

# The best survey solution for your task

Laser scanning is widely used in mine survey for its safety, accuracy and speed. We compare the benefits of different modes of operation now available.

In this study, surveys were conducted using the same Maptek™ I-Site™ 8820 laser scanner in three different modes: tripod, vehicle mounted stop-go and continuous.

Tripod scanning collects the most accurate data from one setup and is typically used for highwall survey. Standard scan referencing involves setting up the tripod over a known or GPS-referenced position and backsighting to a known position.

However, as laser scanning has made workflows more efficient, surveyors might need to move up to 50 times a day. Tripod setup becomes onerous.

Our solution was the I-Site vehicle mount. Originally requiring two GPS units for backsighting, the system now uses an inbuilt compass and GPS streaming that records scan position and direction while driving.

The laser scanner is attached via a custom mount which fits standard roof racks and remains in place for multiple survey locations.

In stop-go mode, the surveyor drives to each location, stops and conducts the laser scan from within the vehicle, and moves on.

Some operators raised the scanner head on platforms for increased scene coverage. While I-Site laser scanners are tested to IP65 for rugged operation, the benefit of scanning from the higher vantage point must be balanced against error tolerance for data accuracy, especially in windy conditions.

I-Site Drive is the latest survey innovation from Maptek. Data can be collected continuously while the vehicle is moving. The scanner head is mounted at 45-90° to the scene. I-Site Drive uses an RTK GPS link with an inertial navigation system to continuously update the vehicle position.

The result is extremely fast field pickup with automatic scan registration as the vehicle moves. Data registered in local coordinates leads to extremely fast processing.

## Comparison study

A rehabilitation area was scanned with the I-Site 8820 laser scanner, comparing the three modes of use. The scanner has a maximum range of 2000m and an accuracy of 6mm.

Tripod scanning from eight locations took 55 minutes and provided the most accurate data as reference for the study. Registration by scan name and backsighting to a radio tower 8km away established the data in local coordinates.

Scanning the rehabilitation zone using the stop-go method required nine locations and was completed in 35 minutes. Global registration was required to correct the compass orientation.

Using I-Site Drive the same scene was scanned in seven minutes. No registration was required and the point cloud data was process-ready. Lack of vehicle access led to poorer coverage of surrounding areas. A simple 360° scan over the missing area would provide supplementary data if needed.

Scans are previewed in real time on the tablet. Simply drive past scenes again to capture missing data.



## Conformance

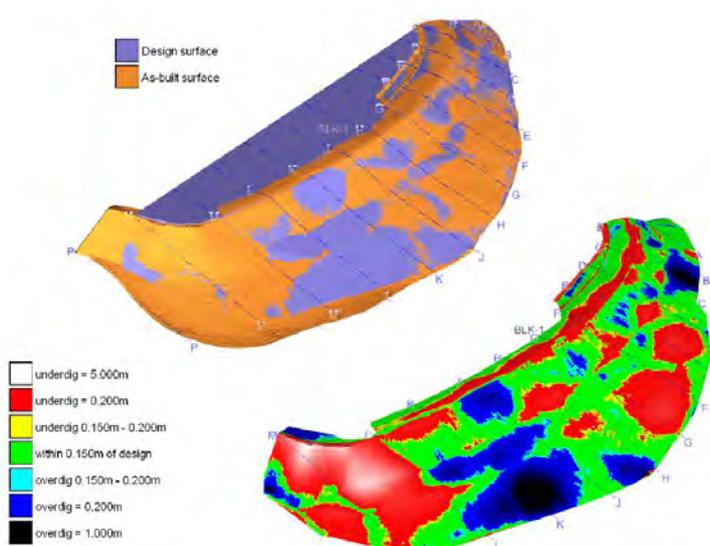
Minor volumetric differences were noted between tripod, stop-go and continuous scanning modes.

	fill m <sup>3</sup>	m <sup>3</sup> diff	% diff
Tripod	311,103		
Stop-go	311,616	513	0.016
Drive	311,016	-87	-0.028

Using the pre-release conformance reporting module in I-Site Studio, results from each scanning mode were compared to the design surface, showing a close similarity between tripod and stop-go especially.

	wall underdig	wall overdig	bench underdig	bench overdig
Tripod	85%	3%	39%	20%
Stop-go	86%	2%	40%	20%
Drive	91%	2%	41%	24%

Finally, laser scans were compared to aerial lidar to check scan positioning. Differences in point spacing between I-Site scan data and heavily filtered lidar data results in the greatest deviation between outputs, particularly for horizontal surfaces.



## Summary

Each survey method has particular benefits. Tripod setup mode will always produce the most accurate survey data. Vehicle mounted stop-go survey is safe and cost effective, avoiding tedious tripod setups and allowing more scans to be completed.

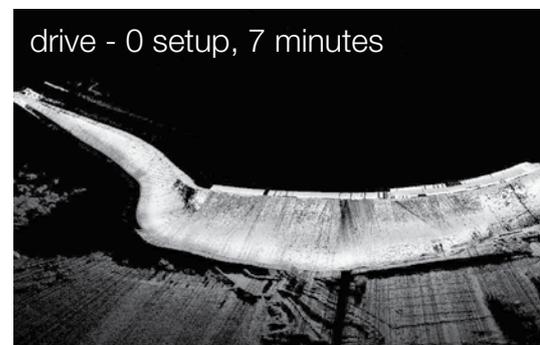
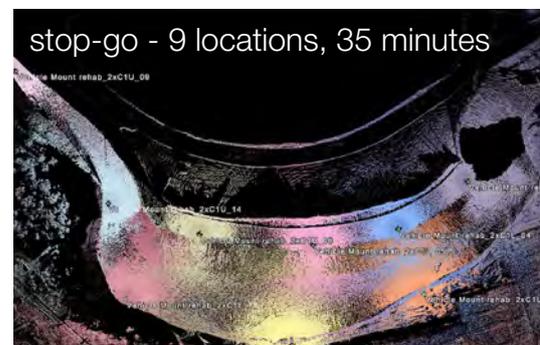
The I-Site Drive approach allows an unbeatable area to be scanned for the time taken. While it has a slightly restricted maximum range, surveyors can easily switch between continuous and stop-go scanning modes to overcome this.

Data accuracy in all cases was better than aerial methods.

I-Site laser scanning technology provides the most versatile survey workflows. Surveyors can confidently select the approach that best matches their accuracy and efficiency goals.

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## Rehabilitation zone scans



Simple conformance reporting reveals differences between as-built and design surfaces.