Using LiDAR for Precise Vegetation Management

Quantum Spatial is a proven partner to airport planners, engineers, facility managers, and contractors whose objective is to build, expand, and make improvements while meeting FAA regulatory and safety requirements. We have more than three decades of experience providing industry-leading geospatial services to hundreds of airports and airfields around the world.

Our software engineers have developed a proprietary platform to expedite vegetation management using aerial LiDAR surveys, a high accuracy solution to identify specific trees impacting the airspace. Aerial LiDAR surveys designed for airport vegetation management commonly emit laser energy within a range of 1 – 2 million pulses per second yielding a minimum of 12 points per square meter and up to 4 separate elevation measurements through vegetation canopy per point. LiDAR data offer remarkably dense elevation measurements at very high accuracy ensuring critical vertical obstructions in the airspace are properly identified, evaluated, and reported.
Quantum Spatial, Inc. (QSI) is a proven partner to airport planners, engineers, facility managers, and contractors whose objective is to build, expand, and make improvements while meeting FAA regulatory and safety requirements. We have more than three decades of experience providing industry-leading geospatial services to hundreds of airports and airfields around the world.

The QSI analytical process comparing LiDAR data with aviation surfaces to classify obstructions shown in red and near surface vegetation shown in yellow.

The Quantum Spatial Difference
Detailed Visual Display of Vegetation Obstructions

Traditional aerial photogrammetric mapping is required for Federal Aviation Administration (FAA) reporting, but the data and information compiled are constrained by image resolution, photointerpretation, and the potential vegetation obstructions to the airspace.

Seeking more detailed information to support vegetation management than the traditional survey methodologies required by the FAA could deliver, Mead & Hunt consulted Quantum Spatial, Inc. (QSI) for LiDAR survey and analytical support. LiDAR enables collection of richer data, that combined with QSI analytical capabilities, provides a more comprehensive view of the surrounding geography and vegetation obstructions.

Mount Pleasant Municipal Airport is a city owned, public-use airport located about two miles outside of downtown Mount Pleasant, MI. Mead & Hunt worked with the airport to develop its airport layout plan (ALP), a critical tool that identifies the location and nature of existing and proposed airport facilities and structures, as well as non-aviation areas and surrounding geography, which included many densely wooded areas.

“A nearby racetrack property included 20 heavily wooded acres. Our initial ALP survey methodology wasn’t able to tell us if that entire property posed risks to Mount Pleasant’s runway operations, or if there were only certain trees that needed to be cut,” said Stephanie Ward, Mead & Hunt’s
QSI’s experience includes photogrammetry services for over 575 airport mapping projects in accordance to FAA AC 150/5300-16, -17, and -18 guidelines. These projects have ranged from small one-runway airports to some of the largest airports in the country. Quantum Spatial continually improves our efficiency by adapting and automating our tools and procedures to meet the FAA and other airport-specific requirements.

“Knowing exactly which trees were problematic was critical because the FAA is getting stricter about enforcement of airspace, requiring airports to clear and maintain their approach surfaces and often with limited time to respond.”

Stephanie Ward, Aviation Planning Manager, Mead & Hunt
Garver, an employee-owned multi-disciplined engineering, planning, architectural, and environmental services firm, has also teamed with QSI on multiple aviation projects. One of the most significant programs is the statewide vegetation management program at all of the General Aviation Airports in Kentucky.

This program was implemented because of the obstruction issues plaguing most of the airports and airfields throughout the state. This program is utilizing LiDAR data because this technology helps with the identification of current vegetation issues and where future problems can exist along an airport or airfields approach.

“From my perspective, QSI has an advantage with the product they’ve developed.”

Ryan Sisemore, PE, ENV SP
East Region Director of Aviation, Garver

The QSI vegetation management platform reports key details for each obstruction to include location, height, and aviation surfaces penetrated along with the number of obstructions per land parcel.

Learn more about QSI’s vegetation management solutions by reaching out to our aviation sales team or email us at transportation@quantumspatial.com.

Robert Vander Meer  (920) 803-5821
Doug Fuller  (920) 803-5837
Paul Bishop  (859) 277-8700
Leading Garver’s team for the Kentucky vegetation management program is Mark Upchurch. Mark is Garver’s business team leader and worked with QSI for over 2 years on the Kentucky program report that QSI produced for the State which will provide guidance for obstruction removal. The report will be presented to airports to show obstructions and identify potential vegetation issues that airports can use to identify parcels in question.

As Mark noted, “the more obstructions an airport has, the greater minimums become and the less accessible the airport is. Vegetation management is important because airport managers want their airports to be ‘all weather,’ optimizing accessibility and making the business more robust.”

Additionally, as Mark concluded, QSI’s obstruction reports were able to document that in some cases, obstructions were more prevalent than originally anticipated at airports in Kentucky which would impact the utilization of an airfield.

“Vegetation management is important because airport managers want their airports to be ‘all weather’ optimizing accessibility and making the business more robust.”

Mark Upchurch
Business Team Leader, Garver

QSI’s extensive experience providing mapping and obstruction surveys under the current FAA guidelines has allowed us the opportunity to work closely with the FAA and National Geodetic Survey (NGS) and understand the durations and requirements associated with the numerous types of airport projects that are covered by these guidelines. In fact, QSI was the first firm in the United States to complete an NGS approved project under FAA AC 150/5300-18B guidelines.
“The LiDAR surveys from QSI are invaluable. Not only are we identifying and addressing current vegetation issues, we can use the data to be more proactive in managing trees within the flight paths to ensure they never pose a problem.”

- Stephanie Ward, Aviation Planning Manager, Mead & Hunt