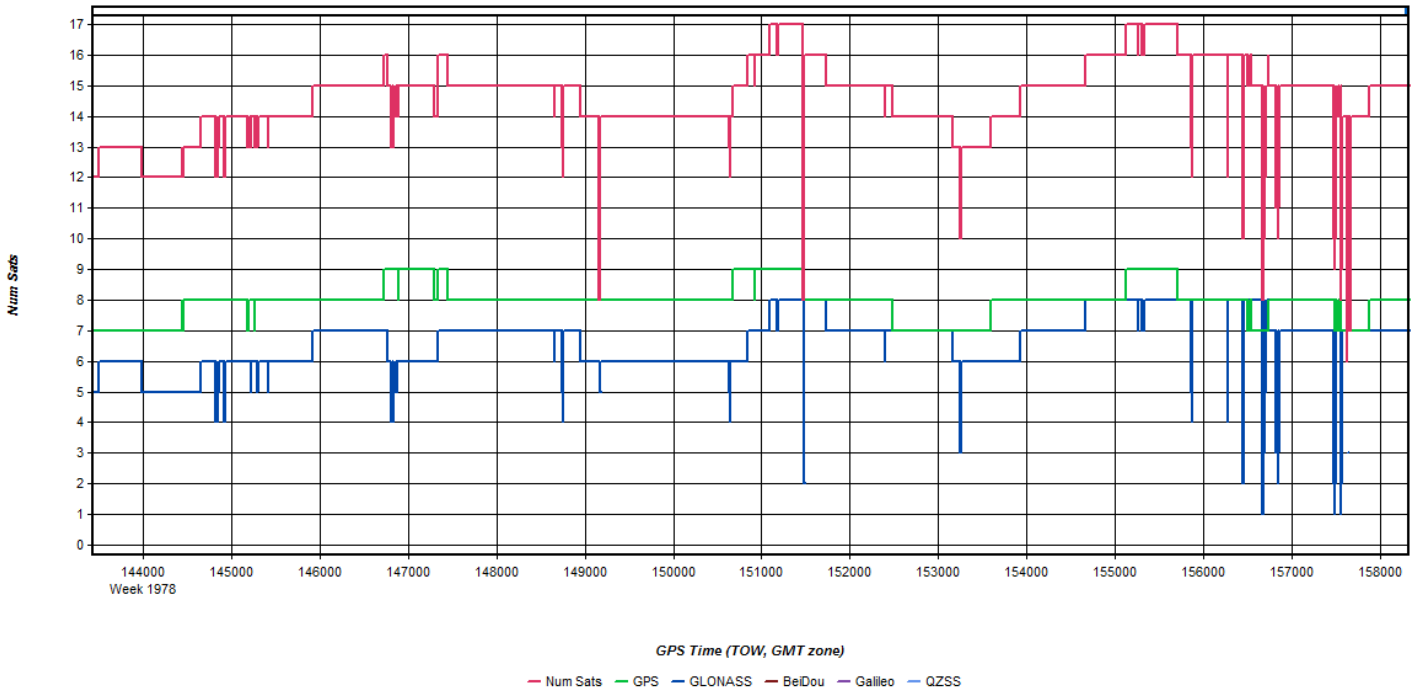

PDOP
2.3
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
PDOP


Status
2
1
0
-1
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

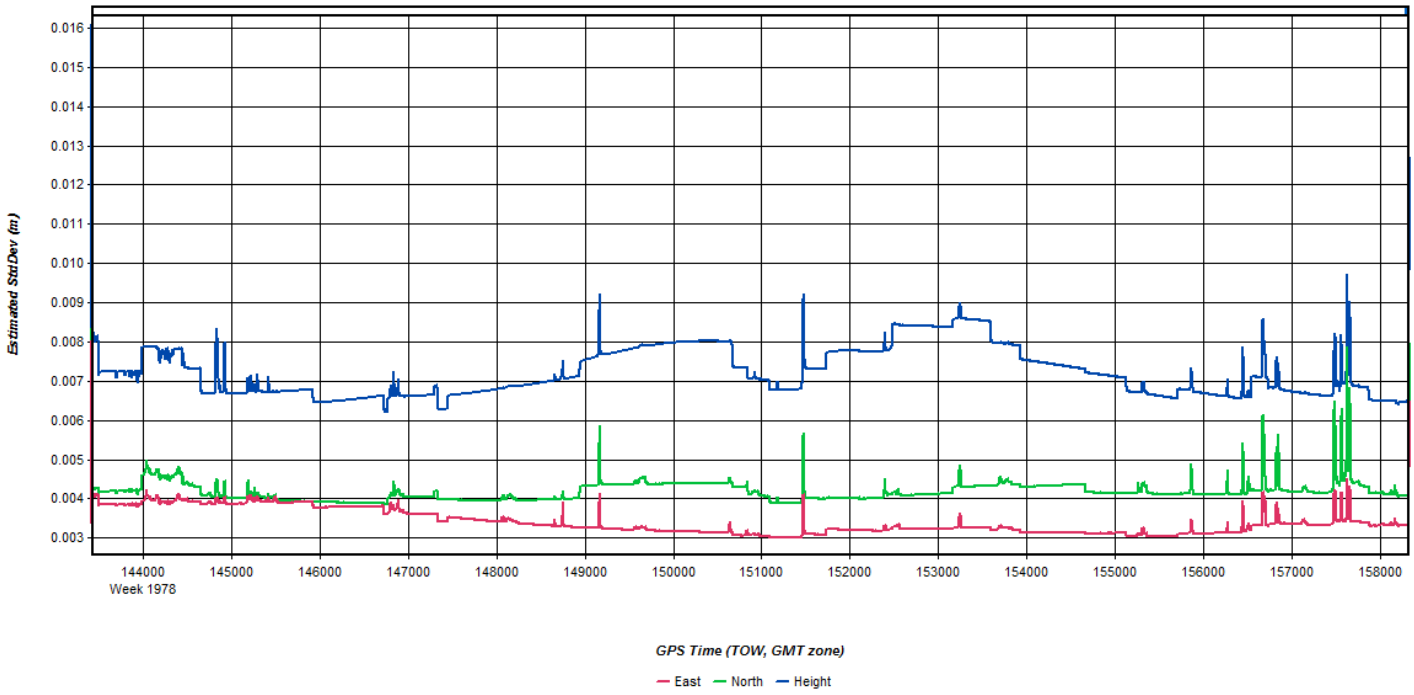

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
Roll
Pitch

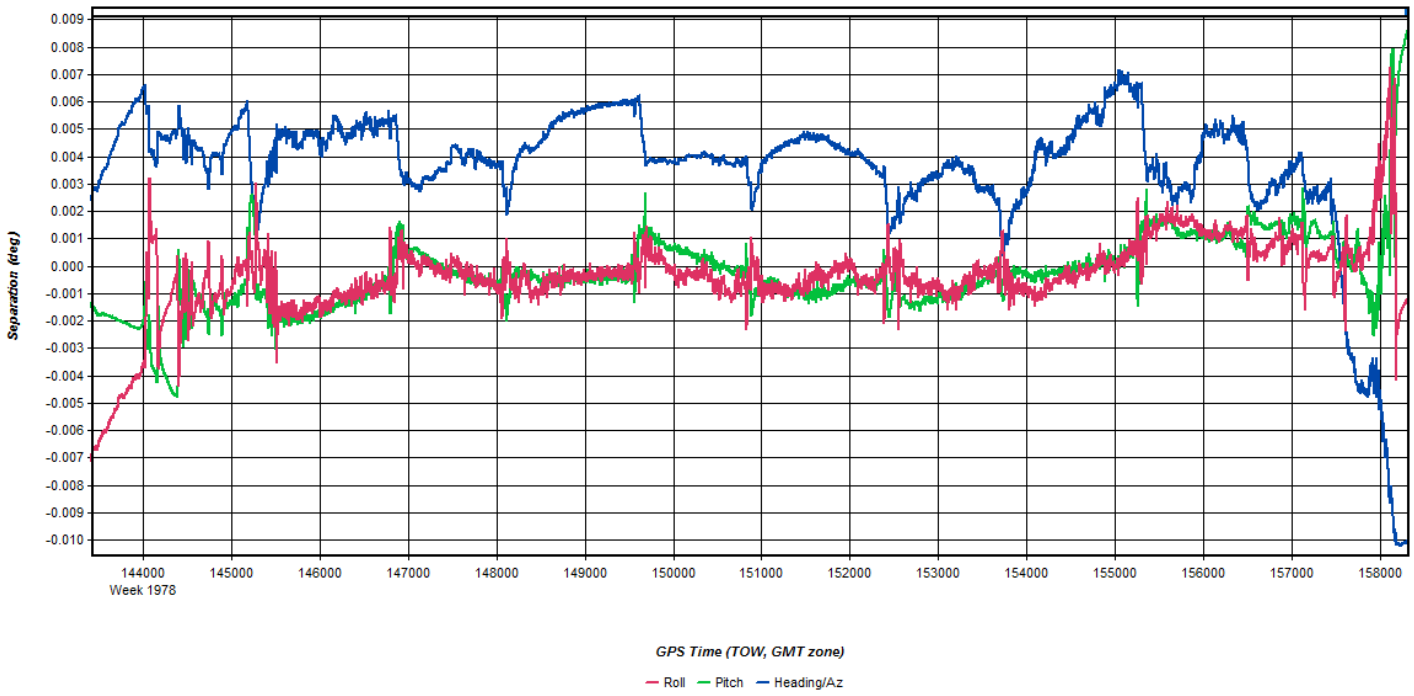

RMS (m)
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
RMS
SD

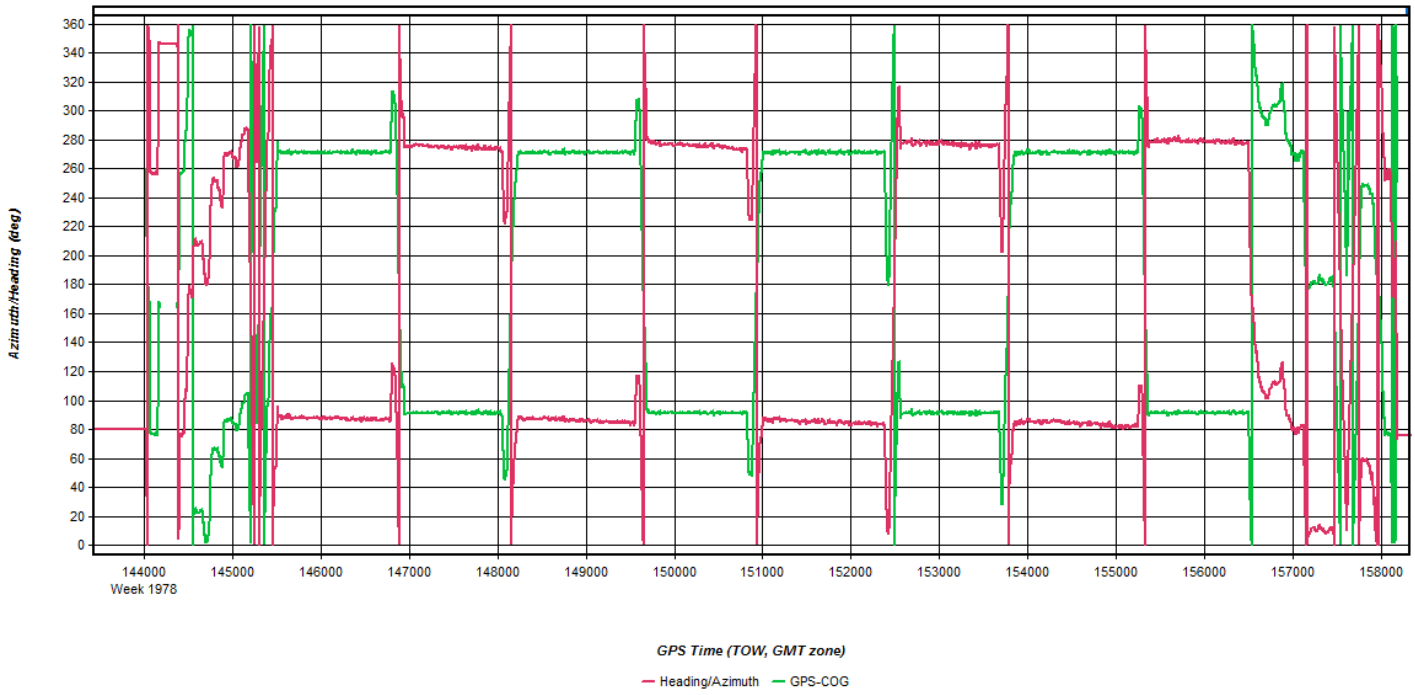

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
Height

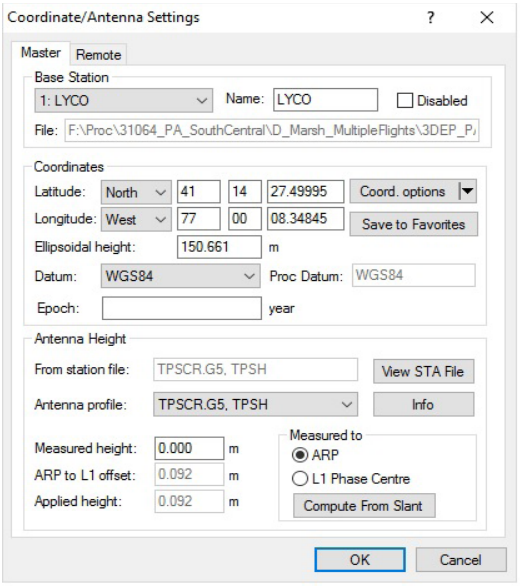

Num Sats
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
East
North
Up

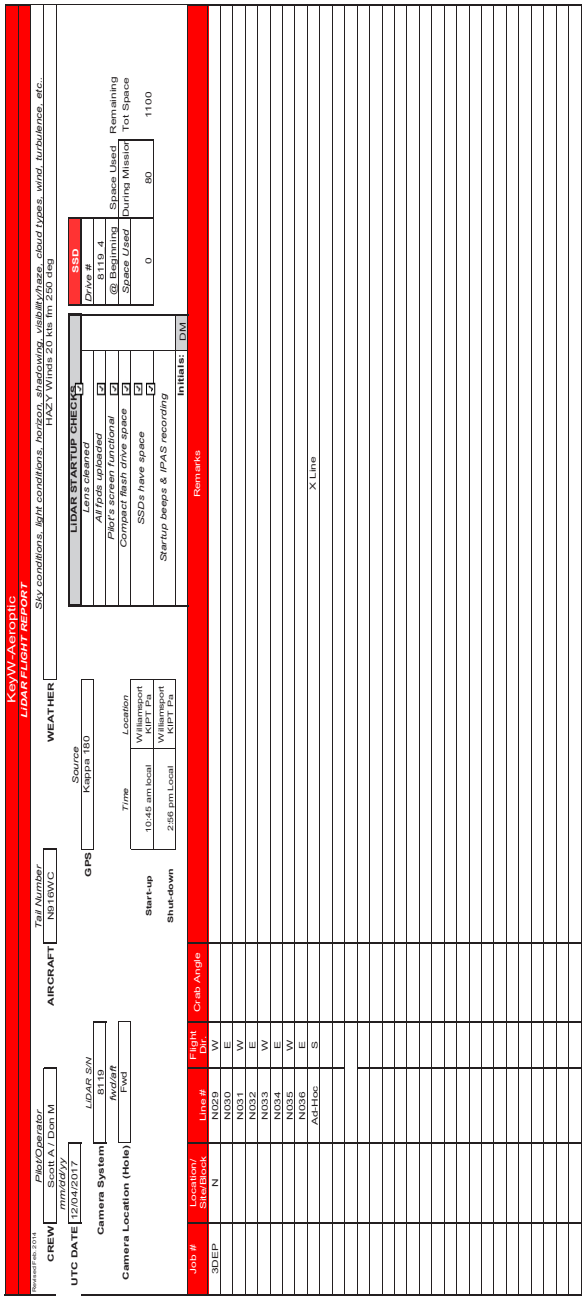

Estimated StdDev (m)
0.016
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
-0.007
-0.008
-0.009
-0.010
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
144000
Week 1978
145000
146000
147000
148000
149000
150000
151000
152000
153000
154000
155000
156000
157000
158000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_MultipleFlights\3DEP_P
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log



KeyW Aeronautics
LIDAR FLIGHT REPORT

Revised Feb. 2014

Pilot/Operator: Scott A / Don M
CREW
mm/dd/yy
UTC DATE 12/04/2017

Tail Number: N916WC
AIRCRAFT

WEATHER
Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.
HAZY Winds 20 kts fm 250 deg

LIDAR S/N
Camera System 8119
fwd/aft
Camera Location (Hole) Fwd

GPS
Source
Kappa 180

	Time	Location
Start-up	10:45 am local	Williamsport KIPT Pa
Shut-down	2:56 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS
- Lens cleaned
- Airpds uploaded ☑
- Pilot's screen functional ☑
- Compact flash drive space ☑
- SSDs have space ☑
- Startup beeps & IPAS recording ☑

Initials: DM

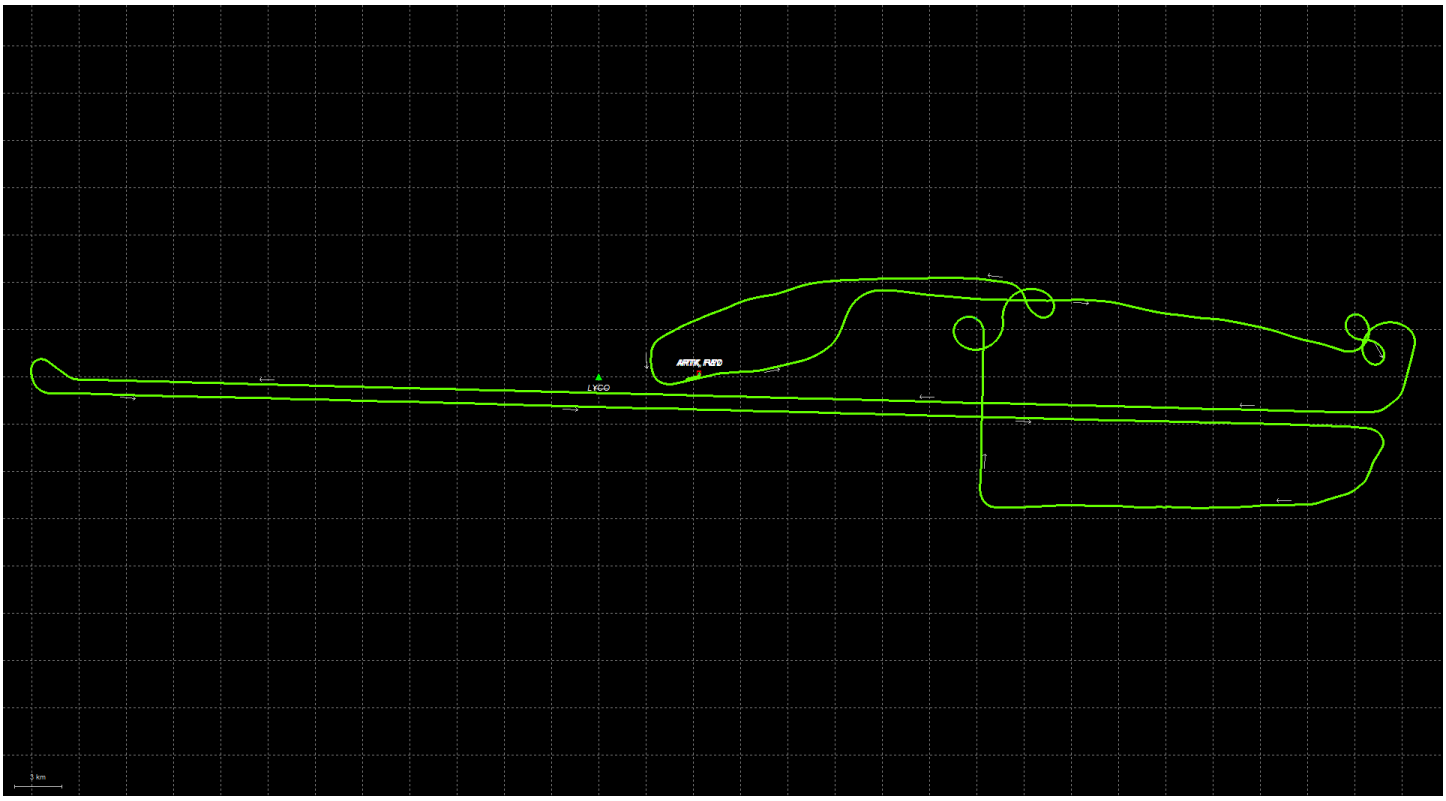
SSD
Drive # 8119_4

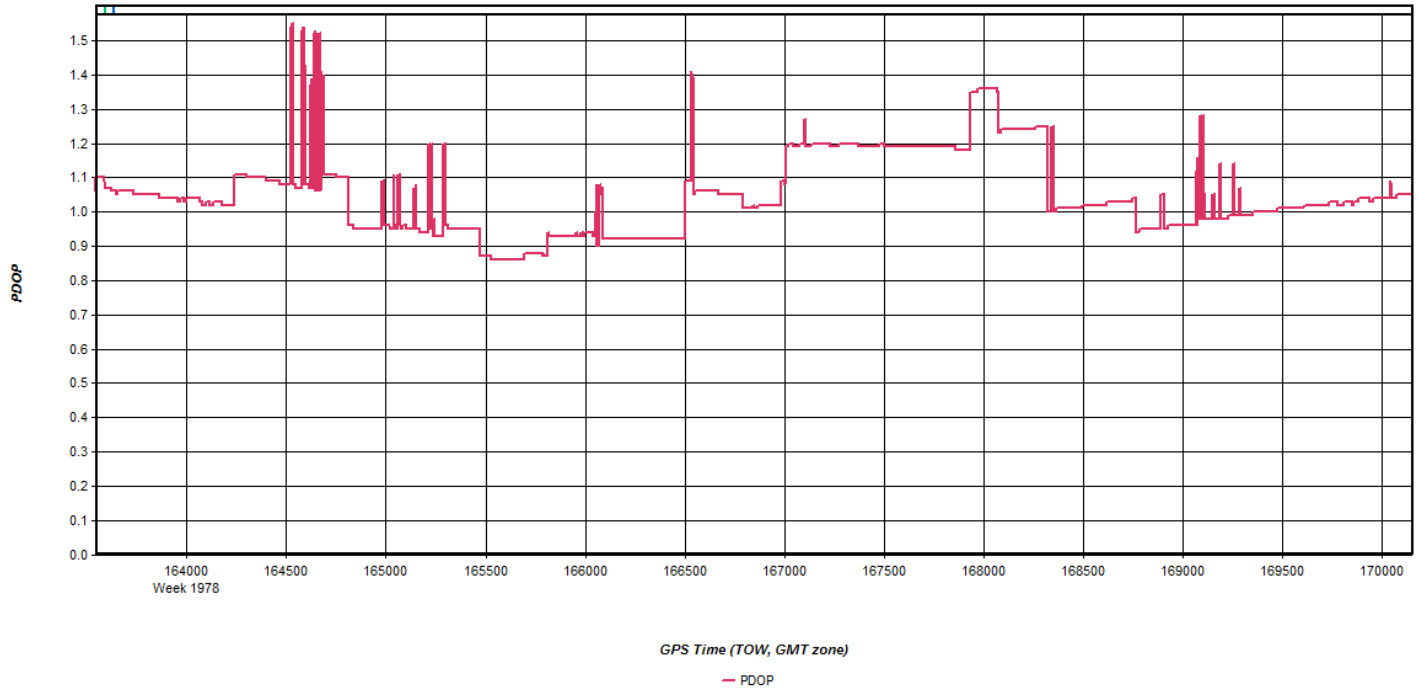
	@ Beginning	During Mission	Tot Space
Space Used	0	80	1100
Remaining			

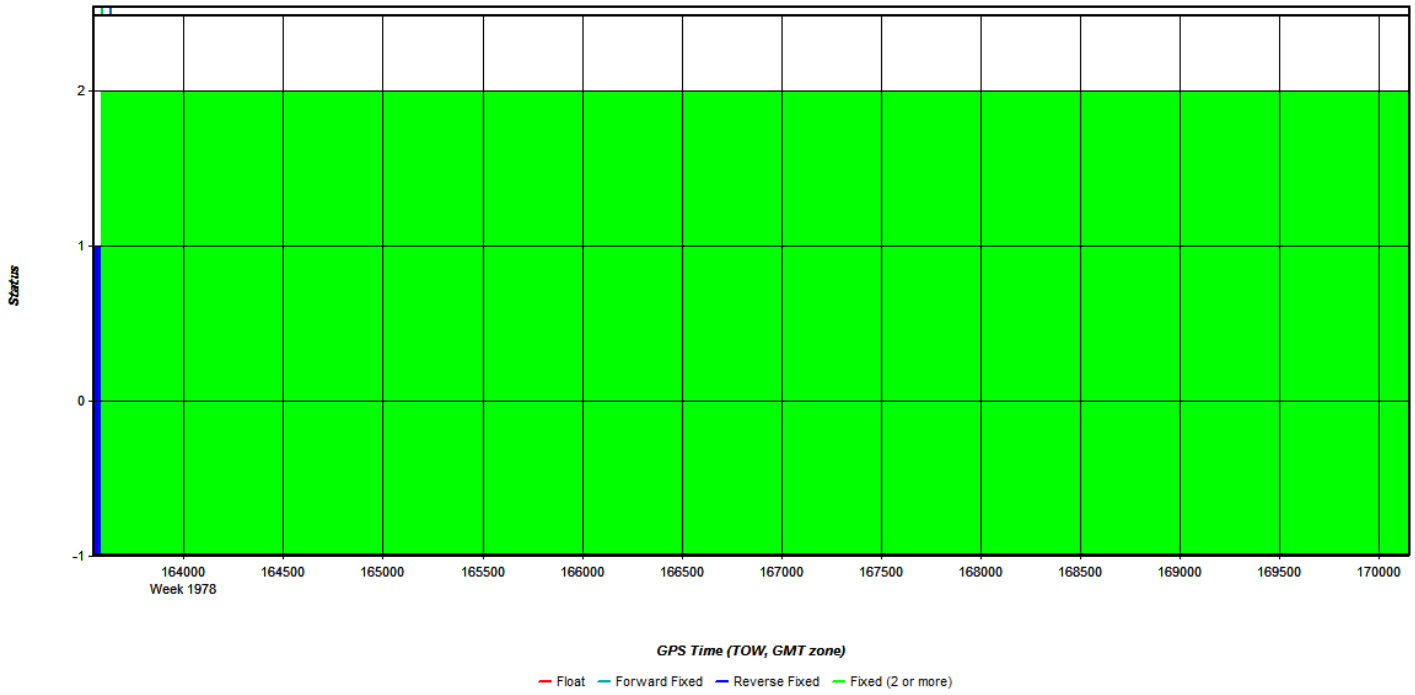
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N029	W		
		N030	E		
		N031	W		
		N032	E		
		N033	W		
		N034	E		
		N035	W		
		N036	E		
		Ad-Hoc	S		X Line

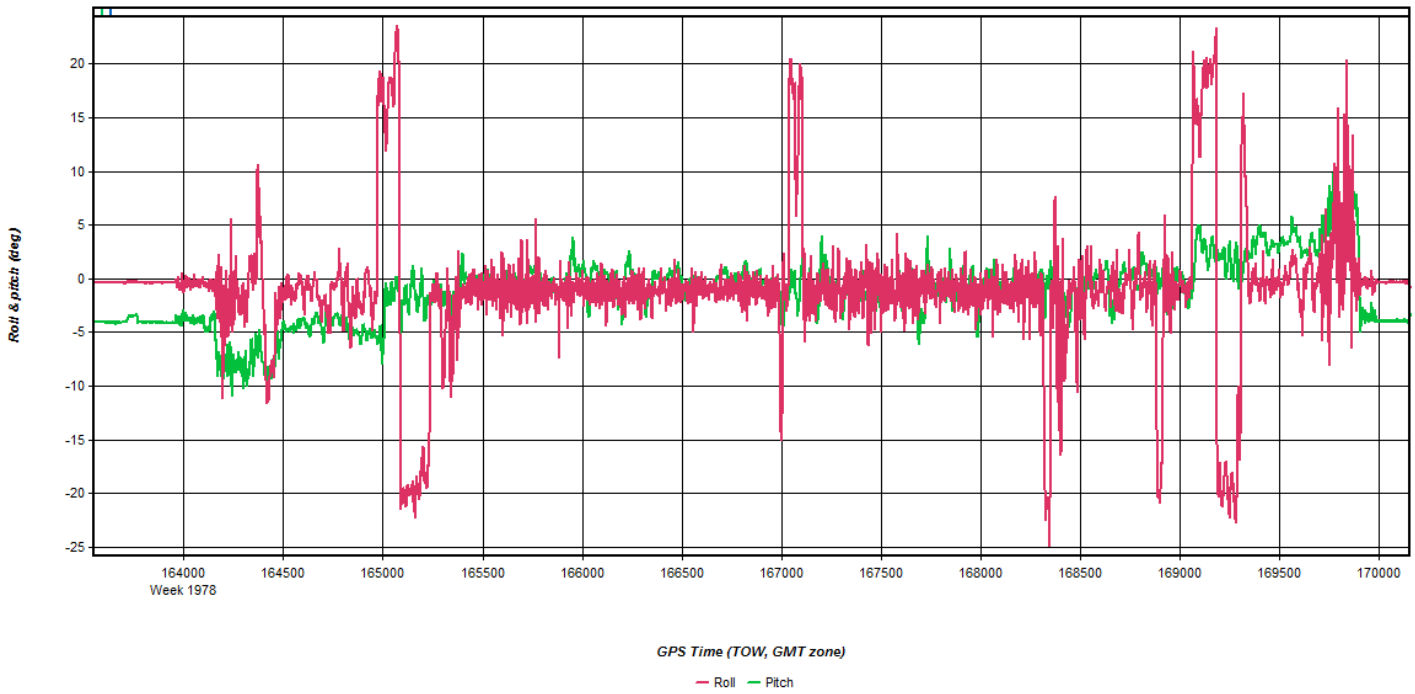
Page 1

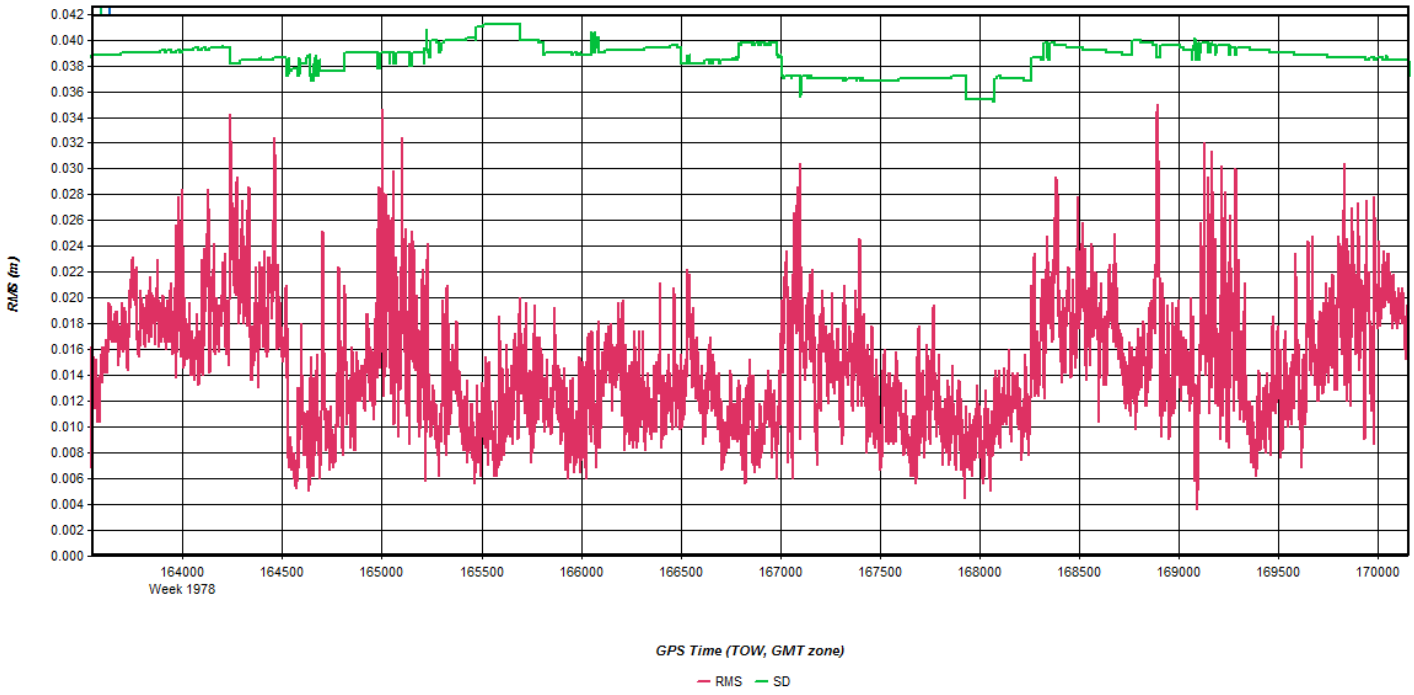
December 4, 2017-B (N916WC, SN8119)

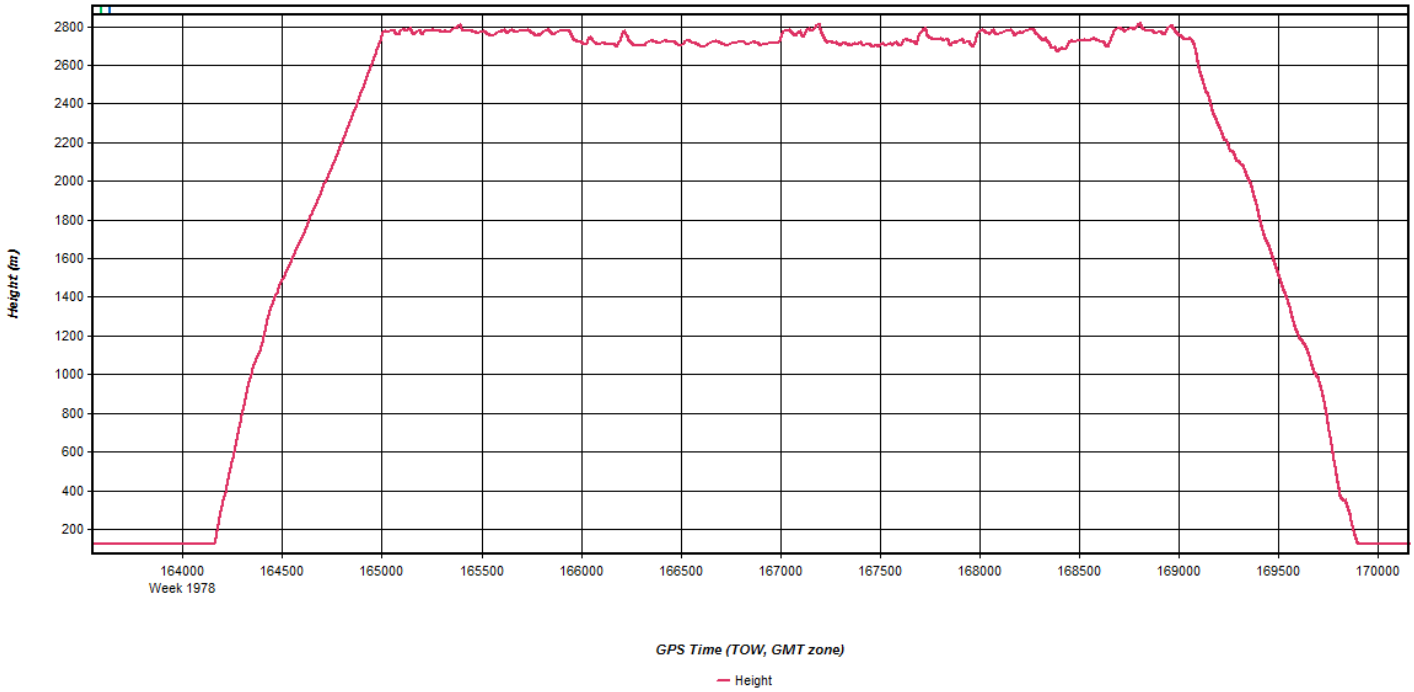

ARTK_FIX0
LYCO

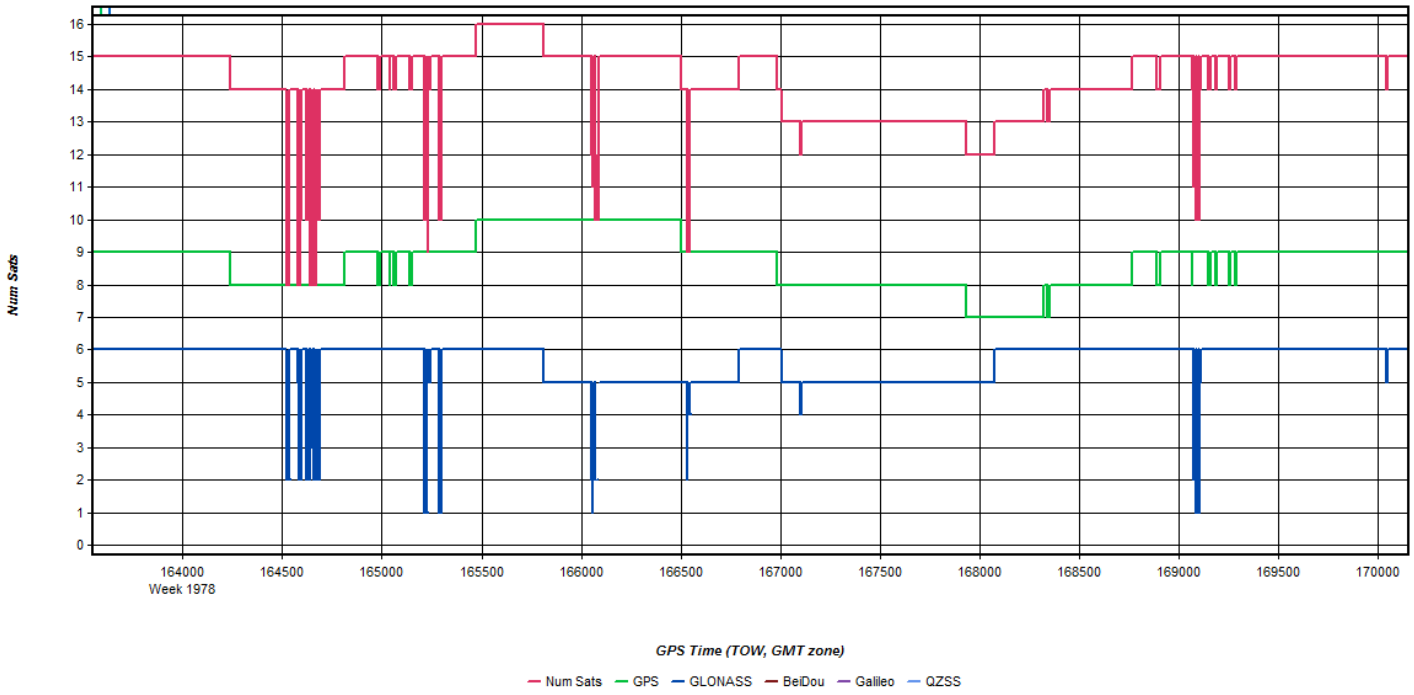

PDOP
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
PDOP

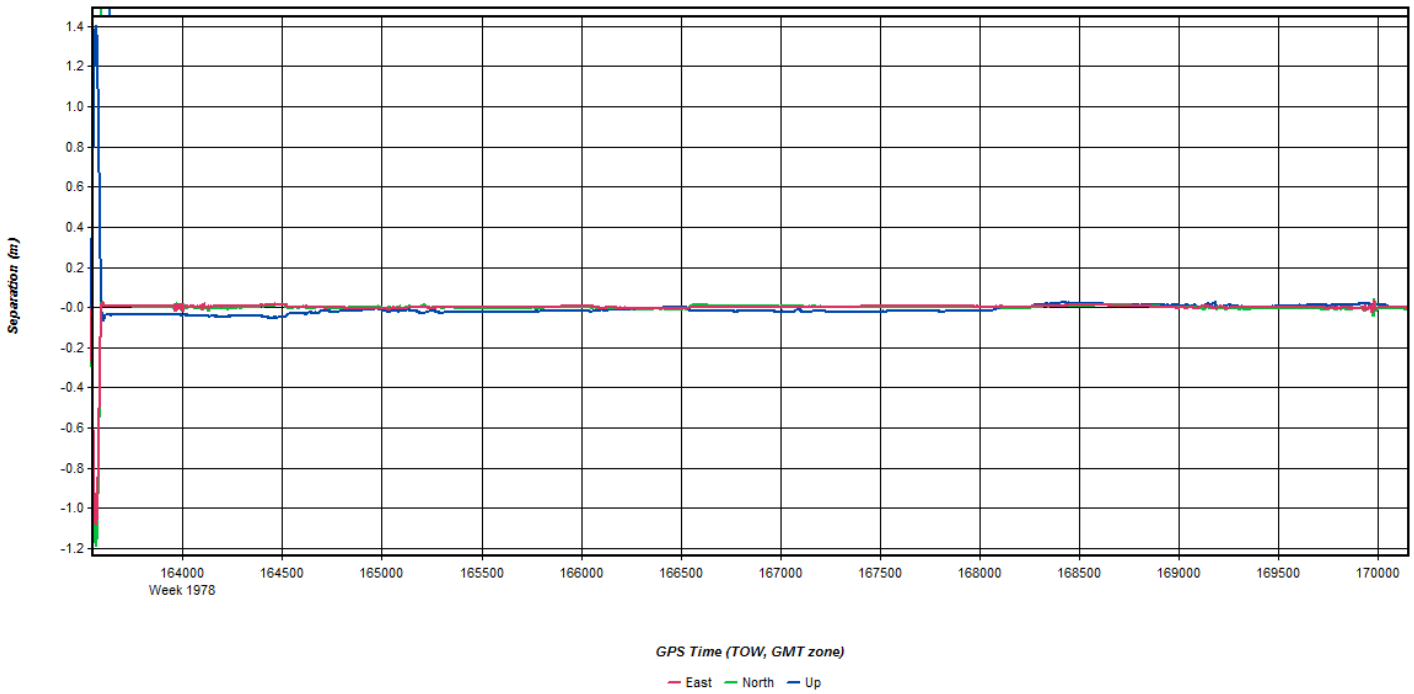

Status
2
1
0
-1
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

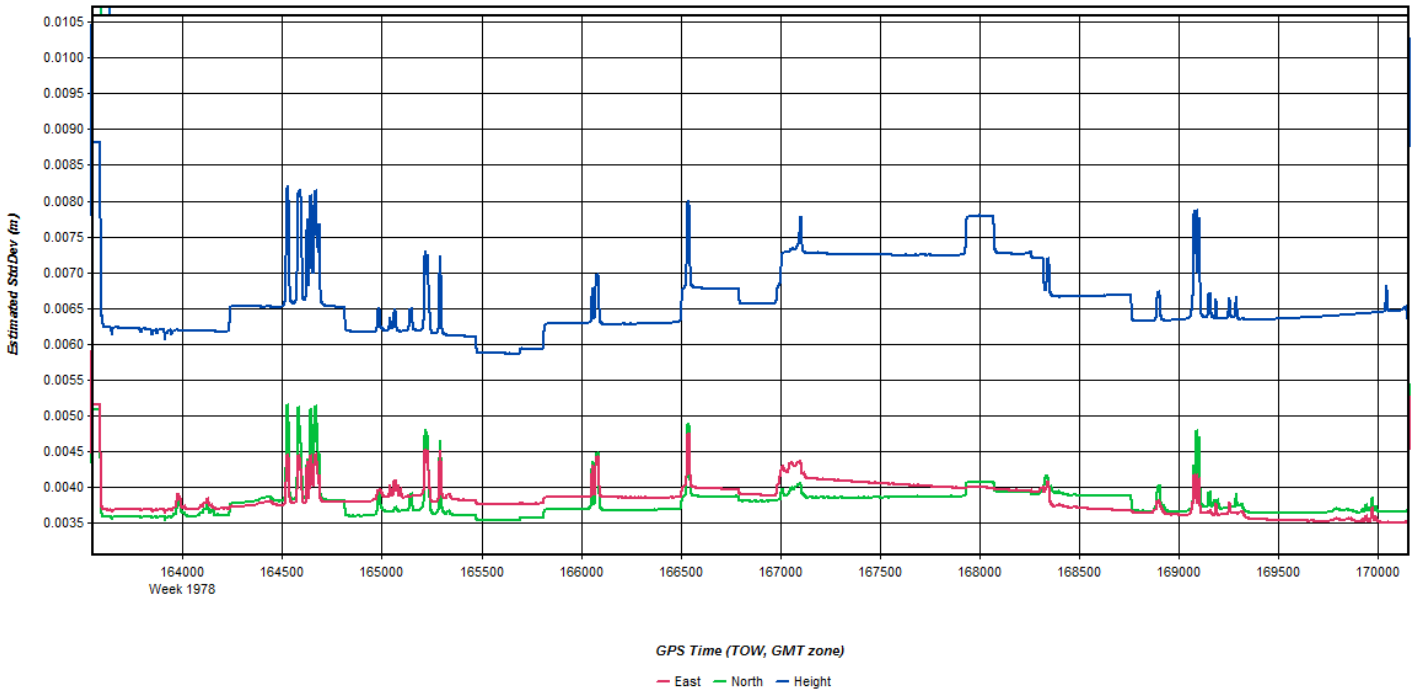

Roll & pitch (deg)
20
15
10
5
0
-5
-10
-15
-20
-25
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
Roll
Pitch


RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
RMS
SD

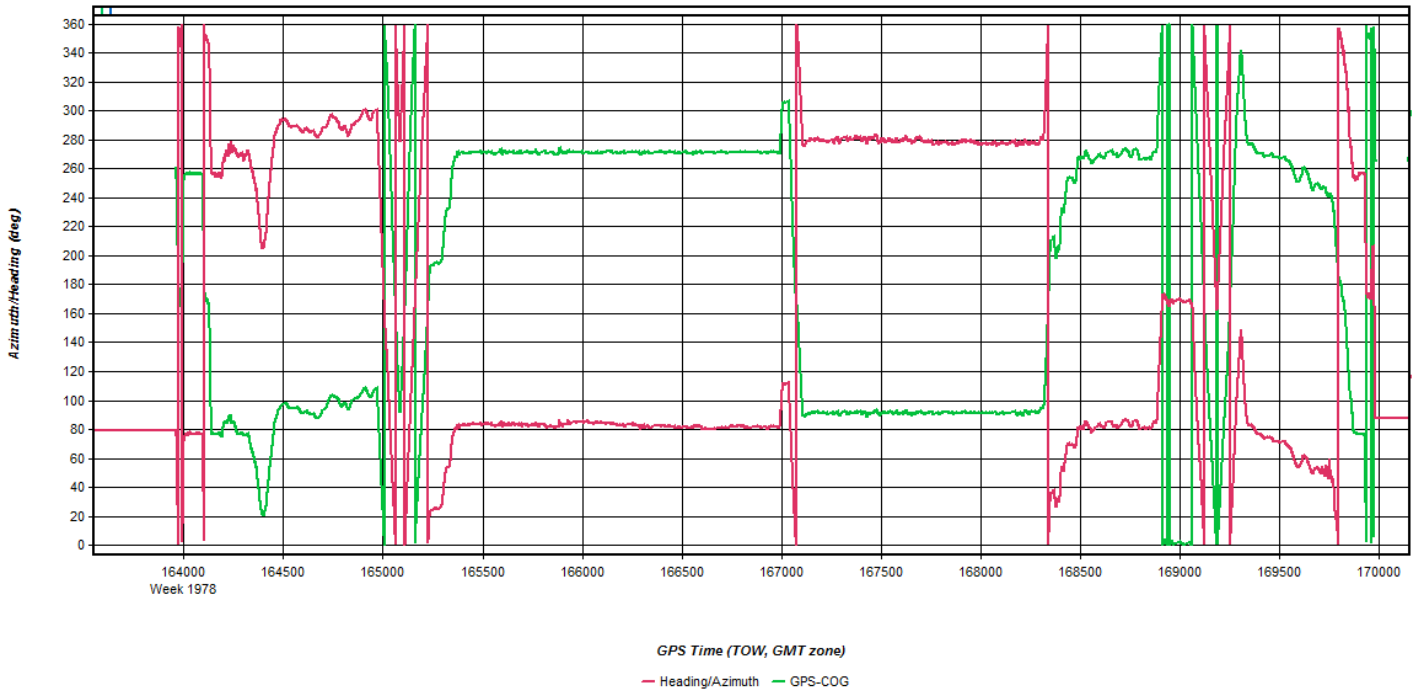

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
Height

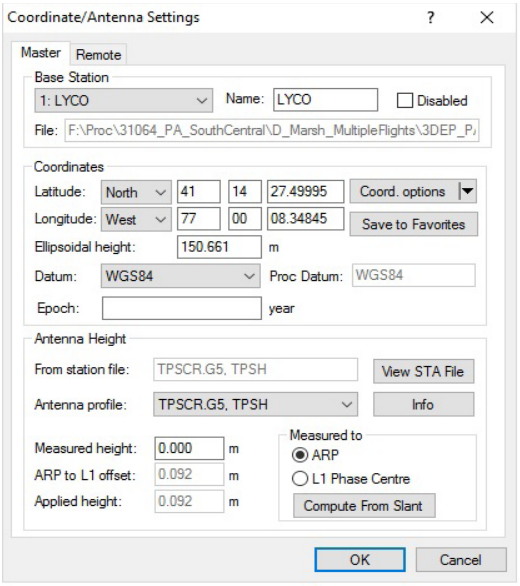

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0105
0.0100
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.012
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
-0.010
-0.012
-0.014
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
164000
Week 1978
164500
165000
165500
166000
166500
167000
167500
168000
168500
169000
169500
170000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_MultipleFlights\3DEP_P
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LIDAR

KeyW Aeronautics
LIDAR FLIGHT REPORT

Revised Feb 2014

CREW	Pilot/Operator: Scott A	AIRCRAFT	Tail Number: N916WC	WEATHER	Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: HAZY
UTC DATE	mm/dd/yy: 12/04/2017				
Camera System	LiDAR S/N: 8119	GPS	Source: Kappa 180		
Camera Location (Hole)	fwd/aft: Fwd				

	Time	Location
Start-up	10:45 am local	Williamsport KIPT Pa
Shut-down	2:56 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

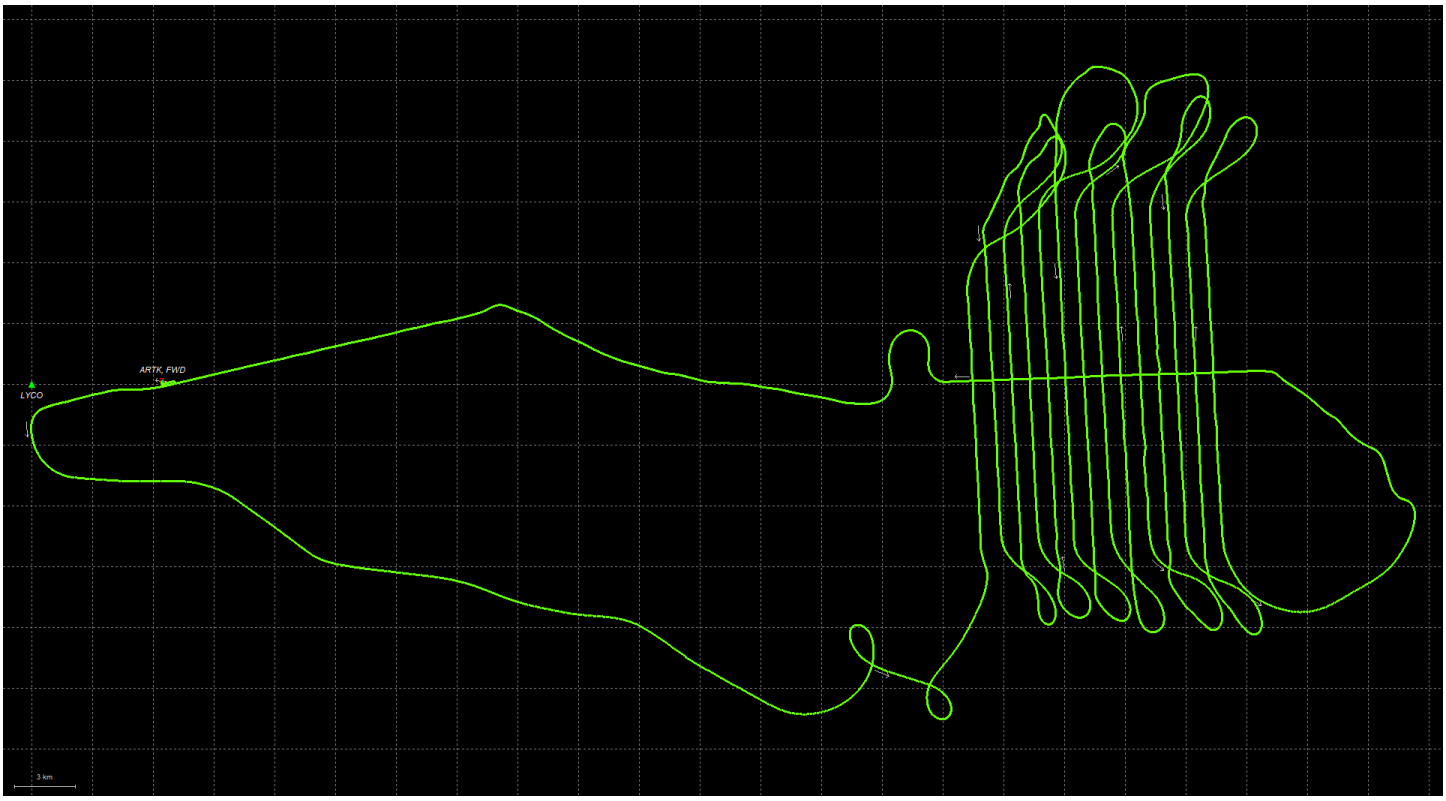
Lens cleaned	
AirPods uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

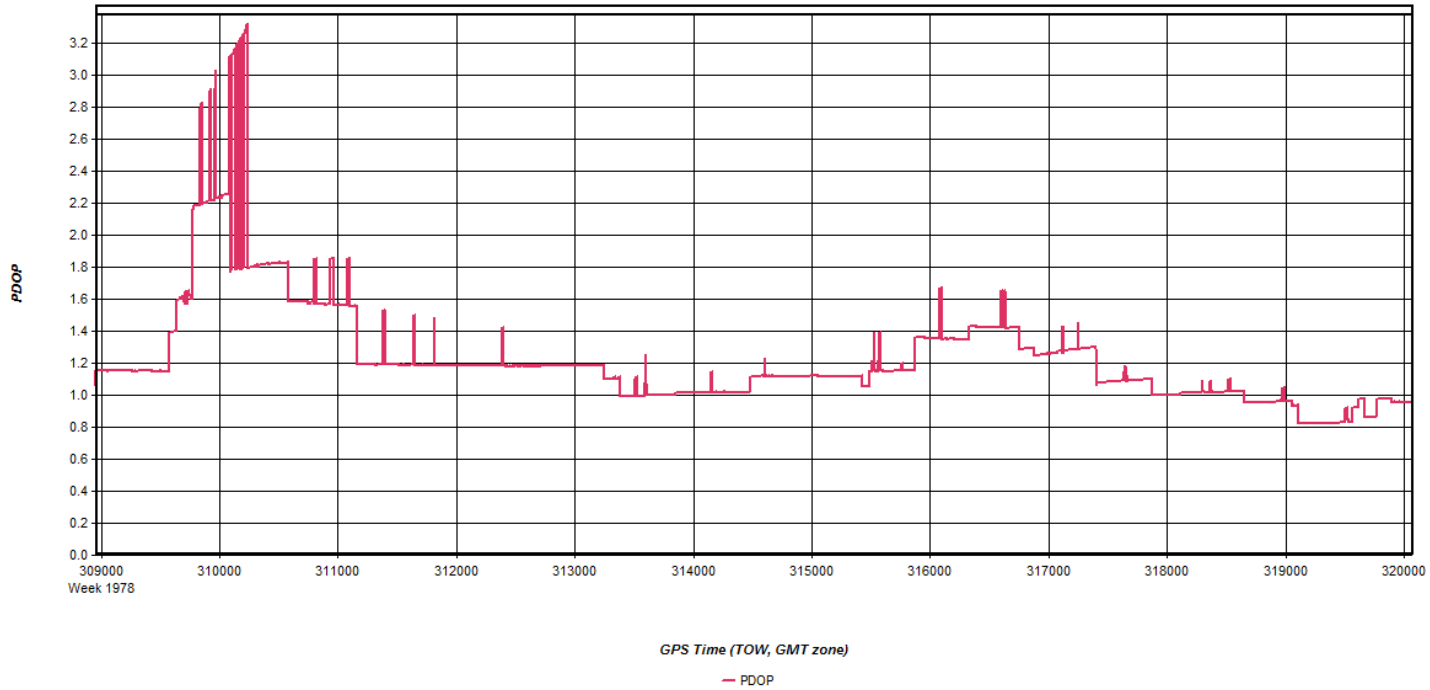
SSD

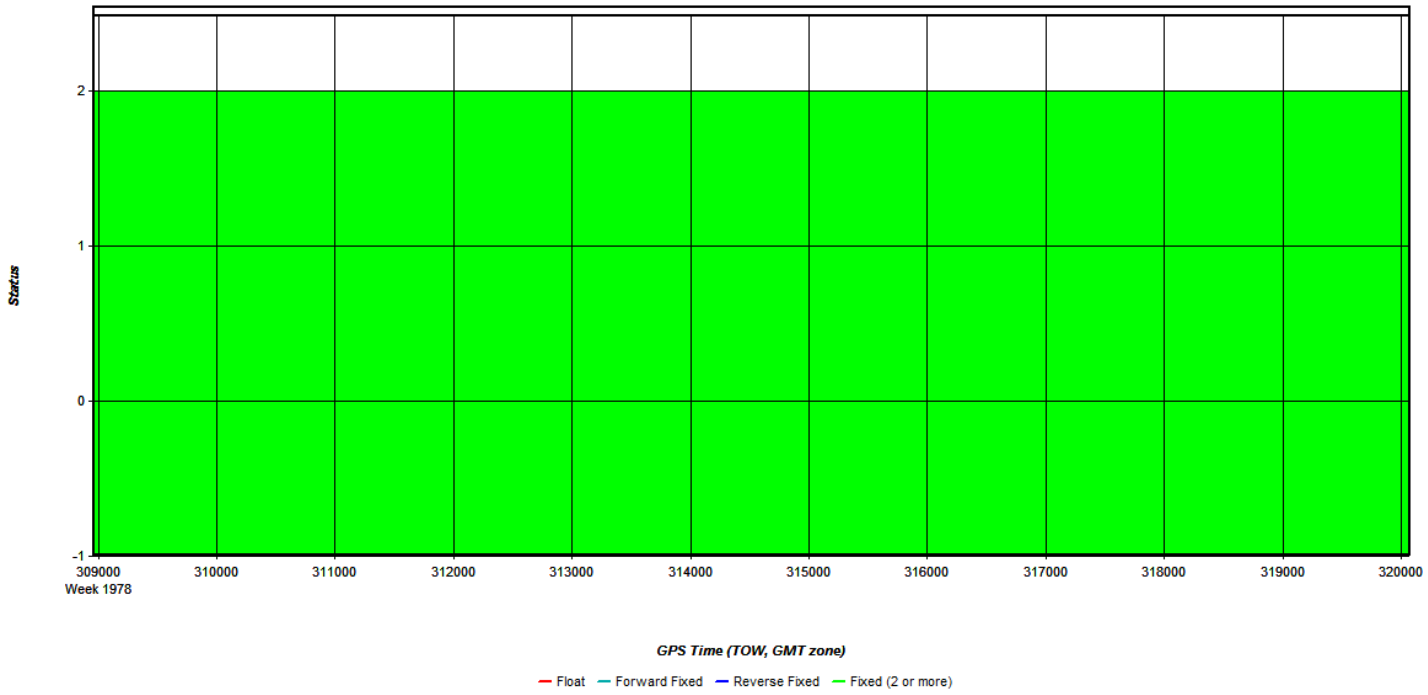
Drive #	
	8119_4
@ Beginning	
Space Used	110
During Mission	15
Space Used	Remaining
Tot Space	1055

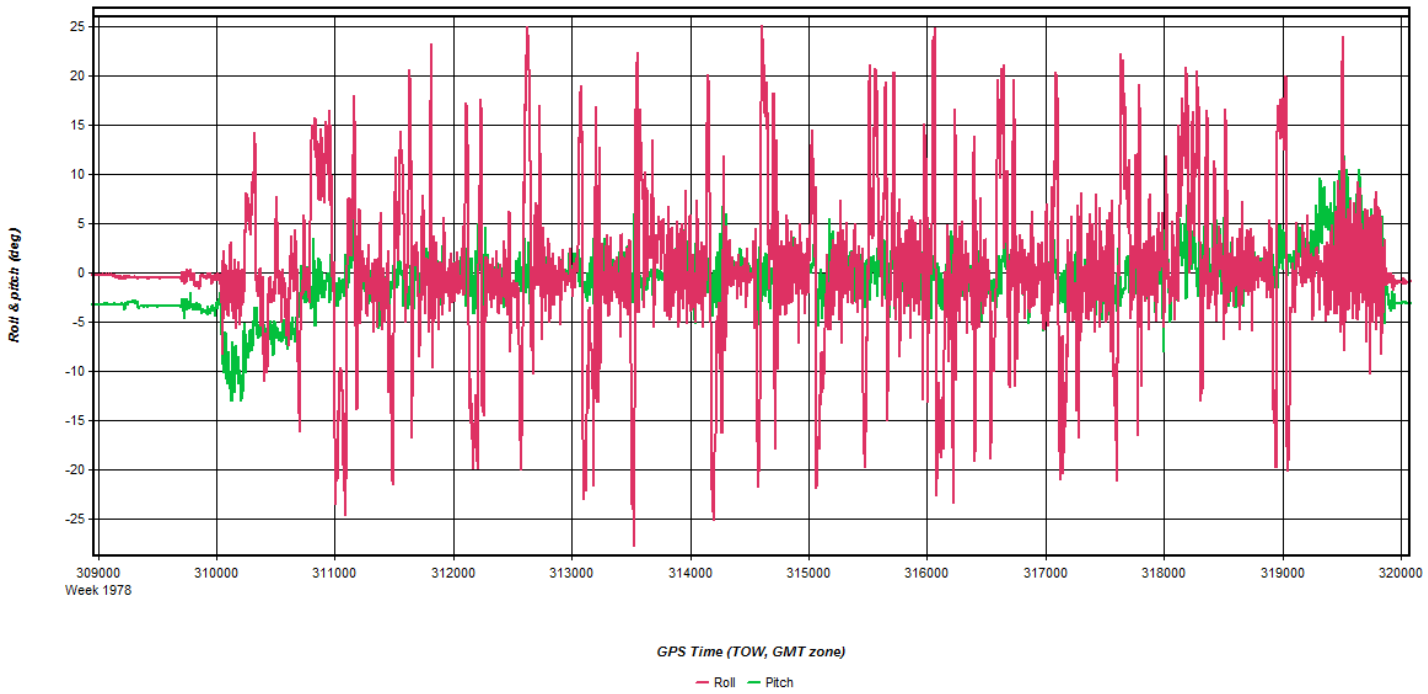
Job #	Location/ Site/Block	Line #	Flight Dir	Crab Angle	Remarks
3DEP	N	N047	W		
		N048	E		X line
		Ad-Hoc	N		

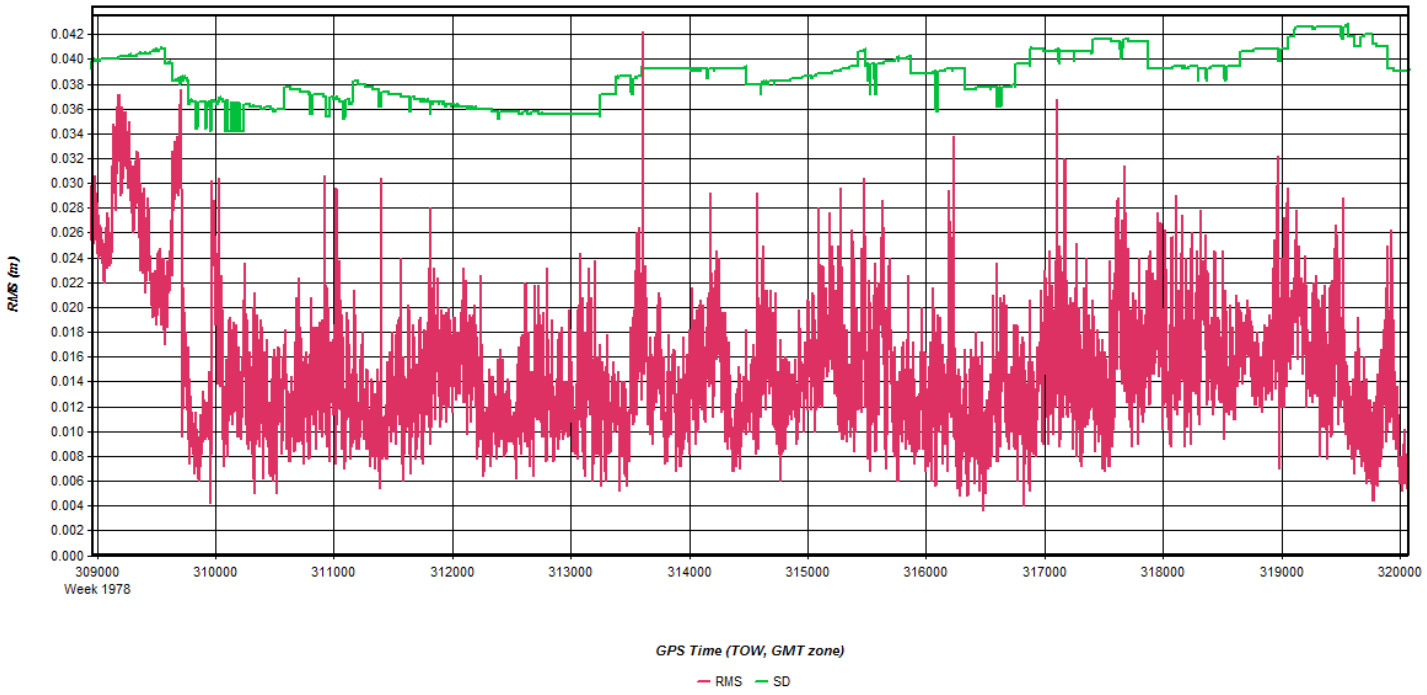
December 6, 2017-A (N916WC, SN8119)


ARTK_FWD
LYCO
3 km

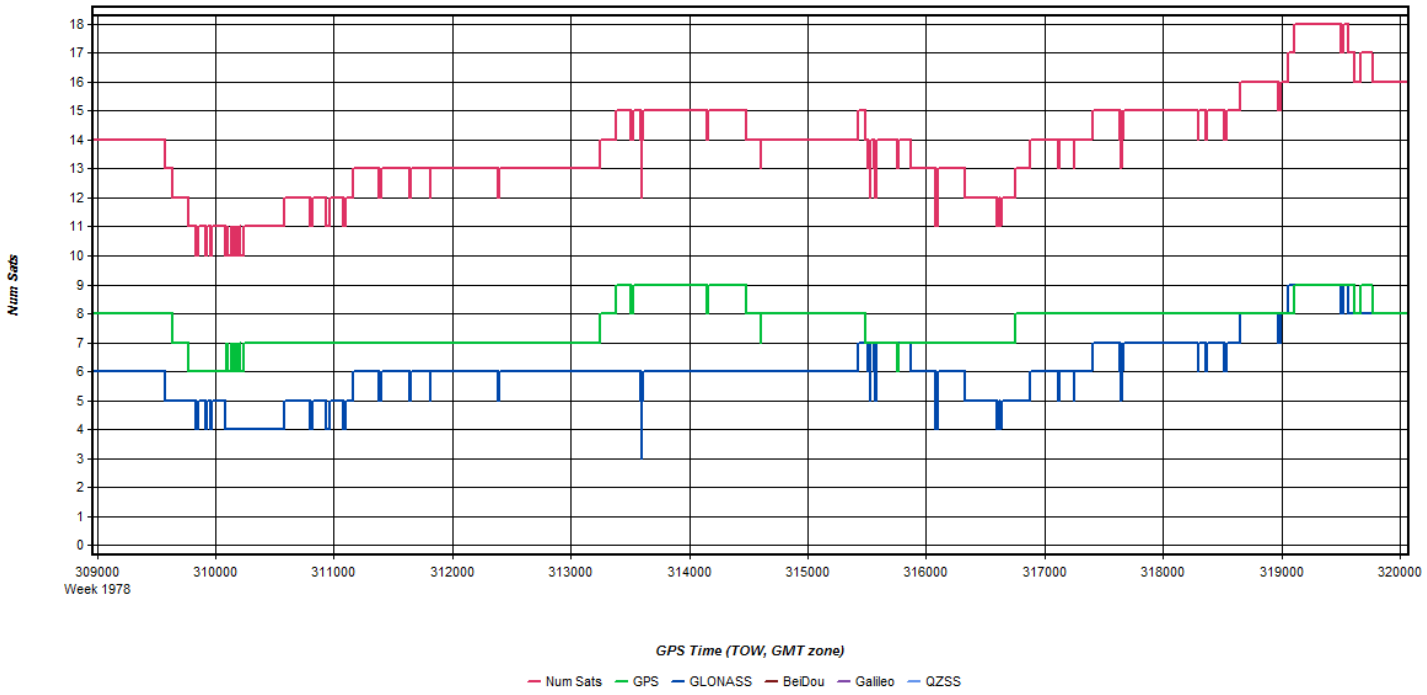

PDOP
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
PDOP

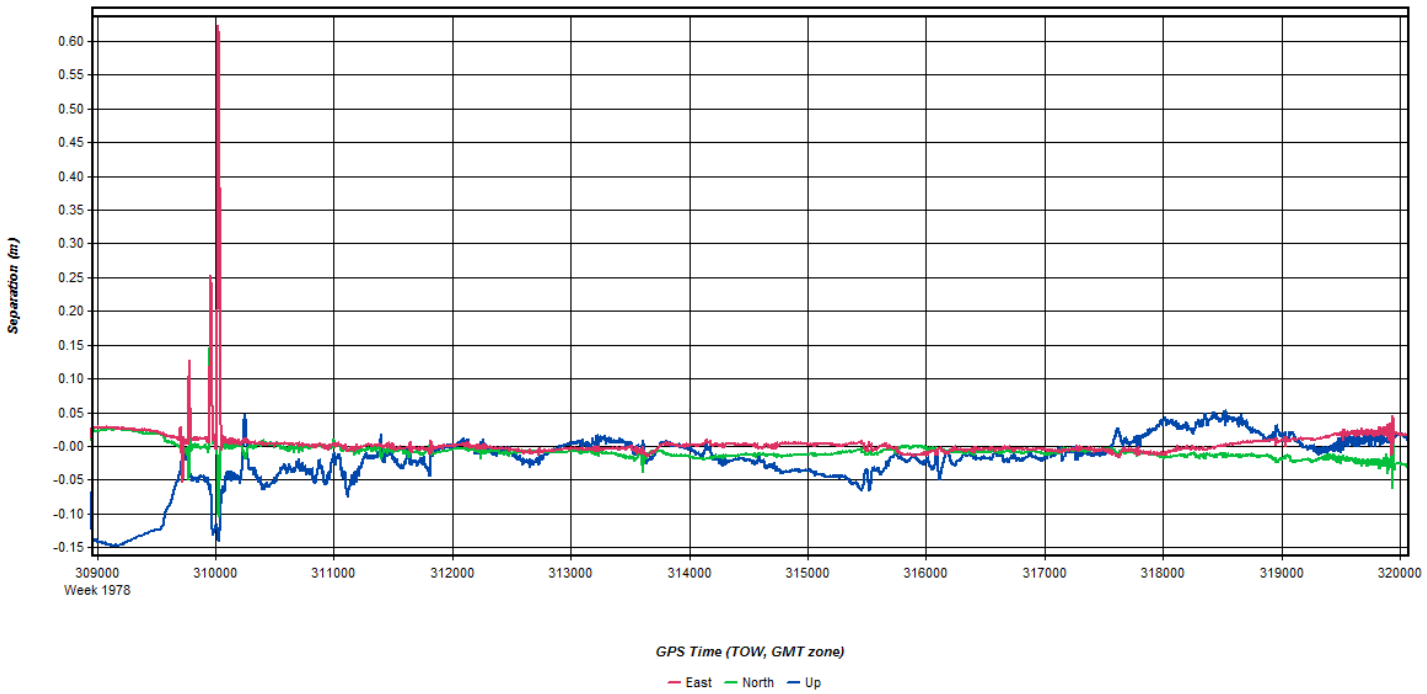

Status
2
1
0
-1
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

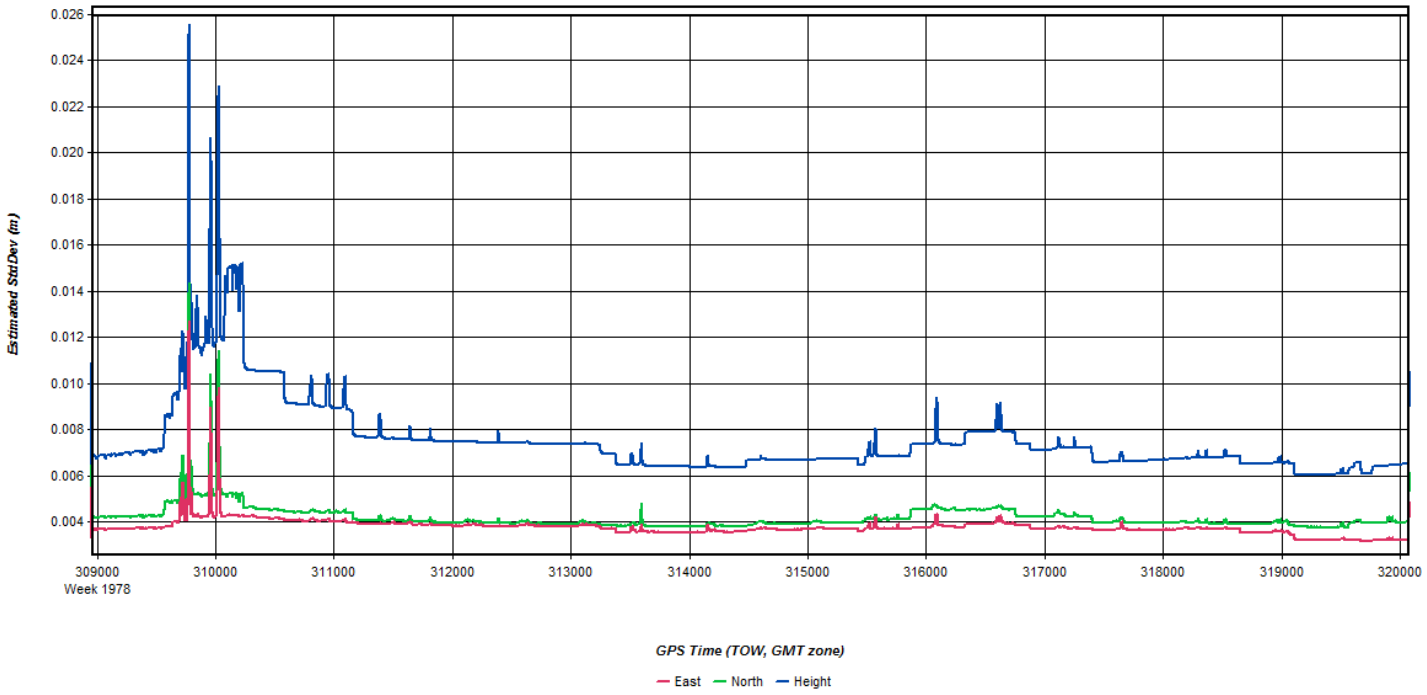

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
Roll
Pitch

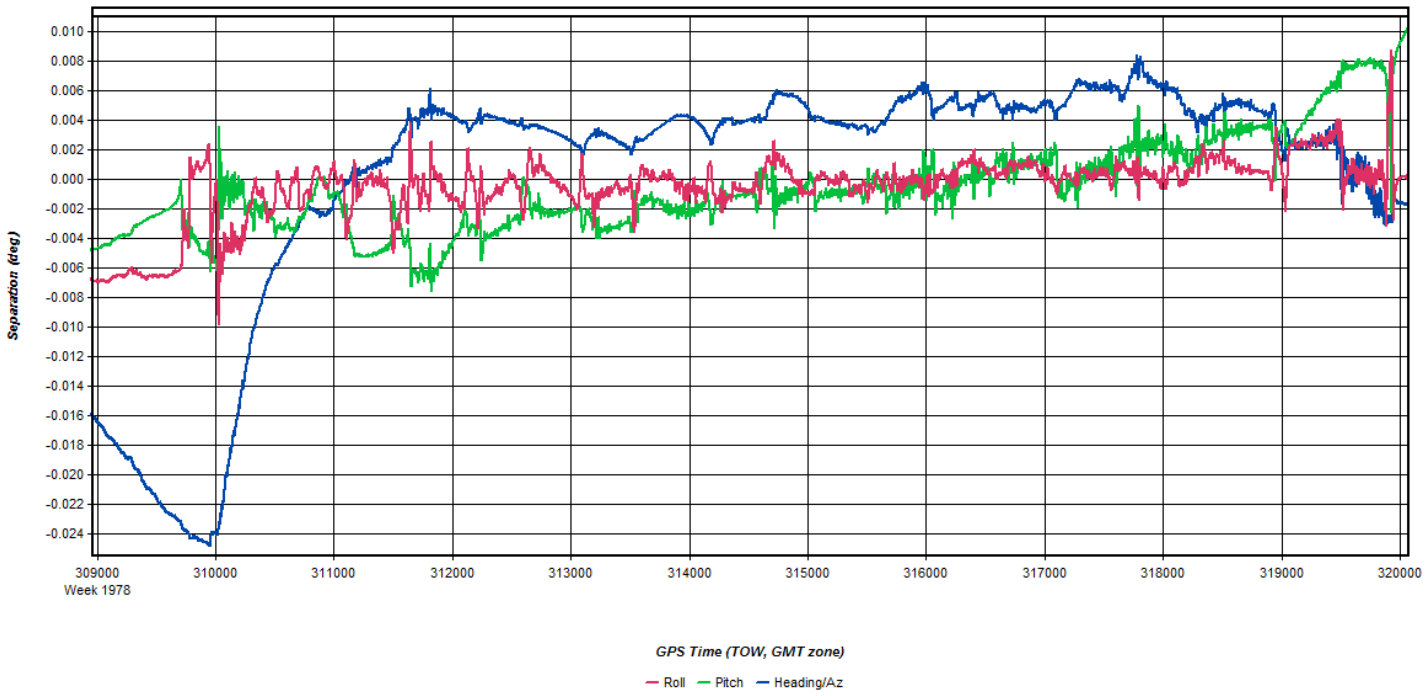

RMS (m)
0.042
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
RMS
SD

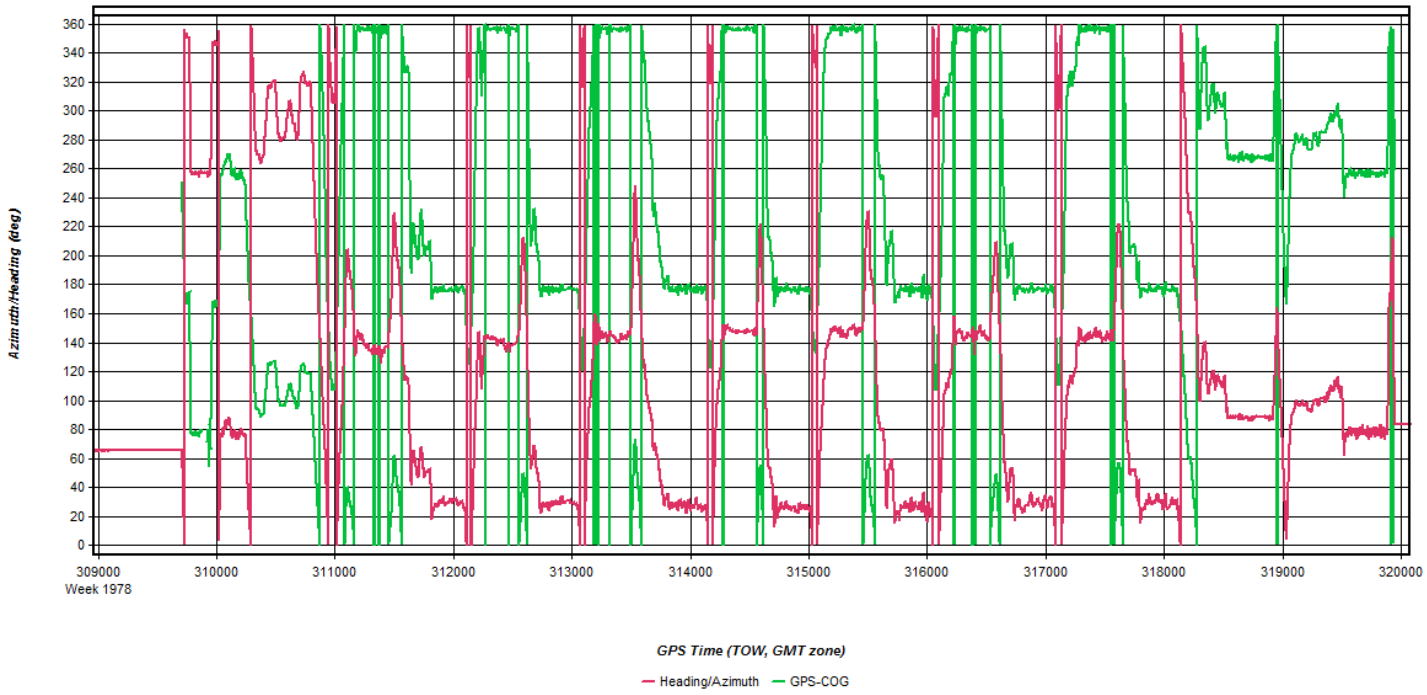

Height (m)
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
Height

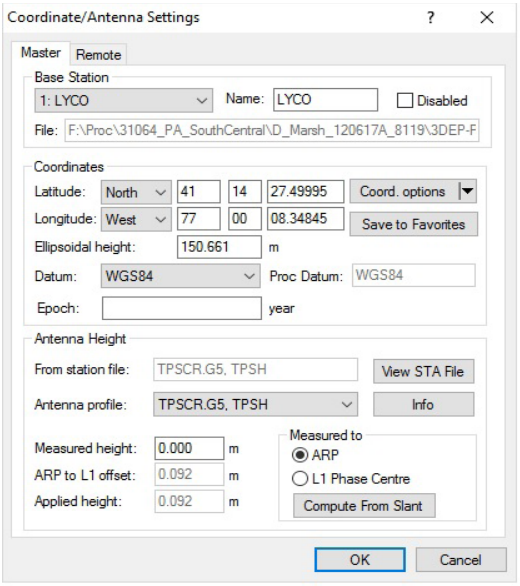

Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
-0.00
-0.05
-0.10
-0.15
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.010
0.008
0.006
0.004
0.002
0.000
-0.002
-0.004
-0.006
-0.008
-0.010
-0.012
-0.014
-0.016
-0.018
-0.020
-0.022
-0.024
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
309000
Week 1978
310000
311000
312000
313000
314000
315000
316000
317000
318000
319000
320000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_120617A_8119\3DEP-F
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aeronautics
LIDAR FLIGHT REPORT

Revised Feb. 2014

CREW	Pilot/Operator: Ernest G & Don M	**AIRCRAFT**	Tail Number: N816WC
UTC DATE	12/06/2017 (mm/dd/yy)	**WEATHER**	Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: clear but very Windy 67 Kts fm 273 Deg
Camera System	LiDAR S/N: 8119	**GPS**	Source: Kappa 180
Camera Location (Hole)	fwd/aft: Fwd		

	Time	Location
Start-up	8:49 am local	Williamsport KIPT Pa
Shut-down	12:52 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

Lens cleaned	
AirPods uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

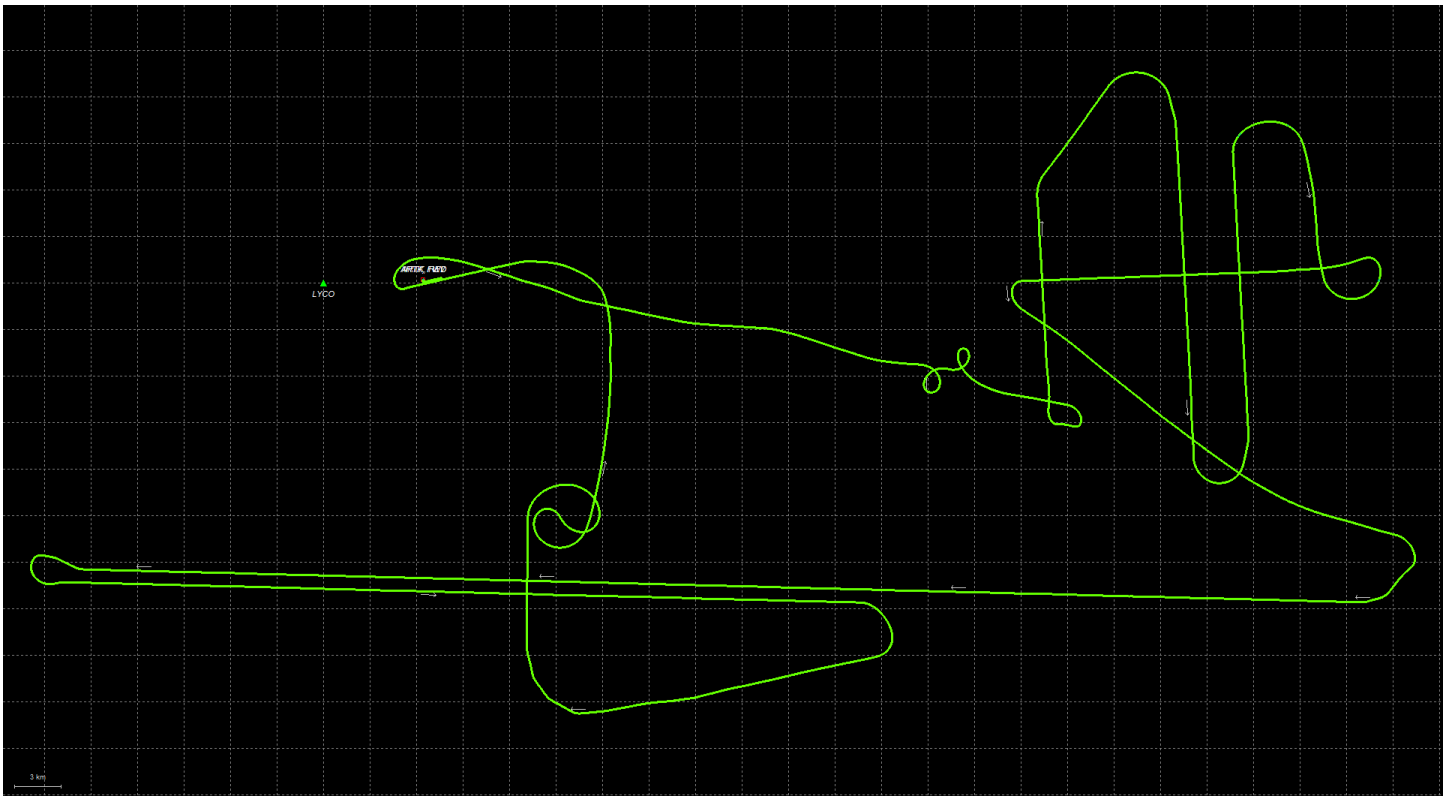
SSD

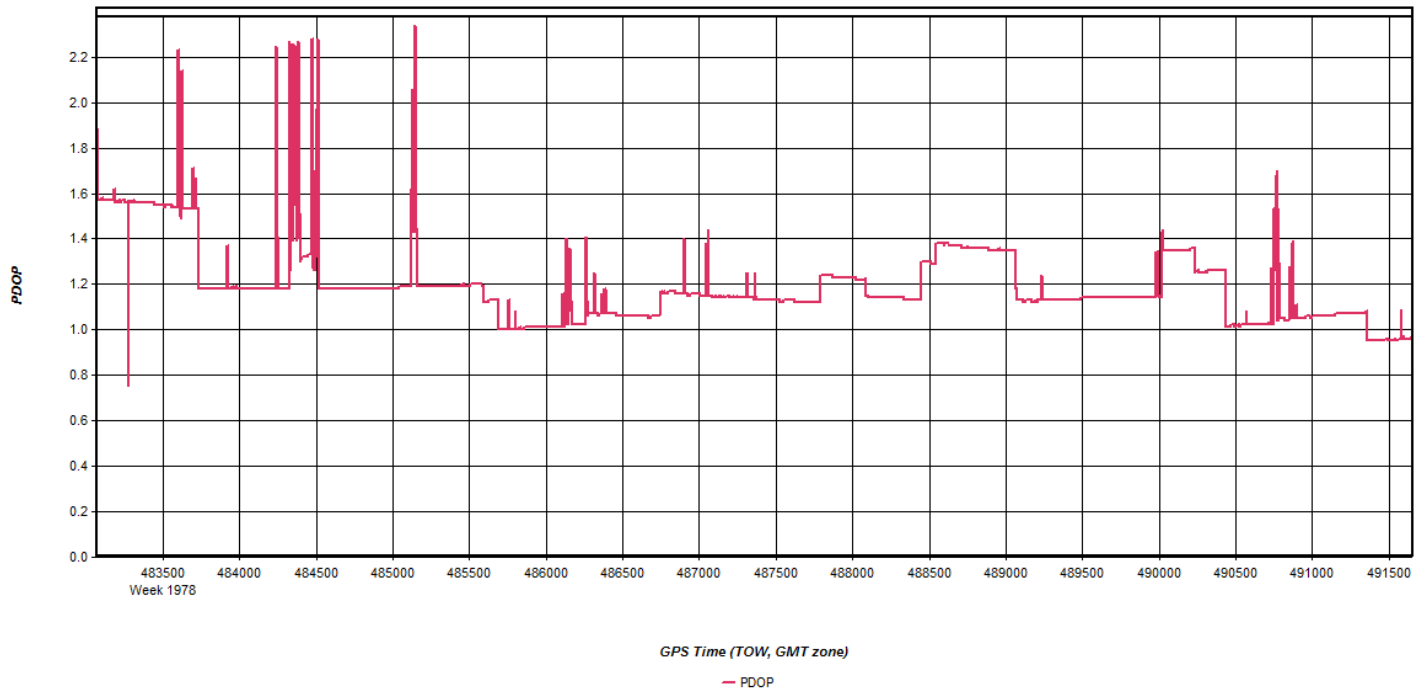
Drive #	8119_2
@ Beginning	
Space Used	112
Space Used During Mission	32
Remaining Tot Space	974

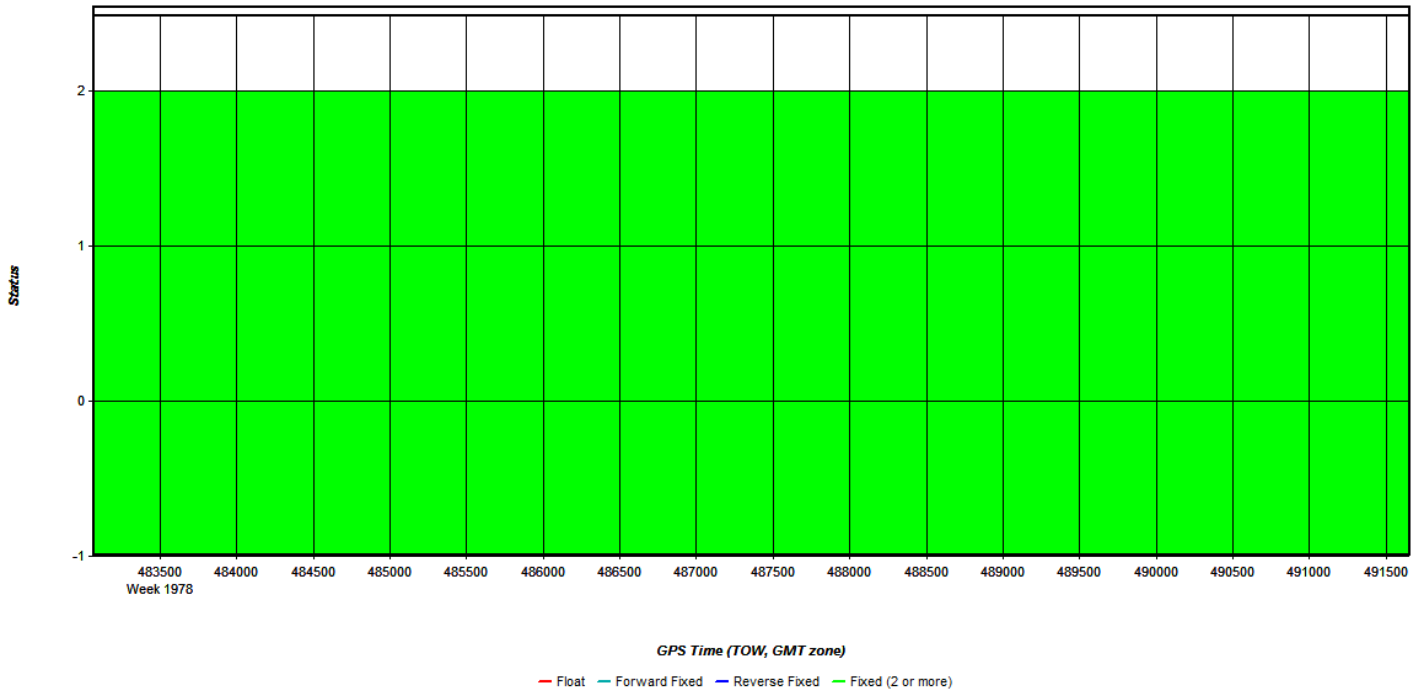
Job #	Location/ Site/Block	Line #	Flight Dir	Crab Angle	Remarks
3DEP	N	E001	N	appr 24	
		E002	S		Gap to line 2 (@ N 1/4 the way towards the S) observed in QC due to poor navigation
		E003	N		
		E004	N		
		E005	S		
		E006	N		
		E007	N		
		E008	S		
		E009	N		
		E010	N		
		E011	S		Gap to line 12 observed (@ appr 1/2) in QC due to poor navigation
		E012	N		
		E013	N		
		E014	S		
		EX01	X		X line
		E015			was not collected due to low Fuel

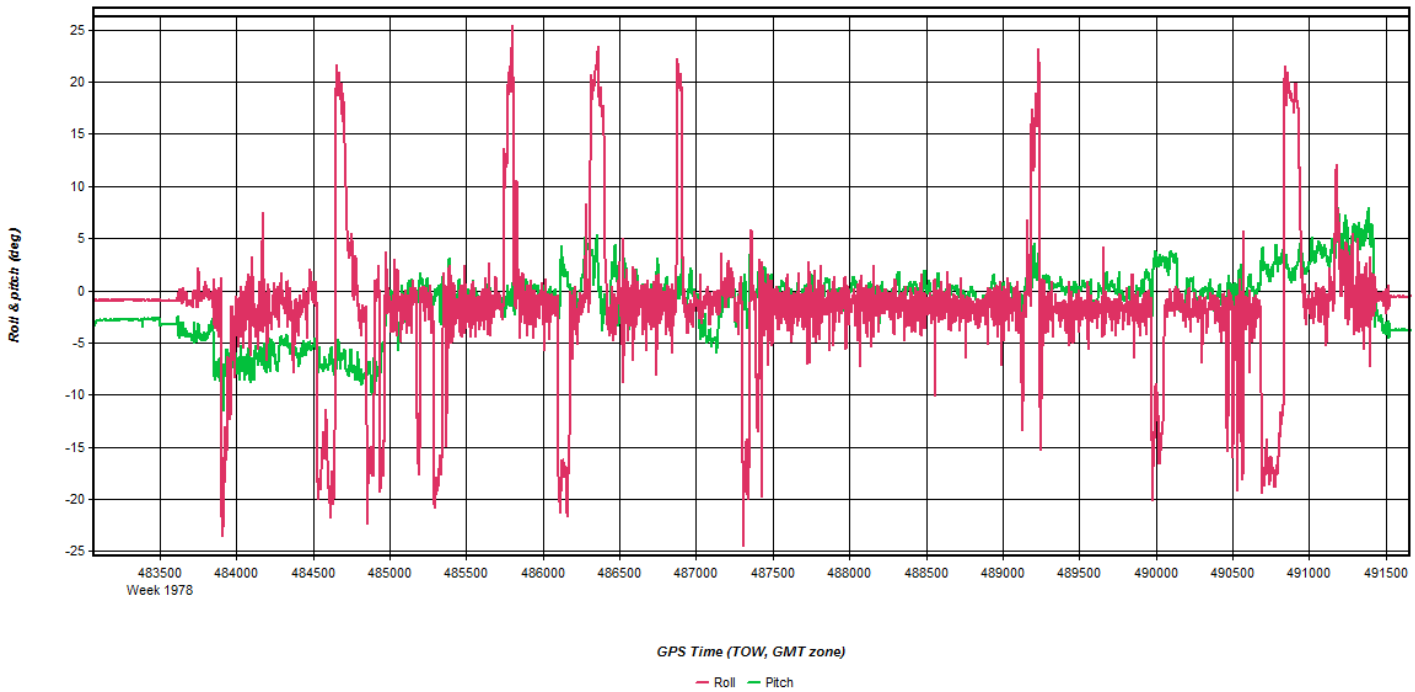
Page 1

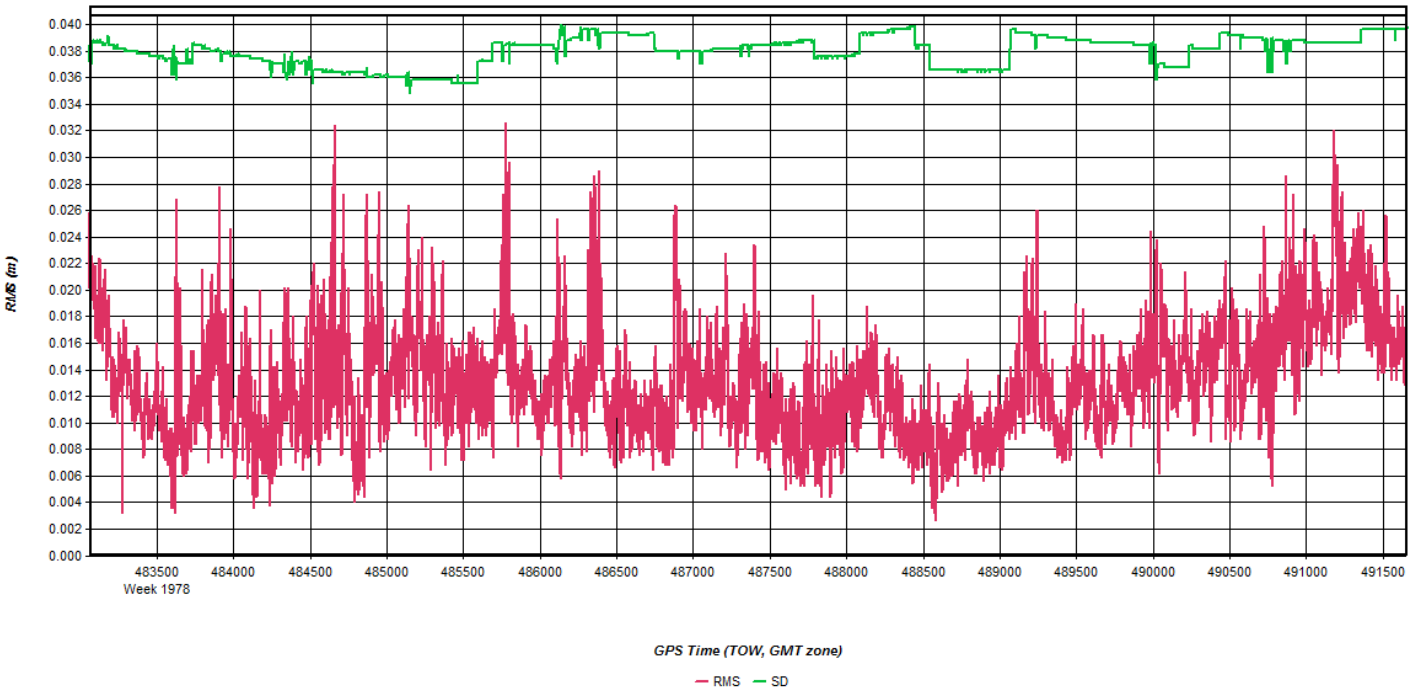
December 8, 2017-A (N916WC, SN8119)

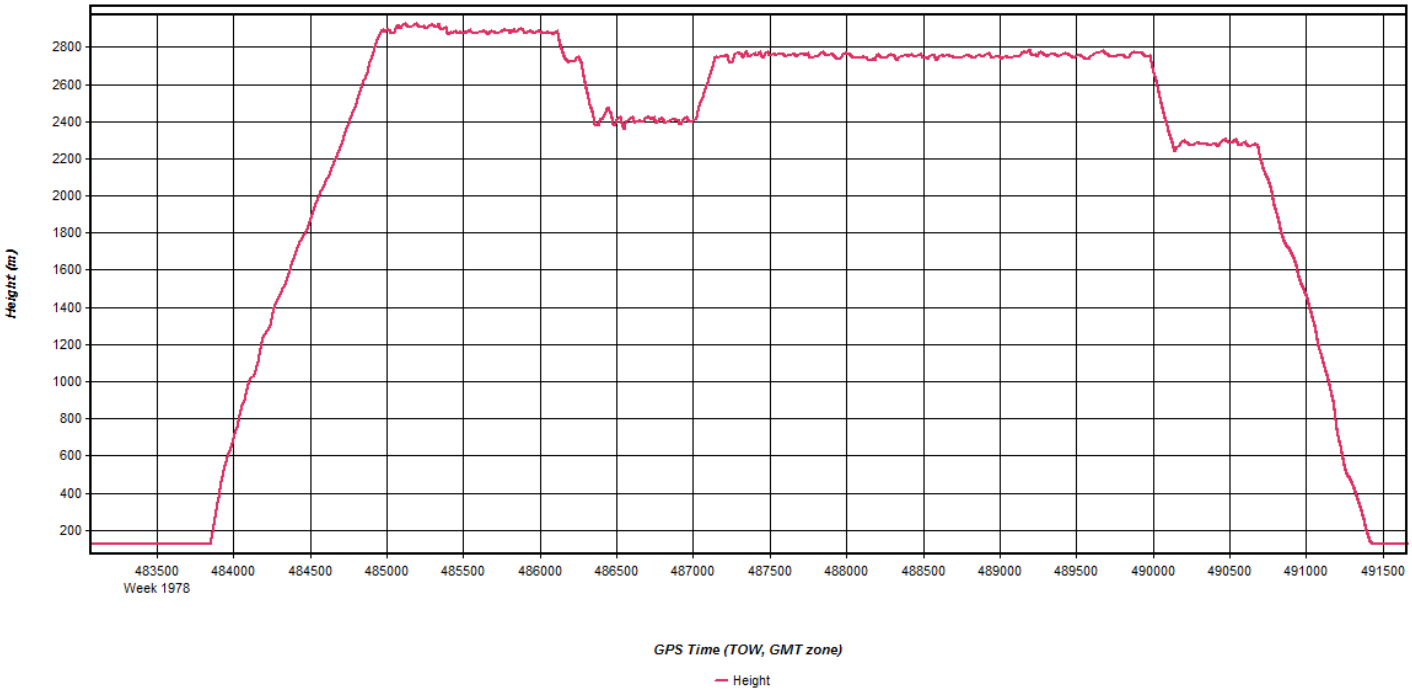

LYCO
3 km

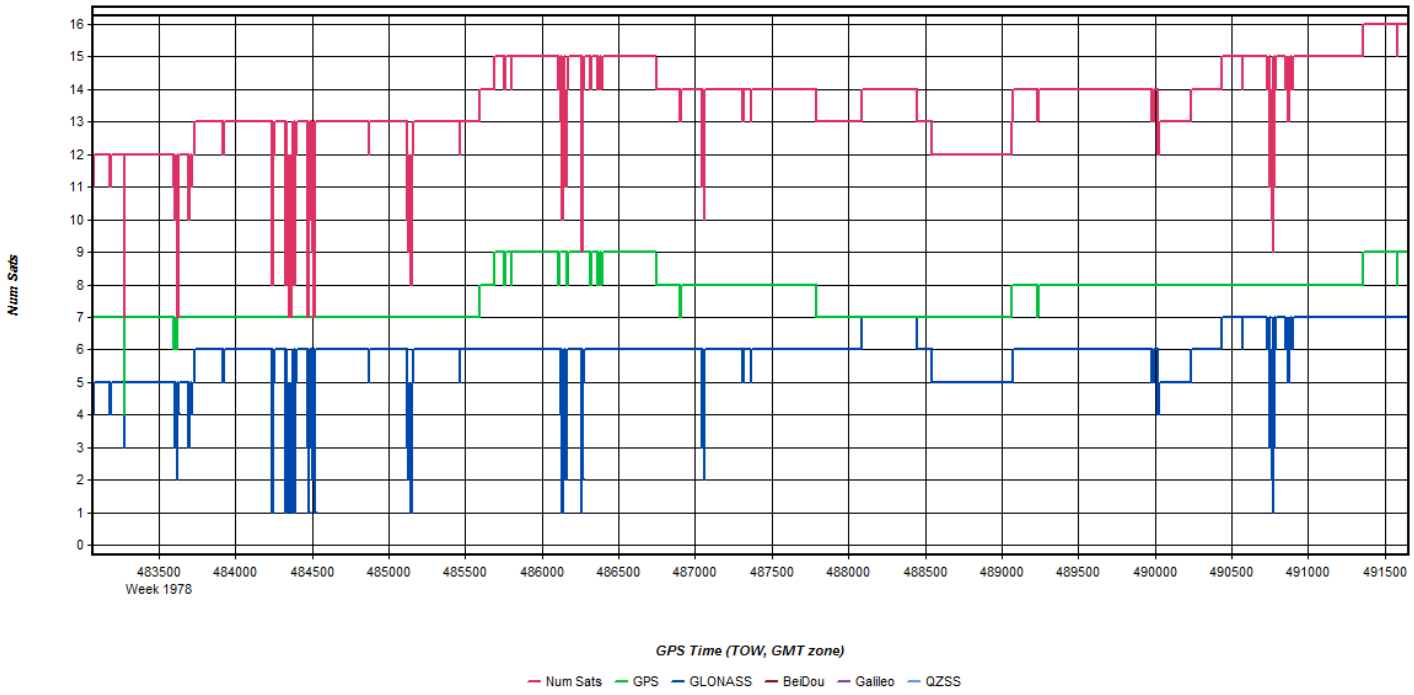

PDOP
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
PDOP

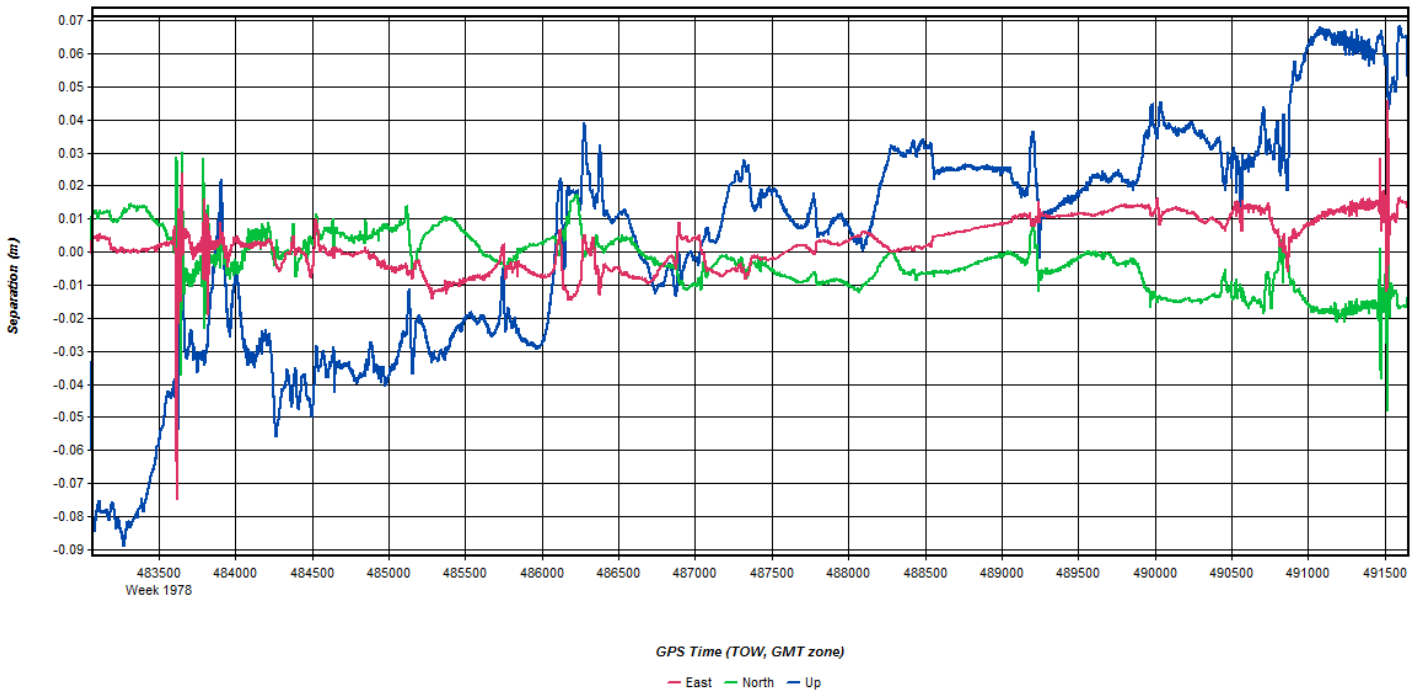

Status
2
1
0
-1
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

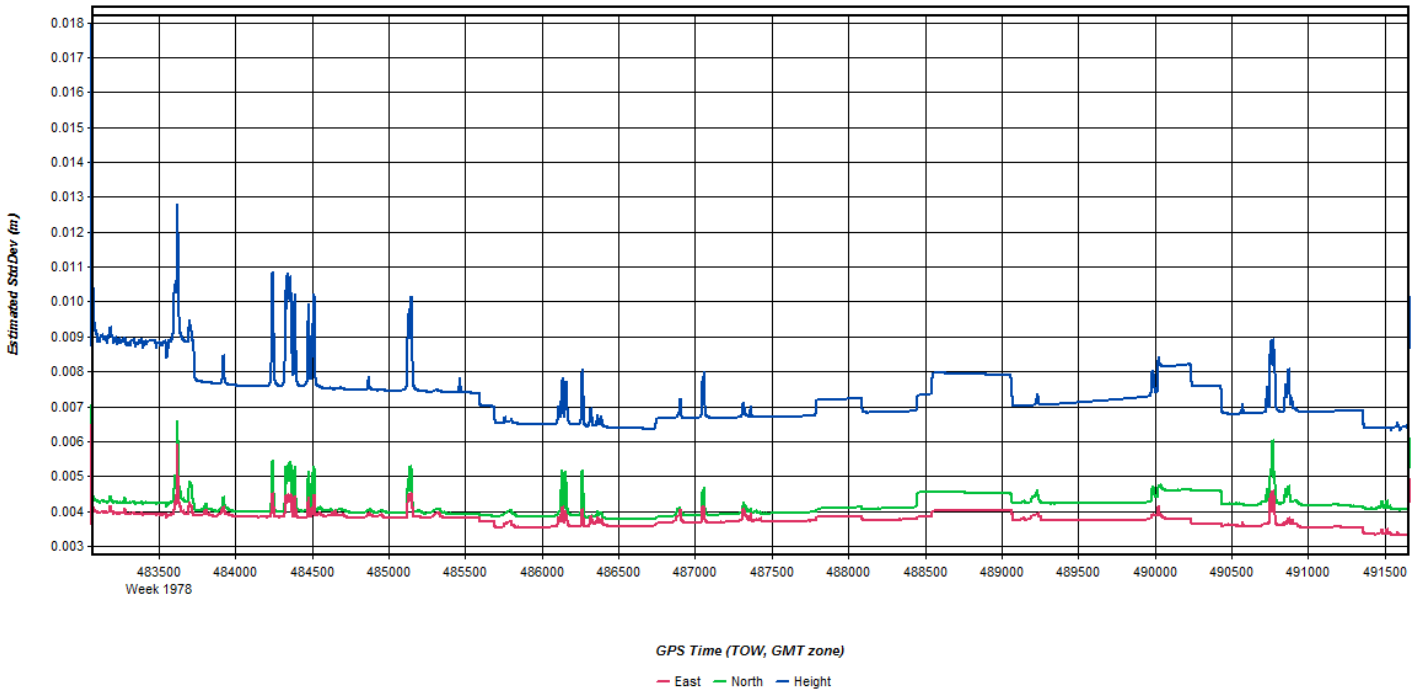

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
-25
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
Roll
Pitch

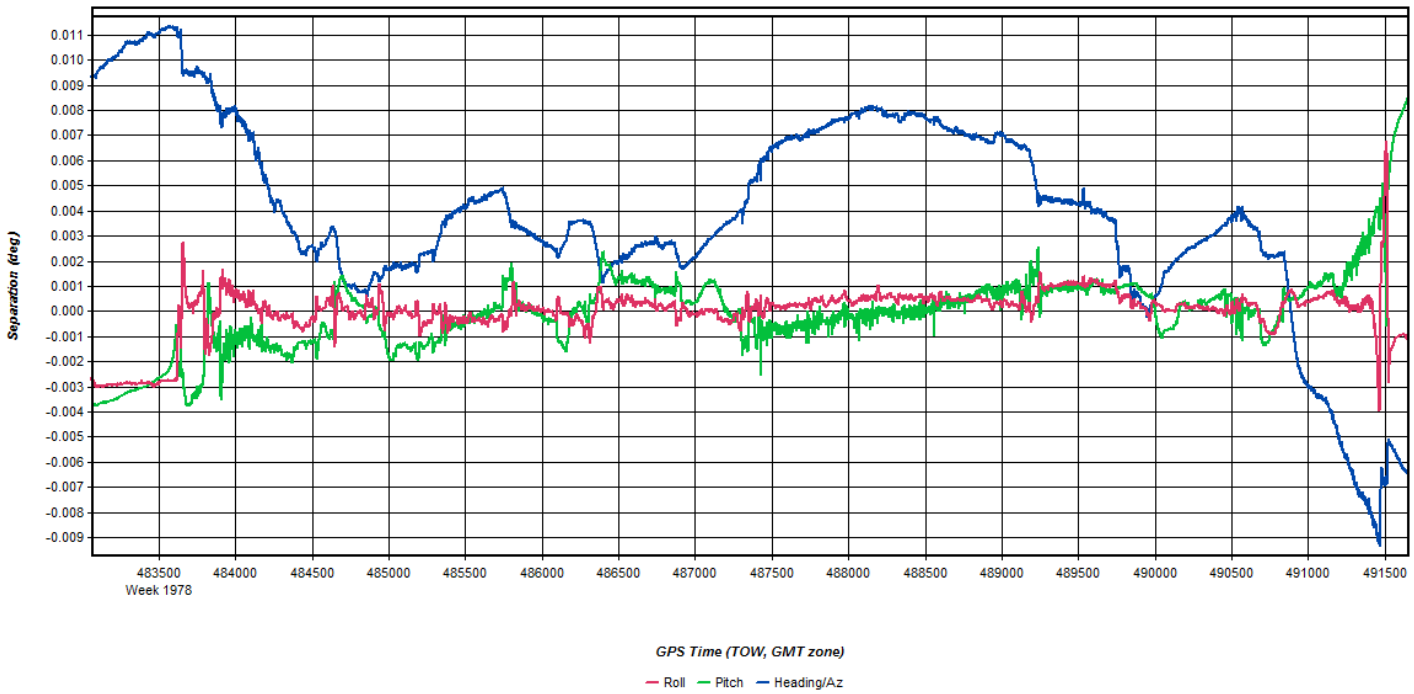

RMS (m)
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
RMS
SD

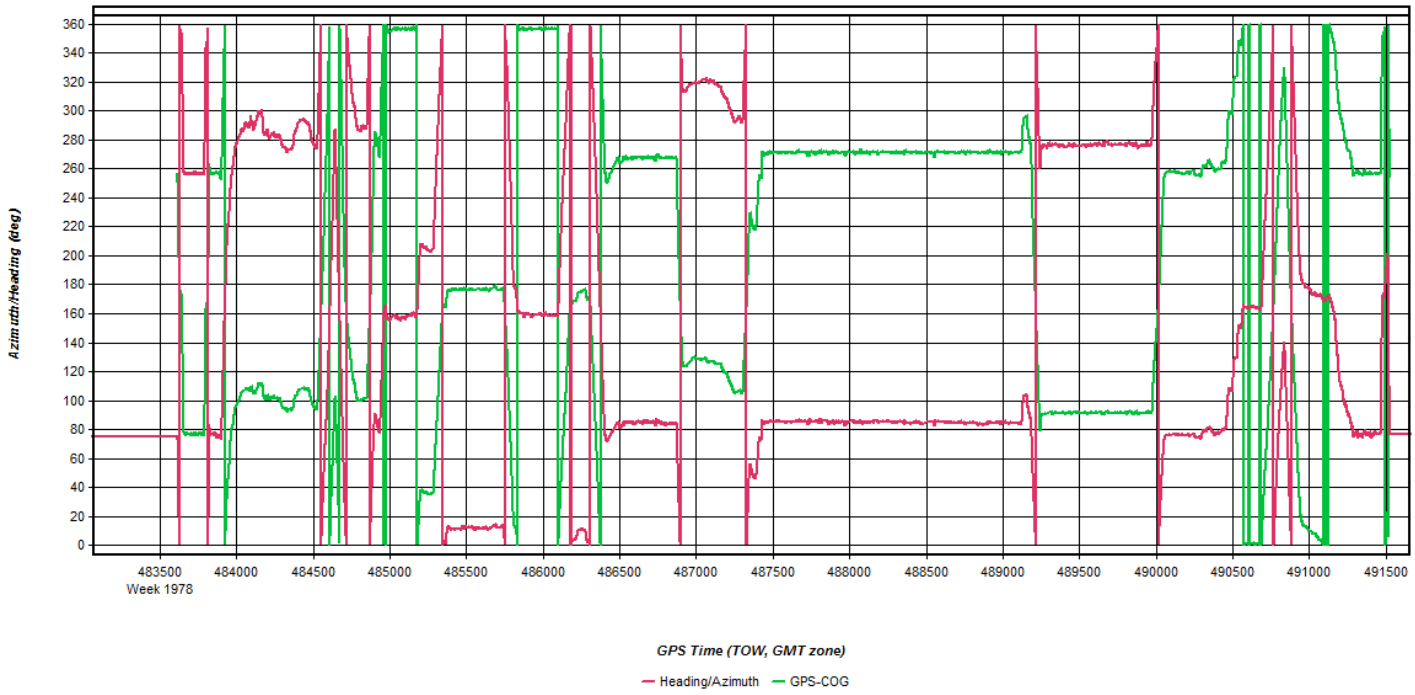

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
Height

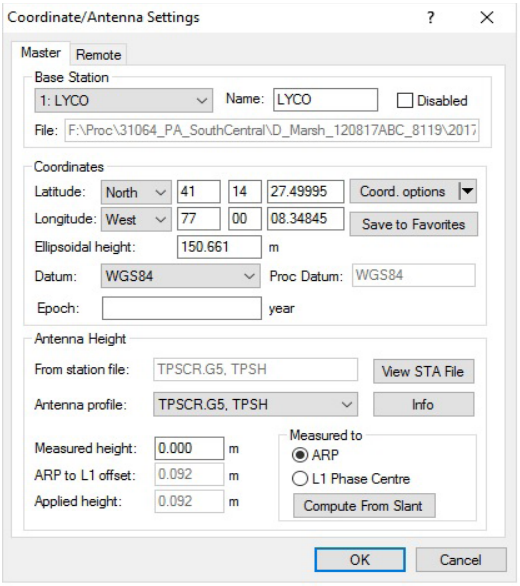

Num Sats
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
-0.09
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
-0.007
-0.008
-0.009
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
483500
Week 1978
484000
484500
485000
485500
486000
486500
487000
487500
488000
488500
489000
489500
490000
490500
491000
491500
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_120817ABC_8119\2017
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aerotrio

LIDAR FLIGHT REPORT

Revised Feb. 2014

Pilot/Operator: Scott A. & Don M | Tail Number: N916WC | AIRCRAFT | WEATHER: Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: clear. Wind: 37 Kts fm 266 Deg

CREW

UTC DATE: 12/08/2017 (mm/dd/yy)

Camera System: LiDAR S/N: 8119; fwd/aft: Fwd

Camera Location (Hole):

GPS: Source: Kappa 180

	Time	Location
Start-up	9:15 am local	Williamsport KIPT Pa
Shut-down	11:32 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

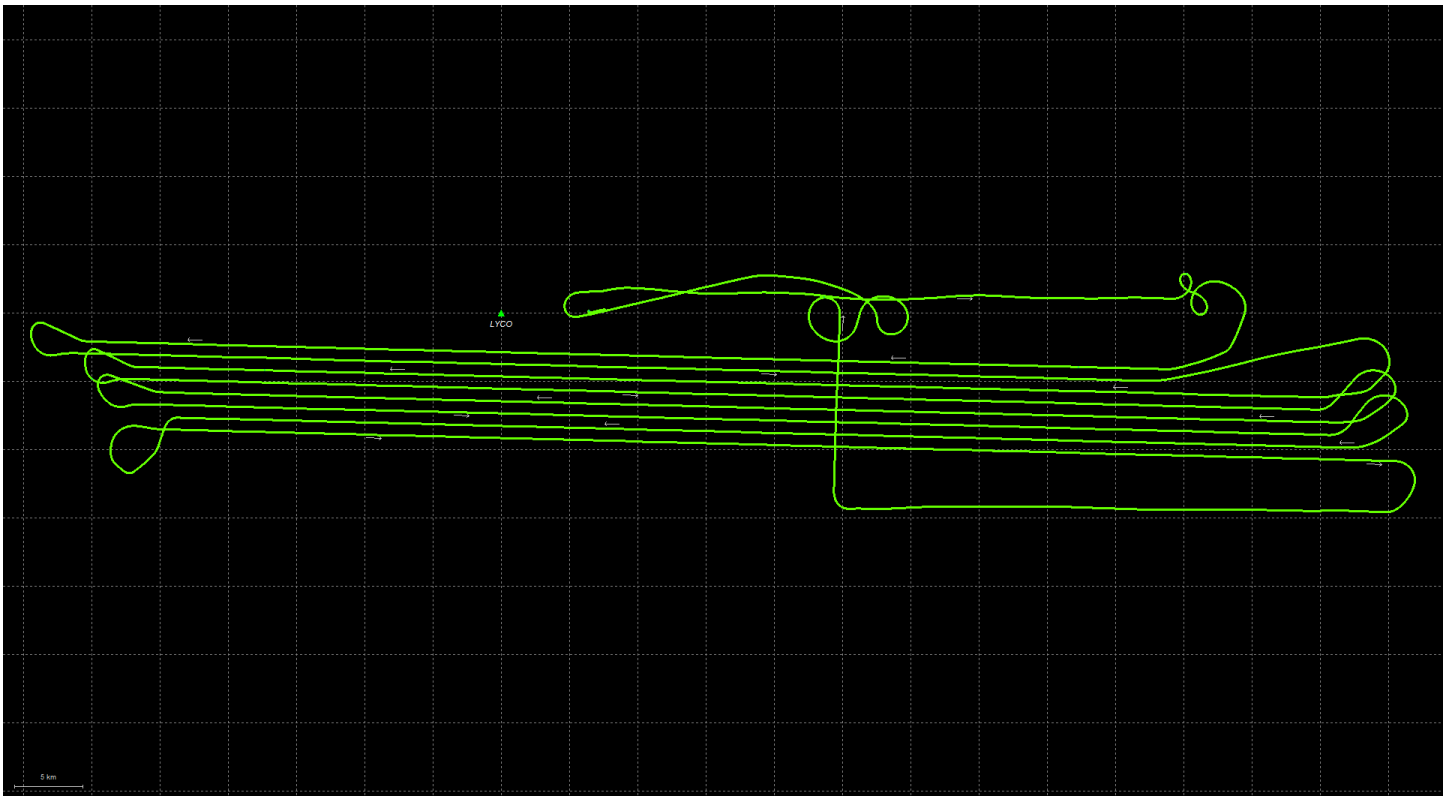
Lens cleaned	
Airpts uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

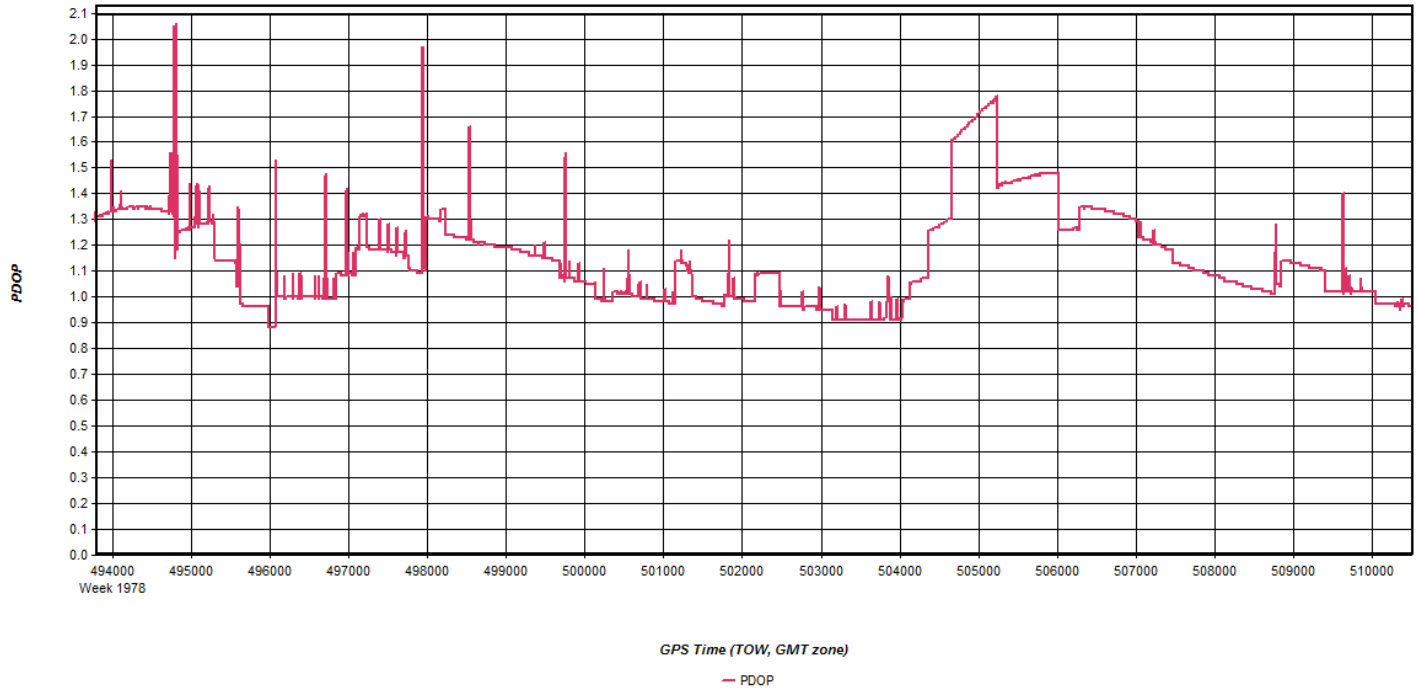
SSD

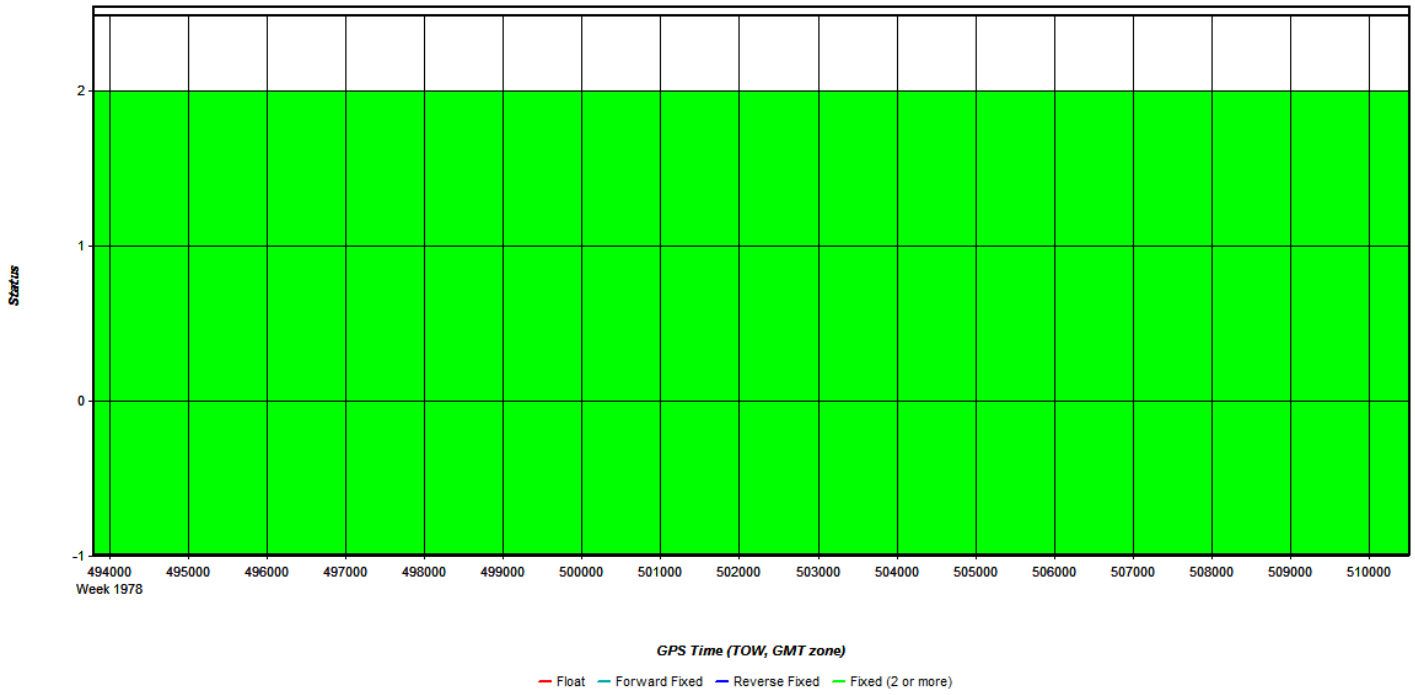
Drive #	8119_3
@ Beginning	
Space Used	109
During Mission	90
Space Used	
Tot Space	919
Remaining	

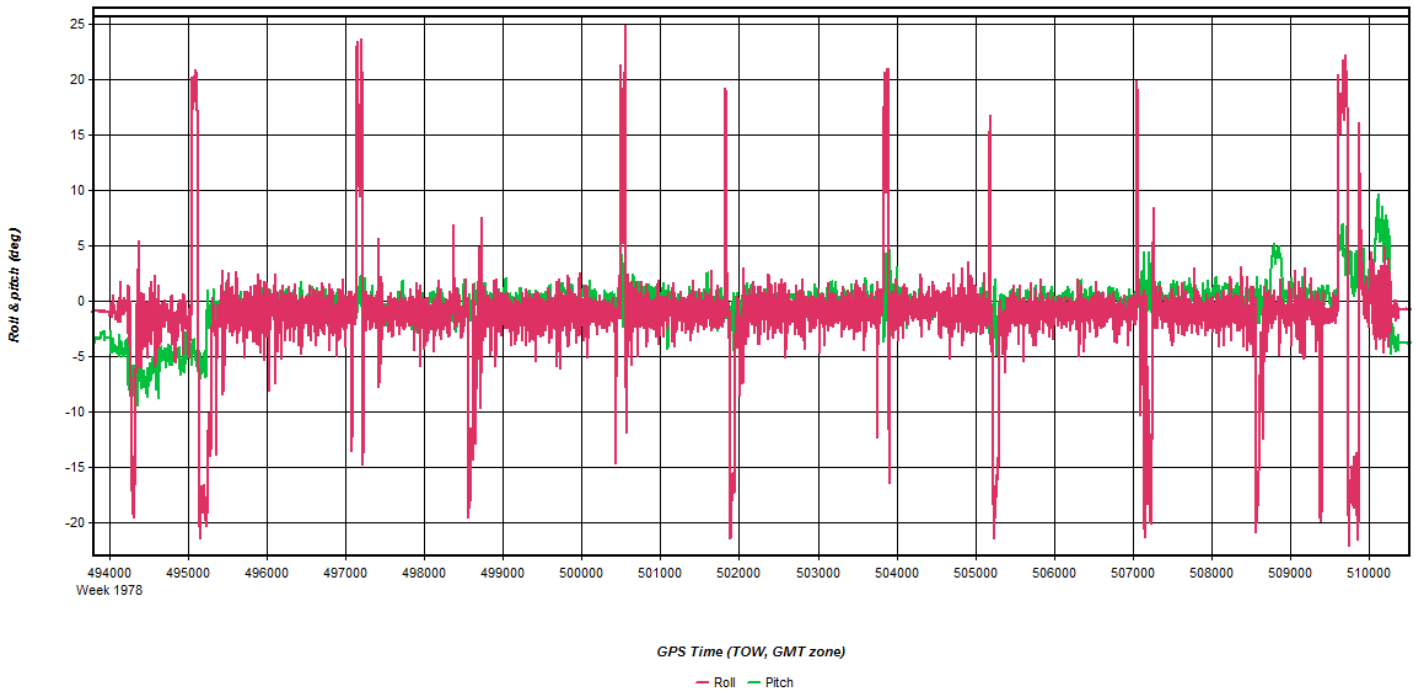
Job #	Location/ Site/Block	Line #	Flight Dir	Crab Angle	Remarks
3DEP	N	E001	N	appr 24	
		E011	S		Partial N 1/2
		E015	N		whole
		Ex01	W		
		N001	W		
		N008	E		Clouds on the 2nd 1/2
		N003	N		Clouds and abet
					ad-Hoc

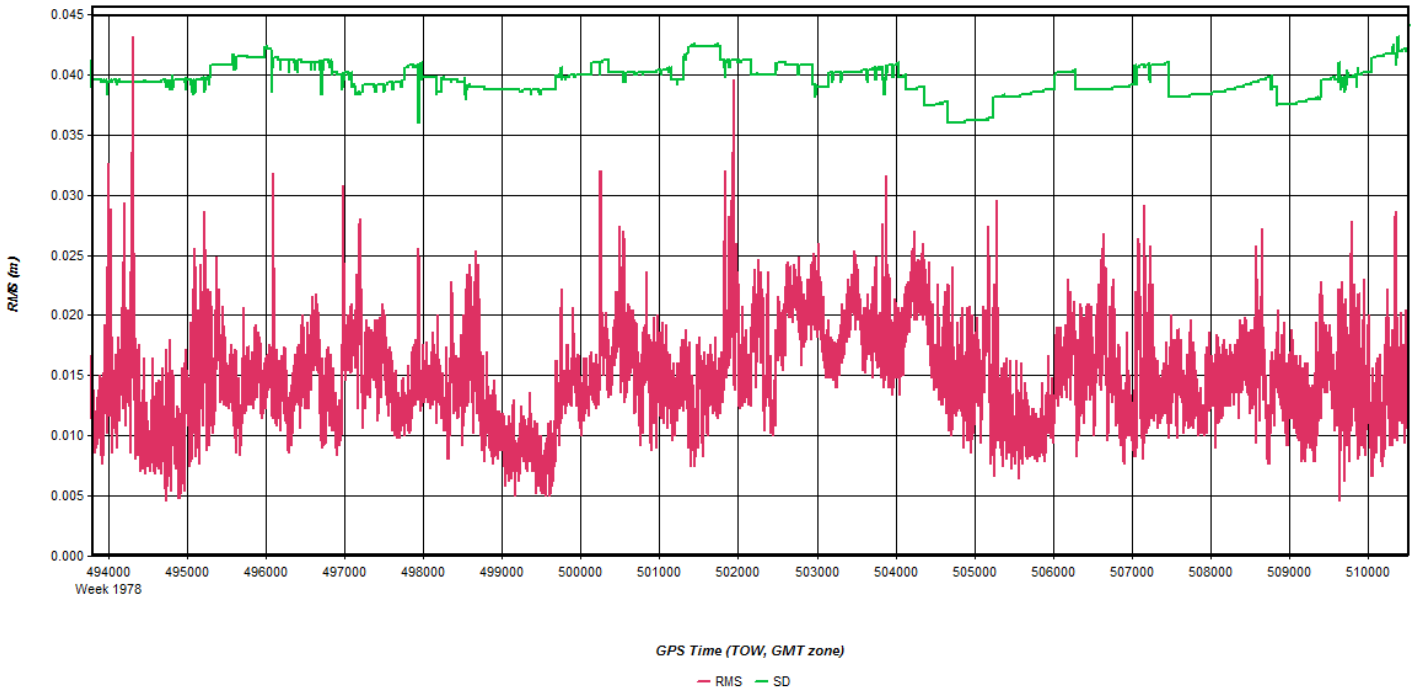
December 8, 2017-B (N916WC, SN8119)

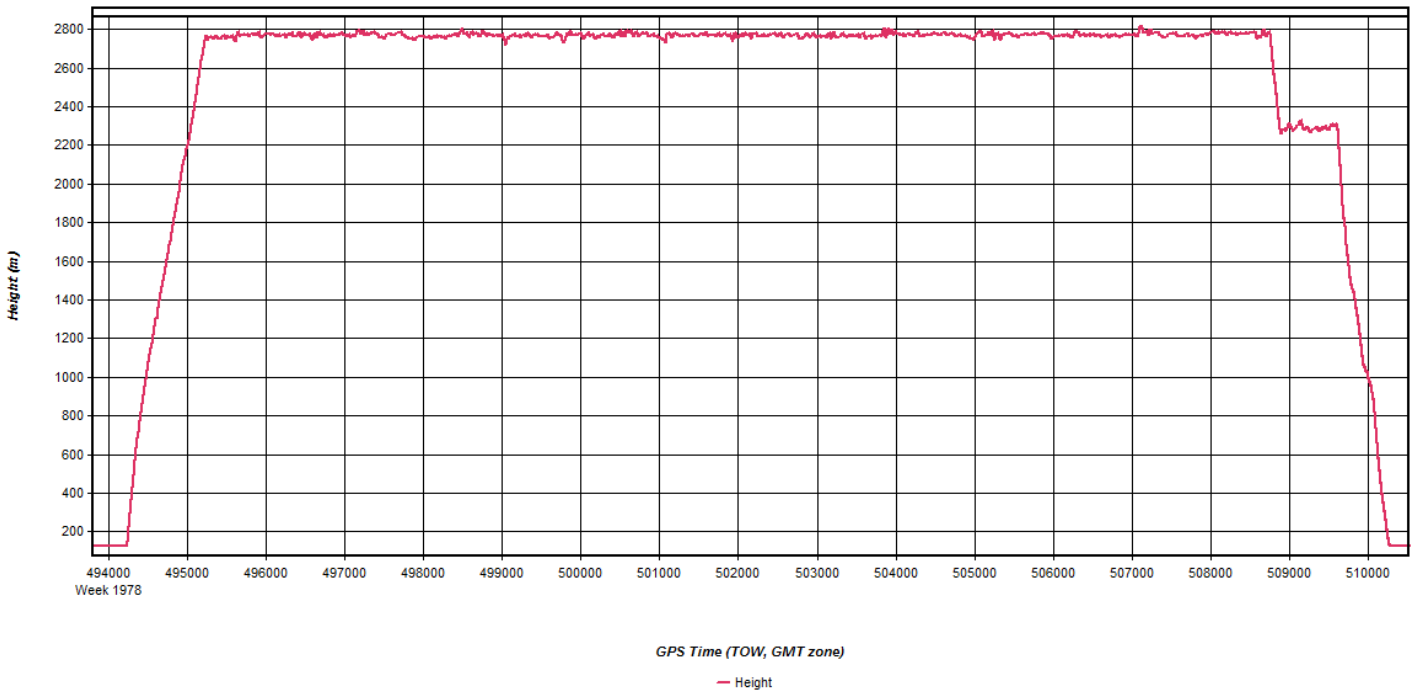

LYCO
5 km


PDOP
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
PDOP

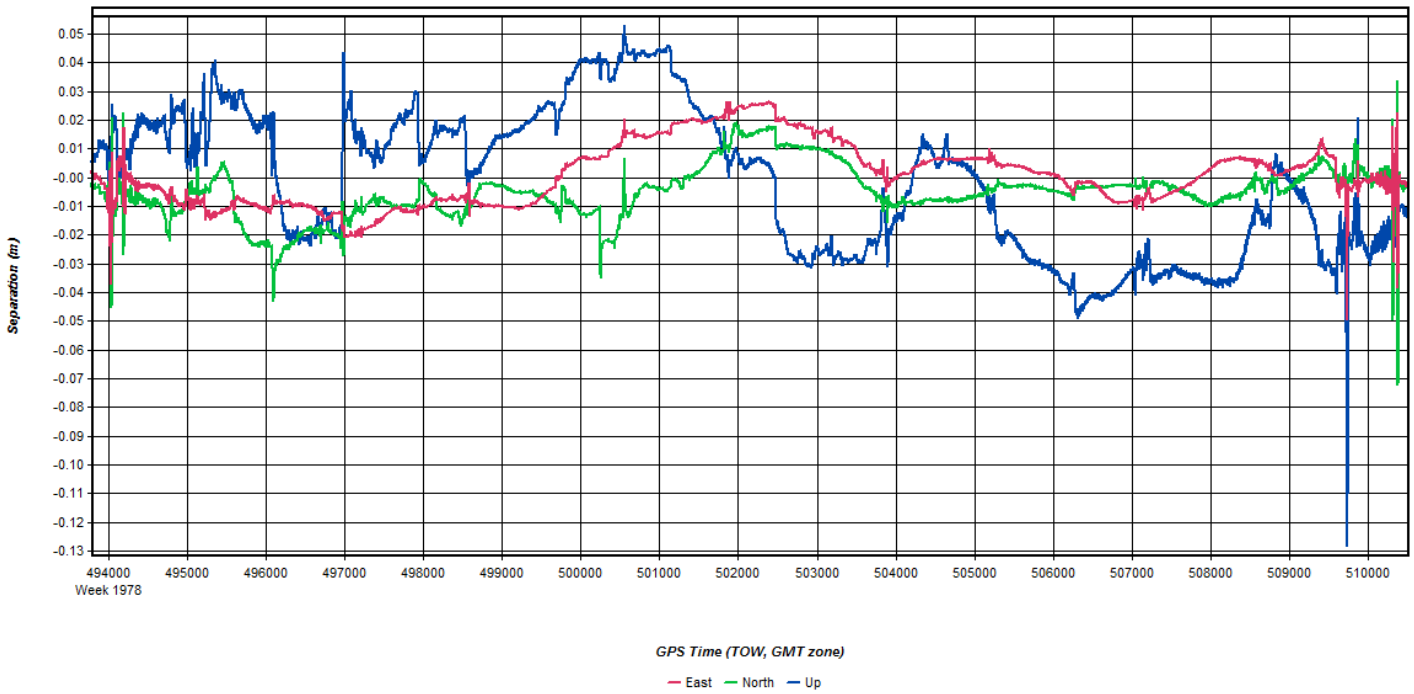

Status
2
1
0
-1
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

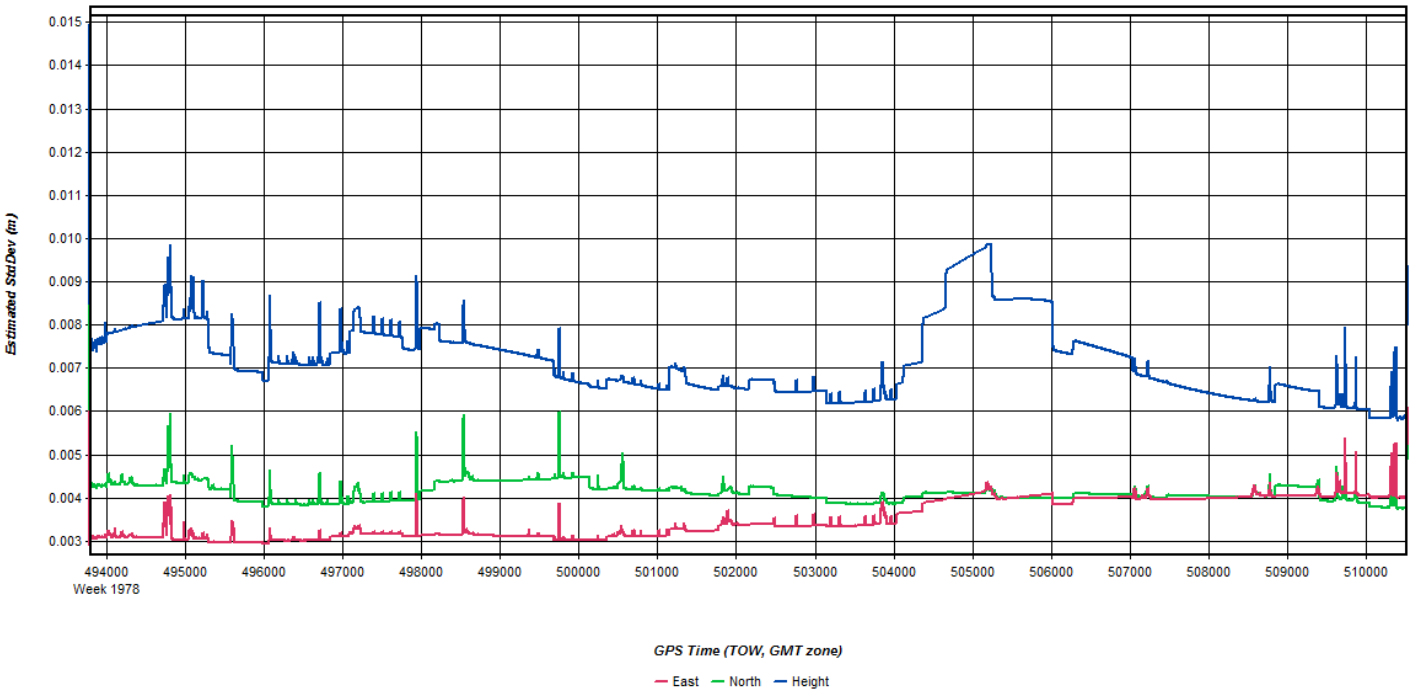

Roll & pitch (deg)
25
20
15
10
5
0
-5
-10
-15
-20
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
Roll
Pitch


RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
RMS
SD

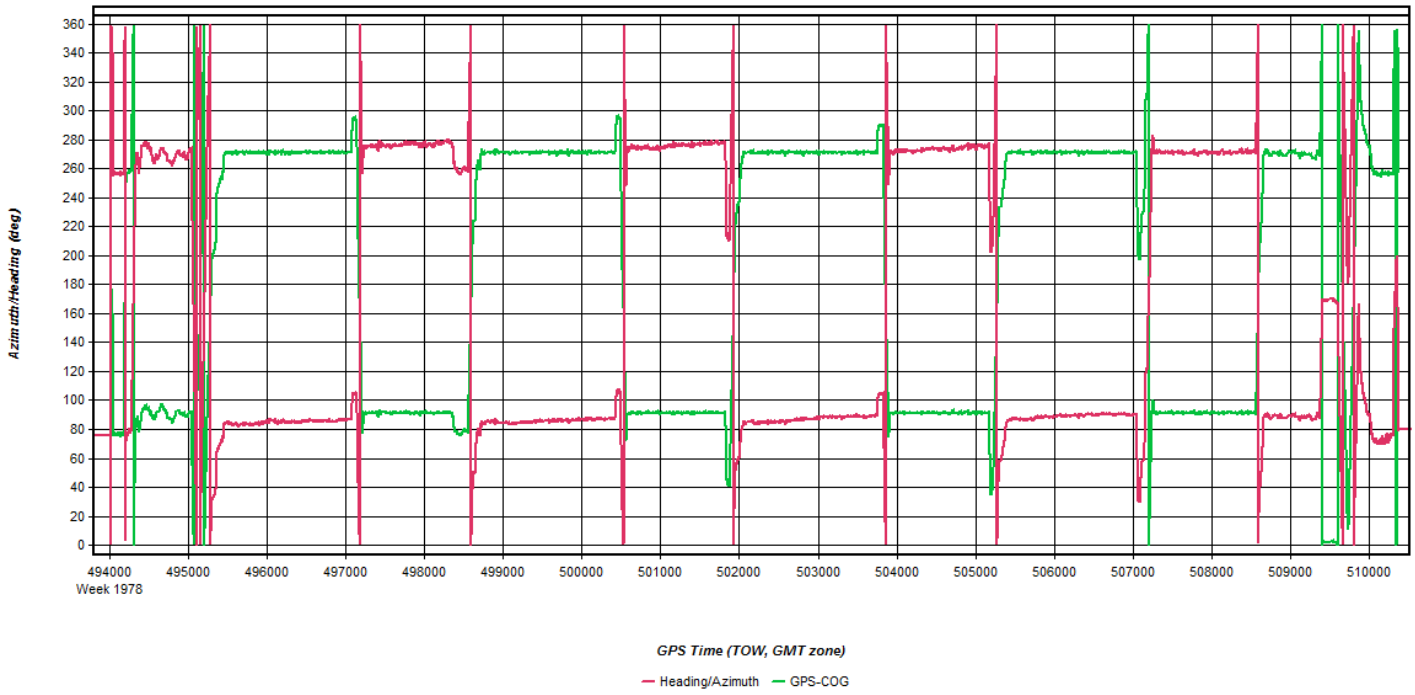

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
Height

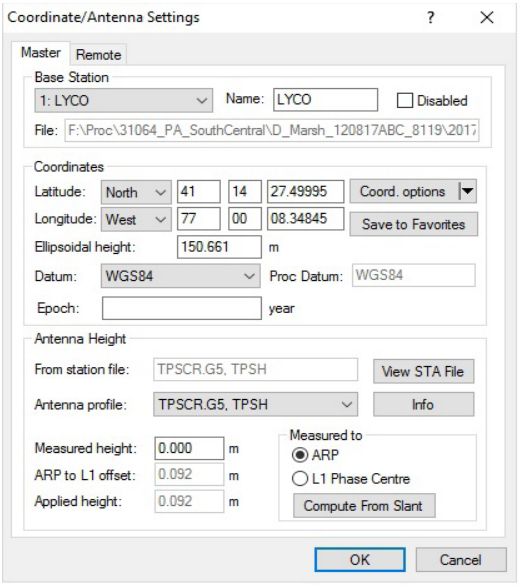

Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.05
0.04
0.03
0.02
0.01
-0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
-0.09
-0.10
-0.11
-0.12
-0.13
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.015
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
494000
Week 1978
495000
496000
497000
498000
499000
500000
501000
502000
503000
504000
505000
506000
507000
508000
509000
510000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_120817ABC_8119\2017
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aeronautics
LIDAR FLIGHT REPORT

Revised Feb. 2014

CREW	Pilot/Operator: Scott A. & Don M	AIRCRAFT	Tail Number: N916WC
WEATHER	Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: clear. Wind: 3.3 Kts fm 260 Deg		
UTC DATE	12/08/2017 (mm/dd/yy)		
Camera System	8119 (LiDAR S/N)	GPS	Kappa 180 (Source)
Camera Location (Hole)	Fwd (fwd/aft)		

	Time	Location
Start-up	12:05 pm local	Williamsport KIPT Pa
Shut-down	4:47 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

Lens cleaned	
AirPods uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

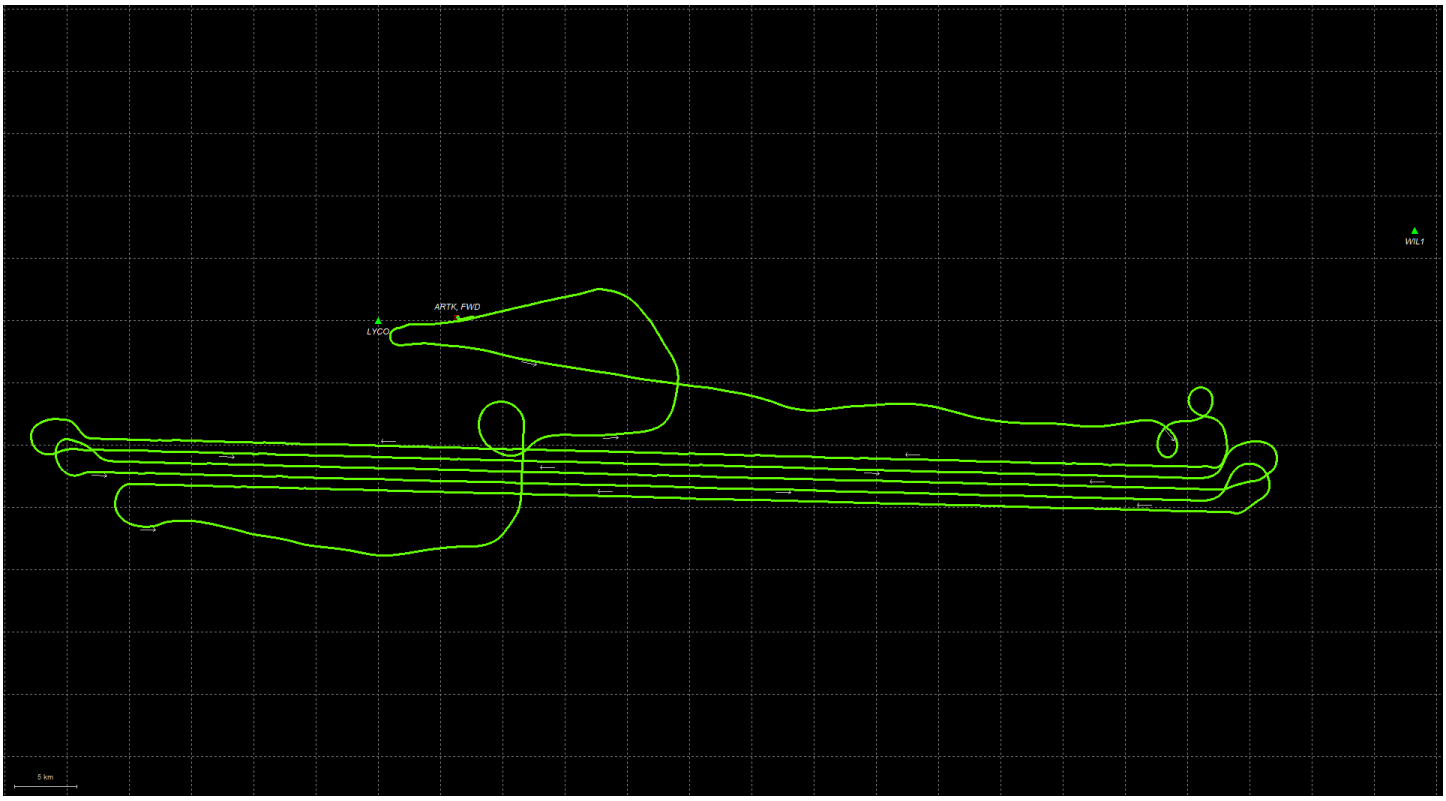
SSD

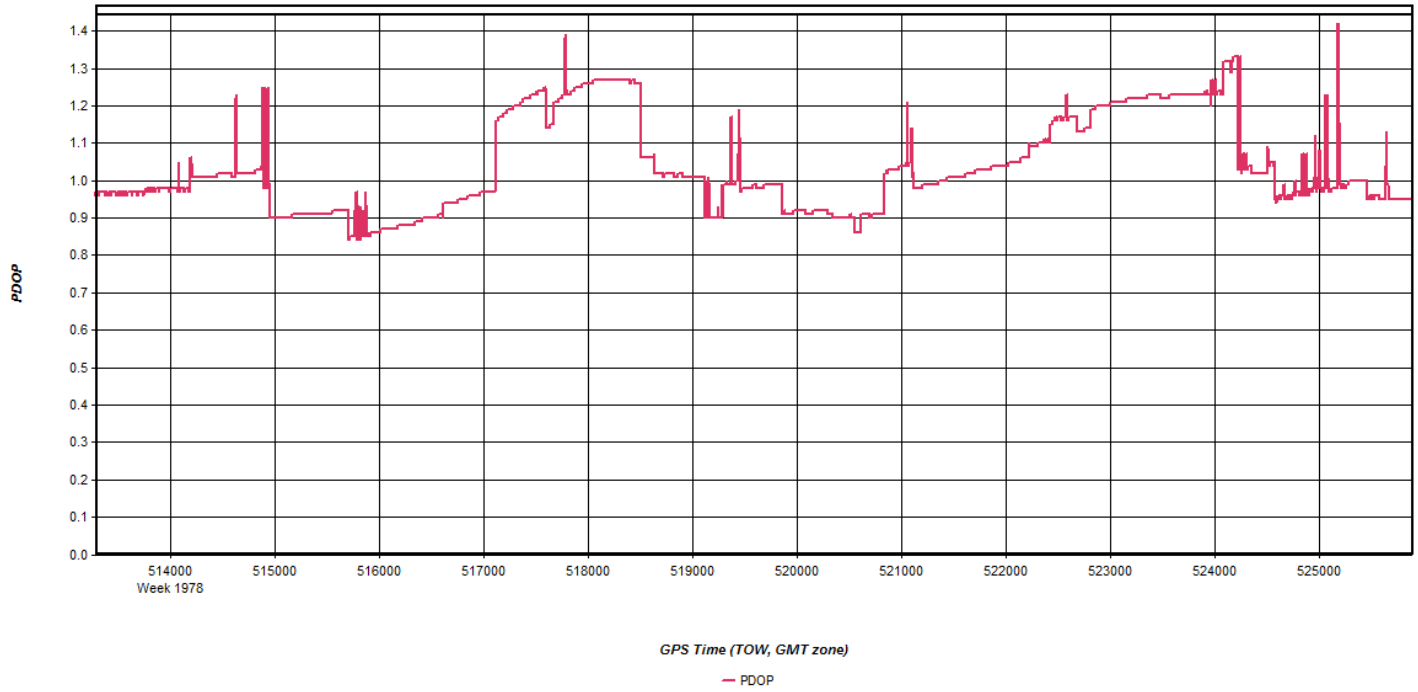
Drive #	8119_3
@ Beginning Space Used	134
During Mission	89
Tot Space Remaining	895

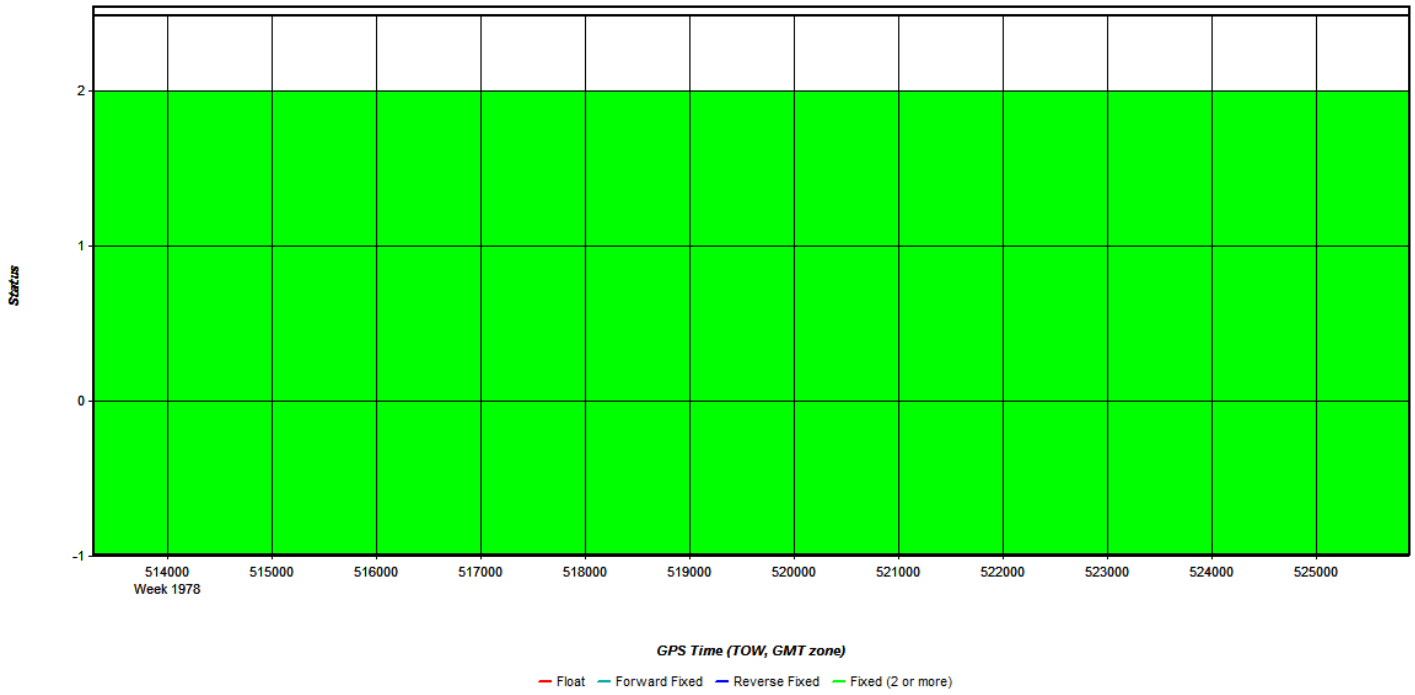
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N049	W		
		N050	E		
		N051	W		
		N052	E		
		N053	W		
		N054	E		
		N055	W		
		N056	E		
		NX03	N		ad-Hoc

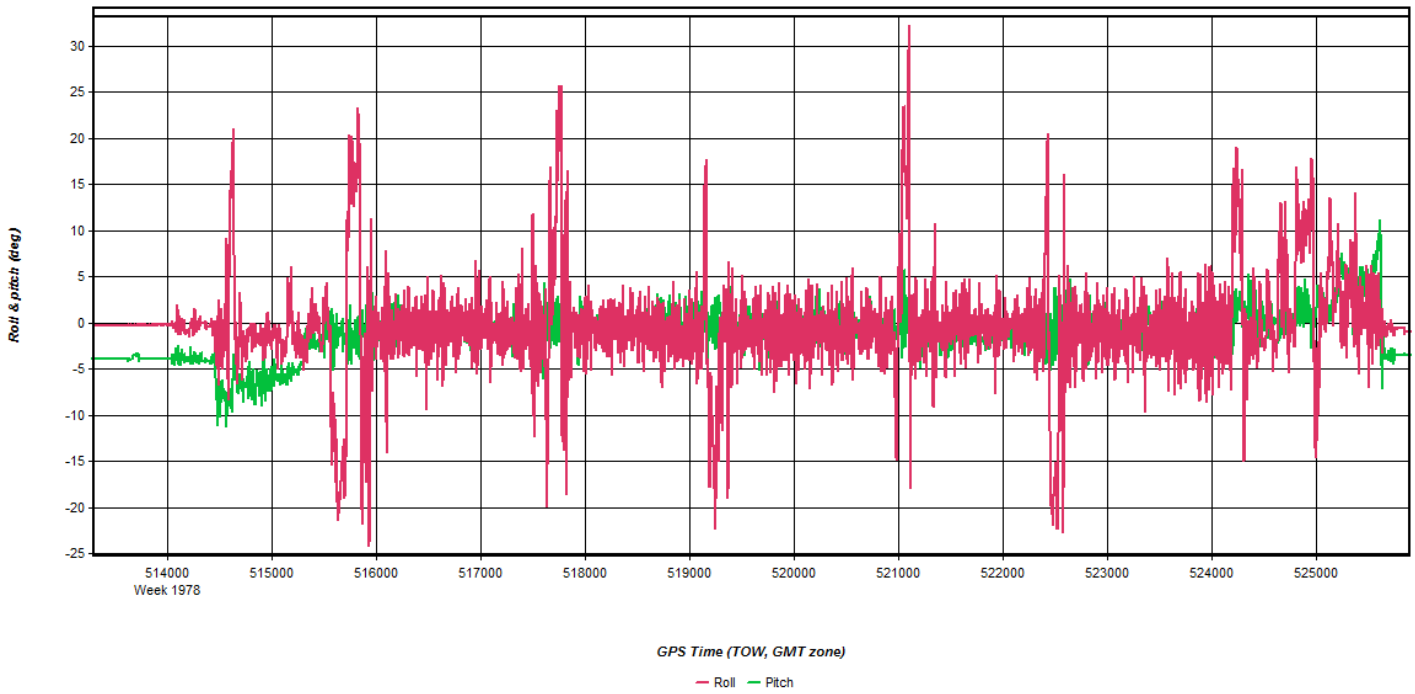
Page 1

December 8, 2017-C (N916WC, SN8119)

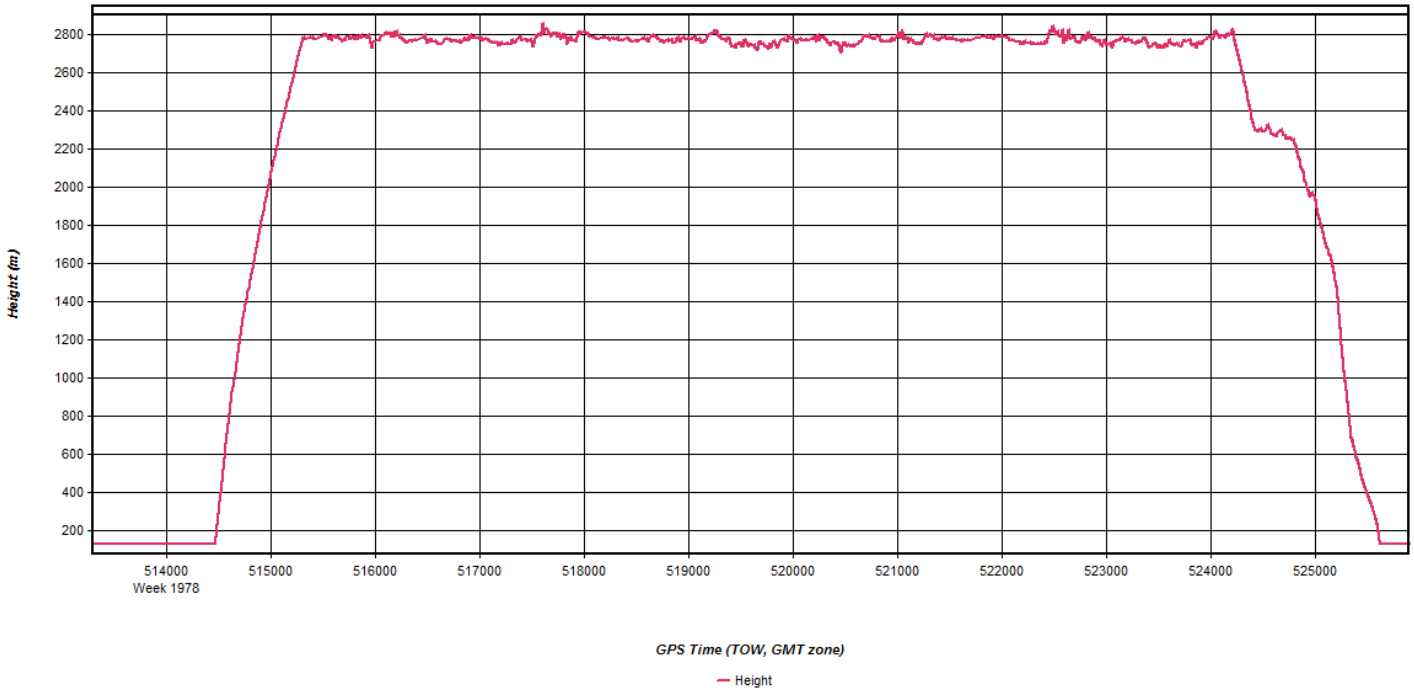

ARTK, FWD
LYCO
WIL1
5 km

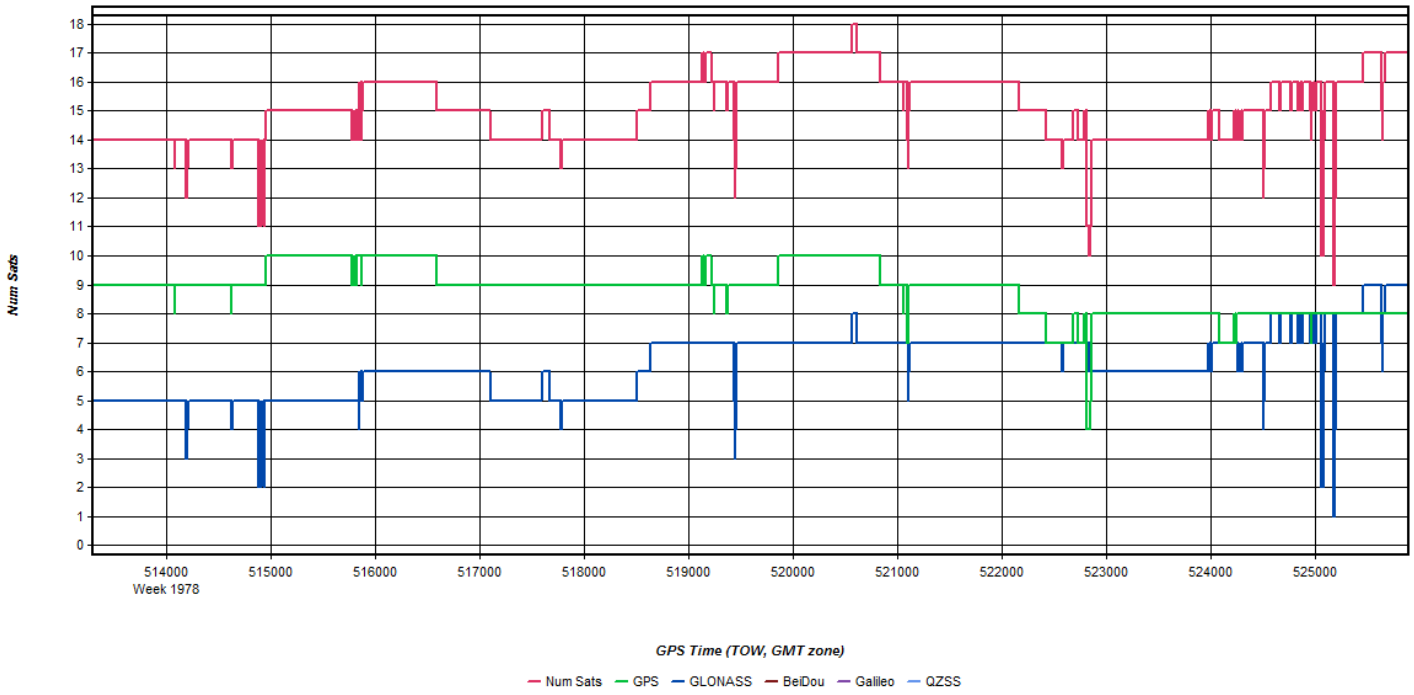

PDOP
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
PDOP

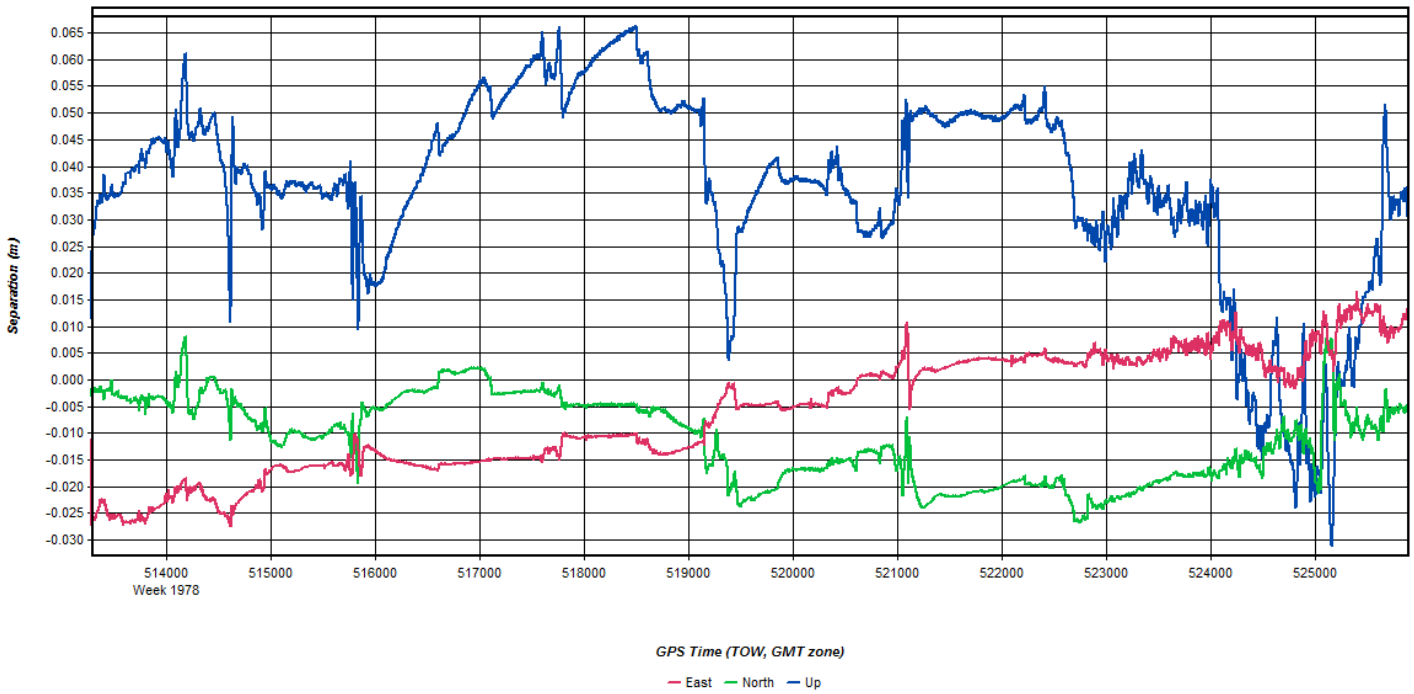

Status
2
1
0
-1
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

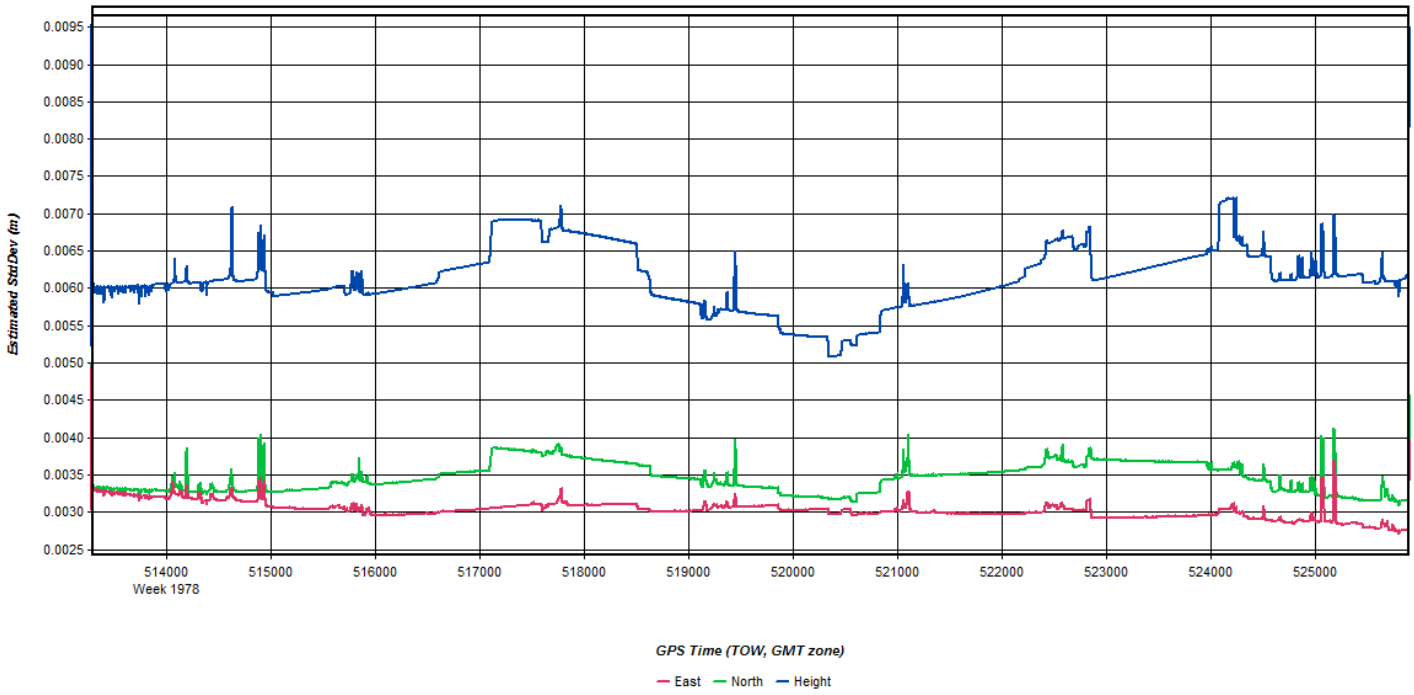

Roll & pitch (deg)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
Roll
Pitch

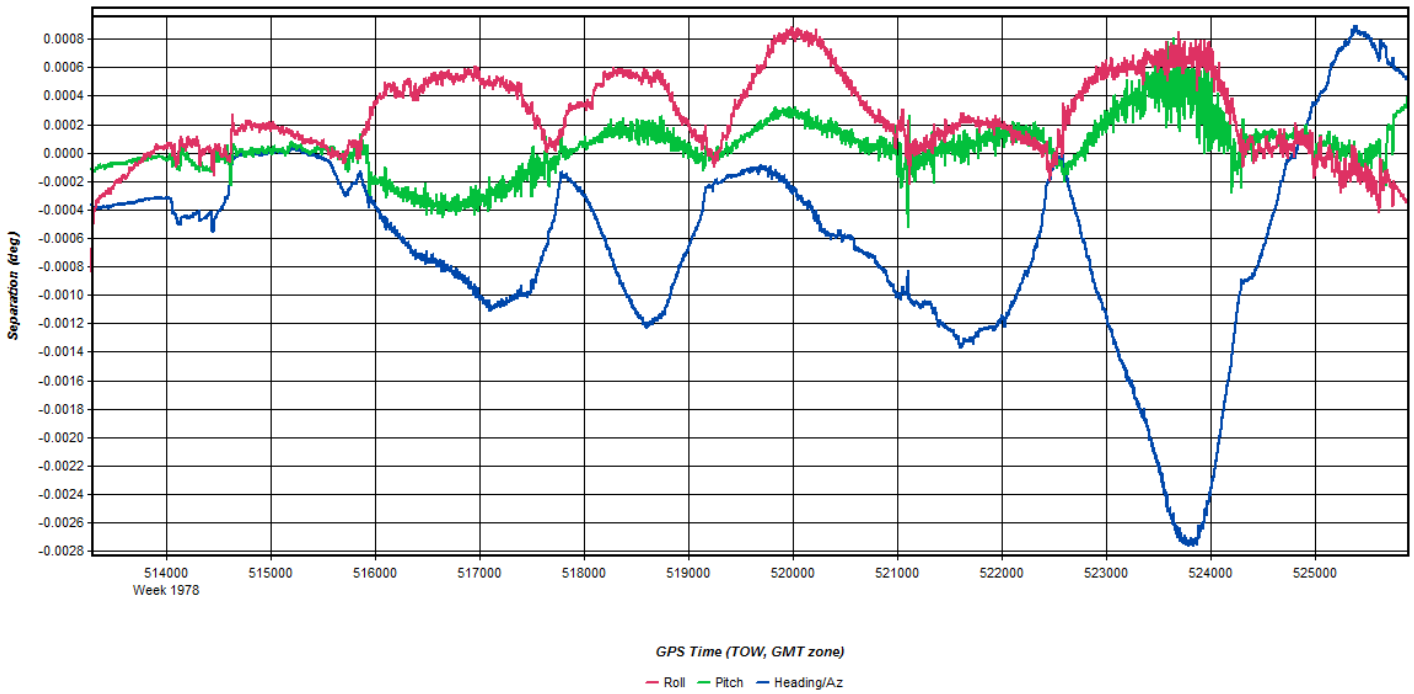

RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
RMS
SD

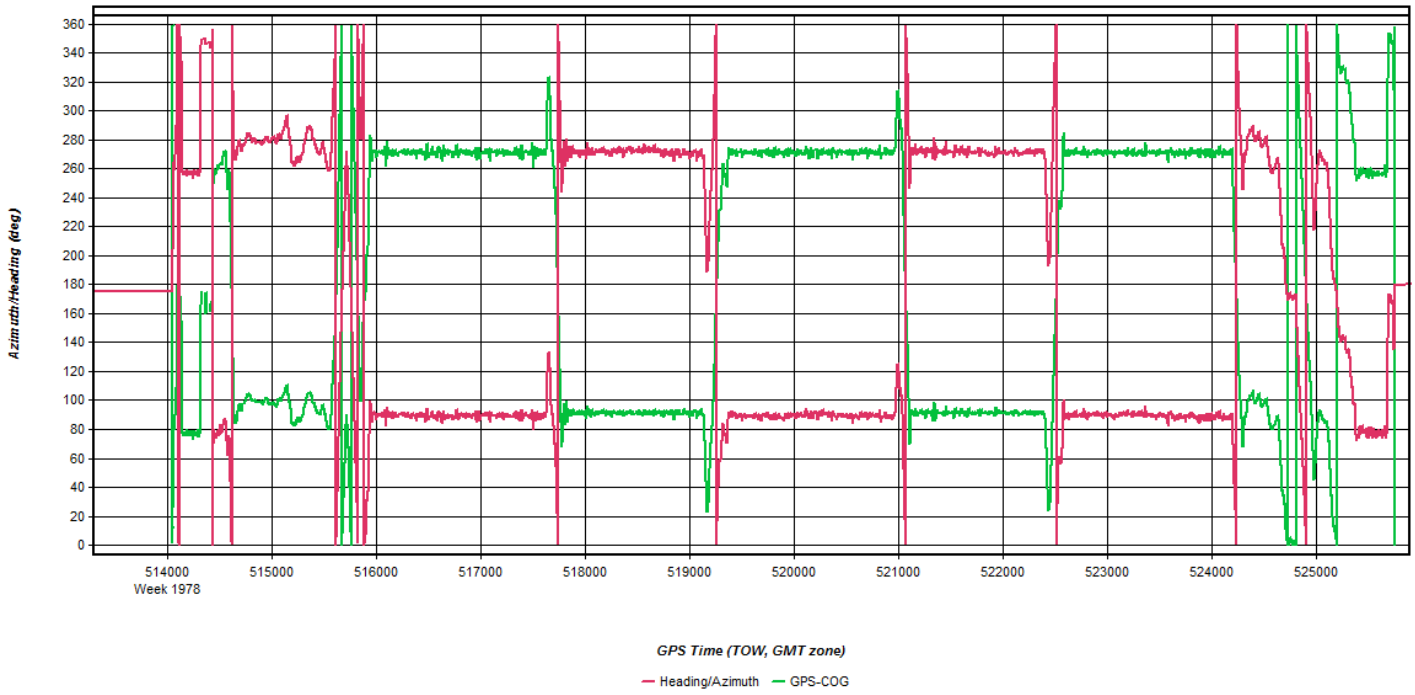

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
Height

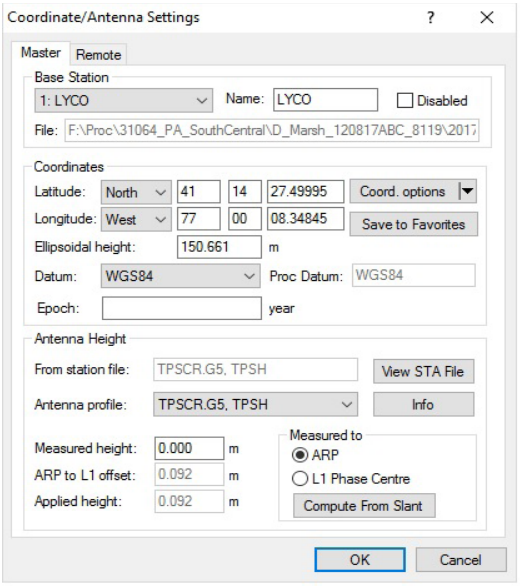

Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS

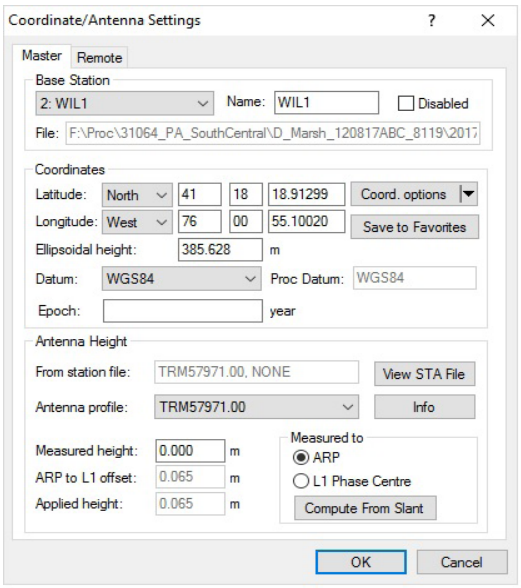

Separation (m)
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
-0.015
-0.020
-0.025
-0.030
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.0095
0.0090
0.0085
0.0080
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0008
0.0006
0.0004
0.0002
0.0000
-0.0002
-0.0004
-0.0006
-0.0008
-0.0010
-0.0012
-0.0014
-0.0016
-0.0018
-0.0020
-0.0022
-0.0024
-0.0026
-0.0028
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
514000
Week 1978
515000
516000
517000
518000
519000
520000
521000
522000
523000
524000
525000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_120817ABC_8119\2017
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel


Coordinate/Antenna Settings
Master
Remote
Base Station
2: WIL1
Name:
WIL1
Disabled
File:
F:\Proc\31064_PA_SouthCentral\D_Marsh_120817ABC_8119\2017
Coordinates
Latitude:
North
41
18
18.91299
Coord. options
Longitude:
West
76
00
55.10020
Save to Favorites
Ellipsoidal height:
385.628
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

Flight Log

LiDAR

KeyW Aerotrio
LIDAR FLIGHT REPORT

Revised Feb. 2014

Pilot/Operator: Ernie Q. & Don M | Tail Number: N916WC | AIRCRAFT | WEATHER: Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc.: clear. Wind: 2.3 Kts fm: 272 Deg

CREW | UTC DATE: 12/08/2017 (mm/dd/yy)

Camera System: LiDAR S/N: 8119 | fwd/aft: Fwd

Camera Location (Hole):

GPS: Source: Kappa 180

	Time	Location
Start-up	5:30 pm local	Williamsport KIPT Pa
Shut-down	9:02 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

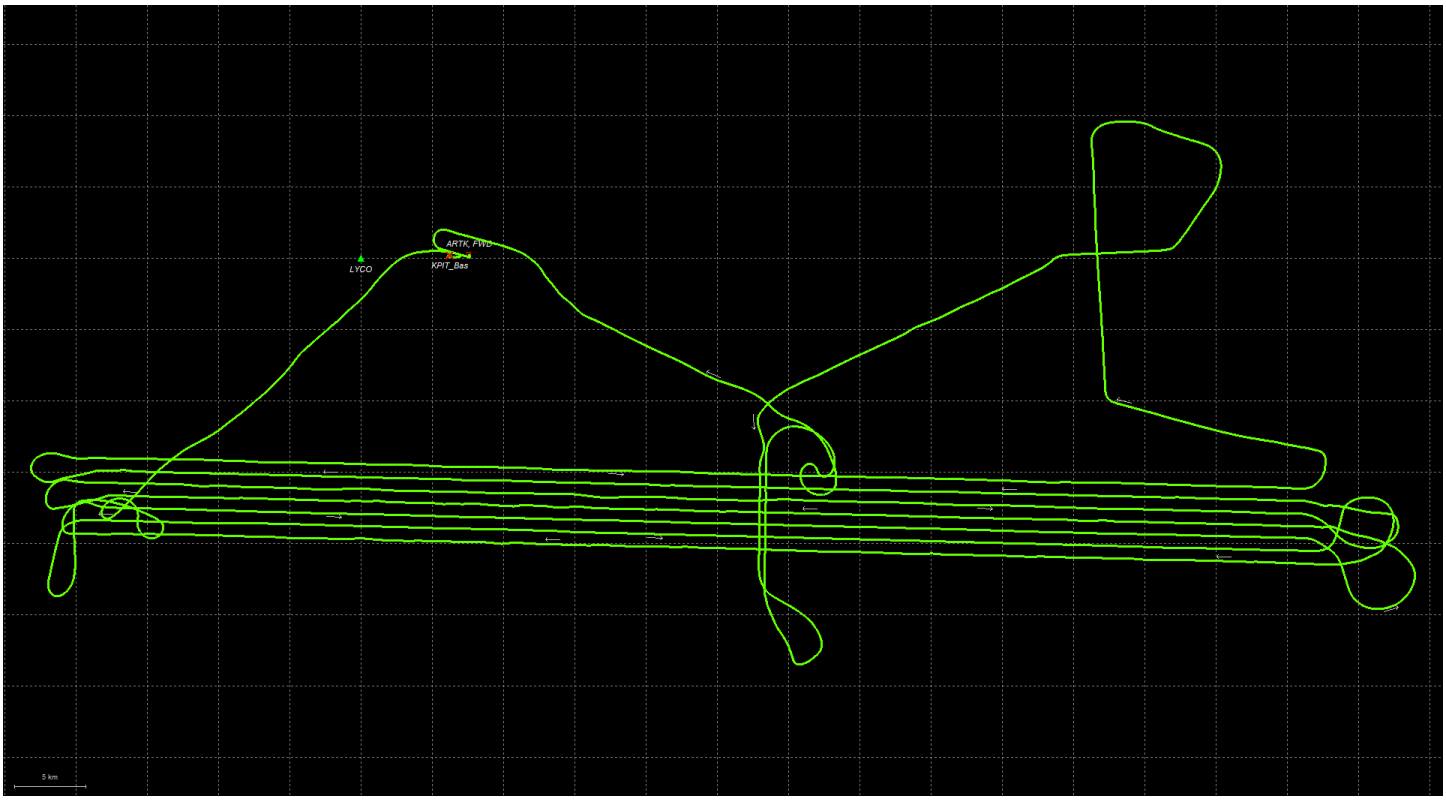
Lens cleaned	
AITpds uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	☑
Initials:	DM

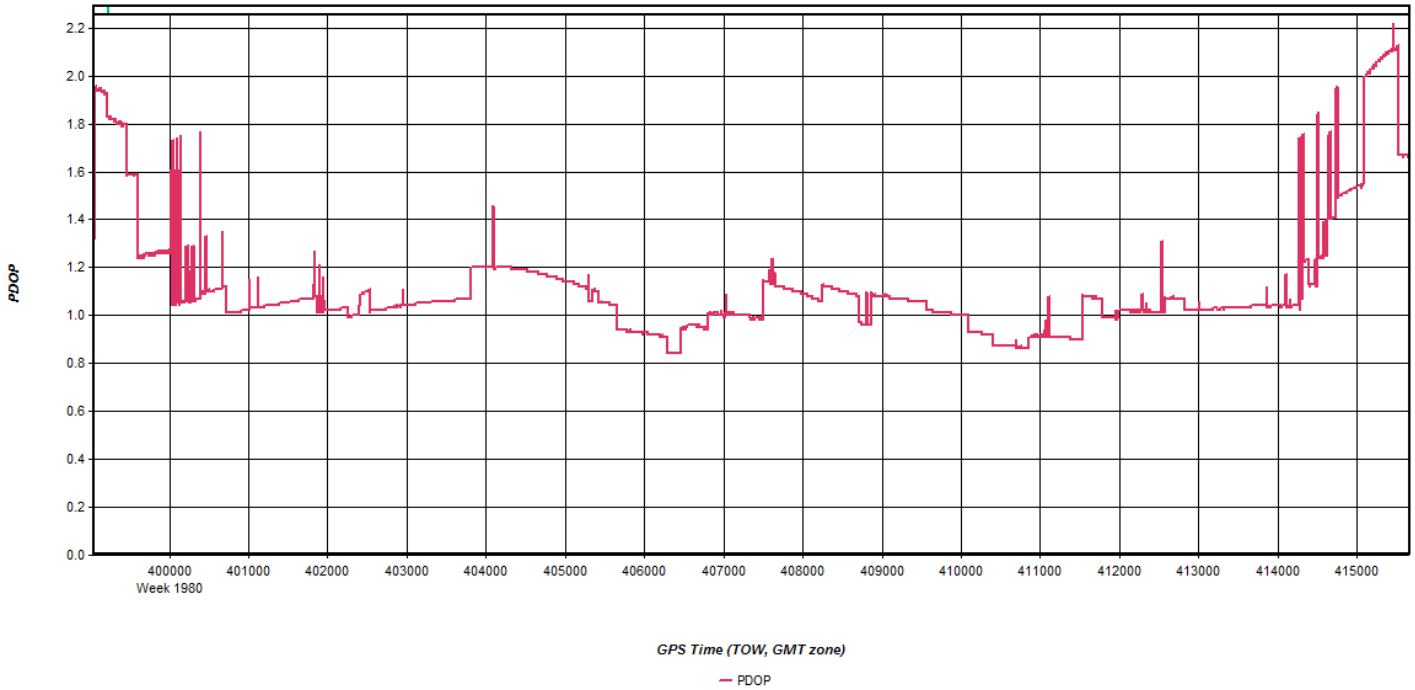
SSD

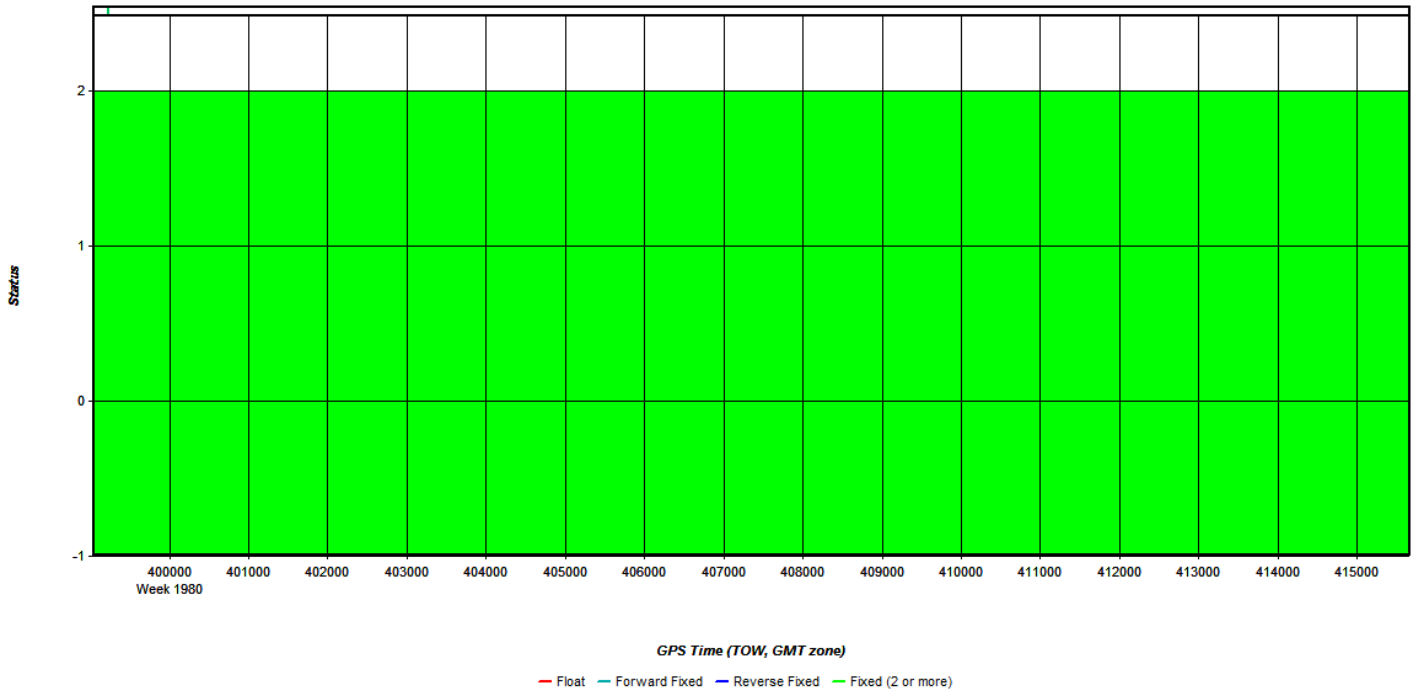
Drive #	8119_3
@ Beginning	
Space Used	223
During Mission	90
Space Used	
Remaining Tot Space	805

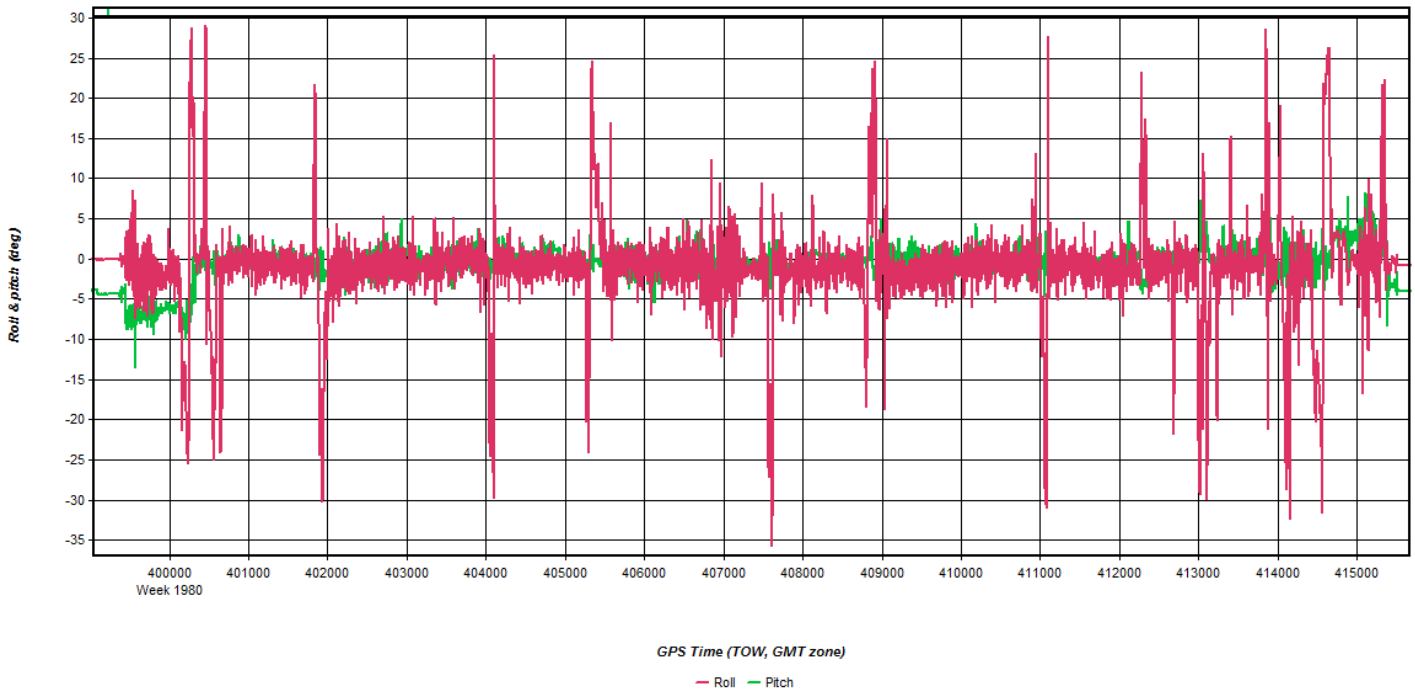
Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N057	W		
		N058	E		
		N059	W		
		N060	E		
		N061	W		
		NX03	N		ad-Hoc

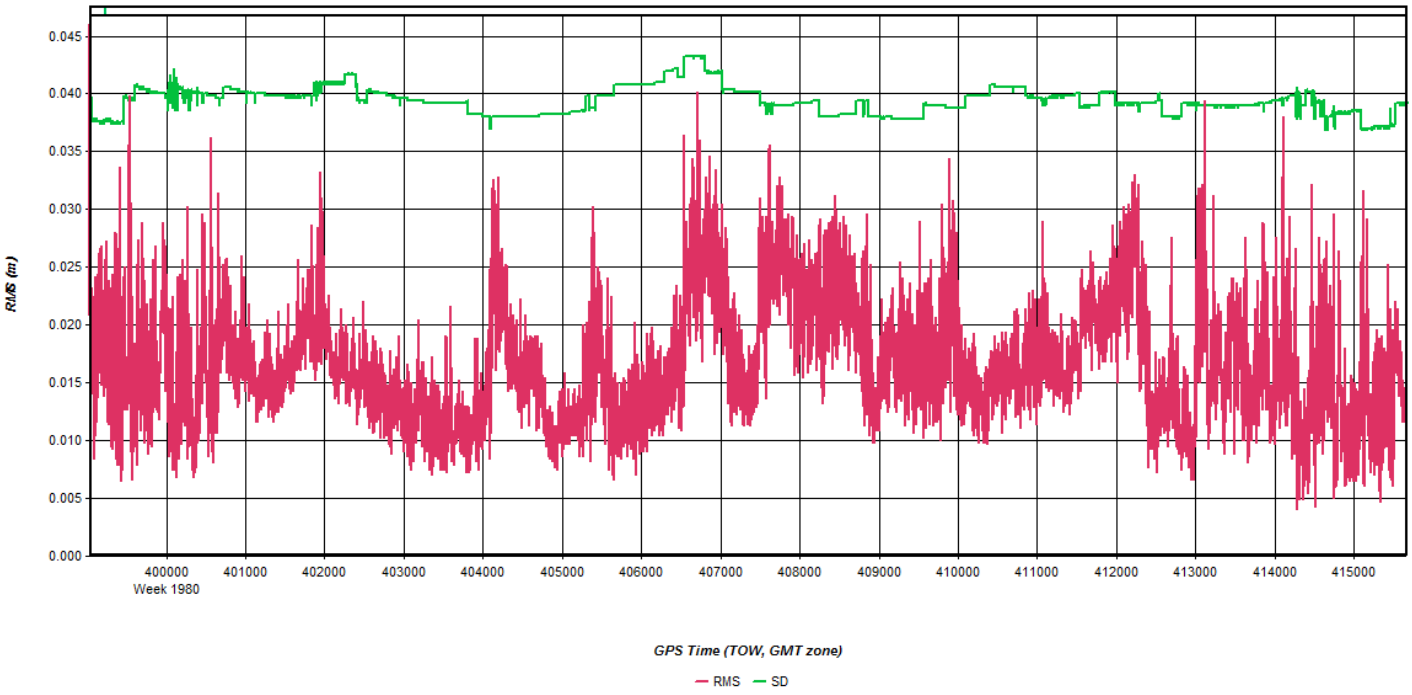
December 21, 2017-A (N916WC, SN8119)

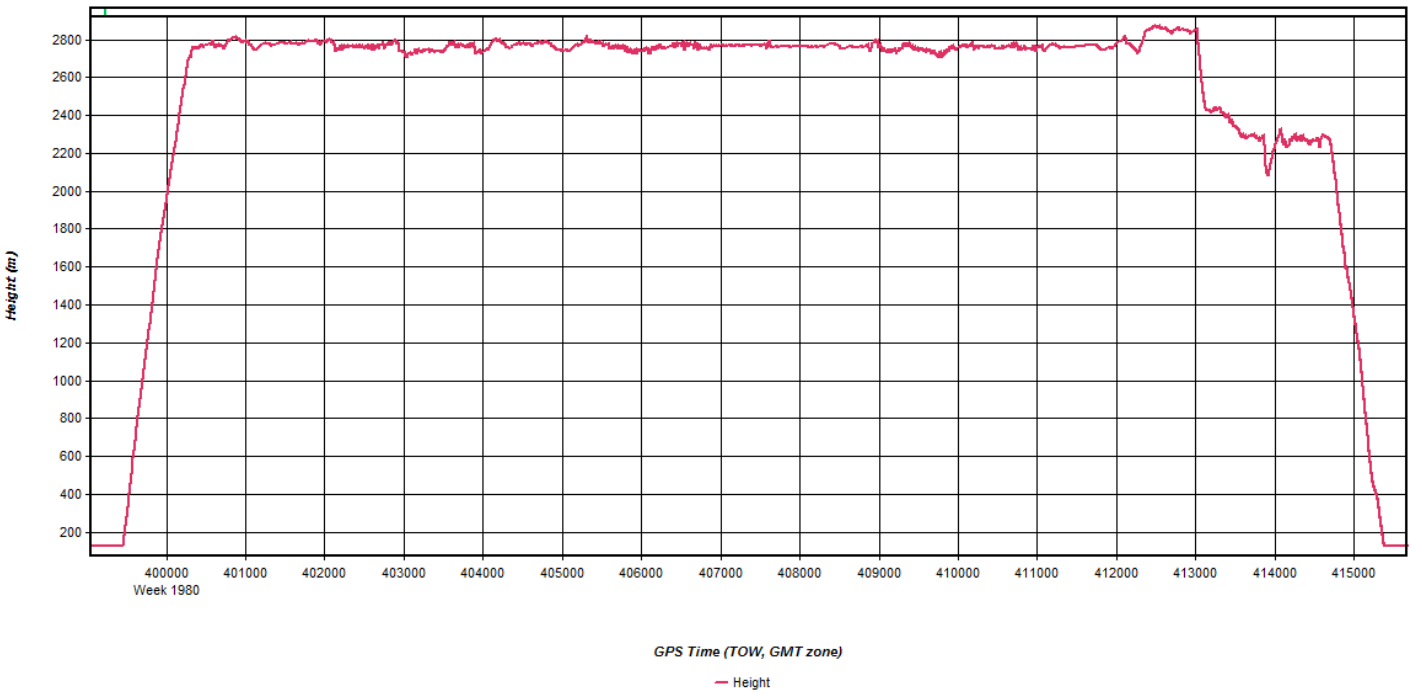

ARTK_FIXD
KPIT_Bas
LYCO
5 km

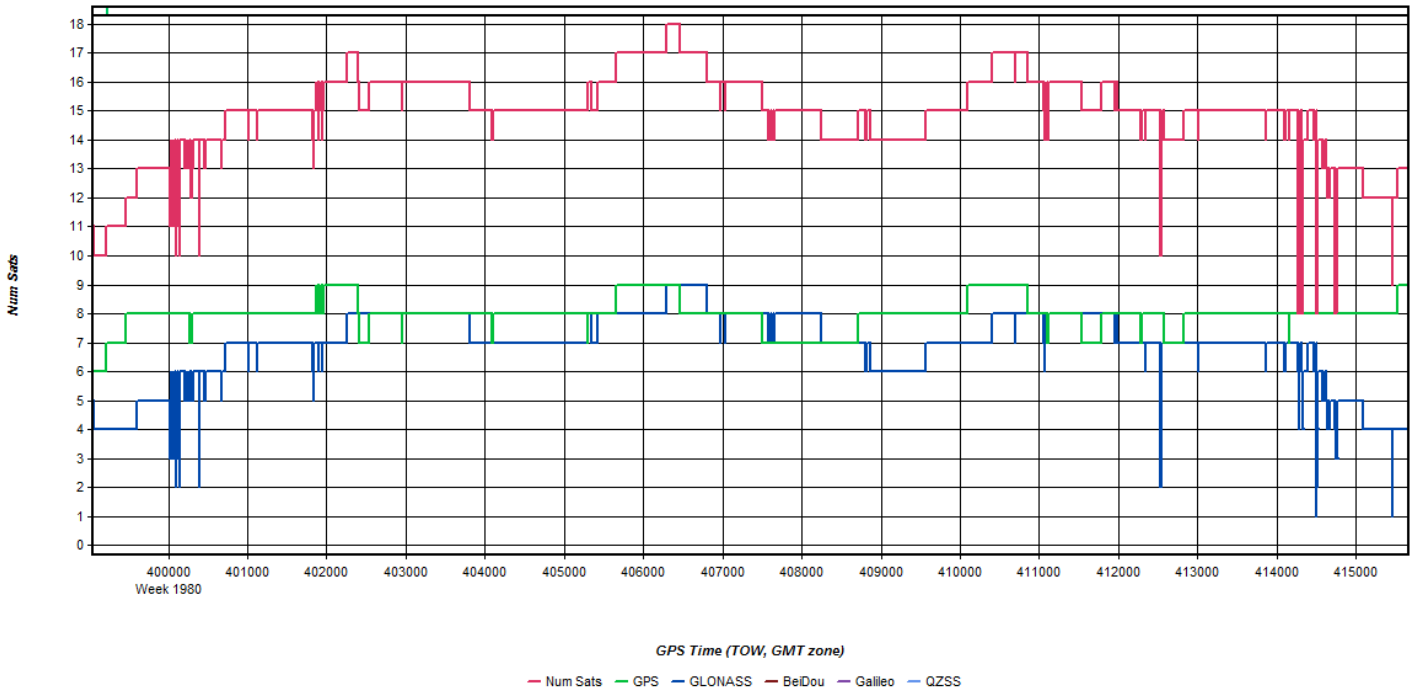

PDOP
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
PDOP


Status
2
1
0
-1
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
Float
Forward Fixed
Reverse Fixed
Fixed (2 or more)

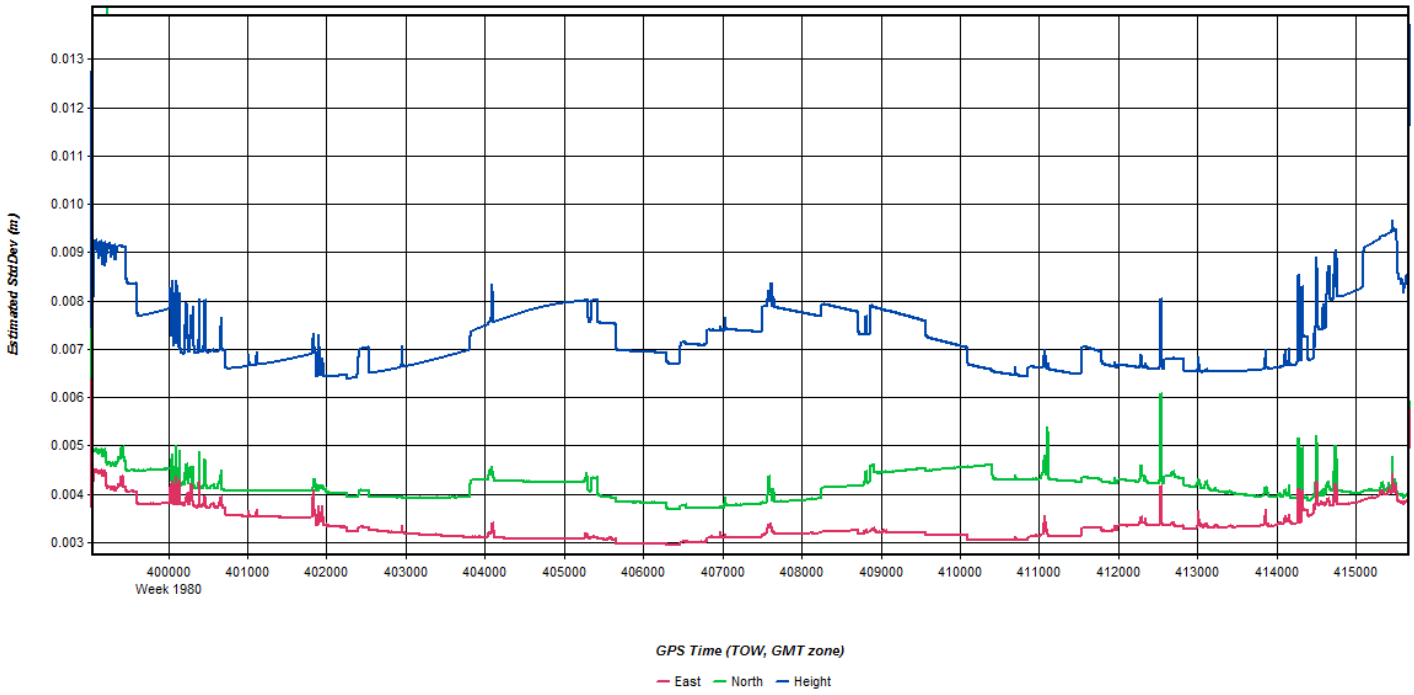

Roll & pitch (deg)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
Roll
Pitch

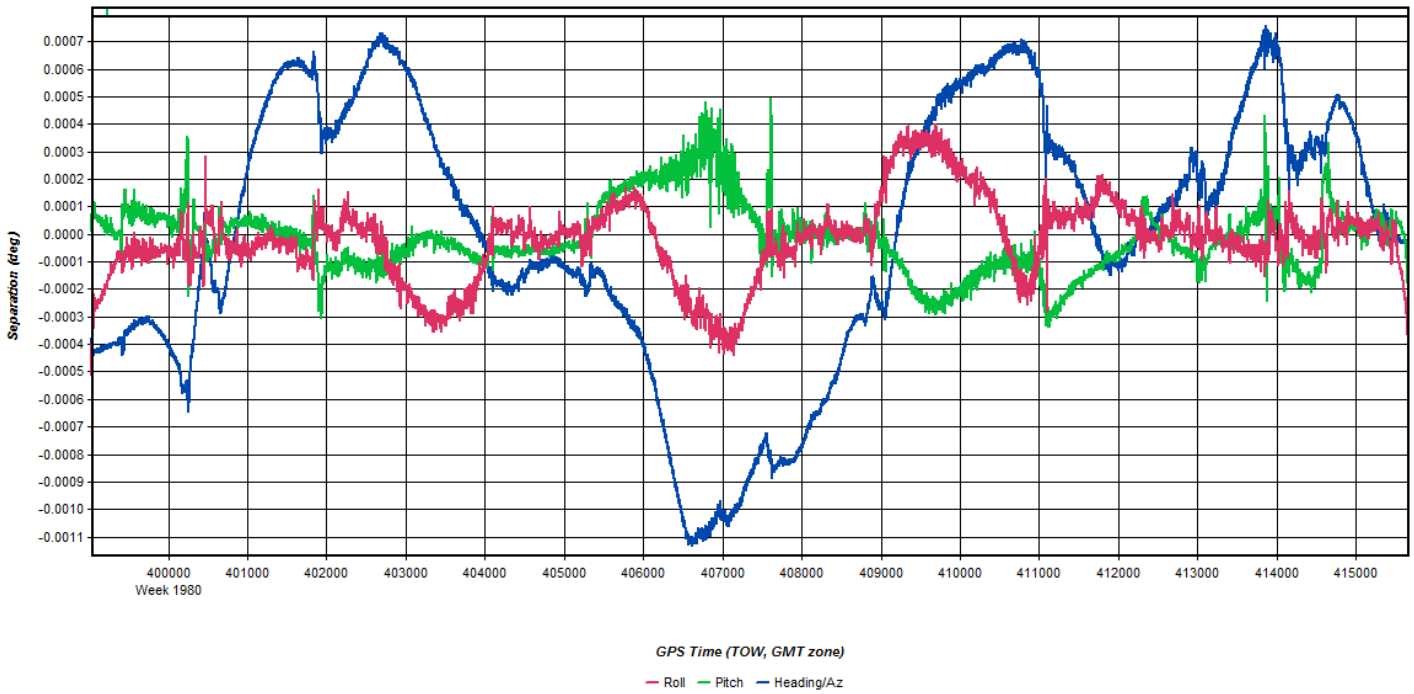

RMS (m)
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
RMS
SD

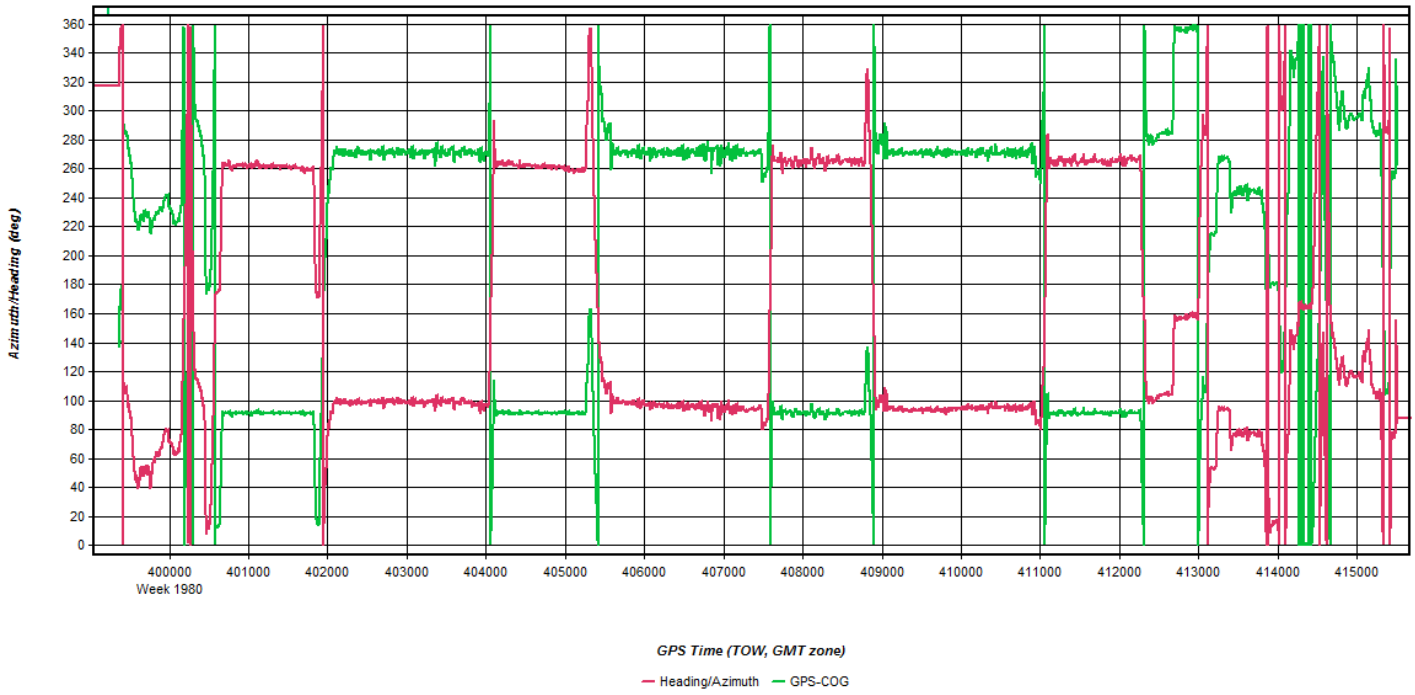

Height (m)
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
Height

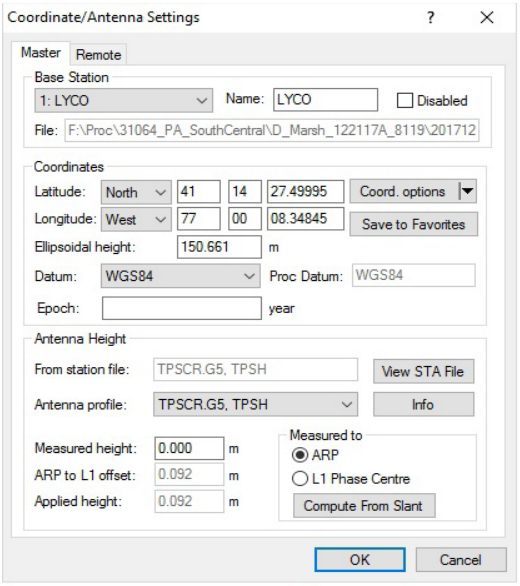

Num Sats
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
Num Sats
GPS
GLONASS
BeiDou
Galileo
QZSS


Separation (m)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
East
North
Up


Estimated StdDev (m)
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
East
North
Height


Separation (deg)
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
-0.0001
-0.0002
-0.0003
-0.0004
-0.0005
-0.0006
-0.0007
-0.0008
-0.0009
-0.0010
-0.0011
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
Roll
Pitch
Heading/Az


Azimuth/Heading (deg)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
400000
Week 1980
401000
402000
403000
404000
405000
406000
407000
408000
409000
410000
411000
412000
413000
414000
415000
GPS Time (TOW, GMT zone)
Heading/Azimuth
GPS-COG


Coordinate/Antenna Settings
Master
Remote
Base Station
1: LYCO
Name: LYCO
Disabled
File: F:\Proc\31064_PA_SouthCentral\D_Marsh_122117A_8119\201712
Coordinates
Latitude: North 41 14 27.49995
Coord. options
Longitude: West 77 00 08.34845
Save to Favorites
Ellipsoidal height: 150.661 m
Datum: WGS84
Proc Datum: WGS84
Epoch: year
Antenna Height
From station file: TPSCR.G5, TPSH
View STA File
Antenna profile: TPSCR.G5, TPSH
Info
Measured height: 0.000 m
ARP to L1 offset: 0.092 m
Applied height: 0.092 m
Measured to
ARP
L1 Phase Centre
Compute From Slant
OK
Cancel

Flight Log

LiDAR

KeyW Aerotrac
LIDAR FLIGHT REPORT

Revised Feb. 2014

CREW	Pilot/Operator Chris H & Greg M	AIRCRAFT	Tail Number N916WC	WEATHER	Sky conditions, light conditions, horizon, shadowing, visibility/haze, cloud types, wind, turbulence, etc. clear.
UTC DATE	12/21/2017 mm/dd/yy				

	LiDAR S/N	GPS	Source
Camera System	8119		Kappa 180
Camera Location (Hole)	fwd/aft Fwd		

	Time	Location
Start-up	9:50 am local	Williamsport KIPT Pa
Shut-down	2:30 pm Local	Williamsport KIPT Pa

LIDAR STARTUP CHECKS

Lens cleaned	
AirPods uploaded	☑
Pilot's screen functional	☑
Compact flash drive space	☑
SSDs have space	☑
Startup beeps & IPAS recording	
Initials:	DM

SSD

Drive #	8119_4
@ Beginning Space Used	unk
Space Used During Mission	80
Remaining Tot Space	unk

Job #	Location/ Site/Block	Line #	Flight Dir.	Crab Angle	Remarks
3DEP	N	N067	E		
		N068	W		
		N066	E		
		N065	W		
		N064	E		
		N063	W		
		N062	E		
		E007	N		
		EX01	E		
		NX03b	N		
		NX03b	S		
					Note that GPS base data from this mission is not yet available...

Page 1

Appendix B

Survey Report

January 9th 2018

SURVEY REPORT OF

LIDAR CALIBRATION & QUALITY CONTROL POINTS

USGS Contract: G16PC00016

PA_South_Central_2017_D17

USGS Task Order: G17PD01254

Presented to:

USGS
science for a changing world

Submitted to:
Quantum Spatial, Inc.
10033 MLK Street North, Suite200
St. Petersburg, FL 33716
(407) 595-5518

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- VVA-Brushland Points……....14

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Appendixes

Appendix A.....Calibration Point Log Sheets

Appendix B.....NVA-Bare Earth Point Log Sheets

Appendix C.....NVA-Urban Area Point Log Sheets

Appendix D.....VVA-Tall Weed Point Log Sheets

Appendix E.....VVA-Forest Point Log Sheets

Appendix F.....VVA-Brushland Point Log Sheets

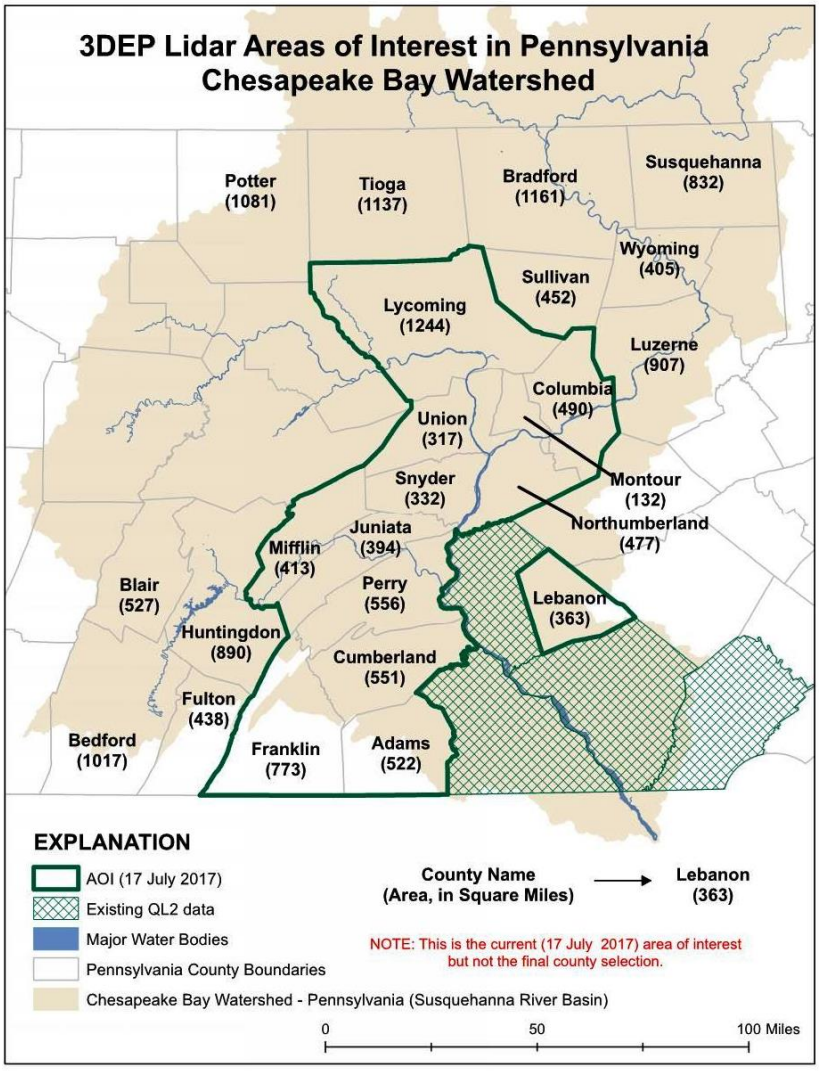
Appendix G.....Digital Data on DVD

Introduction

Quantum Spatial, Inc. was contracted by USGS under task order G17PD01254 to Survey LiDAR calibration and quality control points in support of PA_South_Central_2017_D17. Johnson, Mirmiran, and Thompson, Inc. was sub-contracted by Quantum Spatial, Inc. to provide field surveying services for the establishment of LiDAR calibration and quality control points. This is the report of the procedures used and individual data.

Project Area

The Area of Interest (AOI's), shown in the figure below, consists of approximately 6,564 square miles.


3DEP Lidar Areas of Interest in Pennsylvania
Chesapeake Bay Watershed
Potter (1081)
Tioga (1137)
Bradford (1161)
Susquehanna (832)
Wyoming (405)
Sullivan (452)
Lycoming (1244)
Luzerne (907)
Columbia (490)
Union (317)
Snyder (332)
Montour (132)
Northumberland (477)
Juniata (394)
Mifflin (413)
Perry (556)
Blair (527)
Lebanon (363)
Huntingdon (890)
Cumberland (551)
Fulton (438)
Bedford (1017)
Franklin (773)
Adams (522)
EXPLANATION
AOI (17 July 2017)
Existing QL2 data
Major Water Bodies
Pennsylvania County Boundaries
Chesapeake Bay Watershed - Pennsylvania (Susquehanna River Basin)
County Name
(Area, in Square Miles)
Lebanon
(363)
NOTE: This is the current (17 July 2017) area of interest
but not the final county selection.
0
50
100 Miles

Technical Approach to Land Cover Validation Point Selection

Referencing ASPRS Positional Accuracy Standards for Digital Geospatial Data (Edition 1, Version 1.0, - November 2014) table C.1 Recommended Number of Checkpoints based on Area, Quantum Spatial calculated that 292 Non-Vegetated Vertical Assessment (NVA) and 103 Vegetated Vertical Assessment (VVA) points were required for this project area. A total of 395 points within approximately 6,564 square miles were located.

To ensure that checkpoints were distributed generally proportionate among the various vegetated land cover types, Quantum Spatial used existing USGS Land Cover data to divide both the NVA and VVA categories among the various types, calculating the approximate number of required points in each representative type proportionate to the total project area. The resulting point classes are detailed below:

NVA Class	# of Points
Bare Earth	87
Urban Area	55
Calibration	150
	292

VVA Class	# of Points
Forested	61
Tall Weeds/Crops	39
Brushland/Trees	3
	103

Quantum Spatial has adopted the philosophy that each vegetative class must be well distributed throughout the project area. While points in varying classes may be near to one another, points of a single vegetative class may not. Proposed point locations are selected with this distribution methodology in mind.

Survey Accuracy Requirements

Given that the survey accuracy of calibration and quality control check points should be 3 times more accurate than the required accuracy of the data set, Quantum Spatial requires that calibration and NVA points are better than 3 centimeters RMSE, both horizontally and vertically, and that VVA points be better than 5 centimeters RMSE, both horizontally and vertically. The surveyed accuracy of each point must be determined through redundant measurements and/or network adjustment using procedures and methodologies that reliably and consistently result in the accuracies.

Due to variances in reference control accuracy and adjustment, Quantum Spatial requires that the survey methodology used be explained, so that it can be repeated if necessary.

Field Survey Methodology

Date Range: October 24, 2017-December 22, 2017

Equipment Used:

Field crews used Trimble R6 and R8 dual frequency GNSS receivers as base stations and rovers.

GNSS Methodology:

A combination of GNSS RTN (KeyNET), fast static GPS and traditional surveying methods were used during this project. The GNSS RTN consisted of two (2) occupations for a duration of 180 epochs per point at least 4 hours apart for redundant checks. The fast-static GPS method consisted of collecting a minimum 30 minutes of static data which was downloaded and processed using NGS "OPUS" (Online Positioning User Service).

In areas under the tree canopy, traditional surveying methods were used. Pairs of points were collected in open areas using GNSS methods. Multiple observations were collected at each point and the coordinates were compared and averaged. These points were occupied using a total station to survey the forested check points.

All of the GPS RTN information was downloaded and analyzed using Trimble Business Center (TBC) software & Trimble's ASCII File Generator (AFG) "Quality Control Report". TBC provided a report of RMSE values in meters for Horizontal, Vertical & 3D components and the AFG reported any measurements above the input tolerance of 0.09' or 0.16' depending on the checkpoint classification tolerance.

Corpscon v.6.0.1 was used to convert the final adjusted coordinates from State Plane to UTM18.

Overall Project Accuracy Statement

Final averaged values meet or exceed the required tolerances for each classification of check point.

All coordinates have been reported in the North American Datum of 1983 (NAD83/ 2011) and all elevations are relative to the North American Vertical Datum of 1988 (NAVD88) using the Geoid 12B model. Universal Transverse Mercator Zone 18 (UTM18) coordinates are reported in meters for points in the following AOI's: Adams, Cumberland, Franklin, Lebanon, Juniata, Mifflin, Perry, Snyder, Northumberland, Montour, Columbia, Union and Lycoming Counties.

AOI Accuracy Requirements

Calibration Points
Average Horizontal RMSE is 0.010 meter
Average Elevation RMSE is 0.028 meter.
Average 3-dimensional RMSE is 0.004 meter.

NVA Points
Average Horizontal RMSE is 0.015 meter
Average Elevation RMSE is 0.030 meter.
Average 3-dimensional RMSE is 0.004 meter.

VVA Points
Average Horizontal RMSE is 0.018 meter
Average Elevation RMSE is 0.030 meter.
Average 3-dimensional RMSE is 0.009 meter.

AOI Accuracy Tolerances

		Type:	Tolerance:
CA	=	Calibration Point	Better than **0.03 m** (0.098 US FT)
BE	=	Bare Earth Point	Better than **0.03 m** (0.098 US FT)
UA	=	Urban Area Point	Better than **0.03 m** (0.098 US FT)
TW	=	Tall Weed Point	Better than **0.05 m** (0.164 US FT)
FO	=	Forest Point	Better than **0.05 m** (0.164 US FT)
SH	=	Brushland Point	Better than **0.05 m** (0.164 US FT)

Note:
Three (3) place coordinates and elevations herein are used for computational purposes and do not imply a precision beyond two (2) place.

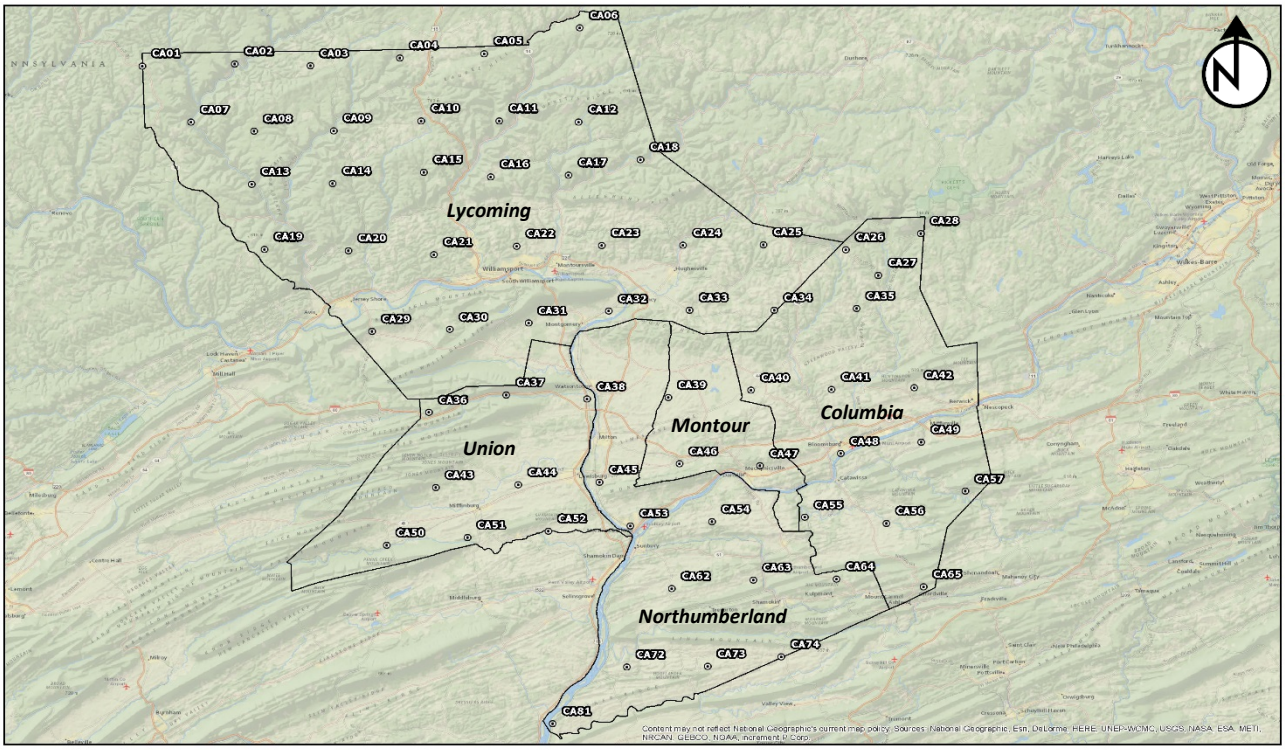
Surveyor's Certification

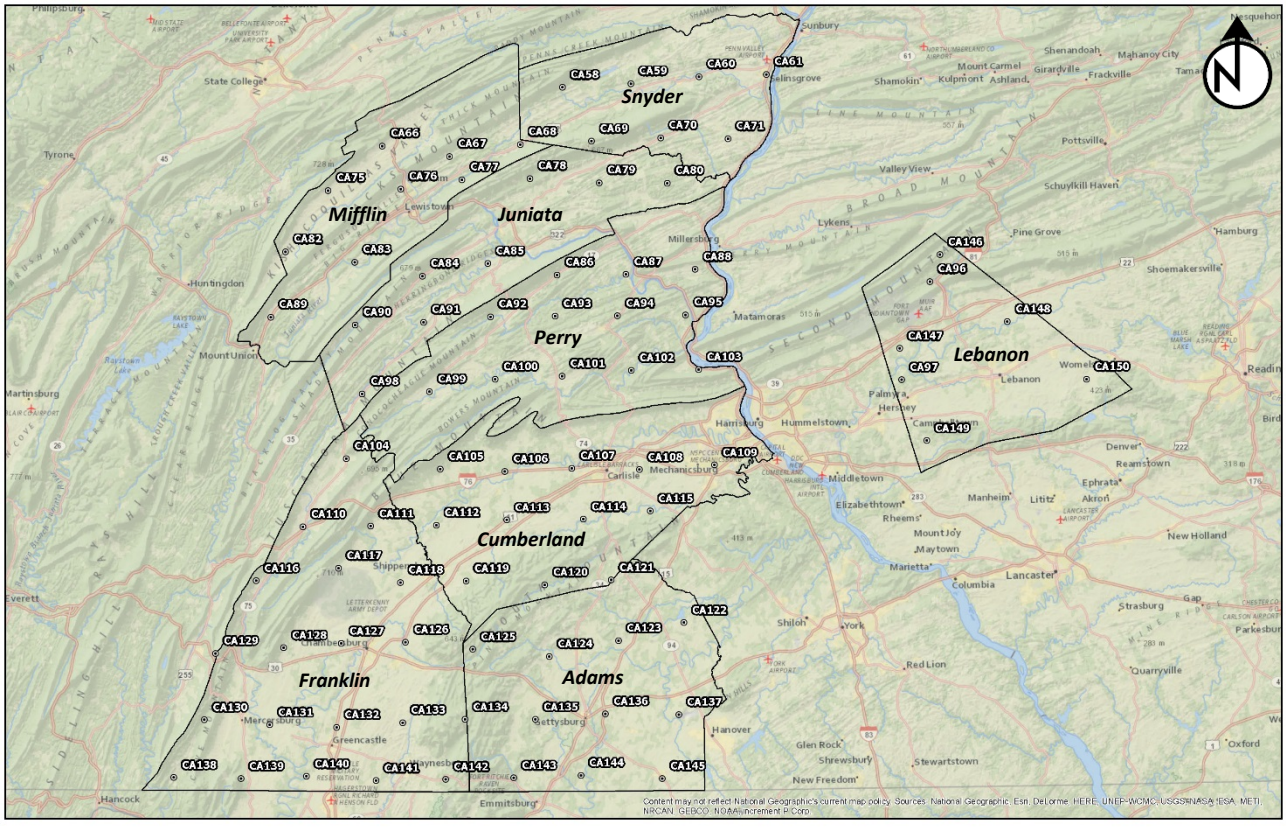
I hereby certify to Quantum Spatial, Inc. that the information contained herein is correct to the best of my knowledge, information and belief and that the survey was completed by acceptable surveying procedures and was completed under my direct supervision.

Thomas E. Farcht Jr., PLS
Johnson, Mirmiran & Thompson, Inc.
SU-037547-E (AGENT)

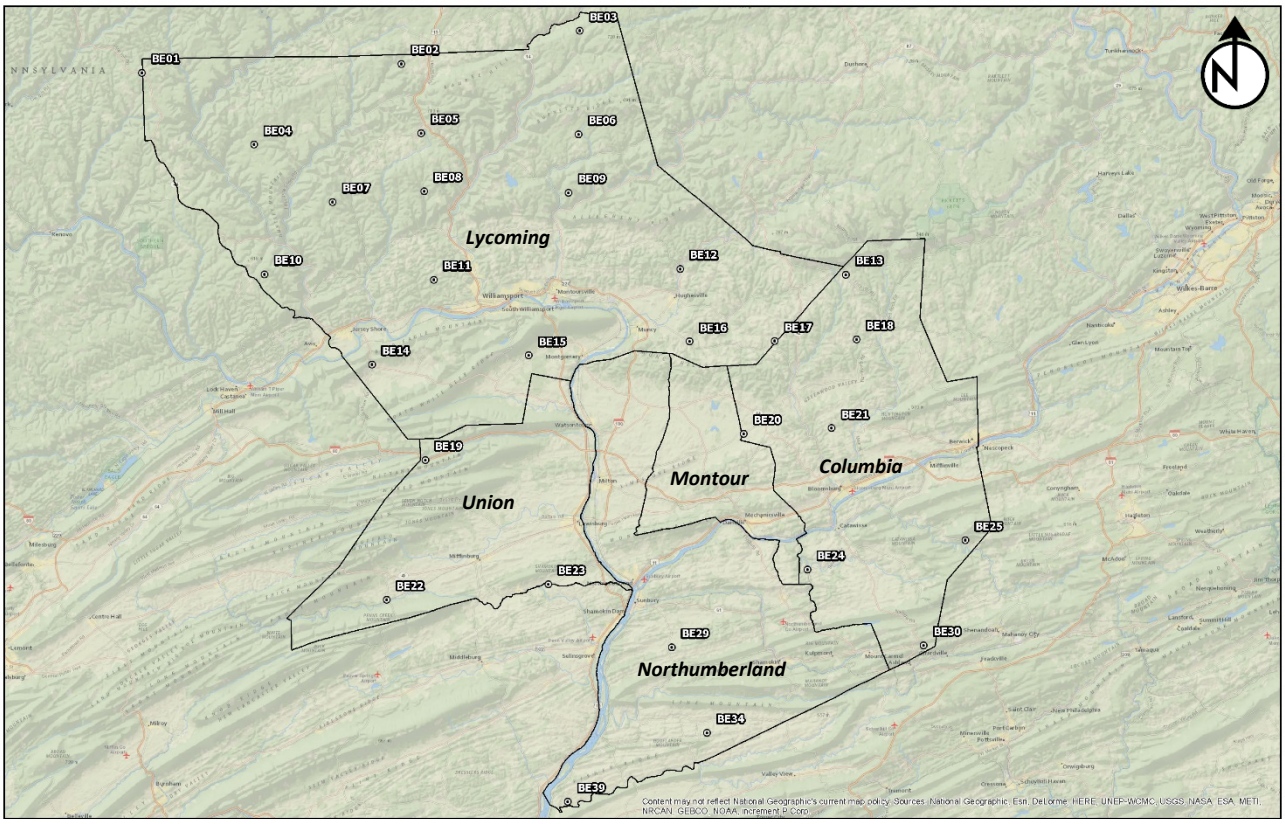
Project AOI & Point: Location Maps

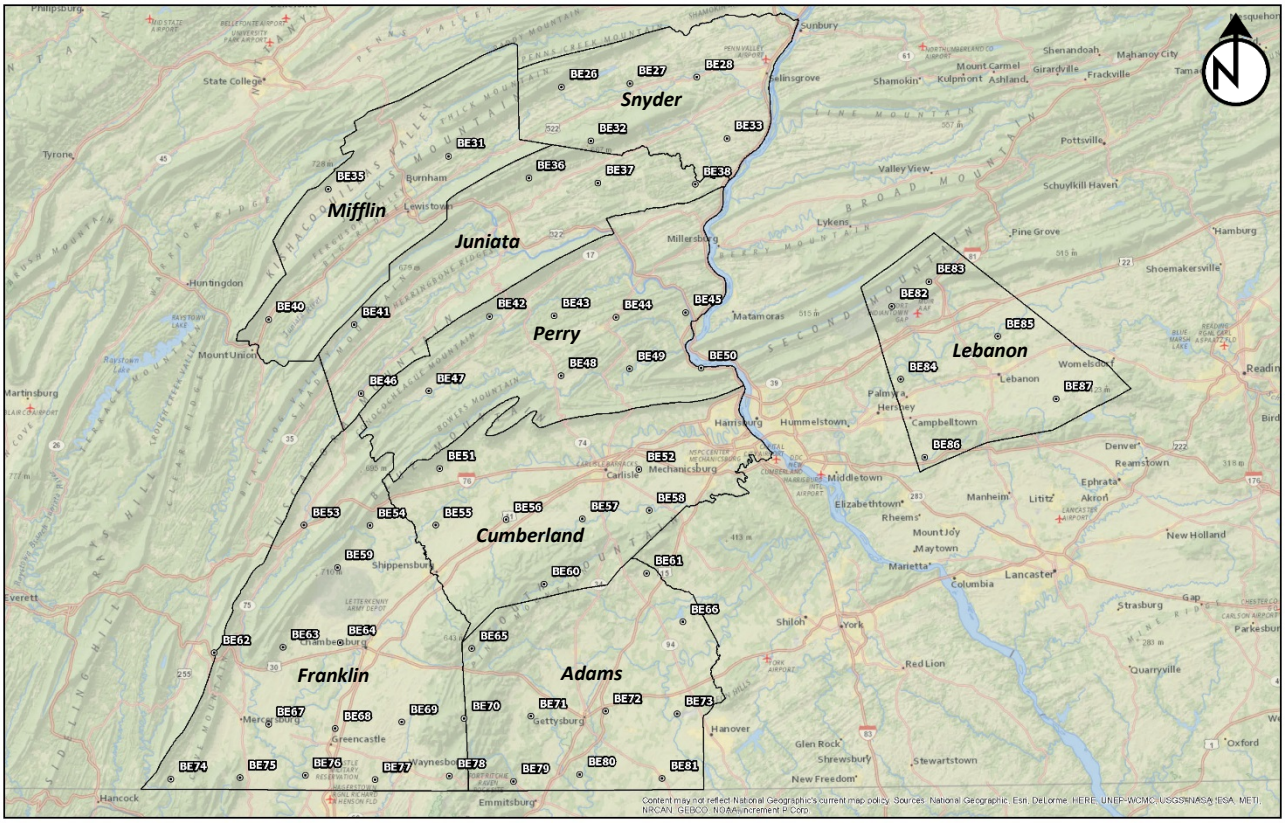
USGS LIDAR CALIBRATION POINTS (CA-150 TOTAL)



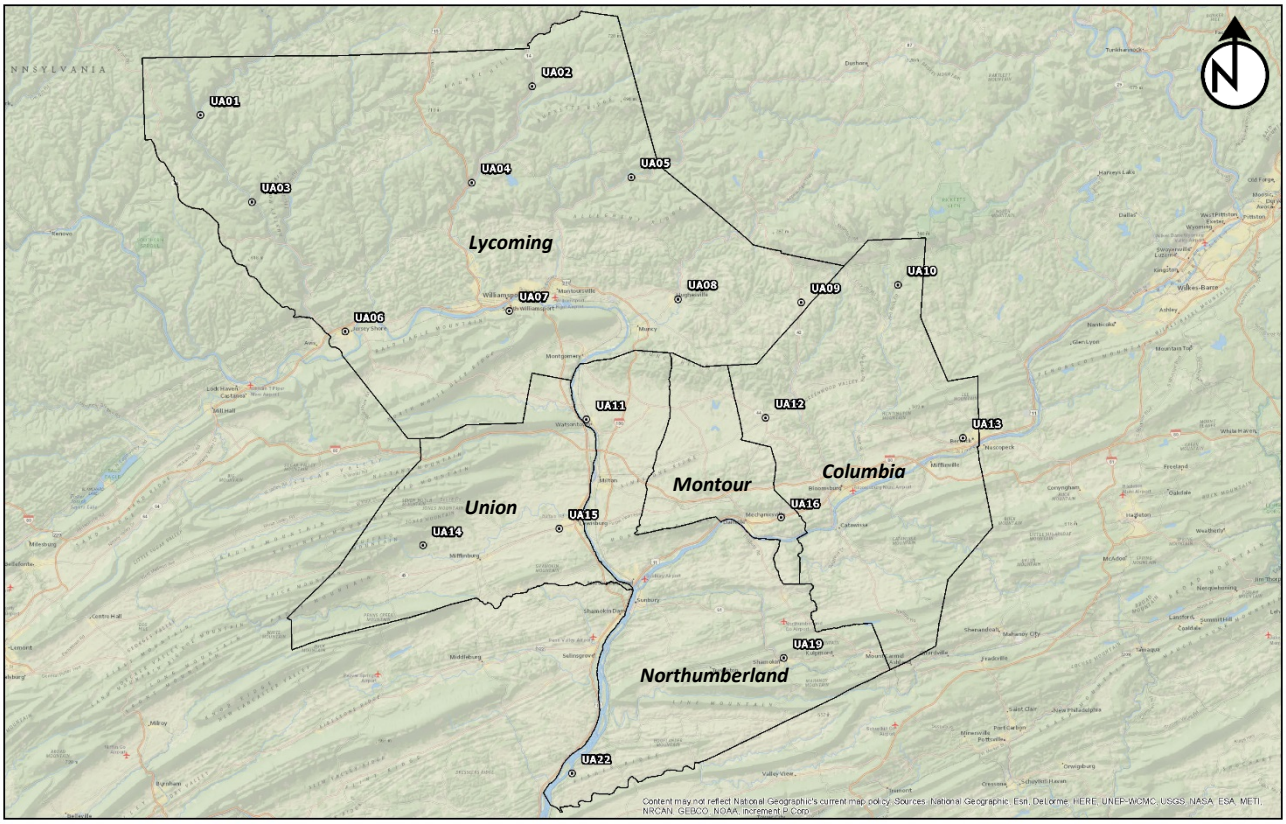


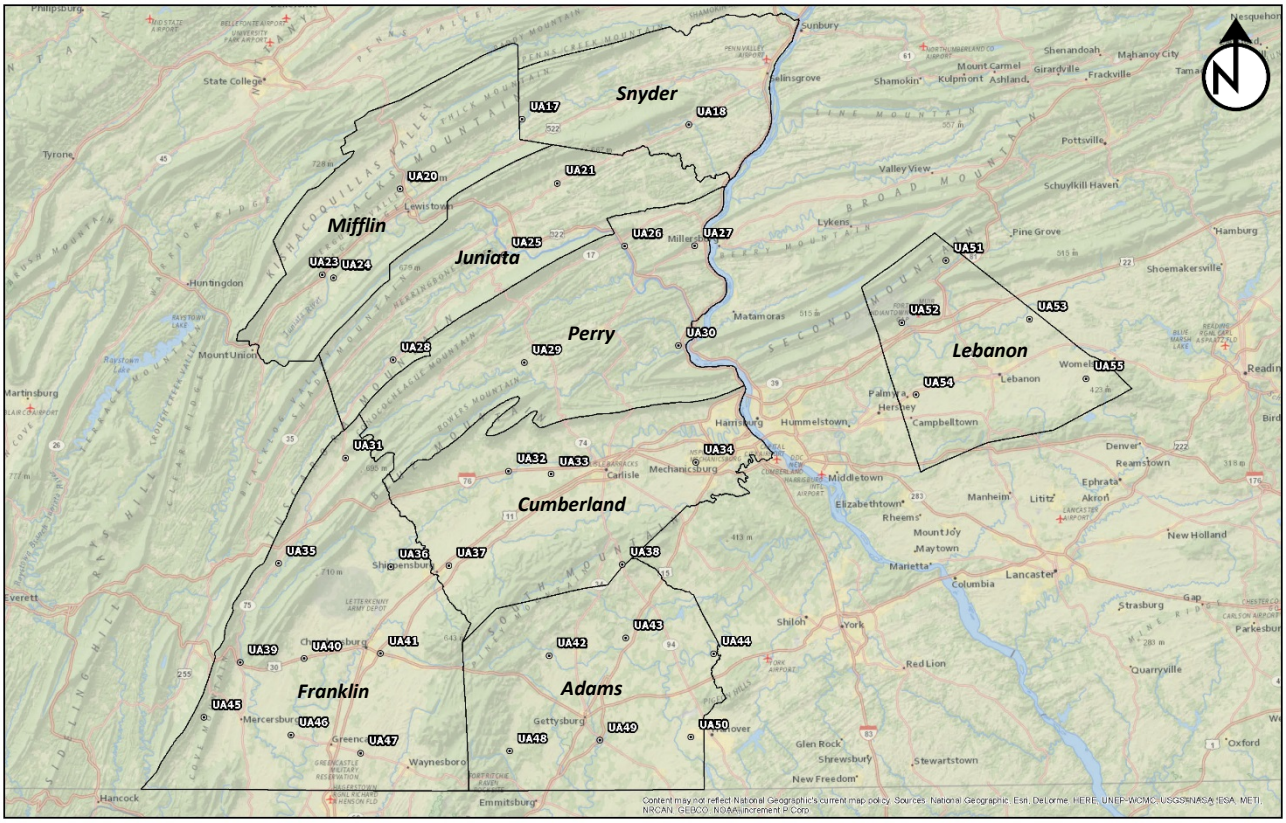
USGS LIDAR BARE EARTH POINTS (BE-87 TOTAL)



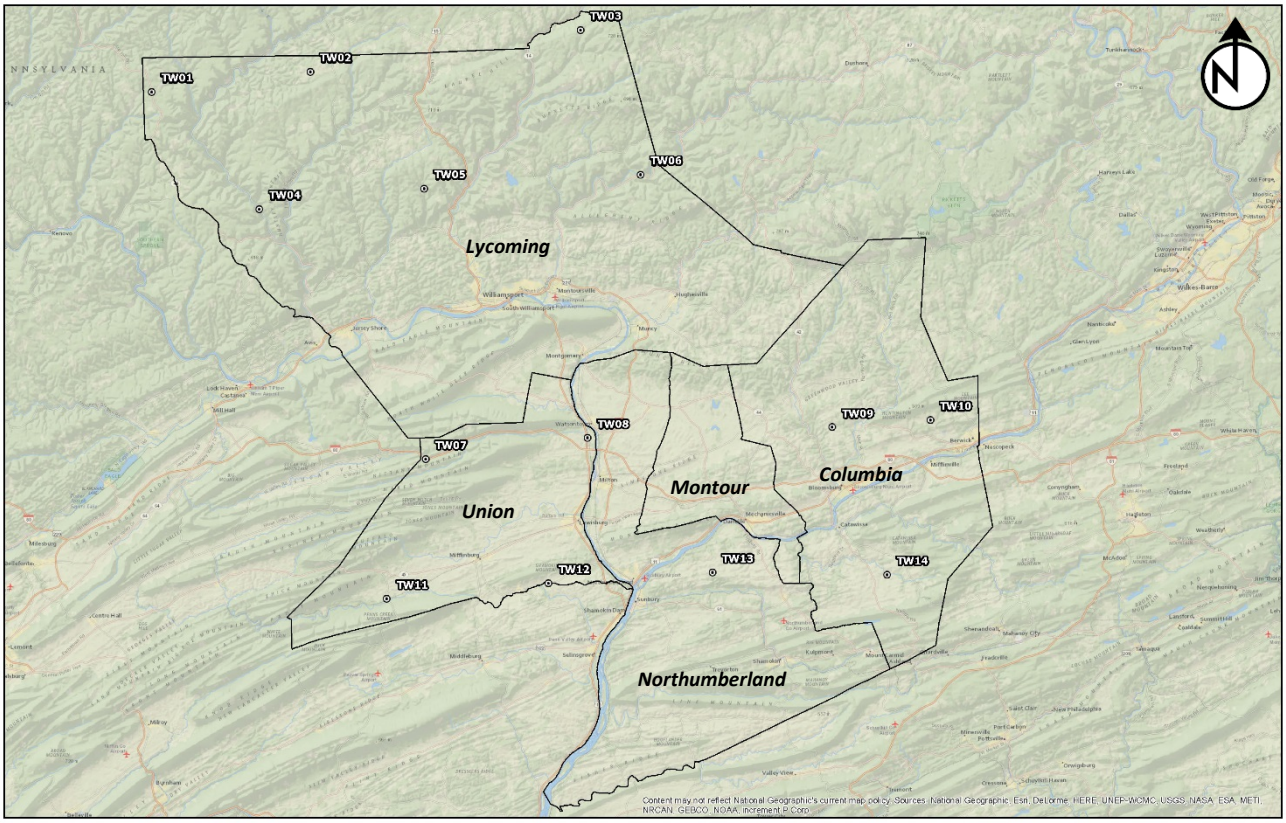


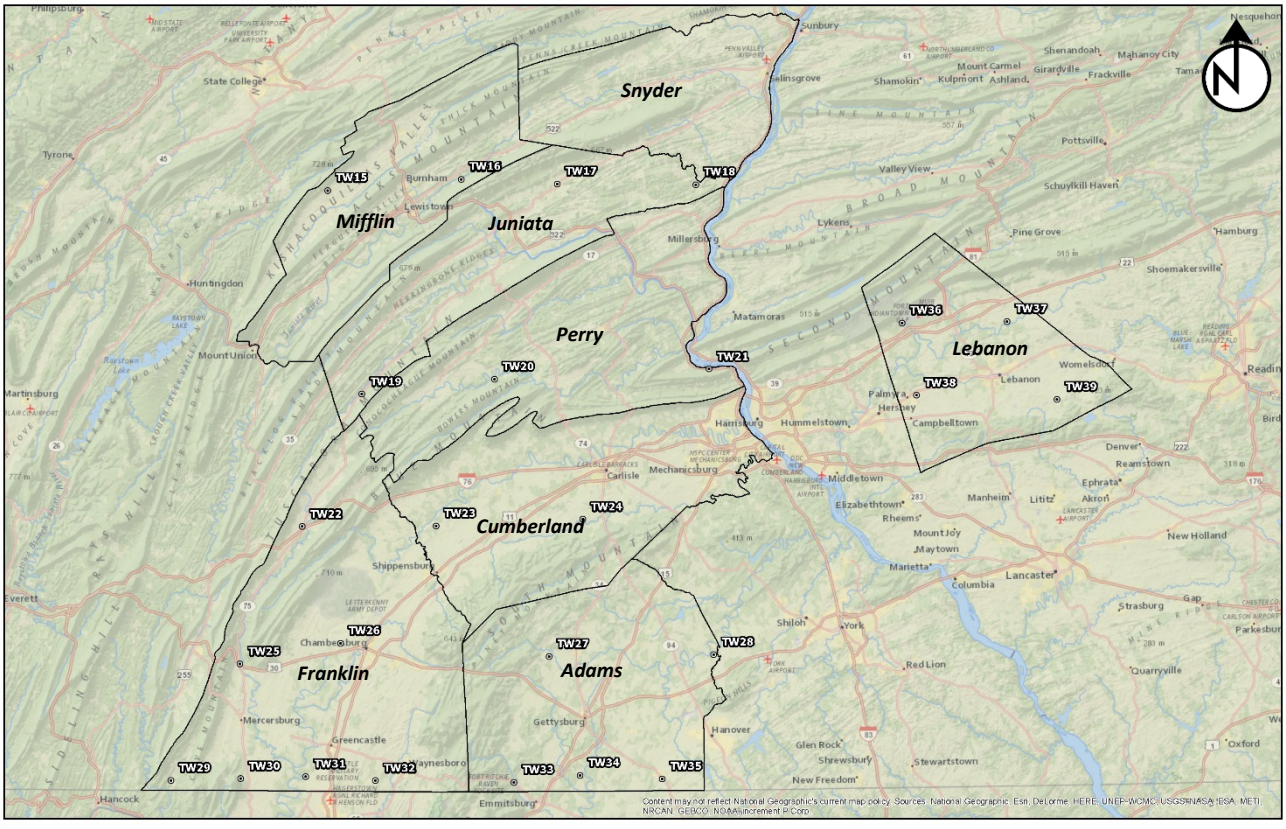
USGS LIDAR URBAN AREA POINTS (UA-55 TOTAL)



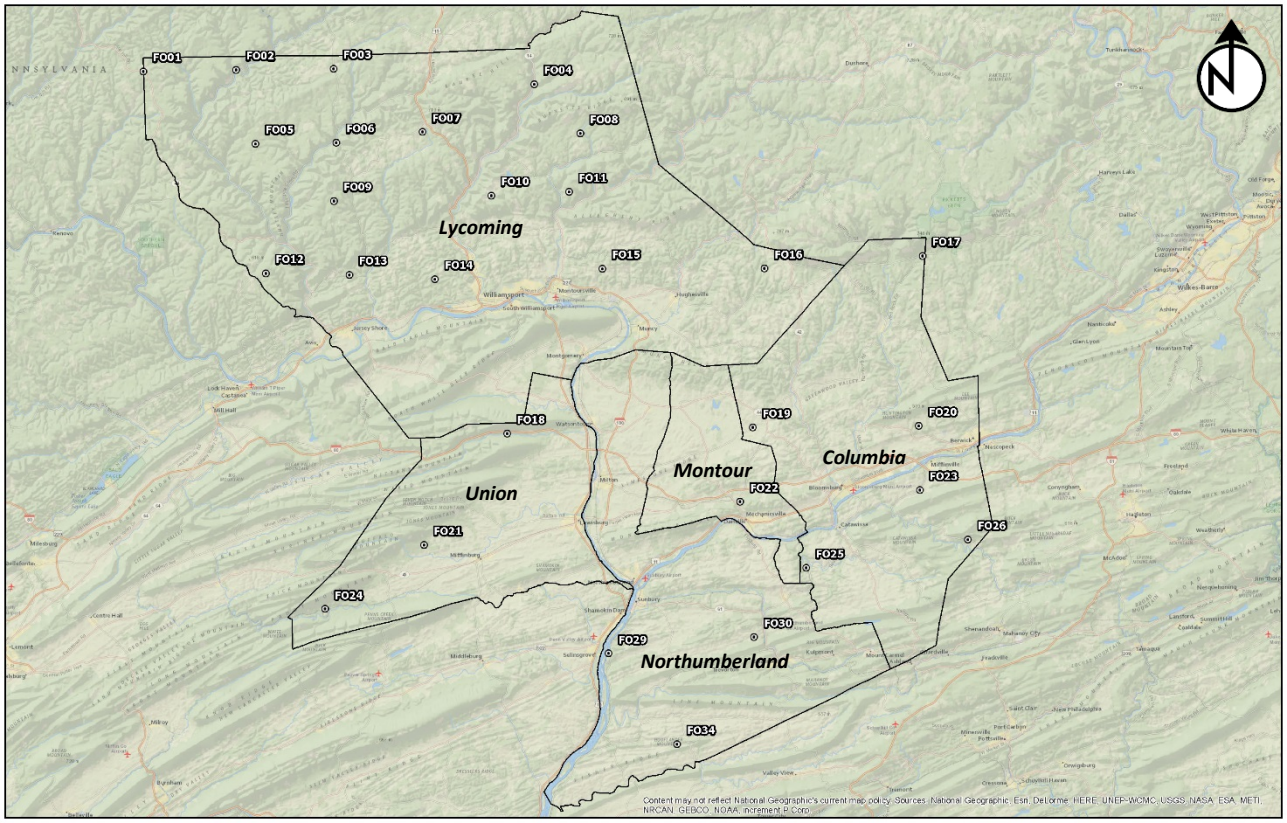


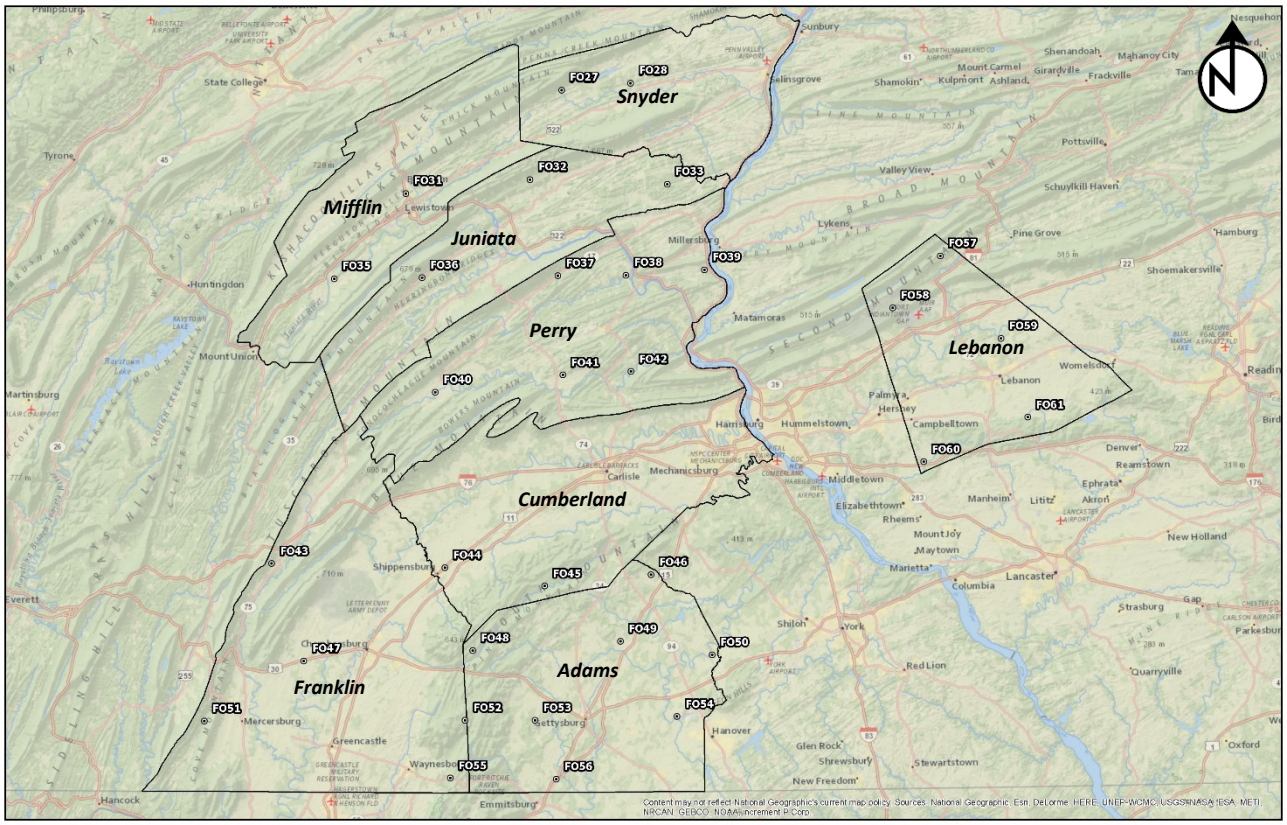
USGS LIDAR TALL WEED POINTS (TW-39 TOTAL)



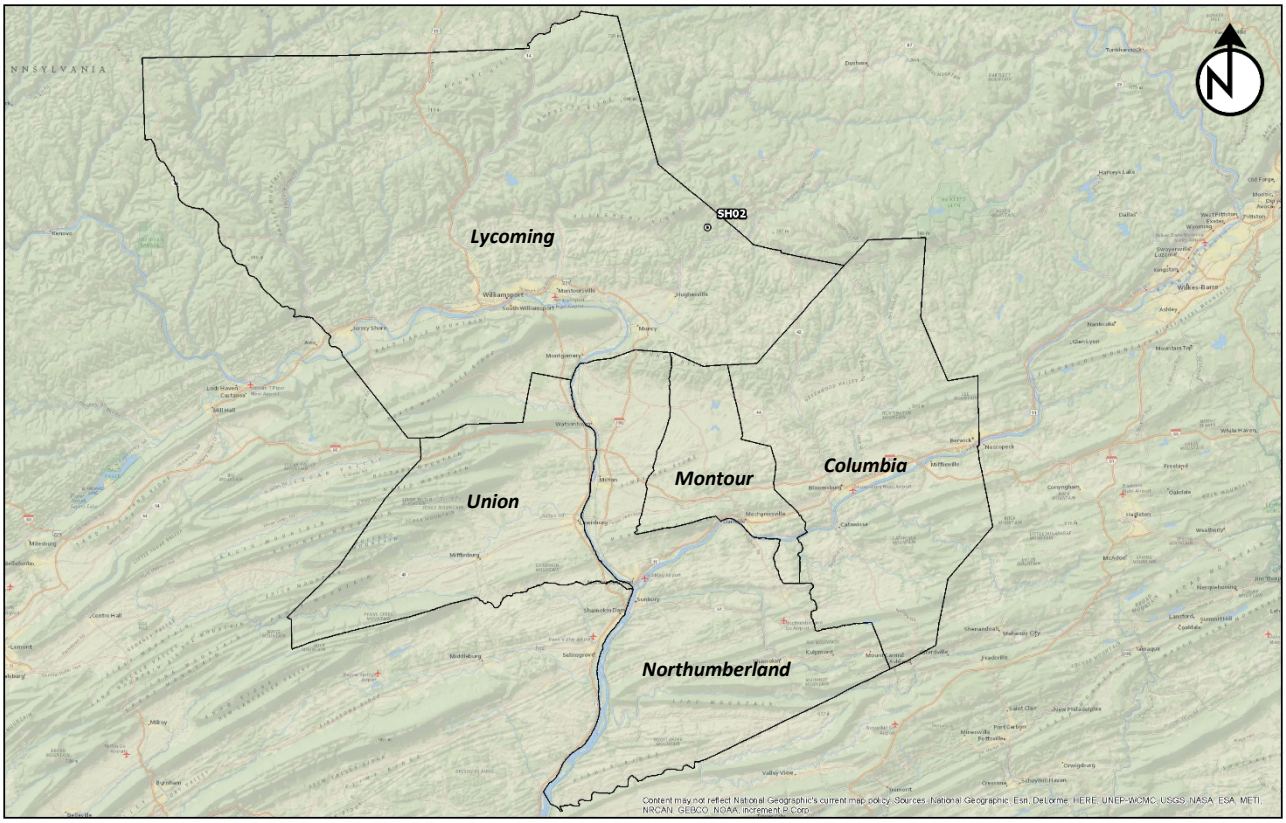


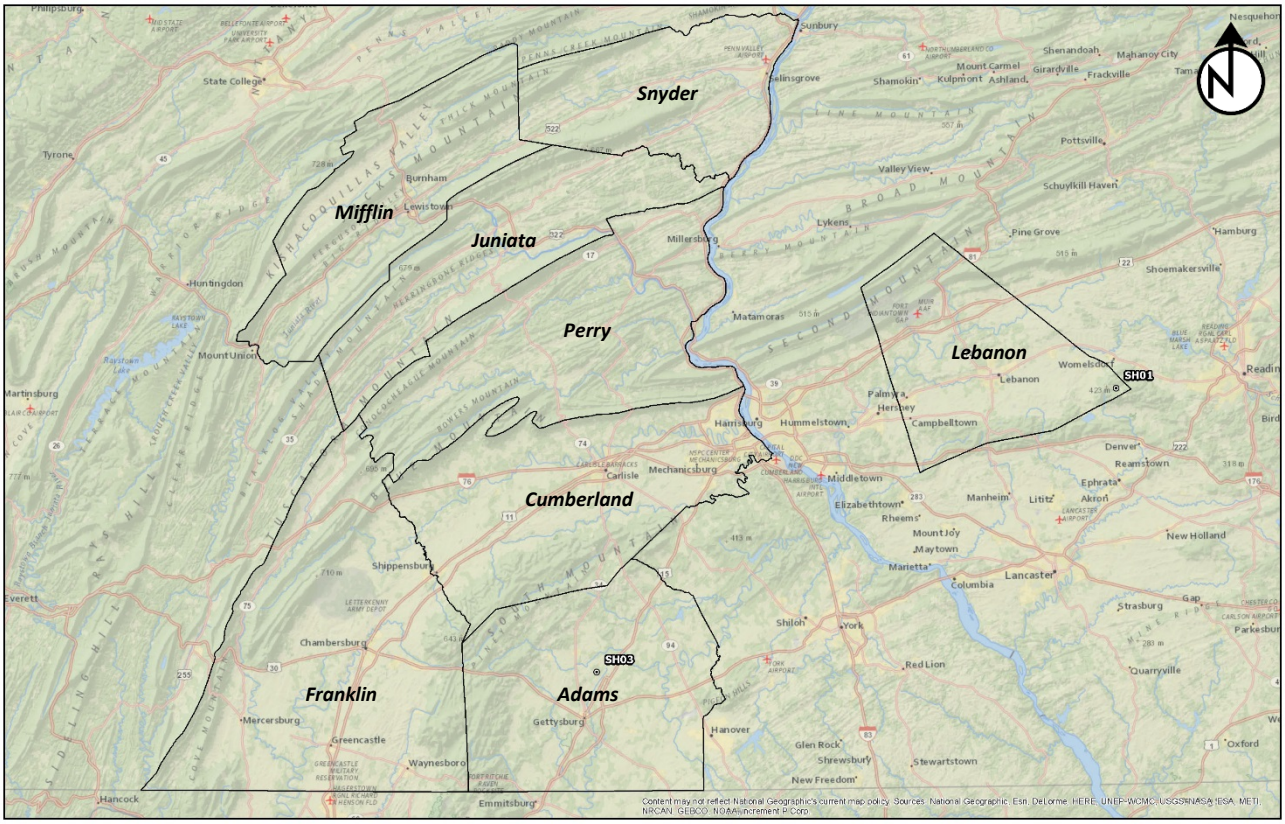
UGGS LIDAR FOREST POINTS (FO-61 TOTAL)





USGS LIDAR BRUSHLAND POINTS (SH-3 TOTAL)





Final Point Coordinates

UTM Zone18

Calibration Point Coordinates

Horizontal Datum - NAD83(2011)
UTM ZONE 18
Vertical Datum – NAVD 88
Geoid - GEOID12B
Units — Meters

Point ID	Northing(m)	Easting (m)	Elev. (m)
CA001	4600318.057	283201.108	605.320
CA002	4600234.418	296003.961	244.360
CA003	4599591.962	306397.386	529.707
CA004	4600402.010	318757.030	488.927
CA005	4600668.411	330417.363	406.276
CA006	4604177.393	343708.342	611.560
CA007	4591589.686	289674.883	221.425
CA008	4589929.753	298316.760	520.358
CA009	4589663.285	309286.871	270.154
CA010	4590789.189	321409.424	491.596
CA011	4590429.431	332174.162	604.837
CA012	4589906.237	343107.236	419.497
CA013	4581911.990	297746.254	199.759
CA014	4581656.679	308897.155	588.890
CA015	4582984.735	321531.326	441.500
CA016	4581999.921	330746.671	396.199
CA017	4581925.853	341462.211	464.221
CA018	4583950.427	351422.425	228.900
CA019	4571988.544	299216.849	571.801
CA020	4571407.107	310756.800	240.817
CA021	4570439.007	322543.594	303.110
CA022	4571355.839	333960.059	187.403
CA023	4571109.181	345684.864	292.905
CA024	4570786.680	356914.855	200.099
CA025	4570531.990	368007.326	361.720
CA026	4569431.213	379321.136	353.184
CA027	4565362.967	383682.480	264.169
CA028	4571525.646	389727.490	359.306
CA029	4559100.569	313627.554	194.391
CA030	4559060.868	324326.623	486.437
CA031	4559677.580	335239.661	206.382
CA032	4561146.041	346351.462	155.113
CA033	4560909.223	357513.163	207.213
CA034	4560576.230	369152.564	284.175
CA035	4560462.001	380515.587	259.209

Point ID	Northing(m)	Easting (m)	Elev. (m)
CA036	4546564.398	321084.173	471.219
CA037	4548888.667	331831.234	250.282
CA038	4547912.161	342966.110	150.734
CA039	4547816.017	354117.939	191.304
CA040	4548545.659	365595.291	171.829
CA041	4548331.201	376694.670	251.265
CA042	4548215.930	388110.872	260.602
CA043	4535155.076	321668.833	248.106
CA044	4535205.226	333054.031	161.697
CA045	4535231.642	344261.738	154.311
CA046	4537703.731	355364.568	169.497
CA047	4537035.123	366461.244	218.863
CA048	4538547.049	377644.361	144.204
CA049	4539949.397	388808.213	184.842
CA050	4526620.922	314622.256	184.468
CA051	4527430.144	325782.316	167.599
CA052	4528062.273	336955.069	162.441
CA053	4528522.826	348301.762	147.559
CA054	4528811.000	359573.850	257.011
CA055	4529057.888	372384.395	208.043
CA056	4527758.284	383609.054	255.299
CA057	4532307.514	394650.636	343.530
CA058	4516928.182	308505.968	224.146
CA059	4517194.703	319976.954	180.137
CA060	4517975.919	331420.092	163.073
CA061	4518032.349	342698.607	134.037
CA062	4518827.915	353726.399	214.480
CA063	4519770.210	364993.283	196.812
CA064	4519584.871	376459.811	461.602
CA065	4517998.254	388418.047	404.343
CA066	4508056.393	278037.741	249.291
CA067	4505963.824	289258.233	234.080
CA068	4507585.564	301140.282	244.799
CA069	4507758.650	313108.205	648.327
CA070	4507976.564	324657.145	222.207
CA071	4507461.964	335923.632	238.835
CA072	4507129.751	347131.992	237.119
CA073	4506916.847	358287.460	296.341
CA074	4508018.763	368487.720	232.253
CA075	4500905.037	268753.712	272.689
CA076	4500758.612	280905.244	185.797
CA077	4502010.108	291209.534	177.360
CA078	4501864.336	302574.583	230.663
CA079	4500754.859	314144.186	202.970
CA080	4500349.422	325557.117	183.193

Point ID	Northing(m)	Easting (m)	Elev. (m)
CA081	4498864.510	336674.216	165.728
CA082	4490878.378	261257.780	297.167
CA083	4488776.170	272793.222	158.120
CA084	4486108.281	284062.774	211.069
CA085	4487860.598	295088.194	137.089
CA086	4485598.927	306646.812	178.597
CA087	4485321.561	318114.099	124.044
CA088	4485805.659	329759.120	162.183
CA089	4480016.831	258480.340	205.725
CA090	4478259.382	272531.676	342.957
CA091	4478374.400	284016.450	208.379
CA092	4478942.300	295250.880	229.658
CA093	4478683.932	306074.488	262.264
CA094	4478427.185	316520.029	232.796
CA095	4478222.842	327920.886	165.837
CA096	4482526.725	368970.487	163.657
CA097	4466268.510	363735.438	151.748
CA098	4466722.487	273395.101	210.615
CA099	4466769.203	284672.604	226.439
CA100	4468479.271	295686.975	212.279
CA101	4468648.438	306923.378	186.930
CA102	4469255.633	318520.671	131.933
CA103	4469063.193	329820.303	112.507
CA104	4455989.979	270371.717	286.262
CA105	4453748.575	286083.461	221.433
CA106	4453032.650	296882.153	171.792
CA107	4453205.395	308098.552	138.972
CA108	4452614.074	319424.273	143.715
CA109	4453004.093	331988.408	133.577
CA110	4444814.695	262768.090	259.316
CA111	4444567.156	274131.303	224.049
CA112	4444371.494	285098.789	181.960
CA113	4444883.964	296942.785	196.198
CA114	4444619.990	309744.282	173.942
CA115	4445629.732	320973.598	155.250
CA116	4436020.940	254644.427	268.332
CA117	4437700.946	268510.623	226.591
CA118	4434986.307	278801.606	191.136
CA119	4434904.364	289814.997	249.801
CA120	4433847.759	302966.708	267.513
CA121	4434311.153	314100.821	303.586
CA122	4426820.248	326046.212	154.862
CA123	4424133.110	314986.960	175.344
CA124	4421835.843	303367.040	218.692
CA125	4423428.753	290573.462	415.364

Point ID	Northing(m)	Easting (m)	Elev. (m)
CA126	4424985.376	279355.140	218.021
CA127	4425095.215	268547.930	226.941
CA128	4424669.303	258928.864	222.258
CA129	4424090.783	247479.903	697.536
CA130	4413030.442	245283.826	224.895
CA131	4411860.386	256200.763	173.118
CA132	4411098.732	267387.625	172.110
CA133	4411516.338	278434.403	255.700
CA134	4411760.548	288917.221	429.536
CA135	4411397.744	300707.442	190.322
CA136	4411965.030	312453.539	170.346
CA137	4411481.406	324707.950	167.052
CA138	4403534.501	239850.307	160.731
CA139	4403002.515	251120.370	247.133
CA140	4403051.466	262033.602	177.460
CA141	4401992.344	273714.513	203.142
CA142	4401841.352	285345.717	306.334
CA143	4401742.978	296741.088	154.972
CA144	4401800.207	308014.929	129.781
CA145	4400864.668	321614.731	177.114
CA146	4486976.636	370783.388	279.044
CA147	4471531.168	363605.764	146.595
CA148	4475440.263	381755.431	145.424
CA149	4455977.996	367653.324	164.209
CA150	4465400.960	394666.565	150.744

Bare Earth Point Coordinates

Horizontal Datum - NAD83(2011)
UTM ZONE 18
Vertical Datum NAVD 88
Geoid - GEOID12B
Units – Meters

Point ID	Northing(m)	Easting (m)	Elev. (m)
BE01	4600323.341	283193.588	605.458
BE02	4600416.004	318991.581	488.294
BE03	4604181.095	343702.541	611.897
BE04	4589928.398	298312.106	520.524
BE05	4590788.715	321400.242	492.394
BE06	4589907.280	343114.200	419.432
BE07	4581661.418	308900.503	588.894
BE08	4582751.429	321573.974	452.024
BE09	4581914.983	341456.000	464.008
BE10	4571990.646	299211.584	571.447
BE11	4570517.005	322495.581	303.988
BE12	4570915.974	356498.399	195.332
BE13	4569429.719	379329.816	352.773
BE14	4559087.430	313623.430	194.818
BE15	4559674.357	335242.134	206.254
BE16	4560901.385	357514.619	207.017
BE17	4560590.359	369226.263	284.390
BE18	4560479.345	380497.940	259.247
BE19	4545684.192	320544.492	453.776
BE20	4547967.146	364545.824	167.703
BE21	4548342.706	376691.521	252.151
BE22	4526634.883	314609.668	184.758
BE23	4528063.392	336965.231	162.797
BE24	4528960.915	372737.051	173.056
BE25	4532322.212	394653.848	344.895
BE26	4516932.947	308510.164	224.738
BE27	4517190.114	319987.169	179.172
BE28	4517902.989	331216.785	162.481
BE29	4518819.226	353725.442	215.133
BE30	4518009.682	388434.160	403.803
BE31	4505956.855	289261.047	234.202
BE32	4507770.513	313122.063	648.355
BE33	4507473.552	335919.793	238.542
BE34	4506908.960	358213.789	296.345
BE35	4501059.934	268921.068	271.373

Point ID	Northing(m)	Easting (m)	Elev. (m)
BE36	4501869.161	302575.015	230.560
BE37	4500701.230	314089.372	198.653
BE38	4499960.159	330366.325	151.219
BE39	4498001.944	338731.614	165.347
BE40	4479589.855	258240.449	203.960
BE41	4478249.868	272532.267	342.235
BE42	4478935.827	295291.212	229.294
BE43	4478704.700	306063.789	260.746
BE44	4478109.410	316416.166	206.368
BE45	4478555.551	328133.036	124.509
BE46	4466716.480	273392.549	210.888
BE47	4466777.378	284682.303	225.853
BE48	4468641.502	306922.768	186.750
BE49	4469456.164	318412.216	153.307
BE50	4469177.892	330401.260	106.738
BE51	4453745.568	286094.875	221.194
BE52	4452580.873	319458.953	141.765
BE53	4444982.809	263108.531	250.264
BE54	4444564.592	274144.662	224.130
BE55	4444272.082	285183.353	192.182
BE56	4444817.999	296972.320	194.335
BE57	4444603.387	309763.749	173.762
BE58	4445634.904	320970.402	154.927
BE59	4437707.158	268504.079	226.852
BE60	4433848.209	302983.689	267.559
BE61	4435134.837	320238.103	184.527
BE62	4424061.016	247443.323	697.088
BE63	4424641.293	258986.715	222.087
BE64	4425098.431	268546.702	226.843
BE65	4423429.143	290578.781	415.411
BE66	4426821.950	326029.018	154.590
BE67	4411802.622	256159.419	173.215
BE68	4410733.192	267300.358	173.241
BE69	4411498.388	278475.047	257.878
BE70	4411765.046	288912.310	429.567
BE71	4411804.683	300134.995	188.959
BE72	4412262.987	312615.735	163.792
BE73	4411458.223	324620.440	167.243
BE74	4403114.415	239511.397	152.128
BE75	4403006.811	251120.157	246.843
BE76	4403055.539	262030.856	177.487
BE77	4401986.458	273696.942	202.961
BE78	4402197.906	286156.736	356.054
BE79	4400984.294	296871.674	149.124
BE80	4401799.025	308000.968	130.317

Point ID	Northing(m)	Easting (m)	Elev. (m)
BE81	4400720.185	321756.466	179.556
BE82	4478506.668	362649.446	196.672
BE83	4482490.722	368967.885	164.291
BE84	4466276.483	363757.636	150.799
BE85	4472956.576	380232.308	142.146
BE86	4453103.753	367337.291	135.876
BE87	4462208.994	389681.747	184.243

Urban Area Point Coordinates

Horizontal Datum – NAD83(2011)
UTM ZONE 18
Vertical Datum – NAVD 88
Geoid – GEOID12B
Units – Meters

Point ID	Northing(m)	Easting (m)	Elev. (m)
UA01	4594104.265	291053.096	224.650
UA02	4596648.670	336853.518	255.983
UA03	4581908.210	297746.315	199.789
UA04	4583612.593	328093.410	207.179
UA05	4583681.398	350096.664	236.697
UA06	4563717.394	310017.448	190.516
UA07	4565798.335	332739.758	195.771
UA08	4566685.513	356040.950	175.022
UA09	4565730.630	372962.119	374.495
UA10	4567707.727	386326.207	278.184
UA11	4550568.625	342889.352	145.462
UA12	4549990.883	367548.425	197.729
UA13	4546370.796	394643.450	160.891
UA14	4533910.226	319798.692	251.628
UA15	4535625.524	338646.509	146.321
UA16	4536193.493	369225.094	180.098
UA17	4511746.565	301647.243	220.698
UA18	4510000.328	329553.132	181.461
UA19	4516878.174	369007.920	223.931
UA20	4500740.022	280906.468	186.473
UA21	4500858.608	307242.662	192.532
UA22	4501888.683	339347.894	150.386
UA23	4486779.380	267433.664	169.446
UA24	4486216.748	269294.664	217.129
UA25	4489124.985	297957.551	135.476
UA26	4489982.223	318174.097	137.352
UA27	4489689.542	329903.152	185.327
UA28	4472207.007	278846.870	190.945
UA29	4471040.970	300770.996	175.867
UA30	4473109.807	326612.527	163.614
UA31	4455995.409	270374.285	286.300
UA32	4452945.202	297587.708	162.166
UA33	4452236.910	304700.820	156.382
UA34	4453450.566	328974.769	130.979
UA35	4438681.527	258635.545	268.809

Point ID	Northing(m)	Easting (m)	Elev. (m)
UA36	4437532.754	277417.195	207.806
UA37	4437467.051	287087.200	206.947
UA38	4436757.149	316096.480	290.790
UA39	4422304.465	251695.679	193.023
UA40	4422632.442	262411.286	198.835
UA41	4423075.592	275220.041	201.121
UA42	4421835.368	303384.875	217.904
UA43	4424432.951	316327.109	179.804
UA44	4421297.477	330903.113	143.369
UA45	4413288.581	245305.614	227.137
UA46	4409903.851	259823.948	187.205
UA47	4406491.781	271362.474	239.649
UA48	4406097.531	296325.996	187.865
UA49	4407425.936	311438.390	145.056
UA50	4407485.048	326710.097	165.526
UA51	4485920.122	371813.166	167.861
UA52	4475760.106	364110.175	133.743
UA53	4475657.617	385514.954	160.652
UA54	4463609.179	366139.644	133.249
UA55	4465404.437	394661.385	150.684

Tall Weed Point Coordinates

Horizontal Datum - NAD83(2011)
UTM ZONE 18
Vertical Datum - NAVD 88
Geoid - GEOID12B
Units – Meters

Point ID	Northing(m)	Easting (m)	Elev. (m)
TW01	4597484.032	284394.416	603.305
TW02	4599581.661	306340.423	532.669
TW03	4604168.005	343749.551	608.300
TW04	4580853.665	298733.519	206.837
TW05	4582981.620	321551.768	443.310
TW06	4583970.558	351403.107	227.947
TW07	4545711.543	320547.903	453.761
TW08	4547918.769	342960.181	150.871
TW09	4548348.144	376700.686	252.553
TW10	4548911.705	390242.354	279.544
TW11	4526645.792	314595.102	185.086
TW12	4528071.067	336933.691	161.894
TW13	4528851.236	359574.678	256.969
TW14	4527771.415	383610.527	254.035
TW15	4500912.585	268762.368	272.434
TW16	4502050.052	291194.870	174.237
TW17	4500808.317	307222.465	192.766
TW18	4499928.757	330372.755	151.312
TW19	4466678.418	273445.118	212.480
TW20	4468483.064	295691.496	211.906
TW21	4469080.000	331604.730	105.699
TW22	4444841.805	262764.790	258.347
TW23	4444267.598	285189.538	191.850
TW24	4444616.004	309731.628	173.527
TW25	4422228.894	251656.576	191.221
TW26	4425107.495	268556.228	226.931
TW27	4421853.075	303406.981	216.382
TW28	4421327.596	330955.706	141.126
TW29	4403072.990	239473.802	146.672
TW30	4403009.069	251141.912	245.770
TW31	4403034.799	262094.560	173.763
TW32	4401994.352	273728.056	203.478
TW33	4400979.313	296886.625	148.852
TW34	4401802.324	307986.086	130.478
TW35	4400783.114	321688.759	177.218

TW36	4475754.913	364151.698	133.391
TW37	4475455.208	381756.700	145.948
TW38	4463594.117	366177.389	134.227
TW39	4462213.032	389686.693	184.130

Forest Point Coordinates

Horizontal Datum – NAD83(2011)
UTM ZONE 18

Vertical Datum – NAVD 88
Geoid – GEOID12B
Units – Meters

Point ID	Northing(m)	Easting (m)	Elev. (m)
FO01	4600348.412	283217.843	608.052
FO02	4600152.968	296046.771	245.055
FO03	4599899.166	309472.181	499.900
FO04	4596876.566	337040.955	258.633
FO05	4589882.680	298395.905	517.062
FO06	4589700.099	309526.586	271.120
FO07	4590789.980	321443.803	489.855
FO08	4589891.389	343168.972	416.635
FO09	4581657.272	308945.154	587.591
FO10	4581743.120	330656.720	407.192
FO11	4581891.181	341370.519	461.730
FO12	4572012.432	299251.639	572.458
FO13	4571415.565	310733.956	242.186
FO14	4570467.544	322530.394	302.816
FO15	4571148.137	345646.603	295.810
FO16	4570492.140	368000.190	363.679
FO17	4571532.801	389828.484	361.024
FO18	4548865.902	331809.834	243.993
FO19	4548647.388	365682.744	169.670
FO20	4548136.271	388582.958	287.758
FO21	4533869.515	319873.836	250.103
FO22	4538463.404	363626.598	171.734
FO23	4539304.704	388432.641	203.290
FO24	4525481.053	305946.092	245.268
FO25	4529064.621	372436.723	200.992
FO26	4532277.575	394864.326	341.984
FO27	4516641.448	308345.114	208.744
FO28	4517425.593	319952.269	191.520
FO29	4518131.409	344854.690	149.363
FO30	4519770.526	364968.624	203.391
FO31	4500164.636	281742.552	194.444
FO32	4501861.028	302619.739	228.799
FO33	4500332.245	325539.236	183.752
FO34	4505335.000	353900.617	277.811
FO35	4486295.789	269311.375	214.614

Point ID	Northing(m)	Easting (m)	Elev. (m)
FO36	4486001.249	283985.185	217.237
FO37	4485611.584	306719.351	178.486
FO38	4485336.886	318141.063	128.103
FO39	4485865.768	331296.543	145.492
FO40	4466772.422	285607.615	210.036
FO41	4469011.736	307053.362	199.735
FO42	4469244.058	318490.606	140.803
FO43	4438989.653	257355.679	282.406
FO44	4437416.012	286303.583	205.454
FO45	4433814.891	302939.391	266.259
FO46	4435187.462	320769.384	169.337
FO47	4422545.777	262233.016	189.104
FO48	4423390.722	290552.497	415.804
FO49	4424206.439	315320.931	170.775
FO50	4421449.095	330620.264	138.257
FO51	4413014.602	245231.050	221.586
FO52	4411789.370	288926.571	431.831
FO53	4411413.926	300631.976	194.036
FO54	4411318.759	324434.370	161.790
FO55	4402195.213	286120.039	362.913
FO56	4401470.117	303852.785	148.832
FO57	4486939.471	370849.410	269.057
FO58	4478489.868	362621.355	197.639
FO59	4472828.902	380615.473	139.180
FO60	4452627.232	367034.682	134.077
FO61	4459535.940	384675.324	192.198

Brushland Point Coordinates

Horizontal Datum - NAD83(2011)
UTM ZONE 18
Vertical Datum - NAVD 88
Geoid - GEOID12B
Units – Meters

Point ID	Northing(m)	Easting (m)	Elev. (m)
SH01	4463766.990	399755.749	282.317
SH02	4576383.837	360385.000	259.437
SH03	4418968.362	311346.092	163.271

Calibration Point Log Sheets

CA001,4600318.057,283201.108,605.320
CA002,4600234.418,296003.961,244.360
CA003,4599591.962,306397.386,529.707
CA004,4600402.010,318757.030,488.927
CA005,4600668.411,330417.363,406.276
CA006,4604177.393,343708.342,611.560
CA007,4591589.686,289674.883,221.425
CA008,4589929.753,298316.760,520.358
CA009,4589663.285,309286.871,270.154
CA010,4590789.189,321409.424,491.596
CA011,4590429.431,332174.162,604.837
CA012,4589906.237,343107.236,419.497
CA013,4581911.990,297746.254,199.759
CA014,4581656.679,308897.155,588.890
CA015,4582984.735,321531.326,441.500
CA016,4581999.921,330746.671,396.199
CA017,4581925.853,341462.211,464.221
CA018,4583950.427,351422.425,228.900
CA019,4571988.544,299216.849,571.801
CA020,4571407.107,310756.800,240.817
CA021,4570439.007,322543.594,303.110
CA022,4571355.839,333960.059,187.403
CA023,4571109.181,345684.864,292.905
CA024,4570786.680,356914.855,200.099
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CA026,4569431.213,379321.136,353.184
CA027,4565362.967,383682.480,264.169
CA028,4571525.646,389727.490,359.306
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CA031,4559677.580,335239.661,206.382
CA032,4561146.041,346351.462,155.113
CA033,4560909.223,357513.163,207.213
CA034,4560576.230,369152.564,284.175
CA035,4560462.001,380515.587,259.209
CA036,4546564.398,321084.173,471.219
CA037,4548888.667,331831.234,250.282
CA038,4547912.161,342966.110,150.734
CA039,4547816.017,354117.939,191.304
CA040,4548545.659,365595.291,171.829
CA041,4548331.201,376694.670,251.265
CA042,4548215.930,388110.872,260.602
CA043,4535155.076,321668.833,248.106
CA044,4535205.226,333054.031,161.697
CA045,4535231.642,344261.738,154.311
CA046,4537703.731,355364.568,169.497
CA047,4537035.123,366461.244,218.863
CA048,4538547.049,377644.361,144.204
CA049,4539949.397,388808.213,184.842
CA050,4526620.922,314622.256,184.468
CA051,4527430.144,325782.316,167.599
CA052,4528062.273,336955.069,162.441
CA053,4528522.826,348301.762,147.559

CA054,4528811.000,359573.850,257.011
CA055,4529057.888,372384.395,208.043
CA056,4527758.284,383609.054,255.299
CA057,4532307.514,394650.636,343.530
CA058,4516928.182,308505.968,224.146
CA059,4517194.703,319976.954,180.137
CA060,4517975.919,331420.092,163.073
CA061,4518032.349,342698.607,134.037
CA062,4518827.915,353726.399,214.480
CA063,4519770.210,364993.283,196.812
CA064,4519584.871,376459.811,461.602
CA065,4517998.254,388418.047,404.343
CA066,4508056.393,278037.741,249.291
CA067,4505963.824,289258.233,234.080
CA068,4507585.564,301140.282,244.799
CA069,4507758.650,313108.205,648.327
CA070,4507976.564,324657.145,222.207
CA071,4507461.964,335923.632,238.835
CA072,4507129.751,347131.992,237.119
CA073,4506916.847,358287.460,296.341
CA074,4508018.763,368487.720,232.253
CA075,4500905.037,268753.712,272.689
CA076,4500758.612,280905.244,185.797
CA077,4502010.108,291209.534,177.360
CA078,4501864.336,302574.583,230.663
CA079,4500754.859,314144.186,202.970
CA080,4500349.422,325557.117,183.193
CA081,4498864.510,336674.216,165.728
CA082,4490878.378,261257.780,297.167
CA083,4488776.170,272793.222,158.120
CA084,4486108.281,284062.774,211.069
CA085,4487860.598,295088.194,137.089
CA086,4485598.927,306646.812,178.597
CA087,4485321.561,318114.099,124.044
CA088,4485805.659,329759.120,162.183
CA089,4480016.831,258480.340,205.725
CA090,4478259.382,272531.676,342.957
CA091,4478374.400,284016.450,208.379
CA092,4478942.300,295250.880,229.658
CA093,4478683.932,306074.488,262.264
CA094,4478427.185,316520.029,232.796
CA095,4478222.842,327920.886,165.837
CA096,4482526.725,368970.487,163.657
CA097,4466268.510,363735.438,151.748
CA098,4466722.487,273395.101,210.615
CA099,4466769.203,284672.604,226.439
CA0100,4468479.271,295686.975,212.279
CA0101,4468648.438,306923.378,186.930
CA0102,4469255.633,318520.671,131.933
CA0103,4469063.193,329820.303,112.507
CA0104,4455989.979,270371.717,286.262
CA0105,4453748.575,286083.461,221.433
CA0106,4453032.650,296882.153,171.792
CA0107,4453205.395,308098.552,138.972

CA0108,4452614.074,319424.273,143.715
CA0109,4453004.093,331988.408,133.577
CA0110,4444814.695,262768.090,259.316
CA0111,4444567.156,274131.303,224.049
CA0112,4444371.494,285098.789,181.960
CA0113,4444883.964,296942.785,196.198
CA0114,4444619.990,309744.282,173.942
CA0115,4445629.732,320973.598,155.250
CA0116,4436020.940,254644.427,268.332
CA0117,4437700.946,268510.623,226.591
CA0118,4434986.307,278801.606,191.136
CA0119,4434904.364,289814.997,249.801
CA0120,4433847.759,302966.708,267.513
CA0121,4434311.153,314100.821,303.586
CA0122,4426820.248,326046.212,154.862
CA0123,4424133.110,314986.960,175.344
CA0124,4421835.843,303367.040,218.692
CA0125,4423428.753,290573.462,415.364
CA0126,4424985.376,279355.140,218.021
CA0127,4425095.215,268547.930,226.941
CA0128,4424669.303,258928.864,222.258
CA0129,4424090.783,247479.903,697.536
CA0130,4413030.442,245283.826,224.895
CA0131,4411860.386,256200.763,173.118
CA0132,4411098.732,267387.625,172.110
CA0133,4411516.338,278434.403,255.700
CA0134,4411760.548,288917.221,429.536
CA0135,4411397.744,300707.442,190.322
CA0136,4411965.030,312453.539,170.346
CA0137,4411481.406,324707.950,167.052
CA0138,4403534.501,239850.307,160.731
CA0139,4403002.515,251120.370,247.133
CA0140,4403051.466,262033.602,177.460
CA0141,4401992.344,273714.513,203.142
CA0142,4401841.352,285345.717,306.334
CA0143,4401742.978,296741.088,154.972
CA0144,4401800.207,308014.929,129.781
CA0145,4400864.668,321614.731,177.114
CA0146,4486976.636,370783.388,279.044
CA0147,4471531.168,363605.764,146.595
CA0148,4475440.263,381755.431,145.424
CA0149,4455977.996,367653.324,164.209
CA0150,4465400.960,394666.565,150.744

220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA001
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Lee Fire Tower

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600318.057	283201.108	605.320

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	CA001



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA002
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cedar Run

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

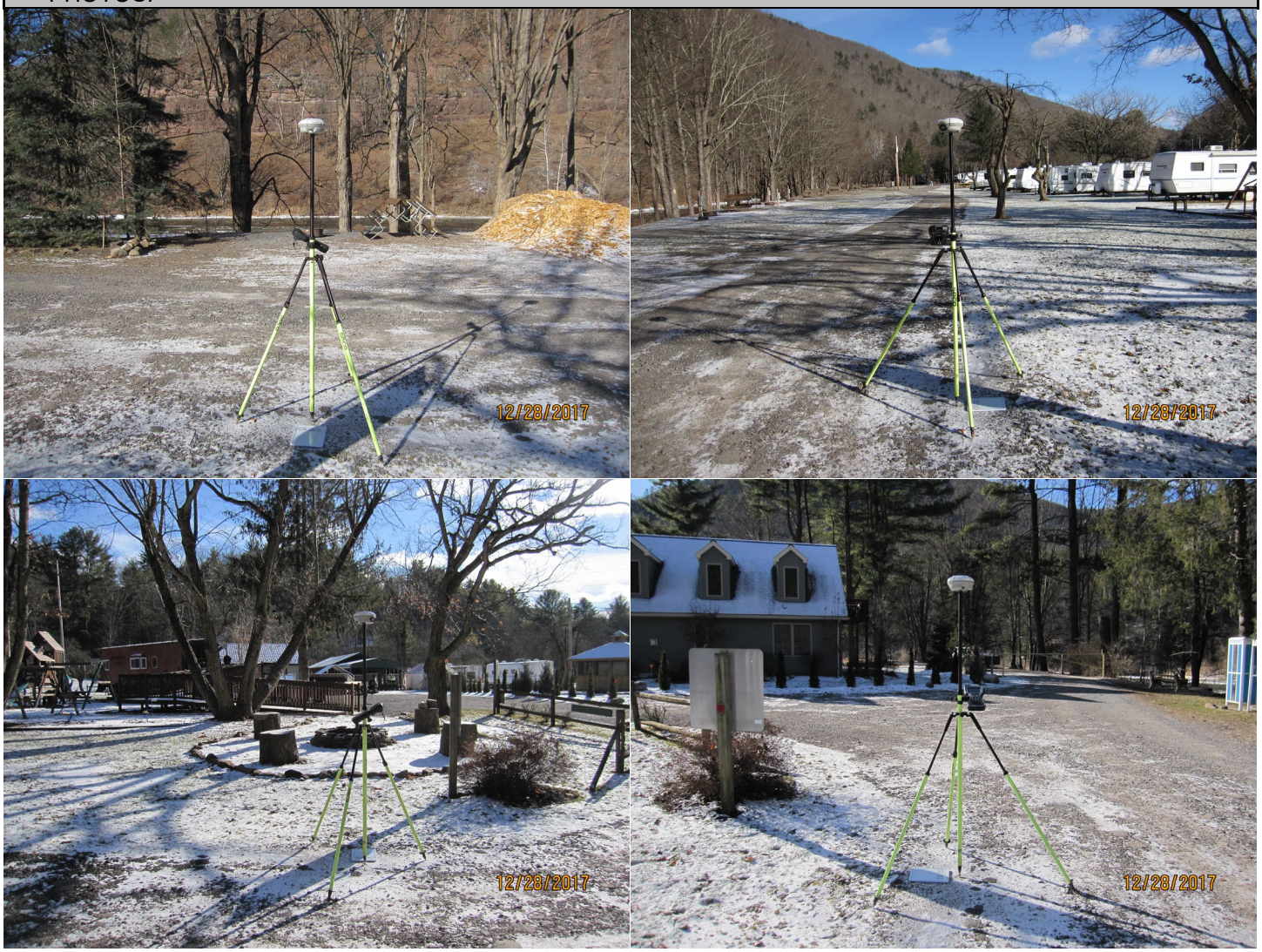
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600234.418	296003.961	244.360

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-17
RMSE Hz	0.023
RMSE Z	0.039
GPS Method	Network

PHOTOS:



Point ID	CA002



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA003
Project No.	31064
Project Name	Lycoming
State	Pennsylvania
County	Lycoming
Quad	Morris

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4599591.962	306397.386	529.707

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA003



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA004
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Nauvoo

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600402.010	318757.030	488.927

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.022
RMSE Z	0.028
GPS Method	Network

PHOTOS:



Point ID	CA004



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA005
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Liberty

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600668.411	330417.363	406.276

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.021
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA005



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA006
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Ralston/Grover

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4604177.393	343708.342	611.560

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	CA006



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA007
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Slate Run

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

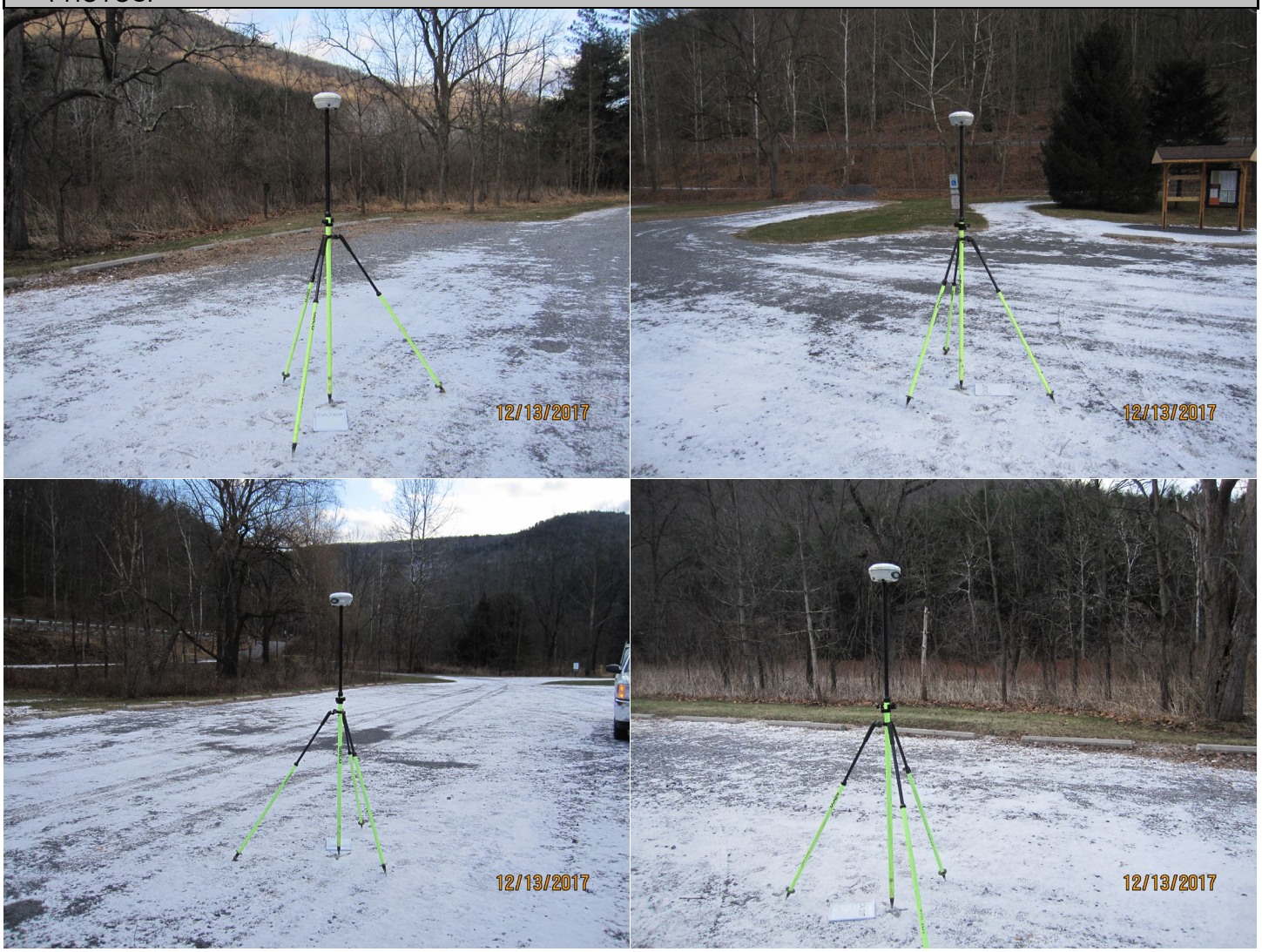
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4591589.686	289674.883	221.425

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.007
RMSE Z	0.031
GPS Method	Static

PHOTOS:



Point ID	CA007



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA008
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cammal

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589929.753	298316.760	520.358

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.022
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA008



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA009
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	English Center

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589663.285	309286.871	270.154

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.026
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	CA009



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA010
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	White Pine

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4590789.189	321409.424	491.596

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.023
RMSE Z	0.030
GPS Method	Network

PHOTOS:



Point ID	CA010



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA011
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Trout Run

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4590429.431	332174.162	604.837

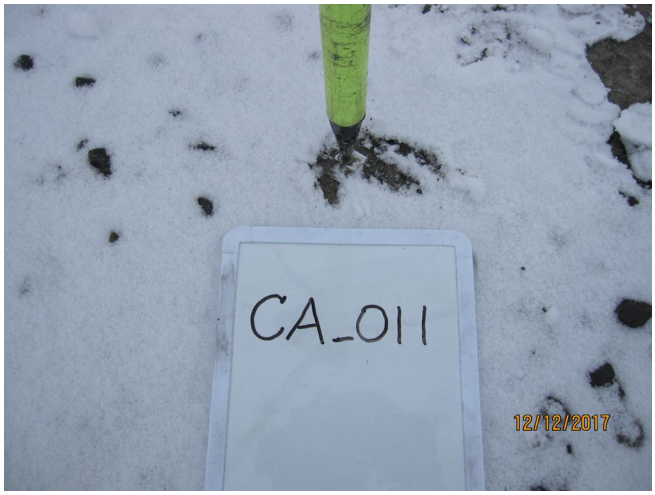
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.017
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA011



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA012
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Bodines

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589906.237	343107.236	419.497

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	CA012



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA013
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581911.990	297746.254	199.759

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.017
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA013



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA014
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Waterville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581656.679	308897.155	588.89

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA014



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA015
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	White Pine

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4582984.735	321531.326	441.500

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5131469606
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.005
RMSE Z	0.039
GPS Method	Static

PHOTOS:







Point ID	CA015



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA016
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cogan Station

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581999.921	330746.671	396.199

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.010
RMSE Z	0.014
GPS Method	Network

PHOTOS:



Point ID	CA016



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA017
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville North

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581925.853	341462.211	464.221

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-201
RMSE Hz	0.016
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA017



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA018
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Barbours

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4583950.427	351422.425	228.900

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.005
RMSE Z	0.017
GPS Method	Static

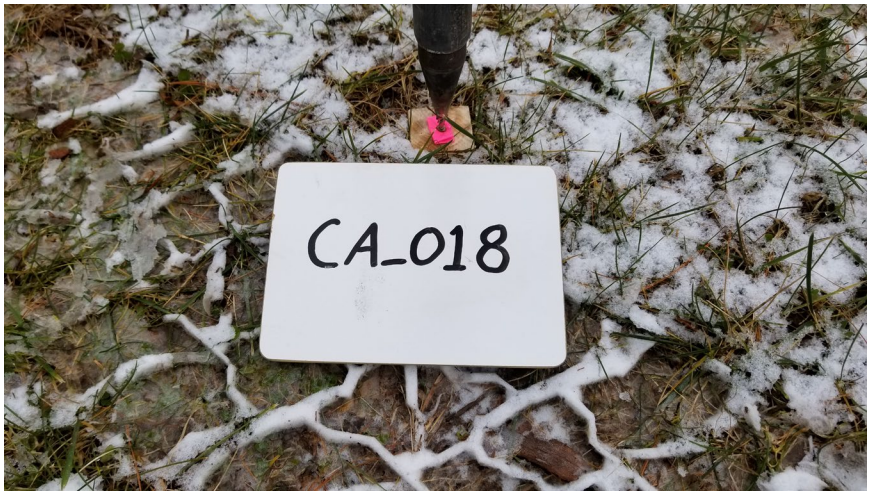
PHOTOS:







Point ID	CA018



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA019
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571988.544	299216.849	571.801

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.021
RMSE Z	0.027
GPS Method	Network

PHOTOS:



Point ID	CA019



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA020
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Waterville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571407.107	310756.800	240.817

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.010
RMSE Z	0.027
GPS Method	Static

PHOTOS:







Point ID	CA020



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA021
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cogan Station

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570439.007	322543.594	303.110

Operator	Tod Yeisley, or LBC, Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.021
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA021



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA022
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville North

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571355.839	333960.059	187.403

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-05-2017
RMSE Hz	0.018
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA022



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA023
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Huntersville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571109.181	345684.864	292.905

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.013
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA023



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA024
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Picture Rocks

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570786.680	356914.855	200.099

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.015
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA024



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA025
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Sonestown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570531.990	368007.326	361.720

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.020
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA025



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA026
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Elk Grove

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

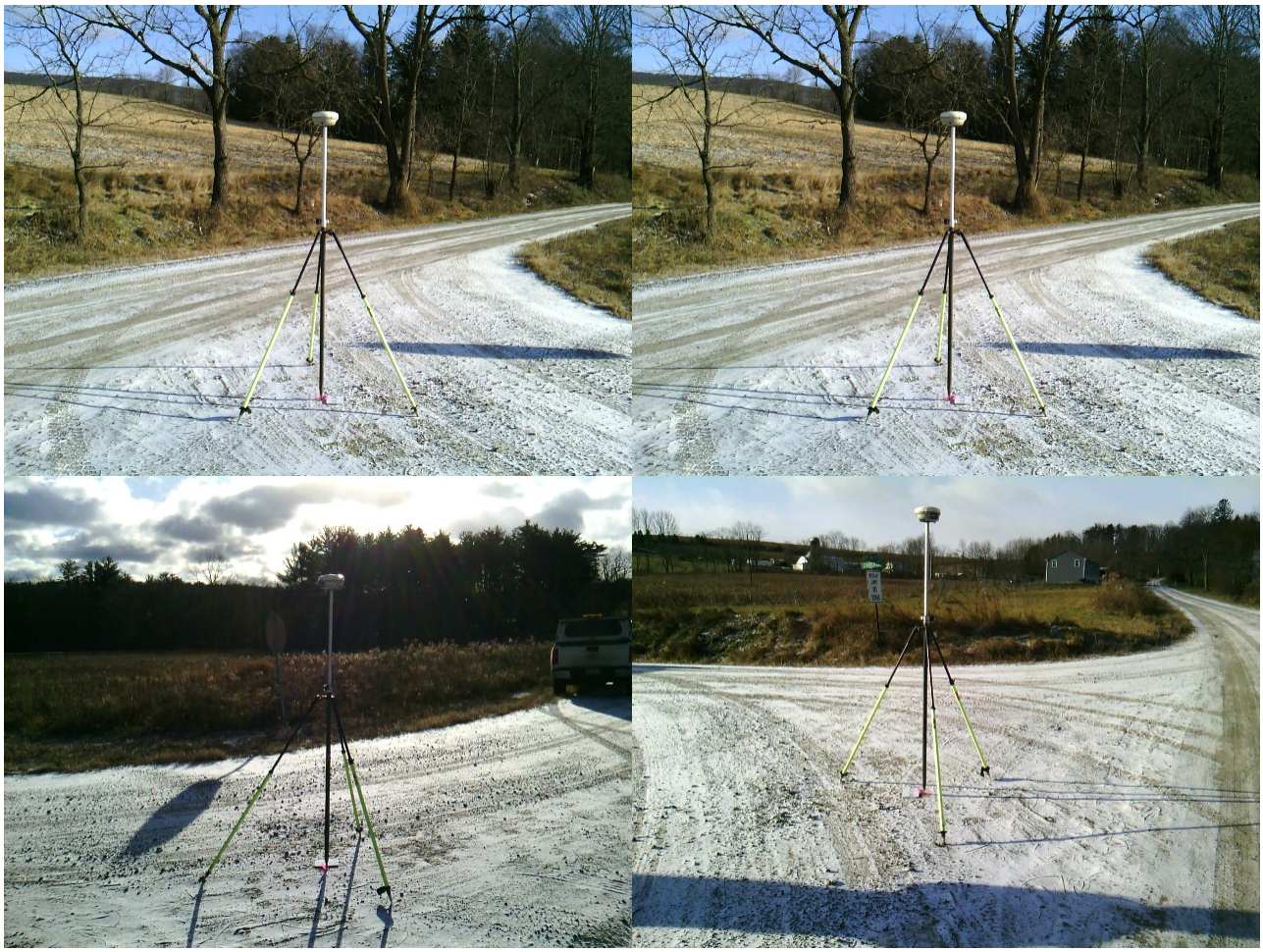
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4569431.213	379321.136	353.184

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA026



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA027
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Benton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4565362.967	383682.480	264.169

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.027
RMSE Z	0.041
GPS Method	Network

PHOTOS:



Point ID	CA027



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA028
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Red Rock

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571525.646	389727.490	359.306

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.014
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA028



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA029
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Linden

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4559100.569	313627.554	194.391

Operator	Ed Starkey
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.014
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA029



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA30
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Williamsport

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

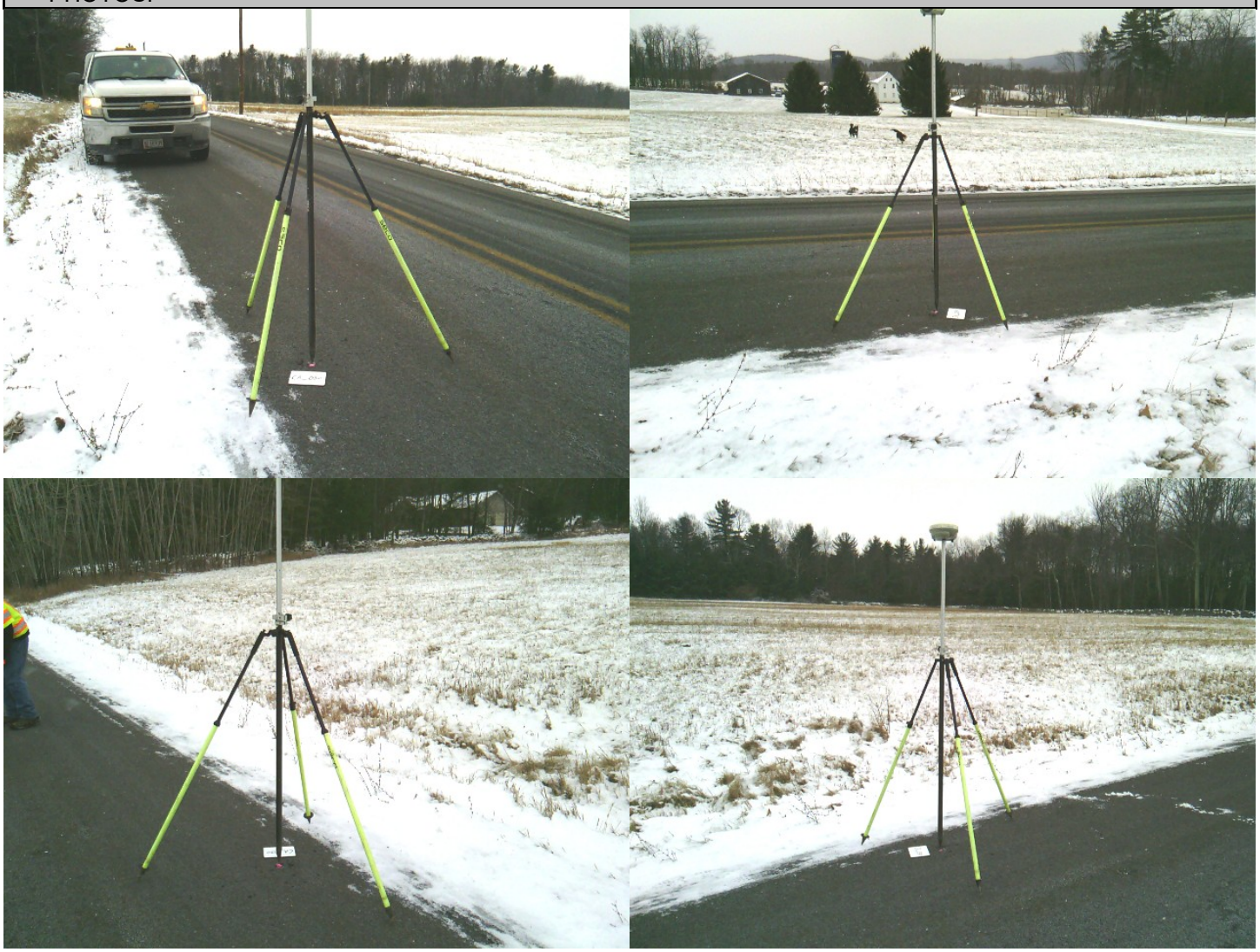
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4559060.868	324326.623	486.437

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.013
RMSE Z	0.016
GPS Method	Network

PHOTOS:



Point ID	CA030



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA031
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville South

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4559677.580	335239.661	206.382

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-04-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA031



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA032
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Muncy

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4561146.041	346351.462	155.113

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.010
RMSE Z	0.011
GPS Method	Network

PHOTOS:



Point ID	CA032



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA033
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Hughesville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4560909.223	357513.163	207.213

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.015
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA033



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA034
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Lairdsville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4560576.230	369152.564	284.175

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.019
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA034



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA035
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Benton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
456462.001	380515.587	259.209

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:






Point ID	CA035



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA036
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Williamsport SE

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4546564.398	321084.173	471.219

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.035
RMSE Z	0.050
GPS Method	Network

PHOTOS:



Point ID	CA036



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA037
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Williamsport SE

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548888.667	331831.234	250.282

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.024
RMSE Z	0.043
GPS Method	Network

PHOTOS:



Point ID	CA037



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA038
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Milton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4547912.161	342966.110	150.734

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.013
RMSE Z	0.017
GPS Method	Network

PHOTOS:









Point ID	CA038



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA039
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Montour
Quad	Washingtonville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4547816.017	354117.939	191.304

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.017
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA039



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA040
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Millville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548545.659	365595.291	171.829

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA040



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA041
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Bloomsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548331.201	376694.670	251.265

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.017
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA041



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA042
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Mifflinville

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

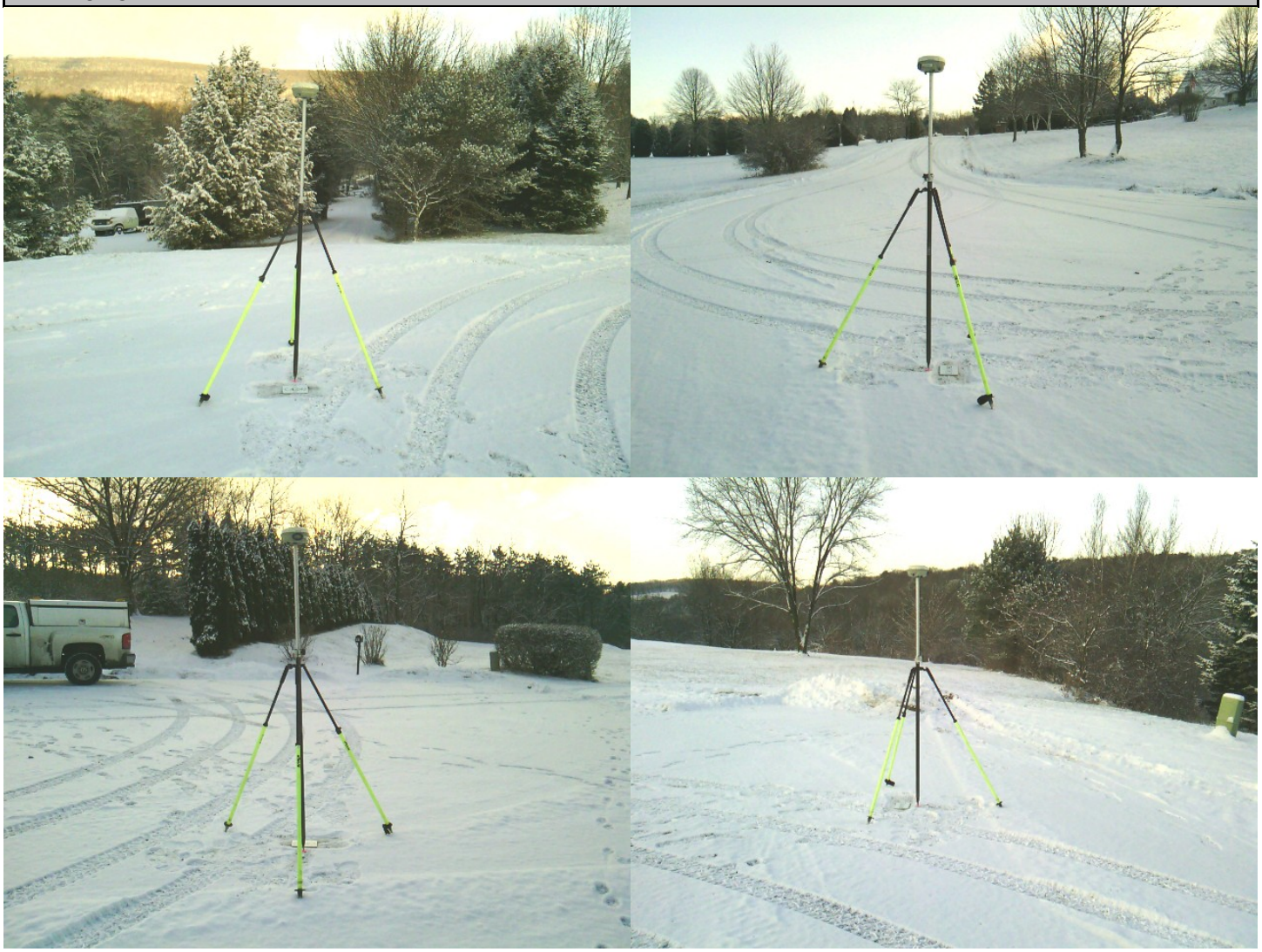
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548215.930	388110.872	260.602

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA042



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA043
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Mifflinburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4535155.076	321668.833	248.106

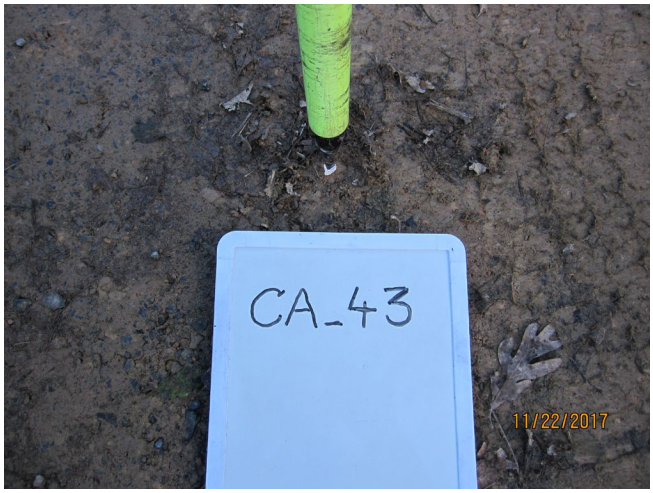
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA043



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA044
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Lewisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4535205.226	333054.031	161.697

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA044



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA045
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Northumberland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4535231.642	344261.738	154.311

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA045



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA046
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Montour
Quad	Riverside

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4537703.731	355364.568	169.497

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.022
RMSE Z	0.027
GPS Method	Network

PHOTOS:



Point ID	CA046



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA047
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Montour
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4537035.123	366461.244	218.863

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	????
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	CA047



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA048
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Catawissa

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

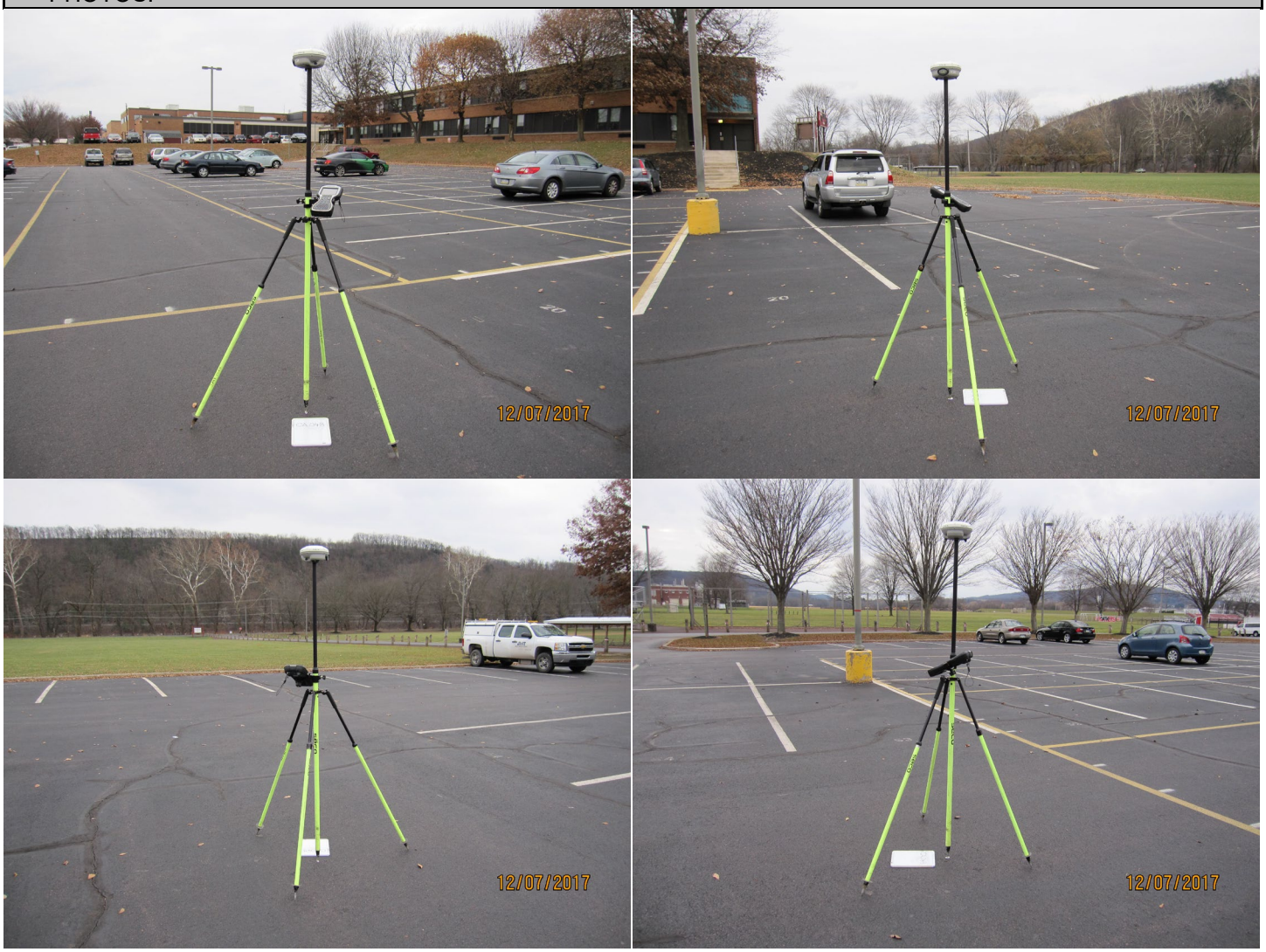
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4538547.049	377644.361	144.204

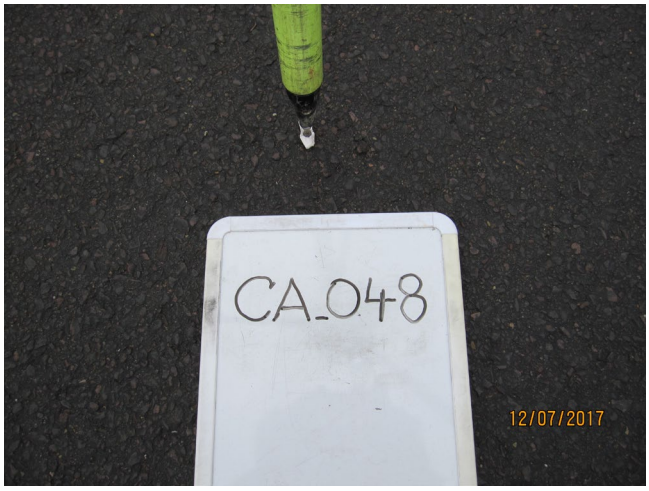
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA048



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA049
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Mifflinville

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

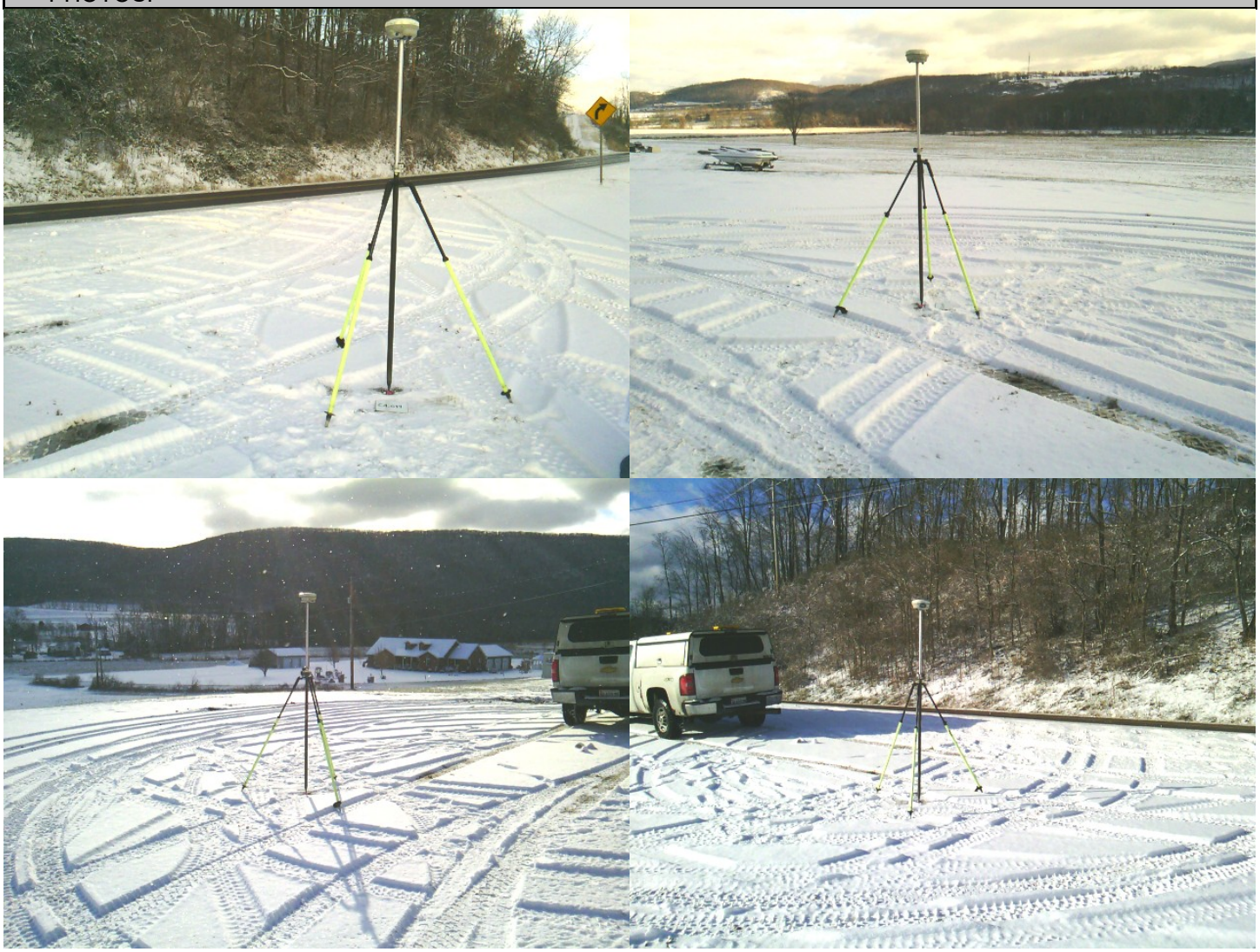
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4539949.397	388808.213	184.842

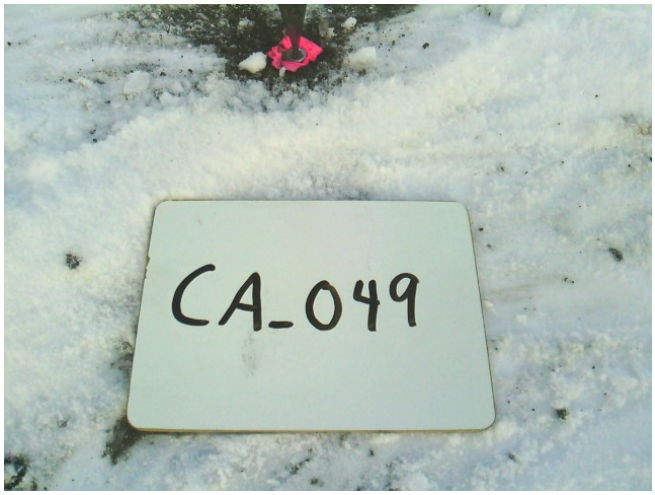
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	513842883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.018
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	CA049



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA050
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Beavertown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4526620.922	314622.256	184.468

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.018
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	CA050



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA051
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Mifflinburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4527430.144	325782.316	167.599

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.019
RMSE Z	0.027
GPS Method	Network

PHOTOS:









Point ID	CA051



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA052
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Lewisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528062.273	336955.069	162.411

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA052



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA053
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Northumberland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528522.826	348301.762	147.559

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:









Point ID	CA053



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA054
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Riverside

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528811.000	359573.850	257.011

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.019
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA054



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA055
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4529057.888	372384.395	208.043

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA055



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA056
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Catawissa

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4527758.284	383609.054	255.299

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA056



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA057
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Columbia
Quad	Shumans

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4532307.514	394650.636	343.530

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA057



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA058
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Snyder
Quad	Weikert

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4516928.182	308505.968	224.146

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:









Point ID	CA058



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA059
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Snyder
Quad	Beavertown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4517194.703	319976.954	180.137

Operator	Ed Starkey
Receiver Model	Trimble R-6 Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	CA059



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA060
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Snyder
Quad	Freeburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4517975.919	331420.092	163.073

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	CA060



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA061
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Snyder
Quad	Sunbury

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4518032.349	342698.607	134.037

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.012
RMSE Z	0.015
GPS Method	Network

PHOTOS:







Point ID	CA061



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA062
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Trevorton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4518827.915	353726.399	214.480

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.015
RMSE Z	0.016
GPS Method	Network

PHOTOS:



Point ID	CA062



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA063
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Northumberland
Quad	Shamokin

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4519770.210	364993.283	196.812

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.026
RMSE Z	0.039
GPS Method	Network

PHOTOS:



Point ID	CA063



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA064
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Northumberland
Quad	Mount Carmel

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4519584.871	376459.811	461.602

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA064



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA065
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Columbia
Quad	Ashland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4517998.254	388418.047	404.343

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	CA065



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA066
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Mifflin
Quad	Barrville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4508056.393	278037.741	249.291

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.024
RMSE Z	0.035
GPS Method	Network

PHOTOS:



Point ID	CA066



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA067
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Mifflin
Quad	Alfarata

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4505963.824	289258.233	234.080

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA067



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA068
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Mifflin
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4507585.564	301140.282	244.799

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	CA068



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA069
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Beaver Springs

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

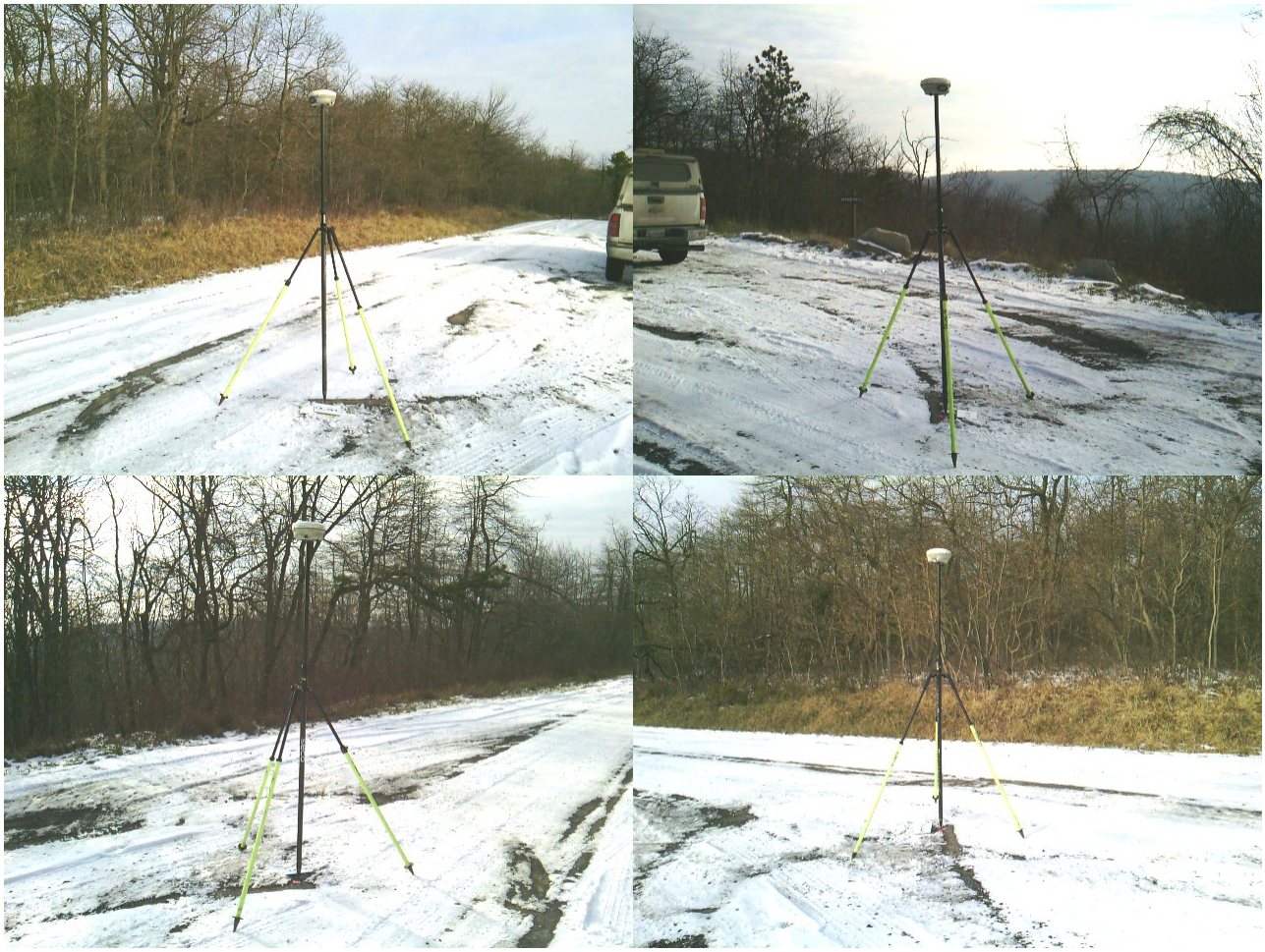
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4507758.650	313108.204	648.327

Operator	Ed Starkey
Receiver Model	Trimble R6 Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meter

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.008
RMSE Z	0.034
GPS Method	Static

PHOTOS:



Point ID	CA069



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA070
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Snyder
Quad	Richfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4507976.564	324657.145	222.207

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA070



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA071
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Snyder
Quad	Dalmatia

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4507461.964	335923.632	238.835

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:









Point ID	CA071



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA072
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Pillow

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

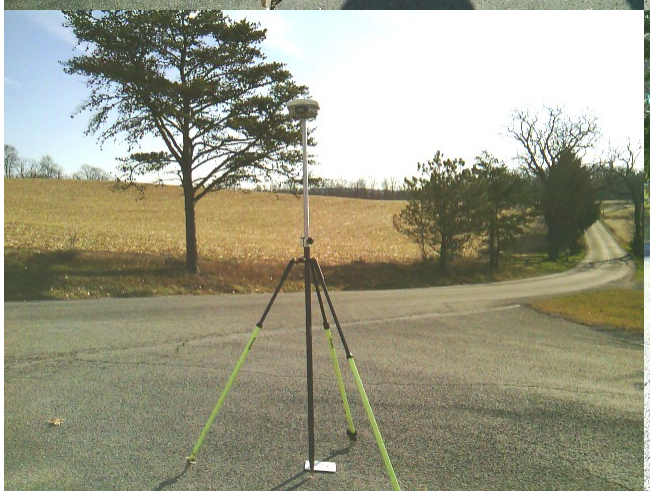
Northing	Easting	Elevation
4507129.751	347131.992	237.119

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.016
RMSE Z	0.018
GPS Method	Network

PHOTOS:






Point ID	CA072



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA073
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Klingerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4506916.847	358287.460	296.341

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.014
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA073



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA074
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Valley View

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4508018.763	368487.720	232.253

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.015
RMSE Z	0.022
GPS Method	Network

PHOTOS:






Point ID	CA074



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA075
Project No.	31064
Project Name	PA 13-County Lidar
State	Pennsylvania
County	Mifflin
Quad	Barrville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500905.037	268753.712	272.689

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA075



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA076
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Burnham

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500758.612	280905.244	185.797

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.015
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA076



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA077
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Alfarata

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4502010.108	291209.534	177.360

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.022
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	CA077



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA078
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4501864.336	302574.583	230.663

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.012
RMSE Z	0.014
GPS Method	Network

PHOTOS:









Point ID	CA078



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA079
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Beaver Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500754.859	314144.186	202.970

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.012
RMSE Z	0.015
GPS Method	Network

PHOTOS:









Point ID	CA079



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA080
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Richfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500349.422	325557.117	183.193

Operator	Ed Starkey
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.007
RMSE Z	0.030
GPS Method	Static

PHOTOS:



Point ID	CA080



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA081
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Dalmatia

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4498864.510	336674.216	165.728

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.016
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA081



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA082
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Allensville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4490878.378	261257.780	297.167

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA082



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA083
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Belleville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4488776.170	272793.222	158.120

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.018
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	CA083



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA084
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McCoysville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4486108.281	284062.774	211.069

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	CA084



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA085
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Mifflintown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4487860.598	295088.194	137.089

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA085



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA086
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Mexico

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485598.927	306646.812	178.597

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.013
RMSE Z	0.014
GPS Method	Network

PHOTOS:



Point ID	CA086



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA087
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Newport

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485321.561	318114.099	124.044

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA087



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA088
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Reward

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485805.659	329759.120	162.183

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.020
RMSE Z	0.031
GPS Method	Network

PHOTOS:



Point ID	CA088



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA089
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Newton Hamilton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4480016.831	258480.340	205.725

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA089



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA090
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	McVeytown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478259.382	272531.676	342.957

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	1.768 Meters

Date (MM-DD-YYYY)	12-22-2017
RMSE Hz	0.005
RMSE Z	0.028
GPS Method	Static

PHOTOS:



Point ID	CA090



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA091
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	McCoysville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478374.400	284016.450	208.379

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.020
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA091



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA092
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Spruce Hill

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478942.300	295250.880	229.658

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-22-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA092



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA093
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Ickesburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478683.932	306074.488	262.264

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.023
RMSE Z	0.027
GPS Method	Network

PHOTOS:



Point ID	CA093



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA094
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Newport

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478427.185	316520.029	232.796

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 / 2.438 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.014
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA094



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA095
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Duncannon

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478222.842	327920.886	165.837

Operator	Ed Starkey
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA095



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA096
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4482526.725	368970.487	163.657

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA096



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA097
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Palmyra

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466268.510	363735.438	151.748

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.021
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	CA097



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA098
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Blair Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466722.487	273395.101	210.615

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.610 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	CA098



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA099
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Blain

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466769.203	284672.604	226.439

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-22-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA099



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA100
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Andersonburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4468479.271	295686.975	212.279

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA100



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA101
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Andersonburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4468648.438	306923.378	186.930

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.014
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA101



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA102
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Shermans Dale

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469255.633	318520.671	131.933

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.016
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA102



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA103
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Wertzville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469063.193	329820.303	112.507

Operator	Ed Starkey
Receiver Model	Trimble R-6 Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.013
RMSE Z	0.016
GPS Method	Network

PHOTOS:



Point ID	CA103



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA104
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Doylesburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4455989.979	270371.717	286.262

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:









Point ID	CA104



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA105
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Newburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4453748.575	286083.461	221.433

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA105



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA106
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Newville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4453032.650	296882.153	171.792

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA106



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA107
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumblerland
Quad	Plainfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4453205.395	308098.552	138.972

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:

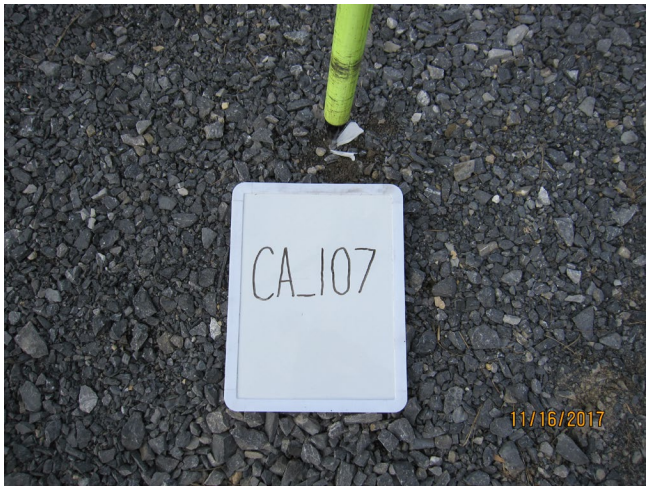








Point ID	CA107



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA108
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mechanicsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4452614.074	319424.273	143.715

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	CA108



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA109
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Lemoyne

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4453004.093	331988.408	133.577

Operator	Tod Yeisley
Receiver Model	Trimble R8 Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:

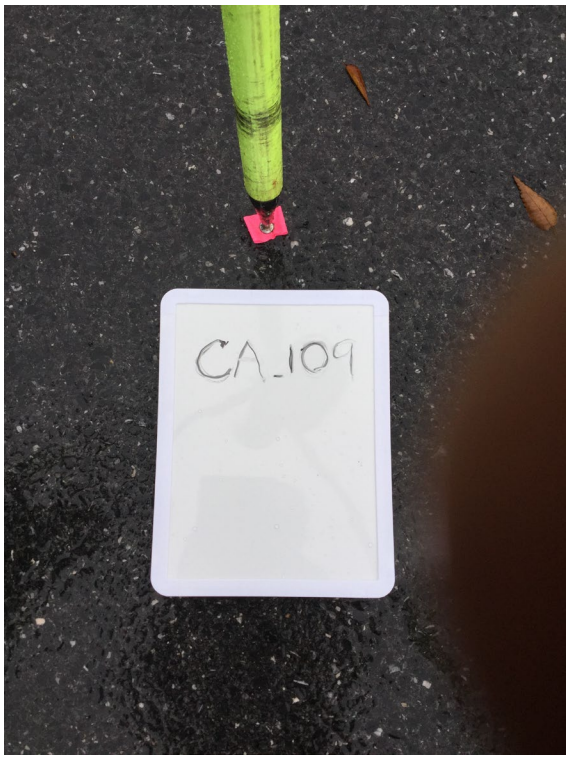








Point ID	CA109



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA110
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Fannettsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444814.695	262768.090	259.316

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA110



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA111
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Roxbury

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444567.156	274131.303	224.049

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA111



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA112
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Shippensburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444371.494	285098.789	181.960

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-17-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA112



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA113
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Newville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444883.964	296942.785	196.198

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-17-2017
RMSE Hz	0.024
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	CA113



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA114
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Carlisle

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

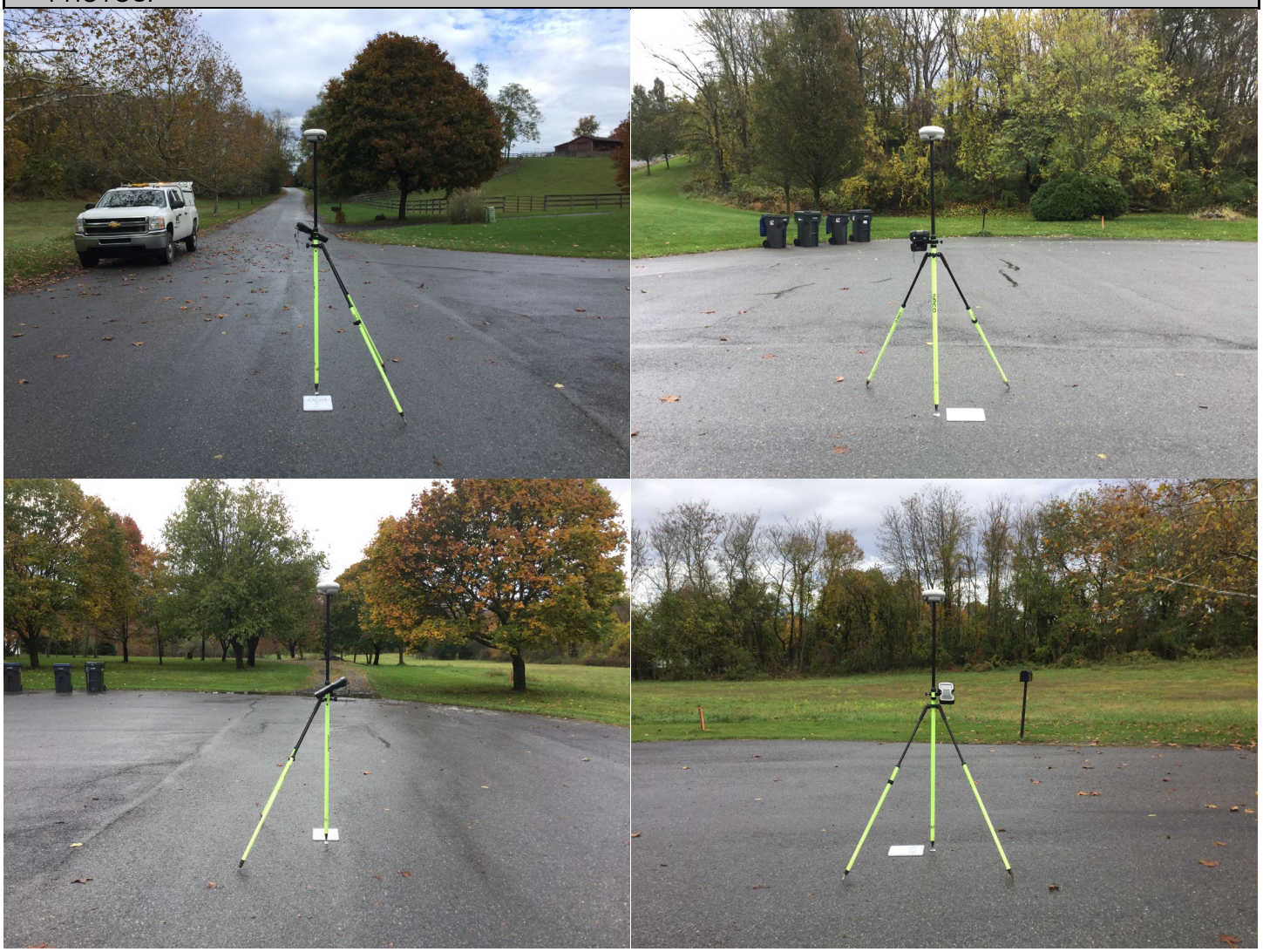
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444619.990	309744.282	173.942

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	CA114



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA115
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mechanicsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4445629.732	320973.598	155.250

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:









Point ID	CA115



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA116
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Fannettsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4436020.940	254644.427	268.332

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.020
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	CA116



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA117
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Roxbury

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4437700.946	268510.623	226.591

Operator	Tod Yeisley
Receiver Model	Trimble R8 Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-29-2017
RMSE Hz	0.018
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA117



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA118
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Shippensburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4434986.307	278801.606	191.136

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-15-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA118



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA119
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Walnut Bottom

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4434904.364	289814.997	249.801

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.014
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA119



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA120
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Dickinson

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4433847.759	302966.708	267.513

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-30-2017
RMSE Hz	0.023
RMSE Z	0.029
GPS Method	Network

PHOTOS:



Point ID	CA120



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA121
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mount Holly Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4434311.153	314100.821	303.586

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-30-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA121



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA122
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Hampton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4426820.248	326046.212	154.862

Operator	LBC
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.015
RMSE Z	0.021
GPS Method	Network

PHOTOS:

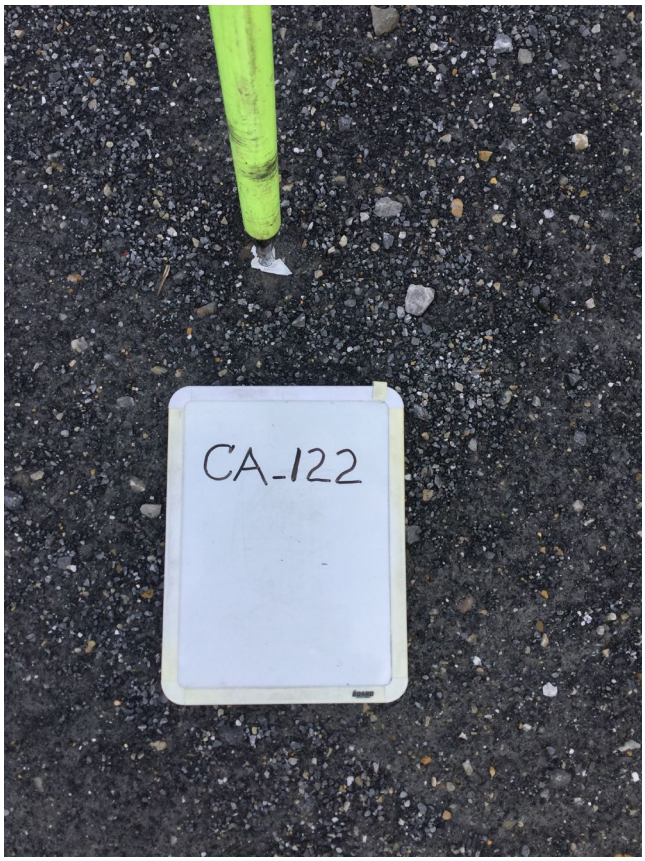








Point ID	CA122



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA123
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Biglerville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424133.110	314986.960	175.344

Operator	LBC
Receiver Model	Trimble R8 Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	CA123



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA124
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Ardentsville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4421835.843	303367.040	218.692

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-31-2017
RMSE Hz	0.020
RMSE Z	0.027
GPS Method	Network

PHOTOS:









Point ID	CA124

220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA125
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Caledonia Park

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4423428.753	290573.462	415.364

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.022
RMSE Z	0.040
GPS Method	Network

PHOTOS:



Point ID	CA125



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA126
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Scotland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424985.376	279355.140	218.021

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.016
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA126



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA127
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Chambersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4425095.215	268547.930	226.941

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.015
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	CA127



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA128
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Saint Thomas

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424669.303	258928.864	222.258

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.017
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA128

220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA129
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	McConnellsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424090.783	247479.903	697.536

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA129



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA130
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Mercersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4413030.442	245283.826	224.895

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA130



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA131
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Williamson

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411860.386	256200.763	173.118

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-28-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA131



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA132
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Greencastle

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411098.732	267387.625	172.110

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA132



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA133
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Waynesboro

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411516.338	278434.403	255.700

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA133



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA134
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Iron Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411760.548	288917.221	429.536

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.006
RMSE Z	0.040
GPS Method	Static

PHOTOS:









Point ID	CA134



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA135
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Fairfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411397.744	300707.442	190.322

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.021
RMSE Z	0.026
GPS Method	Network

PHOTOS:









Point ID	CA135



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA136
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Gettysburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411965.030	312453.539	170.346

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA136



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA137
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	McSherrystown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411481.406	324707.950	167.052

Operator	LBC
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA137



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA138
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Cherry Run

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403534.501	239850.307	160.731

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-27-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	CA138



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA139
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Clear Spring

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403002.515	251120.370	247.133

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-27-2017
RMSE Hz	0.029
RMSE Z	0.031
GPS Method	Network

PHOTOS:



Point ID	CA139



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA140
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Mason and Dixon

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403051.466	262033.602	177.460

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-27-2017
RMSE Hz	0.019
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	CA140

220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA141
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Hagerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401992.344	273714.513	203.142

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA141



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA142
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Smithsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401841.352	285345.717	306.334

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	CA142



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA143
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Emmitsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401742.978	296741.088	154.972

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.019
RMSE Z	0.028
GPS Method	Network

PHOTOS:









Point ID	CA143



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA144
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Taneytown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401800.207	308014.929	129.781

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	4304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	CA144



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA145
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Littlestown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4400864.668	321614.731	177.114

Operator	Layne Clark
Receiver Model	Trimble R8 Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.018
RMSE Z	0.024
GPS Method	Network

PHOTOS:









Point ID	CA145



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA146
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Tower City

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4486976.636	370783.388	279.044

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.021
RMSE Z	0.034
GPS Method	Network

PHOTOS:



Point ID	CA146



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA147
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4471531.168	363605.764	146.595

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.015
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	CA147



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA148
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Fredericksburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4475440.263	381755.431	145.424

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	CA148



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA149
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Elizabethtown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4455977.996	367653.324	164.209

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.021
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	CA149



220 St Charles Way, Suite 200 York, PA 17402

Point ID	CA150
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Womelsdorf

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4465400.960	394666.565	150.744

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	CA150



NVA-Bare Earth Point Log Sheet

BE01,4600323.341,283193.588,605.458
BE02,4600416.004,318991.581,488.294
BE03,4604181.095,343702.541,611.897
BE04,4589928.398,298312.106,520.524
BE05,4590788.715,321400.242,492.394
BE06,4589907.280,343114.200,419.432
BE07,4581661.418,308900.503,588.894
BE08,4582751.429,321573.974,452.024
BE09,4581914.983,341456.000,464.008
BE10,4571990.646,299211.584,571.447
BE11,4570517.005,322495.581,303.988
BE12,4570915.974,356498.399,195.332
BE13,4569429.719,379329.816,352.773
BE14,4559087.430,313623.430,194.818
BE15,4559674.357,335242.134,206.254
BE16,4560901.385,357514.619,207.017
BE17,4560590.359,369226.263,284.390
BE18,4560479.345,380497.940,259.247
BE19,4545684.192,320544.492,453.776
BE20,4547967.146,364545.824,167.703
BE21,4548342.706,376691.521,252.151
BE22,4526634.883,314609.668,184.758
BE23,4528063.392,336965.231,162.797
BE24,4528960.915,372737.051,173.056
BE25,4532322.212,394653.848,344.895
BE26,4516932.947,308510.164,224.738
BE27,4517190.114,319987.169,179.172
BE28,4517902.989,331216.785,162.481
BE29,4518819.226,353725.442,215.133
BE30,4518009.682,388434.160,403.803
BE31,4505956.855,289261.047,234.202
BE32,4507770.513,313122.062,648.355
BE33,4507473.552,335919.793,238.542
BE34,4506908.960,358213.789,296.345
BE35,4501059.934,268921.068,271.373
BE36,4501869.161,302575.015,230.560
BE37,4500701.230,314089.372,198.653
BE38,4499960.159,330366.325,151.219
BE39,4498001.944,338731.614,165.347
BE40,4479589.855,258240.449,203.960
BE41,4478249.868,272532.267,342.235
BE42,4478935.827,295291.212,229.294
BE43,4478704.700,306063.789,260.746
BE44,4478109.410,316416.166,206.368
BE45,4478555.551,328133.036,124.509
BE46,4466716.480,273392.549,210.888
BE47,4466777.378,284682.303,225.853
BE48,4468641.502,306922.768,186.750
BE49,4469456.164,318412.216,153.307
BE50,4469177.892,330401.260,106.738
BE51,4453745.568,286094.875,221.194
BE52,4452580.873,319458.953,141.765
BE53,4444982.809,263108.531,250.264

BE54,4444564.592,274144.662,224.130
BE55,4444272.082,285183.353,192.182
BE56,4444817.999,296972.320,194.335
BE57,4444603.387,309763.749,173.762
BE58,4445634.904,320970.402,154.927
BE59,4437707.158,268504.079,226.852
BE60,4433848.209,302983.689,267.559
BE61,4435134.837,320238.103,184.527
BE62,4424061.016,247443.323,697.088
BE63,4424641.293,258986.715,222.087
BE64,4425098.431,268546.702,226.843
BE65,4423429.143,290578.781,415.411
BE66,4426821.950,326029.018,154.590
BE67,4411802.622,256159.419,173.215
BE68,4410733.192,267300.358,173.241
BE69,4411498.388,278475.047,257.878
BE70,4411765.046,288912.310,429.567
BE71,4411804.683,300134.995,188.959
BE72,4412262.987,312615.735,163.792
BE73,4411458.223,324620.440,167.243
BE74,4403114.415,239511.397,152.128
BE75,4403006.811,251120.157,246.843
BE76,4403055.539,262030.856,177.487
BE77,4401986.458,273696.942,202.961
BE78,4402197.906,286156.736,356.054
BE79,4400984.294,296871.674,149.124
BE80,4401799.025,308000.968,130.317
BE81,4400720.185,321756.466,179.556
BE82,4478506.668,362649.446,196.672
BE83,4482490.722,368967.885,164.291
BE84,4466276.483,363757.636,150.799
BE85,4472956.576,380232.308,142.146
BE86,4453103.753,367337.291,135.876
BE87,4462208.994,389681.747,184.243

220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE01
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Lee Fire Tower

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600323.341	283193.588	605.458

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.020
RMSE Z	0.059
GPS Method	Static

PHOTOS:



Point ID	BE01



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE02
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Nauvoo

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600416.004	318991.581	488.294

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.018
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	BE02



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE03
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Ralston

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4604181.095	343702.541	611.897

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.006
RMSE Z	0.025
GPS Method	Static

PHOTOS:



Point ID	BE03



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE04
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cammal

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589928.398	298312.106	520.524

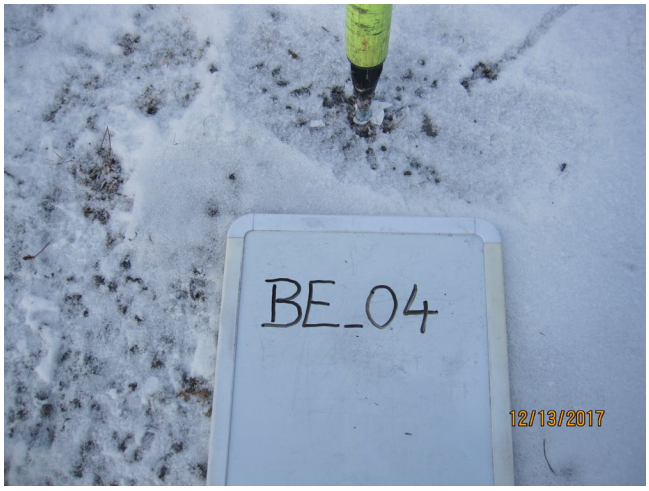
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE04



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE05
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	White Pine

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4590788.715	321400.242	492.394

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.015
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE05



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE06
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Bodines

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589907.280	343114.200	419.432

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.006
RMSE Z	0.040
GPS Method	Static

PHOTOS:



Point ID	BE06



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE07
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Waterville

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

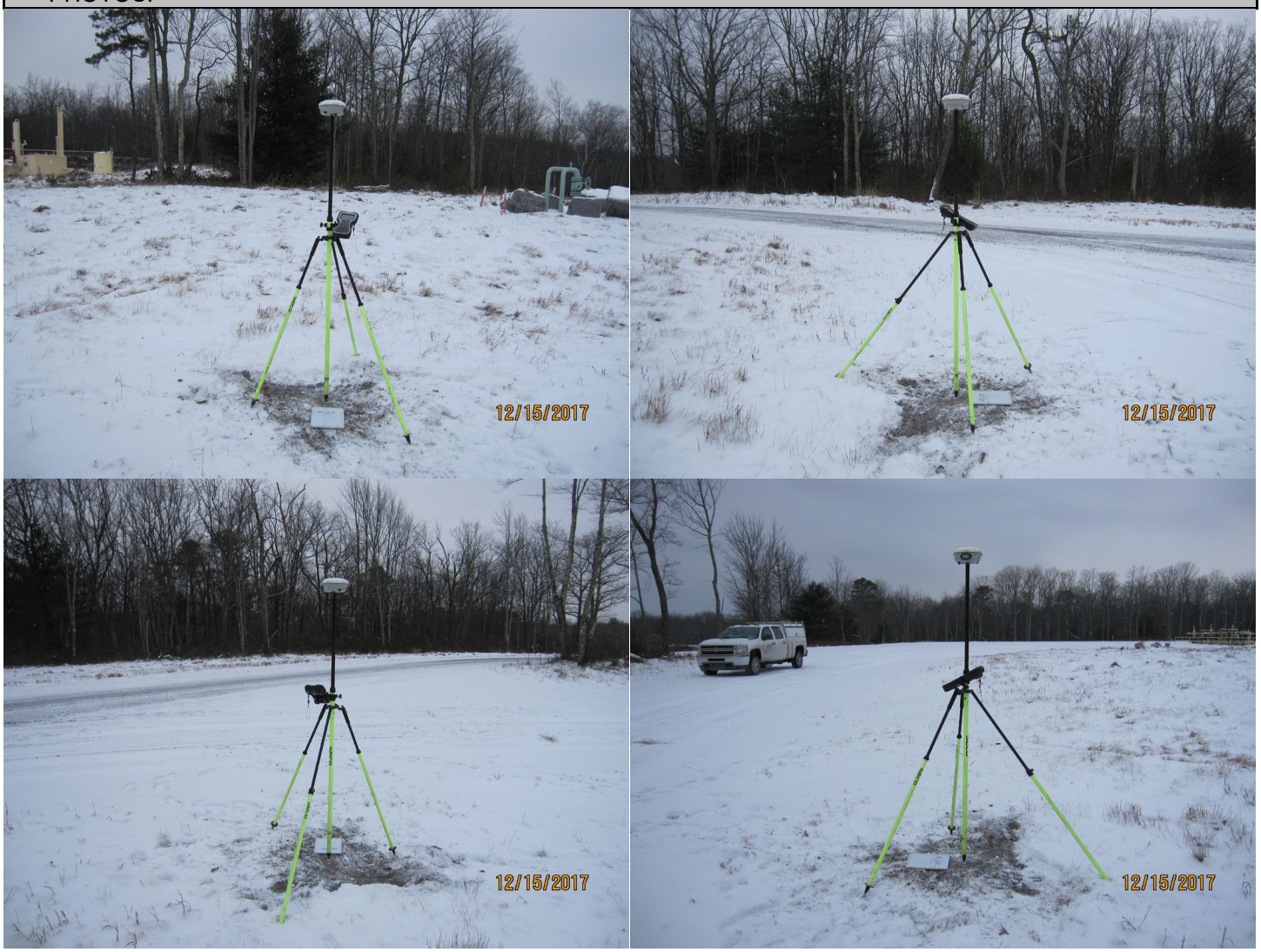
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581661.418	308900.503	588.894

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE07



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE08
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	White Pine

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4582751.429	321573.974	452.024

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.030
RMSE Z	0.050
GPS Method	Static

PHOTOS:







Point ID	BE08



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE09
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville North

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581914.983	341456.000	464.008

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE09



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE10
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571990.646	299211.584	571.447

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	BE10



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE11
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cogan Station

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

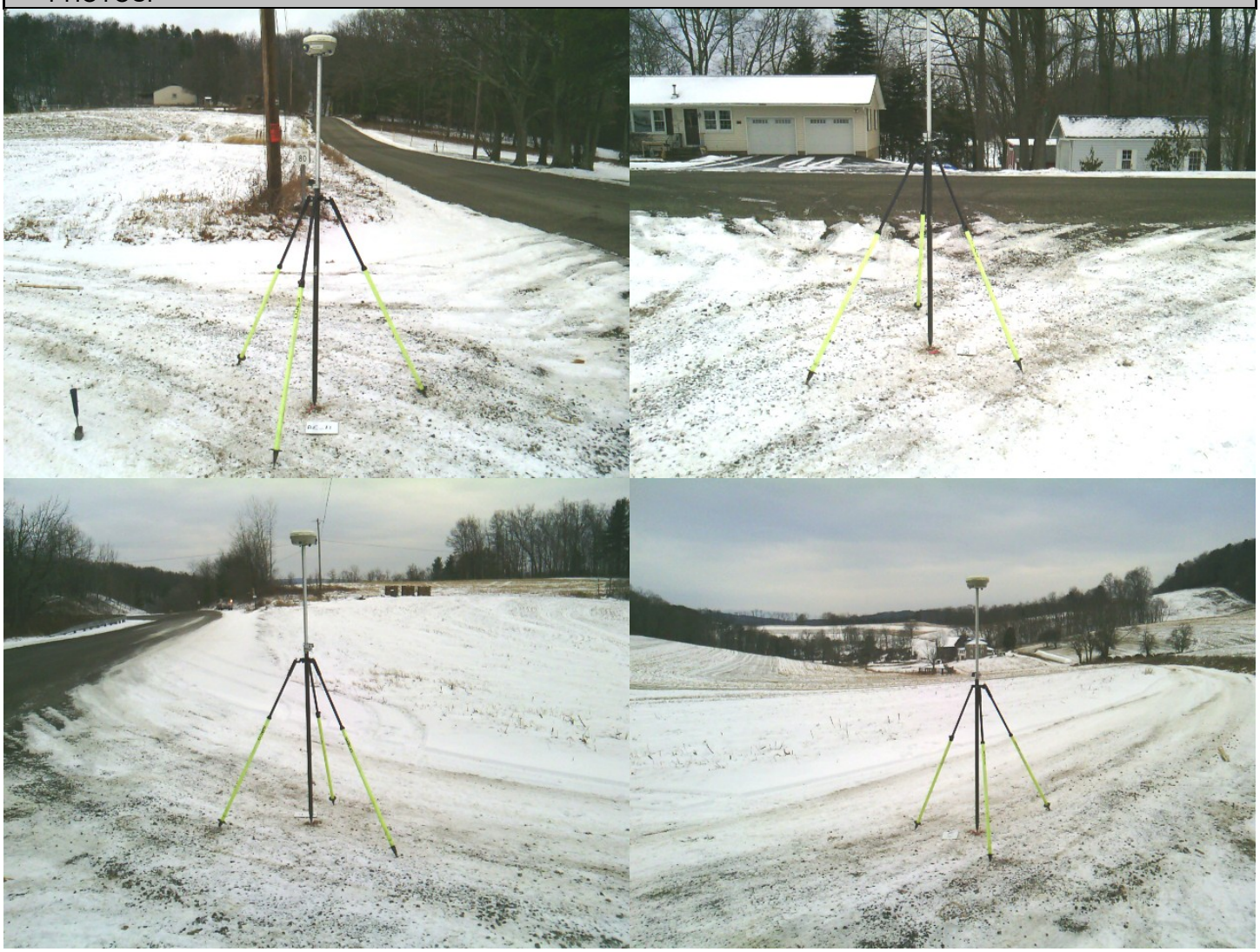
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570517.005	322495.581	303.988

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	BE11



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE12
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Picture Rocks

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570915.974	356498.399	195.332

Operator	Ed Starkey
Receiver Model	Trimble R-6 Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.014
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	BE12



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE13
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Elk Grove

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4569429.719	379329.816	352.773

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.016
RMSE Z	0.022
GPS Method	Network

PHOTOS:






Point ID	BE13



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE14
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Linden

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4559087.430	313623.430	194.818

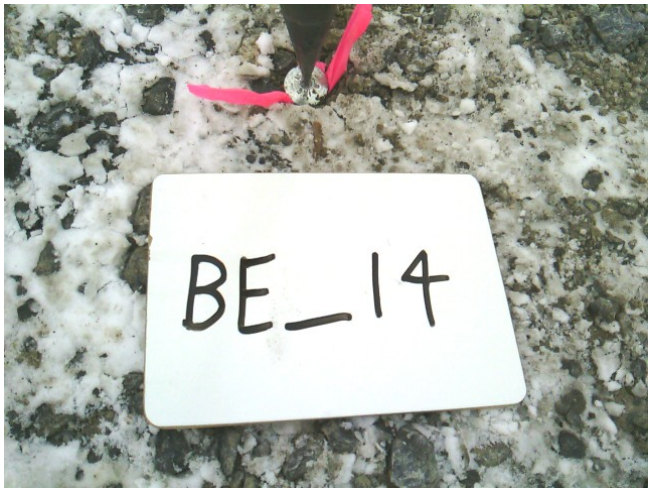
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.011
RMSE Z	0.016
GPS Method	Network

PHOTOS:



Point ID	BE14



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE15
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville South

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4559674.357	335242.134	206.254

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-04-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE15



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE16
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Hughesville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4560901.385	357514.619	207.017

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.016
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	BE16



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE17
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Lairdsville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4560590.359	369226.263	284.390

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.016
RMSE Z	0.018
GPS Method	Network

PHOTOS:






Point ID	BE17



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE18
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Benton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4560479.345	380497.940	259.247

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.020
RMSE Z	0.026
GPS Method	Network

PHOTOS:






Point ID	BE18



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE19
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Carroll

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4545684.192	320544.492	453.776

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.019
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	BE19



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE20
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Millville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4547967.146	364545.824	167.703

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	BE20



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE21
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Bloomsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548342.706	376691.521	252.151

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE21



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE22
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Beavertown

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

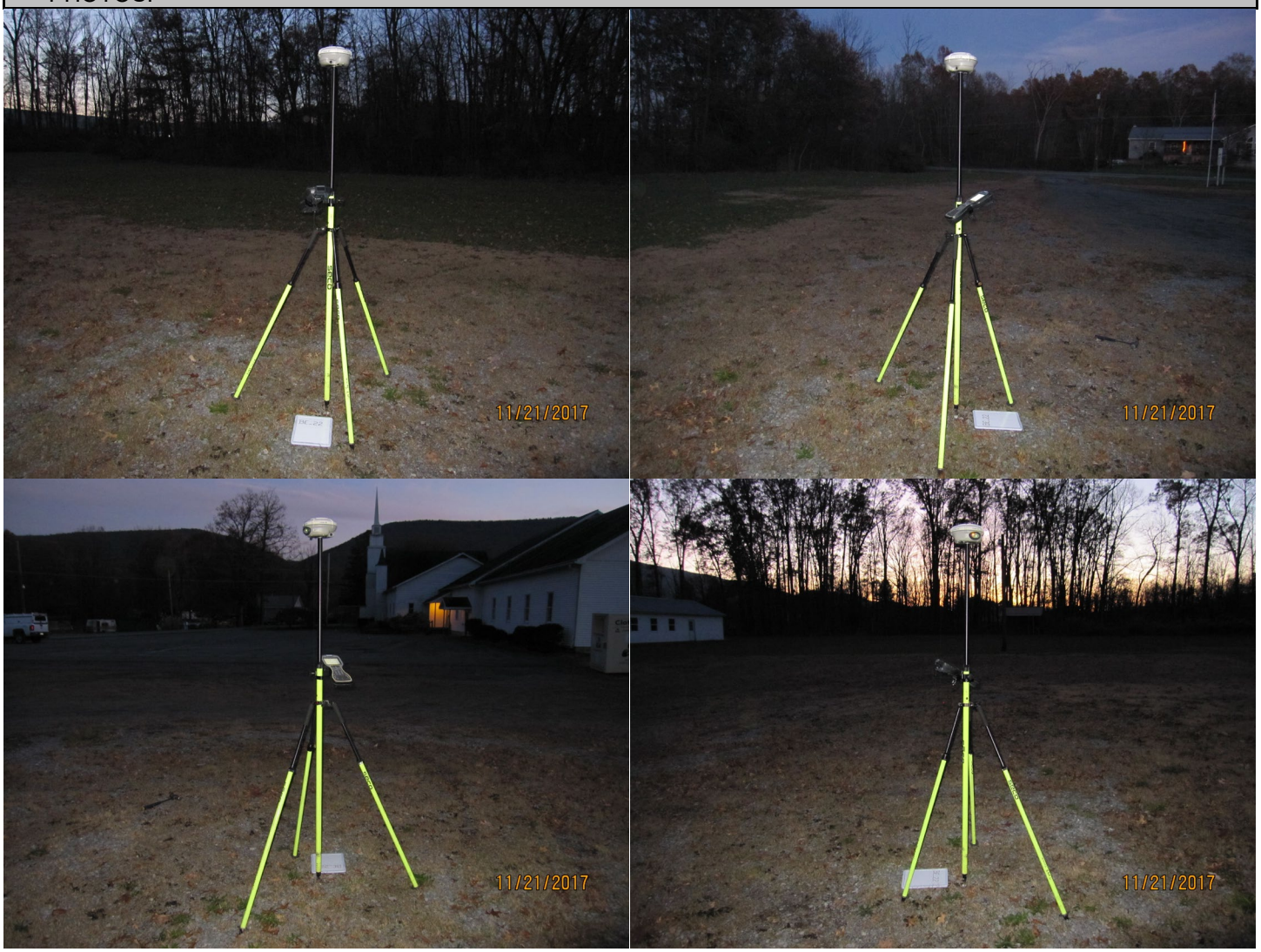
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4526634.883	314609.668	184.758

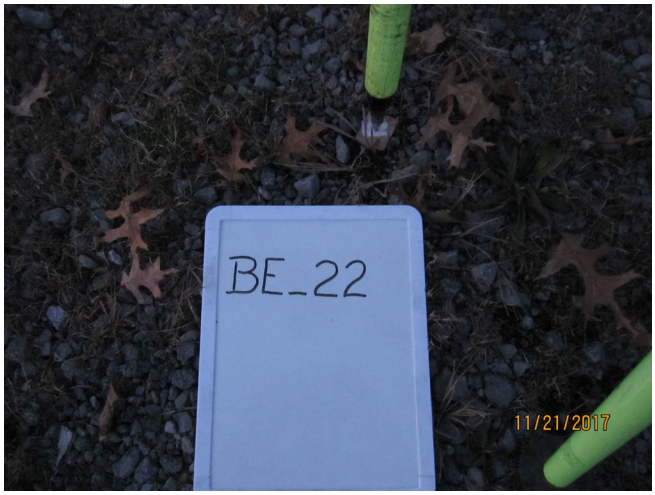
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE22



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE23
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Lewisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528063.392	336965.231	162.797

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.018
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	BE23



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE24
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528960.915	372737.051	173.056

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.015
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE24



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE25
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Shumans

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4532322.212	394653.848	344.895

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.015
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE25



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE26
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Weikert

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4516932.947	308510.164	224.738

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE26



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE27
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Beavertown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4517190.114	319987.169	179.172

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:









Point ID	BE27



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE28
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Middleburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4517902.989	331216.785	162.481

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.030
RMSE Z	0.033
GPS Method	Network

PHOTOS:



Point ID	BE28



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE29
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Trevorton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4518819.226	353725.442	215.133

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.015
RMSE Z	0.016
GPS Method	Network

PHOTOS:









Point ID	BE29



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE30
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Ashland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4518009.682	388434.160	403.803

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	BE30



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE31
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Alfarata

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4505956.855	289261.047	234.202

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	BE31



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE32
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Beaver Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4507770.513	313122.063	648.355

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.005
RMSE Z	0.023
GPS Method	Static

PHOTOS:



Point ID	BE32



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE33
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Dalmatia

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4507473.552	335919.793	238.542

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	BE33



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE34
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Klingerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4506908.960	358213.789	296.345

Operator	Ed Starkey
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE34



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE35
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Barrville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4501059.934	268921.068	271.373

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.013
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	BE35



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE36
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4501869.161	302575.015	230.560

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.014
RMSE Z	0.016
GPS Method	Network

PHOTOS:









Point ID	BE36



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE37
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Beaver Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500701.230	314089.372	198.653

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.011
RMSE Z	0.014
GPS Method	Network

PHOTOS:









Point ID	BE37



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE38
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Richfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4499960.159	330366.325	151.219

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.020
RMSE Z	0.030
GPS Method	Network

PHOTOS:









Point ID	BE38



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE39
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Millersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4498001.944	338731.614	165.347

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE39



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE40
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Newton Hamilton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4479589.855	258240.449	203.960

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.017
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	BE40



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE41
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McVeytown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478249.868	272532.267	342.235

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.006
RMSE Z	0.032
GPS Method	Static

PHOTOS:



Point ID	BE41



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE42
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Spruce Hill

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478935.827	295291.212	229.294

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-22-2017
RMSE Hz	0.018
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE42



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE43
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Ickesburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478704.700	306063.789	260.746

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.023
RMSE Z	0.031
GPS Method	Network

PHOTOS:



Point ID	BE43



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE44
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Newport

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478109.410	316416.166	206.368

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.017
RMSE Z	0.028
GPS Method	Network

PHOTOS:



Point ID	BE44



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE45
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Duncannon

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478555.551	328133.036	124.509

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.024
RMSE Z	0.037
GPS Method	Network

PHOTOS:



Point ID	BE45



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE46
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Blair Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466716.480	273392.549	210.888

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.006
RMSE Z	0.037
GPS Method	Static

PHOTOS:



Point ID	BE46



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE47
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Blain

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466777.378	284682.303	225.853

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-22-2017
RMSE Hz	0.018
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE47



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE48
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Landisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4468641.502	306922.768	186.750

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.014
RMSE Z	0.012
GPS Method	Network

PHOTOS:



Point ID	BE48



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE49
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Shermans Dale

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469456.164	318412.216	153.307

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.020
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	BE49



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE50
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Harrisburg West

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469177.892	330401.260	106.738

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.013
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	BE50



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE51
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Newburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4453745.568	286094.875	221.194

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	BE51



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE52
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mechanicsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4452580.873	319458.953	141.765

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:









Point ID	BE52



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE53
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Fannettsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444982.809	263108.531	250.264

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	BE53



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE54
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Roxbury

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444564.592	274144.662	224.130

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	BE54



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE55
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Shippensburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444272.082	285183.353	192.182

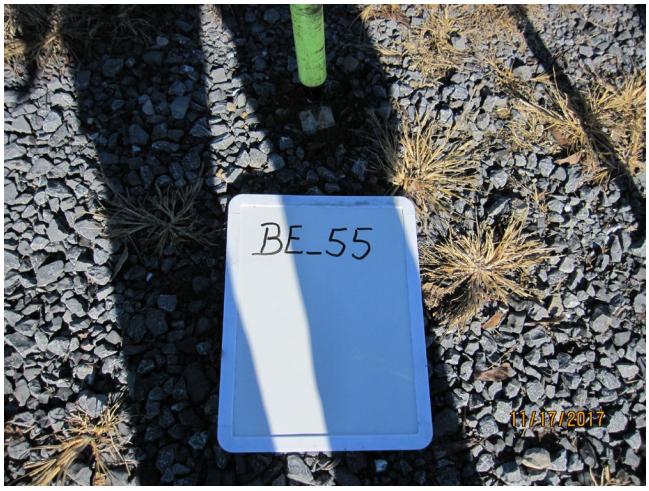
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-17-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	BE55



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE56
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Newville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444817.999	296972.320	194.335

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-17-2017
RMSE Hz	0.020
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	BE56



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE57
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Carlisle

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444603.387	309763.749	173.762

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.025
RMSE Z	0.033
GPS Method	Network

PHOTOS:



Point ID	BE57



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE58
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mechanicsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4445634.904	320970.402	154.927

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	BE58



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE59
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Roxbury

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4437707.158	268504.079	226.852

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-29-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE59



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE60
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Dickinson

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4433848.209	302983.689	267.559

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-30-2017
RMSE Hz	0.020
RMSE Z	0.026
GPS Method	Network

PHOTOS:









Point ID	BE60



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE61
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Dillsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4435134.837	320238.103	184.527

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-30-2017
RMSE Hz	0.013
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	BE61



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE62
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	McConnellsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424061.016	247443.323	697.088

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE62



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE63
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Saint Thomas

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424641.293	258986.715	222.087

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:









Point ID	BE63



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE64
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Chambersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4425098.431	268546.702	226.843

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.015
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	BE64



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE65
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Caledonia Park

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4423429.143	290578.781	415.411

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.027
RMSE Z	0.050
GPS Method	Network

PHOTOS:



Point ID	BE65



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE66
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Hampton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4426821.950	326029.018	154.590

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.017
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	BE66



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE67
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Williamson

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411802.622	256159.419	173.215

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-28-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE67



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE68
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Greencastle

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4410733.192	267300.358	173.241

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.015
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE68



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE69
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Waynesboro

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411498.388	278475.047	257.878

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-07-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	BE69



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE70
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Iron Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411765.046	288912.310	429.567

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	BE70



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE71
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Fairfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411804.683	300134.995	188.959

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.016
RMSE Z	0.022
GPS Method	Network

PHOTOS:









Point ID	BE71



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE72
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Gettysburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4412262.987	312615.735	163.792

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.020
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	BE72



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE73
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	McSherrystown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411458.223	324620.440	167.243

Operator	LBC
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:









Point ID	BE73



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE74
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Cherry Run

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403114.415	239511.397	152.128

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-28-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	BE74



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE75
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Clear Spring

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403006.811	251120.157	246.843

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-27-2017
RMSE Hz	0.026
RMSE Z	0.027
GPS Method	Network

PHOTOS:



Point ID	BE75



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE76
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Mason and Dixon

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403055.539	262030.856	177.487

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-27-2017
RMSE Hz	0.018
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	BE76



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE77
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Hagerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401986.458	273696.942	202.961

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE77



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE78
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Blue Ridge Summit

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4402197.906	286156.736	356.054

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.021
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	BE78



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE79
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Emmitsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4400984.294	296871.674	149.124

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE79



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE80
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Taneytown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401799.025	308000.968	130.317

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE80



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE81
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Littlestown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4400720.185	321756.466	179.556

Operator	LBC
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.016
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	BE81



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE82
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478506.668	362649.446	196.672

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.020
RMSE Z	0.029
GPS Method	Network

PHOTOS:



Point ID	BE82



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE83
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

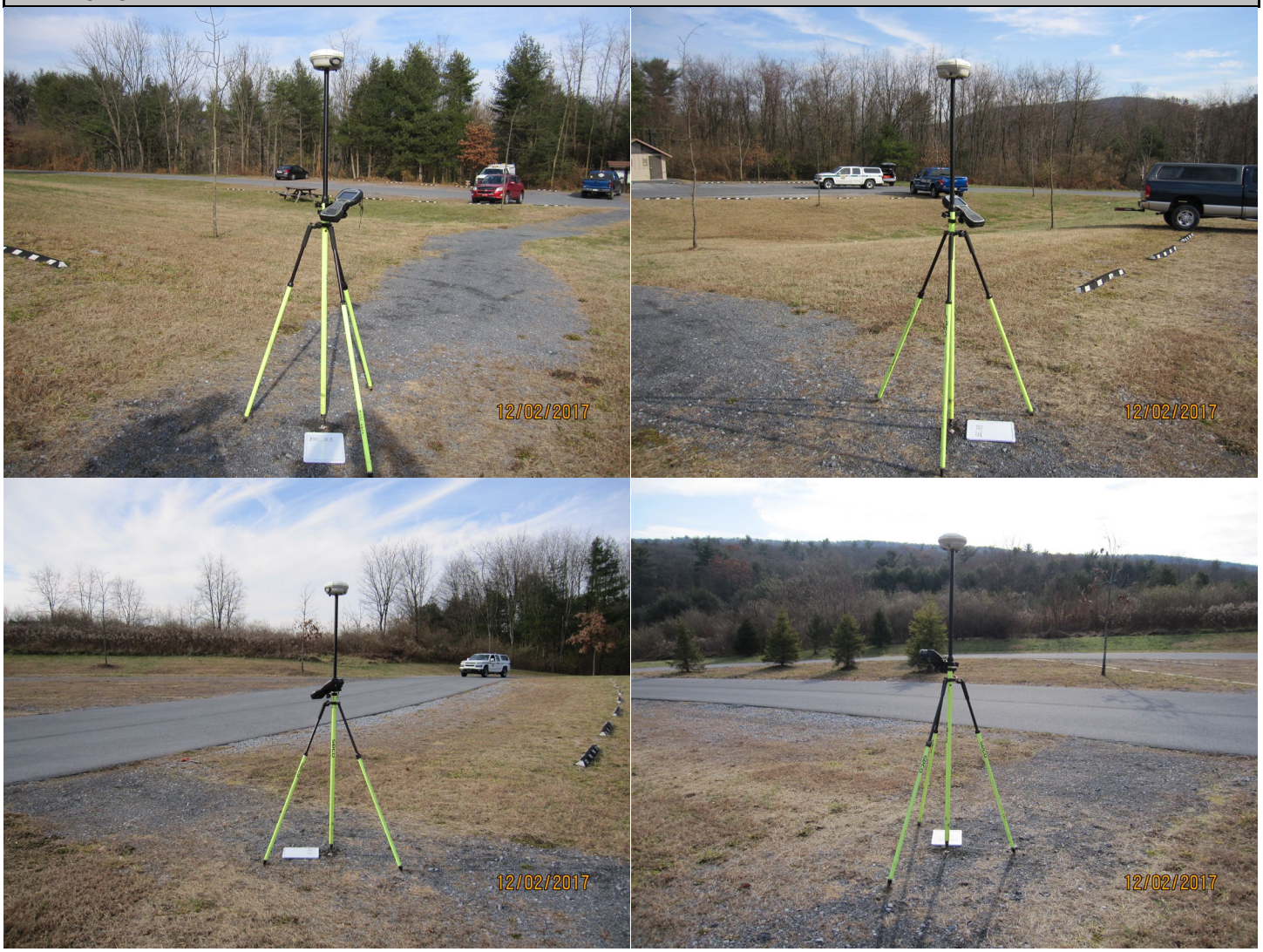
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4482490.722	368967.885	164.291

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE83



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE84
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Palmyra

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466276.483	363757.636	150.799

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	BE84



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE85
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Fredericksburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4472956.576	380232.308	142.146

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-01-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	BE85



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE86
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Elizabethtown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4453103.753	367337.291	135.876

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.018
RMSE Z	0.025
GPS Method	Network

PHOTOS:









Point ID	BE86



220 St Charles Way, Suite 200 York, PA 17402

Point ID	BE87
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Richland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4462208.994	389681.747	184.243

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.014
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	BE87



Appendix C

NVA-Urban Area Point Log Sheets

UA01,4594104.265,291053.096,224.650
UA02,4596648.670,336853.518,255.983
UA03,4581908.210,297746.315,199.789
UA04,4583612.593,328093.410,207.179
UA05,4583681.398,350096.664,236.697
UA06,4563717.394,310017.448,190.516
UA07,4565798.335,332739.758,195.771
UA08,4566685.513,356040.950,175.022
UA09,4565730.630,372962.119,374.495
UA10,4567707.727,386326.207,278.184
UA11,4550568.625,342889.352,145.462
UA12,4549990.883,367548.425,197.729
UA13,4546370.796,394643.450,160.891
UA14,4533910.226,319798.692,251.628
UA15,4535625.524,338646.509,146.321
UA16,4536193.493,369225.094,180.098
UA17,4511746.565,301647.243,220.698
UA18,4510000.328,329553.132,181.461
UA19,4516878.174,369007.920,223.931
UA20,4500740.022,280906.468,186.473
UA21,4500858.608,307242.662,192.532
UA22,4501888.683,339347.894,150.386
UA23,4486779.380,267433.664,169.446
UA24,4486216.748,269294.664,217.129
UA25,4489124.985,297957.551,135.476
UA26,4489982.223,318174.097,137.352
UA27,4489689.542,329903.152,185.327
UA28,4472207.007,278846.870,190.945
UA29,4471040.970,300770.996,175.867
UA30,4473109.807,326612.527,163.614
UA31,4455995.409,270374.285,286.300
UA32,4452945.202,297587.708,162.166
UA33,4452236.910,304700.820,156.382
UA34,4453450.566,328974.769,130.979
UA35,4438681.527,258635.545,268.809
UA36,4437532.754,277417.195,207.806
UA37,4437467.051,287087.200,206.947
UA38,4436757.149,316096.480,290.790
UA39,4422304.465,251695.679,193.023
UA40,4422632.442,262411.286,198.835
UA41,4423075.592,275220.041,201.121
UA42,4421835.368,303384.875,217.904
UA43,4424432.951,316327.109,179.804
UA44,4421297.477,330903.113,143.369
UA45,4413288.581,245305.614,227.137
UA46,4409903.851,259823.948,187.205
UA47,4406491.781,271362.474,239.649
UA48,4406097.531,296325.996,187.865
UA49,4407425.936,311438.390,145.056
UA50,4407485.048,326710.097,165.526
UA51,4485920.122,371813.166,167.861
UA52,4475760.106,364110.175,133.743
UA53,4475657.617,385514.954,160.652

UA54,4463609.179,366139.644,133.249
UA55,4465404.437,394661.385,150.684

220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA01
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Slate Run

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

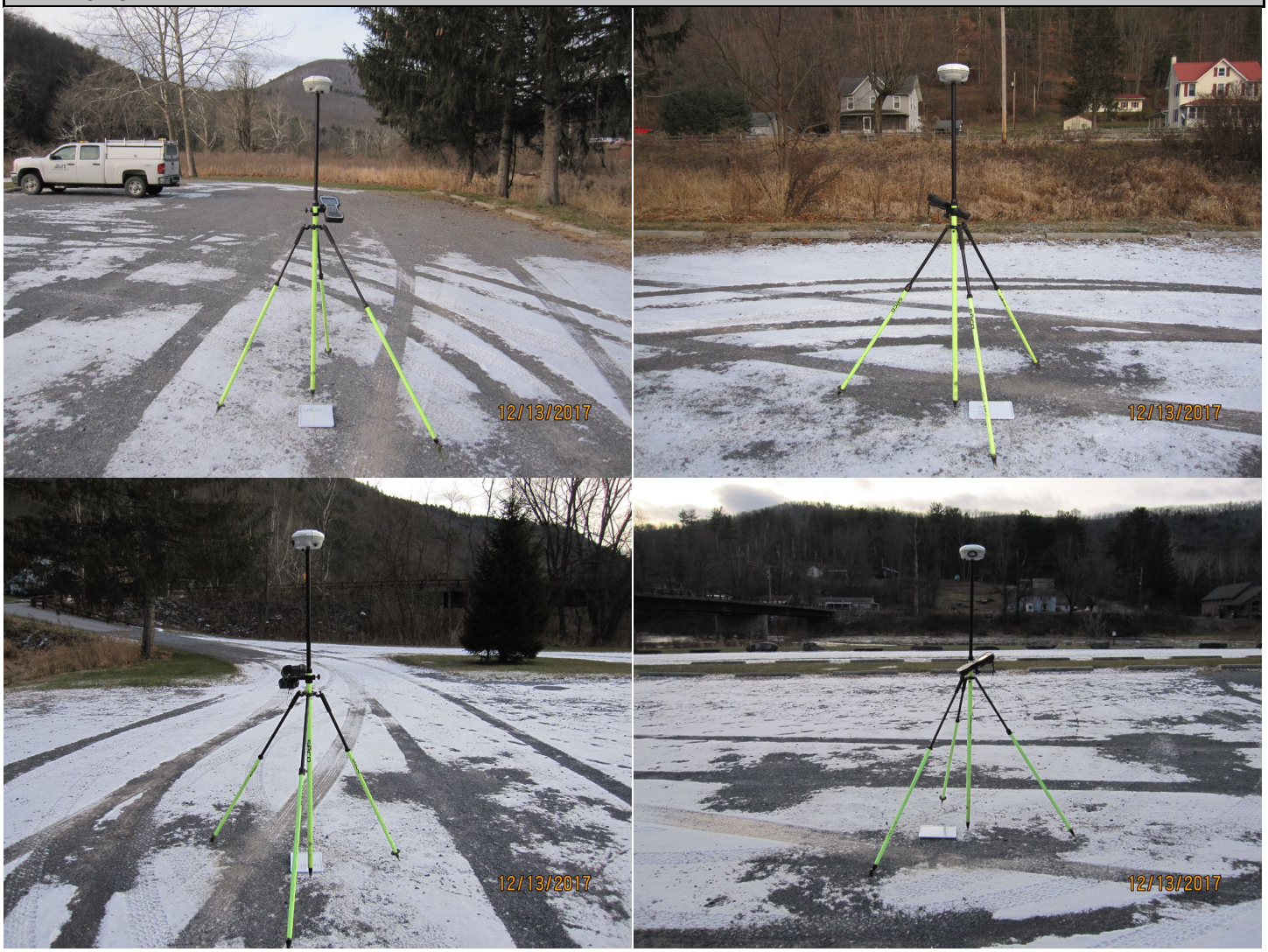
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4594104.265	291053.096	224.650

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.021
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	UA01



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA02
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Ralston

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4596648.670	336853.518	255.983

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.022
RMSE Z	0.029
GPS Method	Network

PHOTOS:



Point ID	UA02



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA03
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581908.210	297746.315	199.789

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.019
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	UA03



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA04
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Trout Run

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4583612.593	328093.410	207.179

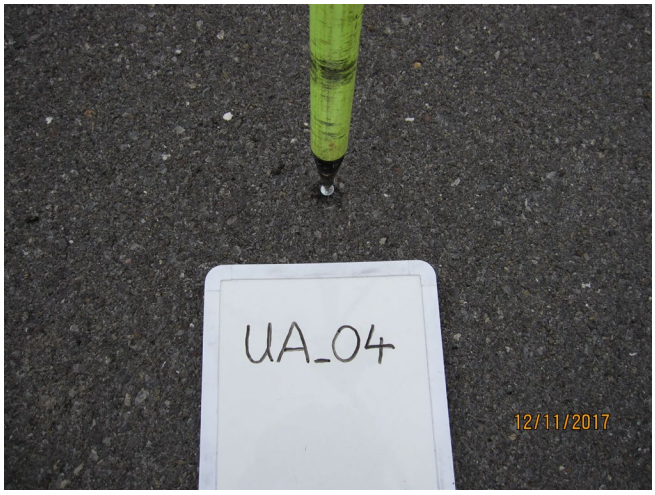
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.018
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	UA04



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA05
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Barbours

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4583681.398	350096.664	236.697

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.013
RMSE Z	0.015
GPS Method	Network

PHOTOS:









Point ID	UA05



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA06
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Shore

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4563717.394	310017.448	190.516

Operator	Ed Starkey
Receiver Model	Trimble R-8, Model 3
Receiver S/N	513842883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.011
RMSE Z	0.015
GPS Method	Network

PHOTOS:









Point ID	UA06



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA07
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville South

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4565798.335	332739.758	195.771

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.022
RMSE Z	0.030
GPS Method	Network

PHOTOS:









Point ID	UA_07



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA08
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Hughesville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4566685.513	356040.950	175.022

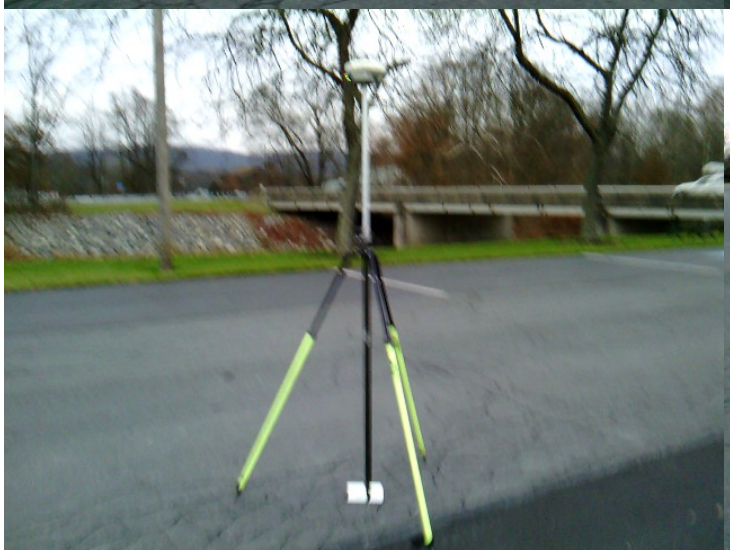
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.013
RMSE Z	0.013
GPS Method	Network

PHOTOS:









Point ID	UA08



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA09
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Lairdsville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4565730.630	372962.119	374.495

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:

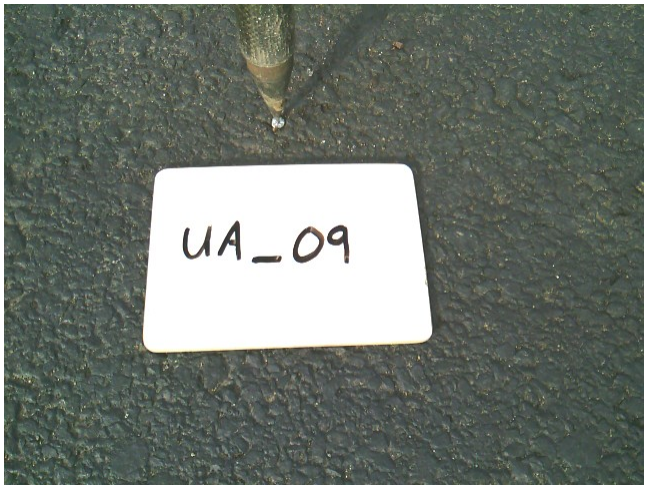








Point ID	UA09



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA10
Project No.	31064
Project Name	PA SOUTH CENTRAL 2017 D7
State	Pennsylvania
County	Columbia
Quad	Red Rock

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4567707.727	386326.207	278.184

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:






Point ID	UA10



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA11
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Milton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4550568.625	342889.352	145.462

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	UA11



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA12
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Millville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4549990.883	367548.425	197.729

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-08-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA12



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA13
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Mifflinville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4546370.796	394643.450	160.891

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.017
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	UA13



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA14
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Hartleton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4533910.226	319798.692	251.628

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.017
RMSE Z	0.019
GPS Method	Network

PHOTOS:

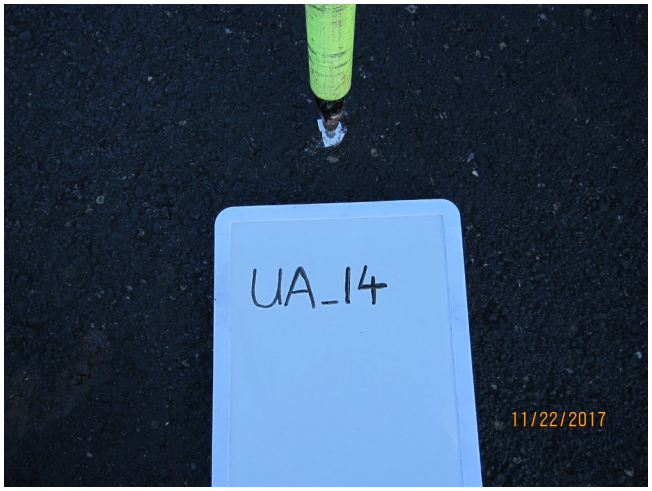








Point ID	UA14



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA15
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Lewisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4535625.524	338646.509	146.321

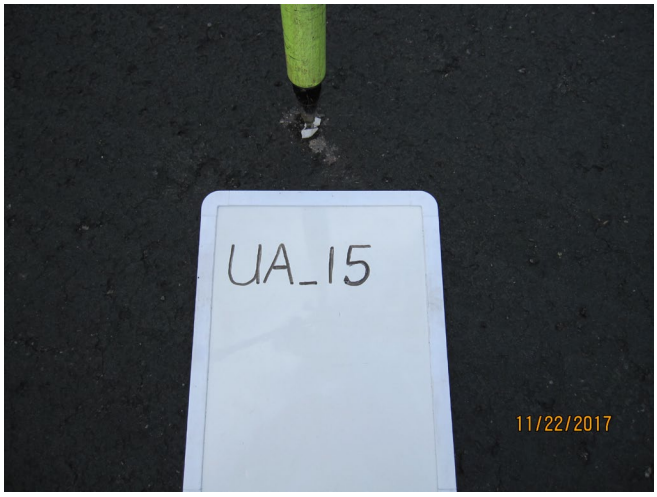
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA15



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA16
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Montour
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4536193.493	369225.094	180.098

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	UA16



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA17
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4511746.565	301647.243	220.698

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	UA17



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA18
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Richfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4510000.328	329553.132	181.461

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 / 2.480 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:









Point ID	UA18



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA19
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4516878.174	369007.920	223.931

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.015
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	UA19



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA20
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Burnham

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500740.022	280906.468	186.473

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.017
RMSE Z	0.019
GPS Method	Network

PHOTOS:









Point ID	UA20



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA21
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500858.608	307242.662	192.532

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	513842883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.009
RMSE Z	0.011
GPS Method	Network

PHOTOS:









Point ID	UA21



Point ID	UA22
Project No.	31064

	Aerial Target
	LiDAR Ground Control

Coordinate System
NAD83(2011)

220 St Charles Way, Suite 200 York, PA 17402

Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Dalamatia

X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4501888.683	339347.894	150.386

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.017
RMSE Z	0.019
GPS Method	Network

PHOTOS:






Point ID	UA21



Point ID	UA23
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control

Coordinate System
NAD83(2011)
UTM18
NAVD88

220 St Charles Way, Suite 200 York, PA 17402

County	Mifflin
Quad	McVeytown

	Photo ID
	Published Control

GEOID12B
Meters

Northing	Easting	Elevation
4486779.380	267433.664	169.446

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	UA23


UA_23
12/18/2017

220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA24
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	McVeytown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4486216.748	269294.664	217.129

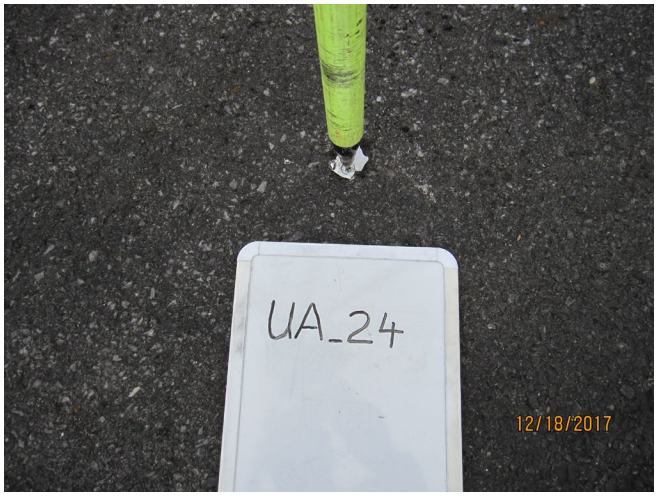
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA24



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA25
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Mifflintown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4489124.985	297957.551	135.476

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	UA25



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA26
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Millerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4489982.223	318174.097	137.352

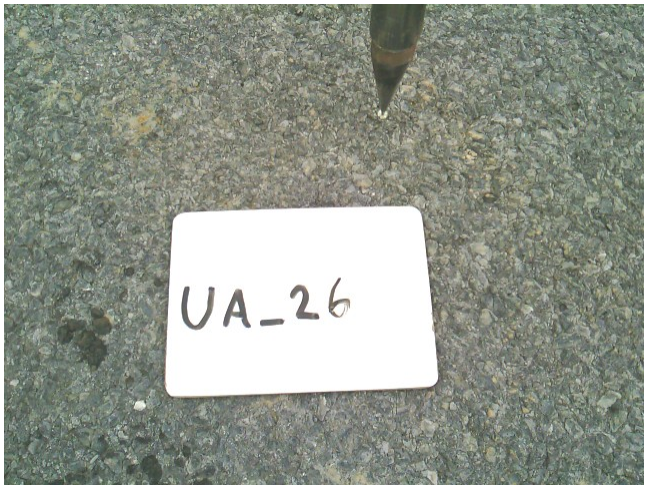
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.013
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	UA26



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA27
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Reward

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4489689.542	329903.152	185.327

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:






Point ID	UA27



Point ID	UA28
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Blain

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

220 St Charles Way, Suite 200 York, PA 17402

Northing	Easting	Elevation
4472207.007	278846.870	190.945

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:

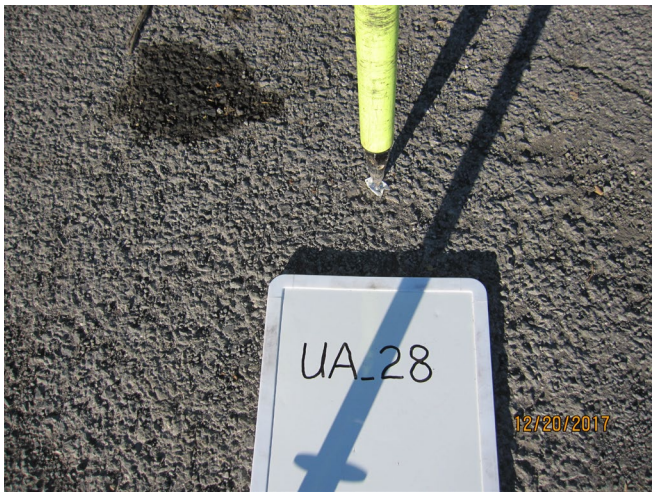








Point ID	UA28


UA_28
12/20/2017

220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA29
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Landisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4471040.970	300770.996	175.867

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	UA29



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA30
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Duncannon

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4473109.807	326612.527	163.614

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.017
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	UA30



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA31
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Doylesburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4455995.409	270374.285	286.300

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	UA31



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA32
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Newville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4452945.202	297587.708	162.166

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	UA32



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA33
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Plainfield

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

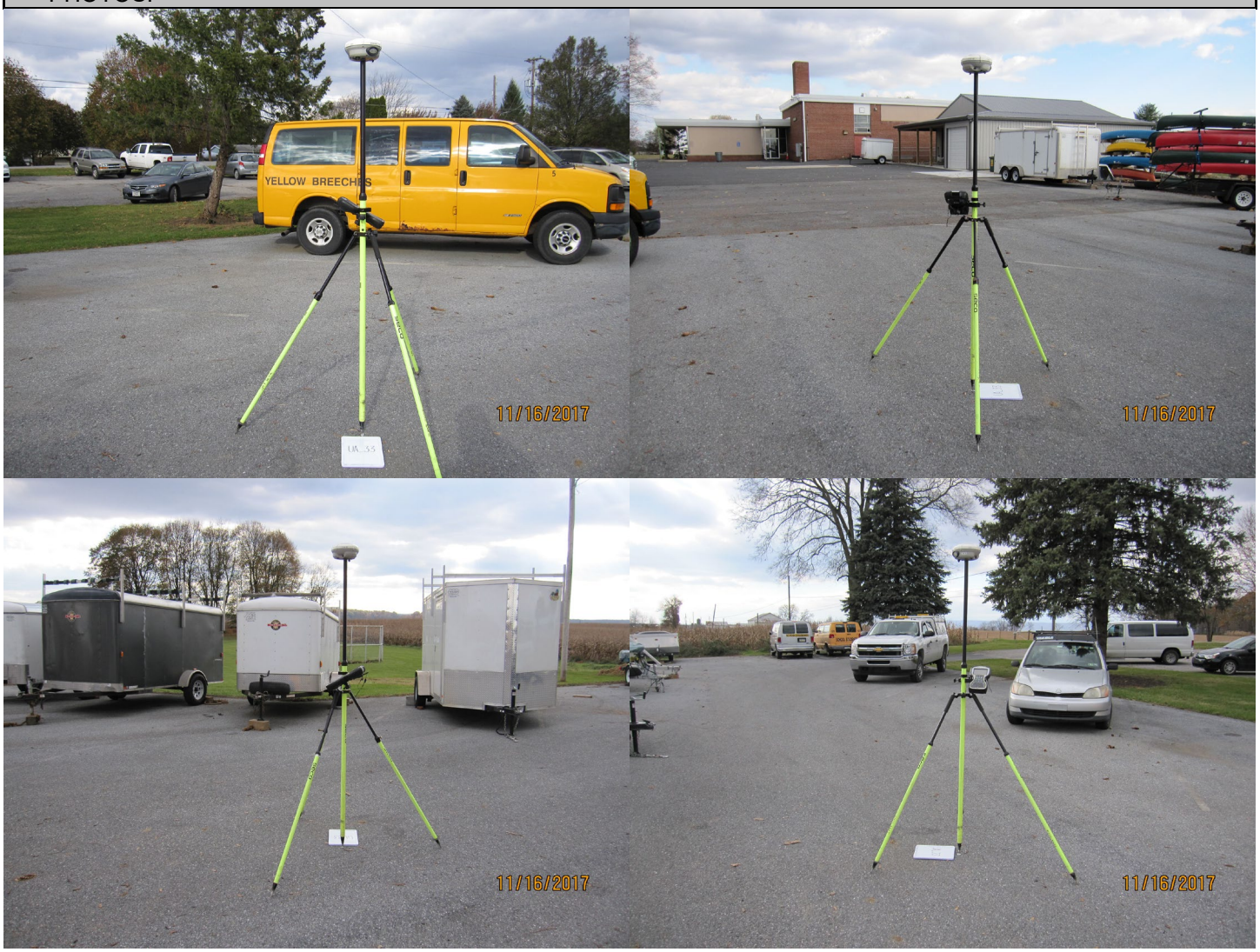
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4452236.910	304700.820	156.382

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	UA33



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA34
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mechanicsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

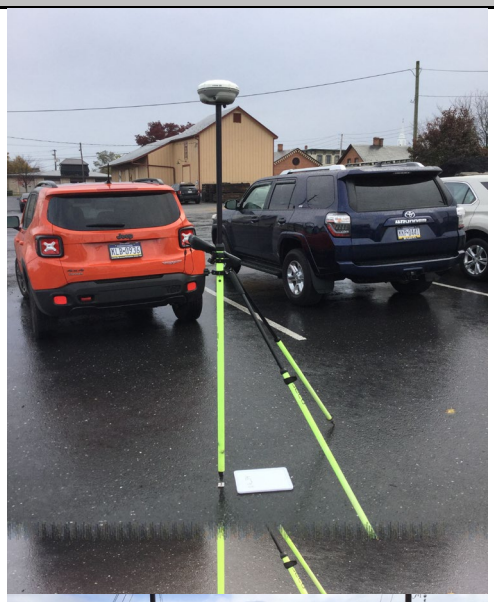
Northing	Easting	Elevation
4453450.566	328974.769	130.979

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:









Point ID	UA34



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA35
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Fannettsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4438681.527	258635.545	268.809

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.017
RMSE Z	0.020
GPS Method	Network

PHOTOS:



Point ID	UA35



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA36
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Shippensburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4437532.754	277417.195	207.806

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-15-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	UA36



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA37
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Walnut Bottom

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

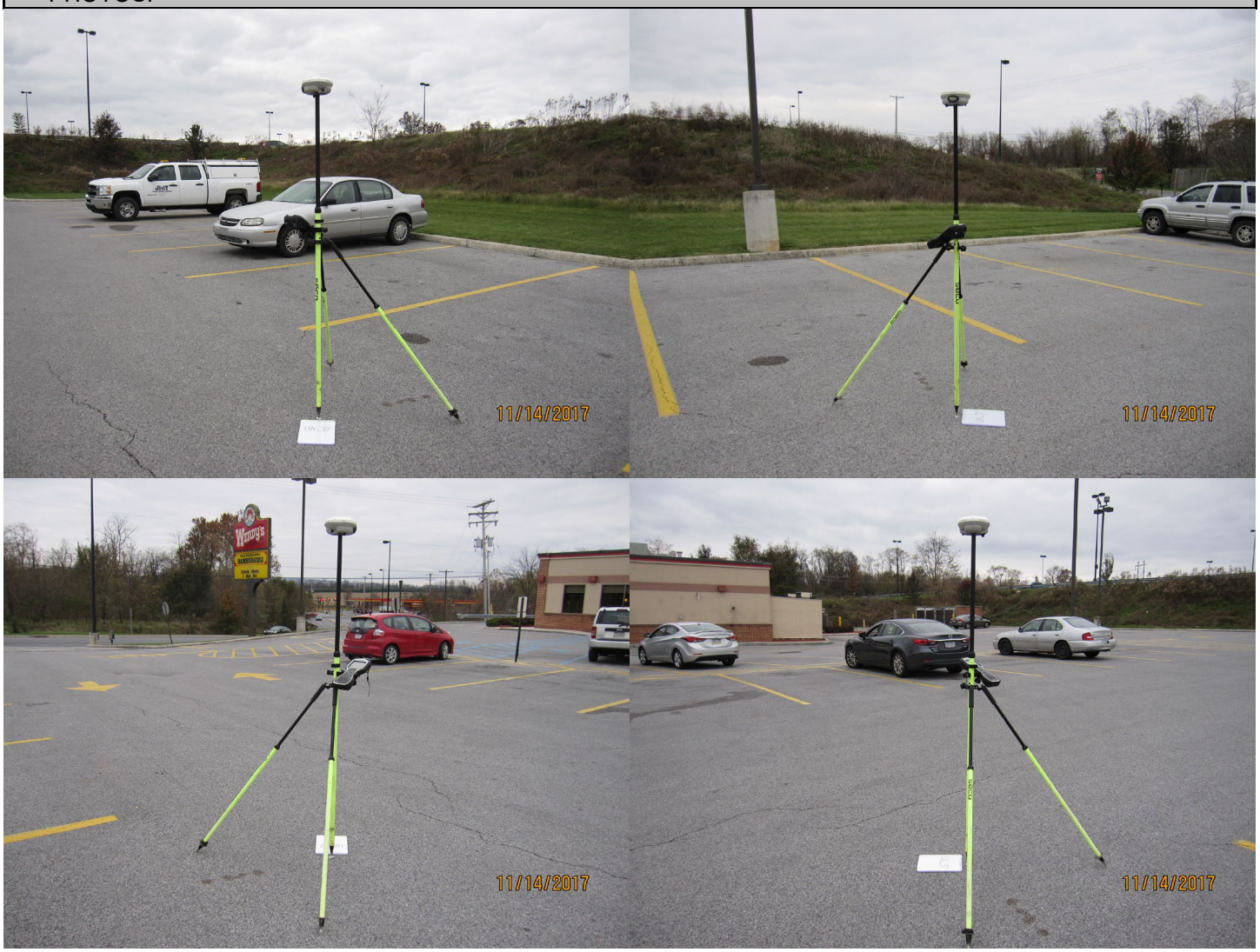
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4437467.051	287087.200	206.947

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	UA37



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA38
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Mount Holly Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4436757.149	316096.480	290.790

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-06-2017
RMSE Hz	0.018
RMSE Z	0.024
GPS Method	Network

PHOTOS:









Point ID	UA38



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA39
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	McConnellsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4422304.465	251695.679	193.023

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.015
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	UA39



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA40
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Saint Thomas

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4422632.442	262411.286	198.835

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.019
RMSE Z	0.027
GPS Method	Network

PHOTOS:



Point ID	UA40



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA41
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Chambersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4423075.592	275220.041	201.121

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA41



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA42
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Ardentsville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4421835.368	303384.875	217.904

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-31-2017
RMSE Hz	0.019
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA42



Point ID	UA43
Project No.	31064

	Aerial Target
	LiDAR Ground Control

Coordinate System
NAD83(2011)

220 St Charles Way, Suite 200 York, PA 17402

Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Biglerville

X	LiDAR QC Point	UTM18
	New Control	NAVD88
	Photo ID	GEOID12B
	Published Control	Meters

Northing	Easting	Elevation
4424432.951	316327.109	179.804

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.017
RMSE Z	0.019
GPS Method	Network

PHOTOS:

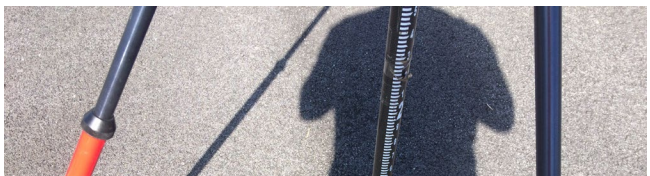








Point ID	UA43



Point ID	UA44
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Abbottstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4421297.477	330903.113	143.369

Operator	Tod Yeisley, or LBC, Ed Starkey
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:









Point ID	UA44



Point ID	UA45
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Mercersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4413288.581	245305.614	227.137

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-28-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:









Point ID	UA45



Point ID	UA46
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Williamson

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4409903.851	259823.948	187.205

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-27-2017
RMSE Hz	0.016
RMSE Z	0.020
GPS Method	Network

PHOTOS:









Point ID	UA46



Point ID	UA47
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Greencastle

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4406491.781	271362.474	239.649

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	UA47



Point ID	UA48
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Iron Springs

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4406097.531	296325.996	187.865

Operator	Tod Yeisley/Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.018
RMSE Z	0.028
GPS Method	Network

PHOTOS:







Point ID	UA48



Point ID	UA49
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Gettysburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4407425.936	311438.390	145.056

Operator	Tod Yeisley/Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



220 St Charles Way, Suite 200 York, PA 17402

Point ID	UA49



Point ID	UA50
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	McSherrystown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4407485.048	326710.097	165.526

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.023
RMSE Z	0.027
GPS Method	Network

PHOTOS:









Point ID	UA50



Point ID	UA51
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Tower City

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485920.122	371813.166	167.861

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.014
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	UA51



Point ID	UA52
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4475760.106	364110.175	133.743

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA52



Point ID	UA53
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Bethel

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4475657.617	385514.954	160.652

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	UA53



Point ID	UA54
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Palmyra

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4463609.179	366139.644	133.249

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.022
RMSE Z	0.027
GPS Method	Network

PHOTOS:









Point ID	UA54



Point ID	UA55
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Womelsdorf

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4465404.437	394661.385	150.684

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	UA_55



VVA-Tall Weed Point Log Sheets

Appendix D

TW01,4597484.032,284394.416,603.305
TW02,4599581.661,306340.423,532.669
TW03,4604168.005,343749.551,608.300
TW04,4580853.665,298733.519,206.837
TW05,4582981.620,321551.768,443.310
TW06,4583970.558,351403.107,227.947
TW07,4545711.543,320547.903,453.761
TW08,4547918.769,342960.181,150.871
TW09,4548348.144,376700.686,252.553
TW10,4548911.705,390242.354,279.544
TW11,4526645.792,314595.102,185.086
TW12,4528071.067,336933.691,161.894
TW13,4528851.236,359574.678,256.969
TW14,4527771.415,383610.527,254.035
TW15,4500912.585,268762.368,272.434
TW16,4502050.052,291194.870,174.237
TW17,4500808.317,307222.465,192.766
TW18,4499928.757,330372.755,151.312
TW19,4466678.418,273445.118,212.480
TW20,4468483.064,295691.496,211.906
TW21,4469080.000,331604.730,105.699
TW22,4444841.805,262764.790,258.347
TW23,4444267.598,285189.538,191.850
TW24,4444616.004,309731.628,173.527
TW25,4422228.894,251656.576,191.221
TW26,4425107.495,268556.228,226.931
TW27,4421853.075,303406.981,216.382
TW28,4421327.596,330955.706,141.126
TW29,4403072.990,239473.802,146.672
TW30,4403009.069,251141.912,245.770
TW31,4403034.799,262094.560,173.763
TW32,4401994.352,273728.056,203.478
TW33,4400979.313,296886.625,148.852
TW34,4401802.324,307986.086,130.478
TW35,4400783.114,321688.759,177.218
TW36,4475754.913,364151.698,133.391
TW37,4475455.208,381756.700,145.948
TW38,4463594.117,366177.389,134.227
TW39,4462213.032,389686.693,184.130

220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW01
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Slate Run/Lee Fire Tower

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4597484.032	284394.416	603.305

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.019
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	TW01



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW02
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Morris

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4599581.661	306340.423	532.669

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.020
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	TW02



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW03
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Grover

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4604168.005	343749.551	608.300

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.006
RMSE Z	0.023
GPS Method	Static

PHOTOS:



Point ID	TW03



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW04
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4580853.665	298733.519	206.837

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.025
RMSE Z	0.036
GPS Method	Network

PHOTOS:



Point ID	TW04



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW05
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	White Pine

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4582981.620	321551.768	443.310

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.006
RMSE Z	0.022
GPS Method	Static

PHOTOS:

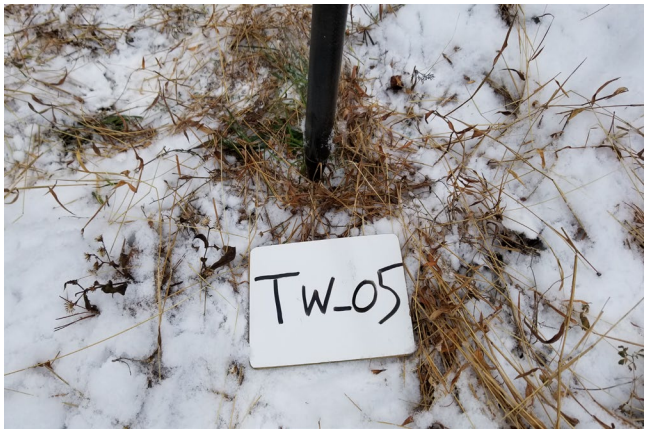








Point ID	TW05



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW06
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Barbours

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4583970.558	351403.107	227.947

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	513469606
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.006
RMSE Z	0.018
GPS Method	Static

PHOTOS:





Point ID	TW06



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW07
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Williamsport SE

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4545711.543	320547.903	453.761

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.026
RMSE Z	0.029
GPS Method	Network

PHOTOS:



Point ID	TW07



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW08
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Milton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4547918.769	342960.181	150.871

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	0.012
RMSE Z	0.015
GPS Method	Network

PHOTOS:



Point ID	TW08



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW09
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Bloomsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548348.144	376700.686	252.553

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	TW09



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW10
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Mifflinville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548911.705	390242.354	279.544

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.020
RMSE Z	0.024
GPS Method	Network

PHOTOS:









Point ID	TW10



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW11
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Beavertown

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

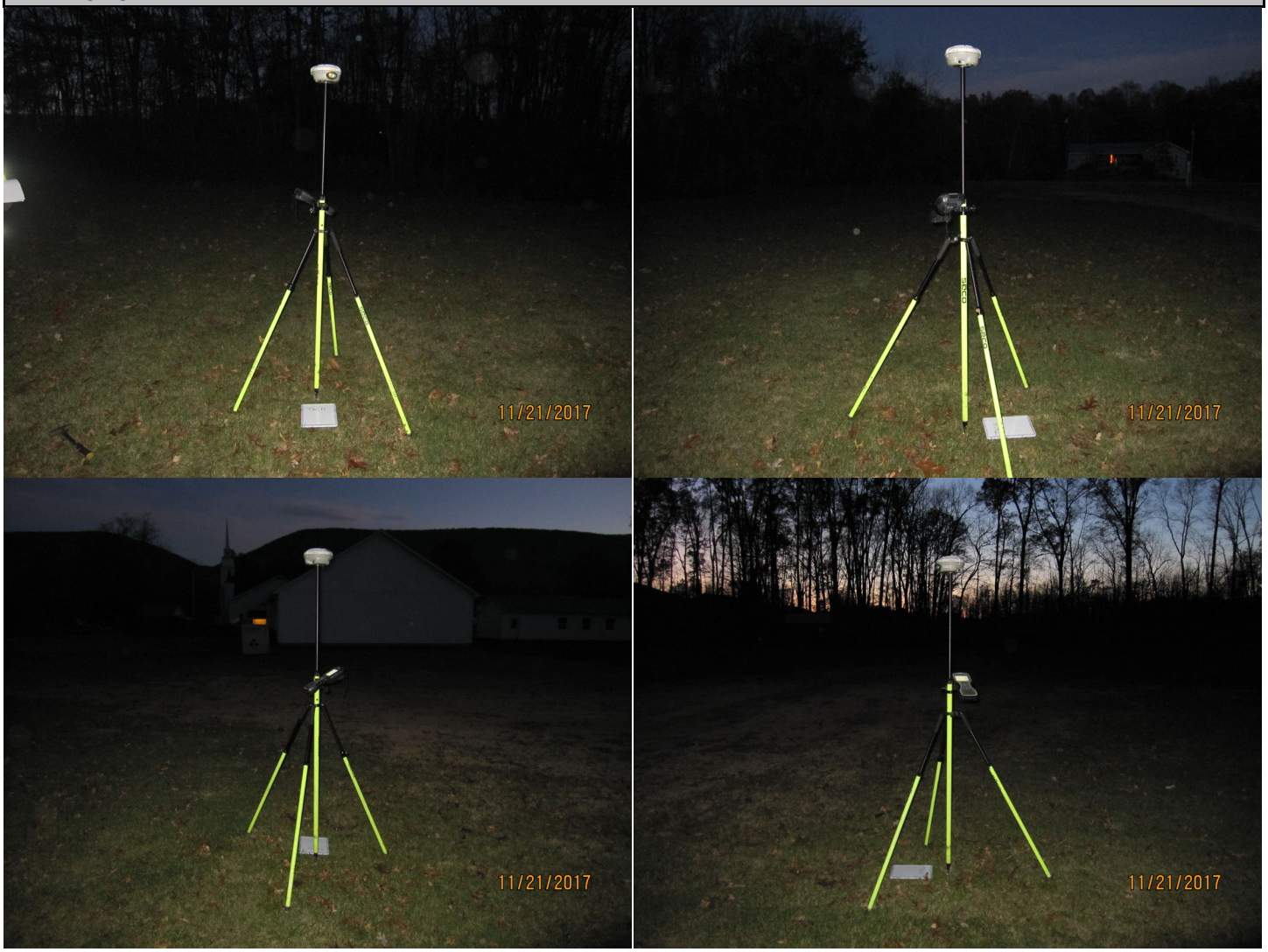
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4526645.792	314595.102	185.086

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.021
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	TW11



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW12
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Lewisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528071.067	336933.691	161.894

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.021
RMSE Z	0.024
GPS Method	Network

PHOTOS:









Point ID	TW12



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW13
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Riverside

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4528851.236	359574.678	256.969

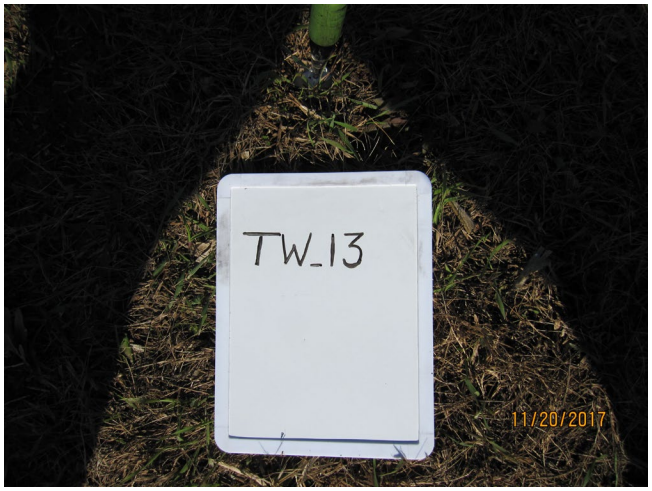
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	TW13



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW14
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Catawissa

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4527771.415	383610.527	254.035

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-21-2017
RMSE Hz	0.016
RMSE Z	0.021
GPS Method	Network

PHOTOS:



Point ID	TW14



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW15
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Barrville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500912.585	268762.368	272.434

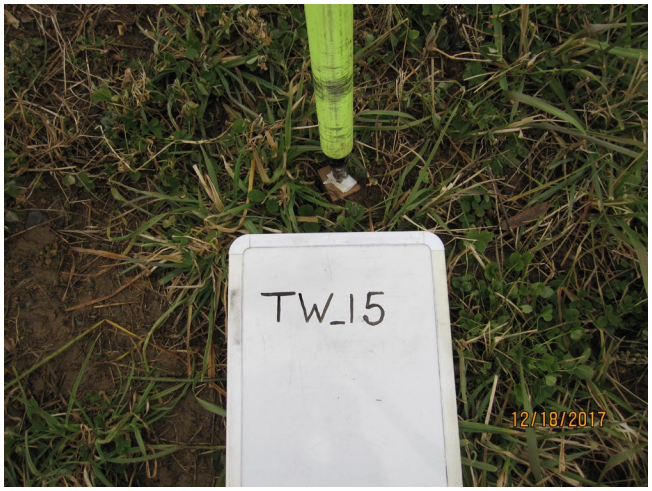
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:



Point ID	TW15



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW16
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Alfarata

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4502050.052	291194.870	174.237

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.020
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	TW16



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW17
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500808.317	307222.465	192.766

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.009
RMSE Z	0.011
GPS Method	Network

PHOTOS:

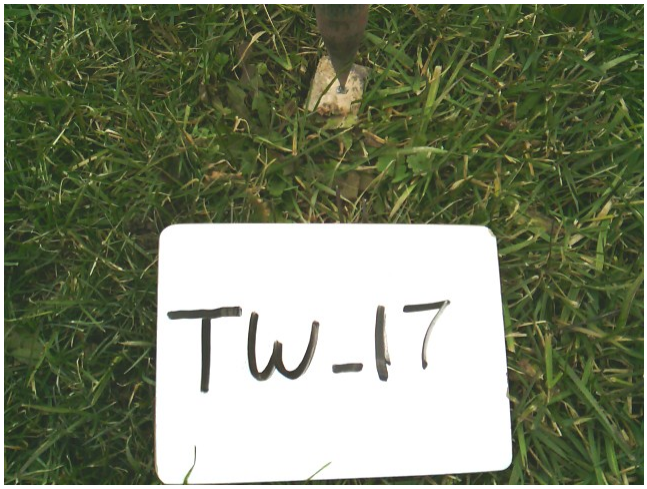








Point ID	TW17



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW18
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Richfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4499928.757	330372.755	151.312

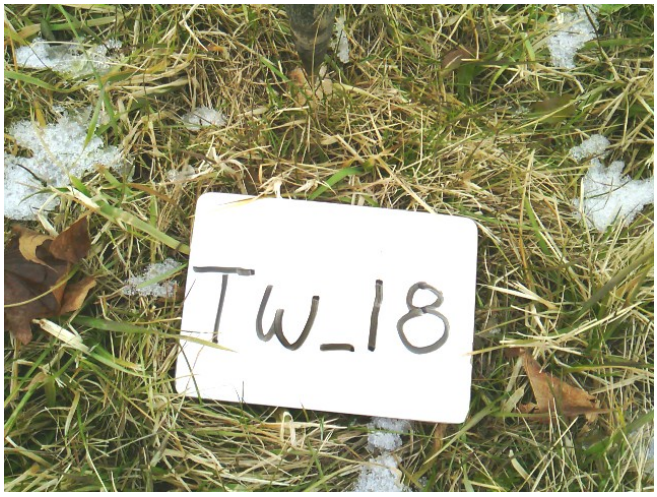
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.017
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	TW18



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW19
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Blairs Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466678.418	273445.118	212.480

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.005
RMSE Z	0.028
GPS Method	Static

PHOTOS:



Point ID	TW19



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW20
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Andersonburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4468483.064	295691.496	211.906

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-22-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:

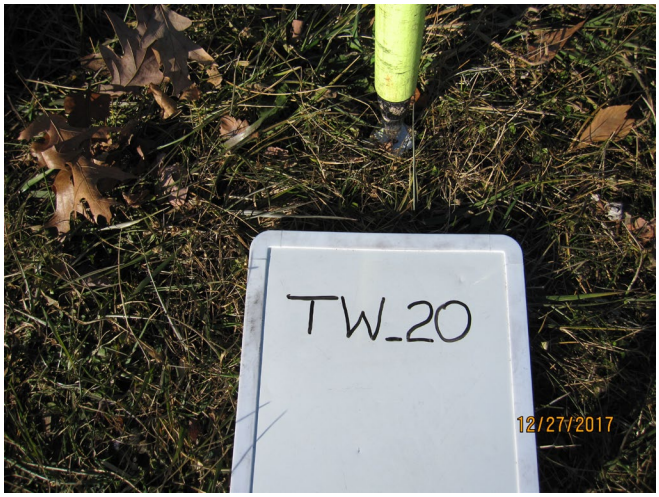








Point ID	TW20



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW21
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Harrisburg West

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469080.000	331604.730	105.699

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.012
RMSE Z	0.015
GPS Method	Network

PHOTOS:



Point ID	TW21



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW22
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Fannettsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444841.805	262764.790	258.347

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.020
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	TW22



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW23
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Shippensburg

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

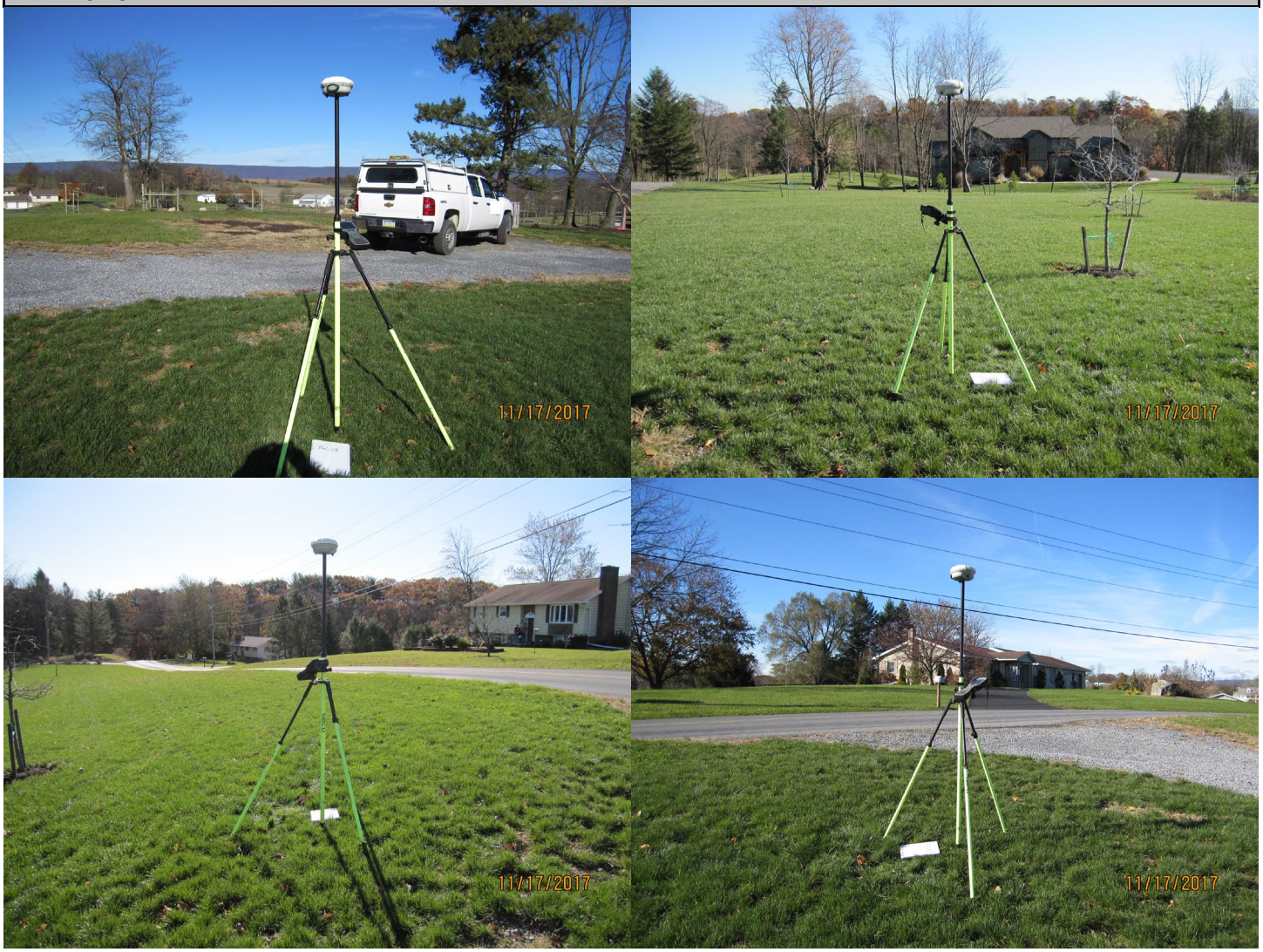
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444267.598	285189.538	191.850

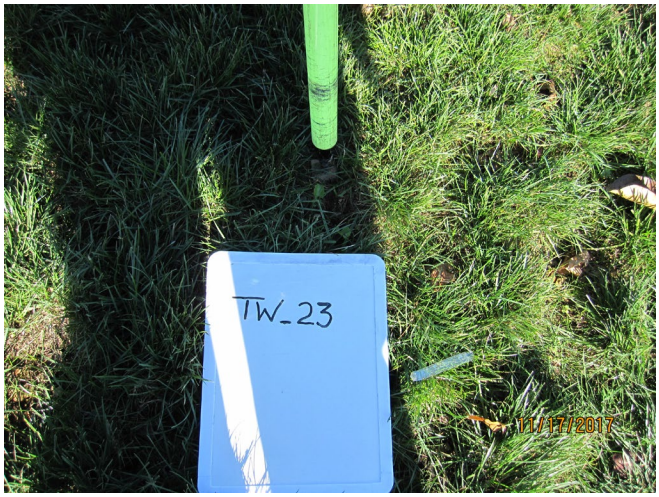
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	TW23



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW24
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Carlisle

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4444616.004	309731.628	173.527

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-17-2017
RMSE Hz	0.022
RMSE Z	0.024
GPS Method	Network

PHOTOS:







Point ID	TW24

220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW25
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	McConnellsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4422228.894	251656.576	191.221

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.014
RMSE Z	0.018
GPS Method	Network

PHOTOS:



Point ID	TW25



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW26
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Chambersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4425107.495	268556.228	226.931

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-13-2017
RMSE Hz	0.014
RMSE Z	0.017
GPS Method	Network

PHOTOS:



Point ID	TW26



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW27
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Ardentsville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4421853.075	303406.981	216.382

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-31-2017
RMSE Hz	0.024
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	TW27



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW28
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Abbottstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4421327.596	330955.706	141.126

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2017
RMSE Hz	0.018
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	TW28



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW29
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Cherry Run

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403072.990	239473.802	146.672

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-29-2017
RMSE Hz	0.017
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	TW29



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW30
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Clear Spring

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403009.069	251141.912	245.770

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-28-2017
RMSE Hz	0.022
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	TW30



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW31
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Mason and Dixon

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4403034.799	262094.560	173.763

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-28-2017
RMSE Hz	0.015
RMSE Z	0.018
GPS Method	Network

PHOTOS:









Point ID	TW31



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW32
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Hagerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401994.352	273728.056	203.478

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	0.017
RMSE Z	0.021
GPS Method	Network

PHOTOS:









Point ID	TW32



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW33
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Emmitsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4400979.313	296886.625	148.852

Operator	Tod Yeisley and Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.018
RMSE Z	0.023
GPS Method	Network

PHOTOS:



Point ID	TW33



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW34
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Taneytown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401802.324	307986.086	130.478

Operator	Tod Yeisley and Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.028
RMSE Z	0.036
GPS Method	Network

PHOTOS:



Point ID	TW34



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW35
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Littlestown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4400783.114	321688.759	177.218

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-25-2017
RMSE Hz	0.021
RMSE Z	0.027
GPS Method	Network

PHOTOS:



Point ID	TW35



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW36
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4475754.913	364151.698	133.391

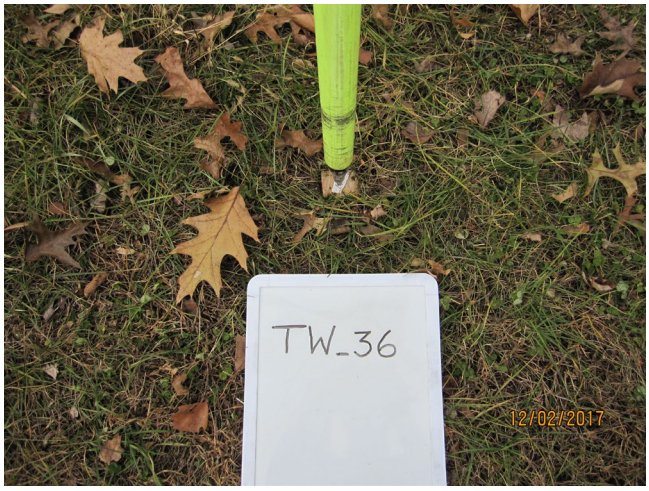
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.018
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	TW36



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW37
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Fredericksburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4475455.208	381756.700	145.948

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-02-2017
RMSE Hz	0.015
RMSE Z	0.019
GPS Method	Network

PHOTOS:









Point ID	TW37



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW38
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Palmyra

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4463594.117	366177.389	134.227

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-01-2017
RMSE Hz	0.022
RMSE Z	0.028
GPS Method	Network

PHOTOS:









Point ID	TW38



220 St Charles Way, Suite 200 York, PA 17402

Point ID	TW39
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Richland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4462213.032	389686.693	184.130

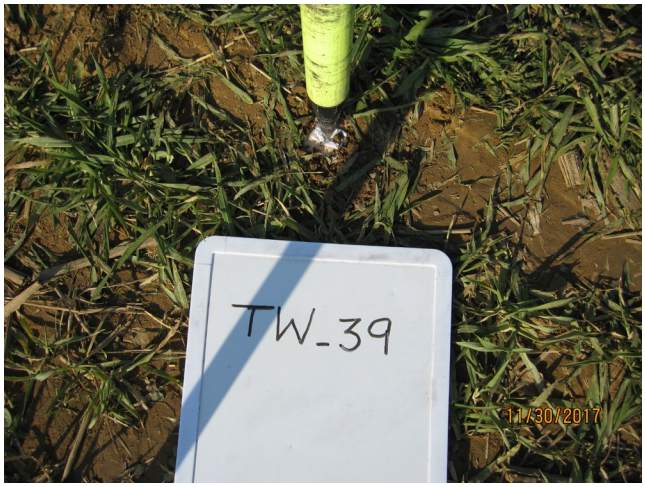
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-01-2017
RMSE Hz	0.016
RMSE Z	0.022
GPS Method	Network

PHOTOS:



Point ID	TW39



VVA-Forest Point Log Sheets

Appendix E

FO01,4600348.412,283217.843,608.052
FO02,4600152.968,296046.771,245.055
FO03,4599899.166,309472.181,499.900
FO04,4596876.566,337040.955,258.633
FO05,4589882.680,298395.905,517.062
FO06,4589700.099,309526.586,271.120
FO07,4590789.980,321443.803,489.855
FO08,4589913.683,343084.473,420.264
FO09,4581657.272,308945.154,587.591
FO10,4581743.120,330656.720,407.192
FO11,4581891.181,341370.519,461.730
FO12,4572012.432,299251.639,572.458
FO13,4571396.522,310716.062,241.391
FO14,4570467.544,322530.394,302.816
FO15,4571148.137,345646.603,295.810
FO16,4570492.140,368000.190,363.679
FO17,4571532.801,389828.484,361.024
FO18,4548865.902,331809.834,243.993
FO19,4548647.388,365682.744,169.670
FO20,4548136.271,388582.958,287.758
FO21,4533869.515,319873.836,250.103
FO22,4538463.404,363626.598,171.734
FO23,4539304.704,388432.641,203.290
FO24,4525481.053,305946.092,245.268
FO25,4529064.621,372436.723,200.992
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FO27,4516641.448,308345.114,208.744
FO28,4517425.593,319952.269,191.520
FO29,4518131.409,344854.690,149.363
FO30,4519770.526,364968.624,203.391
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FO46,4435187.462,320769.384,169.337
FO47,4422545.777,262233.016,189.104
FO48,4423390.722,290552.497,415.804
FO49,4424206.439,315320.931,170.775
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FO59,4472828.902,380615.473,139.180
FO60,4452627.232,367034.682,134.077
FO61,4459535.940,384675.324,192.198

220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO01
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Lee Fire Tower

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600348.412	283217.843	608.052

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO01



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO02
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cedar Run

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4600152.968	296046.771	245.055

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO02



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO03
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Morris

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4599899.166	309472.181	499.900

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO03



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO04
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Ralston

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4596876.566	337040.955	258.633

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.022
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	FO04



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO05
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cammal

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589882.680	298395.905	517.062

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.029
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	FO05



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO06
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	English Center

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589700.099	309526.586	271.120

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-15-2017
RMSE Hz	0.030
RMSE Z	0.043
GPS Method	Network

PHOTOS:



Point ID	FO06



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO07
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	White Pine

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4590789.980	321443.803	489.855

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO07



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO08
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Bodines

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

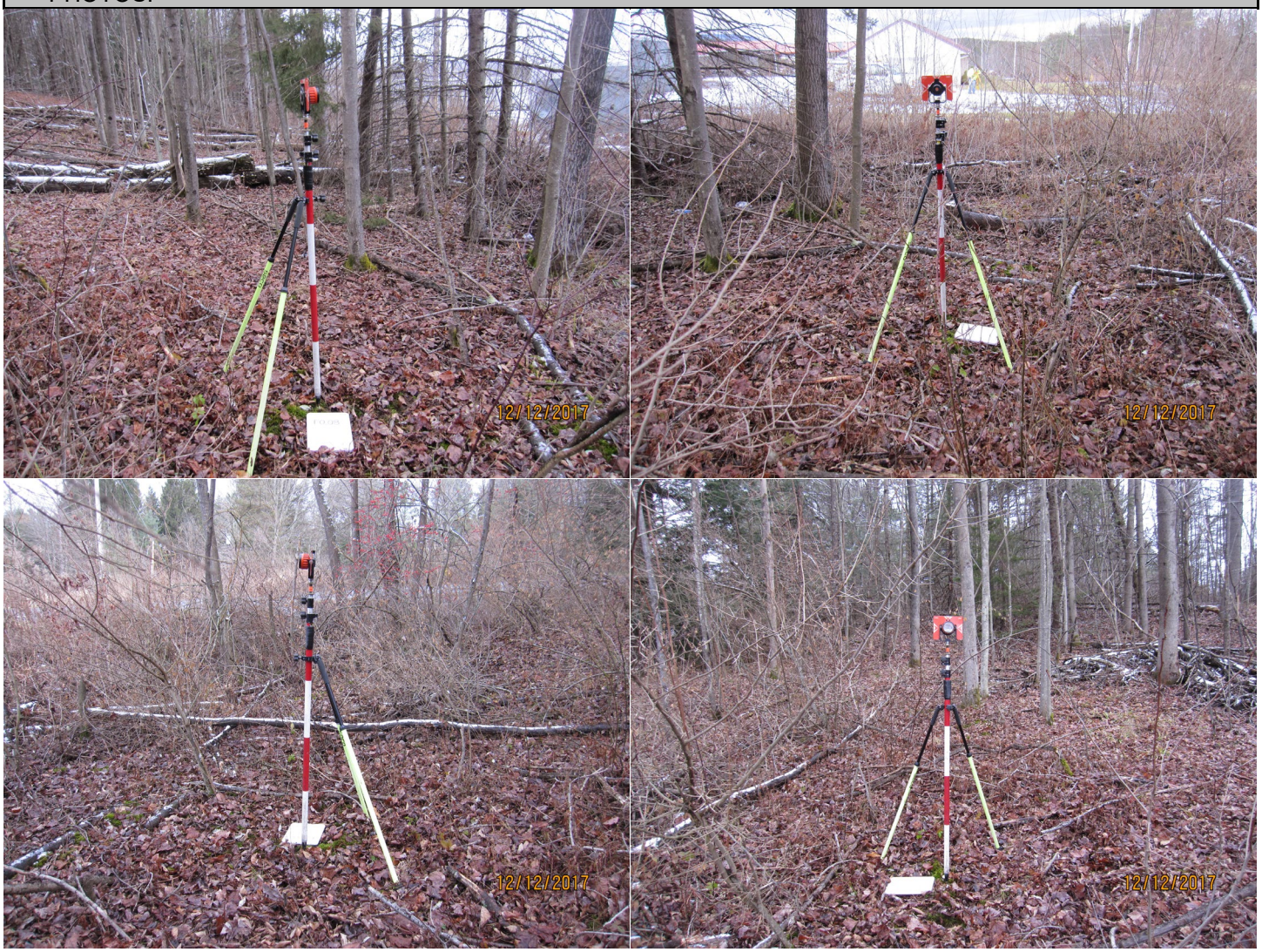
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4589891.389	343168.972	416.635

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO08



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO09
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Waterville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581657.272	308945.154	587.591

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	0.021
RMSE Z	0.026
GPS Method	Network

PHOTOS:



Point ID	FO09



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO10
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cogan Station

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581743.120	330656.720	407.192

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	513842883
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.023
RMSE Z	0.029
GPS Method	Network

PHOTOS:



Point ID	FO10



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO11
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Montoursville North

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4581891.181	341370.519	461.730

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	3.219 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.035
RMSE Z	0.050
GPS Method	Network

PHOTOS:



Point ID	FO11



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO12
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Jersey Mills

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4572012.432	299251.639	572.458

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.027
RMSE Z	0.039
GPS Method	Network

PHOTOS:



Point ID	FO12



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO13
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Salladasburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571415.565	310733.956	242.186

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

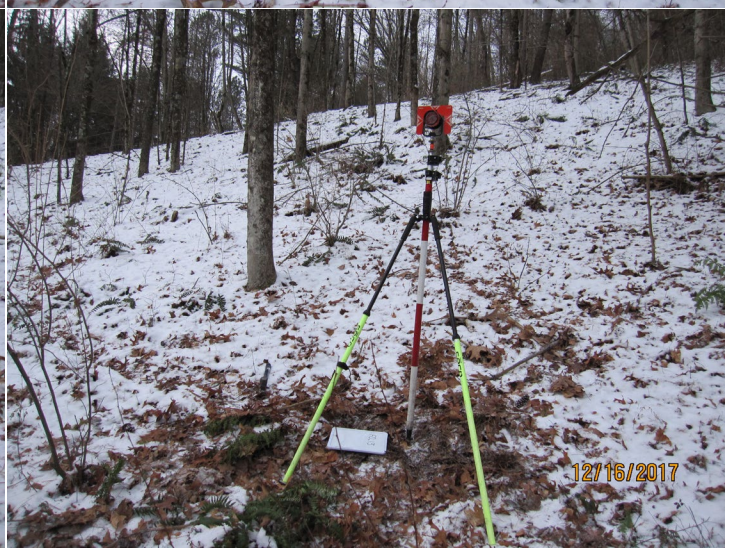
Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	FO13



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO14
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Cogan Station

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570467.544	322530.394	302.816

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.019
RMSE Z	0.024
GPS Method	Network

PHOTOS:



Point ID	FO14



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO15
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Huntersville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571148.137	345646.603	295.810

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.450 Meters

Date (MM-DD-YYYY)	12-11-2017
RMSE Hz	0.034
RMSE Z	0.045
GPS Method	Network

PHOTOS:



Point ID	FO15



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO16
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Sonestown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4570492.140	368000.190	363.679

Operator	Ed Starkey
Receiver Model	Trimble S6 Series
Receiver S/N	93710694
Antenna Height	1.830 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO16



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO17
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Red Rock

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4571532.801	389828.484	361.024

Operator	Ed Starkey
Receiver Model	Trimble R-6 Model 2
Receiver S/N	5138472883
Antenna Height	2.400 Meters

Date (MM-DD-YYYY)	12-13-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:





Point ID	FO17



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO18
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Williamsport SE

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

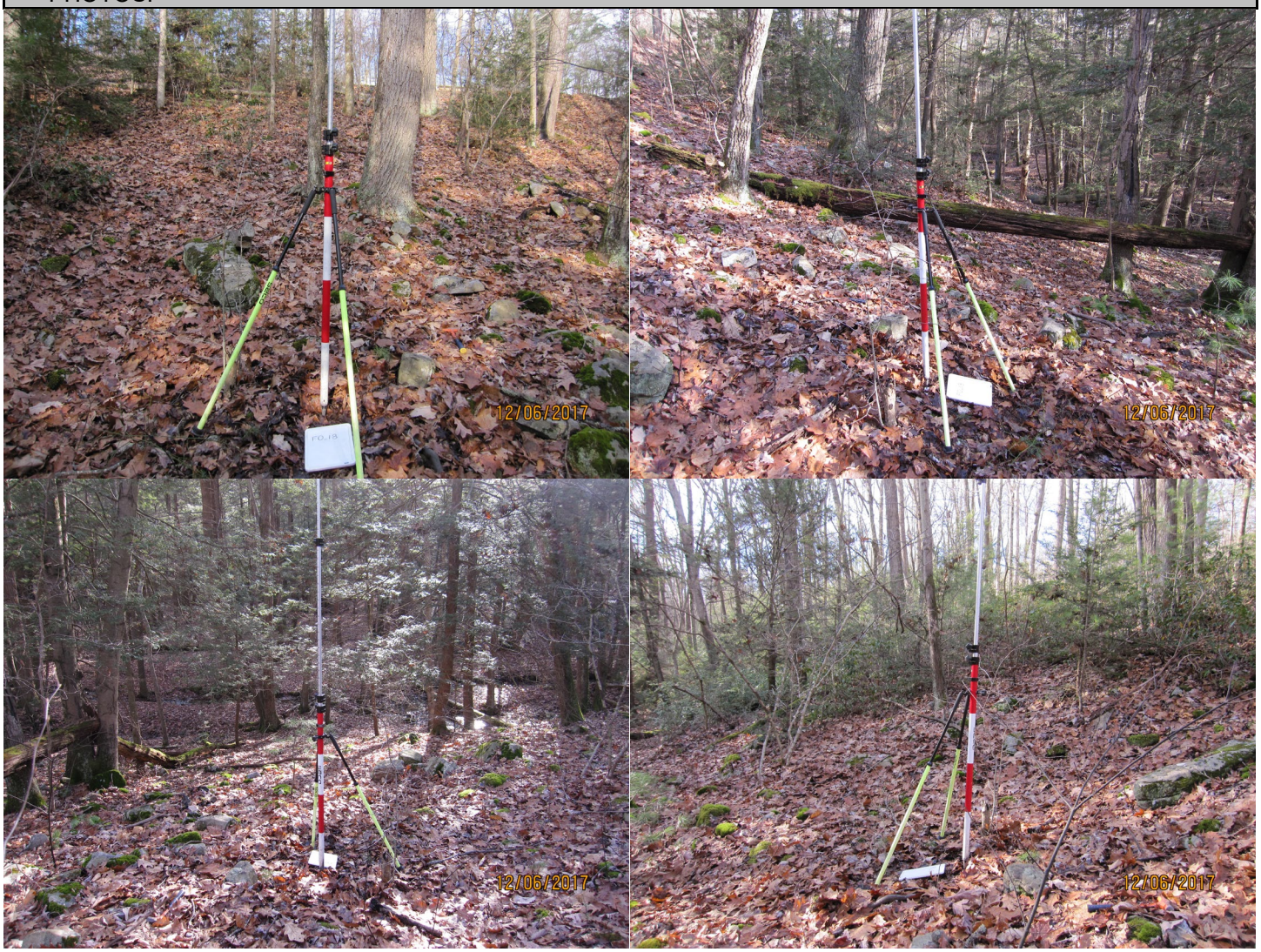
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548865.902	331809.834	243.993

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	3.566 Meters

Date (MM-DD-YYYY)	12-06-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO18



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO19
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Millville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548647.388	365682.744	169.670

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.025
RMSE Z	0.029
GPS Method	Network

PHOTOS:



Point ID	FO19



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO20
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Mifflinville

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

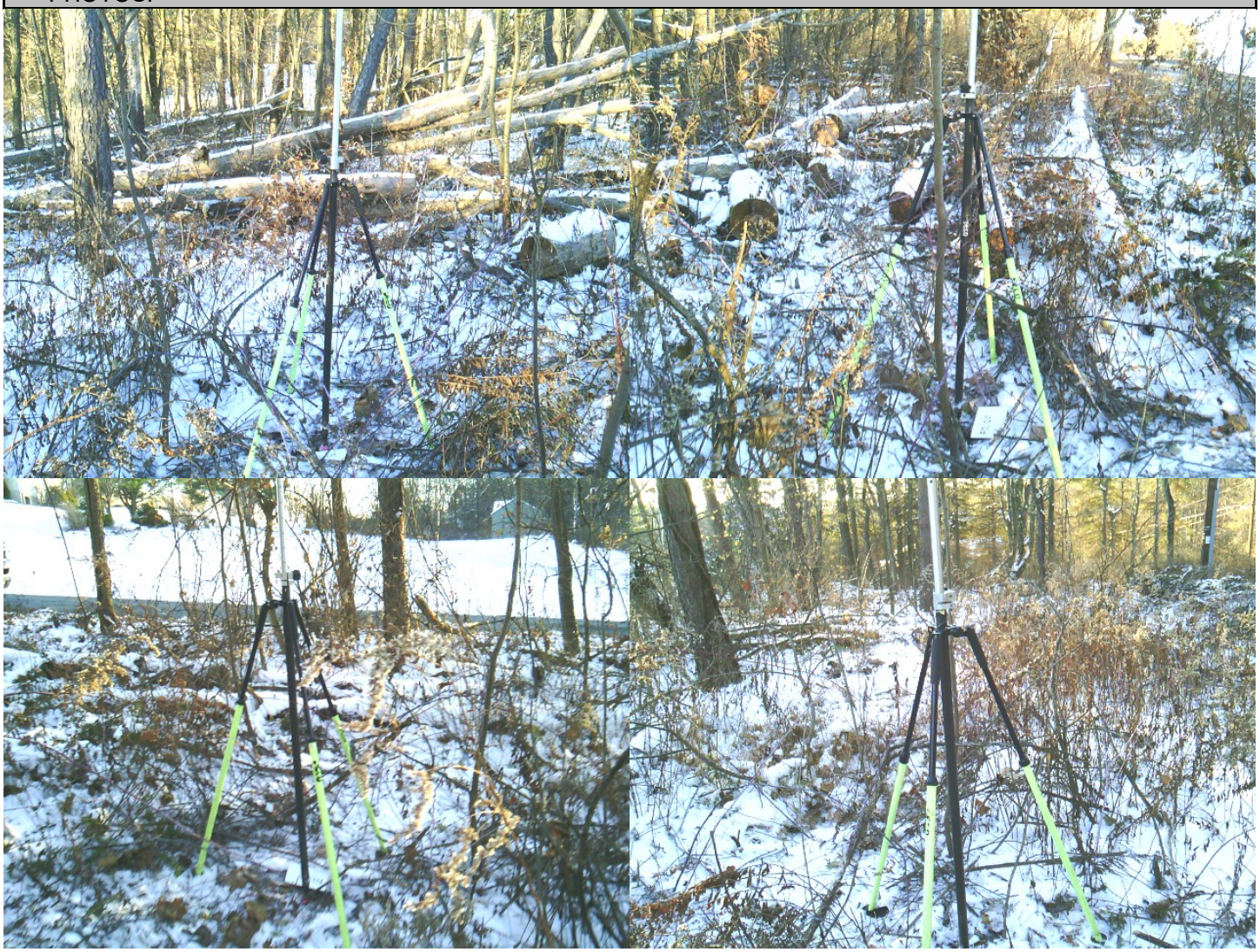
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4548136.271	388582.958	287.758

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	0.034
RMSE Z	0.040
GPS Method	Network

PHOTOS:



Point ID	FO20



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO21
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Hartleton

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4533869.515	319873.836	250.103

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-04-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO21



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO22
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Montour
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4538463.404	363626.598	171.734

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-07-2017
RMSE Hz	0.032
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	FO22



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO23
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Shumans

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4539304.704	388432.641	203.290

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	01-18-2017
RMSE Hz	0.022
RMSE Z	0.025
GPS Method	Network

PHOTOS:









Point ID	FO23



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO24
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Union
Quad	Weikert

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4525481.053	305946.092	245.268

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-22-2017
RMSE Hz	0.056
RMSE Z	0.074
GPS Method	Network

PHOTOS:



Point ID	FO24



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO25
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Danville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4529064.621	372436.723	200.992

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	3.109 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO25



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO26
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Columbia
Quad	Shumans

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4532277.575	394864.326	341.984

Operator	Ed Starkey
Receiver Model	Trimble S6 Series
Receiver S/N	93710694
Antenna Height	1.658 Meters

Date (MM-DD-YYYY)	12-14-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO26



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO27
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Weikert

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4516641.448	308345.114	208.744

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.023
RMSE Z	0.034
GPS Method	Network

PHOTOS:



Point ID	FO27.



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO28
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Snyder
Quad	Beavertown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4517425.593	319952.269	191.520

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.024
RMSE Z	0.033
GPS Method	Network

PHOTOS:



Point ID	FO28



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO29
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Sunbury

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4518131.409	344854.690	149.363

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.039
RMSE Z	0.045
GPS Method	Network

PHOTOS:



Point ID	FO29



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO30
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Shamokin

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4519770.526	364968.624	203.391

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-20-2017
RMSE Hz	0.027
RMSE Z	0.042
GPS Method	Network

PHOTOS:



Point ID	FO30



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO31
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	Lewistown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500164.636	281742.552	194.444

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.022
RMSE Z	0.030
GPS Method	Network

PHOTOS:



Point ID	FO31



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO32
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McClure

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4501861.028	302619.739	228.799

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 / 2.480 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.016
RMSE Z	0.019
GPS Method	Network

PHOTOS:





Point ID	FO32



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO33
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	Richfield

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4500332.245	325539.236	183.752

Operator	Ed Starkey
Receiver Model	Trimble S6 Series
Receiver S/N	93710694
Antenna Height	1.963 Meters

Date (MM-DD-YYYY)	12-17-2017
RMSE Hz	0.007
RMSE Z	0.036
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO33



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO34
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Northumberland
Quad	Klingerstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4505335.000	353900.617	277.811

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.480 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	0.034
RMSE Z	0.053
GPS Method	Network

PHOTOS:



Point ID	FO34



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO35
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Mifflin
Quad	McVeytown

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

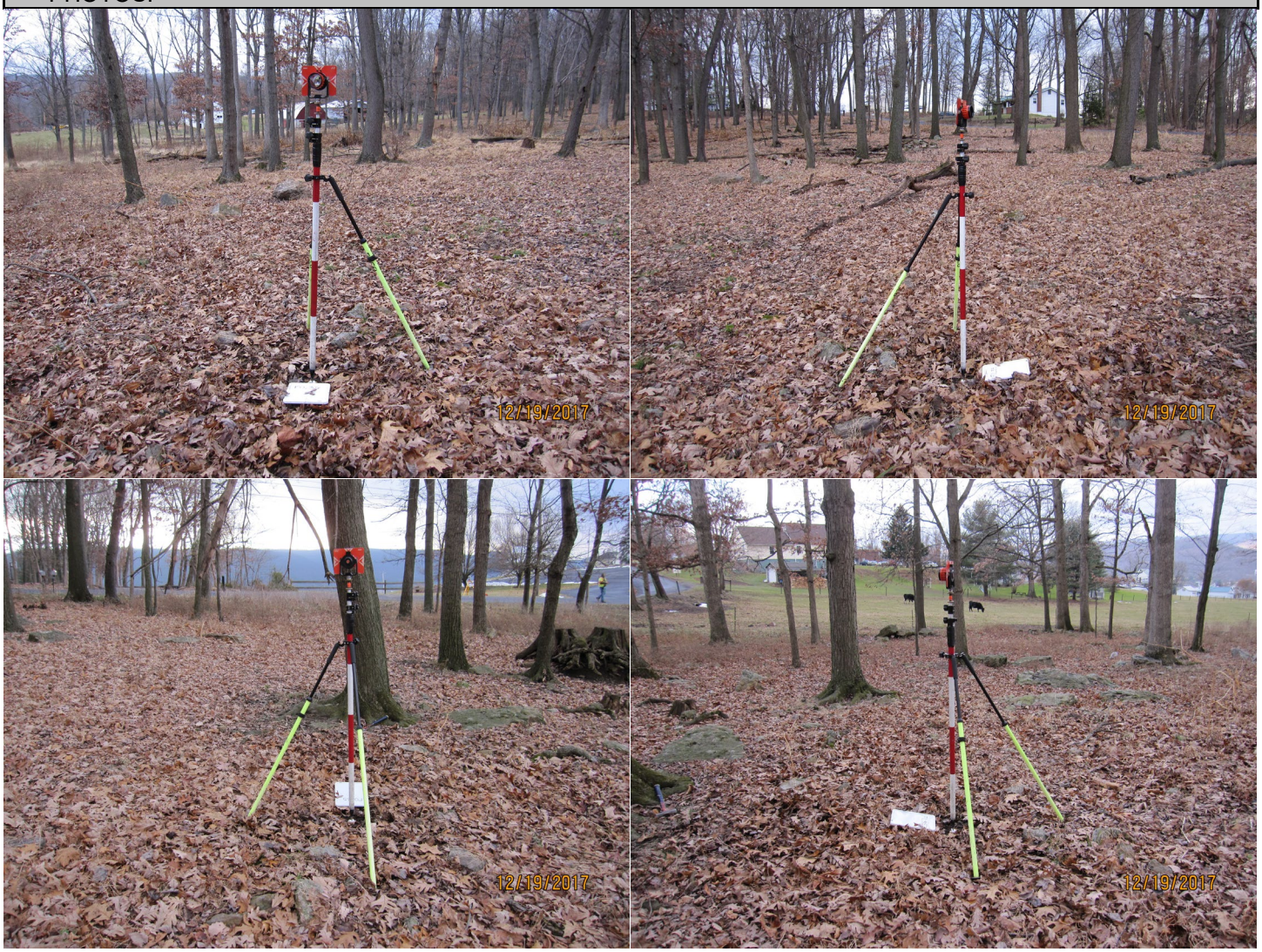
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4486295.789	269311.375	214.614

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-19-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO35



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO36
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Juniata
Quad	McCoysville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4486001.249	283985.185	217.237

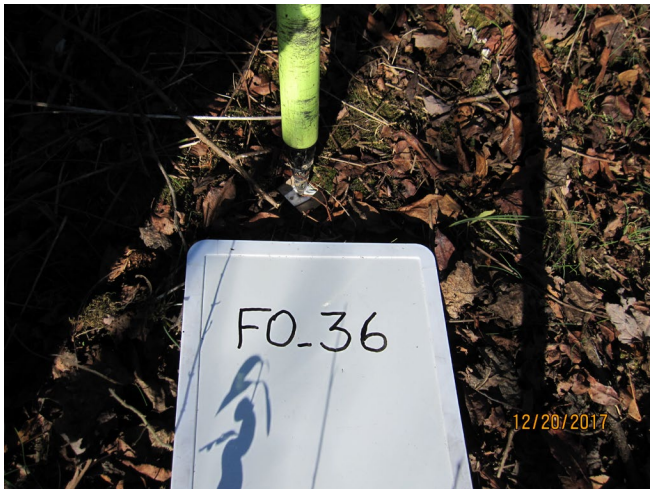
Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.024
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	FO36



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO37
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Ickesburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485611.584	306719.351	178.486

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	0.026
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	FO37



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO38
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Newport

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485336.886	318141.063	128.103

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.028
RMSE Z	0.038
GPS Method	Network

PHOTOS:



Point ID	FO38



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO39
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Millersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4485865.768	331296.543	145.492

Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.480 / 3.463 Meters

Date (MM-DD-YYYY)	12-18-2017
RMSE Hz	0.026
RMSE Z	0.031
GPS Method	Network

PHOTOS:



Point ID	FO39



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO40
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Blain

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4466772.422	285607.615	210.036

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-27-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	FO40



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO41
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Landisburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469011.736	307053.362	199.735

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	12-27-2107
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

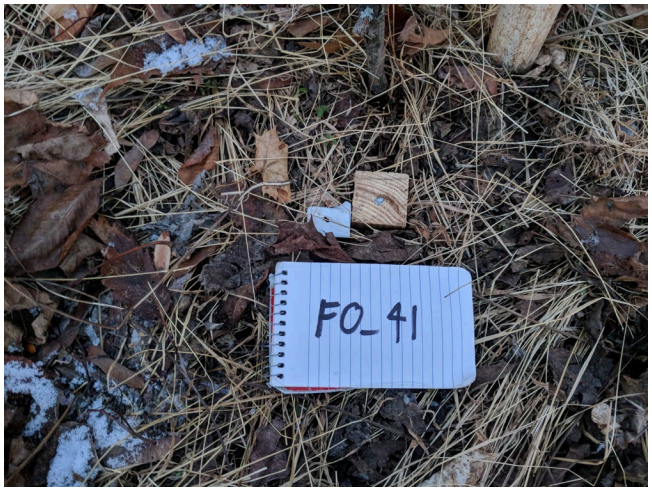
PHOTOS:







Point ID	FO41



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO42
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Shermans Dale

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4469244.058	318490.606	140.803

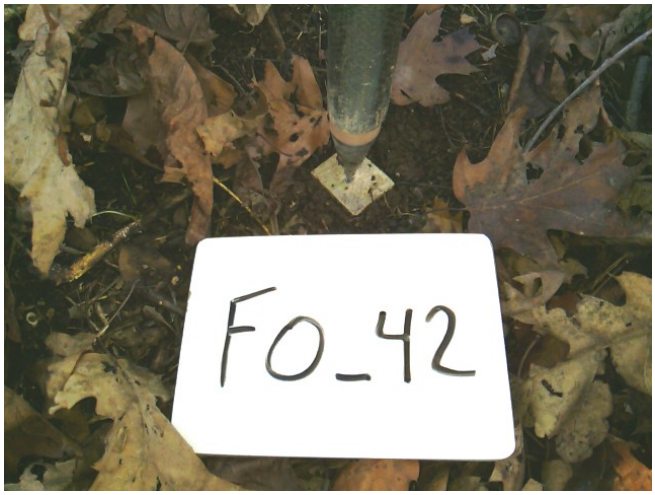
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	5138472883
Antenna Height	2.000 / 2.438 Meters

Date (MM-DD-YYYY)	12-20-2017
RMSE Hz	0.027
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	FO42



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO43
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Fannettsburg

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

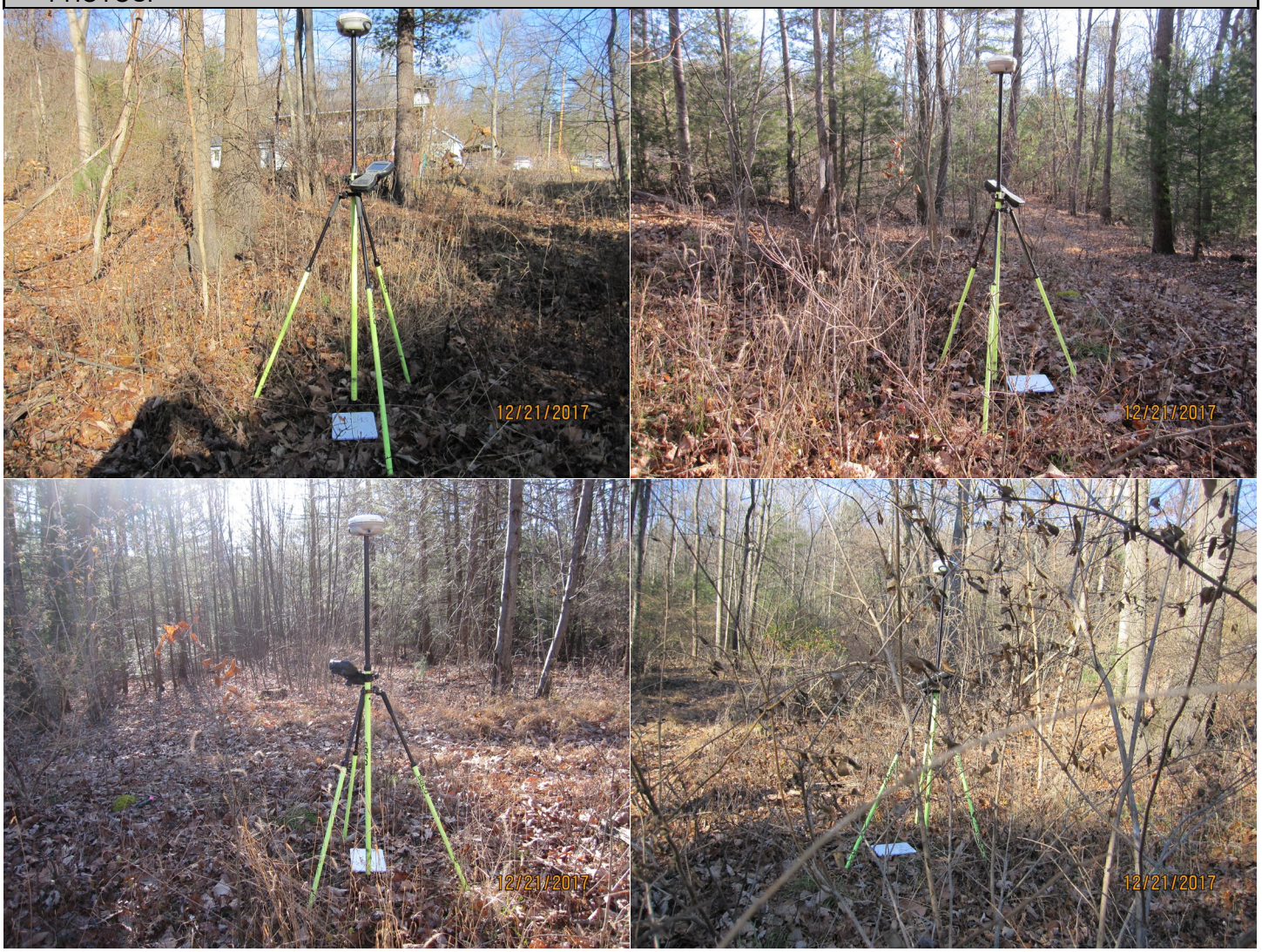
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4438989.653	257355.679	282.406

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-21-2017
RMSE Hz	0.036
RMSE Z	0.048
GPS Method	Network

PHOTOS:



Point ID	FO43



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO44
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Perry
Quad	Shippensburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4437416.012	286303.583	205.454

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	0.024
RMSE Z	0.033
GPS Method	Network

PHOTOS:









Point ID	FO44



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO45
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Cumberland
Quad	Dickinson

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4433814.891	302939.391	266.259

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	3.231 Meters

Date (MM-DD-YYYY)	10-30-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	FO45



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO46
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Dillsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4435187.462	320769.384	169.337

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.646 Meters

Date (MM-DD-YYYY)	10-30-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	FO46



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO47
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Saint Thomas

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4422545.777	262233.016	189.104

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	4.267 Meters

Date (MM-DD-YYYY)	11-14-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	FO47



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO48
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Caledonia Park

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4423390.722	290552.497	415.804

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	11-16-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO48



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO49
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Biglerville

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4424206.439	315320.931	170.775

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.041
RMSE Z	0.055
GPS Method	Network

PHOTOS:









Point ID	FO49



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO50
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Abbottstown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4421449.095	330620.264	138.257

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.025
RMSE Z	0.029
GPS Method	Network

PHOTOS:









Point ID	FO50



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO51
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Mercersburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4413014.602	245231.050	221.586

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	3.505 Meters

Date (MM-DD-YYYY)	11-29-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO51



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO52
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Iron Springs

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

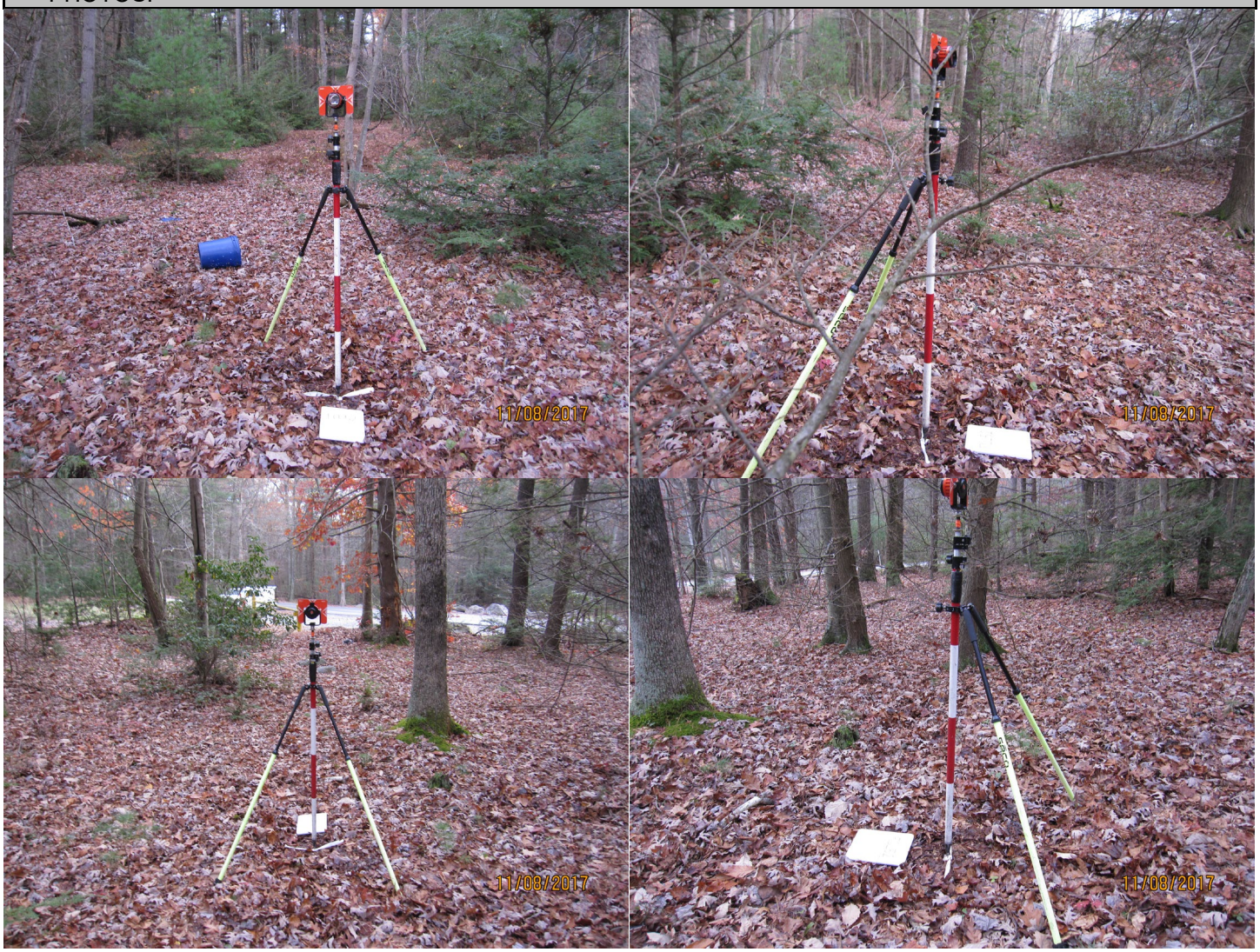
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411789.370	288926.571	431.831

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO52



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO53
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Fairfield

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

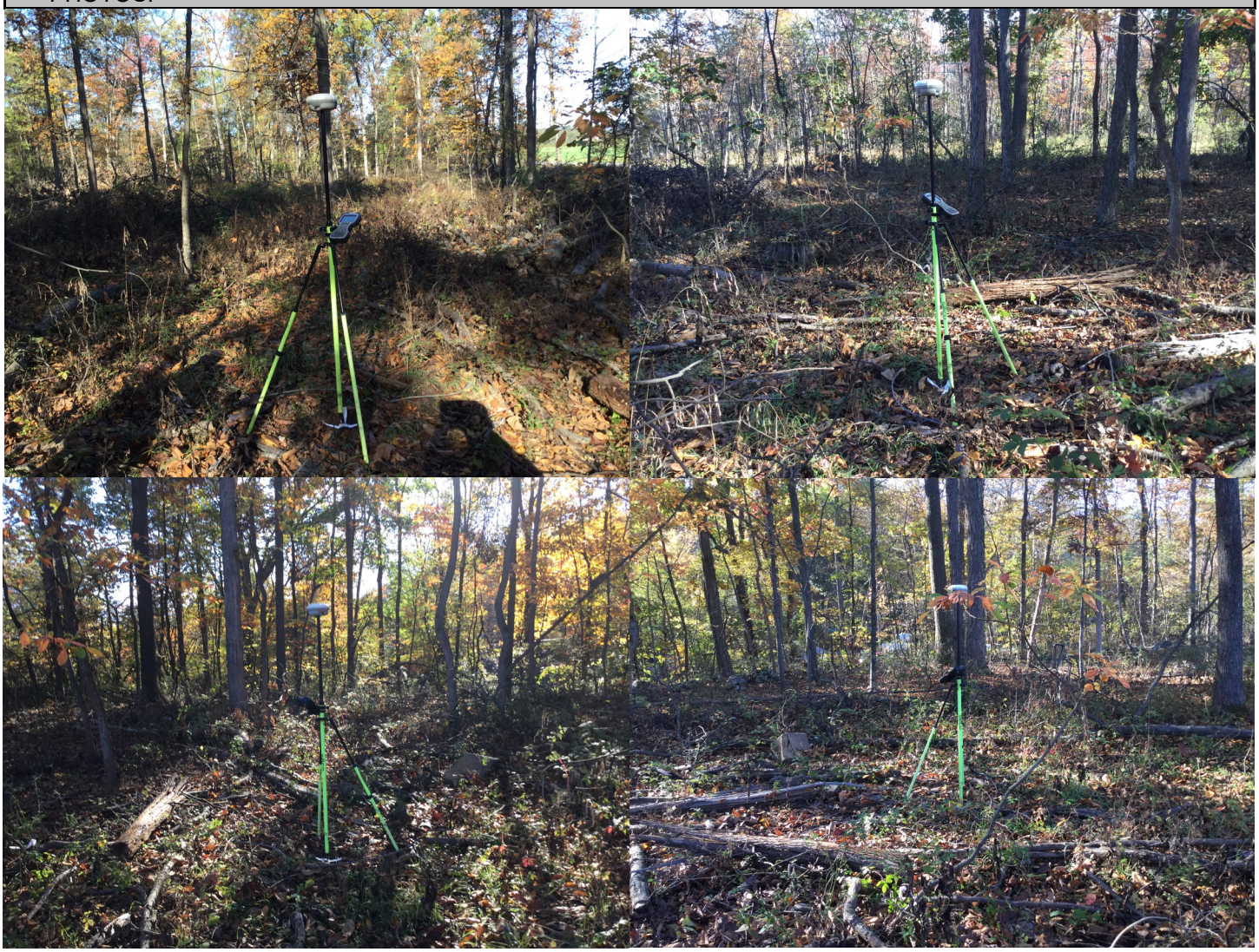
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411413.926	300631.976	194.036

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-24-2017
RMSE Hz	0.020
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	FO53



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO54
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	McSherrystown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4411318.759	324434.370	161.790

Operator	Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.049
RMSE Z	0.059
GPS Method	Network

PHOTOS:



Point ID	FO54



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO55
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Franklin
Quad	Blue Ridge Summit

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4402195.213	286120.039	362.913

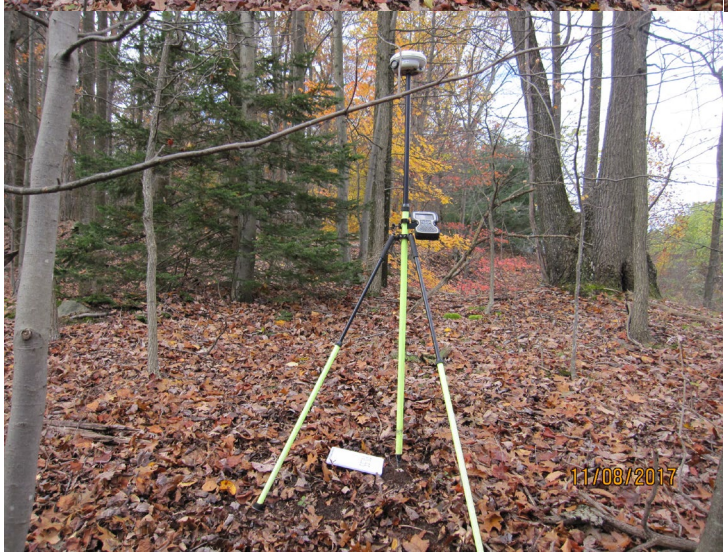
Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.646 Meters

Date (MM-DD-YYYY)	11-08-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Network

PHOTOS:







Point ID	FO55



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO56
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Emmitsburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4401470.117	303852.785	148.832

Operator	Tod Yeisley/Layne Clark
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5304424093
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-27-2017
RMSE Hz	0.058
RMSE Z	0.066
GPS Method	Network

PHOTOS:



Point ID	FO56



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO57
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Tower City

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4486939.471	370849.410	269.057

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.753 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:



Point ID	FO57



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO58
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Indiantown Gap

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

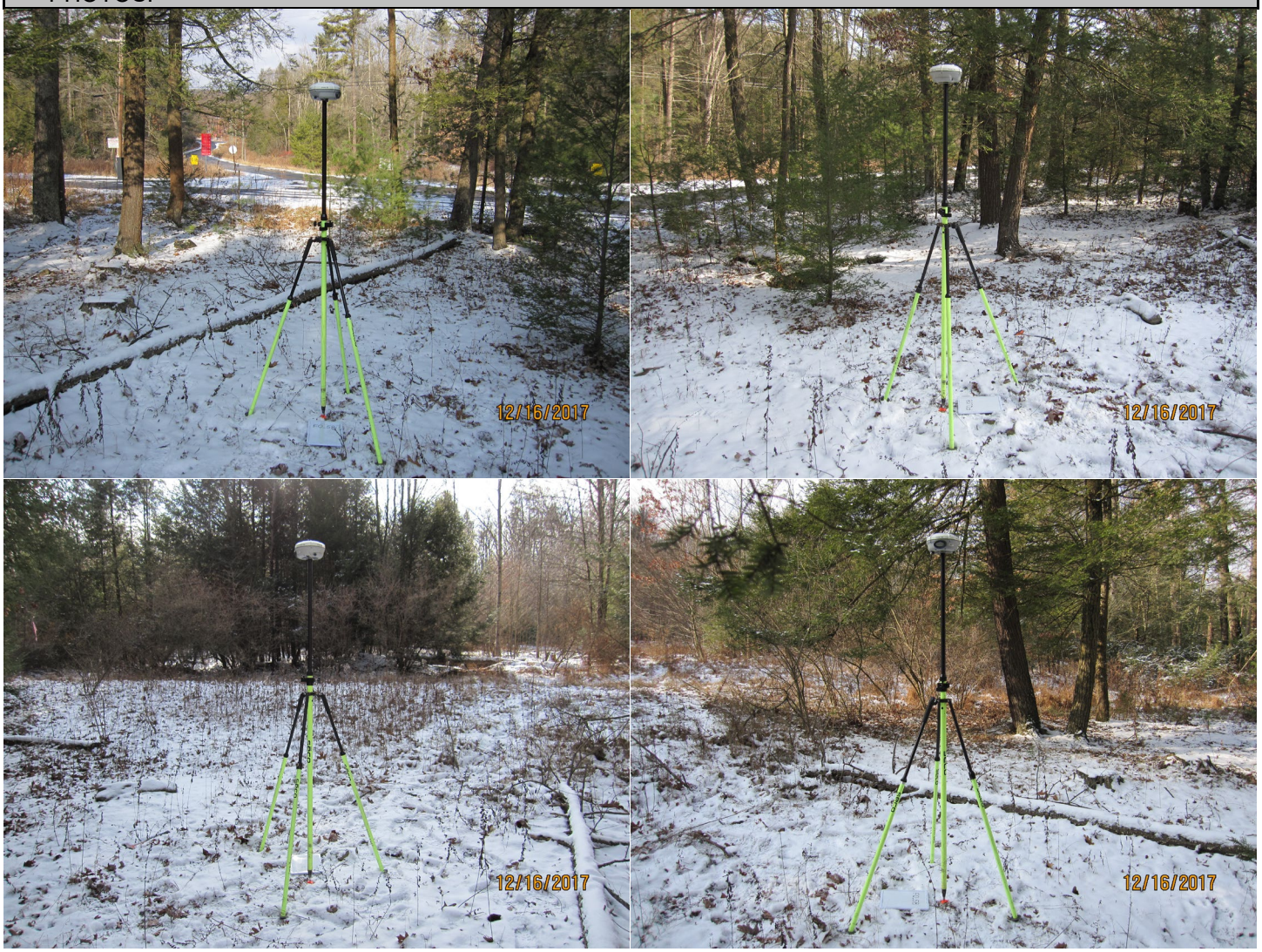
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4478489.868	362621.355	197.639

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-16-2017
RMSE Hz	0.022
RMSE Z	0.032
GPS Method	Network

PHOTOS:



Point ID	FO58



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO59
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Fredericksburg

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4472828.902	380615.473	139.180

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-01-2017
RMSE Hz	0.026
RMSE Z	0.034
GPS Method	Network

PHOTOS:



Point ID	FO59



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO60
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Elizabethtown

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4452627.232	367034.682	134.077

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	0.021
RMSE Z	0.025
GPS Method	Network

PHOTOS:



Point ID	FO60



220 St Charles Way, Suite 200 York, PA 17402

Point ID	FO61
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Richland

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4459535.940	384675.324	192.198

Operator	Tod Yeisley
Receiver Model	N/A
Receiver S/N	N/A
Antenna Height	1.579 Meters

Date (MM-DD-YYYY)	11-30-2017
RMSE Hz	N/A
RMSE Z	N/A
GPS Method	Conventional Traverse

PHOTOS:









Point ID	FO61



VVA-Brushland Point Log Sheets

SH01,4463766.990,399755.749,282.317
SH02,4576383.837,360385.000,259.437
SH03,4418968.362,311346.092,163.271

220 St Charles Way, Suite 200 York, PA 17402

Point ID	SH01
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lebanon
Quad	Womelsdorf

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4463766.990	399755.749	282.317

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-08-2017
RMSE Hz	0.009
RMSE Z	0.032
GPS Method	Static

PHOTOS:









Point ID	SH01



220 St Charles Way, Suite 200 York, PA 17402

Point ID	SH02
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Lycoming
Quad	Picture Rocks

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

Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4576383.837	360385.000	259.437

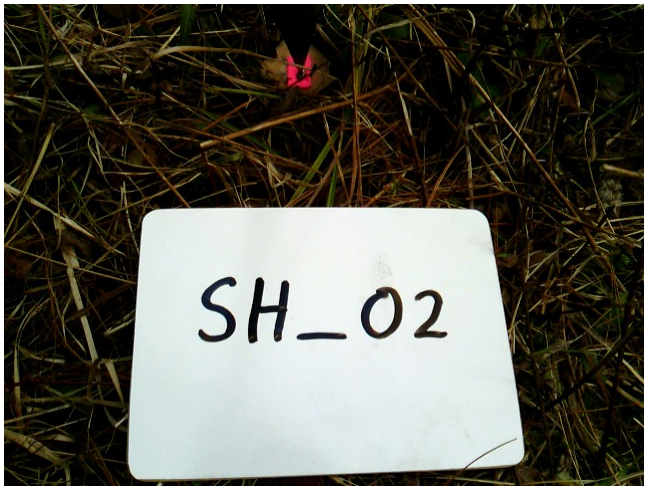
Operator	Ed Starkey
Receiver Model	Trimble R-6, Model 2
Receiver S/N	513842883
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	12-12-2017
RMSE Hz	0.024
RMSE Z	0.045
GPS Method	Network

PHOTOS:



Point ID	SH02



220 St Charles Way, Suite 200 York, PA 17402

Point ID	SH03
Project No.	31064
Project Name	PA South Central 2017 D7
State	Pennsylvania
County	Adams
Quad	Biglerville

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

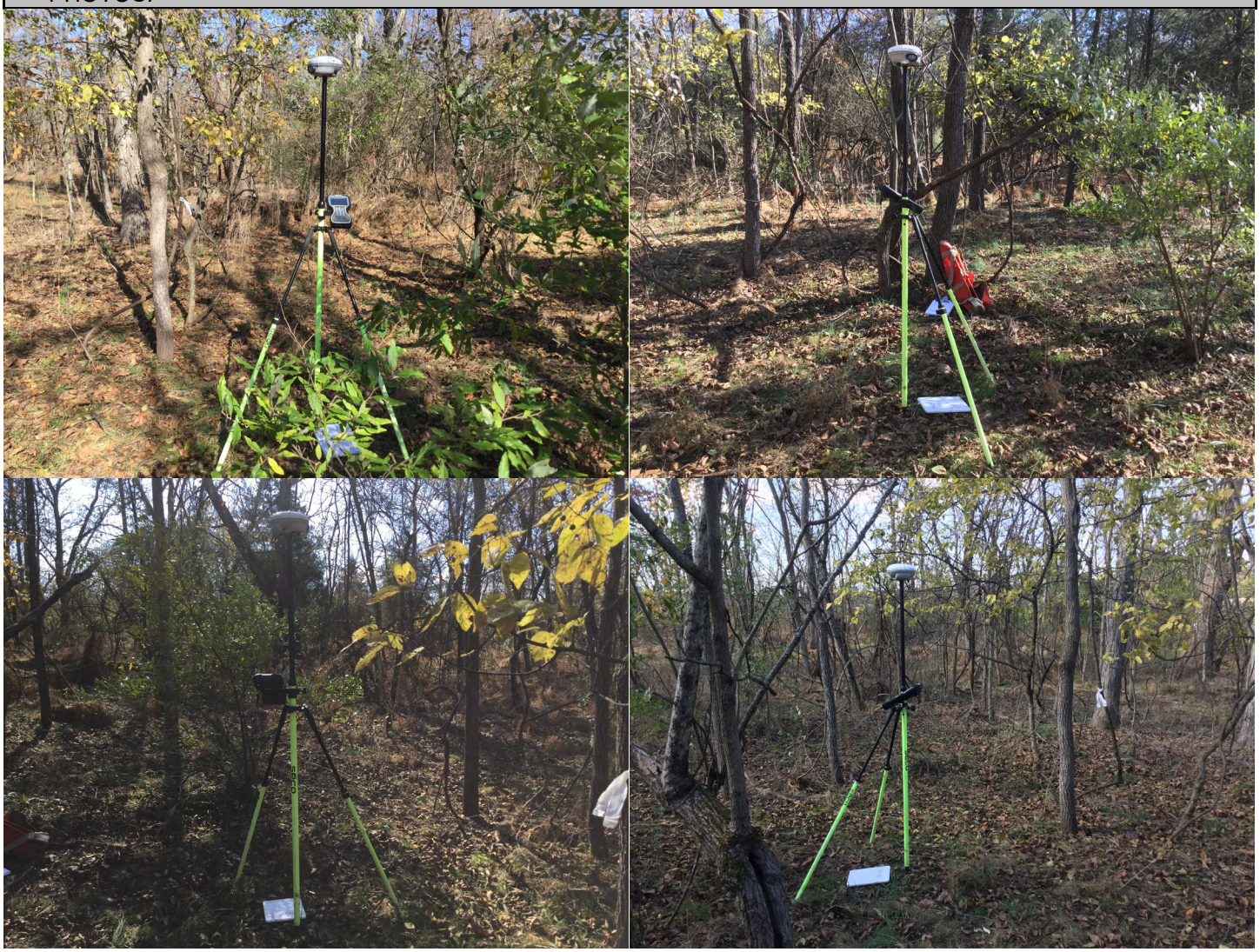
Coordinate System
NAD83(2011)
UTM18
NAVD88
GEOID12B
Meters

Northing	Easting	Elevation
4418968.362	311346.092	163.271

Operator	Tod Yeisley
Receiver Model	Trimble R-8, Model 3
Receiver S/N	5303423309
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	10-31-2017
RMSE Hz	0.030
RMSE Z	0.035
GPS Method	Network

PHOTOS:



Point ID	SH03



Appendix G

PA South Central LIDAR Data On DVD

220 St Charles Way, Suite 200 York, PA 17402

Surveyor's Certification

I hereby certify to Quantum Spatial, Inc. that the information contained herein is correct to the best of my knowledge, information and belief and that the survey was completed by acceptable surveying procedures and was completed under my direct supervision.

Thomas E. Farcht Jr. 1/9/2018

Thomas E. Farcht Jr., PLS
Johnson, Mirmiran & Thompson, Inc.
SU-037547-E (AGENT)

