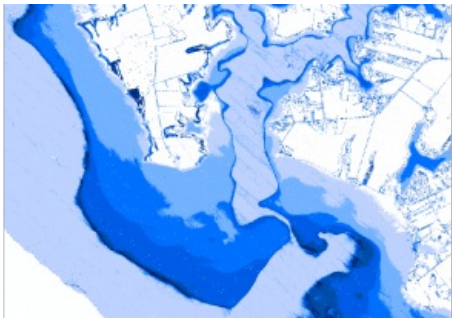
Web GIS Improves Lidar Collection Response Time



The remarkable capabilities of airborne Lidar continue to improve, with scanners now able to emit more than a million pulses every second. Although it has never been easier to acquire high-quality laser data, storing and managing the huge volume of Lidar data collected can prove to be a challenge. Combined with associated metadata such as survey information, environmental conditions and flight lines, data management has now become a critical priority and focus. An initiative called the Lidar Management and Analytical Processing (LMAP) provides an automated workflow for uploading and storing Lidar and metadata into a Geographic Information System (GIS).

Developed in a partnership between RIEGL, a manufacturer of ultra-high-performance Lidar scanners, and Esri, creator of the ArcGIS platform, the LMAP initiative provides an automated workflow to upload and store Lidar and metadata into a GIS. Once organized and managed using standard GIS functionality, LMAP utilizes web applications to visualize the information on a map and perform a range of analysis. As a user of both RIEGL and Esri technologies, North American geospatial-only solutions provider Quantum Spatial Inc. (QSI) decided to implement LMAP to improve project data management and provide a venue for clients to quickly and easily provide feedback on Lidar collection quality and completeness.

Bathymetric Lidar

Lidar is a survey measurement technique that uses light in the form of emitted laser pulses to measure distance, resulting in accurate 3D models of the Earth. These models have a wide variety of uses and applications, including in engineering, town planning, mining, archaeology, computer vision and environmental monitoring. Bathymetric Lidar is a Lidar scanning technology that penetrates the water column to measure seafloor depths. To map Chesapeake Bay in the USA for a client, QSI selected RIEGL's VQ-880-G, a fully integrated airborne scanning system for combined hydrographic and topographic surveying. Offered with an integrated GNSS/IMU system and camera, the VQ-880-G also houses both a green laser that penetrates shallow water for seafloor measurements and an infrared laser for improved capture of the water surface. This results in millions of Lidar points collected of the ground, vegetation, water surface and seafloor.

Results of a bathymetric Lidar survey are dramatically impacted by the environmental conditions at the time of acquisition, specifically water quality and turbidity. To record these conditions and to validate the Lidar, field personnel take measurements during the collection and monitor water quality data transmitted from nearby buoys.

Timely Client Feedback

In February 2018, QSI collected topo-bathymetric Lidar and aerial photography over the extensive river delta regions of Chesapeake Bay within the states of Virginia and Maryland to generate improved shoreline and bathymetry data. This data provides highly accurate information of the bay's geographic features for official shoreline characterization, nautical charting, geodesy and marine resource management assessments. Environmental factors such as water quality and weather were closely monitored to ensure data collection only occurred during peak windows to guarantee the highest-quality data possible. Additional information was also collected, such as aircraft flight lines, survey ground control locations and photographs from the flight. All this information was shared with project stakeholders in different locations using a variety of computing devices.

Getting timely client feedback on the quality and acceptance of the Lidar data collected is a critical success factor in these types of projects. Long turnaround times can quickly lead to inefficient use of field teams and wasted money. Traditionally, QSI has relied on a myriad of technologies such as email, File Transfer Protocol (FTP), blogs, PDF reports, project status software and public websites in order to share data and receive client feedback. Each of these technologies have constraints and limitations including file size, data formats and bandwidth. Big data presents a growing challenge for mapping companies and the clients they serve, especially as advances in technology generates more and more data. To address these challenges, QSI partnered with RIEGL and Esri using the Chesapeake Bay project data and workflows to discover new ways to efficiently manage large volumes of geospatial data.

This is an extract from the article 'Web GIS Improves Lidar Collection Response Time', written by Cherie Jarvis and Ron Behrendt, published in the September/October 2018 issue of GIM International, the worldwide leading magazine for the geospatial industry and a sister publication of Hydro International.