



Lynx marine Mobile Mapper set-up (image courtesy of WHPacific, Inc.)

With its towering cliffs dropping into class IV rapids, Hells Canyon has always been a risky obstacle to personnel using conventional land-surveying methods to map the area.

Despite the remote and hazardous terrain, the U.S. federal government still wanted current, accurate spatial data to better monitor three local dams. A whole new survey solution was needed, and Optech provided it: marine mobile lidar scanning.

To Hell and back...

As the Snake River flows through Hells Canyon National Recreation Area in Idaho, it carves the deepest canyon in North America. From the peaks of the Seven Devils to the river's churning white water, the canyon reaches a depth of 7,993 feet. Classified as a National Wild and Scenic River, this stretch of



Hells Canyon, Snake River, Idaho

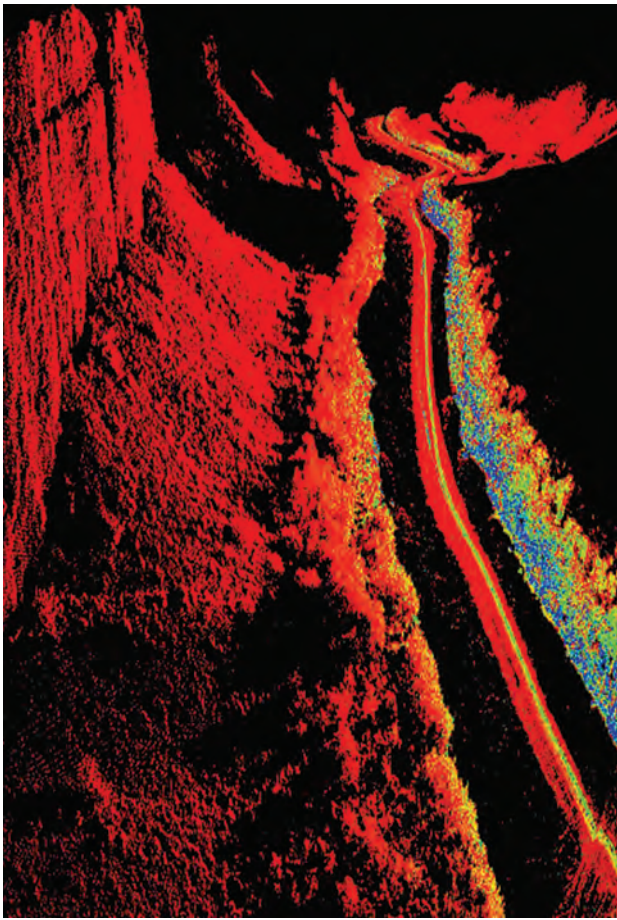
the Snake is also where three important hydroelectric power-generating dams are located: Brownlee, Oxbow and Hells Canyon dams. The goal of the survey project was to obtain a current topographic map of the river canyon with elevation contour lines in intervals of less than 6 feet (the existing data base), with an optimal accuracy of 1 foot.



Aerial view of survey site

The terrain map was needed as part of a proposed study to measure and monitor the erosion of gravel bars. In addition, the federal agency also wanted to monitor the sustainability of the surrounding environment for research on the river snail's habitat.

With the Lynx Mobile Mapper, a GPS and POS (Position Orientation System) mounted on a 24-foot aluminum jet boat, the survey team cruised a 2-mile stretch of the Snake River at speeds ranging between 40 and 48 km/hr (25 and 30 mph). The target range from the boat to the river bank varied between 1.83 and 7.62 m (6 and 25 ft). The ridge running parallel to the river varied in height from 53.34 to 76.20 m (175 - 250 ft). Even in such a dynamically changing survey environment, the Lynx Mobile Mapper effectively handled large variations in range.



QT Modeler image of Lynx raw data without post-processing or production work

Rapid water, rapid survey

As the river's name implies, the trajectory of the boat varied greatly as it snaked through the canyon. Even with the constant changes in speed and direction the POS-GPS component maintained a steady and accurate lock on the boat's ever-shifting trajectory. Aerial photos were used for quality control and testing purposes. The survey accomplished the following:

- 1) A baseline measurement of the gravel bars was taken, which will enable future comparative measurements to quantify the erosion rate;
- 2) The habitat of the river snail was mapped;
- 3) Cliff-side rock was also mapped for environmental needs assessment.

Far better than the <6-foot contour intervals and 1-foot accuracy initially requested, the Lynx point cloud data enabled the output of 3D terrain models with an accuracy of better than 5 cm, with a resolution of 1 cm.

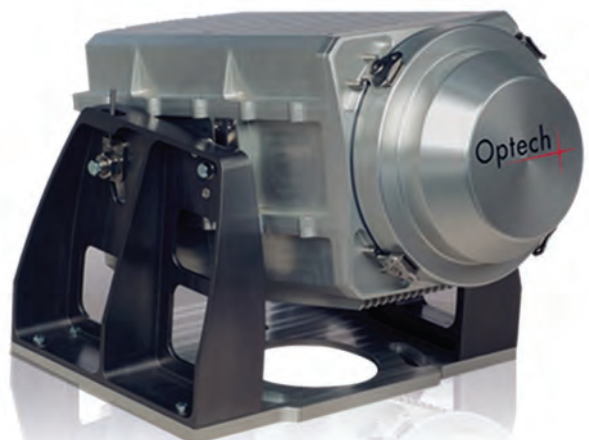
The georeferenced spatial data obtained by the Lynx Mobile Mapper offers unprecedented 3D detail—even when captured from a marine or land vehicle moving at speeds up to and beyond 100 km/hr.

The Snake River survey demonstrated the Lynx Mobile Mapper's unparalleled potential for monitoring gravel bar erosion, aquatic life habitat and vegetation growth in a river environment, from a marine mobile platform.

The Lynx Mobile Mapper proved to be a total survey solution for use on marine mobile platforms by collecting engineering/survey-grade lidar data over large areas that are impractical to survey with static lidar sensors, but that require an accuracy and resolution that exceed those of airborne technologies.



Lynx Mobile Mapper control unit



Lynx Mobile Mapper lidar sensor

Optech Incorporated

300 Interchange Way, Vaughan ON, Canada, L4K 5Z8
Tel: +1 905 660 0808 Fax: +1 905 660 0829

