

## Scanning Glenwood Canyon

In 2010 a massive rockslide closed the busy Interstate I-70 Highway in Glenwood Canyon, 160 miles west of Denver, Colorado.



*I-Site 8800 laser scanner overlooking rockslide with the arrow pointing to the position of scanner on canyon wall rim*

THE AREA TO BE MEASURED WAS NEARLY 3000FT (ABOUT 900M) FROM THE VANTAGE POINT. THE I-SITE 8800 RANGE EASILY COVERED THE AREA OF INTEREST.

A HIGH RESOLUTION SCAN WAS COMPLETED IN LESS THAN 1 HOUR.

In many places Glenwood Canyon is too narrow for standard road construction, so the road had been built above the Colorado River with the canyon walls serving as the road boundaries.

One area just west of Hanging Lake Tunnel is particularly prone to rockslides, causing issues for the Colorado Department of Transportation (CDOT) and the Federal Highway Department. Maptek was contacted in early 2011 to take part in a pilot project to investigate measures for monitoring the area.

The Maptek I-Site™ 8800 laser scanner is not designed to monitor small movements, however, it can help measure and locate larger movements, and calculate the volume of material affected by a rockslide.

CDOT also selected the IBIS-M radar system for the pilot project as it can detect small incremental movements of less than 1mm. The IBIS-M was set up for 3 days to prove its capabilities. A good vantage point was needed for the test.

The opposite canyon wall rim gave the best view of the rock slide, but access was difficult by foot. A helicopter transported people and equipment to the top of the canyon. The area to be measured was nearly 3000ft (about 900m) from the vantage point.

**The I-Site 8800 range easily covered the area of interest. A high resolution scan was completed in less than 1 hour.**



*The I-Site 8800 scanner was flown into position*



*The I-Site 8800 inbuilt camera allows 3D imagery to be captured at the same time as scanning*

The area was surveyed with the I-Site 8800, and a 3D digital terrain model was created of the scans. The model had points less than 0.5ft (0.15m) apart, with a high resolution photograph applied in I-Site automatically.

Rock shoots from previous slides could be identified, as well as undercuts and other geological features. The model can be used for rockfall simulation programs as well as for geological mapping.

The slope terrain model can also be merged with radar system data, allowing identification of the rockslide features and identifying problems in 3D. This can be used as a baseline for measuring future rockslides, allowing for very accurate volumetrics and for pinpointing all the affected areas with before and after scans.

More scanning may be required in the future for a longer monitoring project.

*Thanks to  
Colorado Department of Transport*



*The aftermath of the 2010 rockslide on the I-70 highway*