Accuracy Report - LiDAR

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Document Control

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Revision History

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Project Team

Initials	Name	Role
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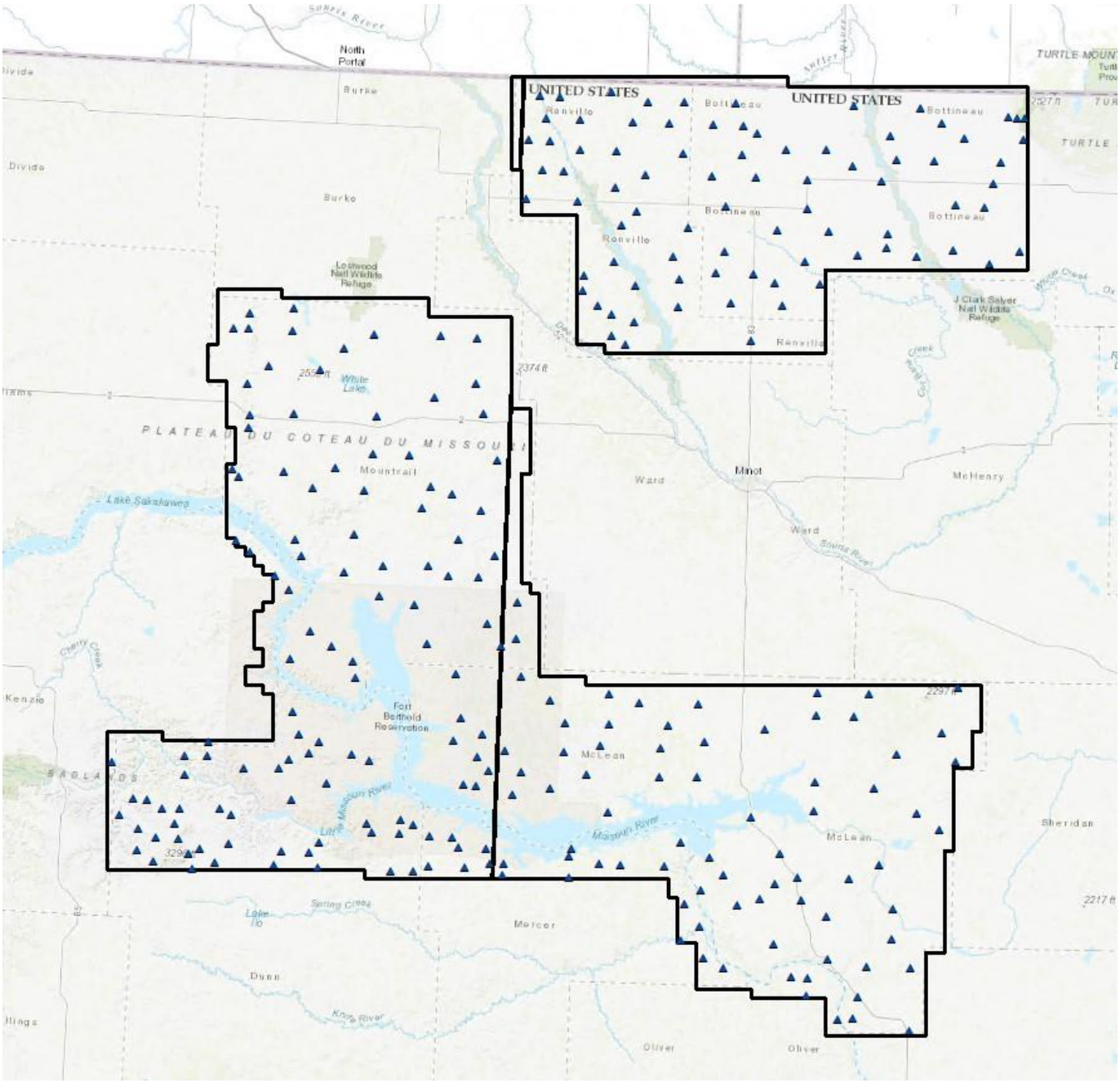
ND Phase10 – LiDAR NVA and VVA Check Points



1. Accuracy reporting

Data collected under this Task Order meets the National Standard for Spatial Database Accuracy (NSSDA) accuracy standards. The NSSDA standards specify that vertical accuracy be reported at the 95 percent confidence level for data tested by an independent source of higher accuracy.

1.1 Positional Accuracy

Before classification and development of derivative products from the point cloud, the absolute and relative vertical accuracies of the point cloud were verified.

1.2 Horizontal Accuracy

This data set was produced to meet ASPRS Positional Accuracy Standards for Digital Geospatial Data (2014) for a 20.2 (cm) RMSEx / RMSEy Horizontal Accuracy Class which equates to Positional Horizontal Accuracy = +/- 49.4 cm at a 95% confidence level.

1.3 Absolute Vertical Accuracy

Unclassified Lidar Point Cloud Data: The Non-Vegetated Vertical Accuracy (NVA) of the Lidar Point Cloud data was calculated against TINs derived from the final calibrated and controlled swath data. The required accuracy (ACCZ) is: 19.6 cm at a 95% confidence level, derived according to NSSDA, i.e., based on RMSEZ of 10 cm in the "open terrain" and/or "Urban" land cover categories. This is a required accuracy. Please refer to the table below for the achieved accuracies. The raw swath point cloud data met the required accuracy levels before point cloud classification and derivative product generation.

Table 1: Accuracy of the Lidar Point Cloud Data

Raw Flight Lines	RMSEz (non-vegetated)	NVA at 95-percent confidence level
Specification (cm)	≤ 10	≤ 19.6
Calculated Values (cm)	1.8	3.3
Specification (m)	≤ 0.100	≤ 0.196
Calculated Values (m)	0.018	0.033
Number of points	161	161

Bare Earth Surface: The accuracy (ACCZ) of the derived DEM and classified lidar data was calculated and is being reported in three (3) ways:

1. **RMSEZ (Non-Vegetated):** The required RMSEZ is ≤ 10 cm.
2. **Non-Vegetated Vertical Accuracy (NVA):** The required NVA is: ≤ 19.6 cm at a 95% confidence level, derived according to NSSDA, i.e., based on RMSEZ of 10 cm in the "open terrain" and/or "Urban" land cover categories. This is a required accuracy.
3. **Vegetated Vertical Accuracy (VVA):** The required VVA is: ≤ 29.4 cm at a 95th percentile level,derived according to ASPRS Guidelines, Vertical Accuracy for Reporting LiDAR Data, i.e. based on the 95th percentile error in Vegetated land cover categories combined (Tall Grass, Brush, Forested Areas). This is a required accuracy.

Please refer to the tables below for the achieved accuracies.

LAS UTM13	RMSEz (non-vegetated)	NVA at 95-percent confidence level	VVA at 95th percentiles
Specification (cm)	≤ 10	≤ 19.6	≤ 29.4
Calculated Values (cm)	2.3	4.5	21.6
Specification (m)	≤ 0.100	≤ 0.196	≤ 0.294
Calculated Values (m)	0.023	0.045	0.216
Number of points	70	70	47

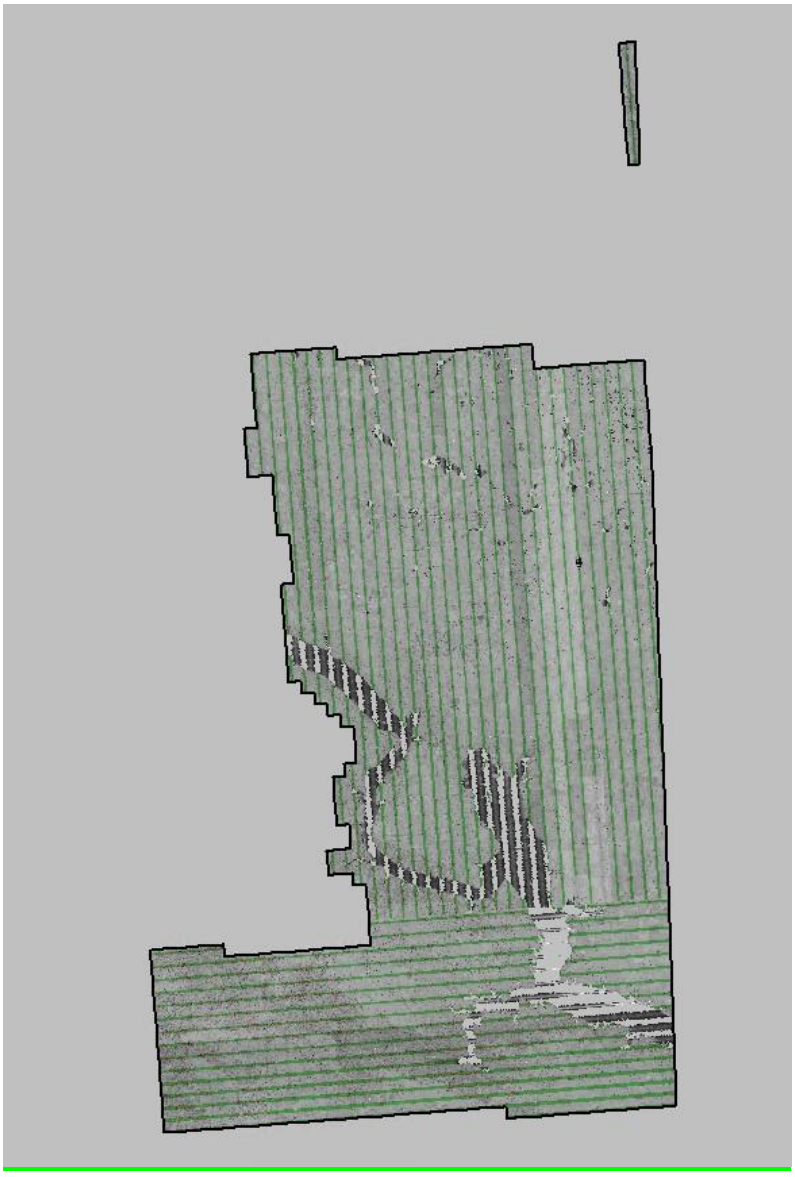
DEM UTM13	RMSEz (non-vegetated)	NVA at 95-percent confidence level	VVA at 95th percentiles
Specification (cm)	≤ 10	≤ 19.6	≤ 29.4
Calculated Values (cm)	2.9	5.8	22.1
Specification (m)	≤ 0.100	≤ 0.196	≤ 0.294
Calculated Values (m)	0.029	0.058	0.221
Number of points	70	70	47

1.4 Relative Accuracy

Swath Separation Rasters are created at 1m resolution using 8cm threshold to show how the individual flightlines agree to one another in areas of overlap. Pixel color was based on vertical difference of swaths using the following breaks:

- 0-8 cm: GREEN;
- 8-16 cm: YELLOW;
- 16 cm or > last additional color ramp bin value: RED (for example, addition of ORANGE pixels for the range of 16-24 cm would require red pixels to represent > 24 cm).

An overview can be seen below.



The individual rasters can be found in the spatial metadata folder of each of the work unit deliverables.