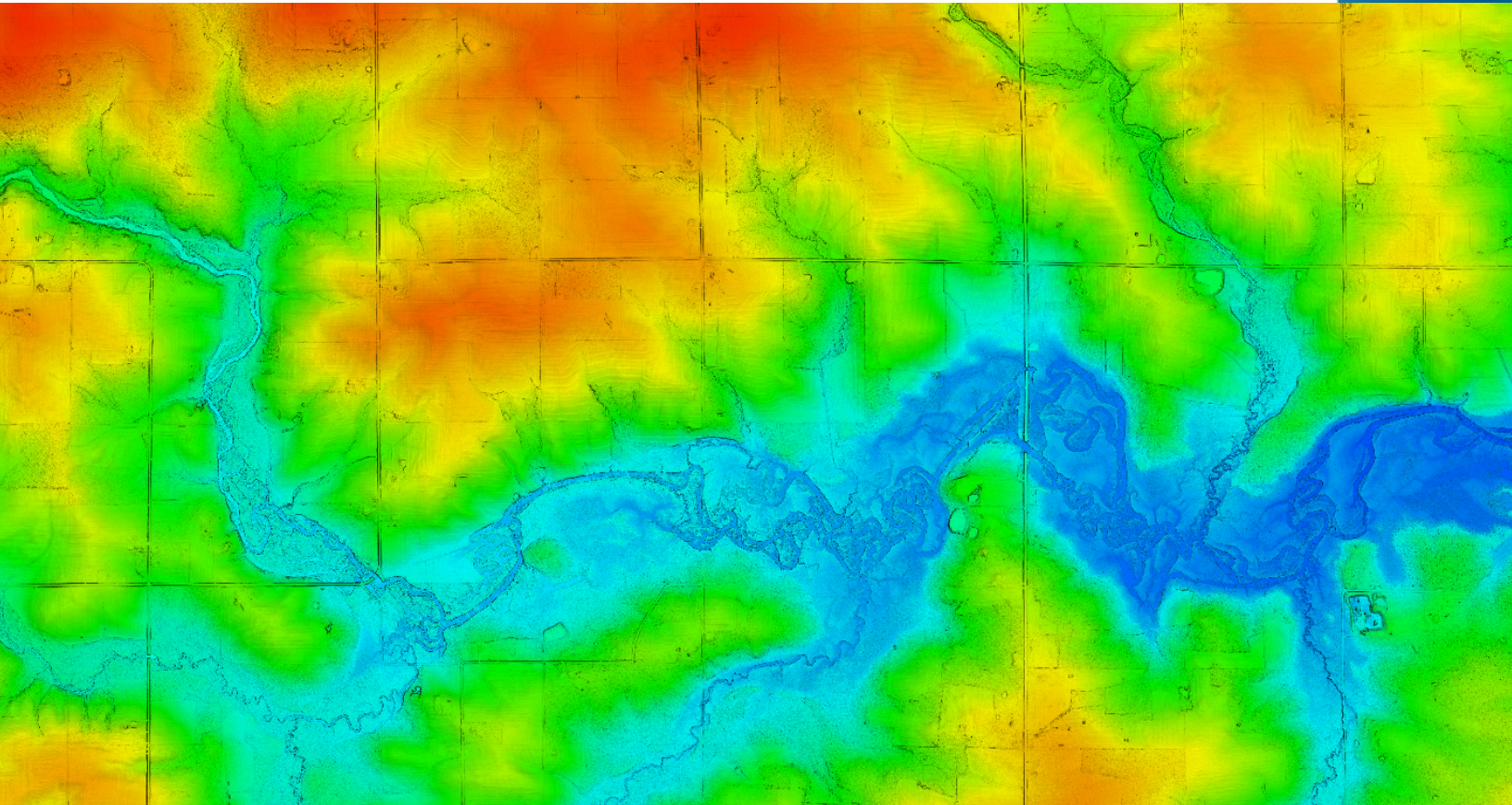


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37876_WI_Statewide_2021_B21 LIDAR PROCESSING REPORT

2022

Submitted: November 4, 2022

Project ID: 218064
Work Unit: 300035

Prepared for:



National Map Help Desk: tnm_help@usgs.gov

Prepared by:



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Appendix A: Flight Logs

1. Summary / Scope

1.1. Summary

This report contains a summary of the 37876_WI_Statewide_2021_B21, Work Unit 300035 lidar acquisition task order, issued by USGS under their Contract G16PC00016 on April 8, 2021. The task order yielded a project area covering 6,730 square miles across 8 counties in Wisconsin with work unit 300035 accounting for 595 square miles in Richland. The intent of this document is only to provide specific validation information for the data acquisition/collection, processing, and production of deliverables completed as specified in the task order.

1.2. Scope

Aerial topographic lidar was acquired using state of the art technology along with the necessary surveyed ground control points (GCPs) and airborne GPS and inertial navigation systems. The aerial data collection was designed with the following specifications listed in Table 1 below.

Table 1. Originally Planned Lidar Specifications

Average Point Density	Flight Altitude (AGL)	Field of View	Minimum Side Overlap	RMSEz
2 pts / m ²	2,300 m	60°	20%	≤ 10 cm

1.3. Coverage

The project boundary covers 595 square miles over Wisconsin. Project extents are shown in Figure 1.

1.4. Duration

Lidar data was acquired from March 29, 2021 to April 1, 2021 in 3 total lifts. See “Section: 2.4. Time Period” for more details.

1.5. Issues

There were no issues to report.

37876_WI_Statewide_2021_B21 Work Unit 300035 Projected Coordinate System: NAD_1983_2011_WISCRS_Richland_Feet Horizontal Datum: NAD83 (2011) Vertical Datum: NAVD88 (GEOID 18) Units: US Survey Feet	
Lidar Point Cloud	Classified Point Cloud in .LAS 1.4 format
Rasters	<ul style="list-style-type: none"> 2-foot Hydro-flattened Bare Earth Digital Elevation Model (DEM) in GeoTIFF format 2-foot Intensity images in GeoTIFF format
Vectors	Shapefiles (*.shp) <ul style="list-style-type: none"> Project Boundary Lidar Tile Index Calibration and QC Checkpoints (NVA/VVA) Continuous Hydro-flattened Breaklines
Reports	Reports in PDF format <ul style="list-style-type: none"> Focus on Delivery Focus on Accuracy Survey Report Processing Report
Metadata	XML Files (*.xml) <ul style="list-style-type: none"> Breaklines Classified Point Cloud DEM Intensity Imagery

37876_WI_Statewide_2021_B21 Richland Work Unit 300035 Boundary

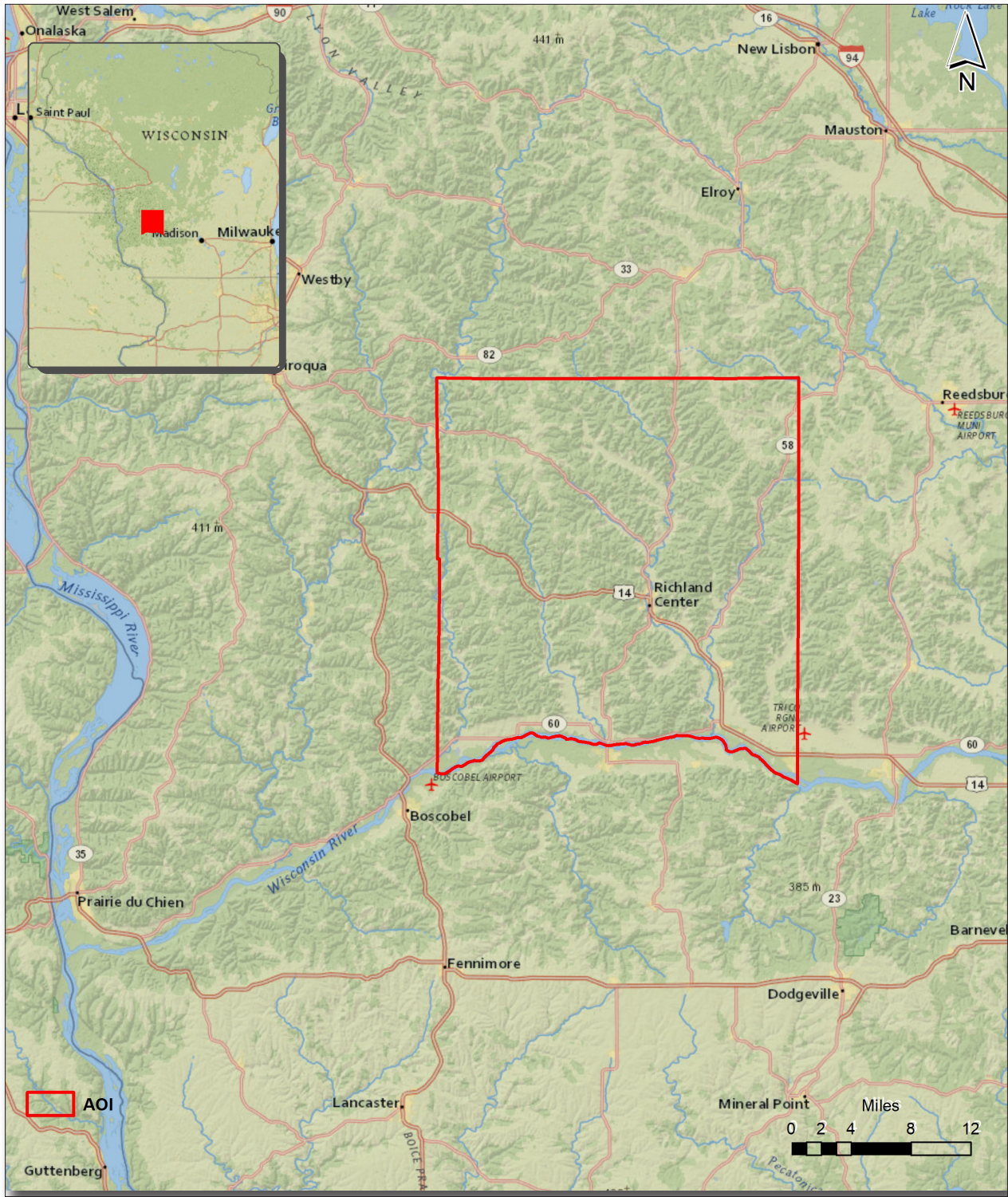


Figure 1. Work Unit Boundary

2. Planning / Equipment

2.1. Flight Planning

Flight planning was based on the unique project requirements and characteristics of the project site. The basis of planning included: required accuracies, type of development, amount / type of vegetation within project area, required data posting, and potential altitude restrictions for flights in project vicinity.

Detailed project flight planning calculations were performed for the project using RiParameter planning software.

2.2. Lidar Sensor

NV5 Geospatial utilized Riegl lidar sensors (Figure 2), serial number(s) 4040 for data acquisition.

The Riegl 1560i system has a laser pulse repetition rate of up to 2 MHz resulting in more than 1.3 million measurements per second. The system utilizes a Multi-Pulse in the Air option (MPIA). The sensor is also equipped with the ability to measure up to an unlimited number of targets per pulse from the laser.

A brief summary of the aerial acquisition parameters for the project are shown in the lidar System Specifications in Table 2.

Table 2. Lidar System Specifications

		Riegl VQ1560i (SN4040)
Terrain and Aircraft Scanner	Flying Height	2300 m
	Recommended Ground Speed	180 kts
Scanner	Field of View	58.5°
	Scan Rate Setting Used	2 x 160 Hz
Laser	Laser Pulse Rate Used	1000 kHz
	Multi Pulse in Air Mode	yes
Coverage	Full Swath Width	2577 m
	Line Spacing	0.558 m
Point Spacing and Density	Average Point Spacing	0.71 m
	Average Point Density	2 x 1.16 pts / m ²

Figure 2. Riegl VQ1560i



2.3. Aircraft

All flights for the project were accomplished through the use of customized planes. Plane type and tail numbers are listed below.

Lidar Collection Planes

- Cessna Conquest 2, Tail Number(s): N441CJ

These aircraft provided an ideal, stable aerial base for lidar acquisition. These aerial platforms have relatively fast cruise speeds, which are beneficial for project mobilization / demobilization while maintaining relatively slow stall speeds, proving ideal for collection of high-density, consistent data posting using a state-of-the-art Riegl VQ1560i, VQ1560ii, LMS-Q1560 lidar systems. Some of NV5 Geospatial's operating aircraft can be seen in Figure 3 below.

Figure 3. Some of NV5 Geospatial's Planes



2.4. Time Period

Project specific flights were conducted between March 29, 2021 to April 1, 2021. Three aircraft lifts were completed. Accomplished lifts are listed below.

Lift	Start UTC	End UTC
03292021A (SN4040,N441CJ)	3/29/2021 1:31:58 PM	3/29/2021 4:12:17 PM
03292021B (SN4040,N441CJ)	3/29/2021 7:45:44 PM	3/29/2021 10:24:59 PM
04012021B (SN4040,N441CJ)	4/01/2021 2:38:51 PM	4/01/2021 6:19:37 PM

3. Processing Summary

3.1. Flight Logs

Flight logs were completed by Lidar sensor technicians for each mission during acquisition. These logs depict a variety of information, including:

- Job / Project #
- Flight Date / Lift Number
- FOV (Field of View)
- Scan Rate (HZ)
- Pulse Rate Frequency (Hz)
- Ground Speed
- Altitude
- Base Station
- PDOP avoidance times
- Flight Line #
- Flight Line Start and Stop Times
- Flight Line Altitude (AMSL)
- Heading
- Speed
- Returns
- Crab

Notes: (Visibility, winds, ride, weather, temperature, dew point, pressure, etc). Project specific flight logs for each sortie are available in Appendix A.

3.2. Lidar Processing

Applanix + POSPac software was used for post-processing of airborne GPS and inertial data (IMU), which is critical to the positioning and orientation of the lidar sensor during all flights. Applanix POSPac combines aircraft raw trajectory data with stationary GPS base station data yielding a “Smoothed Best Estimate Trajectory” (SBET) necessary for additional post processing software to develop the resulting geo-referenced point cloud from the lidar missions.

During the sensor trajectory processing (combining GPS & IMU datasets) certain statistical graphs and tables are generated within the Applanix POSPac processing environment which are commonly used as indicators of processing stability and accuracy. This data for analysis include: max horizontal / vertical GPS variance, separation plot, altitude plot, PDOP plot, base station baseline length, processing mode, number of satellite vehicles, and mission trajectory.

Point clouds were created using the RiPROCESS software. The generated point cloud is the mathematical three dimensional composite of all returns from all laser pulses as determined from the aerial mission. The point cloud is imported into GeoCue distributive processing software. Imported data is tiled and then calibrated using TerraMatch and proprietary software. Using TerraScan, the vertical accuracy of the surveyed ground control is tested and any bias is removed from the data. TerraScan and TerraModeler software packages are then used for automated data classification and manual cleanup. The data are manually reviewed and any remaining artifacts removed using functionality provided by TerraScan and TerraModeler.

DEMs and Intensity Images are then generated using proprietary software. In the bare earth surface model, above-ground features are excluded from the data set. Global Mapper is used as a final check of the bare earth dataset.

Finally, proprietary software is used to perform statistical analysis of the LAS files.

Software	Version
Applanix + POSPac	8.6
RiPROCESS	1.8.6
GeoCue	2020.1.22.1
Global Mapper	19.1;20.1
TerraModeler	21.008
TerraScan	21.016
TerraMatch	21.007

3.3. LAS Classification Scheme

The classification classes are determined by Lidar Base Specifications 2020, Revision A and are an industry standard for the classification of lidar point clouds. All data starts the process as Class 1 (Unclassified), and then through automated classification routines, the classifications are determined using TerraScan macro processing.

The classes used in the dataset are as follows and have the following descriptions:

Table 3. LAS Classifications

	Classification Name	Description
1	Processed, but Unclassified	Laser returns that are not included in the ground class, or any other project classification
2	Bare earth	Laser returns that are determined to be ground using automated and manual cleaning algorithms
7	Low Noise	Laser returns that are often associated with scattering from reflective surfaces, or artificial points below the ground surface
9	Water	Laser returns that are found inside of hydro features
17	Bridge Deck	Laser returns falling on bridge decks
18	High Noise	Laser returns that are often associated with birds or artificial points above the ground surface
20	Ignored Ground	Ground points that fall within the given threshold of a collected hydro feature.

3.4. Classified LAS Processing

The bare earth surface is then manually reviewed to ensure correct classification on the Class 2 (Ground) points. After the bare- earth surface is finalized; it is then used to generate all hydro-breaklines through heads-up digitization.

All ground (ASPRS Class 2) lidar data inside of the Lake Pond and Double Line Drain hydro flattening breaklines were then classified to water (ASPRS Class 9) using proprietary tools. A buffer of 3 feet was also used around each hydro flattened feature to classify these ground (ASPRS Class 2) points to Ignored ground (ASPRS Class 20). All Lake Pond Island and Double Line Drain Island features were checked to ensure that the ground (ASPRS Class 2) points were reclassified to the correct classification after the automated classification was completed.

Any noise that was identified either through manual review or automated routines was classified to the appropriate class (ASPRS Class 7 and/or ASPRS Class 18) followed by flagging with the withheld bit.

All data was manually reviewed and any remaining artifacts removed using functionality provided by TerraScan and TerraModeler. Global Mapper is used as a final check of the bare earth dataset. GeoCue was then used to create the deliverable industry-standard LAS files for all point cloud data. NV5 Geospatial's proprietary software was used to perform final statistical analysis of the classes in the LAS files, on a per tile level to verify final classification metrics and full LAS header information.

3.5. Hydro-Flattened Breakline Processing

Class 2 lidar was used to create a bare earth surface model. The surface model was then used to heads-up digitize 2D breaklines of Inland Streams and Rivers with a 100 foot nominal width and Inland Ponds and Lakes of 2 acres or greater surface area.

Elevation values were assigned to all Inland streams and rivers using NV5 Geospatial's proprietary software.

All ground (ASPRS Class 2) lidar data inside of the collected inland breaklines were then classified to water (ASPRS Class 9) using TerraScan macro functionality. A buffer of 3 feet was also used around each hydro-flattened feature. These points were moved from ground (ASPRS Class 2) to Ignored Ground (ASPRS Class 20).

The breakline files were then translated to Esri file geodatabase format using Esri conversion tools.

Breaklines are reviewed against lidar intensity imagery to verify completeness of capture. All breaklines are then compared to TINs (triangular irregular networks) created from ground only points prior to water classification. The horizontal placement of breaklines is compared to terrain features and the breakline elevations are compared to lidar elevations to ensure all breaklines match the lidar within acceptable tolerances. Some deviation is expected between breakline and lidar elevations due to monotonicity, connectivity, and flattening rules that are enforced on the breaklines. Once completeness, horizontal

placement, and vertical variance is reviewed, all breaklines are reviewed for topological consistency and data integrity using a combination of Esri Data Reviewer tools and proprietary tools.

3.6. Hydro-Flattened Raster DEM Processing

Hydro-Flattened DEMs (topographic) represent a lidar-derived product illustrating the grounded terrain and associated breaklines (as described above) in raster form. NV5 Geospatial’s proprietary software was used to take all input sources (bare earth lidar points, bridge and hydro breaklines, etc.) and create a Triangulated Irregular Network (TIN) on a tile-by-tile basis. Data extending past the tile edge is incorporated in this process so that proper triangulation can occur. From the TIN, linear interpolation is used to calculate the cell values for the raster product. The raster product is then clipped back to the tile edge so that no overlapping cells remain across the project area. A 32-bit floating point GeoTIFF DEM was generated for each tile with a pixel size of 2-foot. NV5 Geospatial’s proprietary software was used to write appropriate horizontal and vertical projection information as well as applicable header values into the file during product generation. Each DEM is reviewed in Global Mapper to check for any surface anomalies and to ensure a seamless dataset. NV5 Geospatial ensures there are no void or no-data values (-999999) in each derived DEM. This is achieved by using propriety software checking all cell values that fall within the project boundary. NV5 Geospatial uses a proprietary tool called FOCUS on Delivery to check all formatting requirements of the DEMs against what is required before final delivery.

3.7. Swath Separation Raster Processing

Swath Separation Images are rasters that represent the interswath alignment between flight lines and provide a qualitative evaluation of the positional quality of the point cloud. NV5 Geospatial proprietary software generated 2-foot raster images in GeoTIFF format using last returns, excluding points flagged with the withheld bit, and using a point-in-cell algorithm. Images are generated with a 75% intensity opacity and (4) absolute 8-cm intervals, see below for interval coloring. Intensity images are linearly scaled to a value range specific to the project area to standardize the images and reduce differences between individual tiles. Appropriate horizontal projection information as well as applicable header values are written to the file during product generation. NV5 Geospatial uses a proprietary tool called FOCUS on Delivery to check all formatting requirements of the images against what is required before final delivery.

	0-8cm
	8-16cm
	16-24cm
	>24cm

3.8. Maximum Surface Height Raster Processing

Maximum Surface Height rasters (topographic) represent a lidar-derived product illustrating natural and built-up features. NV5 Geospatial’s proprietary software was used to take all first-return classified lidar points, excluding those flagged with a withheld bit, and create a Triangulated Irregular Network (TIN) on a tile-by-tile basis. Data extending past the tile edge is incorporated in this process so that proper triangulation can occur. From the TIN, linear interpolation is used to calculate the cell values for the raster product. The raster product is then clipped back to the tile edge so that no overlapping cells remain across the project area. A 32-bit floating point GeoTIFF was generated for each tile with a pixel size of 2-foot. NV5 Geospatial’s proprietary software was used to write appropriate horizontal and vertical projection information as well as applicable header values into the file during product generation. Each maximum surface height raster is reviewed in Global Mapper to check for any anomalies and to ensure a seamless dataset. NV5 Geospatial ensures there are no void or no-data values (-999999) in each derived raster. This is achieved by using proprietary software checking all cell values that fall within the project boundary. NV5 Geospatial uses a proprietary tool called FOCUS on Delivery to check all formatting requirements of the DEMs against what is required before final delivery.

37876_WI_Statewide_2021_B21 Richland Work Unit 300035 Tile Layout

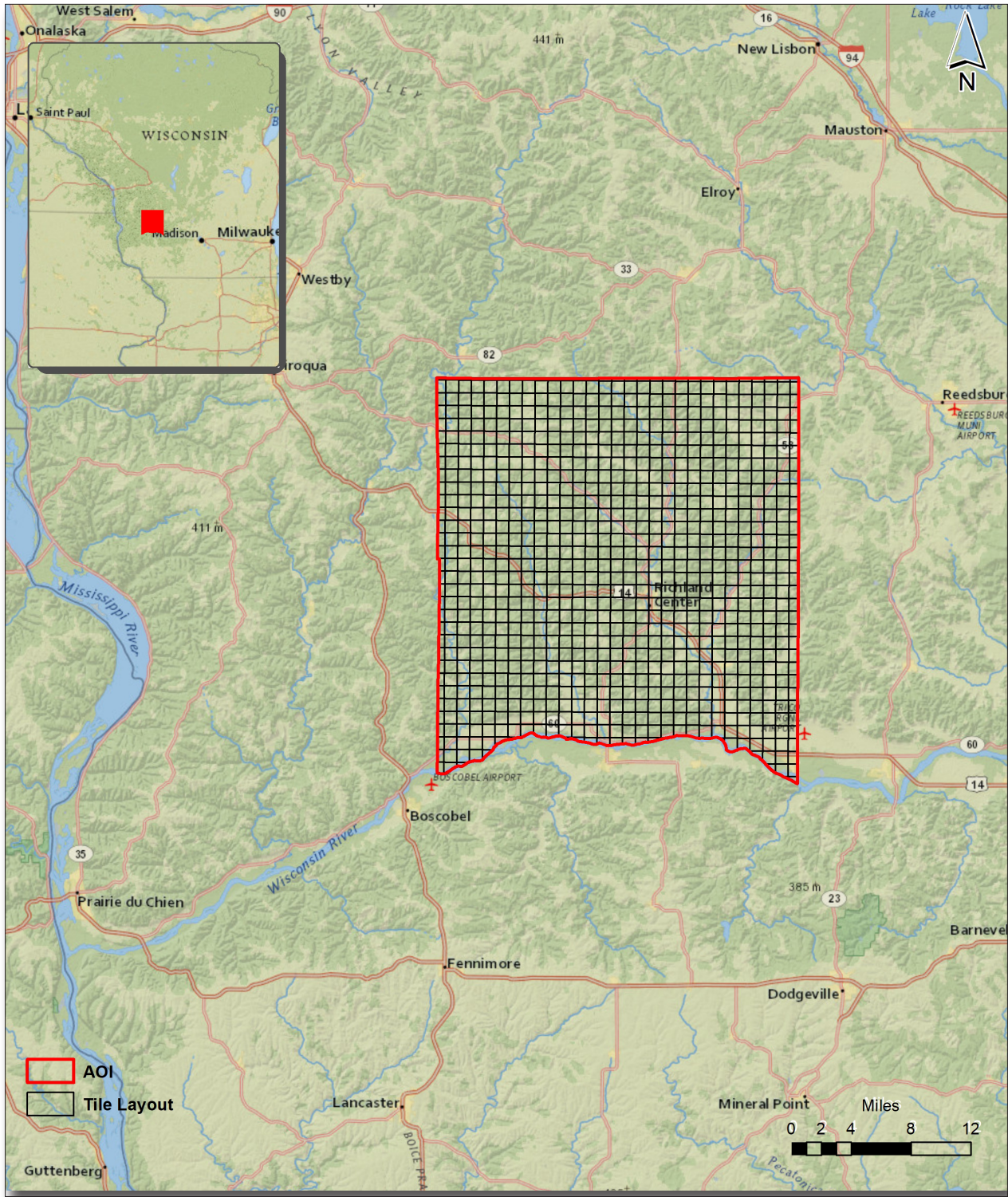


Figure 4. Lidar Tile Layout

4. Project Coverage Verification

Coverage verification was performed by comparing coverage of processed .LAS files captured during project collection to generate project shape files depicting boundaries of specified project areas. Please refer to Figure 5.

37876_WI_Statewide_2021_B21 Richland Work Unit 300035 Lidar Coverage

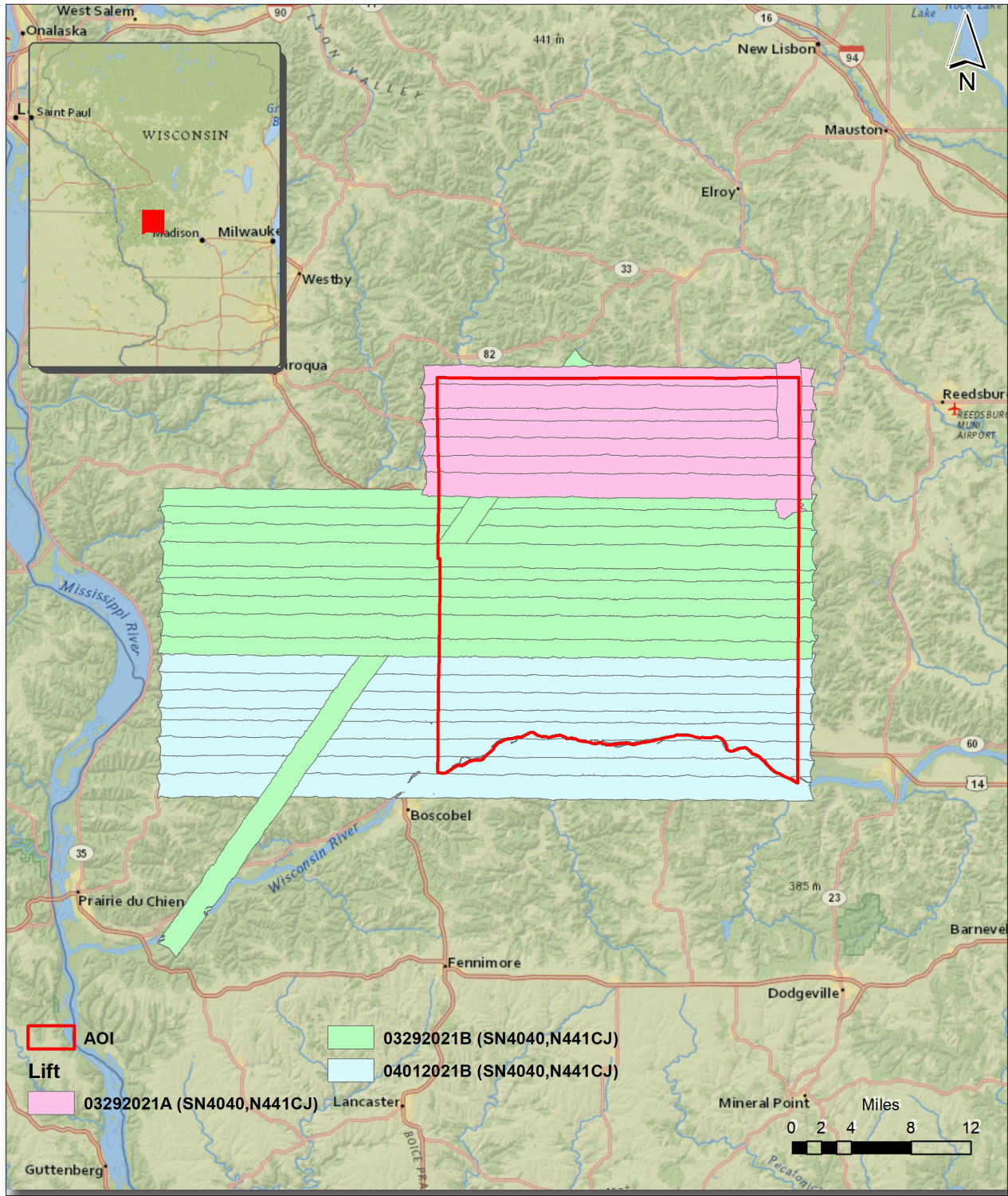


Figure 5. Lidar Coverage

5. Geometric Accuracy

5.1. Horizontal Accuracy

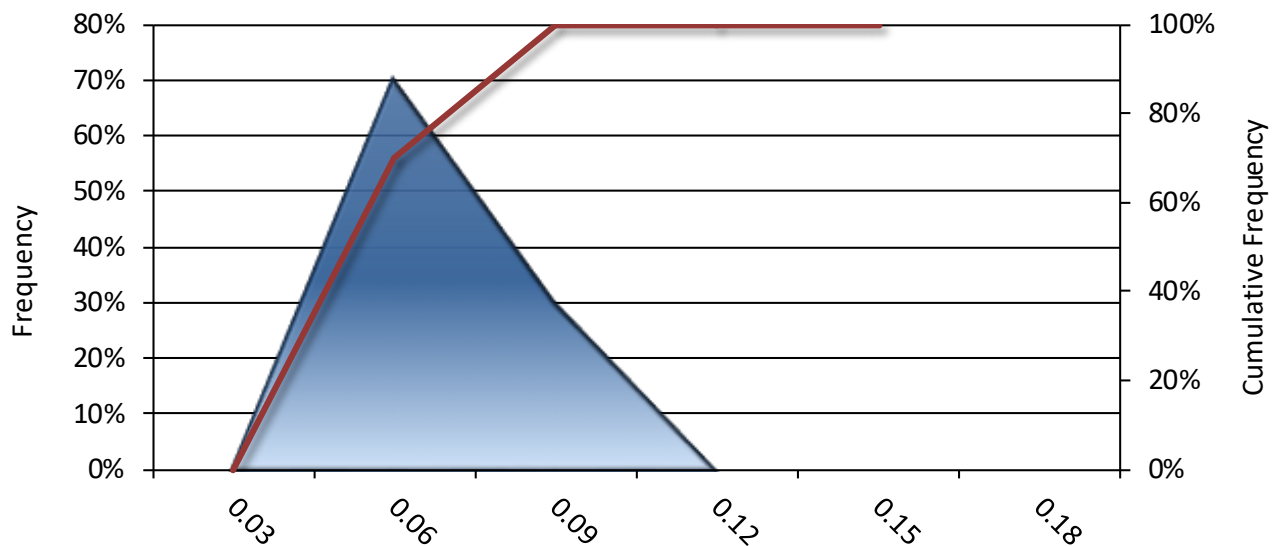
Lidar horizontal accuracy is a function of Global Navigation Satellite System (GNSS) derived positional error, flying altitude, and INS derived attitude error. The obtained RMSE_r value is multiplied by a conversion factor of 1.7308 to yield the horizontal component of the National Standards for Spatial Data Accuracy (NSSDA) reporting standard where a theoretical point will fall within the obtained radius 95% of the time. Based on a flying altitude of 7,545 feet, an IMU error of 0.002 decimal degrees, and a GNSS positional error of 0.015 meters (0.049 ft), this project was compiled to meet 0.25 (0.82 ft) meter horizontal accuracy at the 95% confidence level. A summary is shown below.

Horizontal Accuracy	
RMSE _r	0.47 ft
	0.14 m
ACC _r	0.82 ft
	0.25 m

5.2. Relative Vertical Accuracy

Relative vertical accuracy refers to the internal consistency of the data set as a whole: the ability to place an object in the same location given multiple flight lines, GPS conditions, and aircraft attitudes. When the lidar system is well calibrated, the swath-to-swath vertical divergence is low (<0.10 meters). The relative vertical accuracy was computed by comparing the ground surface model of each individual flight line with its neighbors in overlapping regions. The average (mean) line to line relative vertical accuracy for the WI_Statewide_2021_B21 project was 0.050 feet (0.015 meters). A summary is shown below.

Relative Vertical Accuracy	
Sample	117 flight line surfaces
Average	0.050 ft
	0.015 m
Median	0.046 ft
	0.014 m
RMSE	0.052 ft
	0.016 m
Standard Deviation (1σ)	0.012 ft
	0.003 m
1.96σ	0.023 ft
	0.007 m



Richland County, Wisconsin Relative Vertical Accuracy (ft)
Total Compared Points (n = 10,446,343,727)

Project Report Appendices

The following section contains the appendices as listed in the 37876_WI_8_Counties Lidar Project Report.

Appendix A

Flight Logs

Julian Day 112 Flight A

LIDAR Flight Log



Date	April 22, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Krista R
Location	Eau Claire WI Airport	Operator	Daniel A
Mission Objective			

System	Riegl Q1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes

T- -3C
H- 86%
AMLS- 278m
Hpa-1016

Time to next maintenance: _____ ○ 50 hr ⊕ 100 hr

Aircraft Block Time

Engine On	13:10	Takeoff	13:30
Engine Off	18:59	Landing	18:49
Total	5.8 hrs	Total	5.3 hrs

Mission Plan

AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment

Pre Mission	1317
Post Mission	1851
GPS Time	1856

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		
F8		-	1345	1350			-	
1028		092	1403	1422			140330	
X-Tie		-	1425	1427			142544	
1006		274	1439	1458			143928	
1005		092	1505	1521			150504	
1004		274	1527	1545			152737	
1003		092	1549	1606			154958	
1002		274	1612	1629			161217	
1001		092	1634	1651			163415	
X-Tie		-	1655	1658			165537	
F8		-	1658	1703			-	
F8		-	1752	1757			-	
X-Tie		-	1800	1801			180020	
1062		181	1808	1823			180845	
F8		-	1823	1828			-	

LIDAR Flight Log



Date	April 22, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Krista R
Location	Eau Claire WI Airport	Operator	Daniel A
Mission Objective			

System	Riegl Q1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T- -3C
 H- 86%
 AMLS- 278m
 Hpa-1016
 Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	13:10	Takeoff 13:30
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Total	5.8 hrs	Total 5.3 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	1317	1322
Post Mission	1851	1856

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

Julian Day 112 Flight A

LIDAR Flight Log

Date	April 22, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Krista R
Location	Eau Claire WI Airport	Operator	Daniel A
Mission Objective			

System	Riegl Q1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T- -3C
 H- 86%
 AMLS- 278m
 Hpa-1016
 Time to next maintenance: _____ Ⓞ 50 hr ○ 100 hr

Aircraft Block Time	
Engine On	13:10 Takeoff 13:30
Engine Off	18:59 Landing 18:49
Total	5.8 hrs Total 5.3 hrs

Mission Plan				
AGL Height	2300 m	Pulse Rate	800Khz	
Target Speed	160 kts	Scan Rate	178	
Laser Current	100 %	FOV	60 degs	

Static Alignment	GPS Time	
	Start	End
Pre Mission	1317	1322
Post Mission	1851	1856

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID <small>Time Stamp</small>	Comments
			Start	End	Time	nmi to End		



Julian Day 112 Flight A

LIDAR Flight Log



Date	April 22, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Krista R
Location	Eau Claire WI Airport	Operator	Daniel A
Mission Objective			

System	Riegl Q1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T- -3C
 H- 86%
 AMLS- 278m
 Hpa-1016
 Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	13:10	Takeoff 13:30
Engine Off	18:59	Landing 18:49
Total	5.8 hrs	Total 5.3 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment		GPS Time	
Pre Mission	Start	Start	End
	1317	1851	1856
Post Mission			

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

LIDAR Flight Log



Date	April 22, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Krista R
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Mission Objective			

System	Riegl Q1560
Unit	64
IMU	Applanix AP60
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Scanner 1 Drive	
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Engine On	13:10	Takeoff 13:30
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AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	1317	1322
Post Mission	1851	1856

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

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

(email log daily to flight_log_distribution_list@quantumspatial.com)

Date: 4/1/2021
Lift: A B C D E Pg 1 of 1

Project: **WE 3DEP**

Proj #: **37876**

Flight Mgmt File: **20210401_5404095_A_37876**

Aircraft: **4737LW** Begin Hobbs: **5744.0** End Hobbs: **5800.3** Total: **6.3** Pilot: **Dan Lutter** Co-Pilot: **Tech: Paul Eshen**

Dep Apt: **KLSE** Dep Time (local): **10:06 (Z: 15:06)** Arr Apt: **STAT** Arr Time (local): **4:29 (Z: 2129)** Tot Time Aloft: **6:23**

CORS: **01N** Sca 1: **1111** Sta 2: **1111** Flyovers: **Y / N** IF Y, times: **Sta1)** **Sta2)**

GPS Unit: **Y / N** Sta 1: **1111** Sta 2: **1111** Flyovers: **Y / N** IF Y, times: **Sta1)** **Sta2)**

Gd Temp beg: **°C** End: **°C** OAT beg: **°C** End: **°C** Altimeter begin: **°C** end: **°C**

LIDAR	Type	Serial #	Alt AGL	Alt AMSL	Avg Terr Ht	Max Gdspd	Avg Pt Spacing	Power	PPSM	Begin GB	End GB	Tot GB	Storage Name/#
	FOV	Scan Freq	MplA	Pulses In Air	Pulse Rate	(000'@)							
1	N	164431	65434	130	4514	870042	0						
2	S	165602	126518	152	46121	2665m	-2						
3	N	176646	171148	132	45121	2665	3						
4	S	171810	172780	133	48114	2635	-3						
5	N	172845	174031	12	42421	2610	3						
6	S	172428	175313	145	44120	2580	0						
7	N	179412	180843	133	47121	2575	3						
8	S	180432	182358	145	48612	2570	-3						
9	N	182428	183553	135	41123	2560	3						
10	S	183448	185343	140	49121	2555	-3						
11	N	185728	187410	134	46122	2545	3						
12	S	191507	193111	143	44122	2540	-2						
13	N	193214	194855	140	43121	2525	4						
14	S	194442	200888	147	43123	2510	-4						
15	N	200107	202830	130	47121	2445	5						
16	S	203125	20923	142	4811	2500	-5						
17	N	205220	211352	136	45122	2495	5						
18	N	211514	217116										

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

1 Full sun, clear air
2 tailwind, steady breeze ~160 speed 140 V3 in
3 headwind
4 120ft, 75ft warning line
5 Some lakes still have ice, ground looks squishy
6 155ft, 75ft warning line endline

7 takeback on 200ft low for a second mid line
8 turn starting mid line gone by end
9 few small turn intervals

Total Proj Lines: **125** Lines Flown: **17** Lines Remain: **62** Online Time: **4.5** Mob Time: **1.8** Notes:

4/11/21 B WI 3 DEP 37876
 Arrival KLSIE 8:15 local, 115 z total alt: 2:48

Departure 5:27/101, 2227 z from KIMT

Line #	HDR	Start	Stop	speed	DDOP sets	SPS Alt	Calc	Turb	Note
120	E	224008	125336	144	18/23	2530	9	0	Full Sun
18	S	230212	232254	142	18/22	2500	-3	0	
19	N	232355	234812	138	18/23	2495	4		< 7 GBs sets working incl line 1
20	S	234611	632	148	17/21	2490	-4		< 7 GBs sets working first - 8 miles
<p>4 lines from 58 remain</p> <p>1.4 Actv. time</p> <p>1.5 make total</p> <p>2.9 total</p> <p>Storage: 316 Start: 2200 End: 263 total: 61</p> <p>Some Parameters as A</p>									

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

Date: 4/2/2021

(email log daily to flight_log_distribution_list@quantumspatial.com)

Page 1 of 1

Project: **WI 3DER**

Proj #: **37876**

Flight Mgmt File: **20210402-SW4045-C-37876**

Aircraft: **473TW** Begin Hobbs: **5204.1** End Hobbs: **Total:**

Pilot: **Dan Lulick** Co-Pilot: **Tech/Bar, Edelson**

Dep Apt: **KCV4** Dep Time (Local): **58** (Z): **1458** (Z): **121** Tot Time Aloft: **5:23**

CORS: **01N** Sta 1: **PPP** Sta 2:

Flyovers: **Y / N** (If Y, times: Sta1) **Sta2)**

GPS Unit: **Y / N** Sta 1: Sta 2:

Flyovers: **Y / N** (If Y, times: Sta1) **Sta2)**

Gd Temp beg: **°C** End: **°C** OAT beg: **°C** End: **°C** Altimeter begin: **°C** end: **°C**

LIDAR	Type	Serial #	Alt	Alt	Avg Terr	Max	Avg Pt	Bag	Storage
	FOV	Scan Freq	AGL	AMS	Ht	Gdspd	Spacing	GB	Name
	58.52	500K142	MPIA Y / N			180	158		

Line #	Hdg	Start (UTC)	End (UTC)	Gd Spd	POF/s	GPS Altitude	Crab	Turb	FLIGHT LINE NOTES - visibility, clouds, smoke, partial, etc
114	E	202550	204116	153	87/23	2470	-2	0	hazy skies, high broken overcast, 675 fms lowing, hail 675 below 1400
35	S	204032	204728	143	88/23	2470	-7	0	
34	N	205028	205534	143	88/23	2465	7	0	
23	S	210727	211352	151	84/22	2470	-8	0	
32	N	211456	212547	144	82/25	2475	7	0	675 fms lowing, wide, out of AOE
31	S	213712	212637	155	85/24	2475	-9	0	
30	N	213817	214407	151	87/25	2475	8	0	
24	S	215017	220036	155	83/26	2480	-9	0	675 fms lowing, 6 seconds fly, miles in
28	N	220134	221948	148	86/26	2470	9	0	
27	S	222117	223401	152	84/25	2480	-8	0	
26	N	224006	223800	144	85/23	2480	7	0	
25	S	225925	230824	150	81/23	2480	-7	0	line didn't stop recording after 1900
24	N	231856	233553	151	84/25	2490	10	0	line didn't stop recording after 1900
23	S	233901	2359	148	88/24	2490	-7	0	675 fms lowing, 23.5 miles lowing, hail 675 below 1400
22	N	235921	1834	153	80/25	2495	8	0	sporadic light turb near 1930 line
21	S	1456	3941	152	86/22	2500	-9	0	brief light turb some spots last line, sunset during line
24	N	4134							refuel first 15 seconds to cover the 1st start

Total Proj Lines: **16** Lines Flown: **16** Lines Remain: **0** Online Time: **4:3** Mob Time: **0:8** Notes:

Any total: **4:3** **1:7**

Julian Day 091 Flight A

LIDAR Flight Log



Date	April 01, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S-Krista R
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
T---2C
H-37%
AMLS- 278m
Hpa-1035
Time to next maintenance: _____
<input type="radio"/> 50 hr <input checked="" type="radio"/> 100 hr

Aircraft Block Time		
Engine On	15:26	Takeoff 15:54
Engine Off	22:18	Landing 22:08
Total	6.9 hrs	Total 6.2 hrs

Mission Plan					
AGL Height	2300	m	Pulse Rate	800Khz	
Target Speed	160	kts	Scan Rate	89	
Laser Current	100	%	FOV	60	degs

Static Alignment	GPS Time	
	Start	End
	Pre Mission	1537
Post Mission	2211	2216

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		
Test Strip		-	1602	1603			160220	
X- tie		-	1606	1618			160625	
F8		-	1624	1629			-	
1030		180	1638	1647			163858	
1031		000	1654	1706			165430	
1032		180	1712	1724			174722	
1033		000	1730	1742			173003	
1034		180	1747	1800			174722	
1035		000	1806	1819			180617	
1036		180	1824	1838			182444	
1037		000	1844	1857			184405	
1038		180	1902	1917			190224	
1039		000	1922	1937			192239	
1040		180	1942	1957			194227	
1041		000	2002	2018			200230	

Julian Day 091 Flight A

LIDAR Flight Log



Date	April 01, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon		
Location	Eau Claire WI Airport	Pilot	Andy. S-Krista R
Mission Objective		Operator	D.Arteaga

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T---2C
 H-37%
 AMLS- 278m
 Hpa-1035
 Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time			
Engine On	15:26	Takeoff	15:54
Engine Off	22:18	Landing	22:08
Total	6.9 hrs	Total	6.2 hrs

Mission Plan				
AGL Height	2300 m	Pulse Rate	800Khz	
Target Speed	160 kts	Scan Rate	89	
Laser Current	100 %	FOV	60 degs	

Static Alignment	GPS Time	
	Start	End
	Pre Mission	1537
Post Mission	2211	2216

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted	Mission ID	Comments
			Start	End			
1042		180	2022	2037		202209	
1043		000	2042	2058		204254	
1044		180	2102	2118		210256	
1045		000	2123	2138		212330	
F8		-	2139	2144		-	



LIDAR Flight Log

Julian Day 091	Flight A
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Date	April 01, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S-Krista R
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
T---2C
H-37%
AMLS- 278m
Hpa-1035
Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	15:26	Takeoff 15:54
Engine Off	22:18	Landing 22:08
Total	6.9 hrs	Total 6.2 hrs

Mission Plan				
AGL Height	2300	m	Pulse Rate	800Khz
Target Speed	160	kts	Scan Rate	89
Laser Current	100	%	FOV	60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	1537	1542
Post Mission	2211	2216

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

Julian Day 091 Flight A

LIDAR Flight Log



Date	April 01, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon		
Pilot	Andy. S-Krista R		
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes

T---2C
H-37%
AMLS- 278m
Hpa-1035

Time to next maintenance: _____ @ 50 hr @ 100 hr

Aircraft Block Time	
Engine On	15:26
Takeoff	15:54
Engine Off	22:18
Landing	22:08
Total	6.2 hrs

Mission Plan			
AGL Height	2300	m	Pulse Rate 800Khz
Target Speed	160	kts	Scan Rate 89
Laser Current	100	%	FOV 60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	1537	1542
Post Mission	2211	2216

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

Julian Day 091 Flight A

LIDAR Flight Log



Date	April 01, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S-Krista R
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes	
T---2C	
H-37%	
AMLS- 278m	
Hpa-1035	
Time to next maintenance: _____	☉ 50 hr ○ 100 hr

Aircraft Block Time	
Engine On	15:26
Takeoff	15:54
Engine Off	22:18
Landing	22:08
Total	6.2 hrs

Mission Plan			
AGL Height	2300	m	Pulse Rate 800Khz
Target Speed	160	kts	Scan Rate 89
Laser Current	100	%	FOV 60 degs

Static Alignment	GPS Time	
	Start	End
	Pre Mission 1537	1542
Post Mission	2211	2216

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted	Mission ID	Comments
			Start	End			

Julian Day 092 Flight A

LIDAR Flight Log



Date	April 02, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T--8C
 H-47%
 AMLS-278m
 Hpa-1028
 Time to next maintenance: 32hrs ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	12:56	Takeoff 13:17
Engine Off	17:43	Landing 17:35
Total	4.8 hrs	Total 4.3 hrs

Mission Plan					
AGL Height	2300	m	Pulse Rate	800Khz	
Target Speed	160	kts	Scan Rate	178	
Laser Current	100	%	FOV	60	degs

Static Alignment	GPS Time	
	Start	End
	Pre Mission	1304
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		
X-tie		-	1329	1336			132923	
F8		-	1344	1349			-	
1046		180	1355	1411			135536	
1047		000	1415	1431			141558	
1048		180	1436	1453			143644	
1049		000	1457	1512			145729	
1050		180	1518	1535			151849	
1051		000	1539	1555			153935	
1052		180	1600	1618			160046	
1053		000	1622	1637			162212	
1054		180						DR Crashed while aproching the line
								Full system restart and troubleshoooting
								for 20 minutes- Riacquire crashed

Julian Day 092 Flight A

LIDAR Flight Log



Date	April 02, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T-8C
 H-47%
 AMLS-278m
 Hpa-1028
 Time to next maintenance: 32hrs 50 hr 100 hr

Aircraft Block Time		
Engine On	12:56	Takeoff 13:17
Engine Off	17:43	Landing 17:35
Total	4.8 hrs	Total 4.3 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment		GPS Time	
Pre Mission	Post Mission	Start	End
1304	-	1304	1308
-	-	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID <small>Time Stamp</small>	Comments
			Start	End	Time	nmi to End		

Julian Day 092 Flight A

LIDAR Flight Log



Date	April 02, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
T--8C
H-47%
AMLS-278m
Hpa-1028
Time to next maintenance: <u>32hrs</u> ☉ 50 hr ○ 100 hr

Aircraft Block Time	
Engine On	12:56
Takeoff	13:17
Engine Off	17:43
Landing	17:35
Total	4.3 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	1304	1308
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

Julian Day 092 Flight A

LIDAR Flight Log



Date	April 02, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes	
T--8C	
H-47%	
AMLS-278m	
Hpa-1028	
Time to next maintenance: <u>32hrs</u> Ⓞ 50 hr ○ 100 hr	

Aircraft Block Time		
Engine On	12:56	Takeoff 13:17
Engine Off	17:43	Landing 17:35
Total	4.8 hrs	Total 4.3 hrs

Mission Plan				
AGL Height	2300	m	Pulse Rate	800Khz
Target Speed	160	kts	Scan Rate	178
Laser Current	100	%	FOV	60 degs

Static Alignment		GPS Time	
Pre Mission	1304	Start	End
Post Mission	-	Start	1308
Post Mission	-	End	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted	Mission ID	Comments
			Start	End			

Julian Day 092	Flight A
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LIDAR Flight Log



Date	April 02, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes	
T--8C	
H-47%	
AMLS-278m	
Hpa-1028	
Time to next maintenance: <u> 32hrs </u> <input type="radio"/> 50 hr <input type="radio"/> 100 hr	

Aircraft Block Time		
Engine On	12:56	Takeoff 13:17
Engine Off	17:43	Landing 17:35
Total	4.8 hrs	Total 4.3 hrs

Mission Plan					
AGL Height	2300	m	Pulse Rate	800	Khz
Target Speed	160	kts	Scan Rate	178	
Laser Current	100	%	FOV	60	degs

Static Alignment		GPS Time	
Pre Mission	1304	Start	End
Post Mission	-	-	1308
		-	

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

Julian Day 093 Flight B

LIDAR Flight Log



Date	April 03, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T--21C
 H-16%
 AMLS-278m
 Hpa-1018
 Time to next maintenance: _____ 50 hr 100 hr

Aircraft Block Time		
Engine On	20:00	Takeoff 20:16
Engine Off	23:02	Landing 22:58
Total	3.0 hrs	Total 2.7 hrs

Mission Plan					
AGL Height	2300	m	Pulse Rate	800Khz	
Target Speed	160	kts	Scan Rate	178	
Laser Current	100	%	FOV	60	degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	2006	2011
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		
Test Strip 01		-						
Test Strip 02		--	2048	2049			204836	Data recorder error- full system restart and cable swap
F8		-	2050	2055			-	
1054		180	2101	2117			210103	
1055		000	2121	2138			212113	
1056		180	2143	2159			214306	
1057		000	2204	2221			220425	
1058		180	180	2226	2233		222609	System crashed after 8 minutes on line

LIDAR Flight Log



Julian Day 093 Flight B

Date	April 03, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
T--21C
H-16%
AMLS-278m
Hpa-1018
Time to next maintenance: _____ Ⓢ 50 hr Ⓞ 100 hr

Aircraft Block Time	
Engine On	20:00
Takeoff	20:16
Engine Off	23:02
Landing	22:58
Total	3.0 hrs
	2.7 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	2006	2011
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted	Mission ID	Comments
			Start	End			

Julian Day 093 Flight B

LIDAR Flight Log



Date	April 03, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes

T--21C
 H-16%
 AMLS-278m
 Hpa-1018

Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	20:00	Takeoff 20:16
Engine Off	23:02	Landing 22:58
Total	3.0 hrs	Total 2.7 hrs

Mission Plan					
AGL Height	2300	m	Pulse Rate	800	Khz
Target Speed	160	kts	Scan Rate	178	
Laser Current	100	%	FOV	60	degs

Static Alignment		GPS Time
Pre Mission	2006	Start
Post Mission	-	End
		2011
		-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		

Julian Day 093 Flight B

LIDAR Flight Log



Date	April 03, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
T--21C
H-16%
AMLS-278m
Hpa-1018
Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	20:00	Takeoff 20:16
Engine Off	23:02	Landing 22:58
Total	3.0 hrs	Total 2.7 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment	GPS Time	
	Start	End
Pre Mission	2006	2011
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted	Mission ID	Comments
			Start	End			

Julian Day 093 Flight B

LIDAR Flight Log



Date	April 03, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes	
T--21C	
H-16%	
AMLS-278m	
Hpa-1018	
Time to next maintenance: _____ ☉ 50 hr ○ 100 hr	

Aircraft Block Time	
Engine On	20:00
Takeoff	20:16
Engine Off	23:02
Landing	22:58
Total	3.0 hrs
Total	2.7 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment		GPS Time
Pre Mission	2006	Start
Post Mission	-	End
Pre Mission	2006	2011
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID
			Start	End	Time	nmi to End	

Julian Day 095 Flight A

LIDAR Flight Log



Date	April 05, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S- Krista R
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes
 T-6C
 H-70%
 AMLS-278m
 Hpa-1010
 Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	13:22	Takeoff 13:41
Engine Off	15:53	Landing 15:50
Total	2.5 hrs	Total 2.2 hrs

Mission Plan					
AGL Height	2300	m	Pulse Rate	800Khz	
Target Speed	160	kts	Scan Rate	178	
Laser Current	100	%	FOV	60	degs

Static Alignment	GPS Time	
	Start	End
	Pre Mission	1330
Post Mission	-	1335

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
			Start	End	Time	nmi to End		
X-Tie		-	1352	1354			135212	
F8		-	1404	1409			-	
1058		180	1413	1429			141350	
1059		000	1434	1450			143404	
1060		180	1455	1511			145534	
1061		000						System crashed just before we
								enter the line- tried to restart while
								in the air but it froze 2 times

Julian Day 095 Flight A

LIDAR Flight Log

Date	April 05, 2021	Aircraft	C-GJMT
Project	3218_QSI_PierceMarathon	Pilot	Andy. S- Krista R
Location	Eau Claire WI Airport	Operator	D.Arteaga
Mission Objective			

System	Riegl VQ-1560
Unit	64
IMU	Applanix AP60
GPS Rx	Trimble GNSS17
Scanner 1 Drive	
Scanner 2 Drive	

Additional Notes

T-6C
H-70%
AMLS-278m
Hpa-1010

Time to next maintenance: _____ ☉ 50 hr ○ 100 hr

Aircraft Block Time		
Engine On	13:22	Takeoff 13:41
Engine Off	15:53	Landing 15:50
Total	2.5 hrs	Total 2.2 hrs

Mission Plan			
AGL Height	2300 m	Pulse Rate	800Khz
Target Speed	160 kts	Scan Rate	178
Laser Current	100 %	FOV	60 degs

Static Alignment		GPS Time	
Pre Mission	Start	Start	End
1330	1330	-	1335
Post Mission	-	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID Time Stamp	Comments
			Start	End	Time	nmi to End		



Julian Day 095 Flight A

LIDAR Flight Log



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Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID Time Stamp	Comments
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Julian Day 095 Flight A

LIDAR Flight Log



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Target Speed	160 kts	Scan Rate	178
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Static Alignment

Pre Mission	1330
Post Mission	-
GPS Time	Start End
	1330 1335
	- -

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID Time Stamp	Comments
			Start	End	Time	nmi to End		

Julian Day 095 Flight A

LIDAR Flight Log



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	Start	End
	Pre Mission	1330
Post Mission	-	-

Flight Line	LiDAR File Name	Flight Direction	GPS Time		Line Aborted		Mission ID	Comments
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