

CASE STUDY AEC

Project

BRIDGE DATA COLLECTION

KEY ACHIEVEMENTS



15 mm (19/32 in) relative accuracy



Captured the bridge from all angles



Data capture time cut by 65%



Reduced safety risk for the data capture team

WITH FAST, ACCURATE DATA CAPTURE, OSPREY INTEGRITY WILL SPEED UP NATURAL DISASTER RECOVERY

OVERVIEW

After a natural disaster, repairing critical infrastructure can take years, making it difficult to return to life as usual. Forming an accurate damage assessment is vital as the first step towards recovery, but collecting data can be logistically challenging. Landslides, unstable ground, and tree collapse, among many other hazards, can impede the ability to gather intelligence on the condition of assets. At the same time, difficulties in capturing the data can result in incomplete or inaccurate as-found models.

After flooding devastated British Columbia in November 2021, Osprey was contracted to scan the partially collapsed Voght Bridge at Coldwater River, Merritt, in south-central British Columbia for insurance purposes.

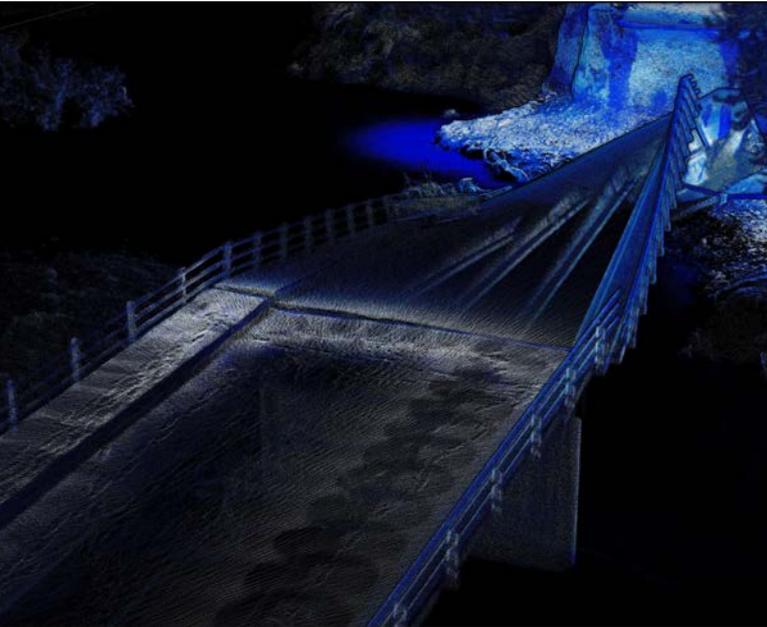
Osprey had previously acquired a Hovermap LiDAR autonomy and mapping payload due to its ability to expedite data capture while maintaining required accuracy - enhancing their inspection and survey capabilities in a variety of settings. At the damaged bridge, they put Hovermap to work, conducting a LiDAR scan to augment their photogrammetry data.

CAPTURING AN ACCURATE REPLICA OF THE ENTIRE BRIDGE

Historically, a scan of a damaged bridge would be carried out manually by field personnel using terrestrial scanners and taking notes and photographs or by using aerial photogrammetry. The use of terrestrial

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IN A SINGLE 7-MINUTE FLIGHT, THE OSPREY TEAM CAPTURED A COMPLETE, COMPREHENSIVE LIDAR SCAN OF THE BRIDGE.

scanning in this scenario would typically take several hours and would have required Osprey personnel to set up equipment in at least eight potentially unstable locations. Additionally, when capturing aerial data, drones are inhibited when the GPS signal is lost, resulting in abnormal flight behavior and making it difficult to capture clear, photogrammetry images.

ACCURATE, FAST, AND SAFE DATA CAPTURE

Using Hovermap mounted to a DJI M300 drone, the Osprey team captured a complete, comprehensive LiDAR scan of the bridge in a single 7-minute flight, reducing data capture time by up to 65%. By contrast, aerial photogrammetry would have taken at least three times longer - without the ability to capture the underside of the bridge.

“Hovermap allows us to bring a higher level of situational awareness to our work. It’s the ideal tool for capturing accurate data from dangerous and inaccessible locations, without personnel having to compromise their safety.”

Courtland Penk, Osprey Integrity President

Hovermap’s Collision Avoidance capability ensured the drone maintained a safe standoff distance from the bridge and other obstacles while getting close enough to capture the detail needed. Additionally, without GPS, most drones are unable to provide a stable hover in place. However, Hovermaps GPS-denied flight capabilities made it possible for the drone to fly below the concrete deck, enabling Osprey to scan all parts of the bridge, including inaccessible girders and trusses, to capture an entire data set.

“With Hovermap, we were able to capture the structure from all sides. This even included getting Hovermap close to the river to capture the underside of the bridge, ensuring the downed girders were included in the data.”

Courtland Penk, Osprey Integrity President

DELIVERABLES

The Hovermap 3D point cloud data was processed and resulted in a 15 mm (19/32 in) relative accuracy as-found model of the collapsed bridge, well below the required accuracy range of 30 mm (1 3/16 in).

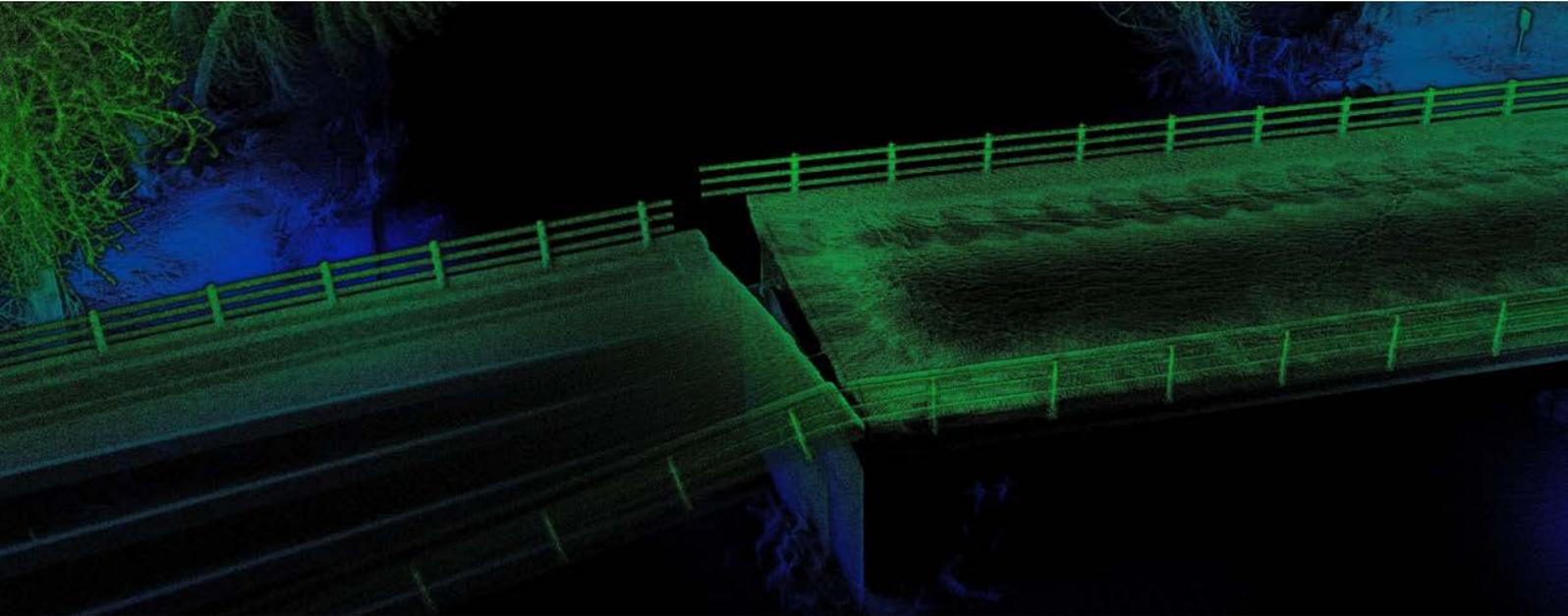
To share point cloud data with stakeholders, Osprey used Spexi Geospatial, a cloud-based visualization software that allows the data to be viewed in 2D or 3D. Spexi enables fast sharing of data and gives stakeholders the ability to annotate, measure and export these functions to compatible files for CAD, BIM, and other programs.

“Thanks to Hovermap’s versatility, assets can be surveyed from all angles, from a safe distance.”

Courtland Penk, Osprey Integrity President

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AIDING RECOVERY

Osprey believes this quick, safe, and accurate method of data capture can streamline engineering efforts and accelerate future restoration activities, expediting a return to life as normal for those affected by a natural disaster.

The point cloud provides a complete 3D representation of the bridge in its current state, allowing engineers, detailers, and erectors to plan the rebuild without ever visiting the site - these time savings are already being demonstrated in the recovery workflow.

Bridge engineers will be able to access the point cloud in Spexi to plan the reconstruction, remotely measuring distances or volumes of damaged portions of the bridge for replacement. Bridge detailers can use the point cloud as the basis for the as-built portion of the bridge model for the reconstruction detailing. Bridge erectors can use the point cloud of the surrounding topography to plan the placement of lifting and other heavy machinery. They can also measure the volume or length of the damaged portions that need to be removed - all without the requirement to be on site.

“When natural disasters occur, Hovermap has the potential to speed up recovery efforts significantly. Its rapid capture of visuals and measurements allows engineering teams to accelerate the rebuild process.”

Courtland Penk, Osprey Integrity President



Osprey Integrity is a Canadian data acquisition company that offers a fusion of commercial aviators and industrial inspection specialists to provide clients in the construction, resources, government, and infrastructure sectors with usable end data. Osprey added Hovermap to their toolkit in August 2021 to enhance their LiDAR and 3D modelling capabilities.

Our flagship product Hovermap, is a smart mobile scanning unit that combines advanced collision avoidance and autonomous flight technologies to map hazardous and GPS-denied environments. Hovermap is uniquely versatile, it can be mounted to a drone, cage, backpack or vehicle to map challenging, inaccessible areas. With a wide range of applications, Hovermap is being used by customers around the world.