

Project Report Appendices

The following section contains the appendices as listed in the East Vermont 2014 LiDAR Project Report.

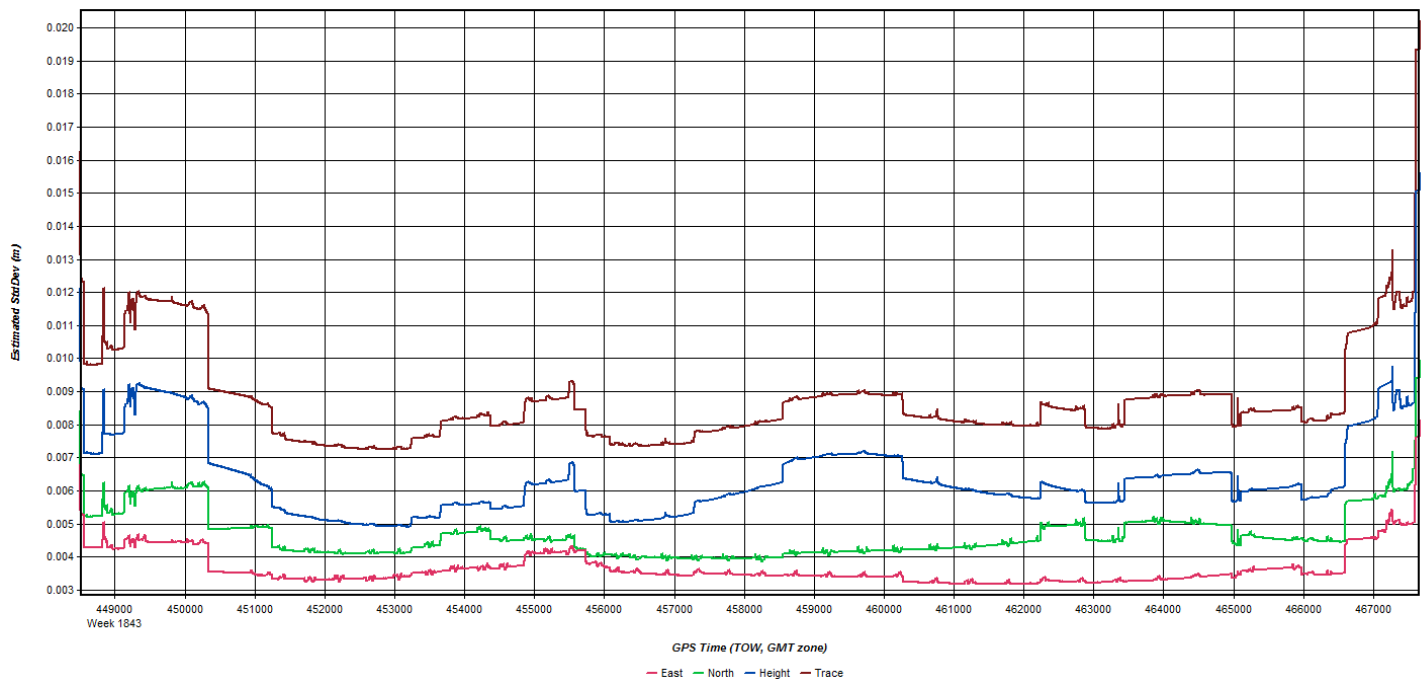
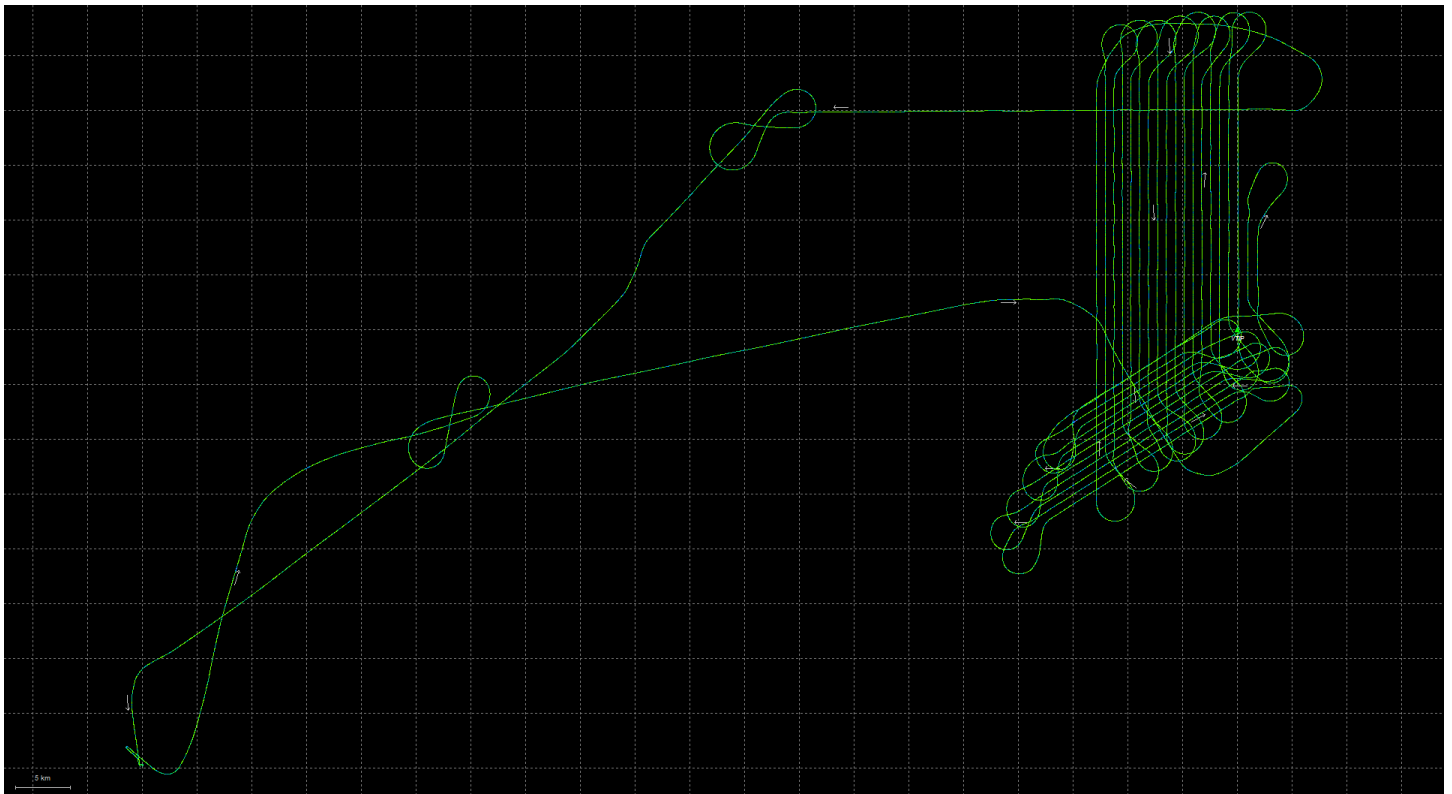
Appendix A

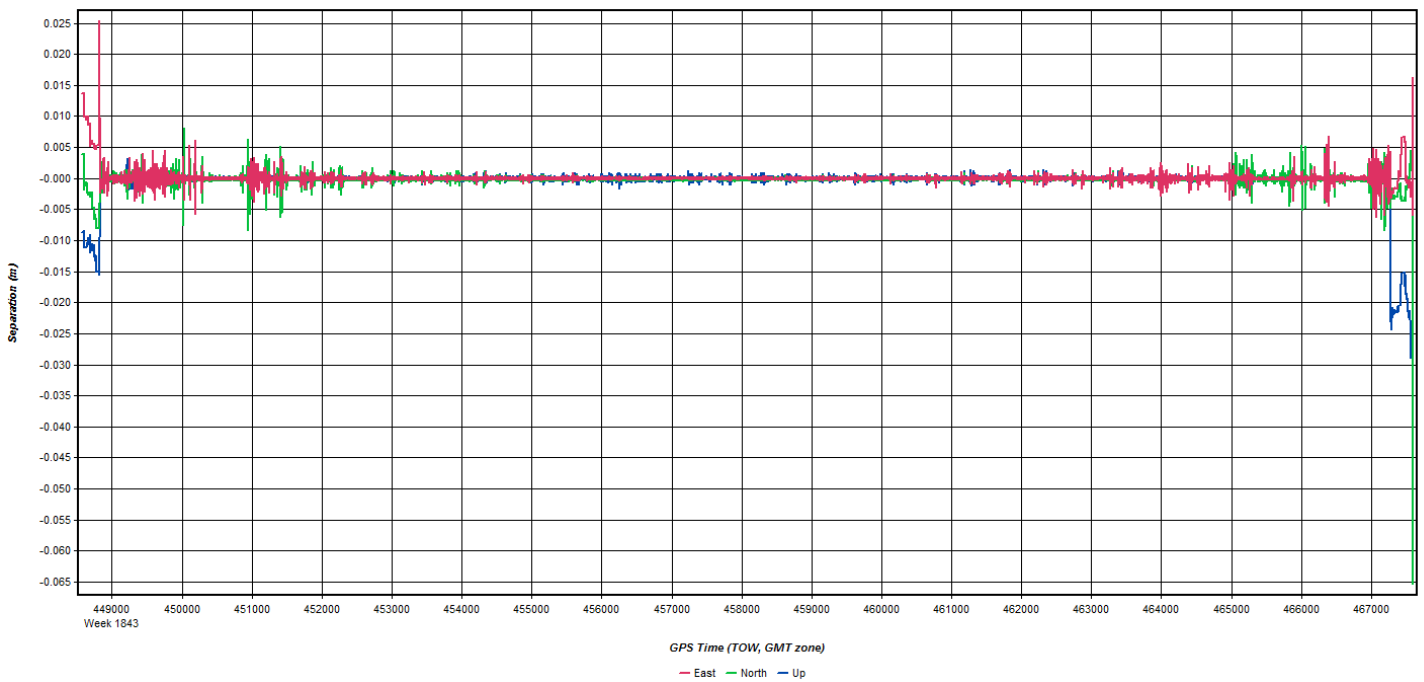
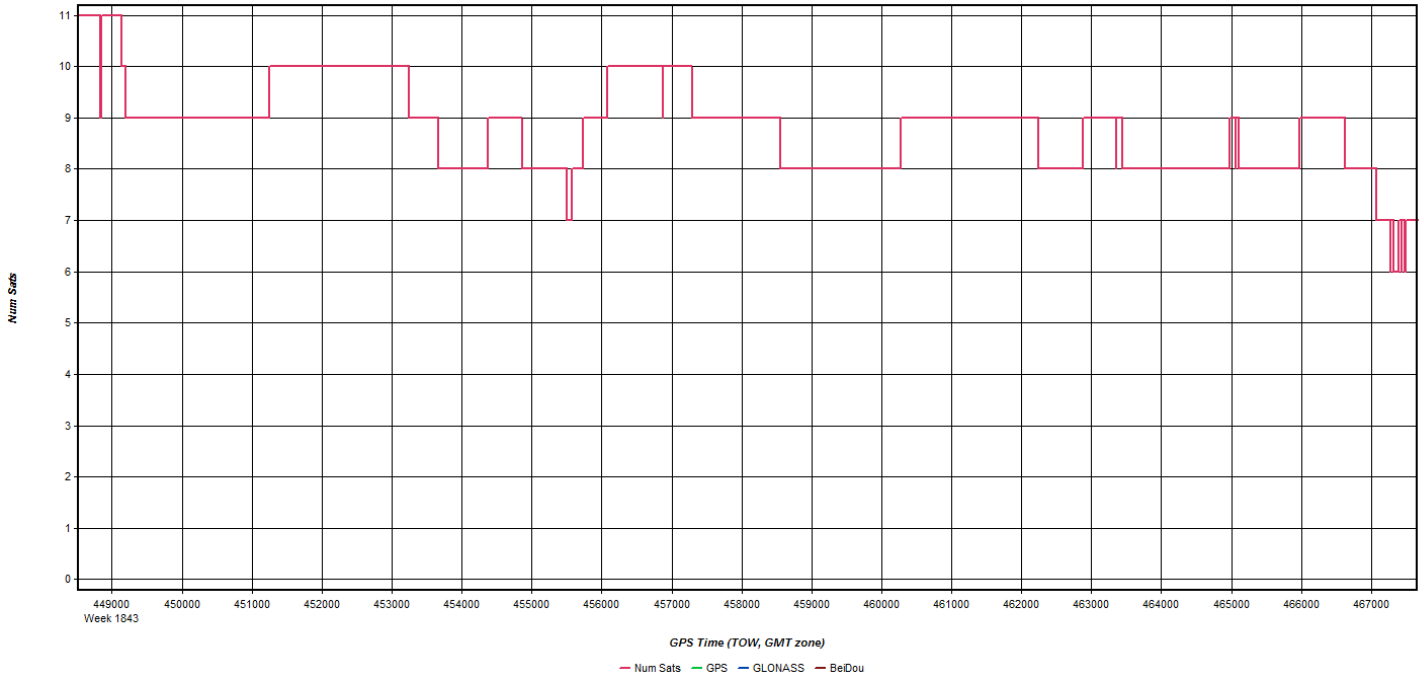
GPS/IMU Processing Statistics Flight Logs Base Station Logs

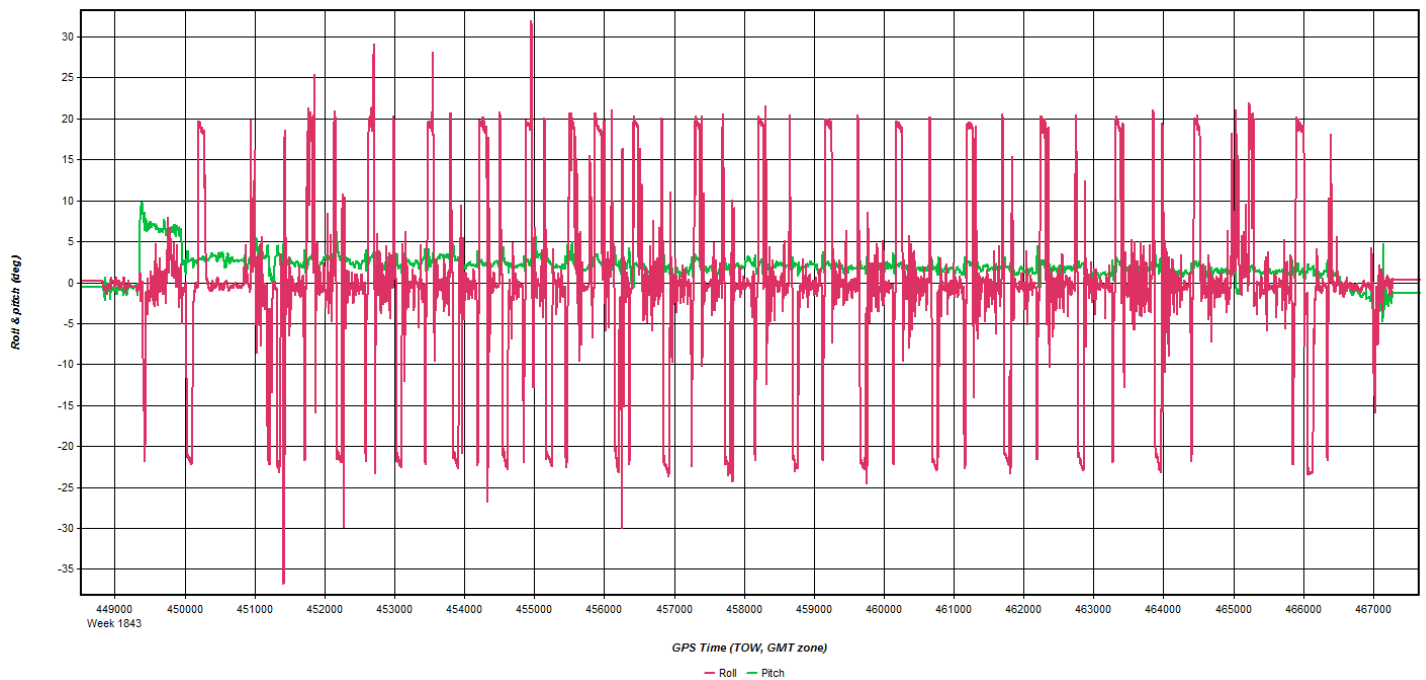
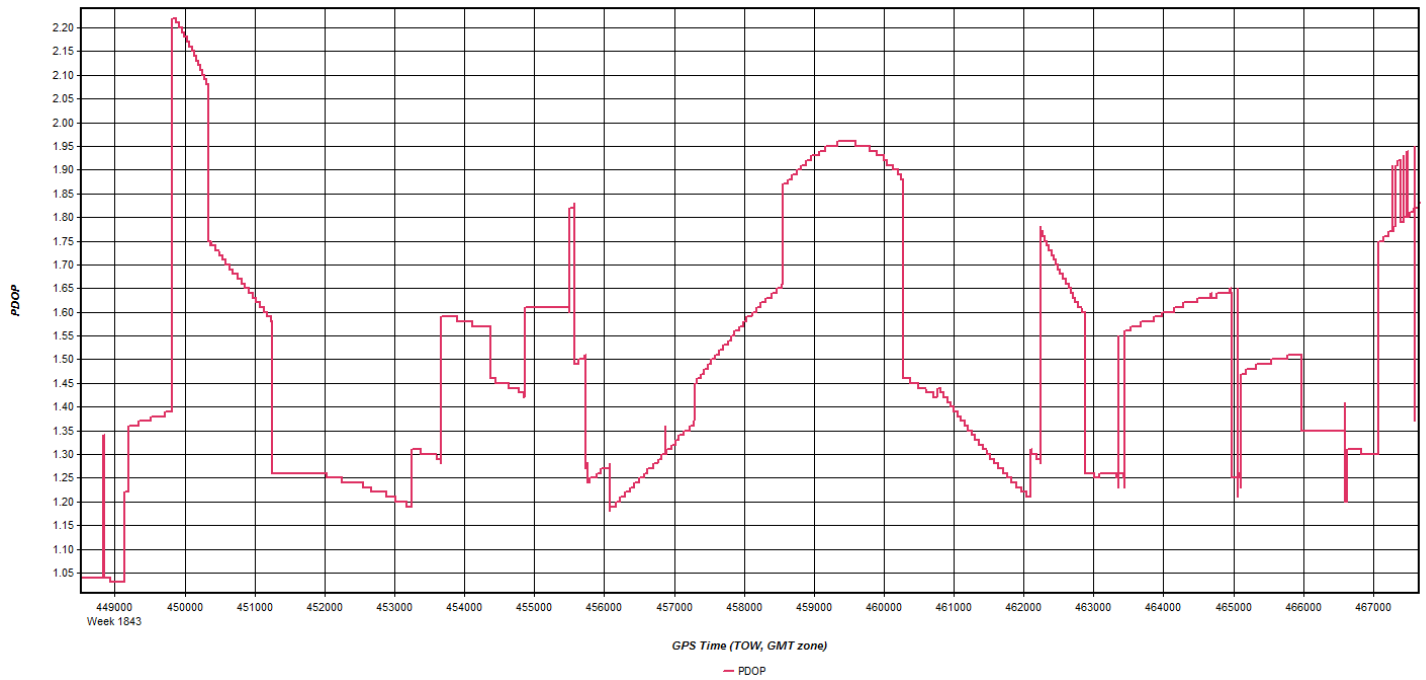
There were eight total lifts flown by Quantum Spatial in 2015. Graph reports generated from processing software and flight logs are found on the following pages.

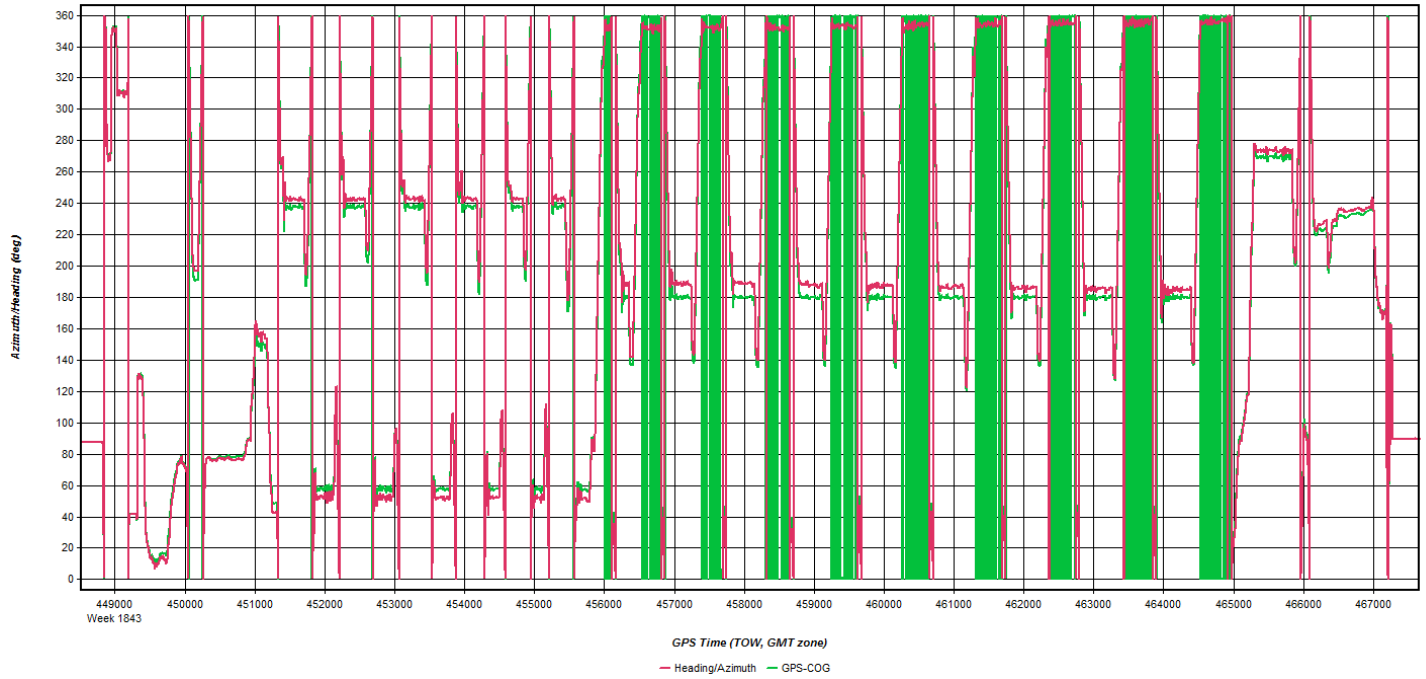
Mar 8, 2015-A (SN7121).....	2
Mar 8, 2015-A (SN7123).....	7
Flight Log.....	13
Mar 8, 2015-A (SN7225).....	14
Flight Log.....	20
Mar 8, 2015-B (SN7121).....	21
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Flight Log.....	32
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Flight Log.....	39
Mar 8, 2015-C (SN7121).....	40
Mar 9, 2015-A (SN7121).....	45

Mar 8, 2015-A (SN7121)









Coordinate/Antenna Settings

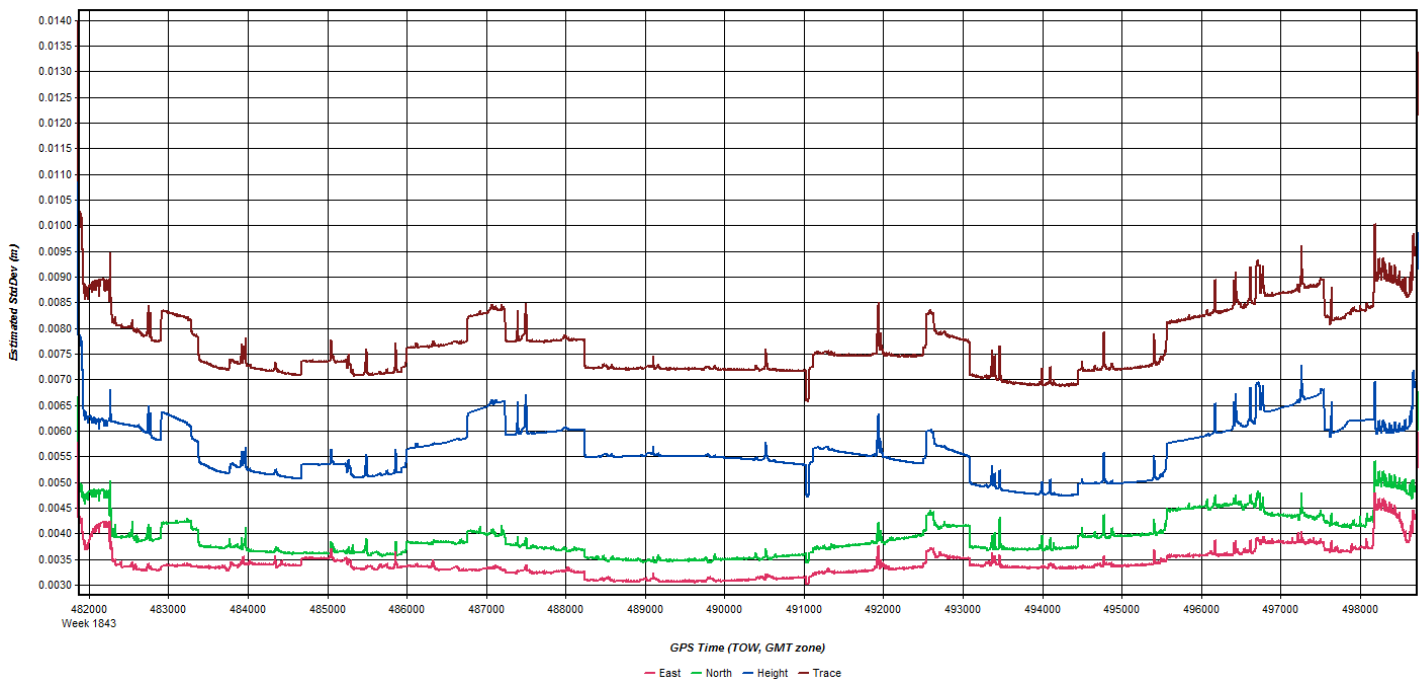
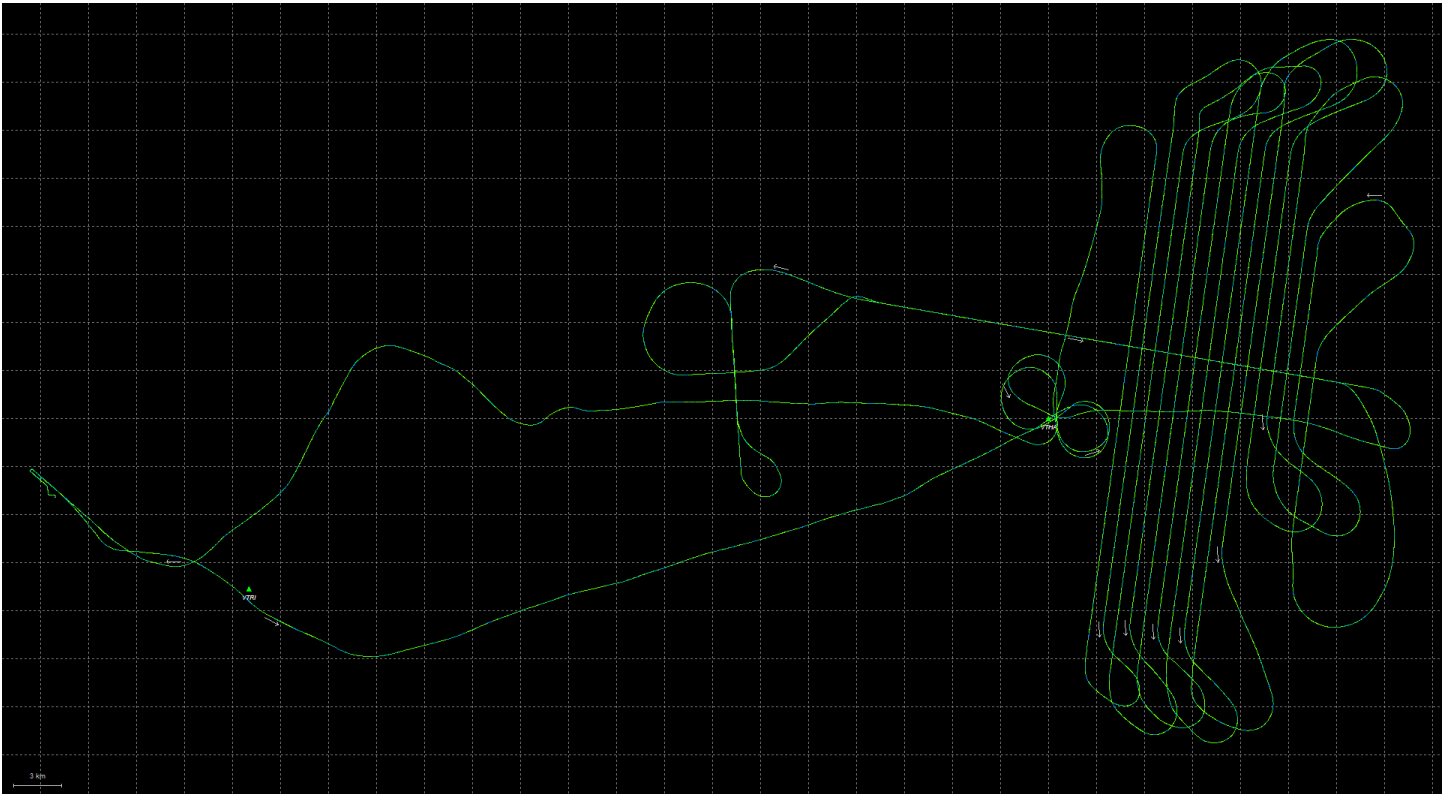
Master Remote

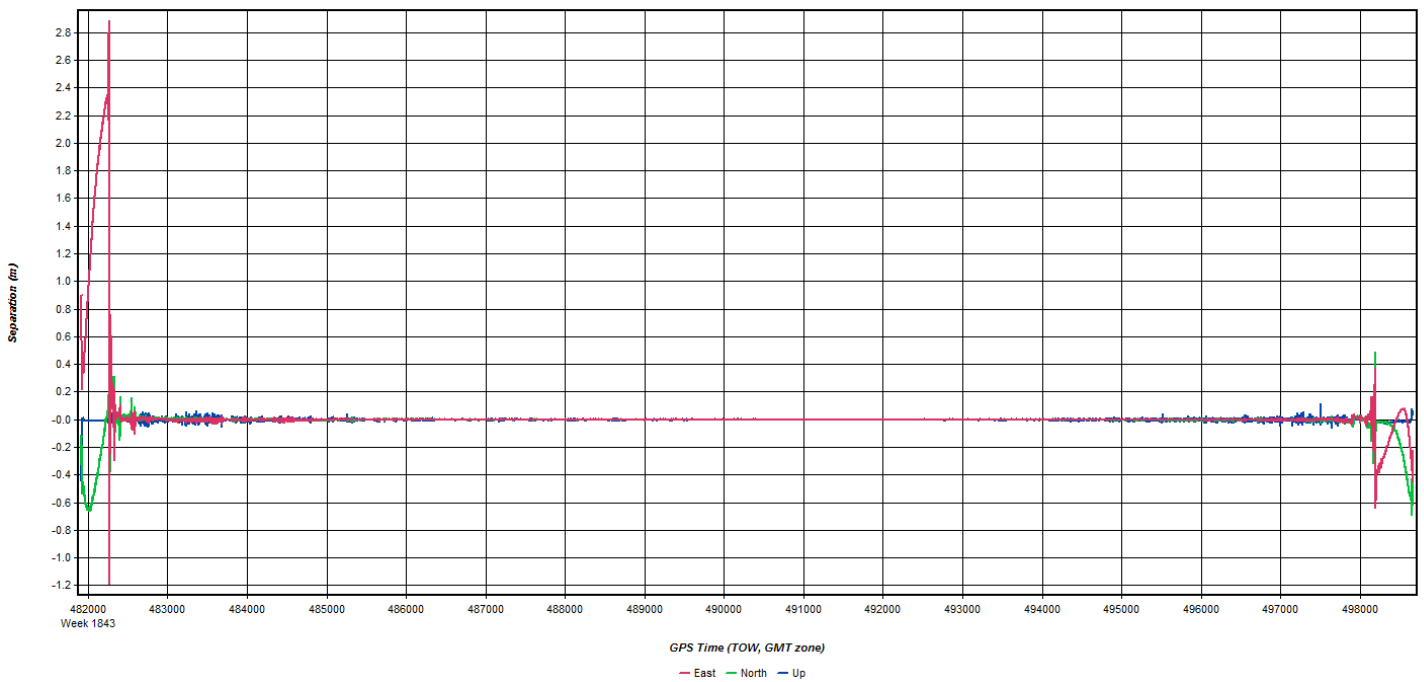
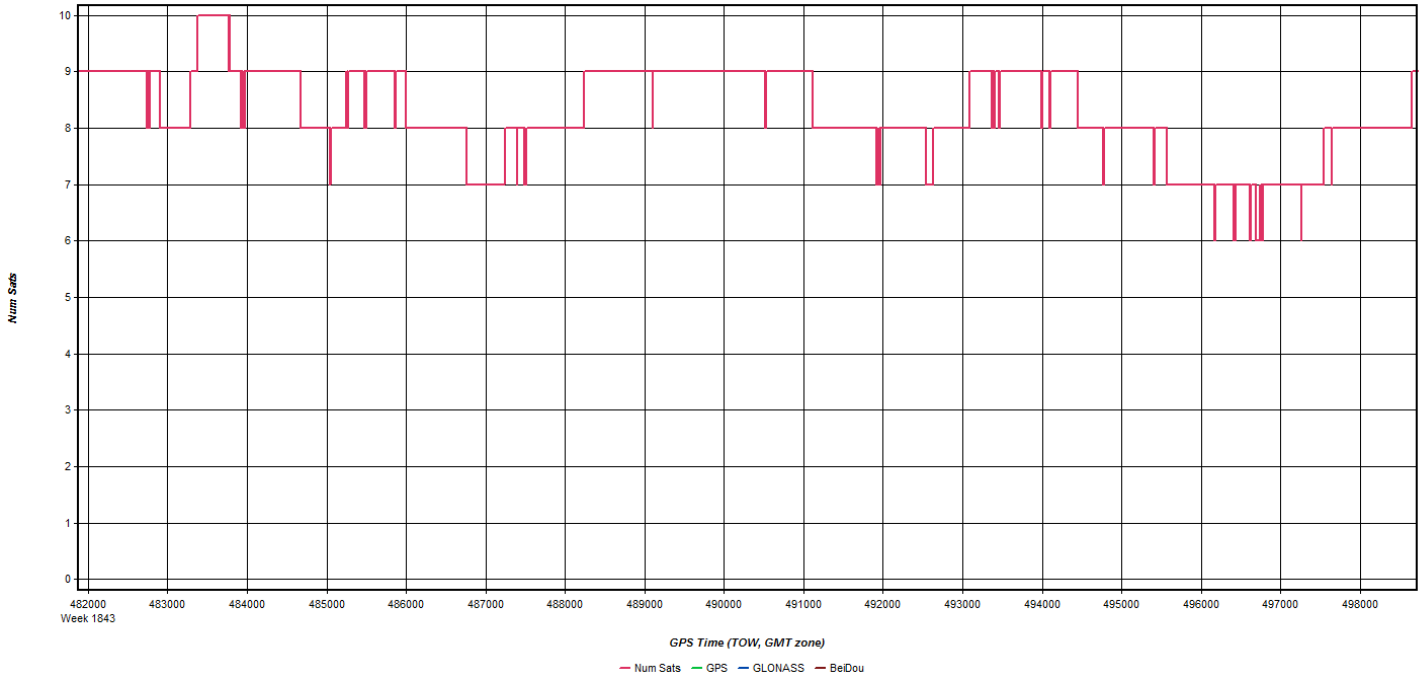
Base Station
 1: VTIP Name: VTIP Disabled
 File: E:\Proc\22399_Eastern_VT_Kucera\RawLaser\20150508_04311

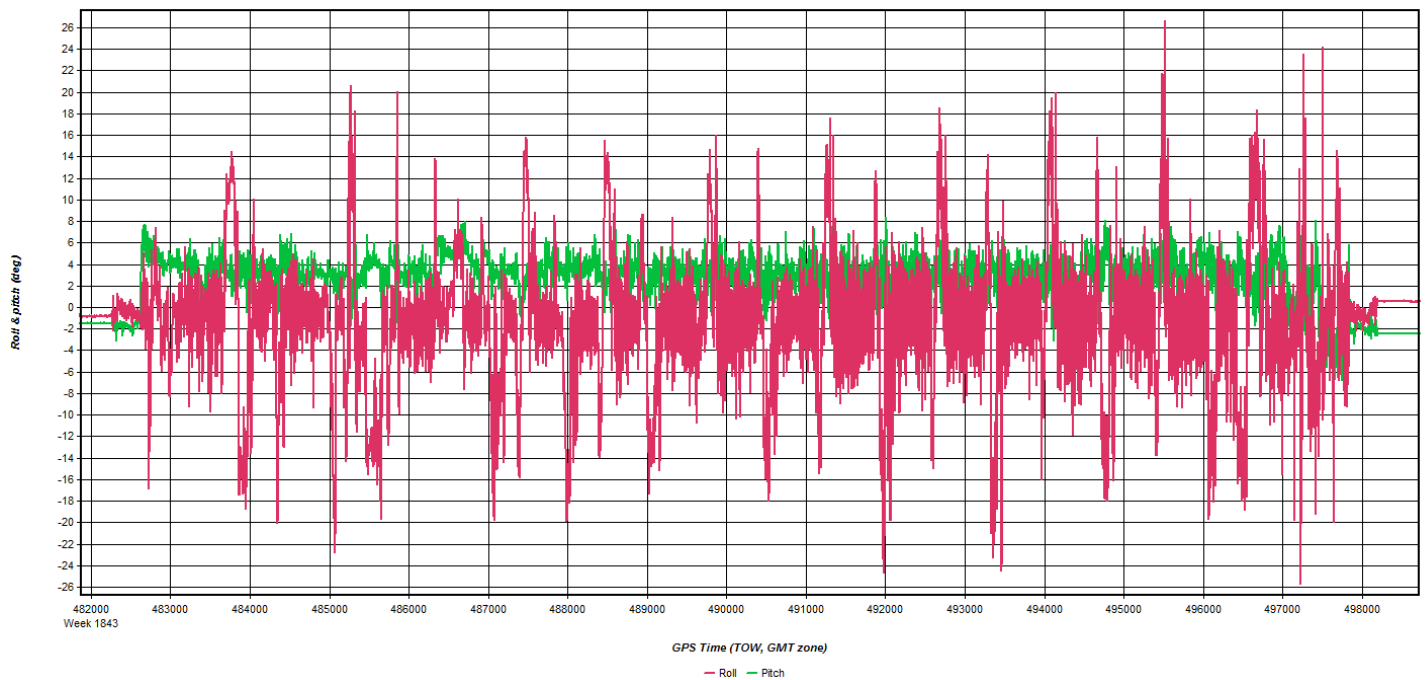
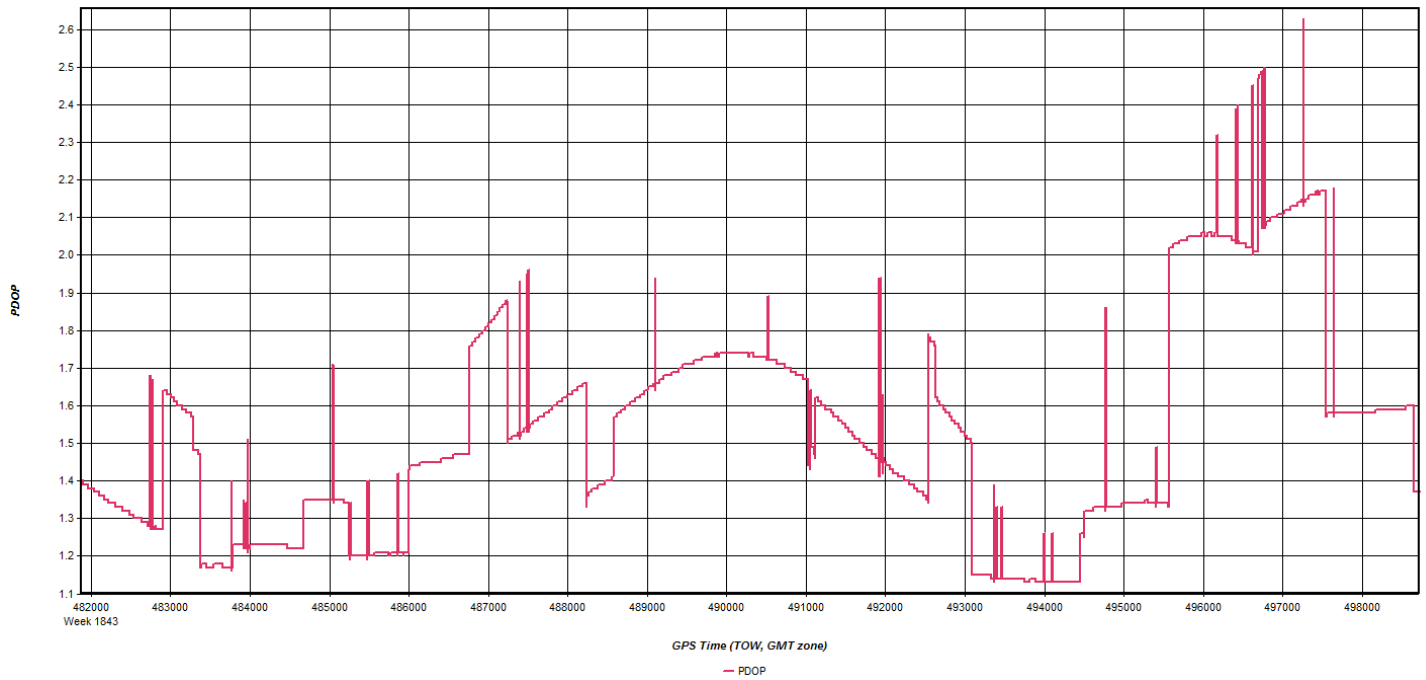
Coordinates
 Latitude: North 44 49 12.18043
 Longitude: West 71 53 25.83872
 Ellipsoidal height: 341.732 m
 Datum: NAD83(2011)

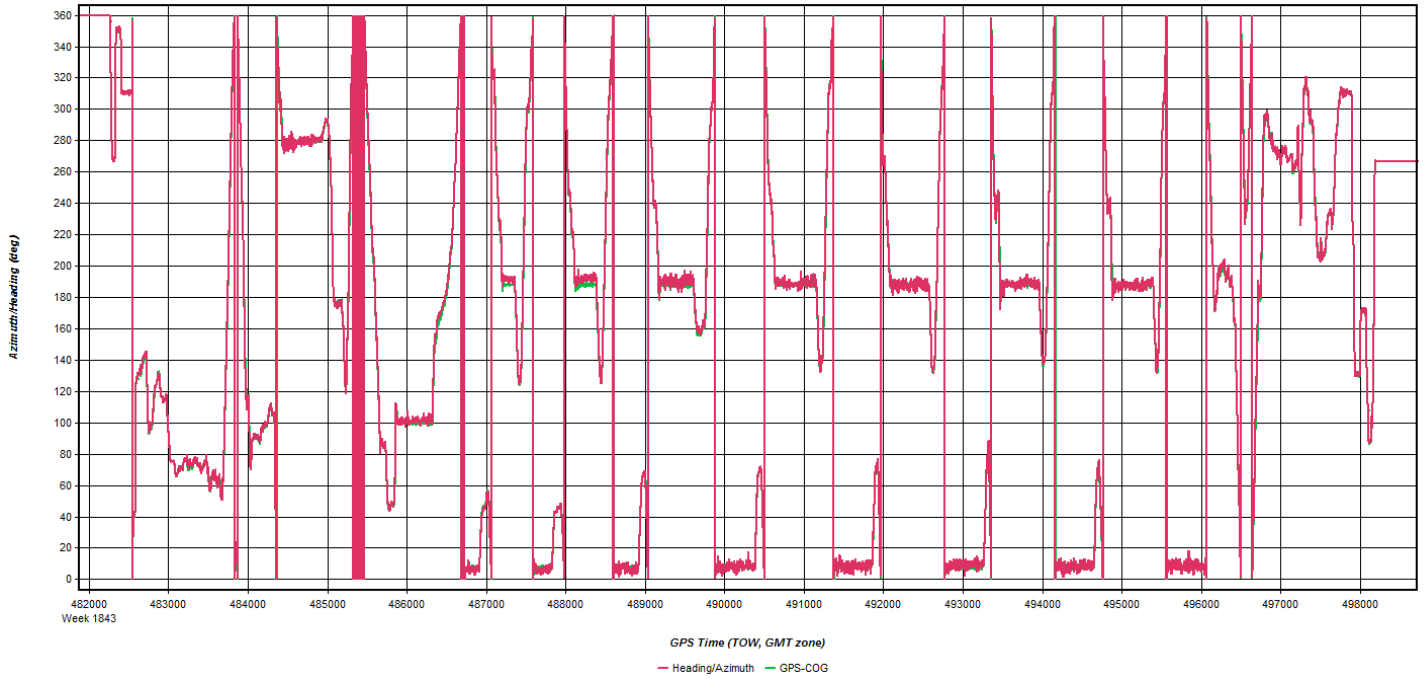
Antenna Height
 From station file: TRM55971.00, NONE
 Antenna profile: TRM55971.00
 Measured height: 0.000 m
 ARP to L1 offset: 0.067 m
 Applied height: 0.067 m
 Measured to:
 ARP
 L1 Phase Centre

Mar 8, 2015-A (SN7123)









Coordinate/Antenna Settings

Master Remote

Base Station
 1: VTHA Name: VTHA Disabled
 File: E:\Proc\22399_14133_STOWE\775MW\ALS\7123_20150508_F

Coordinates
 Latitude: North 44 30 30.69556
 Longitude: West 72 21 57.16354
 Ellipsoidal height: 256.821 m
 Datum: NAD83(2011)

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

Coordinate/Antenna Settings

Master Remote

Base Station
2: VTRI Name: VTRI Disabled
File: E:\Proc\22399_14133_STOWE\775MW\ALS\7123_20150508_F

Coordinates
Latitude: North 44 24 47.72636 Compute from PPP
Longitude: West 72 59 41.37328 Enter Grid Values
Ellipsoidal height: 112.262 m Enter MSL Height
Datum: NAD83(2011) Datum Options
Select From Favorites Add To Favorites Use Average Position

Antenna Height
From station file: TRM57971.00, NONE View STA File
Antenna profile: TRM57971.00 Info

Measured height: 0.000 m
ARP to L1 offset: 0.067 m
Applied height: 0.067 m

Measured to
 ARP
 L1 Phase Centre
Compute From Slant

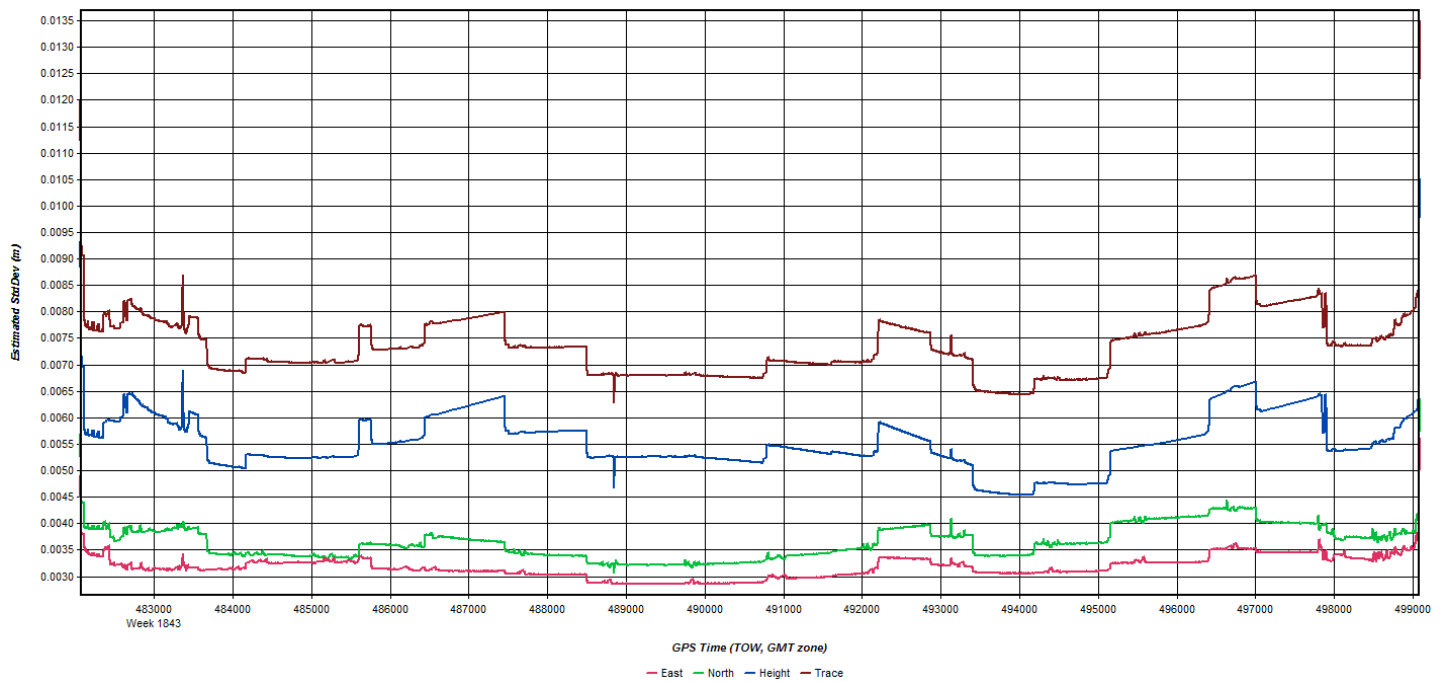
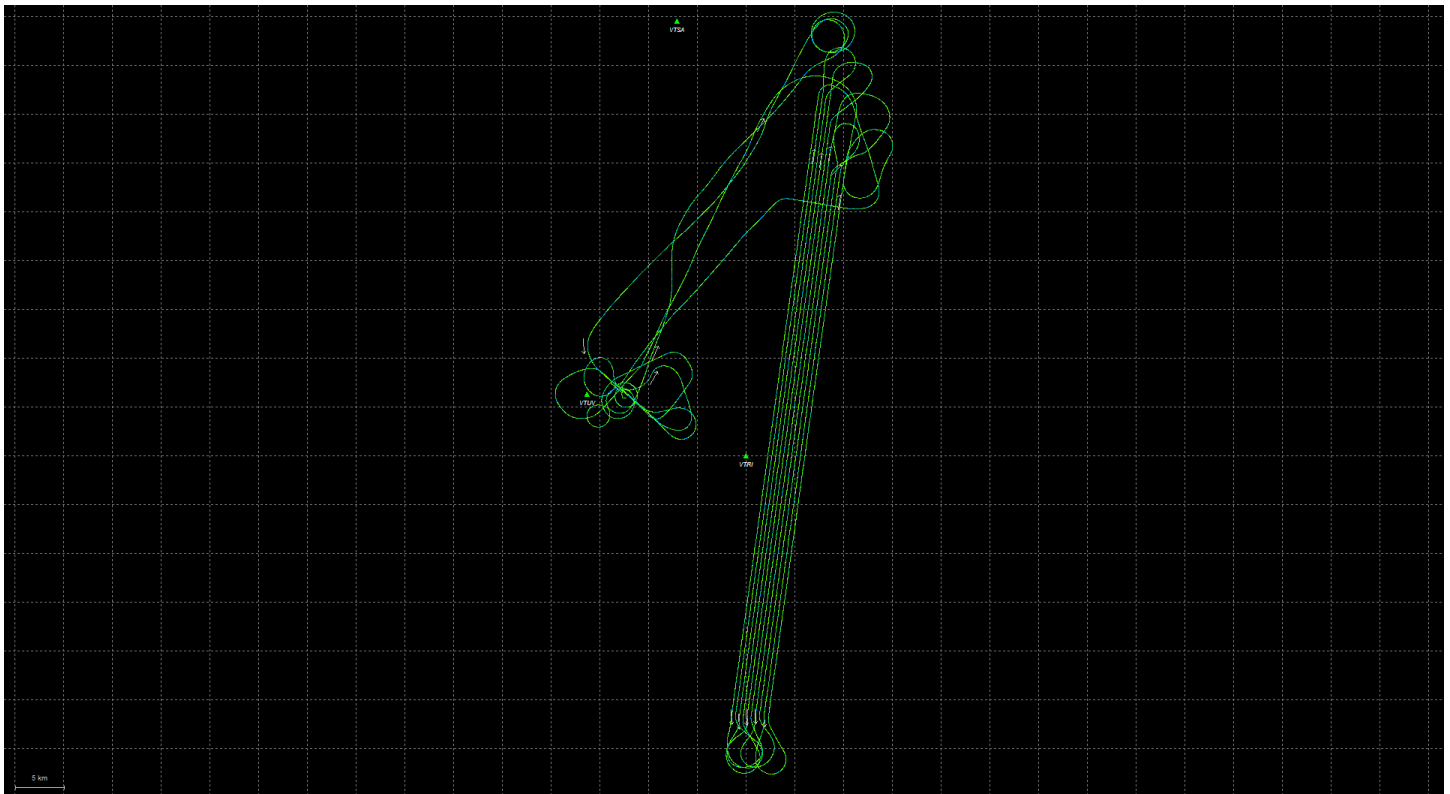
OK Cancel

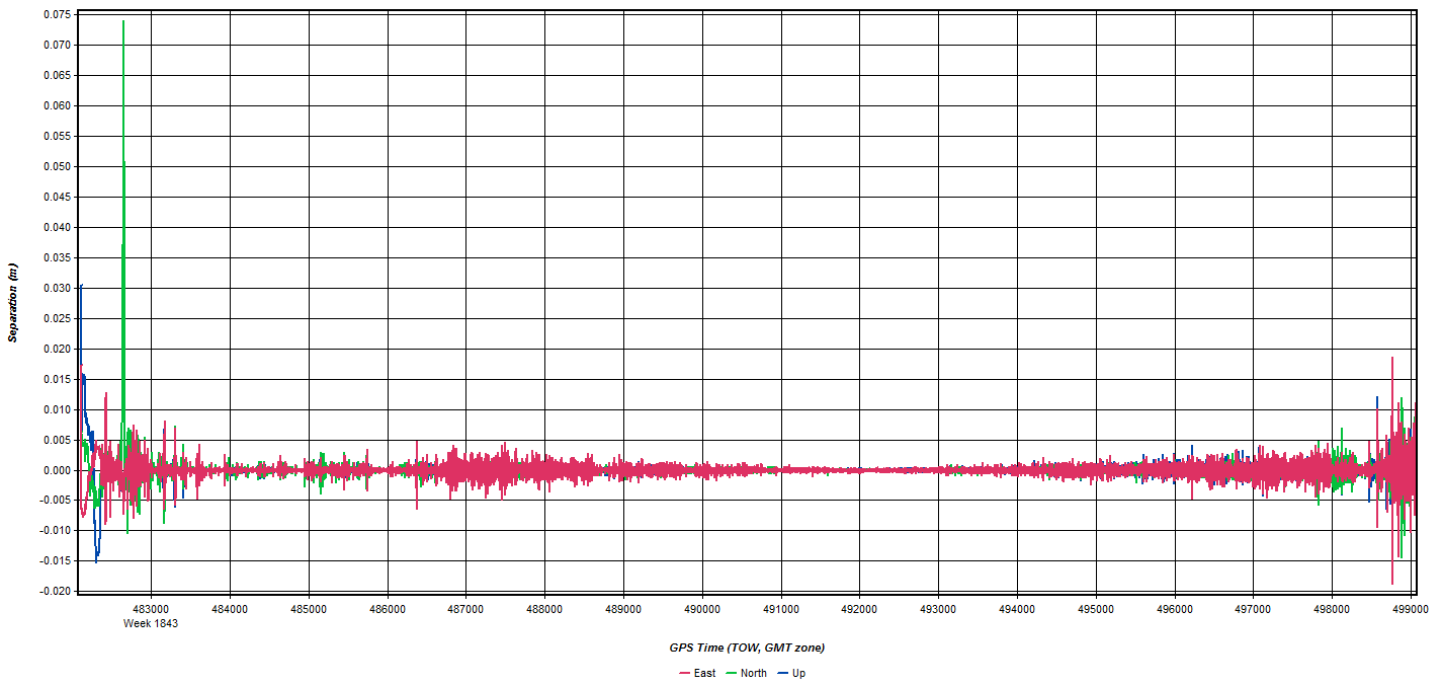
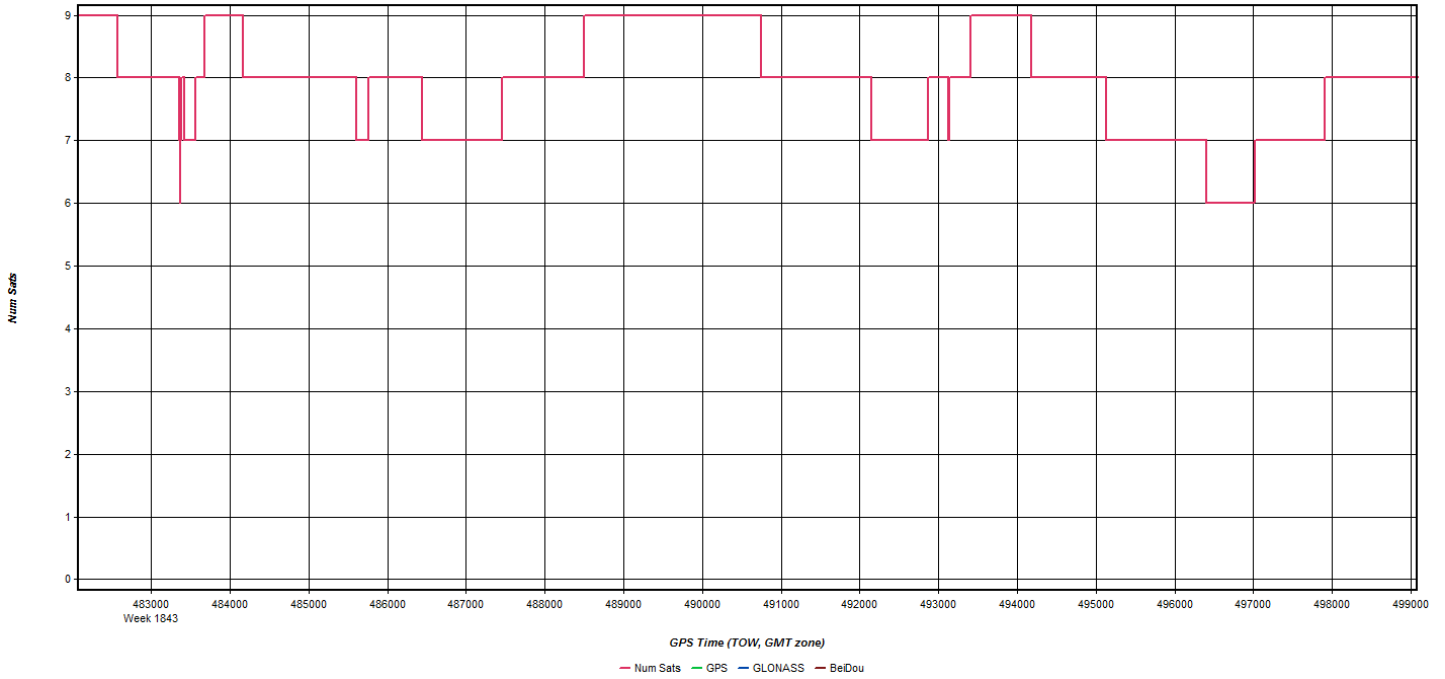
Flight Log

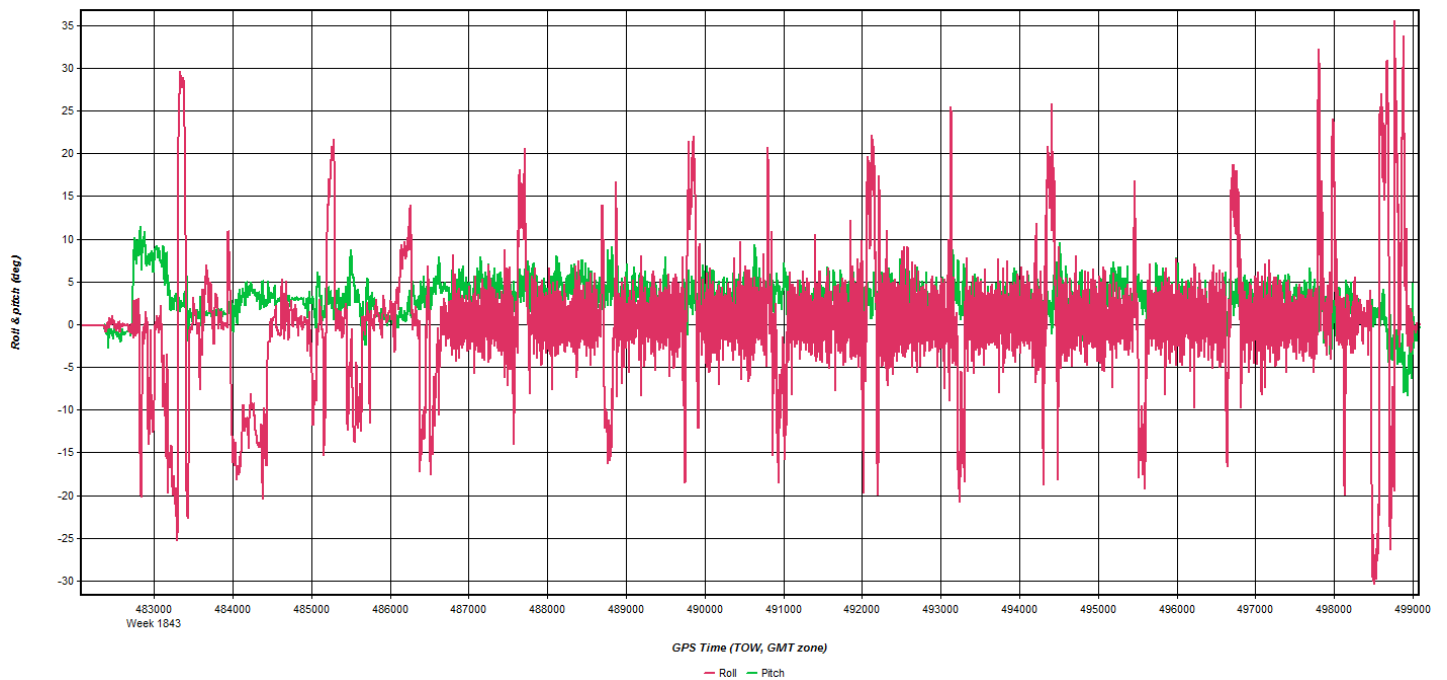
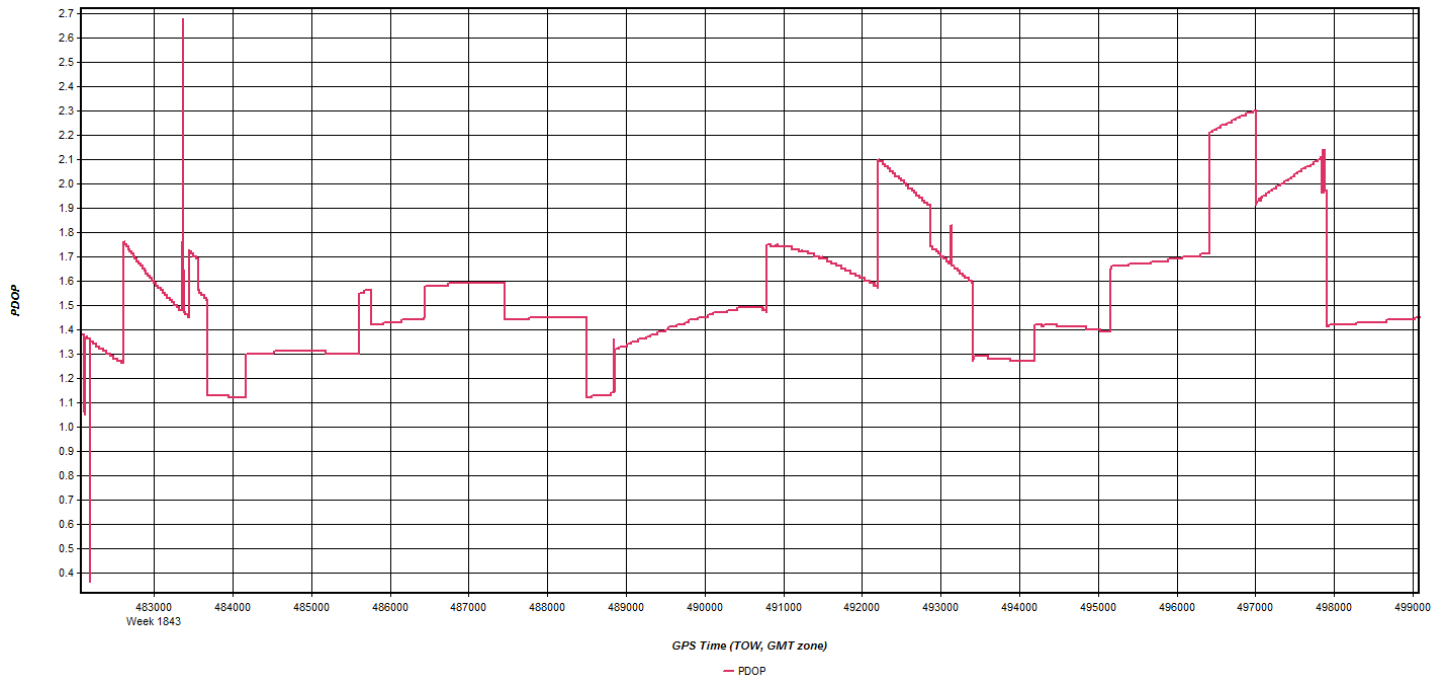
atlantic 2223 S Drake Ave, Suite 200 Huntsville, AL 35805 PH: (256) 971-9991 FX: (256) 971-1154		Project #: 14133 Flight plan name: STOME Location: BURLINGTON Pilot: MAX Operator: DANE Sensor: ALS70 Hobbs Time Start: 3567.8 Hobbs Time Stop: 3572.5 Pre-Static: 0950 - 0955 Post-Static: 1423 - 1428 Fwd Lap: 60 Side Lap 30			Tail Number: 775MW Flight Date: 20150508F01 Sensor SN 7123 Weather CLR				Base Station T2			GPS IMU			Lever Arm X Y Z		
Line/DIR	Start	End	Air Speed	Alt(ft)	# Exp	Light Values	GB Size	Comments or errors while online:									
2116	294	1034	110	5250				X LINE									
UL001	190	1045	134	5210				CAL SITE									
UL001	11	1049	135	4980				CAL SITE									
UL003	100	1054	130	5100				CAL SITE									
2116	114	1058	128	5270				X LINE									
2114	23	1114	124	7920													
2113	203	1119	131	8080													
2112	23	1126	125	7700													
2111	203	1135	130	7730													
2110	23	1143	125	7619													
2109	203	1153	120	7410													
2108	23	1204	119	7440													
2107	203	1217	123	7400													
2106	23	1229	120	7390													
2105	203	1241	130	7270													
2104	23	1253	130	7330													
2103	203	1304	127	7240													
2102	23	1316	135	7120													
2101	203	1327	123	7050													
2100	23	1339	130	7120													

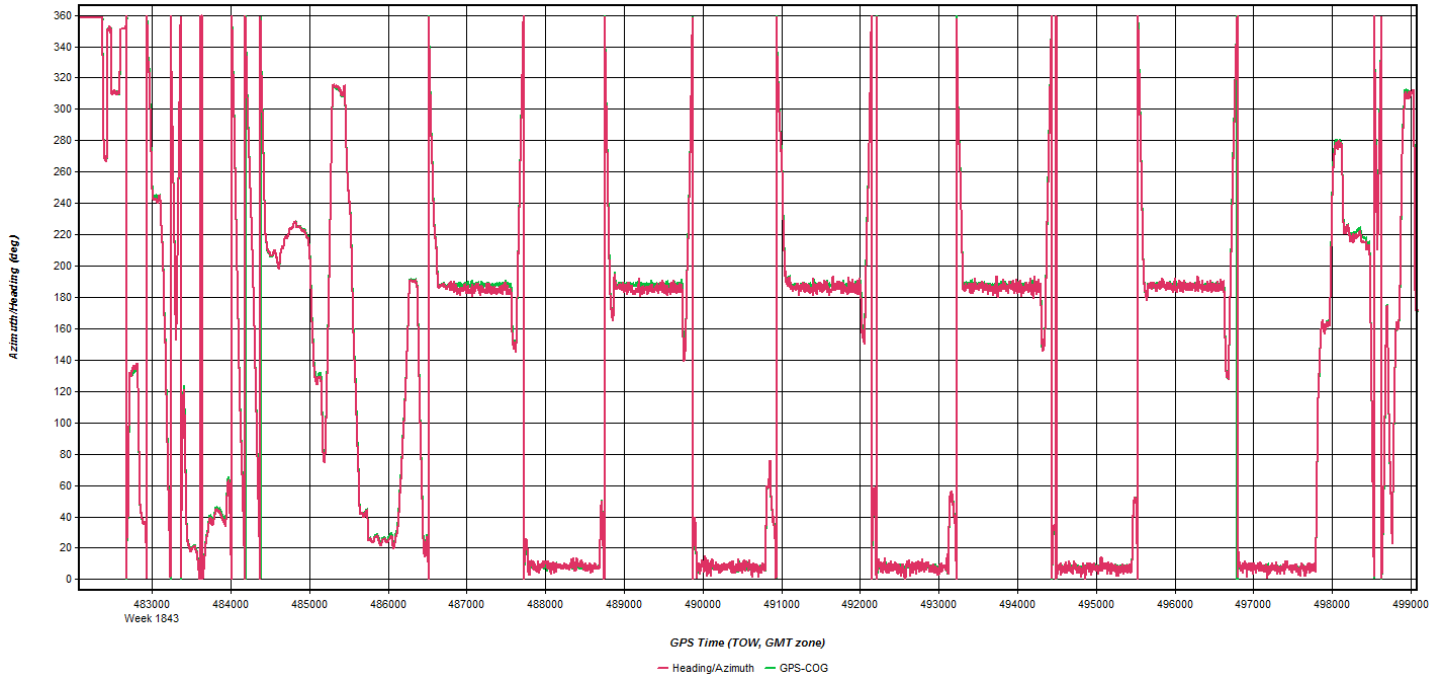
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Mar 8, 2015-A (SN7225)









Coordinate/Antenna Settings

Master Remote

Base Station
 1: VTRI Name: VTRI Disabled
 File: E:\Proc\From_TAG\14133_EAST_BURLINGTON\Acq_LIDAR\N

Coordinates
 Latitude: North 44 24 47.72636
 Longitude: West 72 59 41.37328
 Ellipsoidal height: 112.262 m
 Datum: NAD83(2011)

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

Coordinate/Antenna Settings

Master Remote

Base Station
 2: VTSA Name: VTSA Disabled
 File: E:\Proc\From_TAG\14133_EAST_BURLINGTON\Acq_LIDAR\N

Coordinates
 Latitude: North 44 48 32.64649 Compute from PPP
 Longitude: West 73 04 57.28896 Enter Grid Values
 Ellipsoidal height: 117.578 m Enter MSL Height
 Datum: NAD83(2011) Datum Options
 Select From Favorites Add To Favorites Use Average Position

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

OK Cancel

Coordinate/Antenna Settings

Master Remote

Base Station
 3: VTUV Name: VTUV Disabled
 File: E:\Proc\From_TAG\14133_EAST_BURLINGTON\Acq_LIDAR\N

Coordinates
 Latitude: North 44 28 09.21279 Compute from PPP
 Longitude: West 73 11 52.37575 Enter Grid Values
 Ellipsoidal height: 112.410 m Enter MSL Height
 Datum: NAD83(2011) Datum Options
 Select From Favorites Add To Favorites Use Average Position

Antenna Height
 From station file: TRM41249.00, TZGD View STA File
 Antenna profile: TRM41249.00, TZGD Info
 Measured height: 0.000 m
 ARP to L1 offset: 0.055 m
 Applied height: 0.055 m
 Measured to
 ARP
 L1 Phase Centre
 Compute From Slant

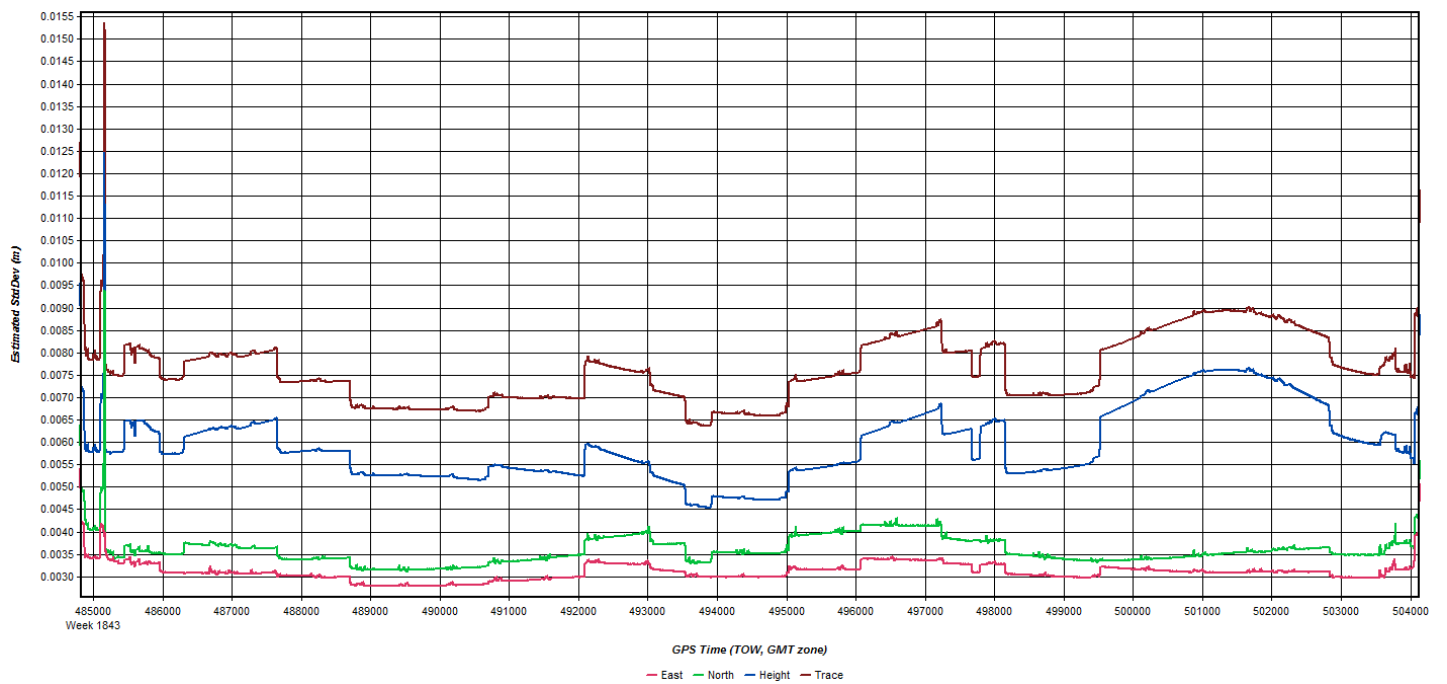
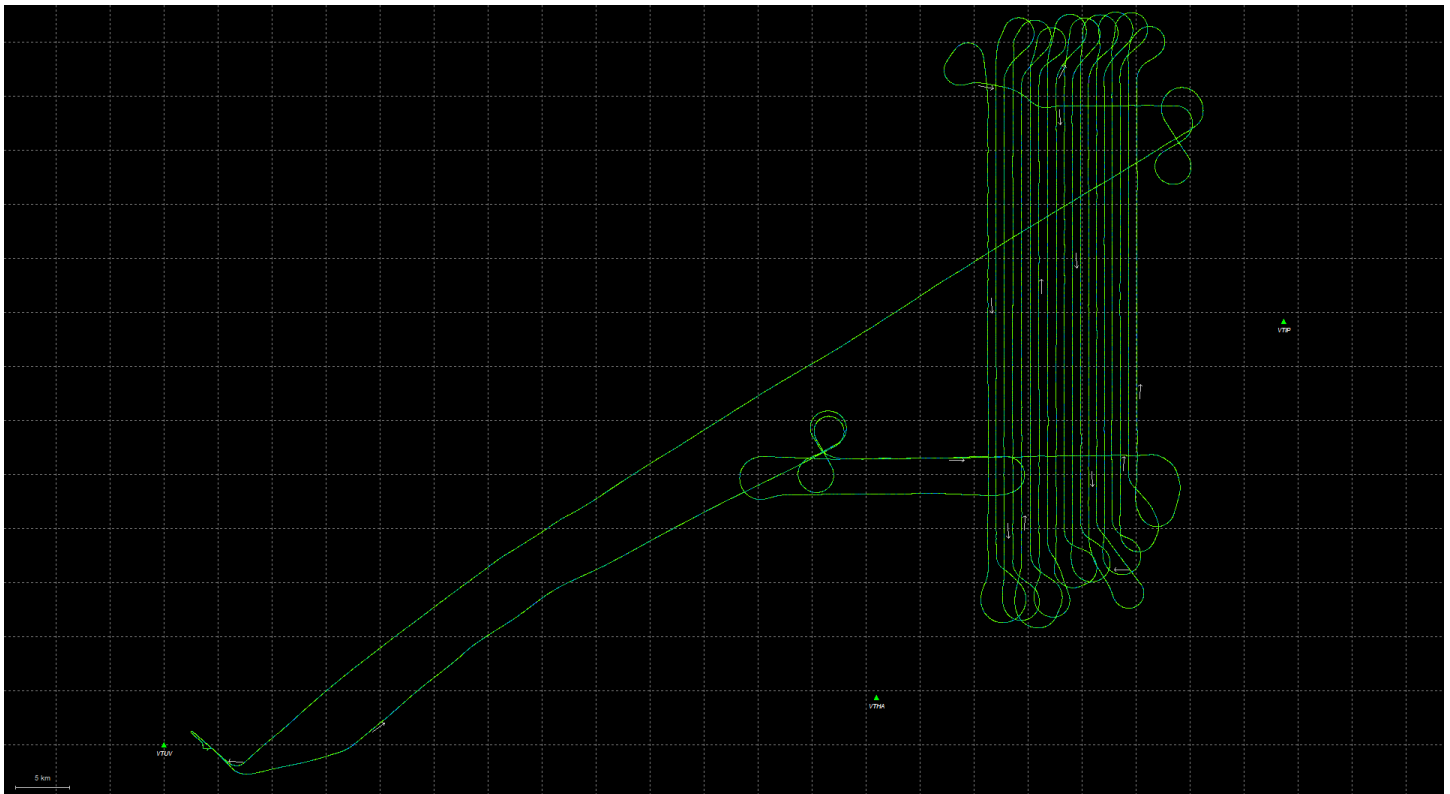
OK Cancel

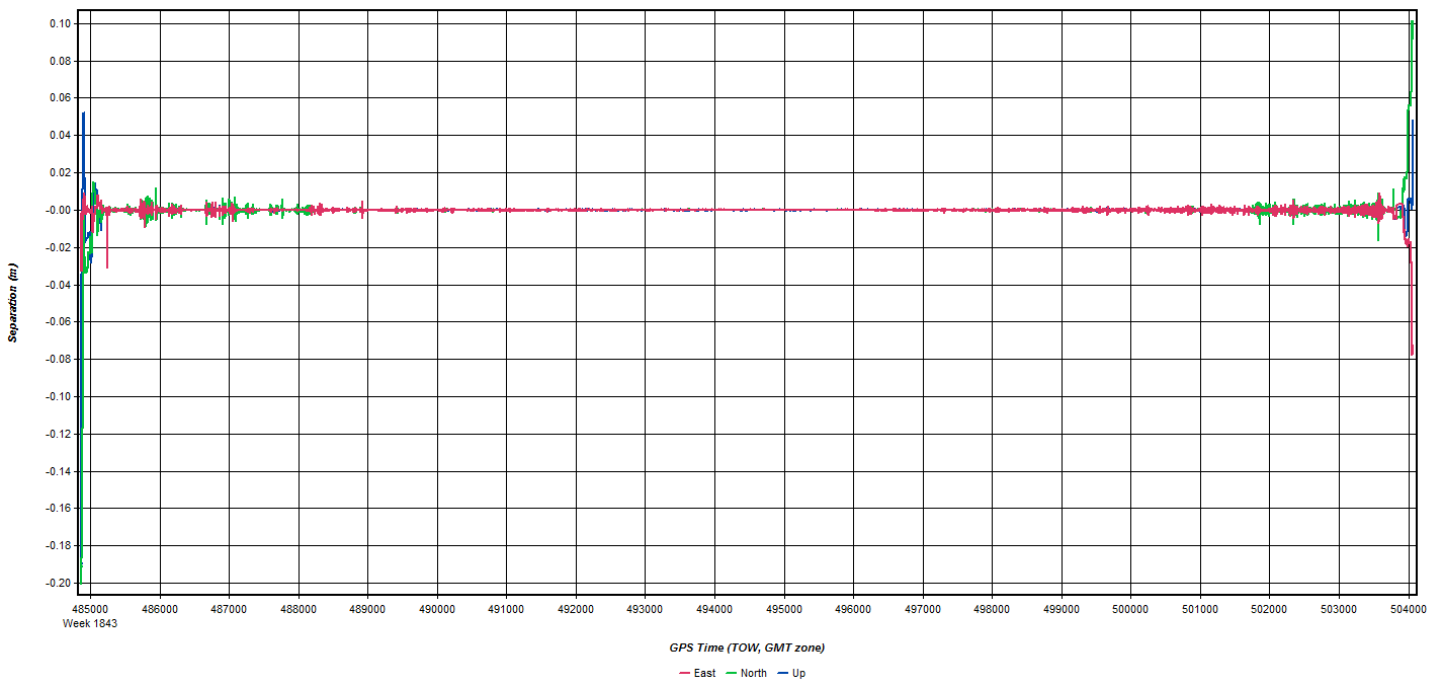
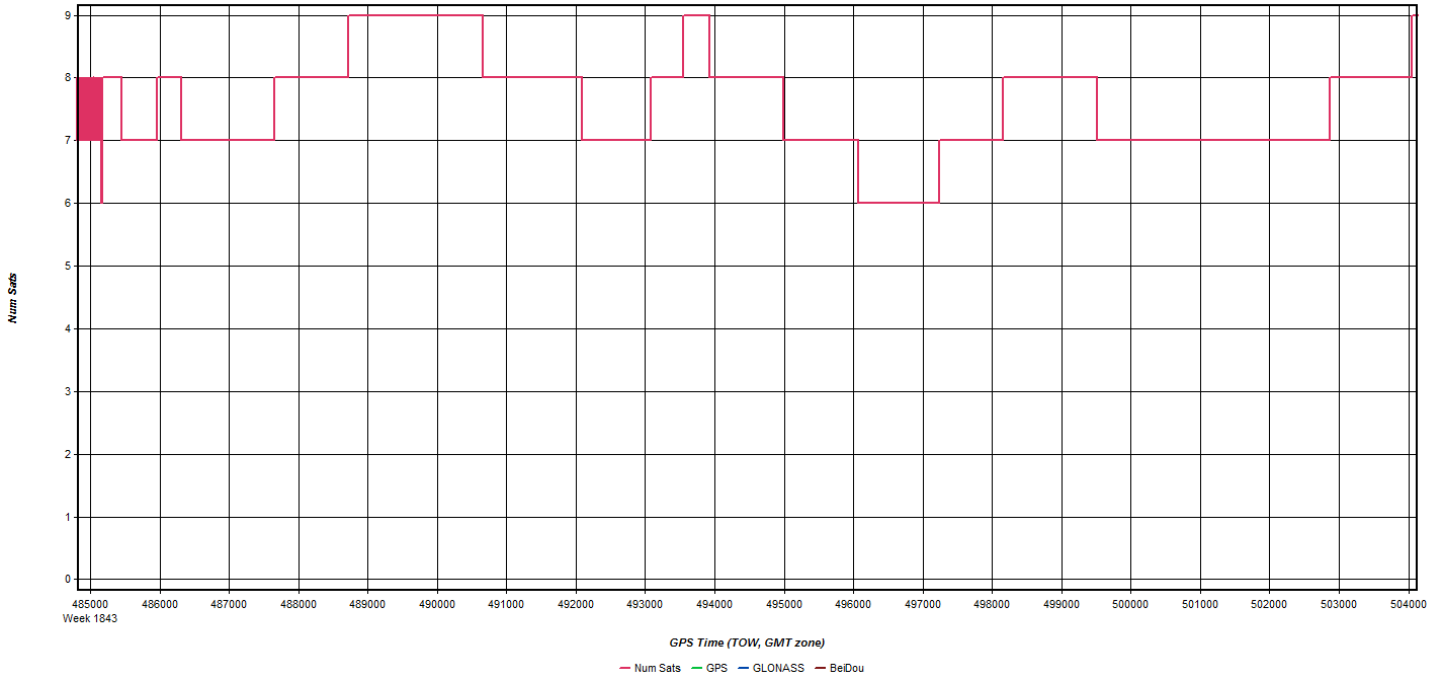
Flight Log

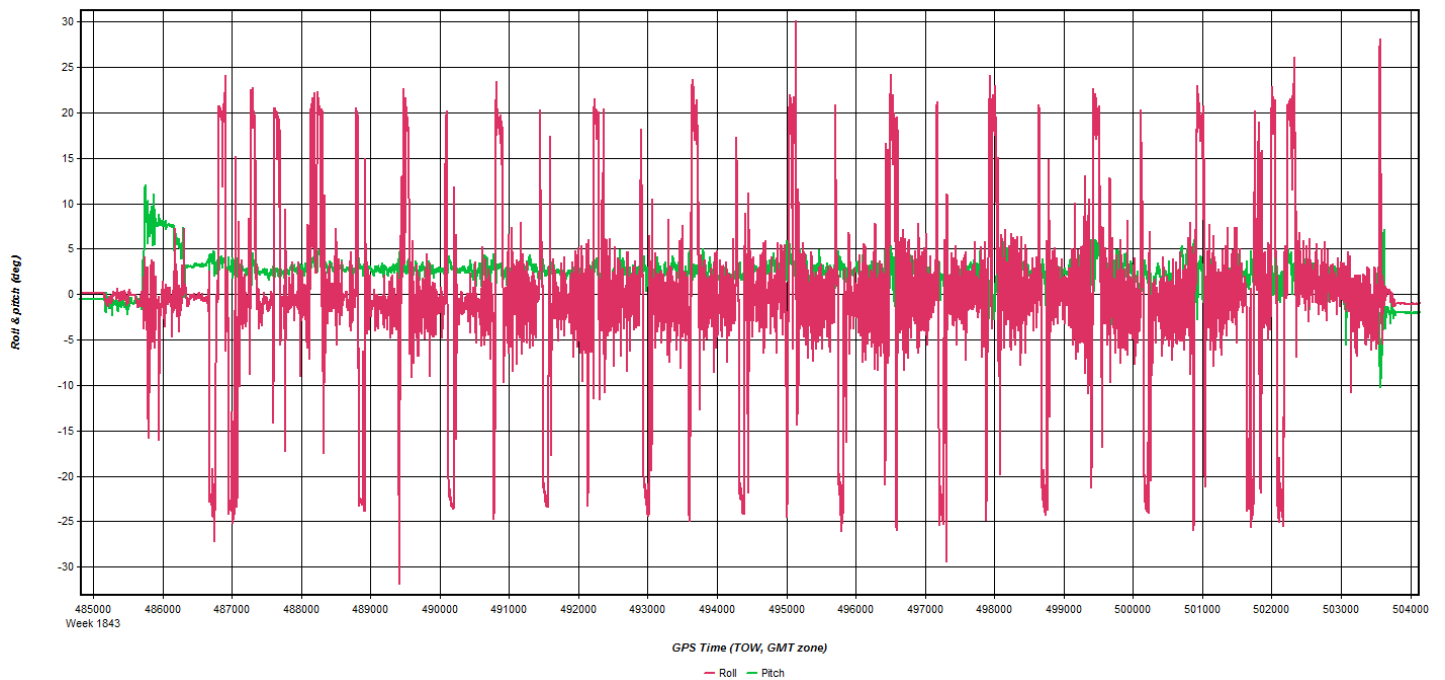
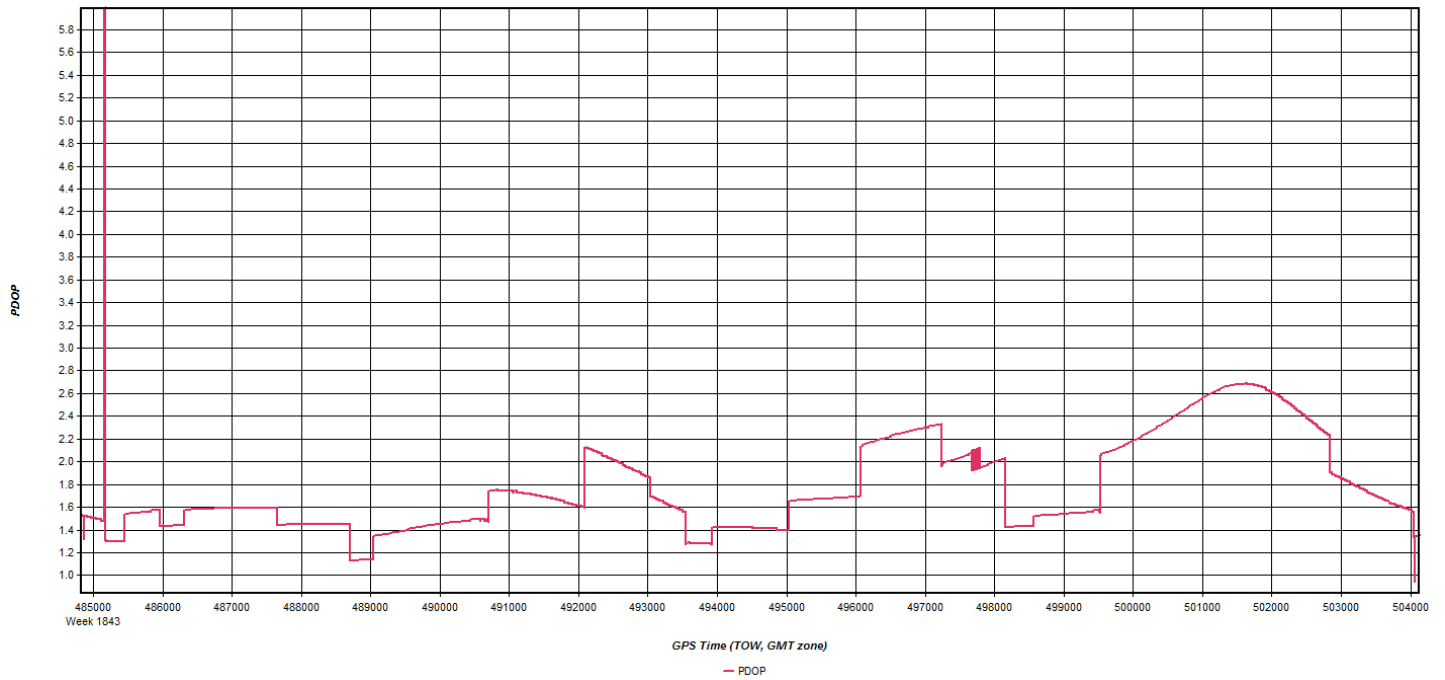
2223 S Drake Ave, Suite 200 Huntsville, AL 35805 PH: (256) 971-9991 FX: (256) 971-1154			Project #: 14133 Flight plan name: East Burlington Location: RBTV Pilot: Blake Operator: JTK Sensor: 7225 Hobbs Time Start: 4230.4 Hobbs Time Stop: 4234.9 Pre-Static: 1355-1400 Post-Static: none Fwd Lap: Side Lap:	Tail Number: NI872H Flight Date: 5/8/2015 Sensor SN: 7225 Weather:	GPS IMU Topcon ARP SET_POINT 1.46 1.402 0.00 0.00	Lever Arm X Y Z				
Line/DIR	Start	End	Air Speed	Alt(ft)	# Exp	Light Values	GB Size	Comments or errors while online:		
UL001	143	1443	1446	125	5000			calibration over BTV		
UL002	330	1449	1452	125	5000			calibration over BTV		
UL003	58	1454	1455	125	5000			calibration over BTV		
	1067	202	1510	1526	125	5000				
	1066	22	1531	1543	125	5000				
	1065	202	1546	1601	125	5000				
	1064	22	1604	1608	125	5000				
	1063	202	1610	1627	125	5000				
	1062	22	1630	1657	125	5000				
	1061	202	1700	1717	125	5000				
	1060	22	1720	1737	125	5000				
	1059	202	1740	1758	125	5000				
	1058	22	1800	1815	125	5000				
UL004	293	1820	1822	130	5000			Cross Flight		

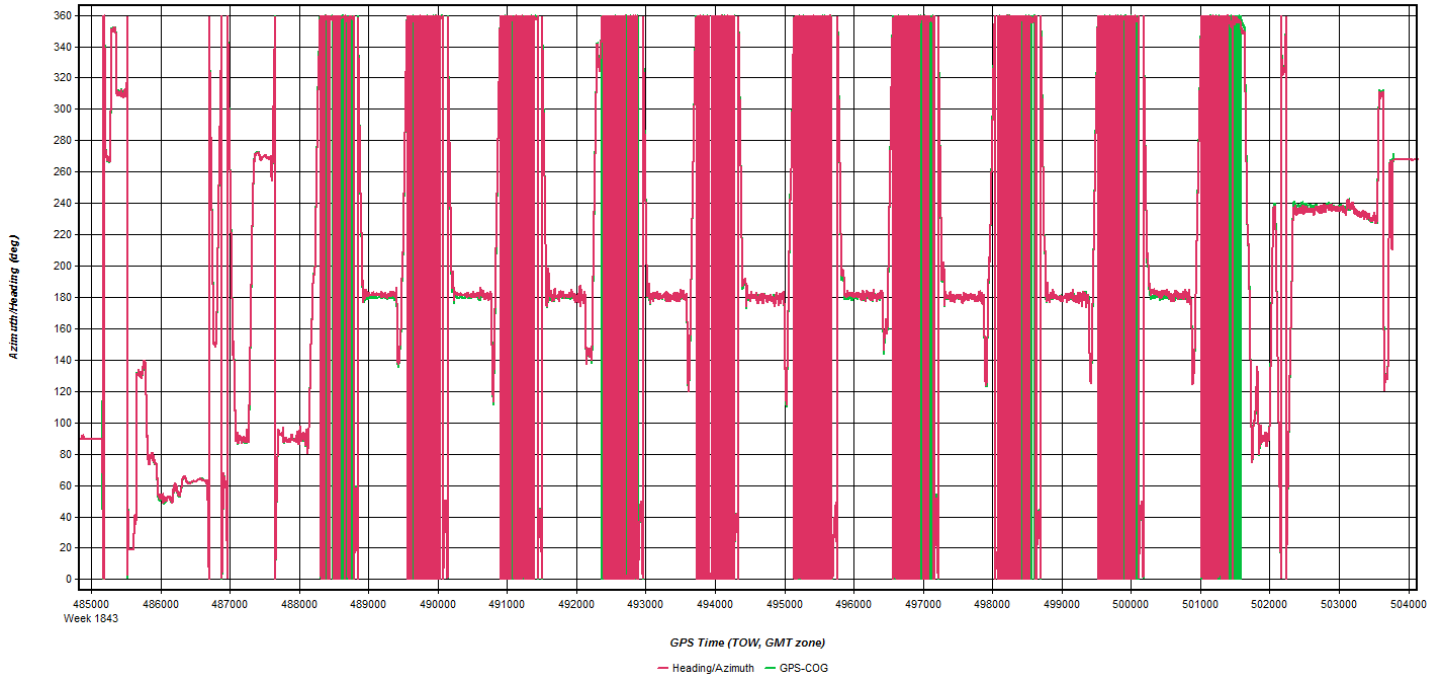
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Mar 8, 2015-B (SN7121)









Coordinate/Antenna Settings

Master Remote

Base Station
 2: VTHA Name: VTHA Disabled
 File: E:\Proc\22399_Eastern_VT_Kucera\RawLaser\20150508_14350

Coordinates
 Latitude: North 44 30 30.69556 Compute from PPP
 Longitude: West 72 21 57.16354 Enter Grid Values
 Ellipsoidal height: 256.821 m Enter MSL Height
 Datum: NAD83(2011) Datum Options
 Select From Favorites Add To Favorites Use Average Position

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

OK Cancel

Coordinate/Antenna Settings

Master Remote

Base Station
3: VTIP Name: VTIP Disabled
File: E:\Proc\22399_Eastern_VT_Kucera\RawLaser\20150508_14350

Coordinates
Latitude: North 44 49 12.18043 Compute from PPP
Longitude: West 71 53 25.83872 Enter Grid Values
Ellipsoidal height: 341.732 m Enter MSL Height
Datum: NAD83(2011) Datum Options
Select From Favorites Add To Favorites Use Average Position

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

OK Cancel

Coordinate/Antenna Settings

Master Remote

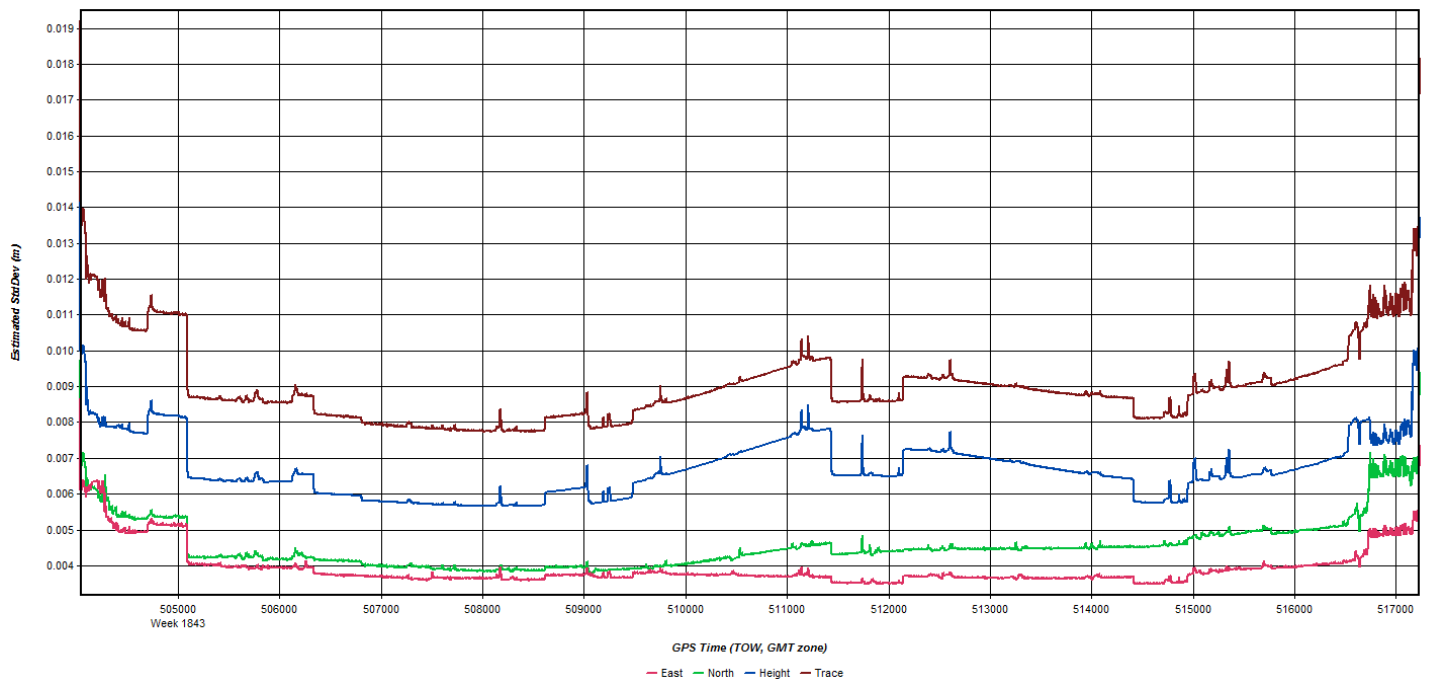
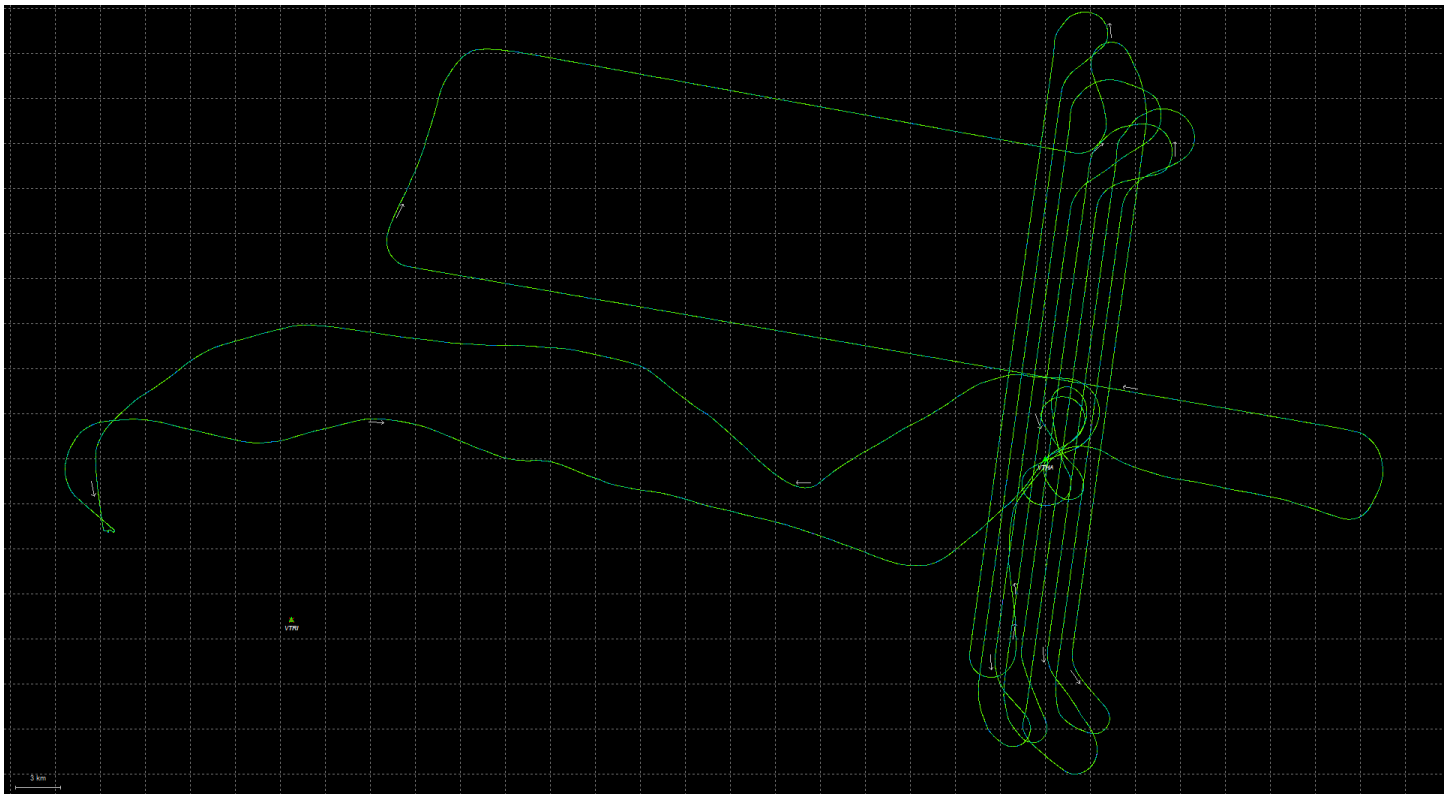
Base Station
1: VTUV Name: VTUV Disabled
File: E:\Proc\22399_Eastern_VT_Kucera\RawLaser\20150508_14350

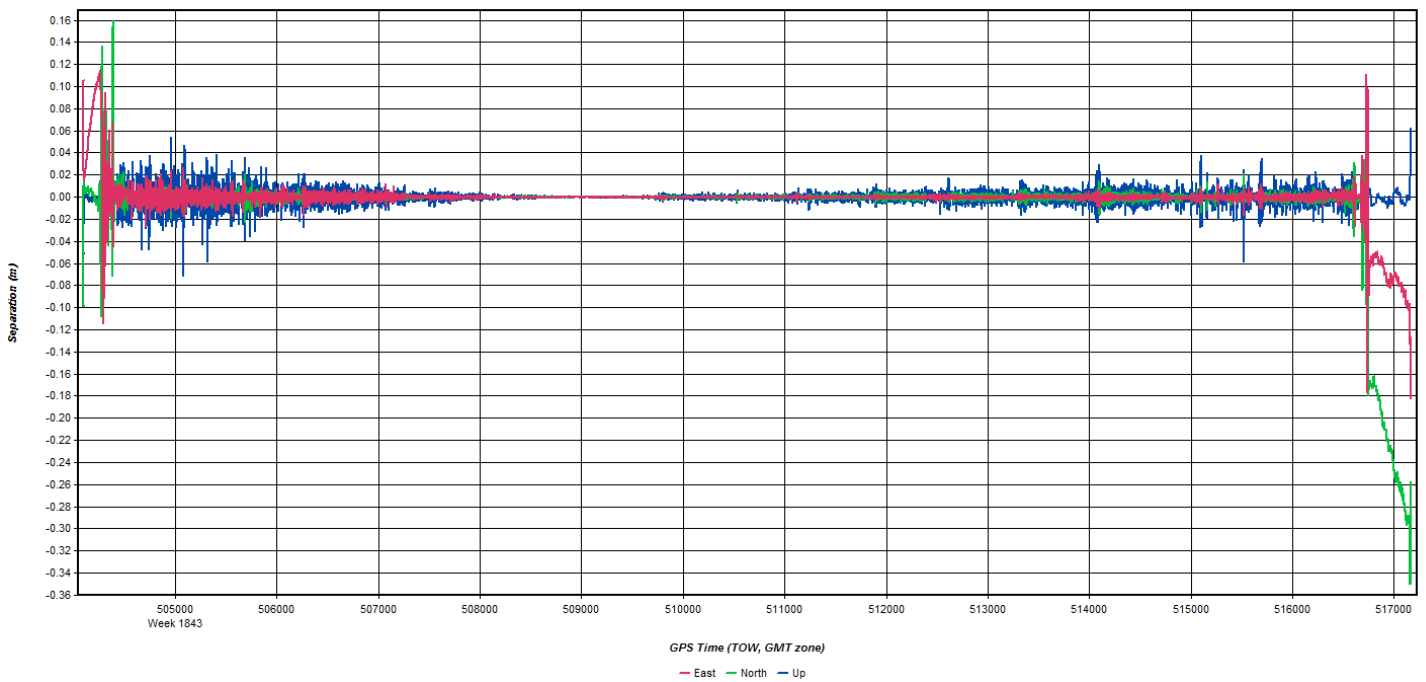
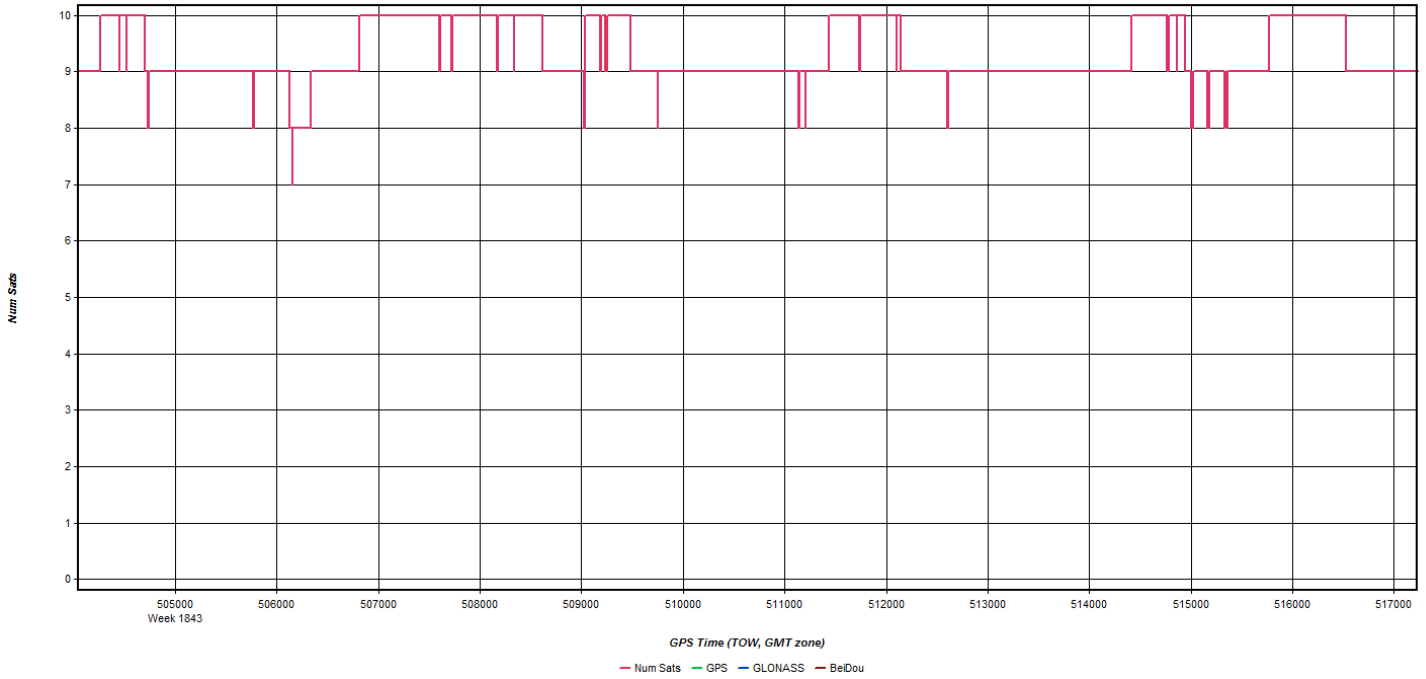
Coordinates
Latitude: North 44 28 09.21279 Compute from PPP
Longitude: West 73 11 52.37575 Enter Grid Values
Ellipsoidal height: 112.410 m Enter MSL Height
Datum: NAD83(2011) Datum Options
Select From Favorites Add To Favorites Use Average Position

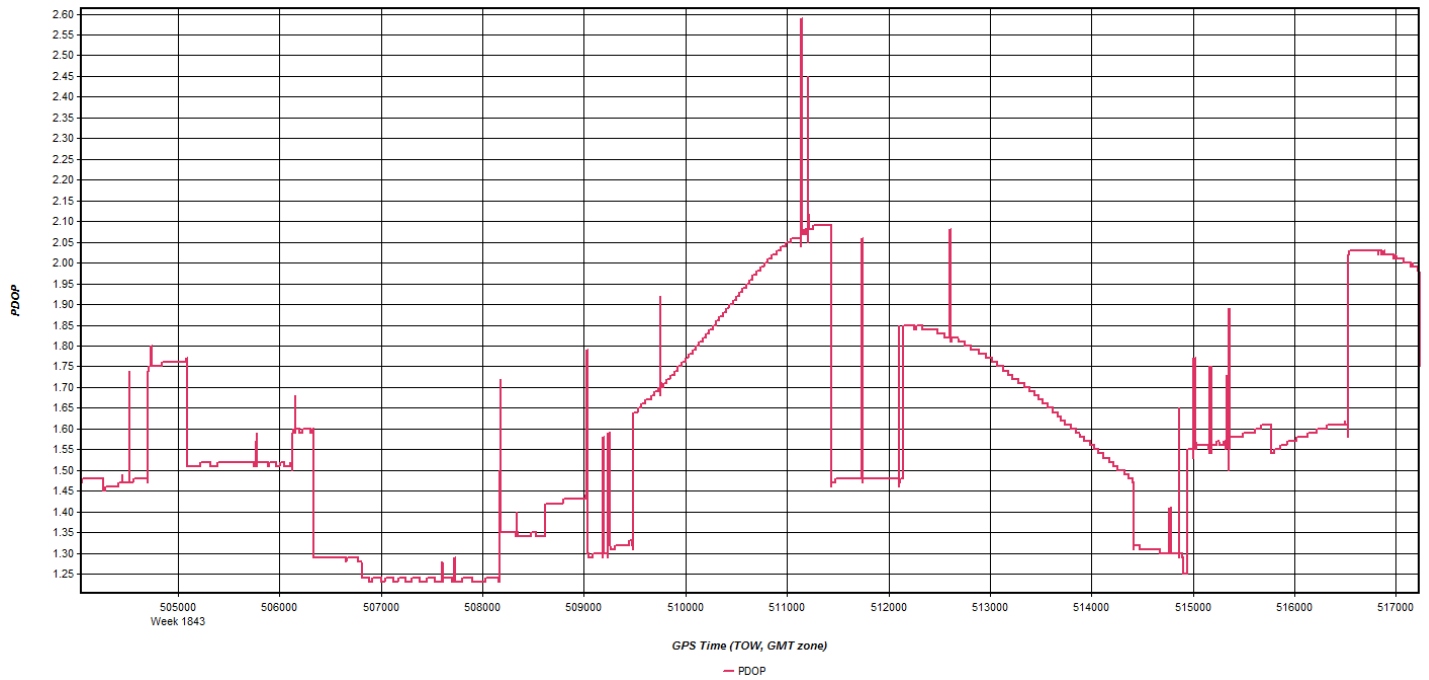
Antenna Height
From station file: TRM41249.00, TZGD View STA File
Antenna profile: TRM41249.00, TZGD Info
Measured height: 0.000 m Measured to
ARP ARP
L1 Phase Centre L1 Phase Centre
ARP to L1 offset: 0.055 m
Applied height: 0.055 m Compute From Slant

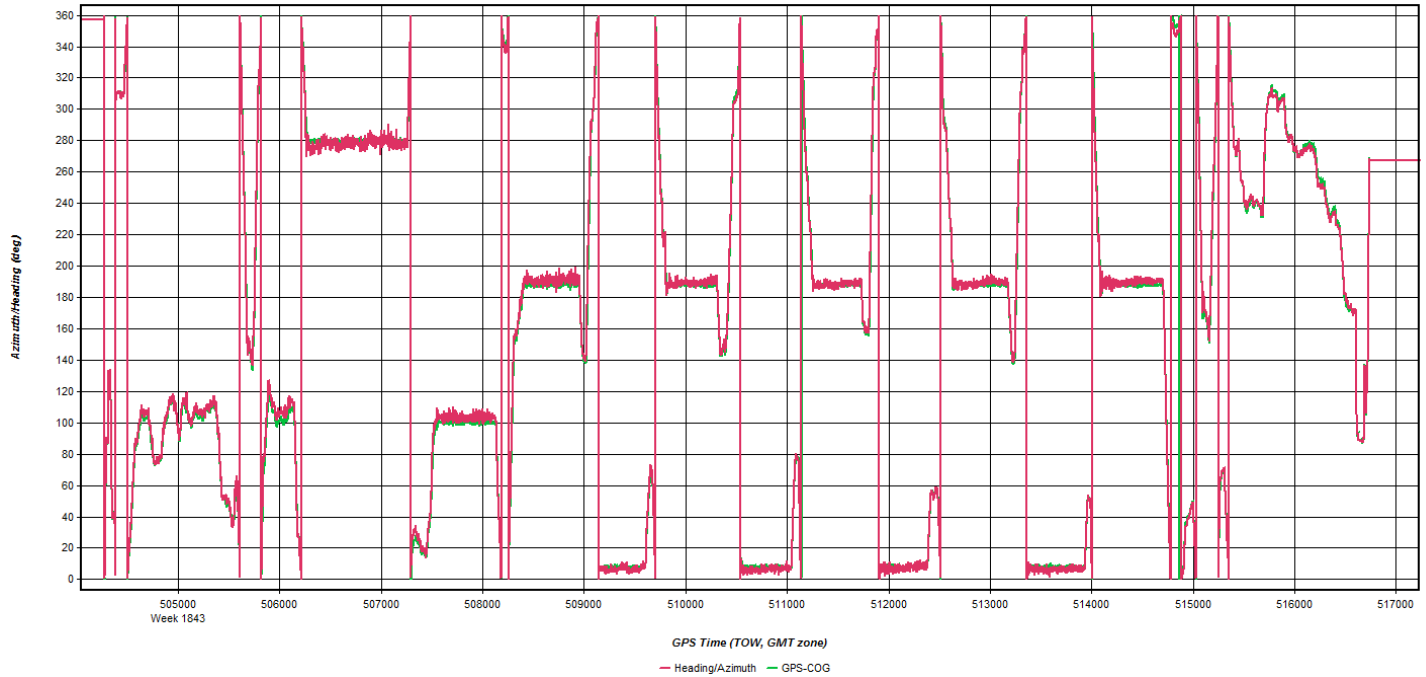
OK Cancel

Mar 8, 2015-B (SN7123)









Coordinate/Antenna Settings

Master Remote

Base Station
 1: VTHA Name: VTHA Disabled
 File: E:\Proc\22399_14133_STOWE\775MW\ALS\7123_20150508_F

Coordinates
 Latitude: North 44 30 30.69556
 Longitude: West 72 21 57.16354
 Ellipsoidal height: 256.821 m
 Datum: NAD83(2011)

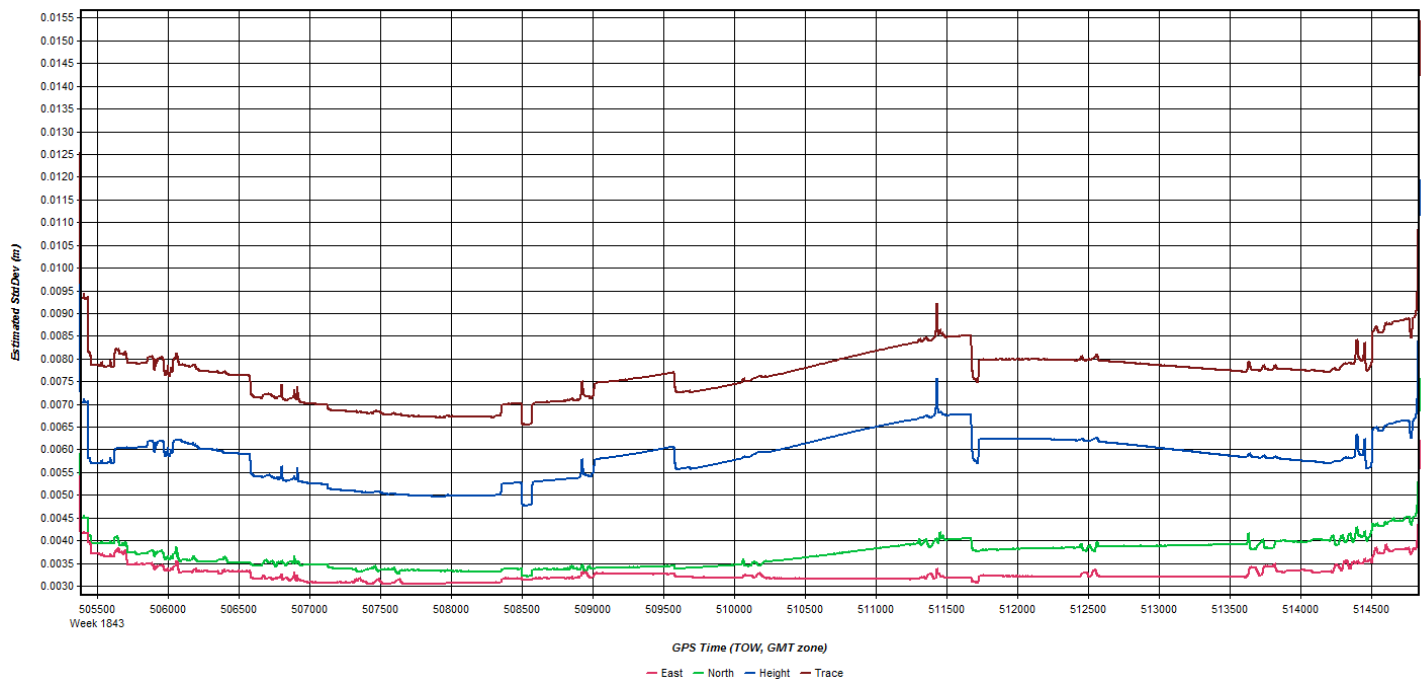
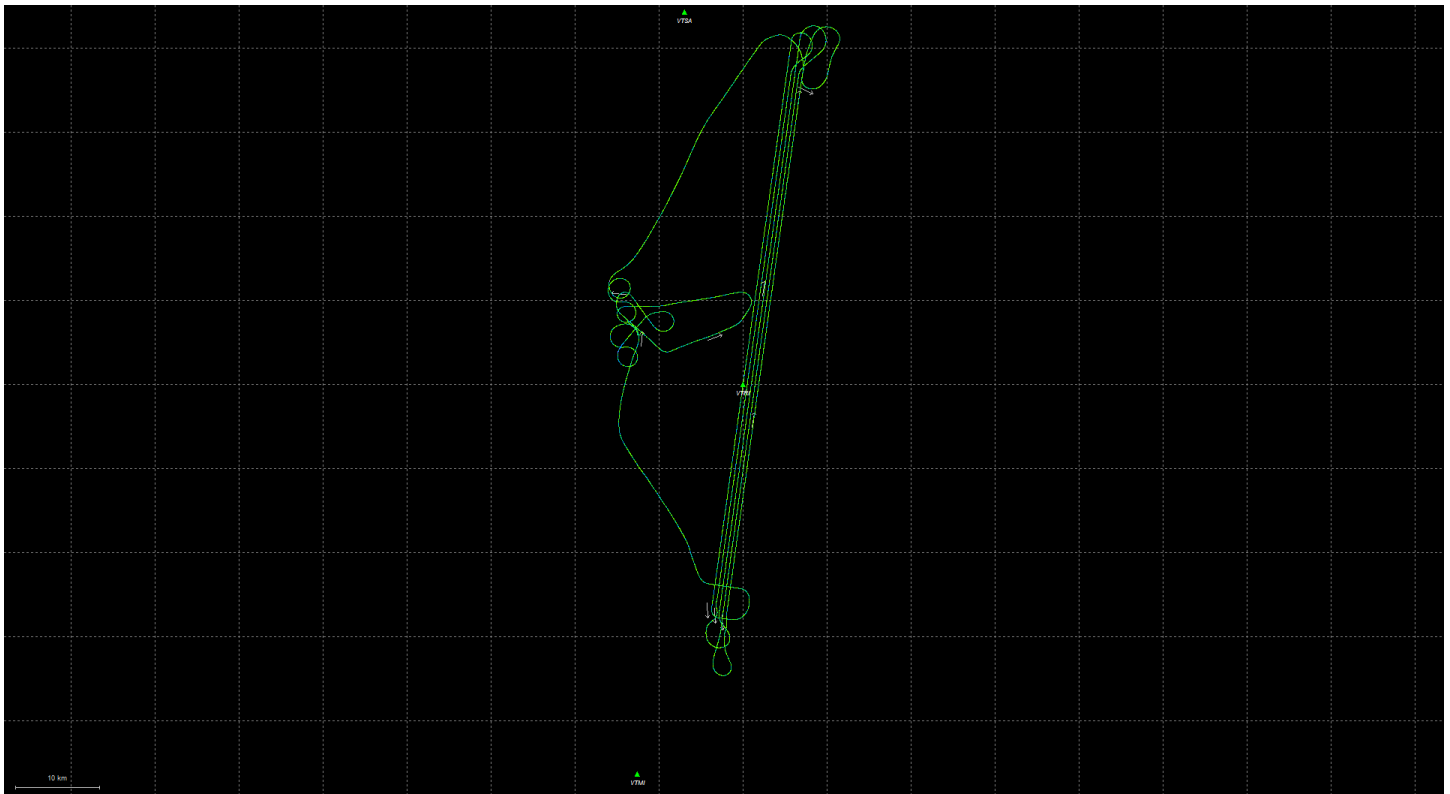
Antenna Height
 From station file: TRM57971.00, NONE
 Antenna profile: TRM57971.00
 Measured height: 0.000 m
 ARP to L1 offset: 0.067 m
 Applied height: 0.067 m
 Measured to:
 ARP
 L1 Phase Centre

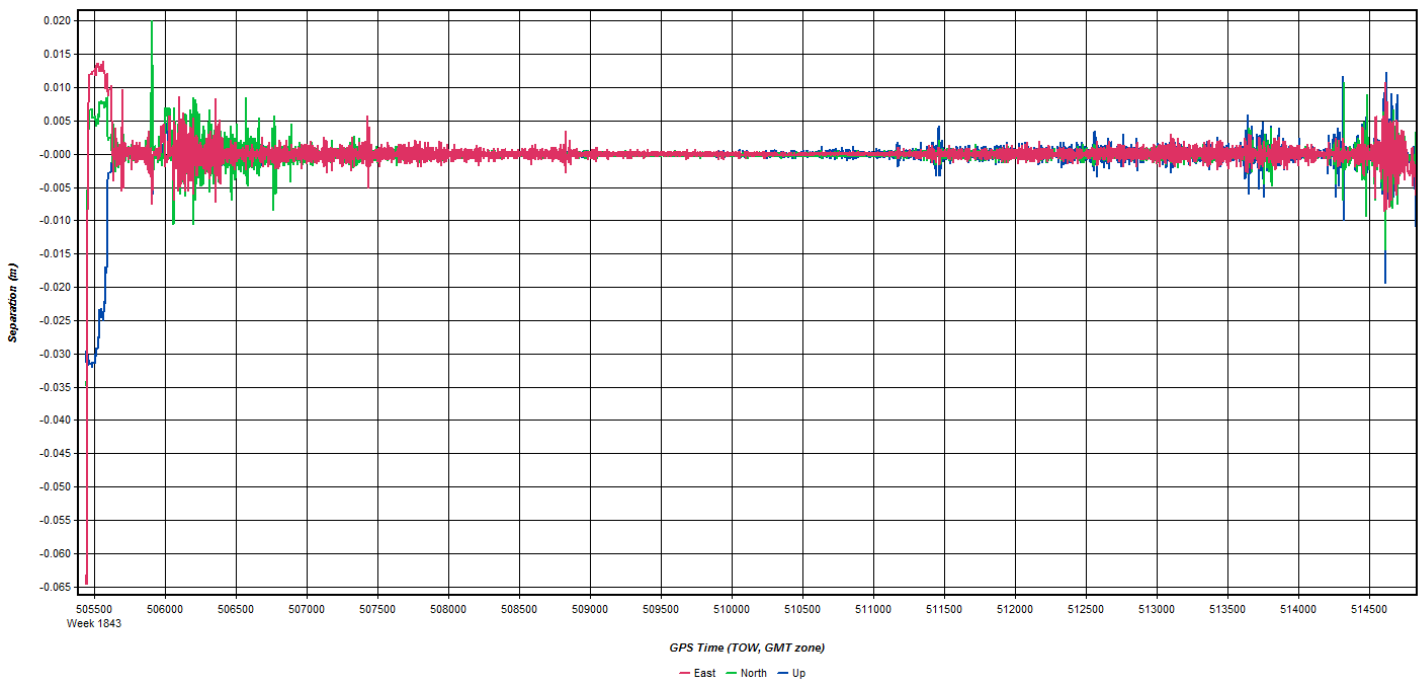
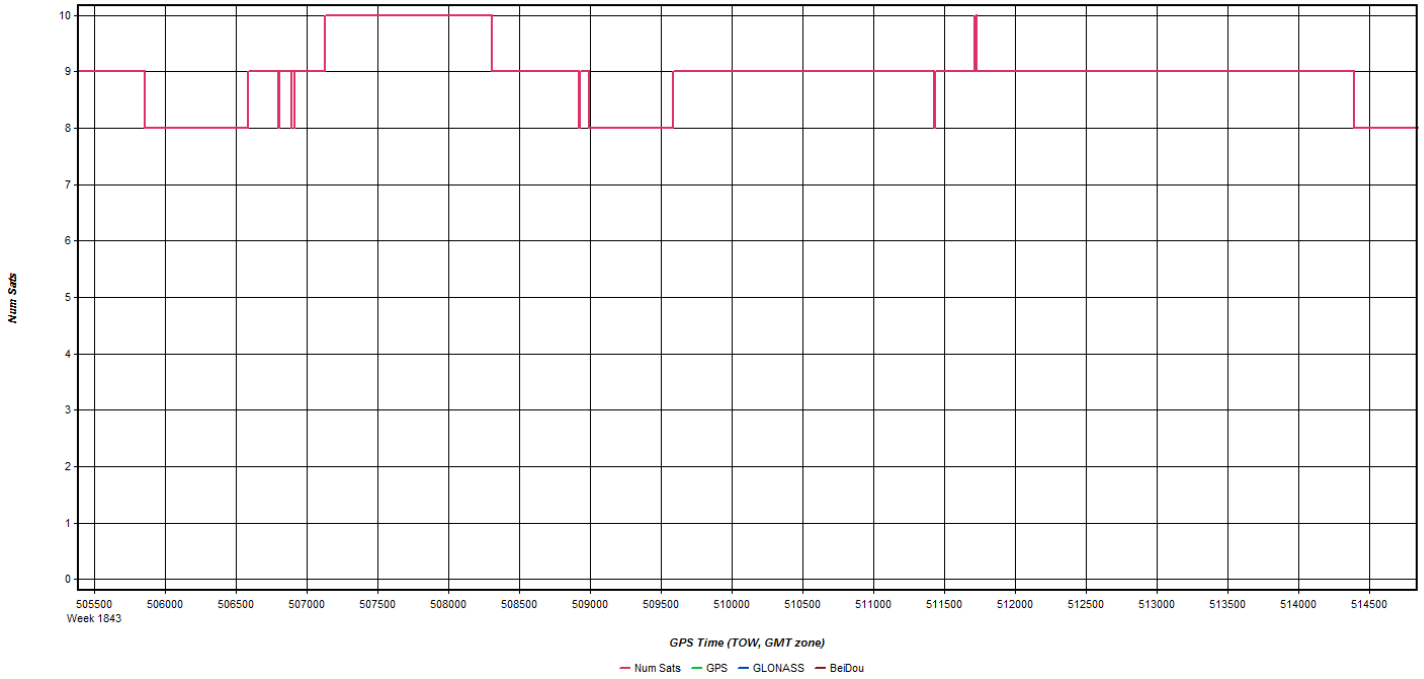
Flight Log

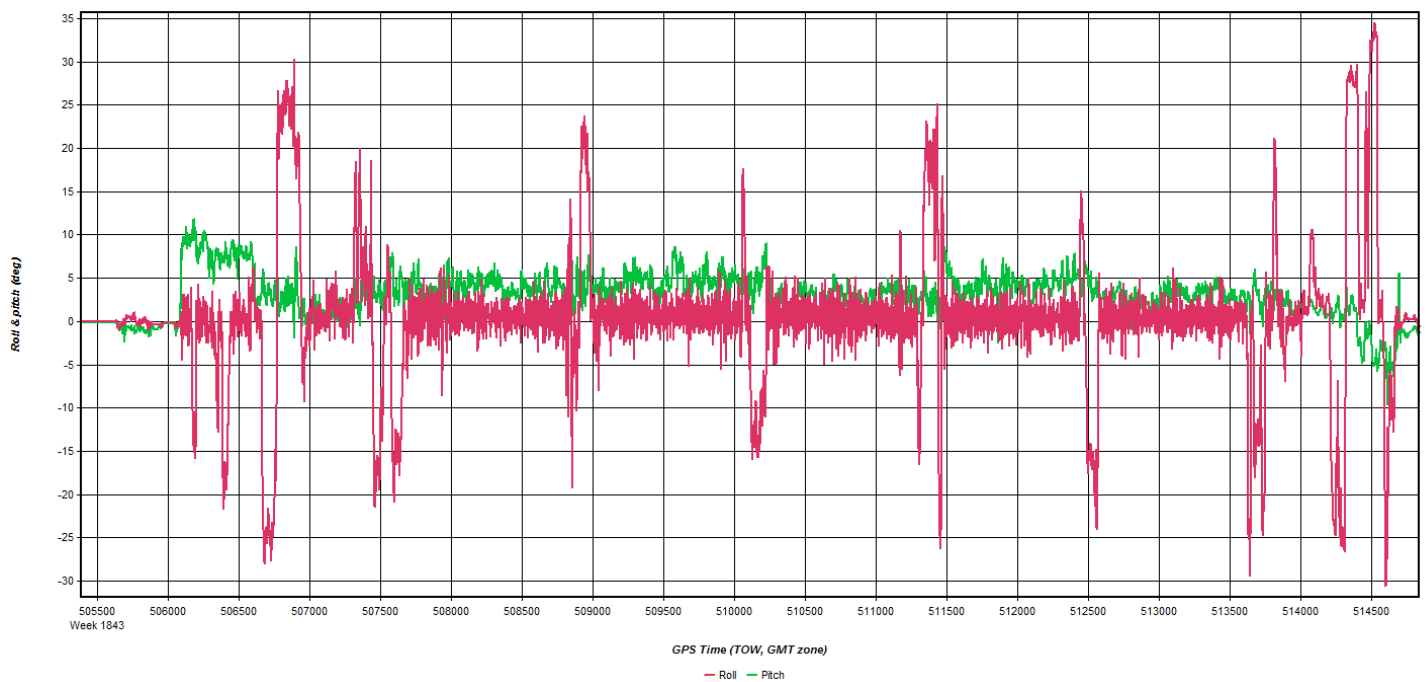
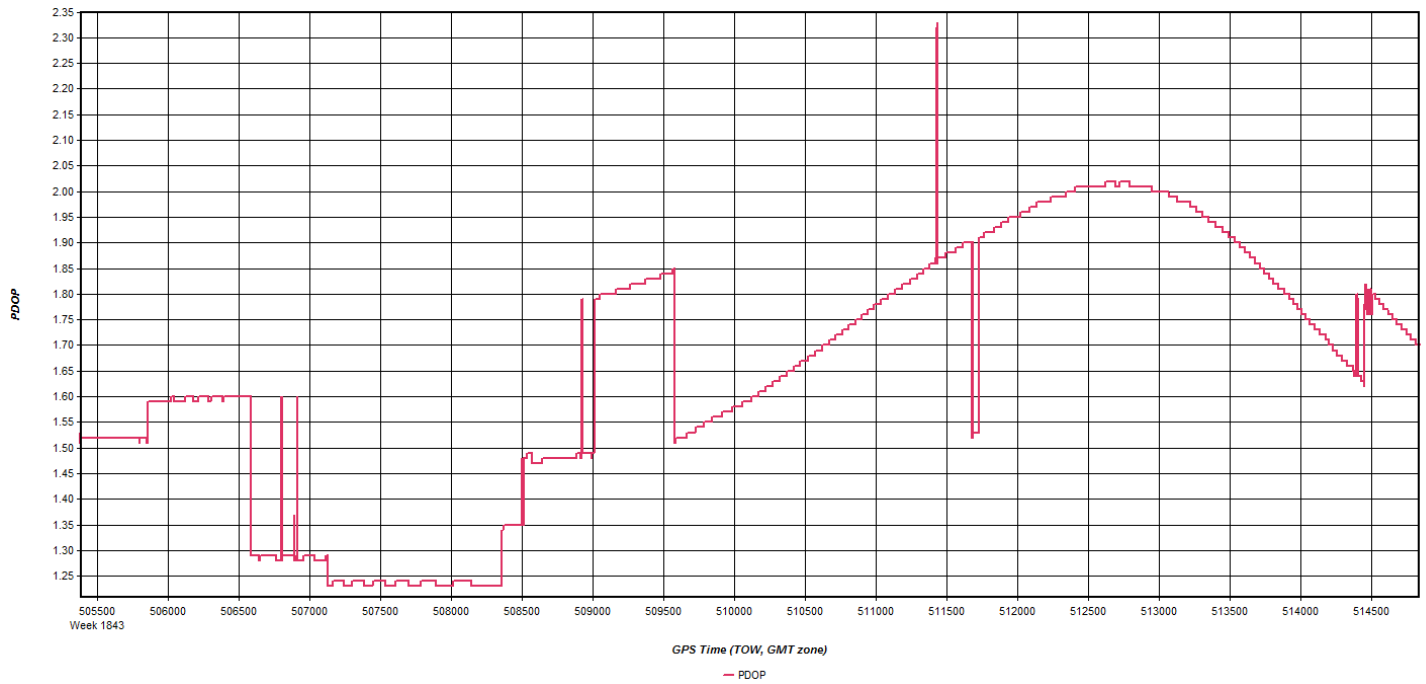
Line/DIR	Start	End	Air Speed	Alt(ft)	# Exp	Light Values	GB Size	Comments or errors while online:		
2116	294	1637	1653	120	5220			X LINE		
2117	115	1658	1707	124	5490			X LINE		
2099	203	1714	1722	128	7110					
2098	23	1725	1732	130	7080					
2097	203	1736	1744	128	7100					
2096	23	1748	1756	130	7010					
2095	203	1800	1808	135	7020					
2094	23	1812	1820	130	6910					
2093	203	1824	1832	135	6940					
2092	23	1836	1844	138	6860					
2091	203	1848	1858	126	6930					

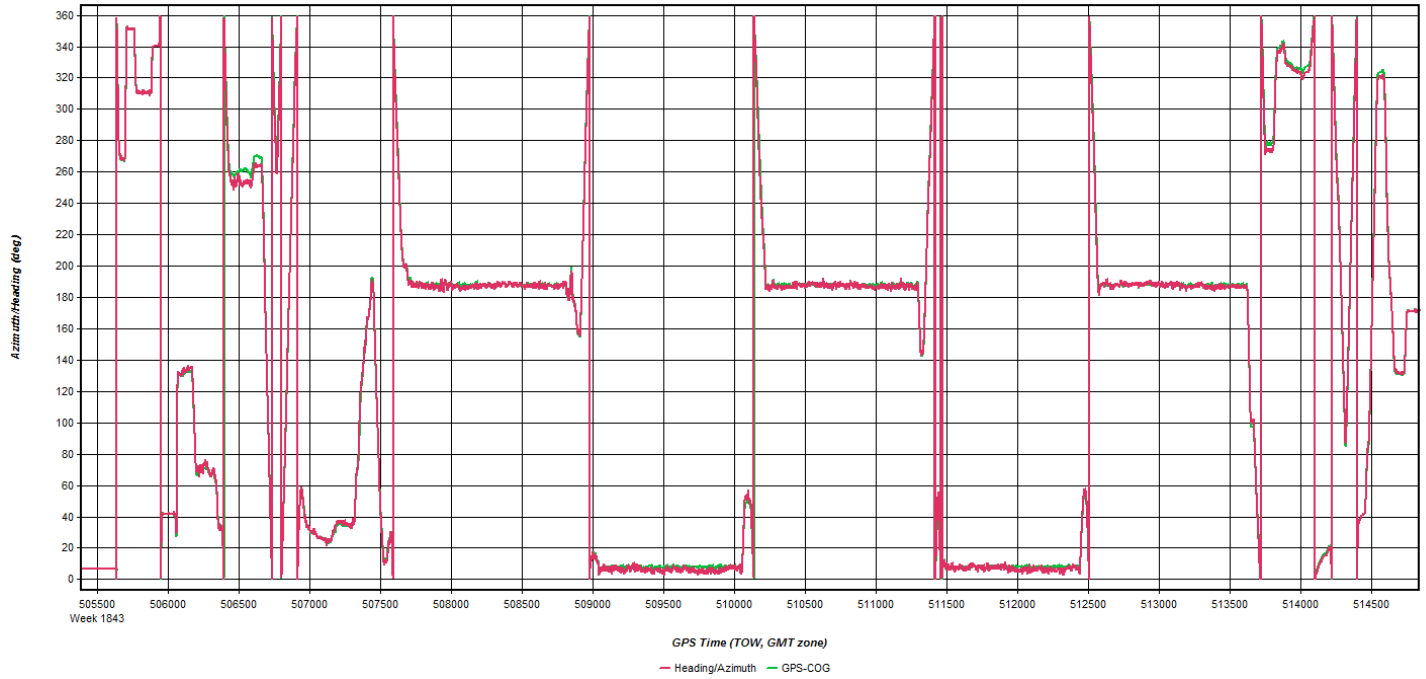
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Mar 8, 2015-B (SN7225)









Coordinate/Antenna Settings [?] [X]

Master Remote

Base Station
 3: VTMI Name: VTMI Disabled
 File: E:\Proc\From_TAG\14133_EAST_BURLINGTON\Acq_LiDAR\N

Coordinates
 Latitude: North 43 59 55.02507
 Longitude: West 73 09 09.38024
 Ellipsoidal height: 96.027 m
 Datum: NAD83(2011)

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

Coordinate/Antenna Settings

Master Remote

Base Station
1: VTRI Name: VTRI Disabled
File: E:\Proc\From_TAG\14133_EAST_BURLINGTON\Acq_LIDAR\N

Coordinates
Latitude: North 44 24 47.72636 Compute from PPP
Longitude: West 72 59 41.37328 Enter Grid Values
Ellipsoidal height: 112.262 m Enter MSL Height
Datum: NAD83(2011) Datum Options
Select From Favorites Add To Favorites Use Average Position

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

OK Cancel

Coordinate/Antenna Settings

Master Remote

Base Station
2: VTSA Name: VTSA Disabled
File: E:\Proc\From_TAG\14133_EAST_BURLINGTON\Acq_LIDAR\N

Coordinates
Latitude: North 44 48 32.64649 Compute from PPP
Longitude: West 73 04 57.28896 Enter Grid Values
Ellipsoidal height: 117.578 m Enter MSL Height
Datum: NAD83(2011) Datum Options
Select From Favorites Add To Favorites Use Average Position

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

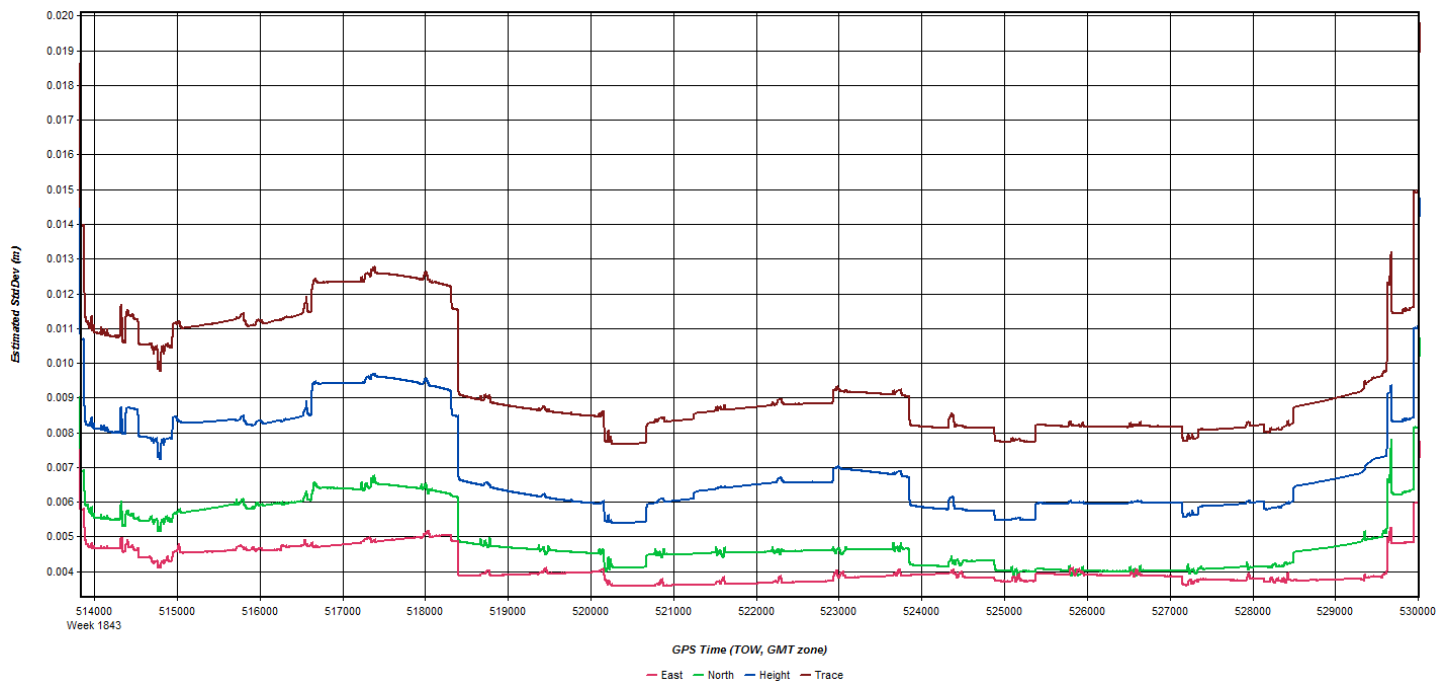
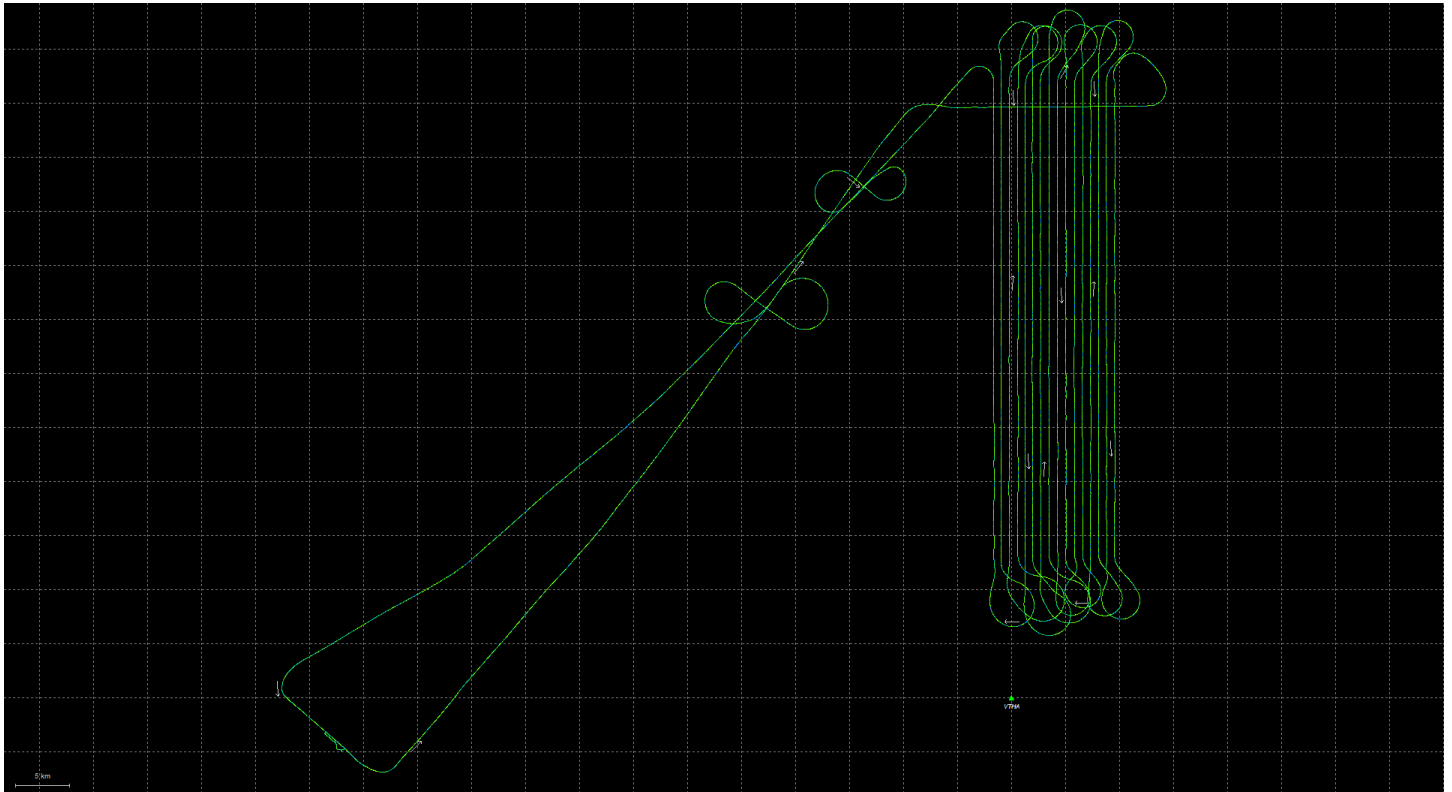
OK Cancel

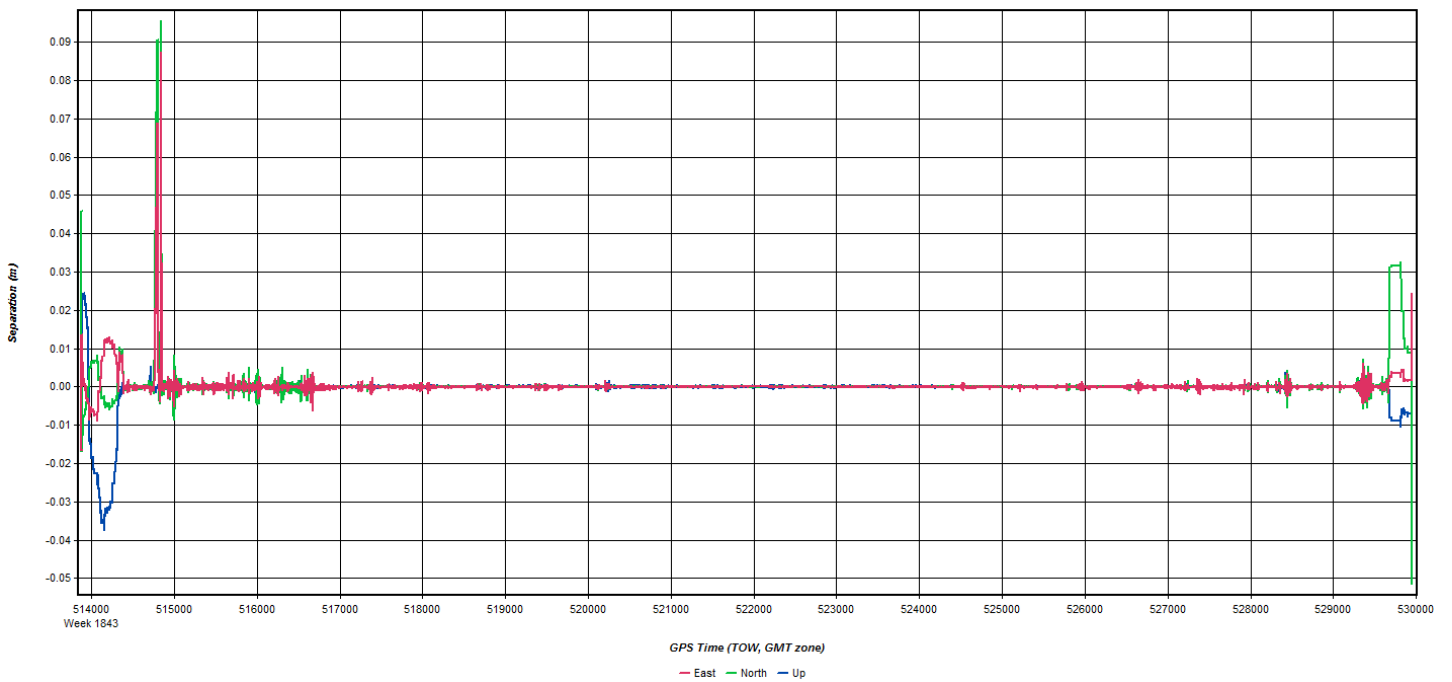
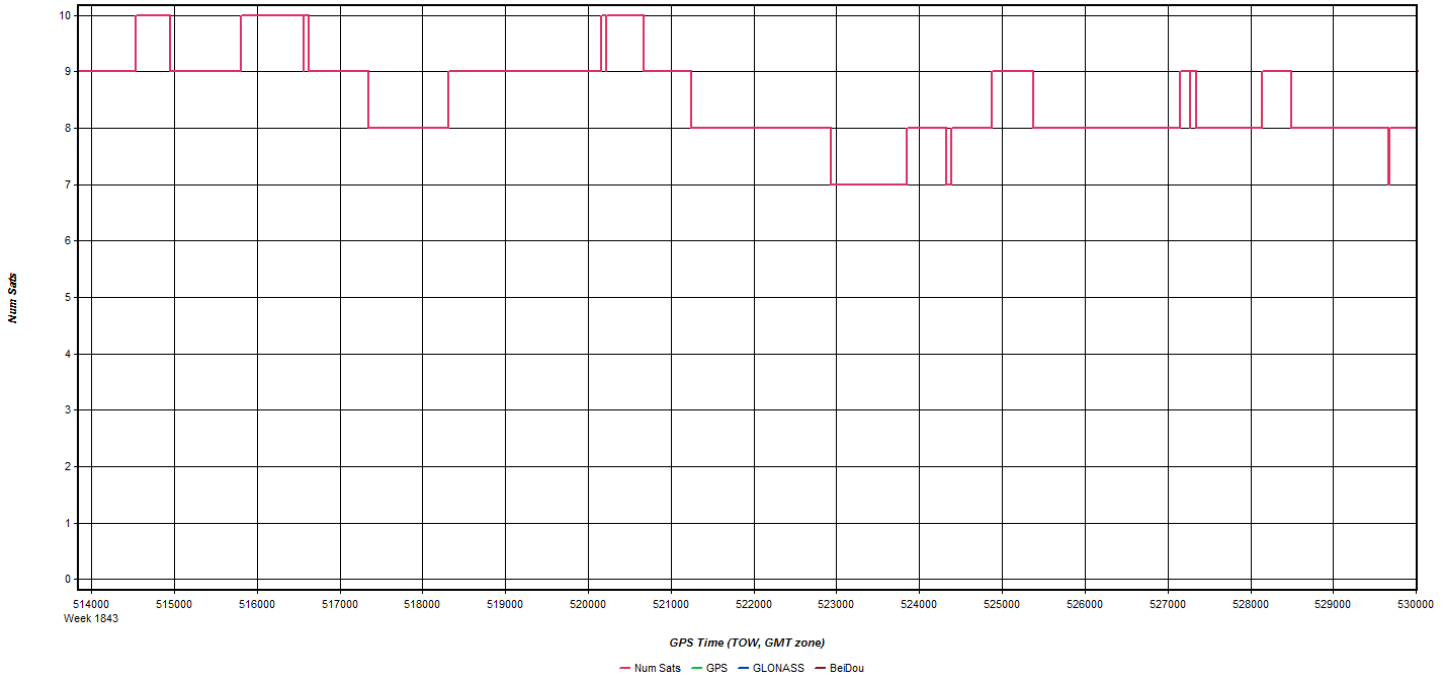
Flight Log

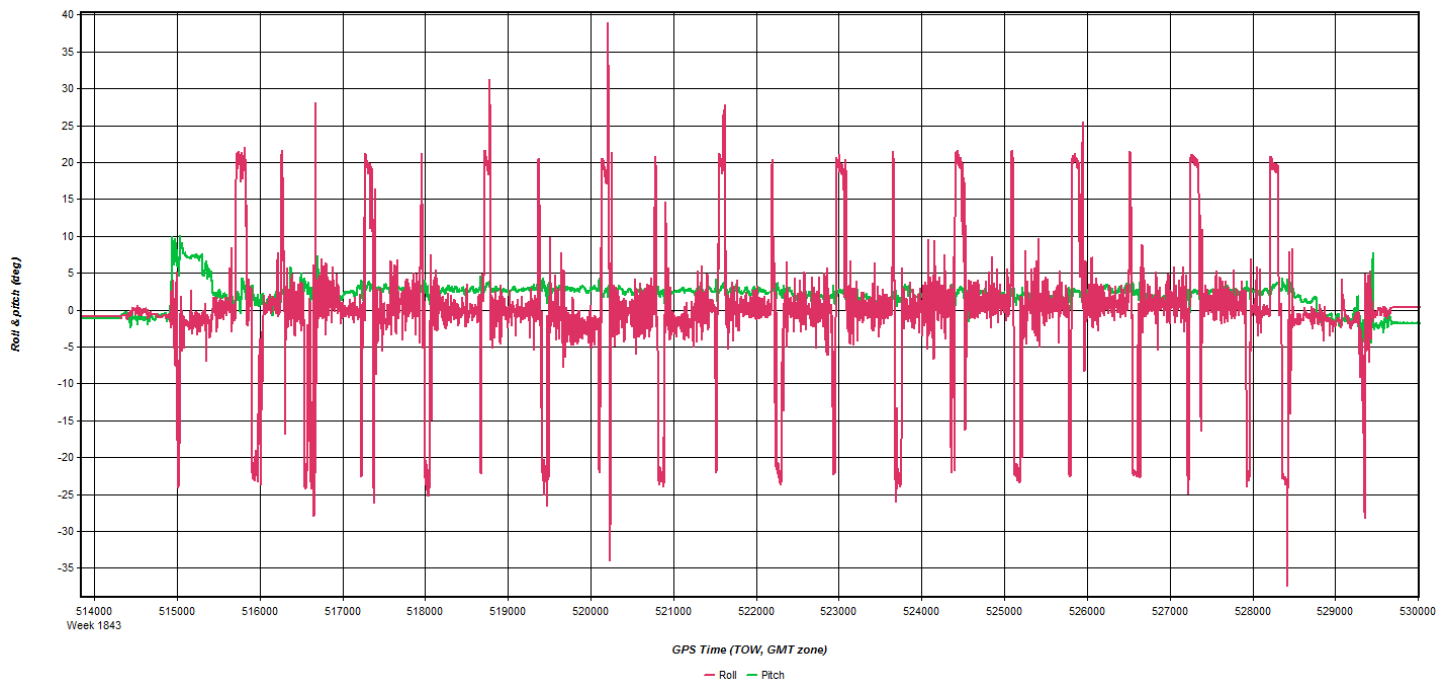
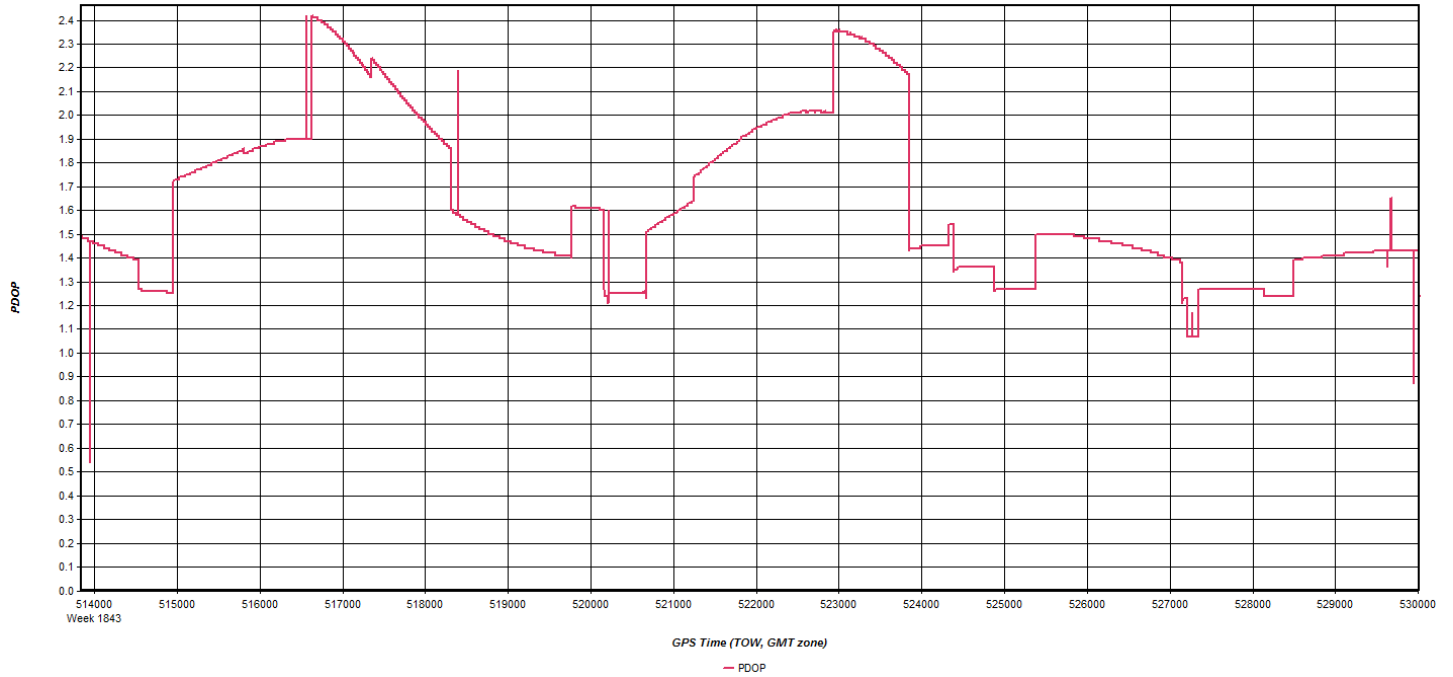
atlantic		Project # 14133		Tail Number: NI872H		Lever Arm			
2223 S Drake Ave, Suite 200 Huntsville, AL 35805 PH: (256) 971-9991 FX: (256) 971-1154		Flight plan name: East Burlington Location: KBVT Pilot: Blake Operator: JTK Sensor: 7225 Hobbs Time Start: 4234.8 Hobbs Time Stop: 4237.2 Pre-Static: 2021-2025 Post-Static: none Fwd Lap: Side Lap:		Flight Date: 5/8/2015 Sensor SN: 7225 Weather:		X Y Z			
Line/DIR	Start	End	Air Speed	Alt(ft)	# Exp	Light Values	GB Size	Comments or errors while online:	
1057 202	2057		125	4850				eye safety shut off. Invalid line	
1057 202	2102	2119	130	4850					
1056 22	2124	2141	125	4850					
1055 202	2143	2201	115	4850					
1054 22	2204	2222	125	4850					
1053 202	2223	2239	127	4850					
UL001 293	2242	2244	126	4850					Cross Flight

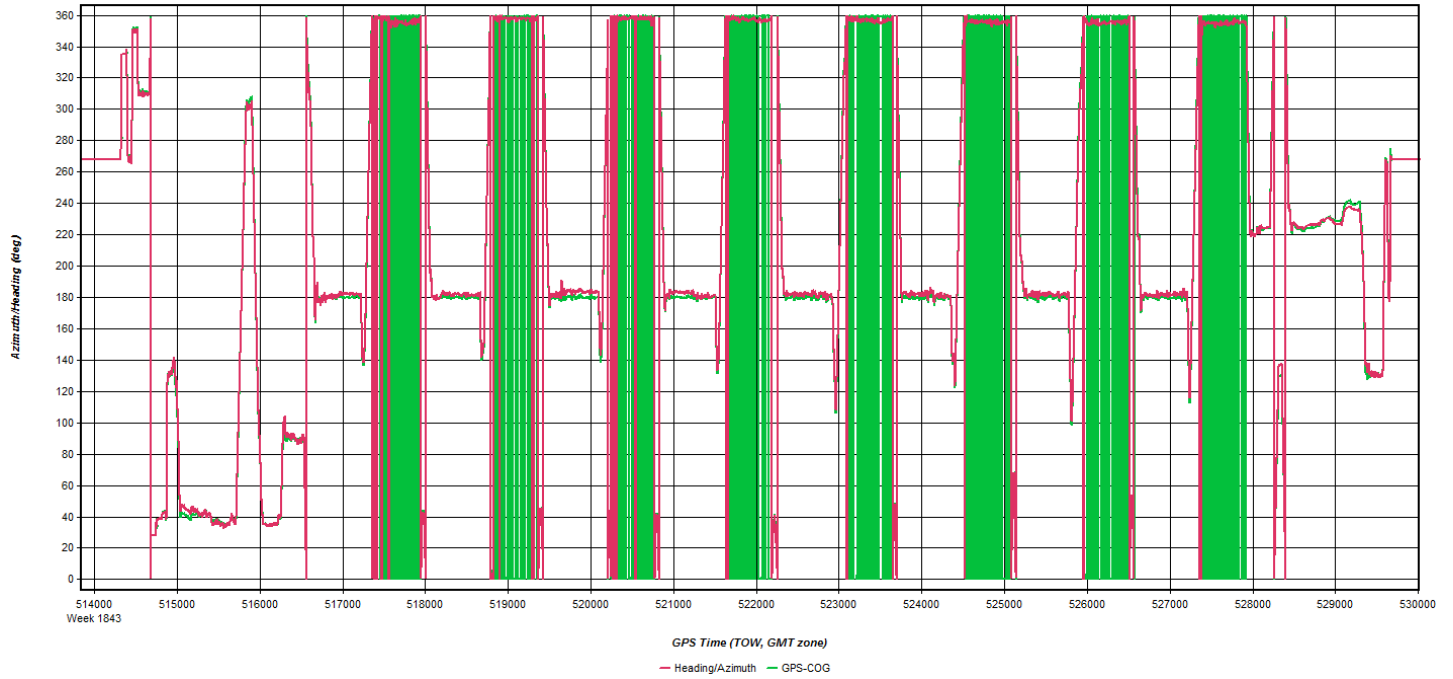
2223 Drake Avenue SW, Suite 200, Huntsville, AL 35805 • 256.971.9991 • 256.971.1154 • www.atlanticfp.com

Mar 8, 2015-C (SN7121)









Coordinate/Antenna Settings

Master Remote

Base Station
 1: VTHA Name: VTHA Disabled
 File: E:\Proc\22399_Eastern_VT_Kucera\RawLaser\20150508_22402

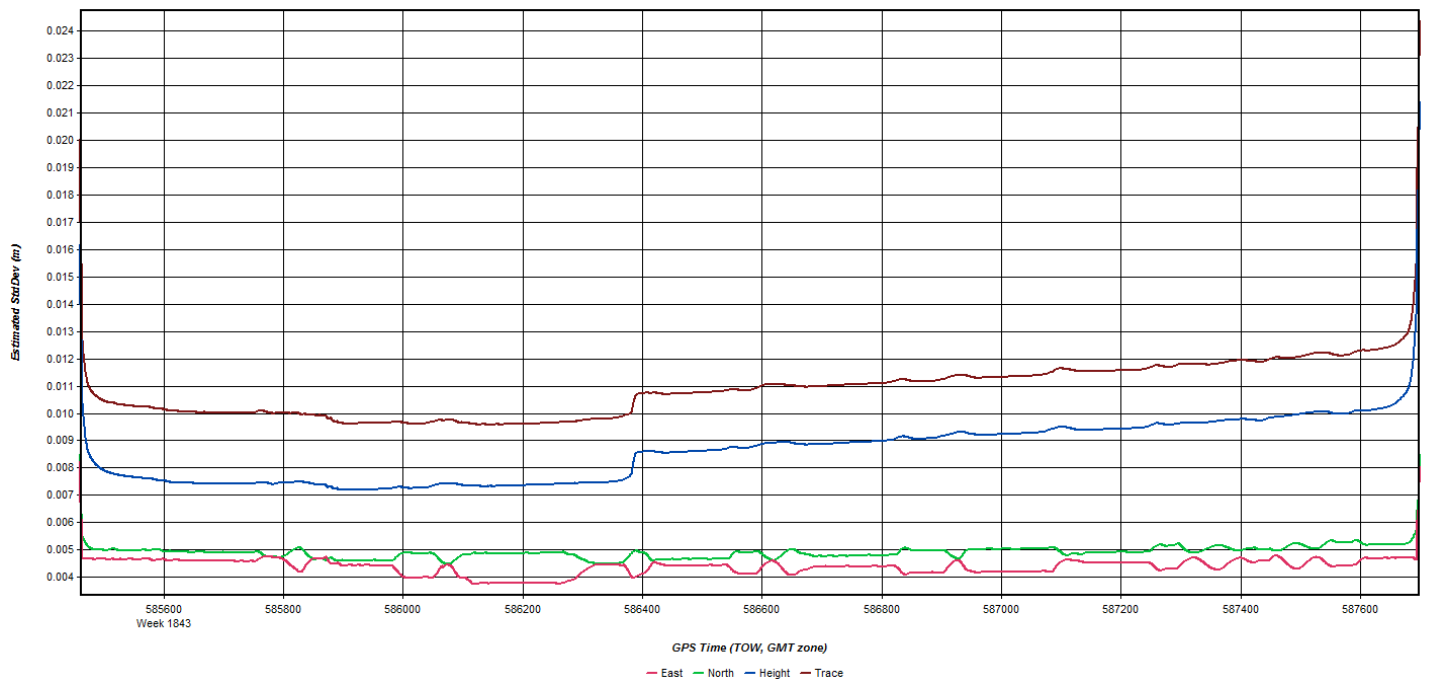
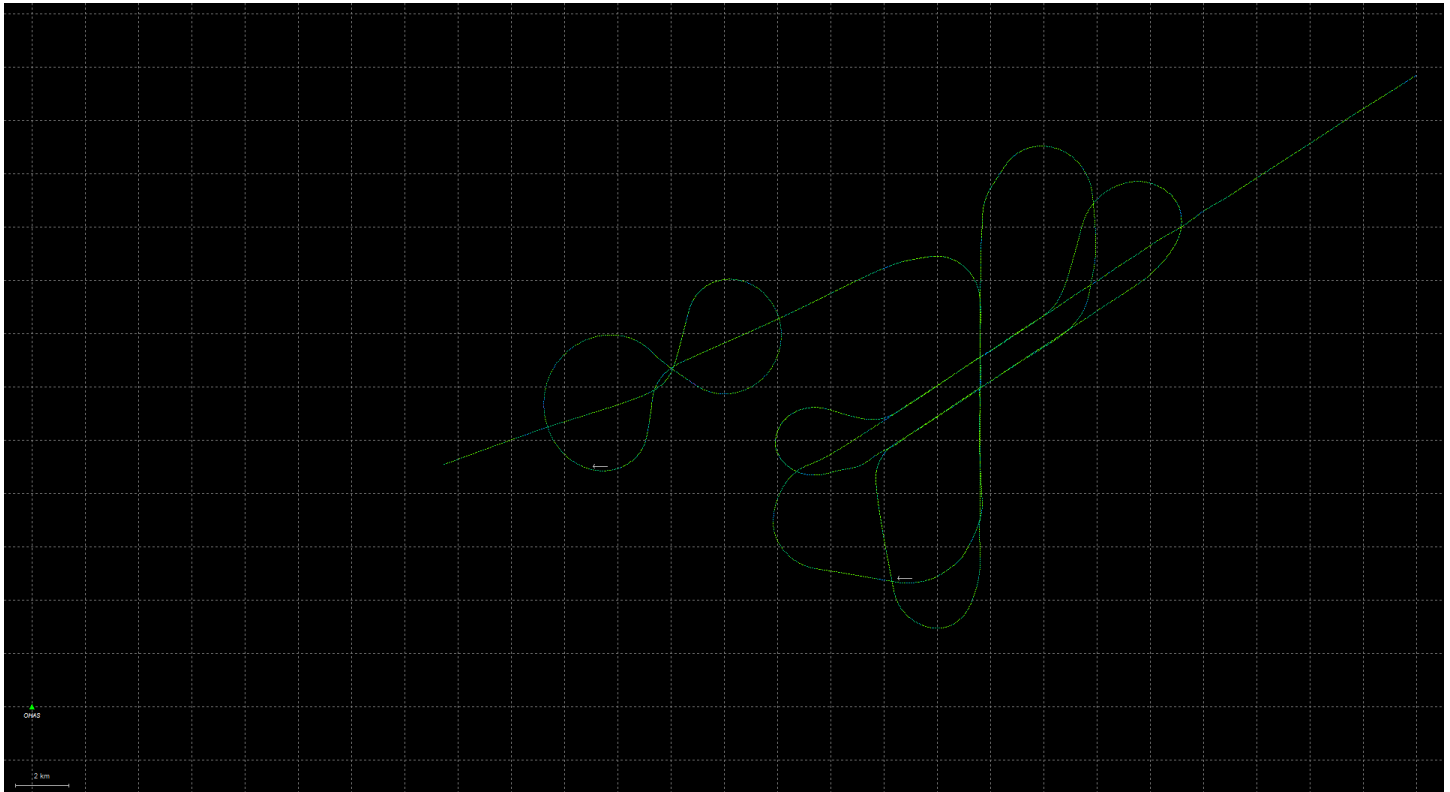
Coordinates
 Latitude: North 44 30 30.69556 Compute from PPP
 Longitude: West 72 21 57.16354 Enter Grid Values
 Ellipsoidal height: 256.821 m Enter MSL Height
 Datum: NAD83(2011) Datum Options
 Select From Favorites Add To Favorites Use Average Position

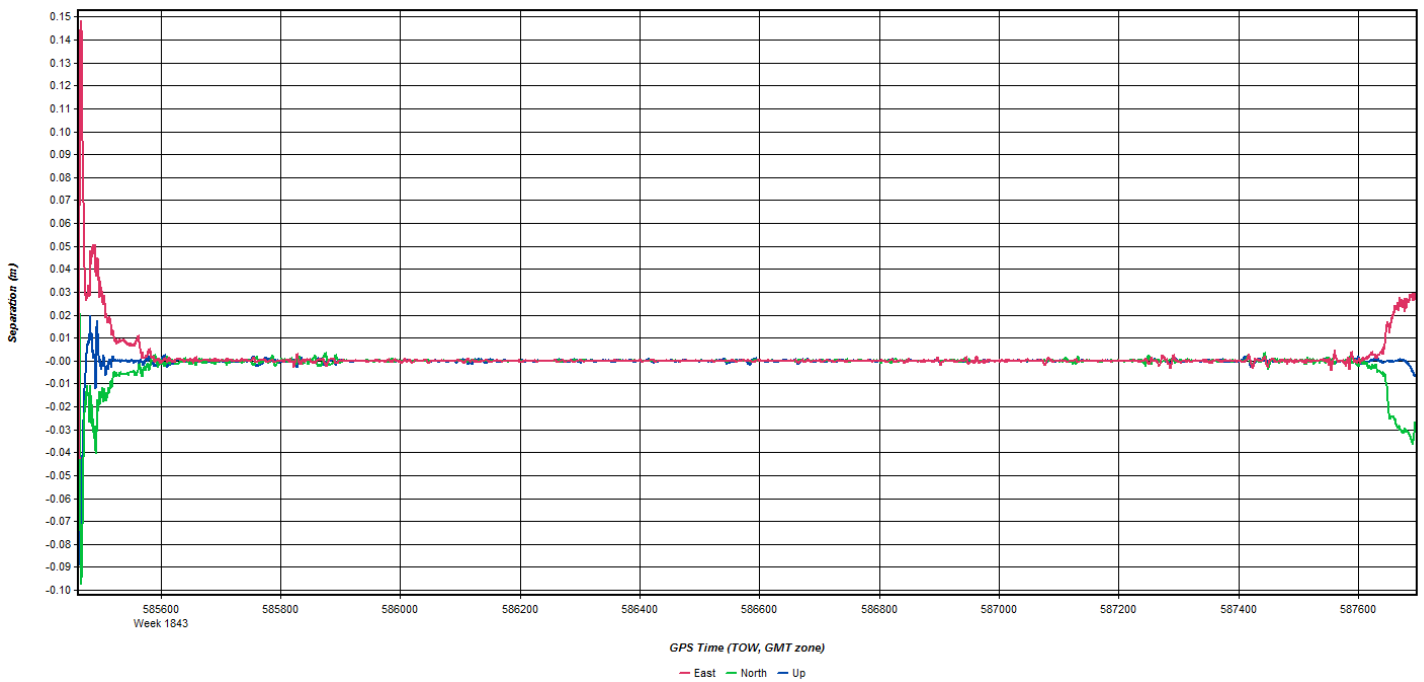
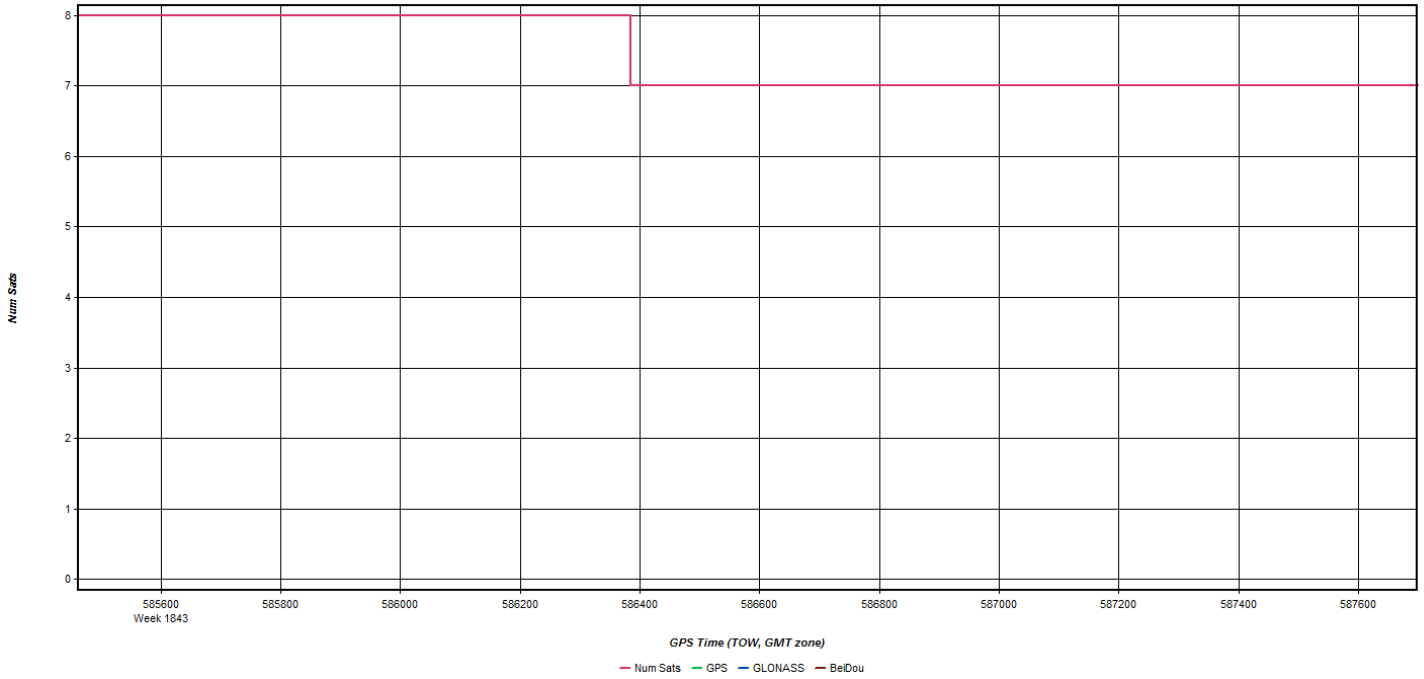
Antenna Height
 From station file: TRM57971.00, NONE View STA File
 Antenna profile: TRM57971.00 Info

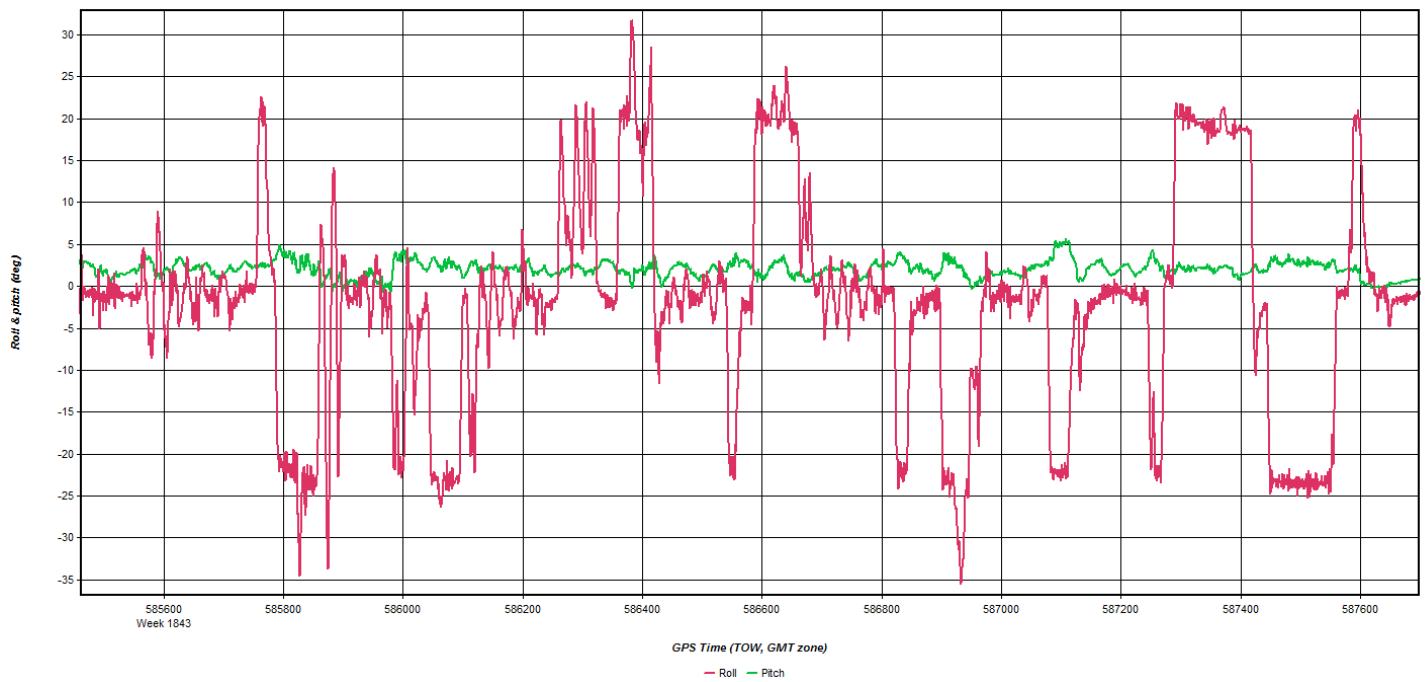
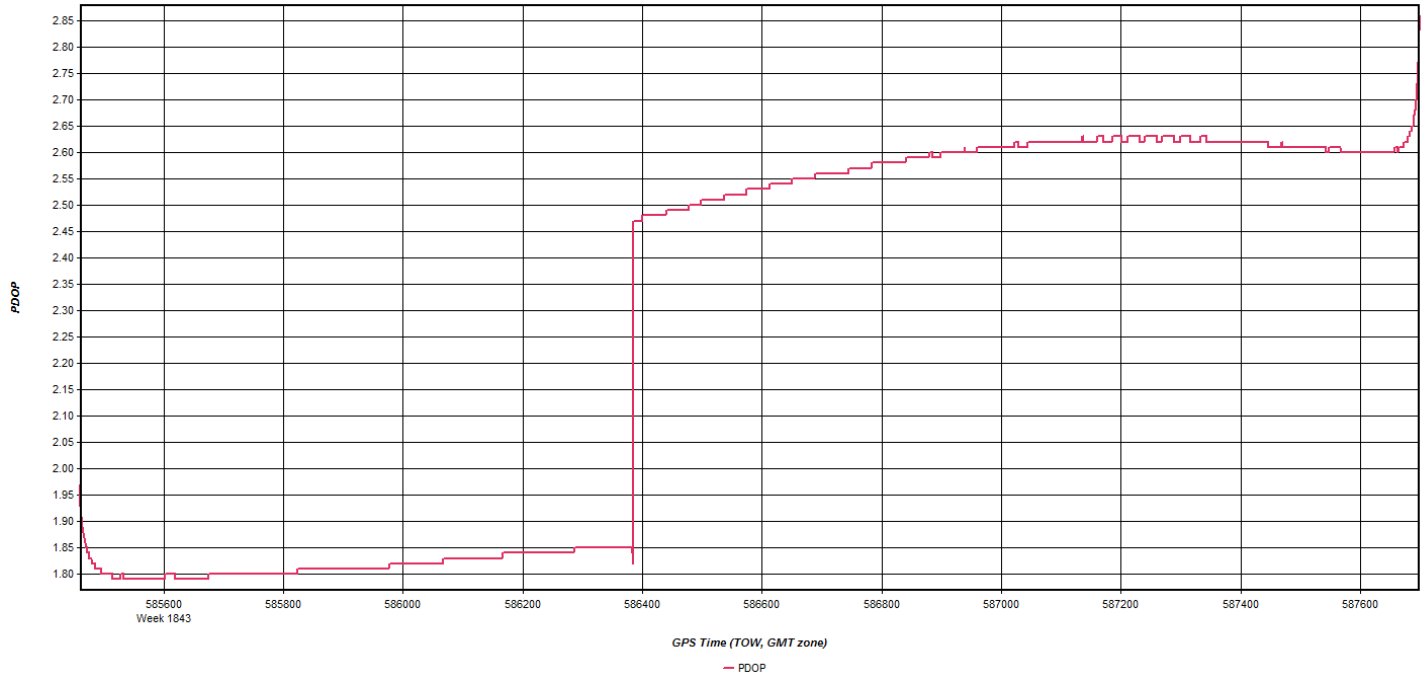
Measured height: 0.000 m Measured to
 ARP to L1 offset: 0.067 m ARP
 Applied height: 0.067 m L1 Phase Centre
 Compute From Slant

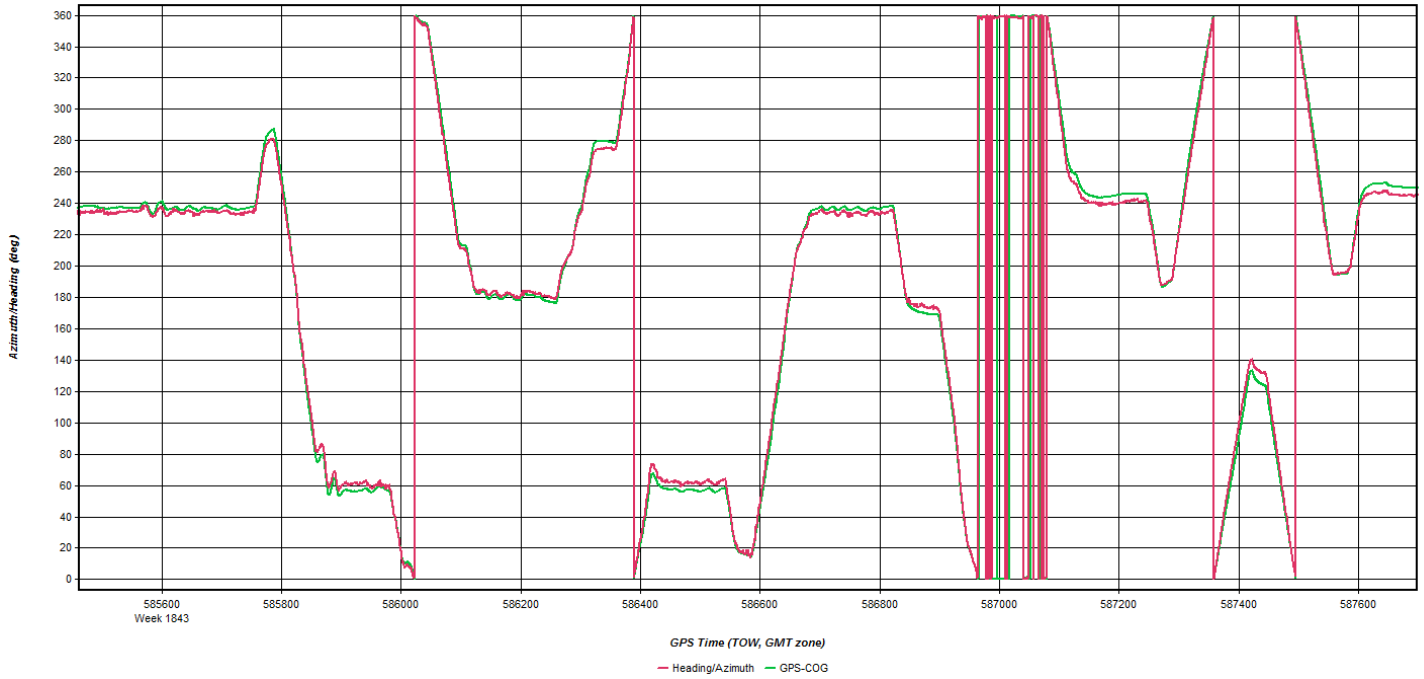
OK Cancel

Mar 9, 2015-A (SN7121)









Coordinate/Antenna Settings [?] [X]

Master Remote

Base Station
 1: OHAS Name: OHAS Disabled
 File: E:\Proc\22399_Eastern_VT_Kucera\RawLaser\20150509_15505

Coordinates
 Latitude: North 41 55 30.22143
 Longitude: West 80 33 03.84434
 Ellipsoidal height: 181.594 m
 Datum: NAD83(2011)

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

Appendix B

Woolpert's Flight Report

AIRBORNE LIDAR PROJECT REPORT



WOOLPERT

DESIGN | GEOSPATIAL | INFRASTRUCTURE

USGS EASTERN VERMONT QL2 LIDAR

Woolpert Project Number: 76020
November 2015



WOOLPERT
DESIGN | GEOSPATIAL | INFRASTRUCTURE

AIRBORNE LIDAR PROJECT REPORT

USGS EASTERN VERMONT QL2 LIDAR

WOOLPERT PROJECT NUMBER: 76020

Woolpert
4454 Idea Center Boulevard
Dayton, OH 45430-1500
Tel 937.461.5660

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Section 2	Acquisition
Section 3	GNSS and LIDAR Quality Assurance
Section 4	Flight Logs
Section 5	Final Deliverables

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SECTION 1: OVERVIEW

TASK ORDER NAME: USGS EASTERN VERMONT QL2 LIDAR

WOOLPERT PROJECT #76020

This report contains a comprehensive outline of the airborne LiDAR data acquisition for the Eastern Vermont LiDAR collection area. The project area was approximately 1,290 square miles. The LiDAR was processed to meet the Nominal Post Spacing (NPS) requirement of 0.7 meter. The NPS assessment is made against single swath, first return data located within the geometrically usable center portion (typically ~90%) of each swath.

The data was collected using a Leica ALS70 HP 500 kHz Multiple Pulses in Air (MPiA) LiDAR sensor. This sensor collects up to four returns per pulse, as well as intensity data for the first three returns. If a fourth return was captured, the system does not record an associated intensity value. The aerial LiDAR was collected at the following sensor specifications:

Post Spacing (Minimum):	2.29 ft / 0.7 m
AGL (Above Ground Level) average flying height:	6,808 ft / 2,075 m
Average Ground Speed:	150 knots / 172 mph
Field of View (full):	40 degrees
Pulse Rate:	263.0 kHz
Scan Rate:	39.4 Hz
Side Lap (Minimum):	27 %

LiDAR data was produced in Universal Transverse Mercator (UTM) Zone 18N, NAD83. Coordinate positions were specified in units of meters. The vertical datum used for the project was referenced to NAVD 1988, meters, GEOID12A.

SECTION 2: ACQUISITION

The LiDAR data was acquired using a Leica ALS70 HP 500 kHz Multiple Pulses in Air (MPiA) LiDAR sensor system, on board a Cessna aircraft. The ALS70 HP LiDAR system, developed by Leica Geosystems of Heerbrugg, Switzerland, includes the simultaneous first, intermediate and last pulse data capture module, the extended altitude range module, and the target signal intensity capture module. The system software is operated on an OC50 Operation Controller aboard the aircraft.

The ALS70 HP 500 kHz Multiple Pulses in Air (MPiA) LiDAR System has the following specifications:

Table 2.1 ALS70 LiDAR System Specifications

Specification	
Operating Altitude	200 - 3,500 meters
Scan Angle	0 to 75° (variable)
Swath Width	0 to 1.5 X altitude (variable)
Scan Frequency	0 - 200 Hz (variable based on scan angle)
Maximum Pulse Rate	500 kHz (Effective)
Range Resolution	Better than 1 cm
Elevation Accuracy	7 - 16 cm single shot (one standard deviation)
Horizontal Accuracy	5 - 38 cm (one standard deviation)
Number of Returns per Pulse	7 (infinite)
Number of Intensities	3 (first, second, third)
Intensity Digitization	8 bit intensity + 8 bit AGC (Automatic Gain Control) level
MPiA (Multiple Pulses in Air)	8 bits @ 1nsec interval @ 50kHz
Laser Beam Divergence	0.22 mrad @ 1/e ² (-0.15 mrad @ 1/e)
Laser Classification	Class IV laser product (FDA CFR 21)
Eye Safe Range	400m single shot depending on laser repetition rate
Roll Stabilization	Automatic adaptive, range = 75 degrees minus current FOV
Power Requirements	28 VDC @ 25A
Operating Temperature	0-40°C
Humidity	0-95% non-condensing
Supported GNSS Receivers	Ashtech Z12, Trimble 7400, Novatel Millenium

Prior to mobilizing to the project site, Midwest Aerial Photography flight acquisition team coordinated with the necessary Air Traffic Control personnel to ensure airspace access.

The LiDAR data was collected in two missions to ensure consistent ground conditions across the project area.

An initial quality control process was performed immediately on the LiDAR data to review the data coverage, airborne GPS data, and trajectory solution. Any gaps found in the LiDAR data were relayed to the flight crew, and the area was re-flown.

Table 2.2 Airborne LiDAR Acquisition Flight Summary

Airborne LiDAR Acquisition Flight Summary			
Date of Mission	Lines Flown	Mission Time (UTC) Wheels Up/ Wheels Down	Mission Time (Local = EDT) Wheels Up/ Wheels Down
October 24, 2015 "A" Mission	1-18	12:21 - 16:12	8:21 AM - 12:12 PM
October 24, 2015 "B" Mission	19 - 33	18:06 - 21:28	2:06 PM - 5:28 PM
October 26, 2015	80 - 99	20:52 - 23:40	4:52 PM - 7:40 PM
October 27, 2015 "A" Mission	33 - 44	13:11 - 17:08	9:11 AM - 1:08 PM
October 27, 2015 "B" Mission	45 - 55	19:29 - 23:22	3:29 PM - 7:22 PM
October 28, 2015	144, 56 - 59, 146	13:48 - 15:18	9:48 AM - 11:18 AM
October 31, 2015 "A" Mission	59 - 79, 146	12:12 - 15:49	8:12 AM - 11:49 AM
October 31, 2015 "B" Mission	100 - 111, 148, 147, 145, 59, 58, 92	17:41 - 21:03	1:41 PM - 5:03 PM
November 4, 2015 "A" Mission	114 - 124, 126 - 128, 149, 150	14:11 - 16:44	10:11 AM - 12:44 PM
November 4, 2015 "B" Mission	129 - 133, 135 - 140, 143, 151	20:06 - 21:43	4:06 PM - 5:43 PM

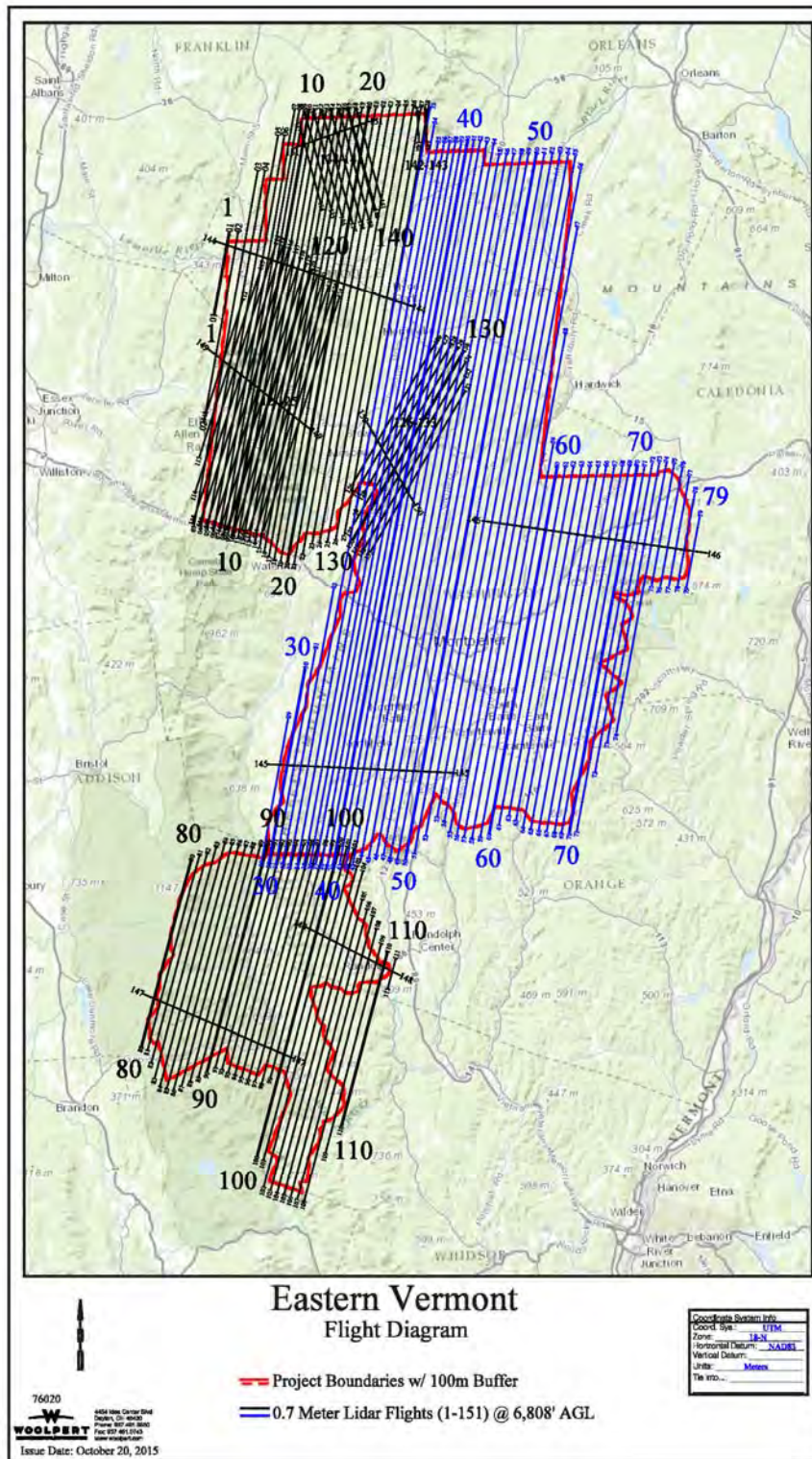
The following 2nd tier altitude flight lines were not required since we had coverage at the lower main flight lines:

- Flight lines 112, 113, 125, 134, 141, 142

The following is a list of the cross flight lines:

- Flight lines 144 - 151

Figure 2.1: LIDAR Flight Diagram of Eastern Vermont QL2 LIDAR Block



SECTION 3: GNSS AND LIDAR QUALITY ASSURANCE

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)-INERTIAL MEASUREMENT UNIT (IMU) TRAJECTORY PROCESSING

EQUIPMENT

Flight navigation during the LiDAR data acquisition mission is performed using IGI CCNS (Computer Controlled Navigation System). The pilots are skilled at maintaining their planned trajectory, while holding the aircraft steady and level. If atmospheric conditions are such that the trajectory, ground speed, roll, pitch and/or heading cannot be properly maintained, the mission is aborted until suitable conditions occur.

The aircraft are all configured with a NovAtel Millennium 12-channel, L1/L2 dual frequency Global Navigation Satellite System (GNSS) receivers collecting at 2 Hz.

Woolpert's aerial LiDAR sensor was equipped with a Litton LN200 series Inertial Measurement Unit (IMU), operating at 200 Hz.

Woolpert's Aerial Acquisition Team coordinated with the necessary Air Traffic Control personnel prior to flying to ensure access.

Flight navigation is performed using IGI CCNS (Computer Controlled Navigation System). The pilots are thoroughly trained and highly skilled at maintaining their planned trajectory, while holding the aircraft steady and level. If atmospheric conditions are such that the trajectory, ground speed, roll, pitch and heading cannot be properly maintained, the mission is aborted until suitable conditions occur.

GNSS BASE STATION INFORMATION

Woolpert utilized the Continuously Operating Reference Stations (CORS) to support the airborne LiDAR data acquisition. The following GPS base station was used in support of the aerial acquisition.

Table 3.1: GNSS Base Station

Station	Latitude	Longitude	Ellipsoid Height (L1 Phase Center)
Name	(DMS)	(DMS)	(Meters)
VTUV	N 44° 28' 09.24915"	W 073° 11' 52.39587"	111.335
VCAP	N 44° 15' 43.14289"	W 072° 34' 56.57401"	159.464
VTHA	N 44° 30' 30.73228"	W 072° 21' 57.18269"	255.754

The collected data was shipped back to the Woolpert Dayton, Ohio office for processing and quality control. All data was downloaded into a standard Woolpert directory structure. The data was

immediately checked for missing files, corrupt files, etc. Once verified, the GPS data was processed using Inertial Explorer software, combining airborne GPS data with base station data.

Within the trajectory processing, there are many factors that affect the overall quality, but the most indicative are the Combined Separation, the Estimated Positional Accuracy, and the Positional Dilution of Precision (PDOP).

DATA PROCESSING

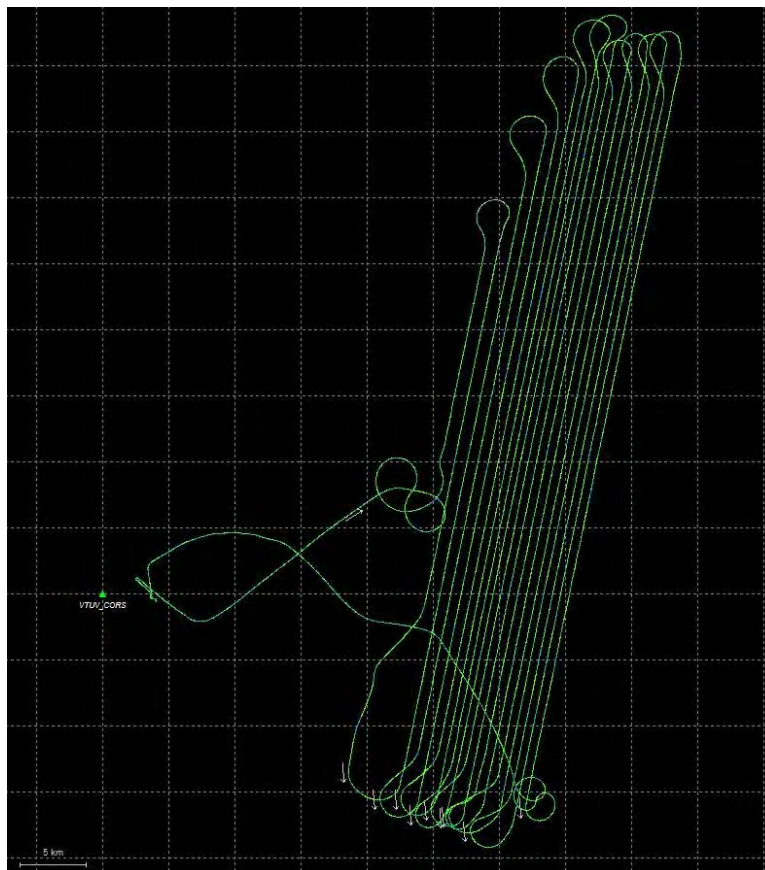
All airborne GNSS and IMU data was post-processed and quality controlled using Leica's Cloud Pro v.1.2.1 software. GNSS data was processed at a 1 and 2 Hz data capture rate and the IMU data was processed at 200 Hz.

TRAJECTORY QUALITY

The GNSS Trajectory, along with high quality IMU data are key factors in determining the overall positional accuracy of the final sensor data. See Figure 3.1 for the flight trajectory.

Flight Trajectory

Figure 3.1: Representative Graph from Day29715: Cessna 310 - N1107Q



Within the trajectory processing, there are many factors that affect the overall quality, but the most indicative are the Combined Separation, the Estimated Positional Accuracy, and the Positional Dilution

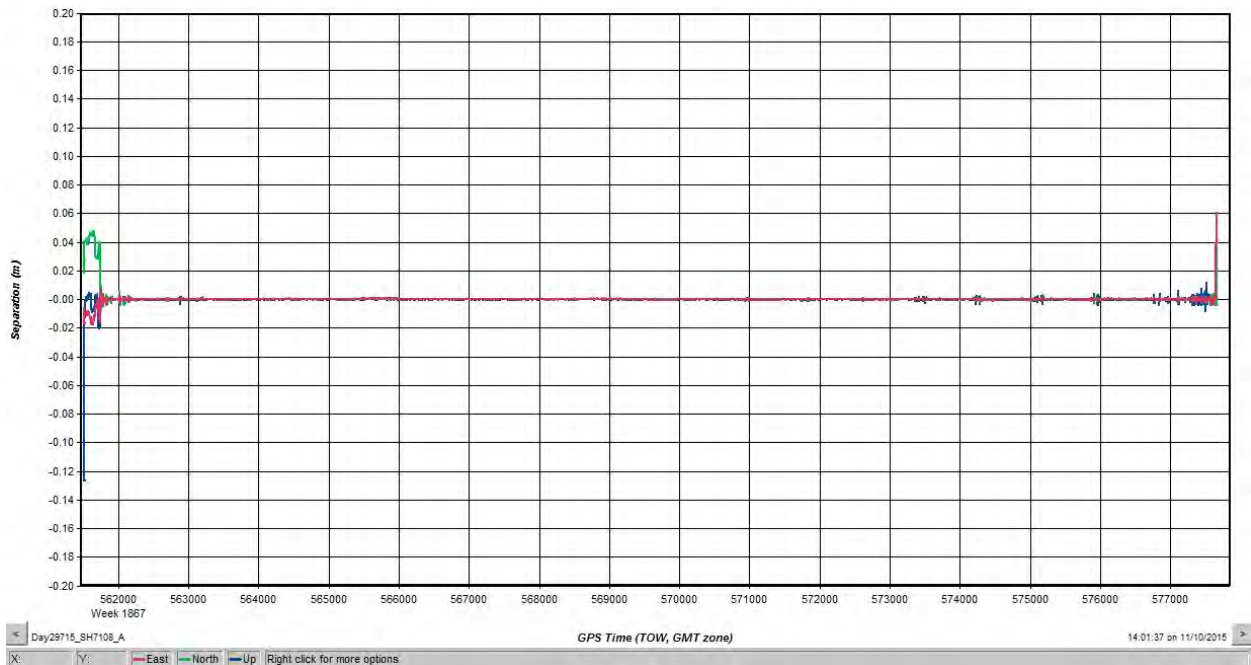
of Precision (PDOP).

Combined Separation

The Combined Separation is a measure of the difference between the forward run and the backward run solution of the trajectory. The Kalman filter is processed in both directions to remove the combined directional anomalies. In general, when these two solutions match closely, an optimally accurate reliable solution is achieved.

Woolpert's goal is to maintain a Combined Separation Difference of less than ten (10) centimeters. In most cases we achieve results below this threshold. See Figure 3.2 for the combined separation graph.

Figure 3.2: Representative Graph from Day29715: Cessna 310 - N1107Q

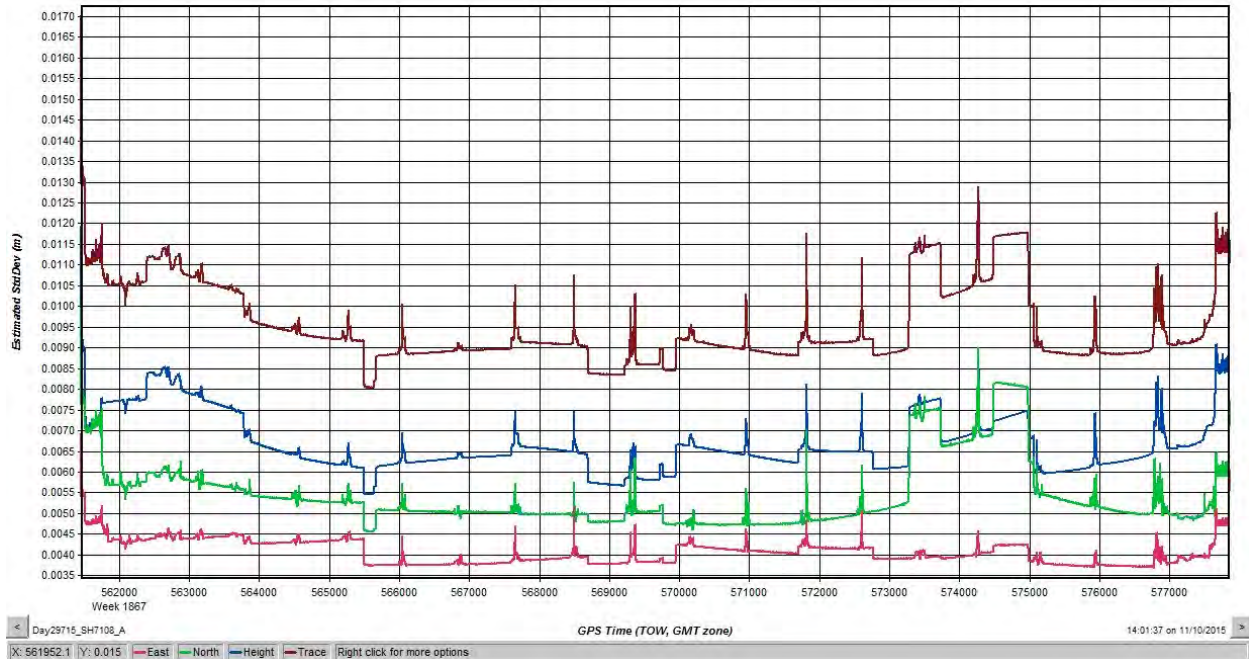


Estimated Positional Accuracy

The Estimated Positional Accuracy plots the standard deviations of the east, north, and vertical directions along a time scale of the trajectory. It illustrates loss of satellite lock issues, as well as issues arising from long baselines, noise, and/or other atmospheric interference.

Woolpert's goal is to maintain an Estimated Positional Accuracy of less than ten (10) centimeters, often achieving results well below this threshold.

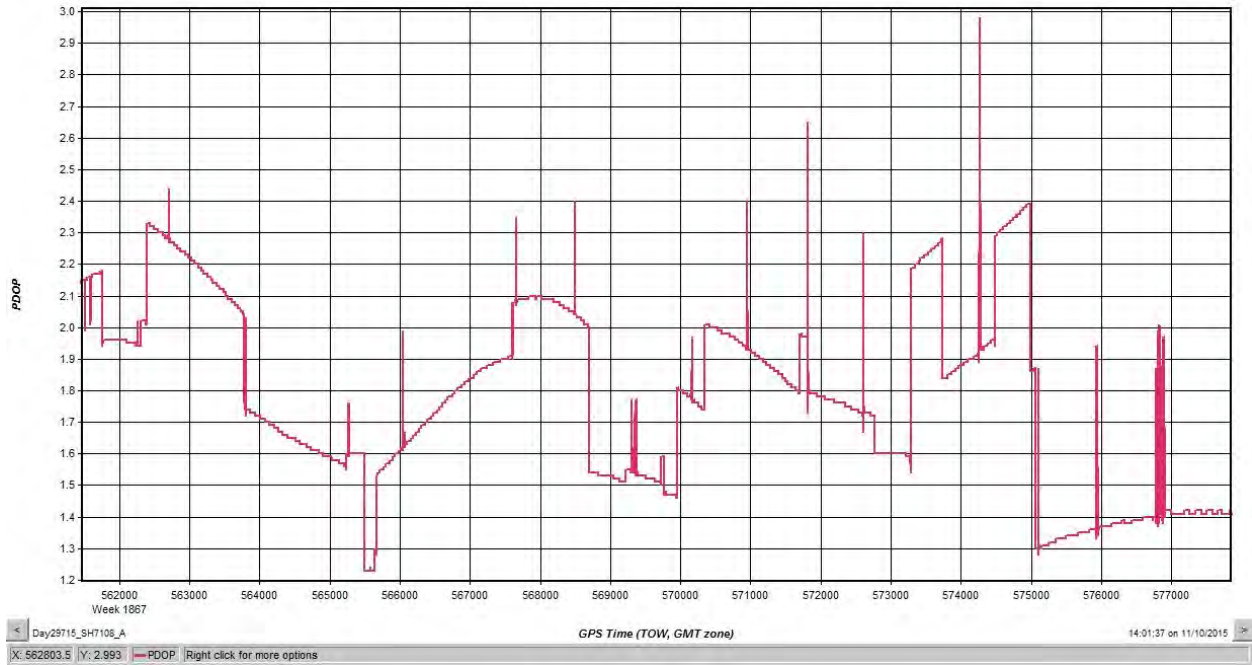
Figure 3.3: Representative Graph from Day29715: Cessna 310 - N1107Q



Positional Dilution of Precision (PDOP)

The PDOP measures the precision of the GPS solution in regards to the geometry of the satellites acquired and used for the solution. Woolpert's goal is to maintain an average PDOP value below 3.0. Brief periods of PDOP over 3.0 are acceptable due to the calibration and control process if other metrics are within specification. See Figure 3.4 for the PDOP Graph.

Figure 3.4 Representative Graph from Day29715: Cessna 310 - N1107Q



QUALITY ASSURANCE RESULTS

10/28/2015

76020 Eastern Vermont Quantum Lidar Day297 SH7108

[Edit](#)

The two missions of Lidar in Eastern VT are all accepted except for the last line where the crew hit rain and cut short. Also, a few of the higher-altitude lines flown as an upper layer for terrain were found unnecessary and can be skipped.

Accepted:

1-32

Reflight:

Line 33 (Start at north end and fly 15 miles)

Mountain Flights to be Skipped:

112

113

125

134

141

142

10/30/2015

76020 Eastern Vermont Quantum Lidar Day299-301 SH7108

One issue where we just barely range gated out on a high mountain peak without a corresponding higher crossflight. Otherwise just a few clouds at the end of the last mission as noted by the crew.

Accepted:

33-57

80-91

93-99

144 (crossflight for lines 1-35)

146 (crossflight for lines 52-79)

Reflights:

Line 58 - First 19 miles on the SOUTH end

Line 59 - First 19 miles on the SOUTH end

Line 92 - First 5 miles on the NORTH end (Please climb 1000' in altitude from original assigned altitude to fly these lines to cover small range gate error on a peak)

11/4/2015

76020 Eastern Vermont Quantum Lidar Day304 SH7108

Crew cleaned up the few needed patches and completed the "main" lower flights of this project. No new reflights were needed so all that will be left are some high-terrain flights and crossflights.

Accepted:

58-79

92

100-111

145-148

11/5/2015

76020 Eastern Vermont Quantum Lidar Day308-A SH7108

All mountain lines flown on this mission are accepted.

Accepted:

114-124

126-128

149-150 (crossflights)

11/6/2015

76020 Eastern Vermont Quantum Lidar Day308-B SH7108

All lines flown on this last mission are accepted with no reflights needed. This completes the Lidar acquisition in the 76020 Eastern VT project.

Accepted:

129-133

135-140

143

151

This completes the Eastern Vermont LIDAR Acquisition.

SECTION 4: FLIGHT LOGS

This section contains the Flight Log(s) covering the project. Flight Logs list mission specific details such as crew members, airports, weather conditions, real time PDOP values and document any issues encountered during the mission. Flight Logs are filled out by the sensor operator during the acquisition flight.

Woolpert

Woolpert												
Leica LIDAR		MM/DD/YYYY	Day of Year	Project #	Phase #	Project Name						
		10/31/2015	304	76020	1	Eastern VT Lidar						
SUBJECT		AIRCRAFT		HUBBIS STATION		LOCAL START TIME		LOCAL END TIME		PIV		
GALAMBOS		N1107Q		2835.3		1:41:00		17:41:00		WOOLPERT PIN		
PIV		SENSOR TYPE		HUBBIS END		LOCAL END TIME		ZULU END TIME		PIV		
SWAIN		ALS-710B		2839.3		5:03:00		21:03:00		KBTB		
Wind Dir/Speed	Visibility	Ceiling	Cloud Cover %	Temp	Dew Point	Pressure	Haze/Fire/Cloud		Departing	KBTB		
210 8	10	Few 10 200 sc		8	-2	30.16			Arriving	KBTB		
Scan Angle (FOV)		Scan Frequency (Hz)		Pulse Rate (kHz)		Laser Power %		Fixed Gain	Mode		Threshold Values	
40		39.4		263		100		255	Single		A 215	
								Gain - Course/Up	Multi		B 195	
								Gain - Fine/Down	X			
Air Speed	AGL		MSL		Waveform Used		Waveform Mode		Pre-Trigger Dist.			
150	Kts	6808	Ft	Varies	Ft	Yes	No	X	@	NS	R	
Line #	Dir.	Line Start Time	Line End Time	Time On Line	SVs	HDOP	PDOP	Line Notes/Comments				
Test	n/a			n/a	n/a	n/a	n/a	GPS Began Logging At:		17:06:35		
↓ Times entered are Zulu / GMT ↓										Verify S-Turns Before Mission Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
100	S	17:41:19	17:49:50	11:53:38	16	0.7	1.3	Flight "B"				
101	N	17:52:59	18:00:39	0:00:00	16	0.7	1.3	takeoff 1719z				
102	S	18:03:52	18:13:02	0:00:00	19	0.6	1					
103	N	18:15:39	18:23:39	0:00:00	17	0.7	1.1					
104	S	18:26:53	18:35:46	0:00:00	16	0.7	1.2					
105	N	18:38:10	18:45:19	0:00:00	16	0.6	1.2					
106	S	18:48:54	18:56:47	0:00:00	15	0.8	1.3					
107	N	18:59:38	19:06:26	0:00:00	17	0.7	1.2					
108	S	19:09:31	19:11:58	0:00:00	17	0.7	1.2	Broke off line due to head on traffic				
108	S	19:19:47	19:25:27	0:00:00	17	0.7	1.2	Resume				
109	N	19:28:05	19:33:04	0:00:00	17	0.7	1.2					
110	S	19:36:04	19:41:13	0:00:00	17	0.7	1.2					
111	N	19:44:59	19:45:47	0:00:00	17	0.7	1.2					
148	W	19:49:46	19:52:23	0:00:00	17	0.7	1.2	Cross-Flight				
147	E	19:59:38	20:03:30	0:00:00	17	0.7	1.2	Cross-Flight				
145	W	20:11:45	20:16:37	0:00:00	17	0.7	1.2	Cross-Flight				
59	N	20:24:43	20:33:53	0:00:00	19	0.6	1	Manual Start UL001/Manual Stop				
58	S	20:37:18	20:49:35	0:00:00	19	0.6	1	58/59 REFLIGHTS X FLIGHT-UL002				
x-flt	W	20:33:38	20:54:45	0:00:00	18	0.6	1	58/59 REFLIGHTS X FLIGHT				
92	S	21:00:28	21:03:10	0:00:00	18	0.6	1.1	% miles North end heading south				
				0:00:00				Climb 1000 feet as instructed				
				0:00:00				not possible--above range gate				
				0:00:00				58/59 REFLIGHTS X FLIGHT				
				0:00:00				Landing 2121z				
				0:00:00				Static: 21:24:00				
				0:00:00								
				0:00:00								
				0:00:00								
				0:00:00								
				0:00:00								
				0:00:00								
↑ Times entered are Zulu / GMT ↑		Page			1			Verify S-Turns After Mission		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Additional Comments:										Drive #		
										ALS 70-2		

SECTION 5: FINAL DELIVERABLES

FINAL DELIVERABLES

The final deliverables are listed below:

- All Raw Data (GNSS/IMU & Laser data)
- Final GNSS/ IMU Trajectory (Sol)
- Final Base Station Coordinates
- Mission Flight logs (.XLSX)
- Leica ALS70 HP SN 7108 Support Files (XLM & IBRC Table)
- Final flight line attributed shapefile - Flight Line Number, Date Flown, & Status
- LiDAR Acquisition Report



WOOLPERT

DESIGN | GEOSPATIAL | INFRASTRUCTURE

Appendix C

Survey Report

April 28, 2015

Field Survey Report of
LiDAR Ground Control & QC Points

TO# 48 – Eastern Vermont LiDAR
USGS Contract: G10PC00026
USGS Task Order: G14PD00971
Photo Science Project No. 22399



1400 Independence Road
Rolla, Missouri 65401

Presented by



A Quantum Spatial Company

1410 Indian Trail Road
Norcross, Georgia 30093
770-564-9843





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PROJECT PROCEDURE SUMMARY

Project Description

Photo Science, a Quantum Spatial company, was contracted by U.S. Geological Survey (USGS) under task order number G14PD00971 to field survey LiDAR calibration control points and quality control points in support of TO# 48 – Eastern Vermont LiDAR. There are 71 calibration points, 25 non vegetated bare earth check points, and 60 vegetated check points divided as 40 forested and 20 tall weeds based on land cover analysis. Each class is dispersed through the project, totalling 156 points.

Field Procedure

Field work began on October 24th, 2014 and came to a temporary stop on December 3rd, 2014 due to weather restrictions. The remainder of the field work was completed from March 24th, 2015 to April 19th, 2015. A static GPS survey was performed using 3 Trimble R8-Model 3, and 1 Trimble R8-Model 4 GNSS receiver. Each point was set on a flat surface at least five meters away from any significant elevation change and occupied for a minimum of 20 minutes. Each point also shares common time with at least one other control point within the project AOI. For any of the QC points that were unable to be collected with GPS were located conventionally with a Trimble M3 2" total station utilizing points previously set with GPS. Data sheets for each point were filled out with information including point type, general location, occupation time, equipment used, and photographs. Final coordinates, point ties, and RMSE values were filled in after the post processed network adjustment.

Office Procedure

The network was constrained to the NGS CORS network in a weighted least squares adjustment using Trimble Business Center Software.

Reporting Procedure

The North American Datum of 1983 (NAD83 (2011)), SPCS Vermont projection was referenced for reporting the horizontal coordinates in meters. The vertical elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88) utilizing the GEOID12A model and are reported in meters.

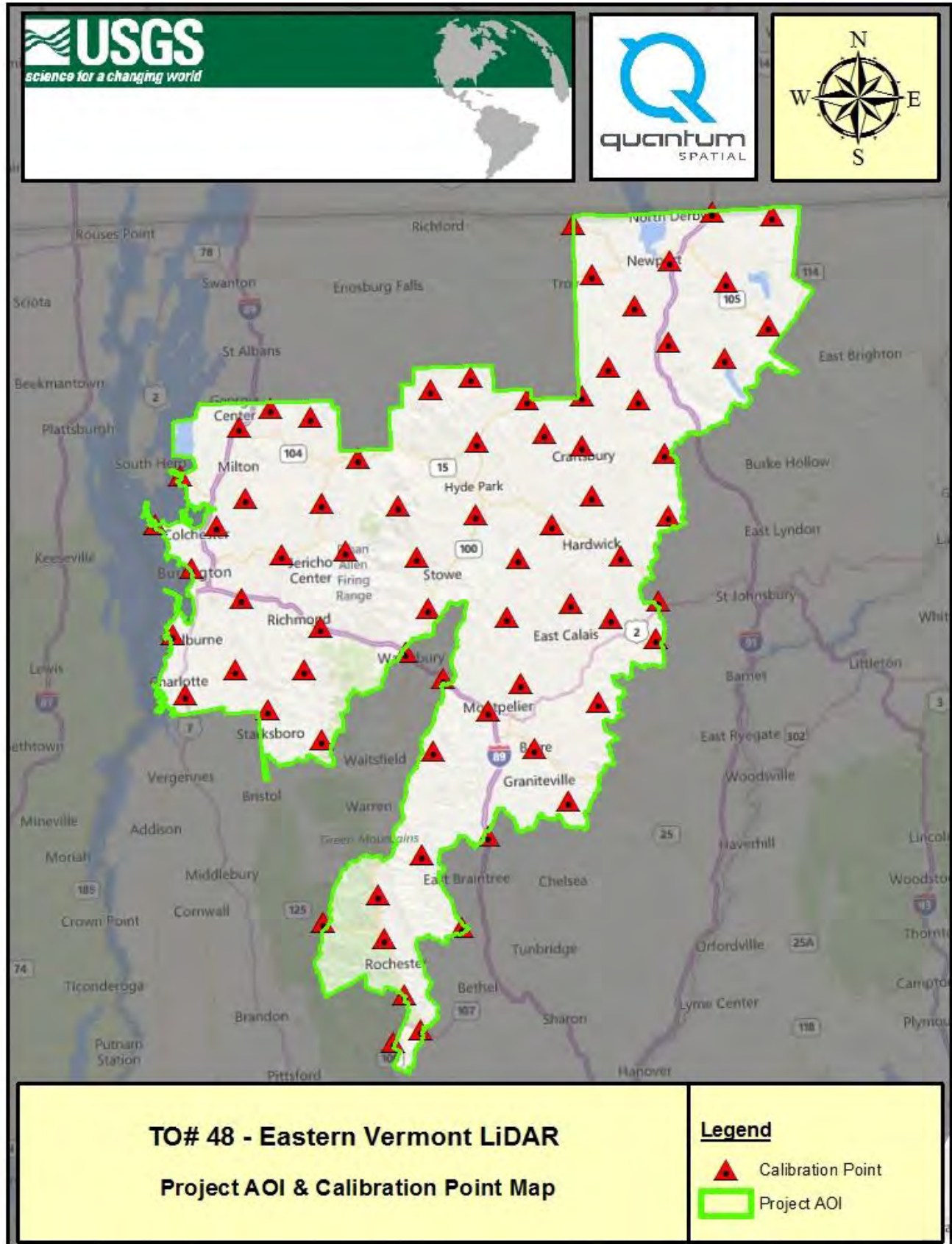
The Horizontal RMSE at the 95% confidence level is 0.006 meter.

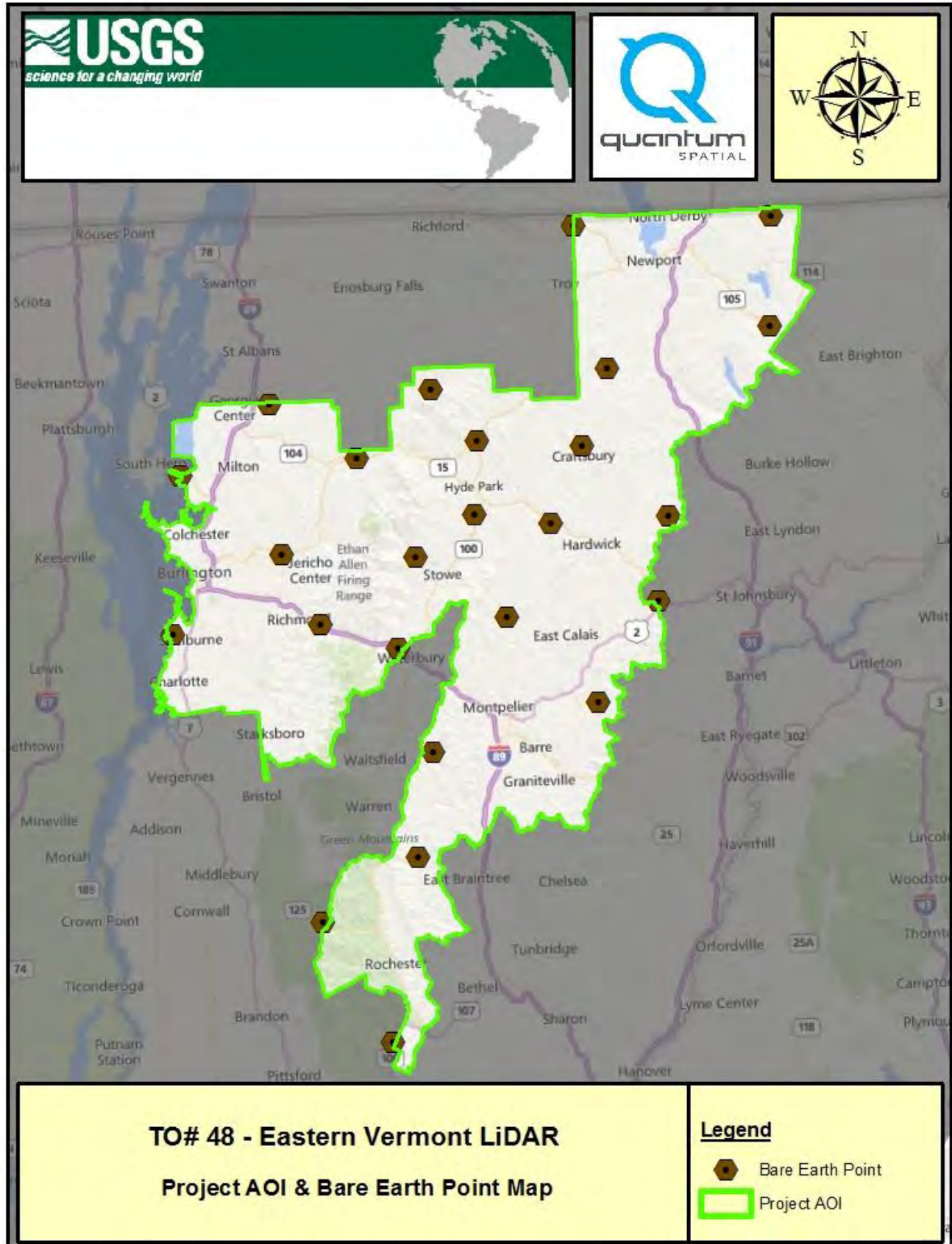
The Elevation RMSE at the 95% confidence level is 0.011 meter.

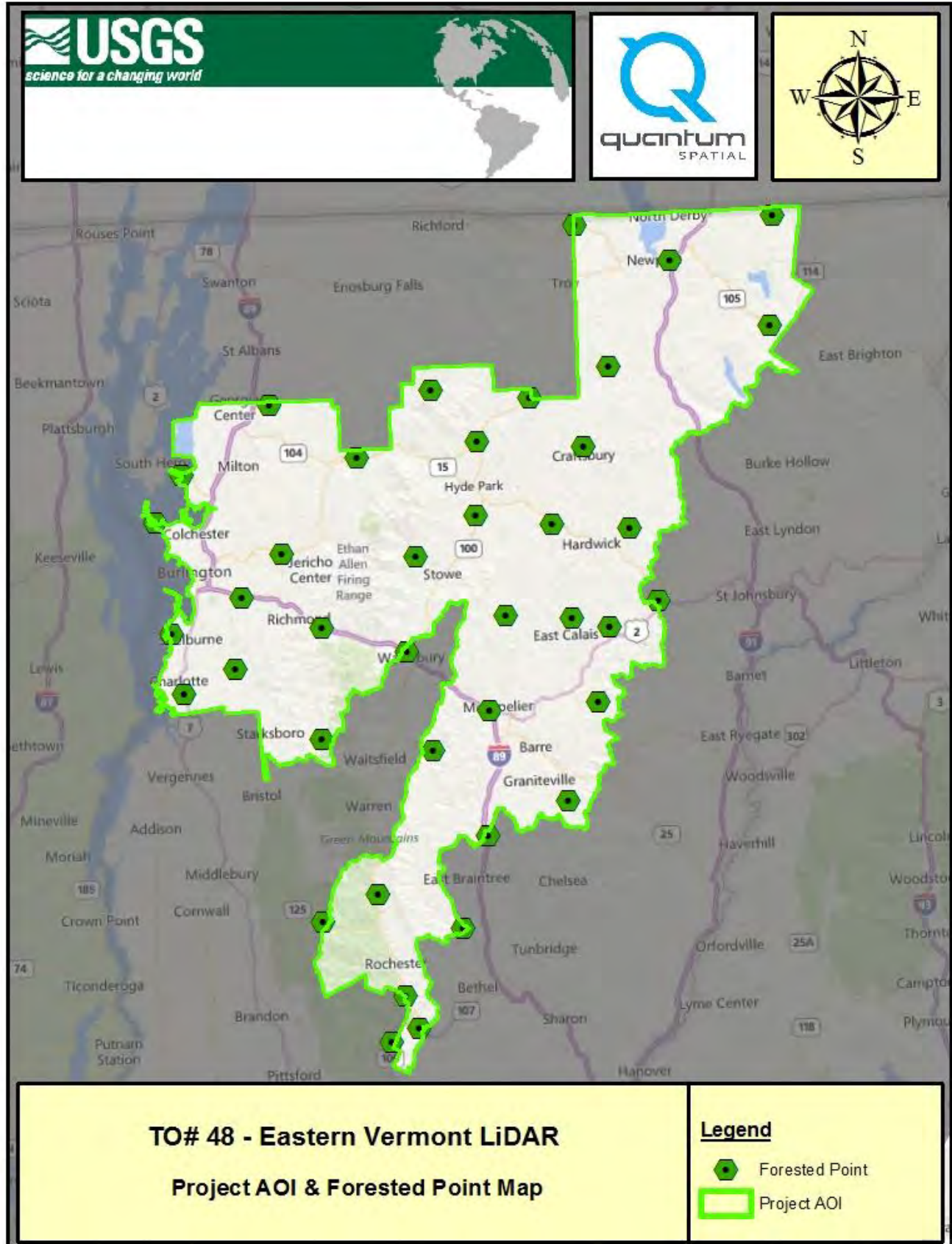
The 3-Dimensional RMSE at the 95% confidence level is 0.013 meter.

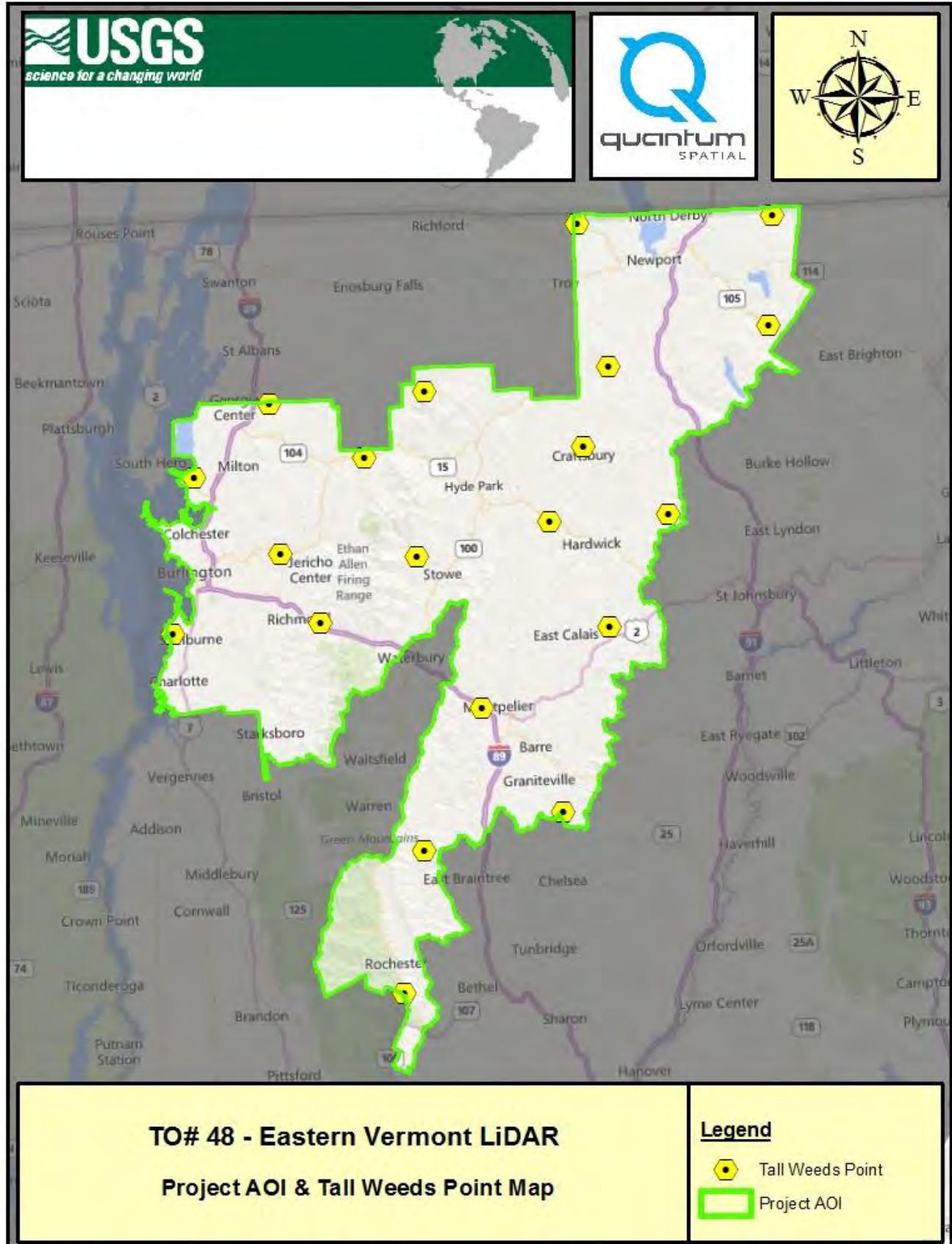


PROJECT AOI & POINT MAPS











FINAL POINT COORDINATES



CALIBRATION POINT COORDINATES

Horizontal Datum - NAD83(2011)
SPCS Vermont (4400)
Vertical Datum - NAVD 88
Geoid - GEOID12A
Units – Meters

POINT_ID	Northing	Easting	Elevation
LC01	160162.038	462983.881	557.100
LC02	147436.458	476528.834	238.886
LC03	139451.242	474287.690	269.565
LC04	141490.290	478919.309	227.782
LC05	157016.086	473320.313	265.478
LC06	164544.425	472483.458	299.163
LC07	158484.089	486620.737	201.203
LC08	171163.338	480179.017	267.345
LC09	173912.827	491422.464	491.203
LC10	179445.934	505204.725	395.560
LC11	188532.369	499666.259	183.423
LC12	188655.728	482606.979	427.543
LC13	195003.269	492061.949	168.168
LC14	200902.547	484661.143	165.790
LC15	199531.706	497653.983	371.715
LC16	196045.162	510774.536	427.335
LC17	206546.592	520803.179	579.064
LC18	210007.610	513374.556	285.293
LC19	212826.320	521366.455	499.813
LC20	212737.935	506570.755	308.473
LC21	210895.519	495767.737	244.941
LC22	212734.170	482369.398	277.378
LC23	205501.339	478389.561	138.104
LC24	210036.650	464175.381	98.667
LC25	202954.247	461182.193	188.883
LC26	191042.581	463862.395	451.956
LC27	196347.626	454726.853	121.301
LC28	203276.810	449579.893	109.383
LC29	199341.407	440879.352	69.378
LC30	209596.935	439193.183	72.866
LC31	215441.991	450982.228	143.294



LC32	220726.527	442637.588	63.308
LC33	228405.545	436714.847	36.549
LC34	227709.884	447171.795	51.633
LC35	222567.165	458014.966	153.390
LC36	222850.310	468729.372	269.508
LC37	221532.115	480714.135	264.330
LC38	220813.876	498044.895	388.802
LC39	220633.000	515309.368	330.738
LC40	227146.511	523658.688	529.231
LC41	230841.917	510679.864	269.461
LC42	226353.865	503770.976	245.782
LC43	228296.762	490909.424	201.593
LC44	230283.866	477890.642	480.281
LC45	231126.553	464918.274	226.394
LC46	232387.652	452021.404	141.353
LC47	236455.888	441262.879	30.925
LC48	244316.749	451490.294	117.536
LC49	247512.074	456828.041	177.021
LC50	245784.750	463485.265	224.252
LC51	238463.593	471394.102	140.119
LC52	249691.851	484015.309	260.619
LC53	251653.985	490829.829	349.428
LC54	240680.033	491568.870	261.450
LC55	247641.743	500327.764	379.987
LC56	241679.205	503123.954	492.847
LC57	239346.310	509271.008	379.450
LC58	237851.560	523278.555	381.545
LC59	246904.667	519176.393	474.591
LC60	247907.277	509543.513	291.745
LC61	252618.964	514157.738	270.213
LC62	256474.095	524455.263	230.591
LC63	253556.025	533929.461	361.715
LC64	258776.299	541573.318	355.530
LC65	266496.917	534426.147	304.490
LC66	277306.773	542615.129	421.623
LC67	278368.695	532629.598	347.909
LC68	270306.425	525106.446	275.823
LC69	262971.801	518838.833	212.264
LC70	268324.294	511955.634	279.712
LC71	276874.655	509064.014	183.791



BARE EARTH POINT COORDINATES

Horizontal Datum - NAD83(2011)
SPCS Vermont (4400)
Vertical Datum - NAVD 88
Geoid - GEOID12A
Units – Meters

POINT_ID	Northing	Easting	Elevation
BE01	160106.070	463014.605	557.367
BE02	139503.024	474210.773	274.987
BE03	170566.636	479506.291	265.639
BE04	188449.507	482573.480	435.773
BE05	195936.344	510728.284	436.162
BE06	212745.603	521451.919	494.251
BE07	206178.949	477129.464	137.147
BE08	210595.113	464130.385	97.081
BE09	209566.249	439099.124	68.491
BE10	222653.431	457975.193	153.757
BE11	221549.400	480650.642	264.115
BE12	227227.244	523632.398	532.852
BE13	226416.106	503701.988	245.836
BE14	228351.373	490765.708	198.426
BE15	236432.616	441315.919	30.802
BE16	247955.020	456613.377	188.258
BE17	238481.738	471196.313	146.514
BE18	249794.514	484068.985	257.966
BE19	240743.949	491601.970	263.025
BE20	239346.004	509239.711	378.996
BE21	210944.363	495652.864	247.864
BE22	252493.949	514041.099	263.292
BE23	276828.383	509092.056	185.343
BE24	258742.640	541605.819	354.074
BE25	277352.581	542575.726	419.004



FORESTED POINT COORDINATES

Horizontal Datum - NAD83(2011)
SPCS Vermont (4400)
Vertical Datum - NAVD 88
Geoid - GEOID12A
Units – Meters

POINT_ID	Northing	Easting	Elevation
FO01	139524.638	474141.576	282.369
FO02	141648.566	478884.825	240.231
FO03	147152.492	476710.991	261.021
FO04	160116.383	463049.624	559.027
FO05	164524.568	472518.497	299.620
FO06	158457.159	486646.872	199.055
FO07	179428.861	505141.627	391.312
FO08	195006.054	492315.359	158.933
FO09	188559.181	482578.486	430.640
FO10	205443.668	478571.774	135.750
FO11	195960.107	510718.618	434.891
FO12	210342.336	506754.866	286.919
FO13	210992.407	495573.356	248.294
FO14	221484.369	480598.797	262.003
FO15	209913.799	464396.991	95.544
FO16	199393.716	440743.199	79.065
FO17	209504.113	439019.800	63.675
FO18	222663.480	458006.937	153.092
FO19	236464.745	441335.325	29.400
FO20	228503.617	436686.962	34.982
FO21	247941.264	456602.869	186.168
FO22	249627.735	483973.481	265.128
FO23	238444.753	471186.207	146.842
FO24	240655.840	491583.119	258.751
FO25	228201.212	490961.607	209.990
FO26	226325.787	503790.538	245.002
FO27	225244.754	516864.478	352.336
FO28	239177.169	509544.121	371.347
FO29	252647.181	514136.044	268.591
FO30	258737.978	541660.046	352.534
FO31	277397.934	542586.069	415.085
FO32	276764.513	509096.593	176.233



FO33	270234.972	525189.641	275.462
FO34	247760.108	500623.475	379.972
FO35	191078.861	463834.978	456.107
FO36	203338.364	449575.222	106.754
FO37	215442.518	450929.941	144.279
FO38	173887.319	491466.003	490.971
FO39	208583.776	513007.493	275.563
FO40	212710.429	521437.859	496.365



TALL WEEDS POINT COORDINATES

Horizontal Datum - NAD83(2011)
SPCS Vermont (4400)
Vertical Datum - NAVD 88
Geoid - GEOID12A
Units – Meters

POINT_ID	Northing	Easting	Elevation
TW01	147632.684	476469.094	239.205
TW02	171724.027	480538.508	274.292
TW03	195481.582	491019.408	155.235
TW04	210672.531	464184.089	97.031
TW05	209546.263	439194.558	72.797
TW06	222654.250	457811.614	153.639
TW07	221464.779	480820.105	262.879
TW08	208590.723	513141.430	270.294
TW09	227284.427	523671.592	533.086
TW10	226759.969	503398.050	210.176
TW11	238434.518	472459.359	135.821
TW12	236034.576	443490.500	35.537
TW13	247970.916	456695.585	190.999
TW14	249461.380	483003.619	240.673
TW15	239166.444	509509.012	371.874
TW16	252620.712	514123.737	267.934
TW17	276846.949	509597.076	197.400
TW18	258757.023	541525.149	351.968
TW19	277350.052	542598.955	417.825
TW20	177546.540	504315.691	465.851



CALIBRATION POINT DATA SHEETS



Point ID	LC01
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ADDISON
Quad	BREADLOAF

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
160162.038	462983.881	557.100

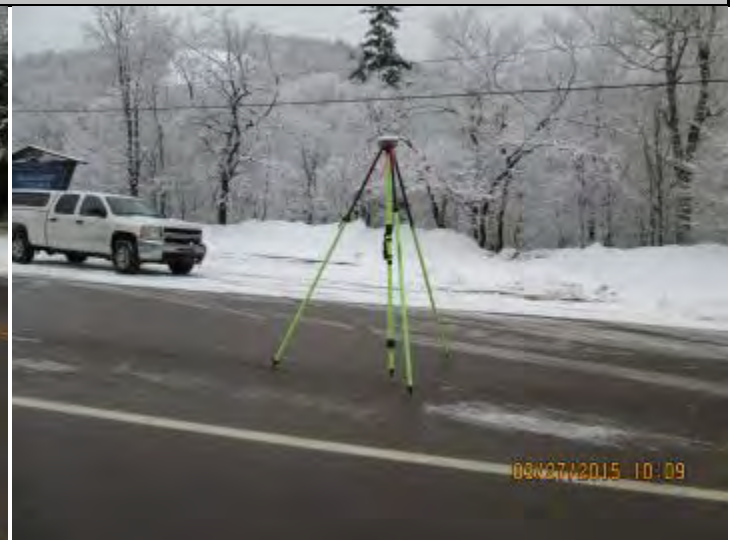
Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260860
Date	27 MAR 2015
Start Time (UTC)	1358
End Time (UTC)	1510

Point Ties: BE01 - LC07 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 –
VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.016

PHOTOS:





Point ID	LC02
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Windsor
Quad	Rochester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
147436.458	476528.834	238.886

Operator	Zeke Ingram
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09763021
Date	10-29-2014
Start Time (UTC)	11:32
End Time (UTC)	14:20

Point Ties: BE14 – LC36 – LC37 – LC43 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	LC03
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Rutland
Quad	Rochester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
139451.242	474287.690	269.565

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08242970
Date	10-24-2014
Start Time (UTC)	17:42
End Time (UTC)	18:43

Point Ties: BE14 – LC36 – LC37 – LC43 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	LC04
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Windsor
Quad	Rochester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
141490.290	478919.309	227.782

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461066 / 5133470976
Antenna Height	2.000 Meters

Static Session	10662970 / 09763020
Date	10-24-2014 / 10-29-2014
Start Time (UTC)	18:03 / 14:07
End Time (UTC)	18:34 / 15:15

Point Ties: BE14 – LC36 – LC37 – LC43 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	LC05
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Windsor
Quad	Hancock

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
157016.086	473320.313	265.478

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5133470976 / 5106461066
Antenna Height	2.000 Meters

Static Session	09762970 / 10663020
Date	10-24-2014 / 10-29-2014
Start Time (UTC)	16:33 / 13:25
End Time (UTC)	19:26 / 20:13

Point Ties: BE14 – LC36 – LC37 – LC43 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	LC06
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ADDISON
Quad	Hancock

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
164544.425	472483.458	299.163

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8 MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263030
Date	10/30/2014
Start Time (UTC)	13:06
End Time (UTC)	16:56

Point Ties: BE01 – BE03 – LC07 – LC08 – NYET – NYIL – TW01 – TW02
VCAP – VTOX – VTRU – VTSP

RMSE Hz: 0.007
RMSE Z: 0.028

PHOTOS:





Point ID	LC07
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Randolph

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
158484.089	486620.737	201.203

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461067
Antenna Height	2.000 Meters

Static Session	10670860
Date	03272015
Start Time (UTC)	14:06
End Time (UTC)	15:32

Point Ties: BE01 - LC01 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.018

PHOTOS:





Point ID	LC08
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORANGE
Quad	Roxbury

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
171163.338	480179.017	267.345

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09763031
Date	10/30/2014
Start Time (UTC)	15:38
End Time (UTC)	19:05

Point Ties: BE03 – LC06 – LC09 – LC10 – NYET – NYIL – TW02 – TW20
VCAP – VTOX – VTRU – VTSP

RMSE Hz: 0.008
RMSE Z: 0.027

PHOTOS:





Point ID	LC09
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORANGE
Quad	Brookfield

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
173912.827	491422.464	491.203

Operator	Zeke Ingram
Receiver Model	TRIMBLE R8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263031
Date	10/30/2014
Start Time (UTC)	17:51
End Time (UTC)	19:32

Point Ties: LC08 – LC10 – NYET – NYIL – TW20 – VCAP – VTOX – VTRU – VTSP

RMSE Hz: 0.008

RMSE Z: 0.029

PHOTOS:





Point ID	LC10
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	WASHINGTON

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
179445.934	505204.725	395.560

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10661062
Date	16 APRIL 2015
Start Time (UTC)	1610
End Time (UTC)	1655

Point Ties: LC11 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.015

PHOTOS:





Point ID	LC11
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	BARRE EAST

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
188532.369	499666.259	183.423

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09763040
Date	10-31-2014
Start Time (UTC)	13:10
End Time (UTC)	15:20

Point Ties: BE04 – BE05 – LC10 – LC12 – LC16 – NYET – NYIL - VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.025

PHOTOS:





Point ID	LC12
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	NORTHFIELD

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
188655.728	482606.979	427.543

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263040
Date	10-31-2014
Start Time (UTC)	12:32
End Time (UTC)	13:54

Point Ties: BE04 – LC10 – LC11 – NYET – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.008
RMSE Z: 0.021

PHOTOS:





Point ID	LC13
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	MONTPELIER

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
195003.269	492061.949	168.168

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09763041
Date	10-31-2014
Start Time (UTC)	16:01
End Time (UTC)	17:44

Point Ties: LC15 – LC16 – NYET – NYIL – TW03 – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.021

PHOTOS:





Point ID	LC14
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Middlesex

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
200902.547	484661.143	165.790

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243042
Date	10-31-2014
Start Time (UTC)	18:02
End Time (UTC)	19:27

Point Ties: BE07 – LC15 – LC23 – LC24 – NYET – NYIL – TW03 – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	LC15
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	MONTPELIER

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
199531.706	497653.983	371.715

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263042
Date	10-31-2014
Start Time (UTC)	17:00
End Time (UTC)	18:36

Point Ties: BE05 – LC13 – LC14 – LC23 – NYET – NYIL – TW03 – VCAP
VTD7 – VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.021

PHOTOS:





Point ID	LC16
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	MARSHFIELD

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
196045.162	510774.536	427.335

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263041
Date	10-31-2014
Start Time (UTC)	14:58
End Time (UTC)	16:31

Point Ties: BE04 – BE05 – LC11 – LC13 – NYET – NYIL – VCAP
VTD7 – VTHA – VTOX – VTUV

RMSE Hz: 0.008
RMSE Z: 0.026

PHOTOS:





Point ID	LC17
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Peacham

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
206546.592	520803.179	579.064

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461067
Antenna Height	2.000 Meters

Static Session	10670890
Date	03302015
Start Time (UTC)	13:18
End Time (UTC)	15:17

Point Ties: BE06 - BE23 - LC39 - LC68 - LC70 - LC71 - MERA - NYET - NYPB - PMTL - TW17 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUW

RMSE Hz: 0.006
RMSE Z: 0.012

PHOTOS:





Point ID	LC18
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	CABOT

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
210007.610	513374.556	285.293

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760861
Date	27 MAR 2015
Start Time (UTC)	1858
End Time (UTC)	1958

Point Ties: LC11 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.013

PHOTOS:





Point ID	LC19
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Washington
Quad	Joes Pond

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
212826.320	521366.455	499.813

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461067
Antenna Height	2.000 Meters

Static Session	10670891
Date	03302015
Start Time (UTC)	15:36
End Time (UTC)	16:09

Point Ties: BE06 - LC39 - LC68 - MERA - NYPB - PMTL - TW17 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC20
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	WOODBURY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
212737.935	506570.755	308.473

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263090
Date	11-05-2014
Start Time (UTC)	13:44
End Time (UTC)	20:45

Point Ties: BE21 – LC20BS – LC21 – LC22 – LC38 – NYET – NYIL – NYPB – VCAP – VTC1 – VTD7
VTD9 – VTHA – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.007
RMSE Z: 0.019

PHOTOS:





Point ID	LC21
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	MOUNT WORCESTER

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
210895.519	495767.737	244.941

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09763093
Date	11-05-2014
Start Time (UTC)	19:31
End Time (UTC)	20:03

Point Ties: BE21 – LC20 – LC38 – VCAP – VTC1
VTD9 – VTHA – VTSA - VTUV

RMSE Hz: 0.008
RMSE Z: 0.018

PHOTOS:





Point ID	LC22
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Stowe

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
212734.170	482369.398	277.378

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243043 / 08243090
Date	10-31-2014 / 11-05-2014
Start Time (UTC)	19:51 / 14:17
End Time (UTC)	20:28 / 14:48

Point Ties: BE07 – LC20 – LC20BS – LC23 – LC24 – LC38 – NYET – NYIL – VCAP
VTC1 – VTD7 - VTD9 – VTHA – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	LC23
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	WATERBURY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
205501.339	478389.561	138.104

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09763042
Date	10-31-2014
Start Time (UTC)	18:05
End Time (UTC)	20:28

Point Ties: BE07 – LC14 – LC15 – LC22 – LC24 – NYET – NYIL – TW03 – VCAP
VTD7 - VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.015

PHOTOS:





Point ID	LC24
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	CHITTINDEN
Quad	RICHMOND

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
210036.650	464175.381	98.667

Operator	Zeke Ingram
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.000 Meters

Static Session	25263043
Date	10-31-2014
Start Time (UTC)	19:18
End Time (UTC)	20:37

Point Ties: BE07 – LC14 – LC22 – LC23 – NYET – NYIL – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.014

PHOTOS:





Point ID	LC25
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Huntington

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
202954.247	461182.193	188.883

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.0m

Static Session	08243221
Date	11/18/14
Start Time (UTC)	17:51
End Time (UTC)	20:26

Point Ties: LC26BS – LC27 – LC28 – LC28BS – NYET – NYIL – NYPB – VCAP – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.013

PHOTOS:





Point ID	LC26
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Mount Ellen

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
191042.581	463862.395	451.956

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5329440824
Antenna Height	2.0m

Static Session	08243220
Date	11/18/14
Start Time (UTC)	16:14
End Time (UTC)	17:29

Point Ties: LC26BS – LC27 – NYET – NYIL – NYPB – VCAP – VTD7
VTD9 – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.007
RMSE Z: 0.016

PHOTOS:





Point ID	LC27
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Addison
Quad	Hinesburg

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
196347.626	454726.853	121.301

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5106461066
Antenna Height	2.0m

Static Session	10663220
Date	11/18/14
Start Time (UTC)	16:57
End Time (UTC)	19:38

Point Ties: LC25 – LC26 – LC26BS – LC28 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.013

PHOTOS:





Point ID	LC28
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Hinesburg

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
203276.810	449579.893	109.383

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5136472526
Antenna Height	2.0m

Static Session	25263221
Date	11/18/14
Start Time (UTC)	19:06
End Time (UTC)	20:51

Point Ties: LC25 – LC27 – LC28BS – NYET – NYIL – NYPB – VCAP – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.007
RMSE Z: 0.013

PHOTOS:





Point ID	LC29
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Mount Philo

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
199341.407	440879.352	69.378

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183350
Date	12/01/2014
Start Time (UTC)	12:04
End Time (UTC)	13:47

Point Ties: BE08 – LC28BS – LC29BS – LC31 – NYET – NYIL – NYPB – TW04
VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.013

PHOTOS:





Point ID	LC30
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Juniper Island

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
209596.935	439193.183	72.866

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183351
Date	12/01/2014
Start Time (UTC)	14:13
End Time (UTC)	15:29

Point Ties: BE09 – BE10 – LC29BS – LC31 – LC31BS – NYET – NYIL – NYPB
VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.015

PHOTOS:





Point ID	LC31
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	ESSEX JUNCTION

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
215441.991	450982.228	143.294

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263351
Date	12-01-2014
Start Time (UTC)	13:34
End Time (UTC)	14:50

Point Ties: LC29BS – LC29 – LC31BS – LC31 – NYET – NYIL – NYPB – TW04
VCAP – VTC1 – VTD7 --VTD9

RMSE Hz: 0.007
RMSE Z: 0.016

PHOTOS:





Point ID	LC32
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Burlington

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
220726.527	442637.588	63.308

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843353
Date	12/01/2014
Start Time (UTC)	16:44
End Time (UTC)	18:37

Point Ties: LC33 – LC34 – LC35 – NYET – NYIL – NYPB – TW05 – TW06
VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.019

PHOTOS:





Point ID	LC33
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Colchester Point

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
228405.545	436714.847	36.549

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183353
Date	12/01/2014
Start Time (UTC)	18:06
End Time (UTC)	19:14

Point Ties: LC32 – LC33BS – LC34 – LC46 – NYET – NYIL – NYPB – TW09
VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.023

PHOTOS:





Point ID	LC34
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	COLCHESTER

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
227709.884	447171.795	51.633

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763353
Date	12-01-2014
Start Time (UTC)	17:44
End Time (UTC)	19:13

Point Ties: LC32 – LC33 – LC33BS – LC46 – NYET – NYIL – NYPB – TW06
VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.020

PHOTOS:





Point ID	LC35
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	ESSEX CENTER

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
222567.165	458014.966	153.390

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133479876
Antenna Height	2.00 METERS

Static Session	09763352
Date	12-01-2014
Start Time (UTC)	16:18
End Time (UTC)	17:21

Point Ties: BE10 – LC32 – NYET – NYIL – NYPB – TW05 – TW06
VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	LC36
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Underhill

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
222850.310	468729.372	269.508

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183363
Date	12/02/2014
Start Time (UTC)	18:15
End Time (UTC)	21:26

Point Ties: BE11 – LC37 – LC44 – LC45 – NYET – NYIL – NYPB – TW07
VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.016

PHOTOS:





Point ID	LC37
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	LAMOILLE
Quad	STOWE

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
221532.115	480714.135	264.330

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763363
Date	12-02-2014
Start Time (UTC)	19:01
End Time (UTC)	21:04

Point Ties: BE11 – LC36 – LC44 – NYET – NYIL – NYPB – TW07
VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.015

PHOTOS:





Point ID	LC38
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Lamoille
Quad	Mount Worchester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
220813.876	498044.895	388.802

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10663090
Date	11-05-2014
Start Time (UTC)	13:41
End Time (UTC)	20:21

Point Ties: BE21 – LC20 – LC20BS – LC21 – LC22 – NYET – NYIL – NYPB – VCAP – VTC1 – VTD7
VTD9 – VTHA – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.016

PHOTOS:





Point ID	LC39
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Cabot

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
220633.000	515309.368	330.738

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18840880
Date	03292015
Start Time (UTC)	13:36
End Time (UTC)	16:37

Point Ties: BE06 - BE14 - BE22 - BE23 - LC17 - LC19 - LC41 - LC59 - LC60 - LC61 - LC62 - LC68 - LC70 - LC71 - MERA - NYET - NYPB - PMTL - TW17 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.004
RMSE Z: 0.009

PHOTOS:





Point ID	LC40
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Stannard

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
227146.511	523658.688	529.231

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461067
Antenna Height	2.000 Meters

Static Session	10670900
Date	03312015
Start Time (UTC)	20:15
End Time (UTC)	18:37

Point Ties: BE12 - LC60 - NYET - NYPB - TW09 - VCAP - VTC1 - VTD7 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.011

PHOTOS:





Point ID	LC41
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Caspian Lake

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
230841.917	510679.864	269.461

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461067
Antenna Height	2.000 Meters

Static Session	10670880
Date	03292015
Start Time (UTC)	15:35
End Time (UTC)	18:51

Point Ties: BE14 - BE22 - LC39 - LC55 - LC58 - LC62 - NYET - TW16 - VCAP - VTD7 - VTEB - VTHA - VTSA

RMSE Hz: 0.007

RMSE Z: 0.011

PHOTOS:





Point ID	LC42
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	LAMOILLE
Quad	WILCOTT

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
226353.865	503770.976	245.782

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263371
Date	12-03-2014
Start Time (UTC)	17:42
End Time (UTC)	19:33

Point Ties: BE13 – BE14 – LC18 – LC43 – NYET – NYIL – NYPB – TW10 – VTC1
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	LC43
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	LAMOILLE
Quad	MORRISVILLE

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
228296.762	490909.424	201.593

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763370
Date	12-03-2014
Start Time (UTC)	15:46
End Time (UTC)	18:14

Point Ties: BE11 – BE13 – BE14 – LC42 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.016

PHOTOS:





Point ID	LC44
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	LAMOILLE
Quad	MOUNT MANSFIELD

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
230283.866	477890.642	480.281

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263362
Date	12-02-2014
Start Time (UTC)	17:37
End Time (UTC)	19:50

Point Ties: BE17 – LC36 – LC37 – LC45 – NYET – NYIL – NYPB – VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	LC45
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Underhill

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
231126.553	464918.274	226.394

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843362
Date	12/02/2014
Start Time (UTC)	17:03
End Time (UTC)	18:46

Point Ties: BE17 – LC36 – LC44 – LC51 – NYET – NYIL – NYPB – VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.019

PHOTOS:





Point ID	LC46
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	
Quad	

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
232387.652	452021.404	141.353

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263354
Date	12-01-2014
Start Time (UTC)	18:40
End Time (UTC)	20:02

Point Ties: BE15 – LC33 – LC33BS – LC34 – NYET – NYIL – NYPB – VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007

RMSE Z: 0.021

PHOTOS:





Point ID	LC47
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	GEORGIA PLAINS

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
236455.888	441262.879	30.925

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526 / 5133470976
Antenna Height	2.00 METERS

Static Session	25263355 / 09763360
Date	12-01-2014 / 12-02-2014
Start Time (UTC)	20:33 / 12:22
End Time (UTC)	21:06 / 13:23

Point Ties: BE15 – LC33BS – LC48 – NYET – NYIL – NYPB – TW12 – TW13
VCAP – VTC1 – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.025

PHOTOS:





Point ID	LC48
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITTENDEN
Quad	GEORGIA PLAINS

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
244316.749	451490.294	117.536

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263360
Date	12-02-2014
Start Time (UTC)	12:51
End Time (UTC)	14:50

Point Ties: BE16 – LC47 – LC49 – LC43 – NYET – NYIL – NYPB – TW12 – TW13 – VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.026

PHOTOS:





Point ID	LC49
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	FRANKLIN
Quad	MILTON

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
247512.074	456828.041	177.021

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763361
Date	12-02-2014
Start Time (UTC)	14:19
End Time (UTC)	15:49

Point Ties: BE16 – LC48 – LC50 – NYET – NYIL – NYPB – TW11 – TW13 – VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.027

PHOTOS:





Point ID	LC50
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	FRANKLIN
Quad	GILSON MOUNTAIN

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
245784.750	463485.265	224.252

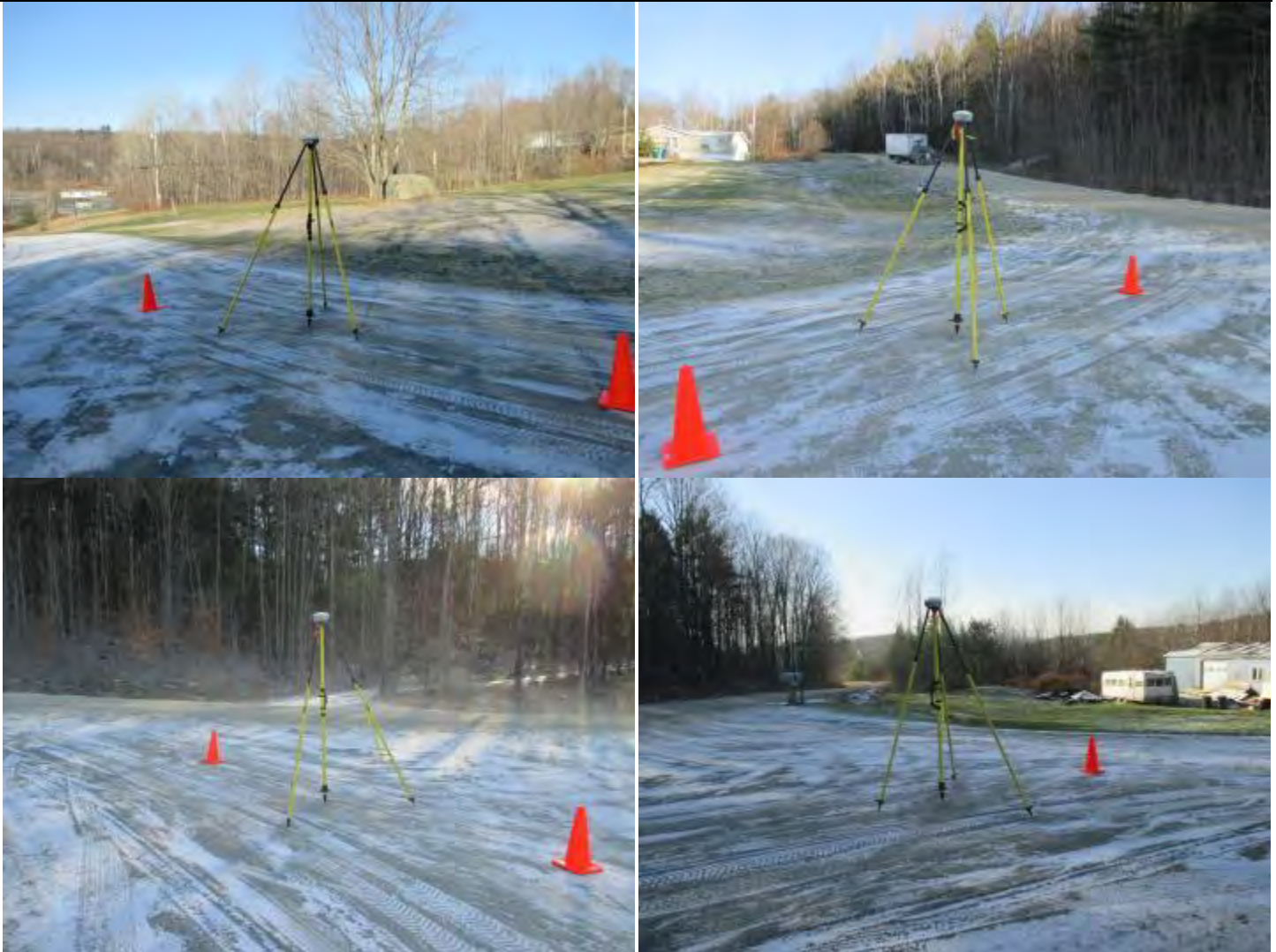
Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263361
Date	12-02-2014
Start Time (UTC)	15:18
End Time (UTC)	16:48

Point Ties: BE16 – BE17 – LC49 – LC51 – NYET – NYIL – NYPB – TW11 – VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.025

PHOTOS:





Point ID	LC51
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Lamoille
Quad	Jeffersonville

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
238463.593	471394.102	140.119

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183362
Date	12/02/2014
Start Time (UTC)	16:13
End Time (UTC)	17:36

Point Ties: BE17 – LC45 – LC50 – NYET – NYIL – NYPB – TW11 – VCAP – VTD7 – VTD9

RMSE Hz: 0.007
RMSE Z: 0.020

PHOTOS:





Point ID	LC52
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	JOHNSON

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
249691.851	484015.309	260.619

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18841070
Date	17 APRIL 2015
Start Time (UTC)	1307
End Time (UTC)	1410

Point Ties: BE14 - BE18 - BE19 - LC54 - NYET - NYPB - TW14 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.004
RMSE Z: 0.009

PHOTOS:





Point ID	LC53
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	LAMOILE
Quad	ALBANY

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
251653.985	490829.829	349.428

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260832
Date	24 MAR 2015
Start Time (UTC)	1802
End Time (UTC)	1900

Point Ties: BE14 - LC54 - LC55 - LC56 - NYET - NYPB - TW14 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	LC54
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Lamoille
Quad	Eden

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
240680.033	491568.870	261.450

Operator	Bill Neville
Receiver Model	Leica GS15
Receiver S/N	0881
Antenna Height	2.000 Meters

Date	03-24-2015
Start Time (UTC)	1701
End Time (UTC)	1804

Point Ties: BE14 - BE18 - BE19 - LC52 - LC53 - LC55 - LC56 - NYET - NYPB - TW14 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.009

PHOTOS:





Point ID	LC55
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	LAMOILLE
Quad	ALBANY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
247641.743	500327.764	379.987

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260883
Date	28 MAR 2015
Start Time (UTC)	1826
End Time (UTC)	1856

Point Ties: BE14 - LC41 - LC53 - LC54 - LC56 - LC58 - LC62 - NYET - NYPB - TW14 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.004
RMSE Z: 0.009

PHOTOS:





Point ID	LC56
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orleans
Quad	Albany

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
241679.205	503123.954	492.847

Operator	Bill Neville
Receiver Model	Leica GS15
Receiver S/N	0893
Antenna Height	2.000 Meters

Static Session	
Date	03-24-2015
Start Time (UTC)	1830
End Time (UTC)	1930

Point Ties: BE14 - LC53 - LC54 - LC55 - NYET - NYPB - TW14 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTSA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	LC57
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	ALBANY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
239346.310	509271.008	379.450

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260900
Date	31 MAR 2015
Start Time (UTC)	1913
End Time (UTC)	2013

Point Ties: BE12 - BE20 - LC60 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC58
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orleans
Quad	Crystal Lake

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
237851.560	523278.555	381.545

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18840881
Date	03292015
Start Time (UTC)	17:14
End Time (UTC)	21:01

Point Ties: BE14 - LC41 - LC55 - LC62 - LC69 - LC70 - NYET - NYPB - TW16 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	LC59
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	CRAFTSBURY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
246904.667	519176.393	474.591

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260880
Date	28 MAR 2015
Start Time (UTC)	1343
End Time (UTC)	1444

Point Ties: BE14 - LC39 - LC60 - LC62 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC60
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	ALBANY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
247907.277	509543.513	291.745

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760880
Date	28 MAR 2015
Start Time (UTC)	1954
End Time (UTC)	2054

Point Ties: BE12 - BE14 - BE20 - LC39 - LC40 - LC57 - LC59 - LC61 - LC62 - NYET - NYPB - TW09 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.004
RMSE Z: 0.009

PHOTOS:





Point ID	LC61
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	IRASBURG

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
252618.964	514157.738	270.213

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260881
Date	28 MAR 2015
Start Time (UTC)	1524
End Time (UTC)	1636

Point Ties: VTUV - BE14 - BE22 - LC39 - LC60 - LC62 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC62
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	ORLEANS

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
256474.095	524455.263	230.591

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10660880
Date	28 MAR 2015
Start Time (UTC)	1308
End Time (UTC)	2104

Point Ties: BE14 - BE22 - LC39 - LC41 - LC55 - LC58 - LC59 - LC60 - LC61 - LC69 - LC70 - NYET - NYPB - TW16 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	LC63
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orleans
Quad	Westmore

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
253556.025	533929.461	361.715

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5046465718
Antenna Height	2.000 Meters

Static Session	57180891
Date	03302015
Start Time (UTC)	14:36
End Time (UTC)	19:30

Point Ties: BE24 - BE25 - LC64 - LC66 - LC67 - LC68 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTETB - VTTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC64
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orleans
Quad	Island Pond

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
258776.299	541573.318	355.530

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18840891
Date	03302015
Start Time (UTC)	18:37
End Time (UTC)	20:59

Point Ties: BE24 - BE25 - LC63 - LC65 - LC66 - LC68 - MERA - NYET - NYPB - PMTL - TW18 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	LC65
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	WEST CHARLESTON

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
266496.917	534426.147	304.490

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760894
Date	29 MAR 2015
Start Time (UTC)	1942
End Time (UTC)	2042

Point Ties: BE24 - BE25 - LC64 - LC68 - MERA - NYET - NYPB - PMTL - TW18 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.013

PHOTOS:





Point ID	LC66
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	WEST OF NORTON POINT OF ENTRY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
277306.773	542615.129	421.623

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760893
Date	29 MAR 2015
Start Time (UTC)	1812
End Time (UTC)	1912

Point Ties: BE24 - BE25 - LC63 - LC64 - LC68 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.012

PHOTOS:





Point ID	LC67
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	DERBY LINE POINT OF ENTRY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
278368.695	532629.598	347.909

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760892
Date	29 MAR 2015
Start Time (UTC)	1652
End Time (UTC)	1752

Point Ties: BE25 - LC63 - LC68 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.014

PHOTOS:





Point ID	LC68
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	NEWPORT

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
270306.425	525106.446	275.823

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10660890
Date	29 MAR 2015
Start Time (UTC)	1227
End Time (UTC)	2130

Point Ties: BE06 - BE23 - BE24 - BE25 - LC17 - LC19 - LC39 - LC63 - LC64 - LC65 - LC66 - LC67 - LC70 - LC71 - MERA - NYET - NYPB - PMTL - TW17 - TW18 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP

RMSE Hz: 0.004
RMSE Z: 0.011

PHOTOS:





Point ID	LC69
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	IRASBURG

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
262971.801	518838.833	212.264

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760884
Date	28 MAR 2015
Start Time (UTC)	1940
End Time (UTC)	2048

Point Ties: BE14 - LC58 - LC62 - LC70 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC70
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	NEWPORT CENTER

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
268324.294	511955.634	279.712

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260884
Date	28 MAR 2015
Start Time (UTC)	1954
End Time (UTC)	2054

Point Ties: BE14 - BE23 - LC17 - LC39 - LC58 - LC62 - LC68 - LC69 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	LC71
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	NORTH TROY STATION

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
276874.655	509064.014	183.791

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260891
Date	29 MAR 2015
Start Time (UTC)	1411
End Time (UTC)	1511

Point Ties: BE06 - BE23 - LC17 - LC39 - LC68 - MERA - NYET - NYPB - PMTL - TW17 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.013

PHOTOS:





BARE EARTH POINT DATA SHEETS



Point ID	BE01
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ADDISON
Quad	BREADLOAF

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

Coordinate System	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
160106.070	463014.605	557.367

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10660860
Date	27 MAR 2015
Start Time (UTC)	1405
End Time (UTC)	1605

Point Ties: LC01 - LC07 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTHA - VTIP - VTOX - VTRU - VTSA

RMSE Hz: 0.007
RMSE Z: 0.016

PHOTOS:





Point ID	BE02
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Rutland
Quad	Rochester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
139503.024	474210.773	274.987

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243020
Date	10-29-2014
Start Time (UTC)	14:10
End Time (UTC)	16:30

Point Ties: LC03 - LC04 - LC05 - NYET - NYIL - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.021

PHOTOS:





Point ID	BE03
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Warren

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
170566.636	479506.291	265.639

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10663031
Date	10/30/2014
Start Time (UTC)	15:55
End Time (UTC)	17:06

Point Ties: LC06 - LC08 - NYET - NYIL - TW02 - VCAP – VTOX - VTRU - VTSA - VTSP

RMSE Hz: 0.008
RMSE Z: 0.027

PHOTOS:





Point ID	BE04
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Northfield

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
188449.507	482573.480	435.773

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10663040
Date (MM-DD-YYY)	10/31/2014
Start Time (UTC)	12:36
End Time (UTC)	15:49

Point Ties: BE05 – LC10 – LC11 – LC12 – LC16 – NYET – NYIL – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.020

PHOTOS:





Point ID	BE05
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Marshfield

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
195936.344	510728.284	436.162

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243041
Date	10/31/2014
Start Time (UTC)	14:57
End Time (UTC)	17:05

Point Ties: BE04 – LC11 – LC15 – LC16 – NYET – NYIL – TW03 – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.026

PHOTOS:





Point ID	BE06
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Joes Pond

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
212745.603	521451.919	494.251

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18840890
Date	03-30-2015
Start Time (UTC)	14:16
End Time (UTC)	16:14

Point Ties: BE23 - LC17 - LC19 - LC39 - LC68 - LC71 - MERA - NYET - NYPB - PMTL - TW17 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	BE07
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Waterbury

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
206178.949	477129.464	137.147

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10663042
Date (MM-DD-YYY)	10-31-2014
Start Time (UTC)	18:51
End Time (UTC)	20:49

Point Ties: LC14 – LC22 – LC23 – LC24 – NYET – NYIL – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.015

PHOTOS:





Point ID	BE08
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	RICHMOND

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
210595.113	464130.385	97.081

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263350
Date	12-01-2014
Start Time (UTC)	12:26
End Time (UTC)	12:58

Point Ties: LC28BS – LC29 – NYIL – TW04 – VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.010
RMSE Z: 0.015

PHOTOS:





Point ID	BE09
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Juniper Island

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
209566.249	439099.124	68.491

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843352
Date	12/01/2014
Start Time (UTC)	15:13
End Time (UTC)	15:53

Point Ties: BE10 – LC30 – LC31BS – NYET – NYIL – NYPB – TW05 – VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.001
RMSE Z: 0.015

PHOTOS:





Point ID	BE10
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	ESSEX CENTER

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
222653.431	457975.193	153.757

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263352
Date	12-01-2014
Start Time (UTC)	15:16
End Time (UTC)	16:38

Point Ties: BE09 – LC30 – LC31BS – LC35 – NYET – NYIL – NYPB – TW05 – VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	BE11
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	LAMOILLE
Quad	STOWE

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
221549.400	480650.642	264.115

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263363 / 25263370
Date	12-02-2014 / 12-03-2014
Start Time (UTC)	20:45 / 15:07
End Time (UTC)	21:01 / 16:17

Point Ties: BE14 – LC36 – LC37 – LC43 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	BE12
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Stannard

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
227227.244	523632.398	532.852

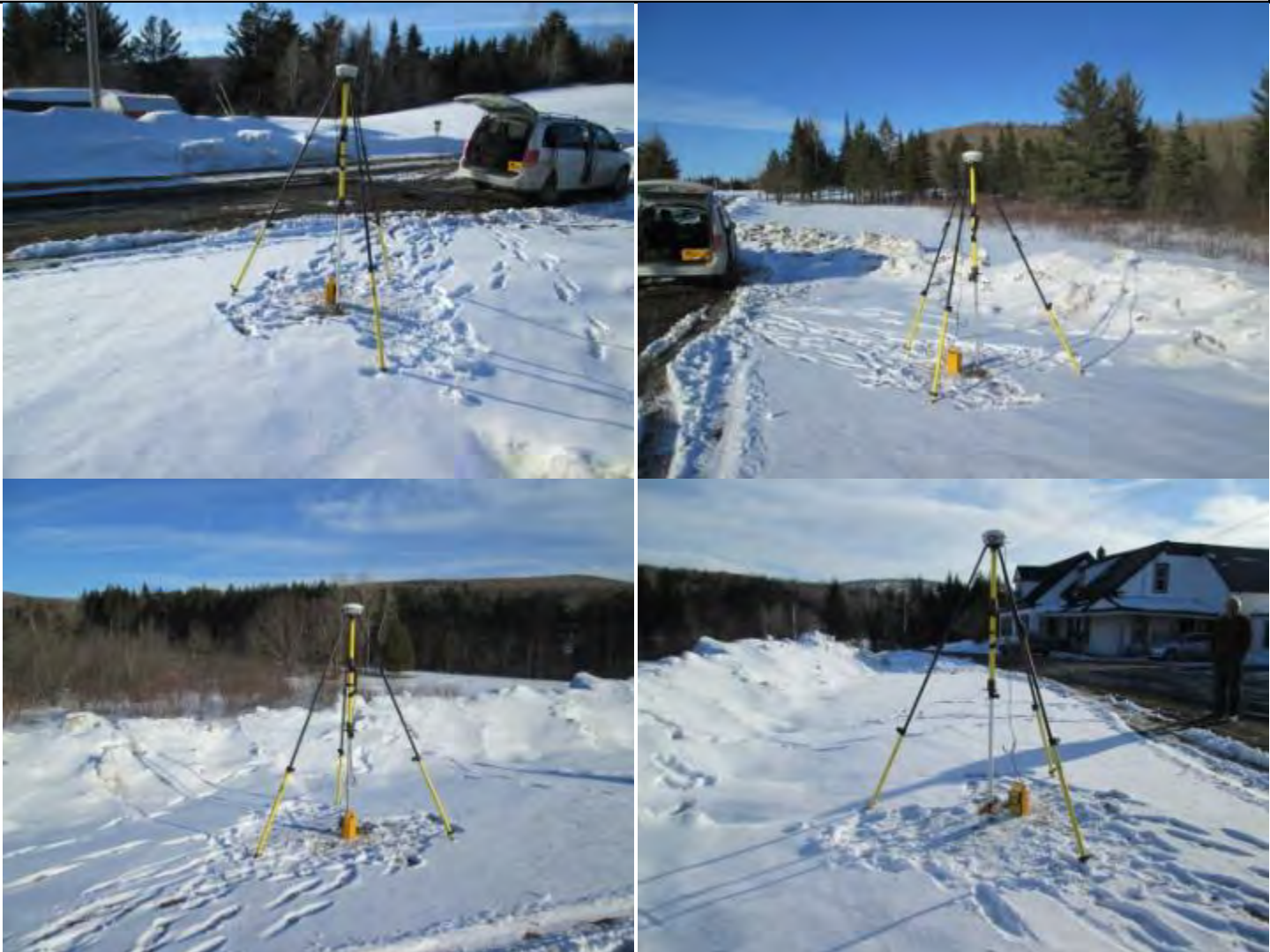
Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5046465718
Antenna Height	2.000 Meters

Static Session	57180900
Date	03-31-2015
Start Time (UTC)	19:57
End Time (UTC)	22:10

Point Ties: BE20 - LC40 - LC57 - LC60 - NYET - NYPB - TW09 - VCAP - VTC1 - VTD7 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.016

PHOTOS:





Point ID	BE13
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Lamoille
Quad	Wolcott

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
226416.106	503701.988	245.836

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183371
Date	12/03/2014
Start Time (UTC)	17:44
End Time (UTC)	19:23

Point Ties: BE14 – LC18 – LC42 – LC43 – NYET – NYIL – NYPB – TW10 – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	BE14
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Lamoille
Quad	Morrisville

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
228351.373	490765.708	198.426

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843370
Date	12/03/2014
Start Time (UTC)	15:47
End Time (UTC)	18:16

Point Ties: BE11 – BE13 – LC42 – LC43 – NYET – NYIL – NYPB – TW07 – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.016

PHOTOS:





Point ID	BE15
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITTENDEN
Quad	GEORGIA PLAINS

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
236432.616	441315.919	30.802

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763354
Date	12-01-2014
Start Time (UTC)	19:31
End Time (UTC)	21:04

Point Ties: LC33BS – LC46 – LC47 – NYET – NYIL – NYPB – TW12 – VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.025

PHOTOS:





Point ID	BE16
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Franklin
Quad	Milton

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
247955.020	456613.377	188.258

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183361
Date	12/02/2014
Start Time (UTC)	14:09
End Time (UTC)	15:28

Point Ties: LC48 – LC49 – LC50 – NYET – NYIL – NYPB – TW11 – TW13 – VCAP – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.027

PHOTOS:





Point ID	BE17
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	LAMOILLE
Quad	JEFFERSONVILLE

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
238481.738	471196.313	146.514

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763362
Date	12-02-2014
Start Time (UTC)	16:17
End Time (UTC)	18:08

Point Ties: LC44 – LC45 – LC50 – LC51 – NYET – NYIL – NYPB – TW11 – VCAP – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.020

PHOTOS:





Point ID	BE18
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	LAMOILE
Quad	JOHNSON

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
249794.514	484068.985	257.966

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10660830
Date	24 MAR 2015
Start Time (UTC)	1650
End Time (UTC)	1732

Point Ties: BE14 - BE19 - LC52 - LC54 - NYET - NYPB - TW14 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	BE19
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Lamoille
Quad	Eden

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
240743.949	491601.970	263.025

Operator	Bill Neville
Receiver Model	Leica GS15
Receiver S/N	0893
Antenna Height	2.000 Meters

Date	03-24-2015
Start Time (UTC)	1719
End Time (UTC)	1744

Point Ties: BE14 - BE18 - LC52 - LC54 - NYET - NYPB - TW14 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.009

PHOTOS:





Point ID	BE20
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	ALBANY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
239346.004	509239.711	378.996

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760900
Date	31 MAR 2015
Start Time (UTC)	1908
End Time (UTC)	2008

Point Ties: BE12 - LC57 - LC60 - NYET - NYPB - TW15 - VCAP - VTC1 - VTD9 - VTEB - VTIP - VTOX - VTRU - VTSA - VTSP

RMSE Hz: 0.006
RMSE Z: 0.009

PHOTOS:





Point ID	BE21
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Mount Worchester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
210944.363	495652.864	247.864

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243091
Date	11-05-2014
Start Time (UTC)	15:40
End Time (UTC)	19:17

Point Ties: LC20 – LC20BS – LC21 – LC38 – NYET – NYIL – NYPB – VCAP – VTC1 – VTD7
VTD9 – VTHA – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.017

PHOTOS:





Point ID	BE22
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	IRASBURG

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
252493.949	514041.099	263.292

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760881
Date	28 MAR 2015
Start Time (UTC)	1608
End Time (UTC)	1702

Point Ties: BE14 - LC39 - LC41 - LC61 - LC62 - NYET - NYPB - TW16 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP – VTUV

RMSE Hz: 0.006
RMSE Z: 0.009

PHOTOS:





Point ID	BE23
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	NOTH TROY STATION

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
276828.383	509092.056	185.343

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760890
Date	29 MAR 2015
Start Time (UTC)	1307
End Time (UTC)	1433

Point Ties: BE06 - LC17 - LC39 - LC68 - LC70 - LC71 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.013

PHOTOS:





Point ID	BE24
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orleans
Quad	Island Pond

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
258742.640	541605.819	354.074

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461067
Antenna Height	2.000 Meters

Static Session	10670892
Date	03-30-2015
Start Time (UTC)	18:22
End Time (UTC)	20:54

Point Ties: BE25 - LC63 - LC64 - LC65 - LC66 - LC68 - MERA - NYET - NYPB - PMTL - TW18 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.010

PHOTOS:





Point ID	BE25
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	WEST OF NORTON POINT OF ENTRY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
277352.581	542575.726	419.004

Operator	SAM
Receiver Model	TRIMBLE R8 - MODEL 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260893
Date	29 MAR 2015
Start Time (UTC)	1722
End Time (UTC)	1705

Point Ties: BE24 - LC63 - LC64 - LC65 - LC66 - LC67 - LC68 - MERA - NYET - NYPB - PMTL - TW18 - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.012

PHOTOS:





FORESTED POINT DATA SHEETS



Point ID	FO01
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	RUTLAND
Quad	ROCHESTOR

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
139524.638	474141.576	282.369

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	BE02
Back Sight PT	FOO1NEWBS
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO02
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ROCHESTOR
Quad	WINDSOR

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
141648.566	478884.825	240.231

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	FO2TP
Back Sight PT	LC04
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO03
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ROCHESTER
Quad	WINDSOR

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
147152.492	476710.991	261.021

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	TPFO3
Back Sight PT	LC02
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO04
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ADDISON
Quad	BREADLOAF

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
160116.383	463049.624	559.027

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	BE01A
Back Sight PT	LCO1A
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO05
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ADDISON
Quad	HANCOCK

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
164524.568	472518.497	299.620

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	F005TP
Back Sight PT	FO05BS
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO06
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORANGE
Quad	RANDOLPH

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
158457.159	486646.872	199.055

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	LC07
Back Sight PT	FO06BS
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO07
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	WASHINGTON

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
179428.861	505141.627	391.312

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TPFO7
Back Sight PT	LC10
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO08
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	MONTPELIER

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
195006.054	492315.359	158.933

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TPFO8
Back Sight PT	BSFO8
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO09
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	NORTHFIELD

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
188559.181	482578.486	430.640

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TPFO9
Back Sight PT	BE04
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO10
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	WATERBURY

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
205443.668	478571.774	135.750

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	TPFO10
Back Sight PT	LC23
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO11
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	MARSHFIELD

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
195960.107	510718.618	434.891

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	FO11TP
Back Sight PT	BSFO11
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO12
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	WOODBURY

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
210342.336	506754.866	286.919

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TPFO12
Back Sight PT	BSFO12
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO13
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	MOUNT WORCESTER

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
210992.407	495573.356	248.294

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	BE21
Back Sight PT	LC21
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO14
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	LAMOILLE
Quad	STOWE

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
221484.369	480598.797	262.003

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	BE11
Back Sight PT	LC37
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO15
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	RICHMOND

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
209913.799	464396.991	95.544

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	TPFO15
Back Sight PT	LC24
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO16
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	JUNIPER ISLAND

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
199393.716	440743.199	79.065

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	LC29BS
Back Sight PT	LC29
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO17
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	JUNIPER ISLAND

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
209504.113	439019.800	63.675

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	TPFO17
Back Sight PT	BSF017
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO18
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	ESSEX CENTER

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
222663.480	458006.937	153.092

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	BE10
Back Sight PT	LC35
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO19
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	GEORGIA PLAINS

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
236464.745	441335.325	29.400

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	BE15
Back Sight PT	LC47
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO20
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	COLCHESTER POINT

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
228503.617	436686.962	34.982

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18--2015
Occupy PT	LC33BS
Back Sight PT	LC33
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO21
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	FRANKLIN
Quad	MILTON

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
247941.264	456602.869	186.168

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	BE16
Back Sight PT	TW13
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO22
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	LAMOILLE
Quad	JOHNSON

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
249627.735	483973.481	265.128

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	LC52
Back Sight PT	BE18
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO23
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	LAMOILLE
Quad	JEFFERSONVILLE

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
238444.753	471186.207	146.842

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	BE17
Back Sight PT	LC51
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO24
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	LAMOILLE
Quad	EDEN

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
240655.840	491583.119	258.751

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	LC54
Back Sight PT	BE19
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO25
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	LAMOILLE
Quad	MORRISVILLE

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
228201.212	490961.607	209.990

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TPFO26
Back Sight PT	BSFO26
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO26
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	LAMOILLE
Quad	VOLCOTT

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
226325.787	503790.538	245.002

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TPFO26
Back Sight PT	BSFO26
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO27
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	CASPIAN LAKE

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
225244.754	516864.478	352.336

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	TPFO27
Back Sight PT	BSFO27
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO28
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ALBANY
Quad	ORLEANS

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
239177.169	509544.121	371.347

Operator	ZEKE INGRAM
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	04-18-2015
Occupy PT	TW15
Back Sight PT	BSFO28
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO29
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	IRASBURG

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
252647.181	514136.044	268.591

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	LC61
Back Sight PT	TW16
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO30
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	ISLAND POND

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
258737.978	541660.046	352.534

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	BE24
Back Sight PT	LC64
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO31
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	WEST OF NORTON POINT OF ENTRY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
277397.934	542586.069	415.085

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	LC66
Back Sight PT	BE25
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO32
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	North Troy Station

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
276764.513	509096.593	176.233

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	BE23
Back Sight PT	LC71
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO33
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	NEWPORT

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
270234.972	525189.641	275.462

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	FO33TP
Back Sight PT	LC68
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO32
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	NORTH TROY STATION

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
247760.108	500623.475	379.972

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	BE23
Back Sight PT	LC71
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO35
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	MT. ELLEN

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
191078.861	463834.978	456.107

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	TPFO35
Back Sight PT	BSFO35
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO36
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	CHITTENDEN
Quad	MT. PHILO

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
203338.364	449575.222	106.754

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	TPFO36
Back Sight PT	LC28BS
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO37
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	WARETBURY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
215442.518	450929.941	144.279

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	LC31
Back Sight PT	BSLC31
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO38
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ADDISON
Quad	BROOKFIELD

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
173887.319	491466.003	490.971

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-28-2015
Occupy PT	FO38TP
Back Sight PT	FO38BS
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO39
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	MARSHFIELD

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
208583.776	513007.493	275.563

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-26-2015
Occupy PT	FO39TP
Back Sight PT	BSLC18
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	FO40
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	JOES POND

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
212710.429	521437.859	496.365

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date (MM-DD-YYYY)	03-31-2015
Occupy PT	BE06
Back Sight PT	LC19
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





TALL WEEDS POINT DATA SHEETS



Point ID	TW01
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ROCHESTOR
Quad	WINDSOR

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
147632.684	476469.094	239.205

Operator	SAM
Receiver Model	Trimble R8 – Model 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10660861
Date	27 MAR 2015
Start Time (UTC)	1452
End Time (UTC)	1746

Point Ties: LC02 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.019

PHOTOS:





Point ID	TW02
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Roxbury

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
171724.027	480538.508	274.292

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243031
Date	10/30/14
Start Time (UTC)	16:06
End Time (UTC)	17:00

Point Ties: BE03 – LC06 – LC08 – NYET – NYIL – VCAP
VTOX – VTRU – VTSP

RMSE Hz: 0.008
RMSE Z: 0.027

PHOTOS:





Point ID	TW03
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Montpelier

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
195481.582	491019.408	155.235

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5106461066
Antenna Height	2.000 Meters

Static Session	10663041
Date	10-31-2014
Start Time (UTC)	16:36
End Time (UTC)	18:16

Point Ties: BE05 – LC13 – LC14 – LC15 – LC23 – NYET – NYIL – VCAP – VTD7
VTHA – VTOX – VTRU – VTUV

RMSE Hz: 0.007
RMSE Z: 0.020

PHOTOS:





Point ID	TW04
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	RICHMOND

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
210672.531	464184.089	97.031

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5133470976
Antenna Height	2.00 METERS

Static Session	09763350
Date	12-01-2014
Start Time (UTC)	12:32
End Time (UTC)	14:06

Point Ties: BE08 – LC28BS – LC29 – LC29BS – LC31 – NYET – NYIL – NYPB
VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.014

PHOTOS:





Point ID	TW05
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Juniper Island

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
209546.263	439194.558	72.797

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183352
Date	12/01/2014
Start Time (UTC)	15:38
End Time (UTC)	17:15

Point Ties: BE09 – BE10 – LC31BS – LC32 – LC35 – NYET – NYIL – NYPB – TW06
VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.015

PHOTOS:





Point ID	TW06
Project No.	22399
Project Name	EASTERN VT LIDAR
State	VERMONT
County	CHITENDEN
Quad	ESSEX CENTER

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
222654.250	457811.614	153.639

Operator	ZEKE INGRAM
Receiver Model	TRIMBLE R-8, MODEL 3
Receiver S/N	5136472526
Antenna Height	2.00 METERS

Static Session	25263353
Date	12-01-2014
Start Time (UTC)	16:48
End Time (UTC)	18:15

Point Ties: BE32 – LC33 – LC34 – LC35 – NYET – NYIL – NYPB – TW05
VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	TW07
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Lamoille
Quad	Stowe

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
221464.779	480820.105	262.879

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5108461884 / 5046455718
Antenna Height	2.0 m

Static Session	18843363 / 57183370
Date	12-02-2014 / 12-03-2014
Start Time (UTC)	19:57 / 15:06
End Time (UTC)	20:28 / 16:18

Point Ties: BE11 - BE14 – LC36 – LC37 – LC43 – NYET – NYIL – NYPB – VCAP – VTC1 – VTD7
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.006
RMSE Z: 0.015

PHOTOS:





Point ID	TW08
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	WASHINGTON
Quad	MARSHFIELD

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
208590.723	513141.430	270.294

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date	03-26-2015
Occupy PT	FO39TP
Back Sight PT	BSLC18
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	TW09
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Caledonia
Quad	Stannard

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
227284.427	523671.592	533.086

Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18840900
Date	03312015
Start Time (UTC)	21:08
End Time (UTC)	22:24

Point Ties: BE12 - LC40 - LC60 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.007
RMSE Z: 0.009

PHOTOS:





Point ID	TW10
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Lamoille
Quad	Wolcott

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
226759.969	503398.050	210.176

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843371
Date	12/03/2014
Start Time (UTC)	18:44
End Time (UTC)	19:38

Point Ties: BE13 – LC18 – LC42 – NYET – NYIL – NYPB – VCAP – VTC1
VTD9 – VTEB – VTHA – VTIP – VTOX – VTRU – VTSA - VTUV

RMSE Hz: 0.007
RMSE Z: 0.017

PHOTOS:





Point ID	TW11
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Lamoille
Quad	Jeffersonville

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
238434.518	472459.359	135.821

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843361
Date	12-02-2014
Start Time (UTC)	14:57
End Time (UTC)	16:44

Point Ties: BE16 – BE17 – LC49 – LC50 – LC51 – NYET – NYIL – NYPB – VCAP – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.020

PHOTOS:





Point ID	TW12
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Chittenden
Quad	Colchester

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
236034.576	443490.500	35.537

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 3
Receiver S/N	5046455718
Antenna Height	2.0m

Static Session	57183354 / 57183360
Date	12-01-2014 / 12-02-2014
Start Time (UTC)	20:09 / 12:16
End Time (UTC)	20:52 / 13:32

Point Ties: BE15 – LC33BS – LC47 – LC48 – NYET – NYIL – NYPB – TW13
VCAP – VTC1 – VTD7 - VTD9

RMSE Hz: 0.006
RMSE Z: 0.024

PHOTOS:





Point ID	TW13
Project No.	22399
Project Name	Eastern Vermont LiDAR
State	Vermont
County	Franklin
Quad	Milton

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
247970.916	456695.585	190.999

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model
Receiver S/N	5108461884
Antenna Height	2.0m

Static Session	18843360
Date	12-02-2014
Start Time (UTC)	13:01
End Time (UTC)	14:27

Point Ties: BE16 – LC47 – LC48 – LC49 – NYET – NYIL – NYPB – TW12 – VCAP – VTD7 - VTD9

RMSE Hz: 0.007
RMSE Z: 0.027

PHOTOS:





Point ID	TW14
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	LAMOILE
Quad	JOHNSON

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

Coordinate System
NAD83(2011)
SPCS - Vermont (4400)
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
249461.380	483003.619	240.673

Operator	SAM
Receiver Model	Trimble R8 – Model 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760830
Date	24 MAR 2015
Start Time (UTC)	1702
End Time (UTC)	1845

Point Ties: BE18 - BE19 - LC52 - LC53 - LC54 - LC55 - LC56

RMSE Hz: 0.007
RMSE Z: 0.011

PHOTOS:





Point ID	TW15
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	WASHINGTON
Quad	ALBANY

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

Coordinate System	
	NAD83(2011)
	SPCS - Vermont (4400)
	NAVD88
	GEOID12A
	Meters

Northing	Easting	Elevation
239166.444	509509.012	371.874

Operator	SAM
Receiver Model	Trimble R8 – Model 3
Receiver S/N	5108461884
Antenna Height	2.000 Meters

Static Session	18841071
Date	17 APRIL 2015
Start Time (UTC)	1632
End Time (UTC)	1732

Point Ties: BE20 - VCAP - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	TW16
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	IRASBURG

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
252620.712	514123.737	267.934

Operator	SAM
Receiver Model	Trimble R8 – Model 3
Receiver S/N	5135472526
Antenna Height	2.000 Meters

Static Session	25260882
Date	28 MAR 2015
Start Time (UTC)	1641
End Time (UTC)	1800

Point Ties: BE14 - BE22 - LC41 - LC58 - LC62 - NYET - NYPB - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.013

PHOTOS:





Point ID	TW17
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	ORLEANS
Quad	NOTH TROY STATION

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
276846.949	509597.076	197.400

Operator	SAM
Receiver Model	Trimble R8 – Model 3
Receiver S/N	5133470976
Antenna Height	2.000 Meters

Static Session	09760891
Date	29 MAR 2015
Start Time (UTC)	1438
End Time (UTC)	1610

Point Ties: BE06 - LC17 - LC19 - LC39 - LC68 - LC71 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:





Point ID	TW18
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orleans
Quad	Island Pond

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
258757.023	541525.149	351.968

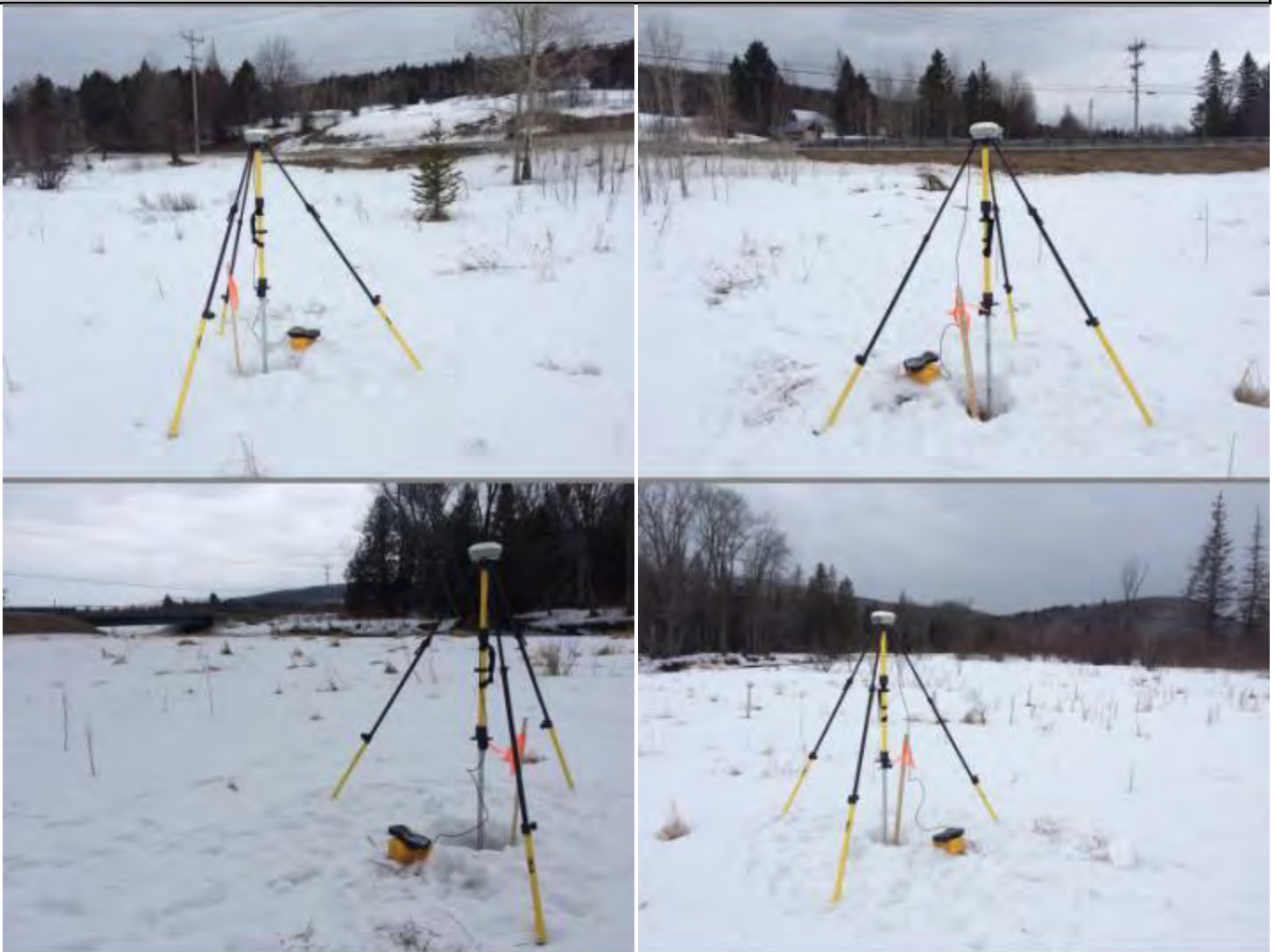
Operator	DI
Receiver Model	Trimble R8 Model 3
Receiver S/N	5046465718
Antenna Height	2.000 Meters

Static Session	57180892
Date	03302015
Start Time (UTC)	19:57
End Time (UTC)	21:10

Point Ties: BE24 - BE25 - LC64 - LC65 - LC68 - MERA - NYET - NYPB - PMTL - VCAP - VTC1 - VTD7 - VTD9 - VTEB - VTHA - VTIP - VTOX - VTRU - VTSA - VTSP - VTUV

RMSE Hz: 0.008
RMSE Z: 0.017

PHOTOS:





Point ID	TW19
Project No.	23299
Project Name	EASTERN VERMONT
State	VERMONT
County	ORLEANS
Quad	WEST OF NORTON POINT OF ENTRY

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
277350.052	542598.955	417.825

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date	03-31-2015
Occupy PT	LC66
Back Sight PT	BE25
RMSE Hz	0.010
RMSE Z	0.020

PHOTOS:





Point ID	TW20
Project No.	22399
Project Name	Eastern VT LiDAR
State	Vermont
County	Orange
Quad	Washington

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

Coordinate System	
NAD83(2011)	
SPCS - Vermont (4400)	
NAVD88	
GEOID12A	
Meters	

Northing	Easting	Elevation
177546.540	504315.691	465.851

Operator	Kevin Chapman
Receiver Model	Trimble R8 Model 4
Receiver S/N	5329440824
Antenna Height	2.000 Meters

Static Session	08243032
Date	10/30/2014
Start Time (UTC)	18:26
End Time (UTC)	19:27

Point Ties: LC08 - LC09 - NYET - NYIL - VCAP - VTOX - VTRU - VTSP

RMSE Hz: 0.006
RMSE Z: 0.011

PHOTOS:



Appendix D

Tall Weeds QAQC Point Issues

Review of the Tall Weeds points in Eastern Vermont LiDAR Task Order – USGS Task Order G14PD00971

During final FVA/SVA/CVA analysis at the completion of the task order, it was observed that two tall weed (TW) QA control check points exhibited a higher residual elevation difference between the survey value and corresponding derived LiDAR bare earth surface value. The inclusion of these two TW points in overall accuracy computations resulted in a SVA for the TW category of 35.1cm and CVA of 31.5cm at the 95th percentile. For this task order the SVA target for the tall weeds category and CVA required accuracy is 26.9cm at the 95th percentile. This triggered additional review by a senior LiDAR technician and LiDAR processing manager to ascertain the cause of higher elevation residuals for tall weeds points TW08 and TW14. This summary report below describes our opinion of the cause and our approach to its resolution.

The control survey campaign for the task order was conducted over two windows, Fall 2014 and Winter/Spring 2015. The survey for these two points was completed in March, 2015. At the time of survey in March 2015, snow cover present at that time covered tall weed growth that had died and was compressed over the course of the winter due to record snow fall. This is illustrated in the survey point pictures shown below. Crews selected these locations using a combination of advanced recon in the fall prior to survey and using Google Earth; and at that time these point locations did have tall weed growth present. Survey team's observation of true bare earth at these locations was not adversely impacted by the presence of snow. Conversely, the LiDAR collection for this task order was accomplished over three acquisition windows, Fall 2014, Spring 2015 and Fall 2015. The acquisition of LiDAR covering these two tall weed point locations was completed in late October, 2015 when tall weed vegetation had regenerated at these locations as illustrated in the LiDAR surface and cross section views below as well as in Google Earth imagery that was obtained in the spring and fall of 2015 prior to the LiDAR mission.

All tall weed points (TW) were reviewed to check for any potential bias or problem within the collection/analysis of these points. Additionally, LiDAR calibration and QAQC points in the vicinity of these points were also reviewed to ensure no systematic bias in these areas. In both cases, these points were found to have dZ values close to 0.0.

The final review found that points TW08 and TW14 exhibited higher degree elevation surface "roughness" in the final bare earth surface (when compared to other tall weed point locations). This was caused by vegetation density that impeded the acquisition of sufficient ground returns that would have minimized the variability of the bare earth surface at these locations and enabled a more accurate representation of true bare earth when compared against corresponding survey values. Therefore, the comparison of LiDAR derived bare earth elevations to survey control at these two locations cannot be accurately represented and we have removed from them from SVA/CVA analysis.

Control Report page for TW08

Point ID	TW08	Aerial Target	Coordinate System
Project No.	23299	LIDAR Ground Control	NAD83(2011)
Project Name	EASTERN VERMONT	X LIDAR QC Point	SPCS - Vermont (4400)
State	VERMONT	New Control	NAVD88
County	WASHINGTON	Photo ID	GEOID12A
Quad	MARSHFIELD	Published Control	Meters

Northing	Easting	Elevation
208590.723	513141.430	270.294

Operator	STEVE MILLER
Instrument Model	Trimble M3 2"
Date	03-26-2015
Occupy PT	FO39TP
Back Sight PT	BSLC18
RMSE Hz	0.010
RMSE Z	0.020



Control Report page for TW14

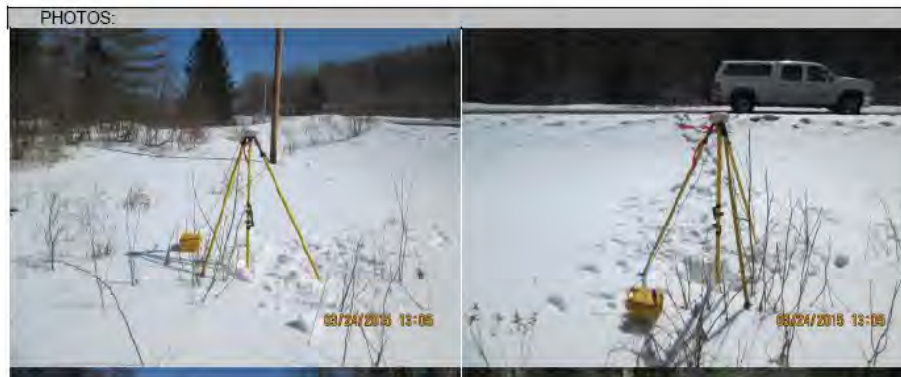
Point ID	TW14	Aerial Target	Coordinate System
Project No.	22399	LIDAR Ground Control	NAD83(2011)
Project Name	Eastern VT LIDAR	X LIDAR QC Point	SPCS - Vermont (4400)
State	Vermont	New Control	NAVD88
County	LAMOILE	Photo ID	GEOID12A
Quad	JOHNSON	Published Control	Meters

Northing	Easting	Elevation
249461.380	483003.619	240.673

Operator	SAM	Static Session	09760830
Receiver Model	Trimble R8 - Model 3	Date	24 MAR 2015
Receiver S/N	5133470976	Start Time (UTC)	1702
Antenna Height	2.000 Meters	End Time (UTC)	1845

Point Ties: BE18 - BE19 - LC52 - LC53 - LC54 - LC55 - LC56

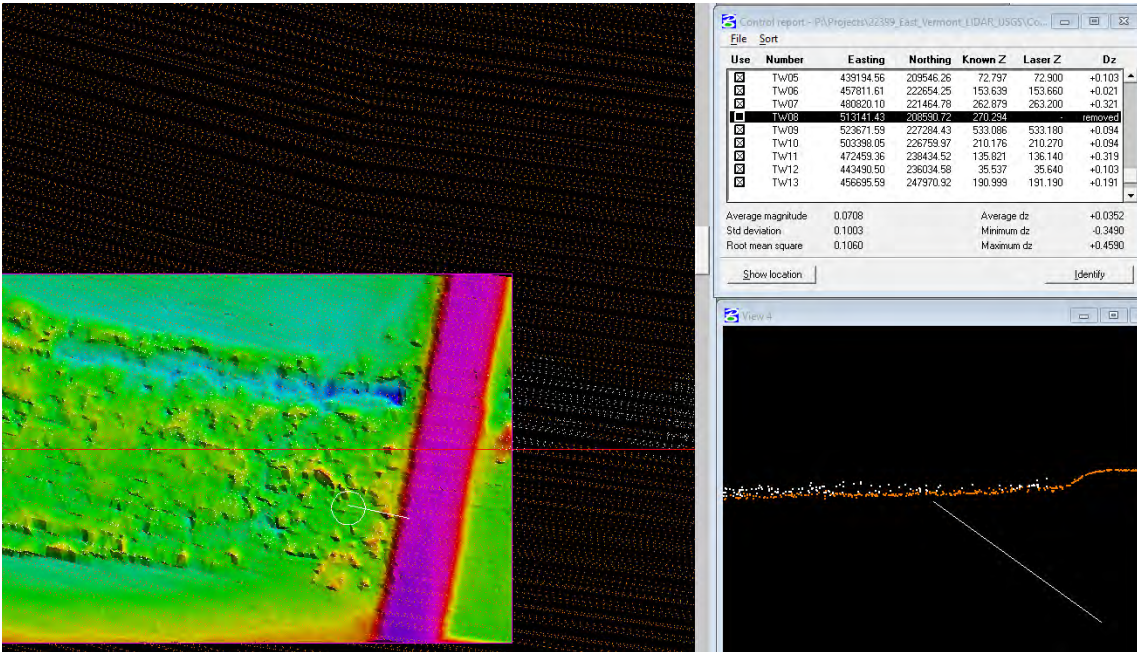
RMSE Hz: 0.007
RMSE Z: 0.011



Analysis of TW08 / TW14

In reviewing both the full point cloud surface and the Class 2 surface, it was determined that there was a limited number of points were truly hitting the bare earth surface. The points that were classified to Class 2 (Ground) are not a true representation of the bare earth surface. In both of these cases, the amount of vegetation in the general vicinity of the QA point is limiting the number of points hitting the ground surface. The surface model screen captures for both points show this in the roughness of the area surrounding the QA point.

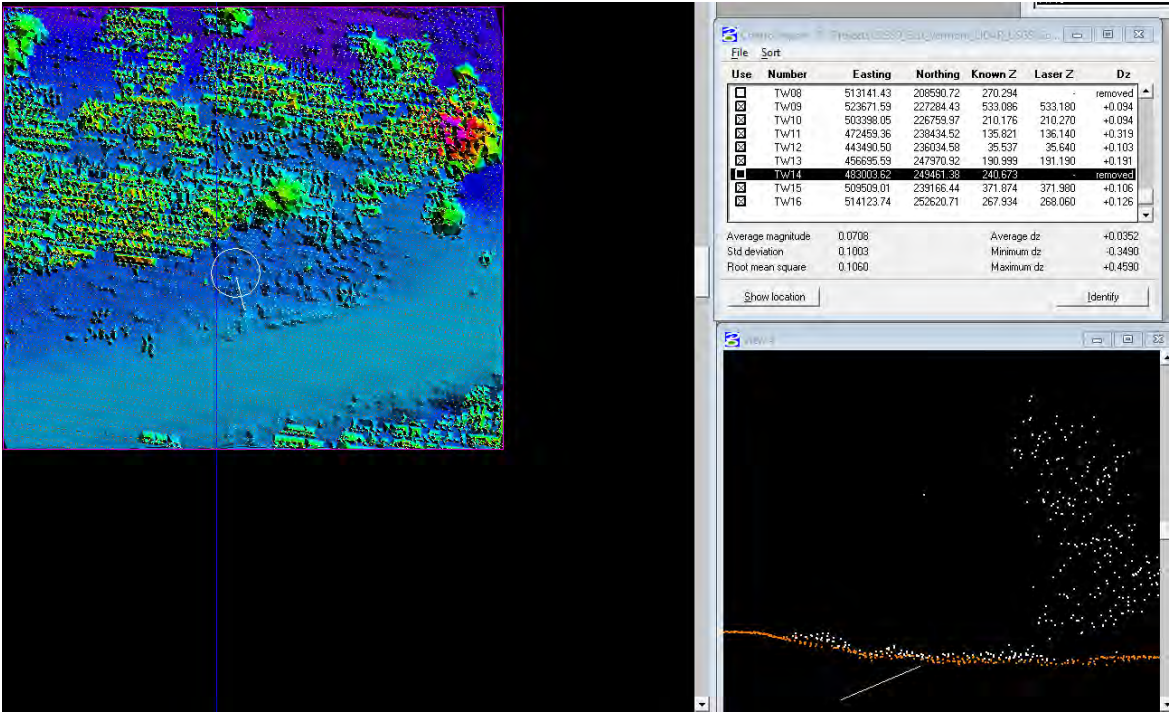
LIDAR Surface/Profile view of TW8



Google Earth imagery taken approximately 4 weeks prior to LIDAR collection



LIDAR Surface/Profile view of TW14



Google Earth imagery taken approximately 6 months prior to LIDAR collection

