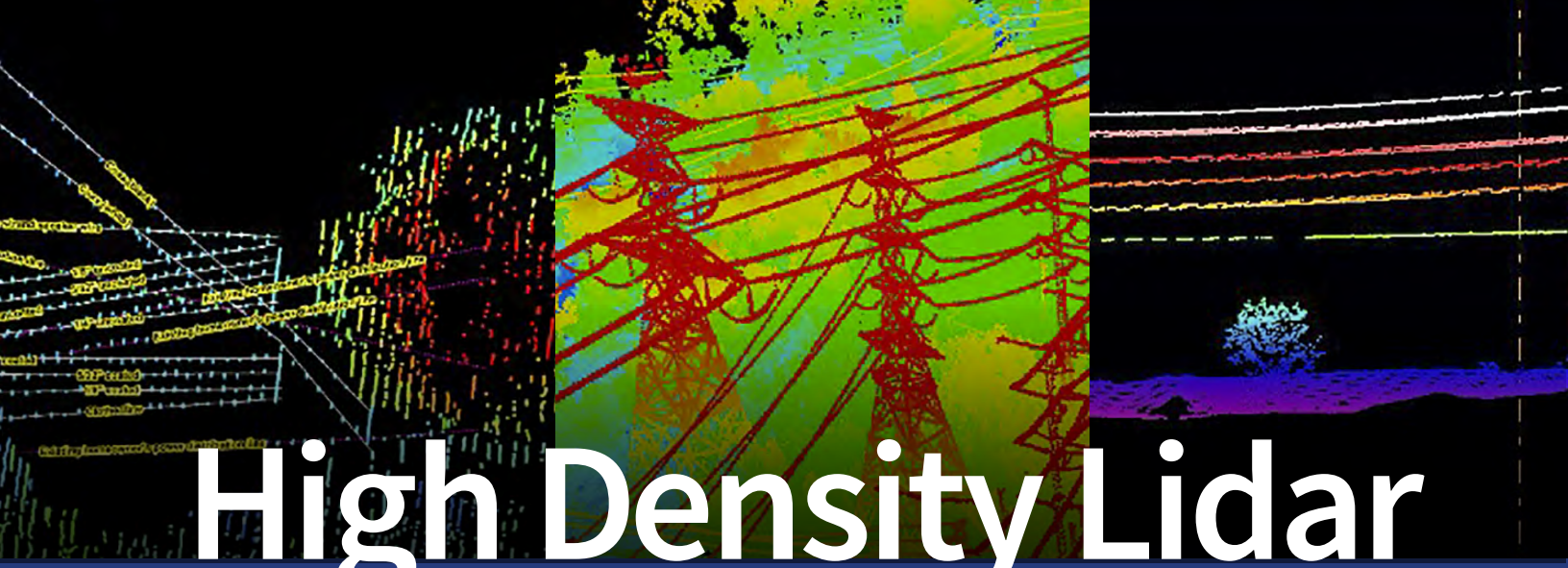
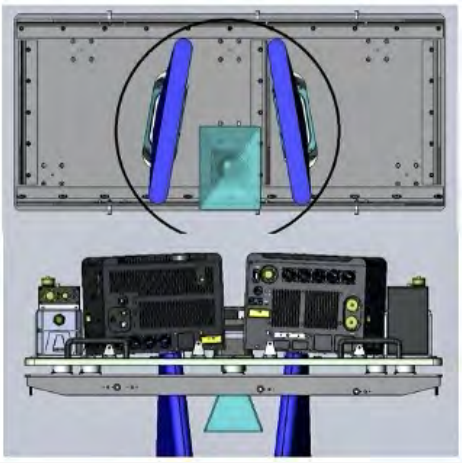


High Density Lidar

for Utility Mapping

Typically, transmission lines, distribution lines, shield wires, towers, poles, guy wires, and other transmission/distribution features are collected with lidar systems at a low flying height and using a slow-moving helicopter to achieve the required lidar point density and strong returns off features of interest. Recent technological advancements in the lidar industry have allowed for the collection of these assets from a fixed wing aircraft. This affords Surdex a best in class collection approach yielding high density, strong return signals on small features, and significantly improved collection efficiencies from a fixed wing aircraft.



Surdex has recently configured the G2 sensor mount into our aerial lidar sensor systems to generate high density lidar data. This system mounts two Optech Galaxy Prime lidar sensors into one aircraft at intersecting angles. This configuration creates a sensor system that produces 1.2 million laser pulses a second, generating over 30 points per square meter on the ground. All this is accomplished from a fixed wing aircraft flying at 140 mph at an altitude of 3000 feet.

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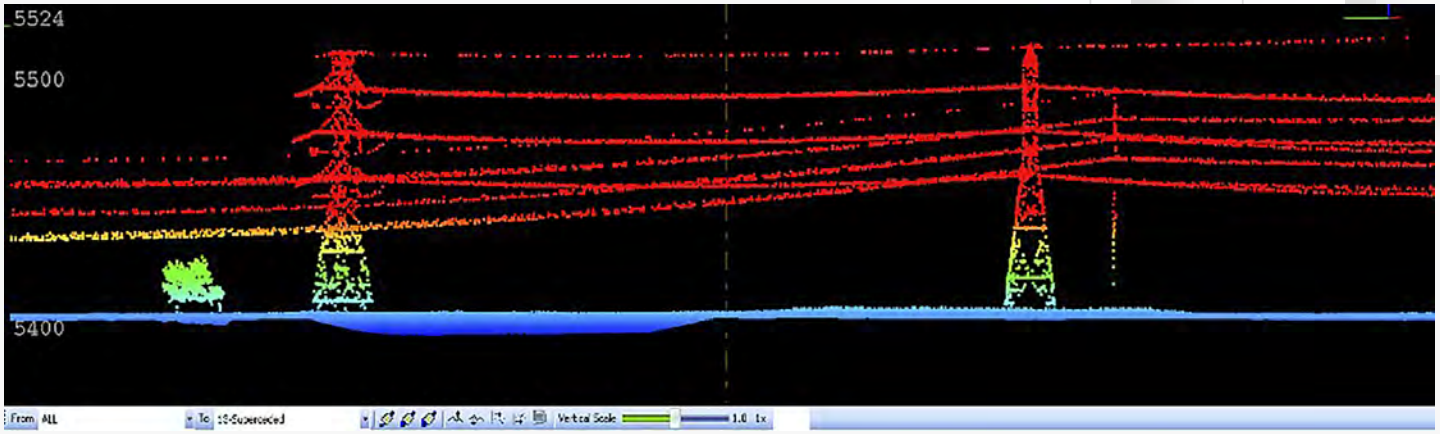


Transmission System Mapping

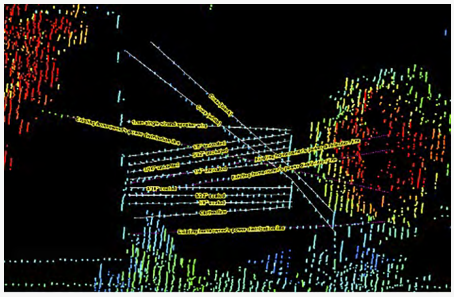
Transmission line asset mapping is required under federal regulations and is a key component of most utility GIS systems. Success of these mapping programs is based on accurate representation of required features and timely production. The Surdex G2 system is designed with intersecting sensor look directions allowing for minimal wire separation to be detected and measured.

Some of the key features of the G2 lidar data to support transmission line mapping include:

- Transmission wire separation detection
- Efficient aerial data collection
- Rapid digitizing of features
- Catenary curve digitizing
- Identification of attaching features

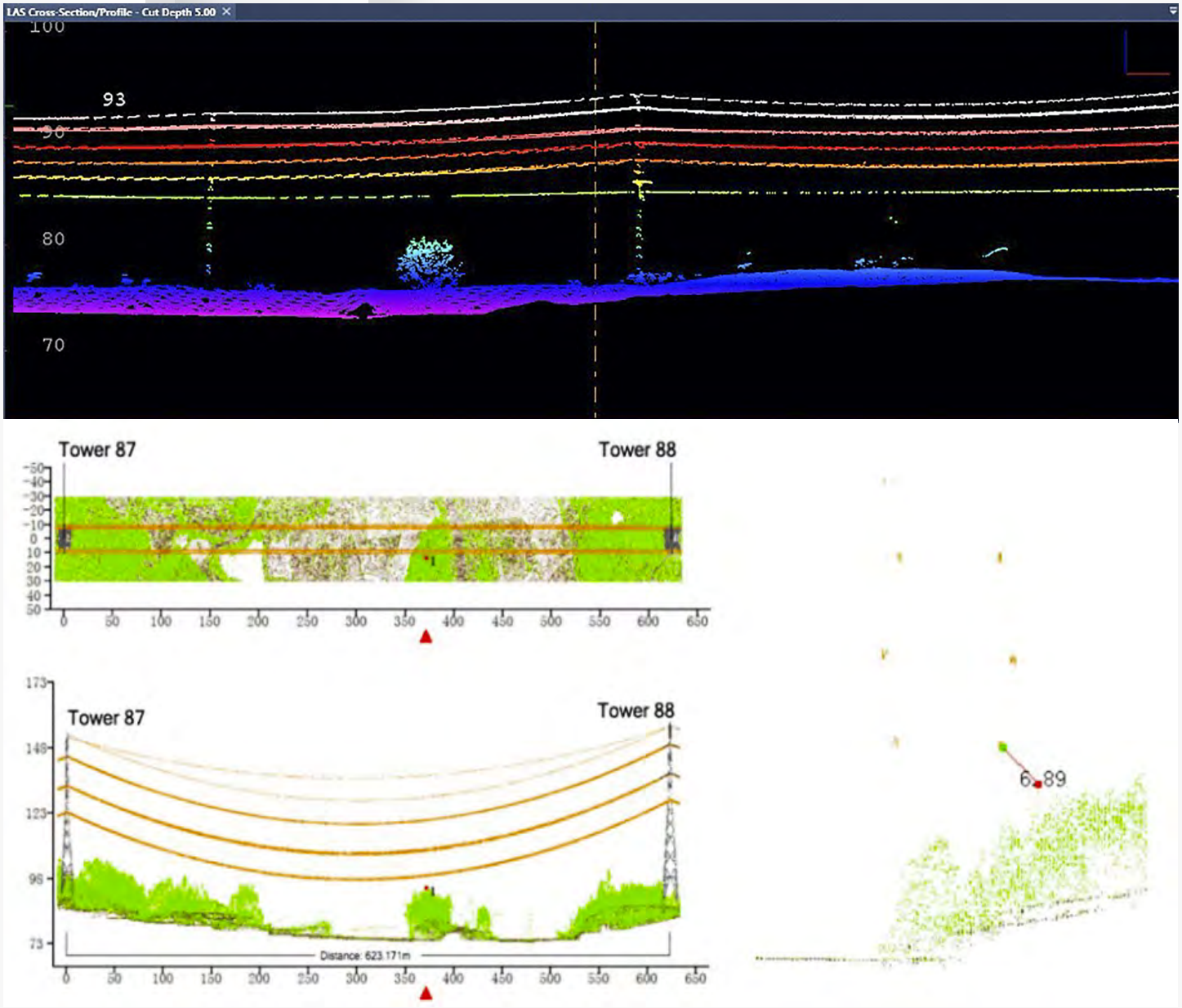
Distribution System Mapping

Utility companies are continually challenged with the need to map, model and assess the status of distribution lines to homes and businesses. Most states require routine inventory of all distribution assets. Collecting high density lidar data with the G2 system allow Surdex to fly and process data over distribution lines in an efficient, accurate and cost-effective manner. The G2 system has been designed with convergent sensor coverage to allow for the detection of line features as small as 2 mm to support distribution line mapping activities.



Some of the key features of the G2 lidar data to support distribution line mapping include:

- Efficient aerial data collection
- Wire detection down to 2 mm in diameter
- High fidelity data digitizing
- Flight altitudes that minimize community disturbance

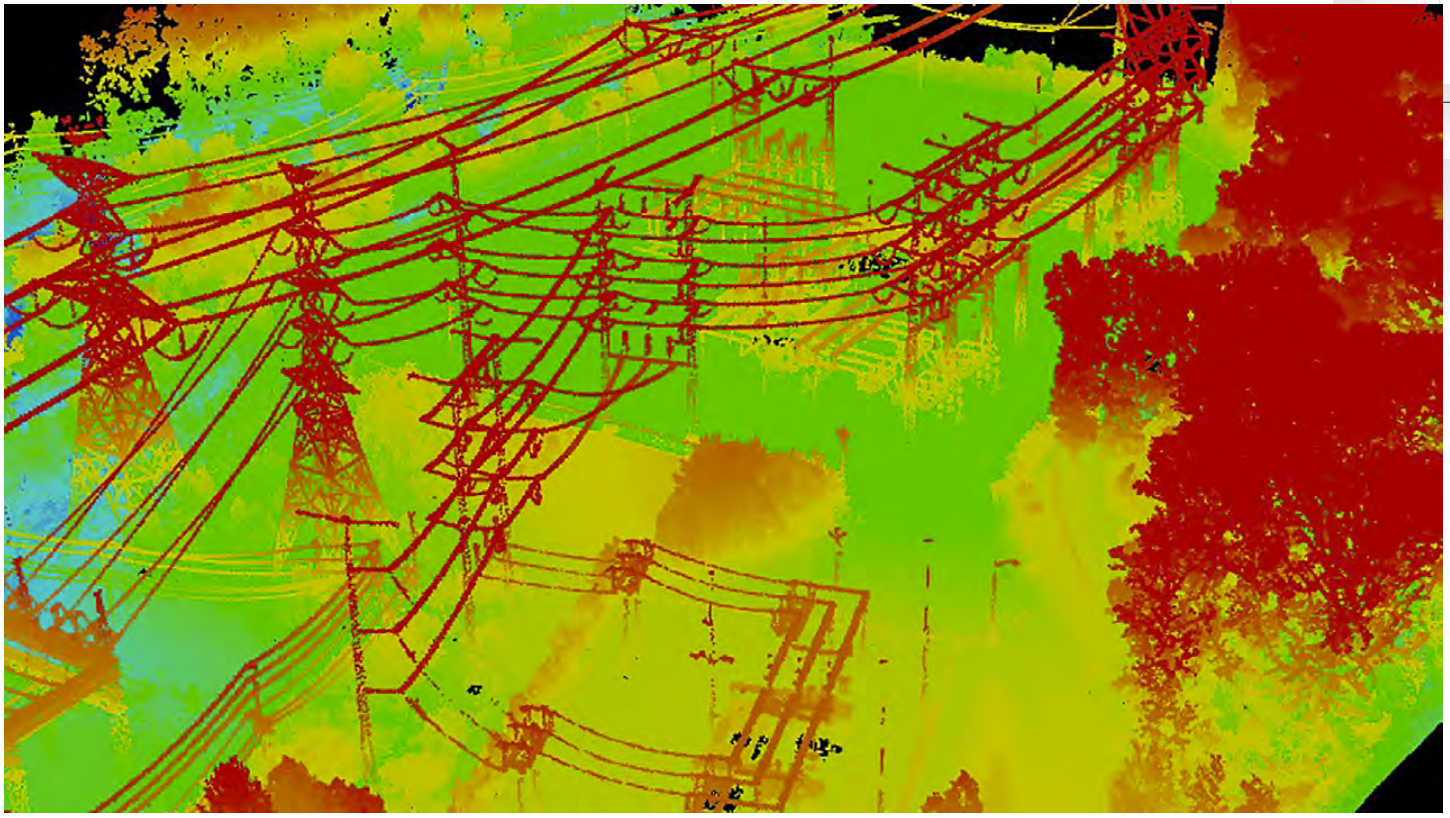


Vegetation Modeling

A significant issue facing electric companies is vegetation encroachment and the damages it can cause. Companies expend a great deal of time monitoring vegetation to ensure lines, poles and easements remain clear of vegetation. High density lidar data can be classified to include powerlines, poles and vegetation. From these models, encroachments can be categorized by location, distance to equipment and impact to system stability.

Some of the key features of the G2 lidar data to support vegetation mapping include:

- Efficient data collection
- Rapid data classification
- Advanced modelling to identify encroachments
- Easily updated



Usefulness of 3-Dimensional Point Clouds

High density lidar collection enables the creation of dense 3D point clouds, enabling users to view objects such as transmission lines and poles. This visualization gives users the ability to inspect assets and determine site conditions, such as encroaching vegetation and damage to poles.

Useful applications include:

- In-office asset assessment
- In-office maintenance planning
- Design and routing
- Streaming data to field engineers for site assessment

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