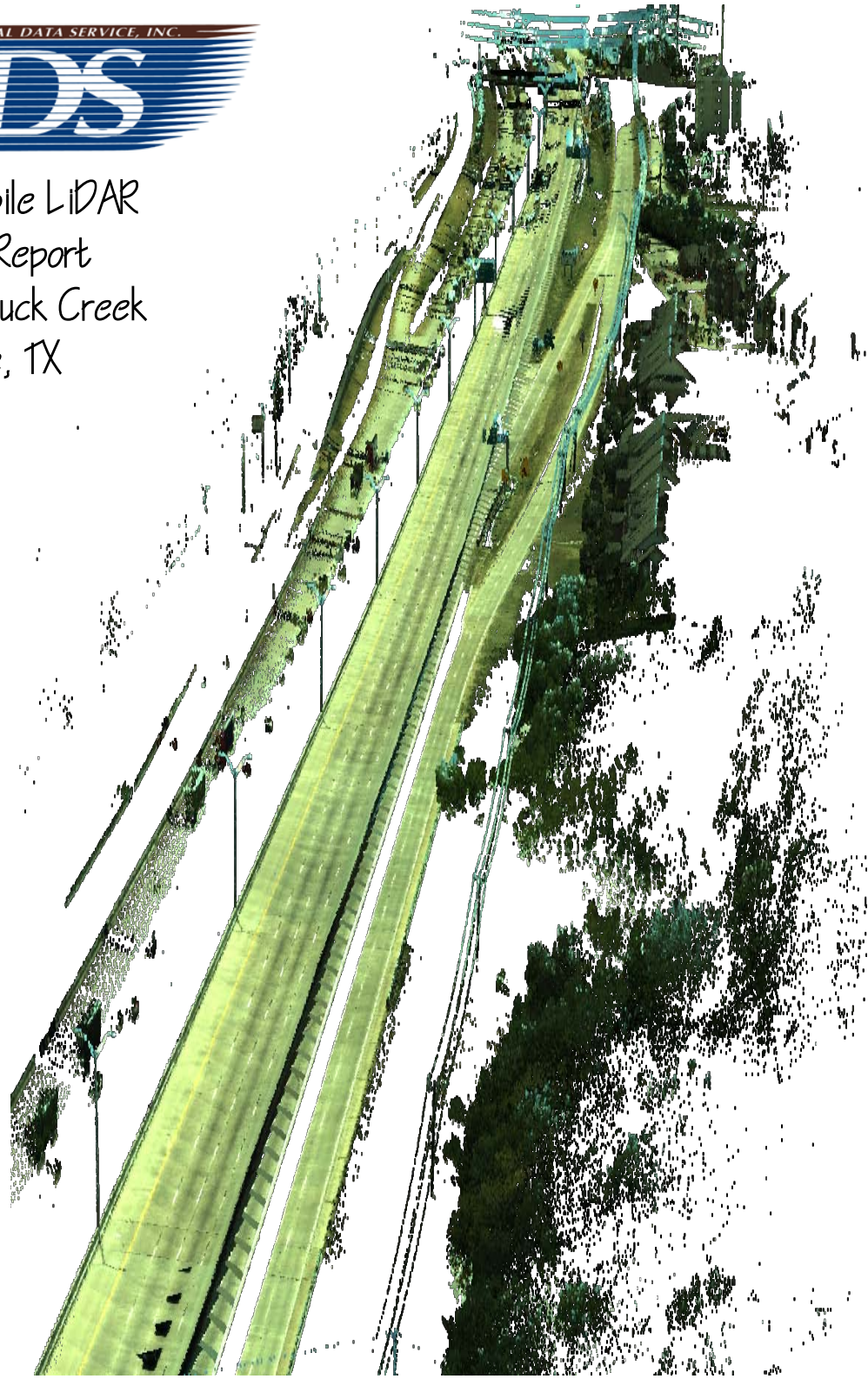




Lynx Mobile LiDAR
Process Report
IH-30 Duck Creek
Mesquite, TX



Project Synopsis

Aerial Data Service, Inc. dispatched our Lynx V200 Mobile Mapping System (MMS) to a stretch of IH-30 in Mesquite, Texas. The collection corridor encompassed the west bound lanes of IH-30 for approximately 2,500 feet from Duck Creek to Northwest Drive.



Project Preparation

A control layout was created with planned ground control points on both the right and left shoulders spaced at increments of approximately 500 feet for the length of the project (12 locations total). Ground control points were painted on the pavement and surveyed by the Texas Department of Transportation (TxDOT), Dallas District. Elevation information for the ground control points was established using conventional leveling. Additionally, TxDOT provided ground control information for station E0570040 to be utilized as a base for the mobile collect. In order to minimize the impact of obstructions, the optimal collection window was determined by analyzing GPS planning data to determine when the maximum number of satellites would be visible.



Project Collection

A dual collect was performed for the project; a day collect was performed allowing imagery to be captured along with the LiDAR data, and a night collect was performed allowing for minimum traffic on the roadway, thus reducing residual object “noise” in the LiDAR data. A project boresite was performed prior to the night collect for use in creating a calibration file for processing the data. The boresight was performed by driving around a building in opposing directions. The data was then extracted into LAS format, and each sensor’s opposing passes were compared to one another. Mismatches between the opposing point clouds represent the systematic error in the sensors orientation on the system platform. The rotations were then virtually adjusted until there was no mismatch between each sensor’s pass.

Trimble Planning software was utilized to determine the optimum collection window; the period with the maximum number of satellites in the equipment’s field-of-view and the minimum position dilution of precision (PDOP).

A Trimble R8GNSS receiver, collecting epochs at 1 second intervals, was set up on control station E0570040 and used as a base station during the LiDAR calibration and collect. The R8GNSS receiver was monitored during the collect to ensure proper function.

A collect was performed using a two person crew, allowing each crew member to focus on their respective task. The collection vehicle was equipped with flashing warning devices to increase its visibility to motorists.

The collected data was analyzed prior to departure from the project area to ensure there were no gaps in the data and that the accuracy of the data would support the project requirements.

Project Processing

Upon delivery of the data to the office, the INS solution was processed and a sensor calibration file was created, using the data collected during the project boresite, to determine the correct heading, roll and pitch values for each sensor. The calibration file facilitated the extraction and conversion of the project data into the LiDAR Archive Format (LAS). After the data conversion to LAS format, GeoCUE and Terrasolid were used to transform the data to the project coordinate system and perform various point classifications. Then, a proprietary solution was used to constrain the 3D LiDAR data to the project control. Upon completion of the point classification and constraint to control, the ground point class was extracted and editable surface models were created and utilized for quality control.

The control report below was generated to determine how well the LiDAR data fit with the TxDOT provided ground control by comparing the elevation of the ground control to the laser Z (LiDAR data).

Point ID	Easting	Northing	Z	Laser Z	Delta Z
AT1001	2550637.925	6992518.1	469.308	469.29	-0.018
AT1003	2550236.952	6992317.986	470.4	470.398	-0.002
AT1005	2549809.579	6992104.047	479.63	479.612	-0.018
AT1007	2549365.179	6991883.207	490.75	490.733	-0.017
AT1009	2548853.115	6991627.601	503.73	503.733	0.003
AT1011	2548430.187	6991395.429	510.78	510.775	-0.005
AT1012	2548261.881	6991297.017	512.42	512.4	-0.02
AT2001	2550608.883	6992573.525	468.12	468.126	0.006
AT2003	2550207.896	6992378.066	469.08	469.068	-0.012
AT2005	2549766.371	6992159.192	478.77	478.76	-0.01
AT2007	2549338.998	6991937.776	489.66	489.645	-0.015
AT2009	2548825.424	6991679.23	504.95	504.92	-0.03
AT2011	2548402.293	6991445.642	511.96	511.916	-0.044
AT2012	2548230.813	6991348.033	513.67	513.656	-0.014

Average dz	-0.01	ft
Minimum dz	-0.04	ft
Maximum dz	0.01	ft
Average magnitude	0.02	ft
Root mean square	0.02	ft
Std deviation	0.01	ft

Breaklines and planimetric data were then collected in a 3D environment utilizing Cardinal System's VRLiDAR software. The entire point cloud was viewed in the 3D environment allowing for more accurate feature identification and collection. The breaklines collected in the 3D environment were draped to the ground class LiDAR data. Contours were then generated from the 3D point cloud data and breaklines at .1' intervals. A second set of contours were generated using a 10' grid of mass points derived from the ground classified LiDAR data and the breaklines at .1'. Both sets of contours and the DTM data used to generate them were provided.