MAPTEK™ I-Site™

CASE STUDY

# Worth its weight in gold

**Laser scan survey allows development to keep pace with the changing landscape at Barrick Gold Corp Pueblo Viejo.**

HIGHLIGHTS

- I-Site provides accurate survey data to help keep the project on budget and to meet deadlines.
- Provides up-to-date progress maps and material volumes for accurate decision making and contractor payments.
- The mobile system allows quick movement between scanning locations for stop-go data collection.

The open pit gold mining operation, planned to come into production in the last quarter of 2011, is located in the Dominican Republic, about 100 km northwest of Santo Domingo. The mine is expected to process 24,000 tonnes of ore a day at full capacity.

Accurate survey data is crucial to help keep the project on budget and to meet deadlines. Sean Jefferys, Chief Surveyor at the mine, considered that Maptek I-Site™ technology could meet the challenge, with the I-Site 4400LR laser scanning system arriving on site in late 2009.

The construction phase at Pueblo Viejo involves a huge amount of material movement, and a large number of contractors on site. Site activities include blasting, quarrying, stockpiles, dam walls, civil works, road building, landfills, infrastructure development, topsoil and overburden removal, as well as contaminated material removal from previous mining operations.

With 13 to 15 different areas under construction over the 700 hectare site, traditional survey methods simply aren't fast enough.

The survey team needs to provide up-to-date progress maps and material volumes for accurate decision making and contractor payments.

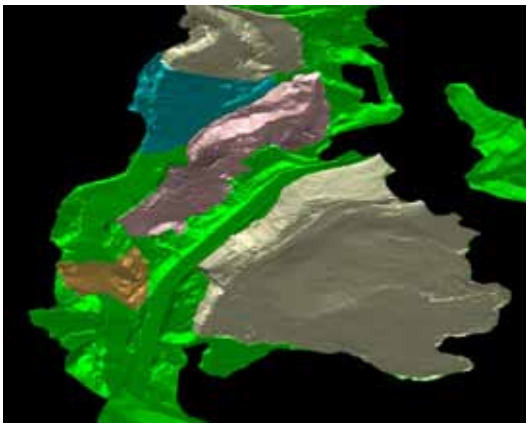
## Speed, accuracy and safety are crucial

Maptek's vehicle mount allows the scanner head to be attached on site vehicles. Besides speeding up the actual survey tasks, conducting surveys from the safety of the vehicle cab significantly minimises risk.

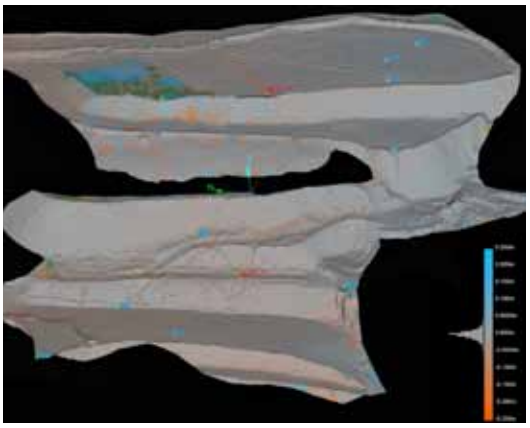
The project area is typical of inland tropical regions, with forested hills and small mountains separated by river valleys and dense jungle. Maximum relief is 500 m above sea level. Annual precipitation can exceed 1500 mm, with a hurricane season from September to October.

During the rainy season, lightning detection systems alert personnel to seek refuge in designated protection areas or a vehicle. Normally the crew would have to stop surveying even though conditions may be perfect for capturing data. Scanning from the safety of the vehicle means that surveyors can continue to work even during storm warnings.

The laser scanner is used every day and data is used for generating surfaces for volumetric measurements, updating designs, slope stability monitoring and as-builts.



*Surveyors scan and update models with the latest data areas that have changed are shown in a different colour*



*Modelled surfaces can be analysed to monitor the slope stability of construction areas*

'WITH I-SITE WE ARE ABLE TO TRACK VOLUMES MORE OFTEN THAN EVER POSSIBLE. WITH TRADITIONAL METHODS WE WOULD BE STRUGGLING TO TRACK VOLUMES 4 TIMES A YEAR. WE ARE NOW DOING IT 24 TIMES A YEAR WITH EASE.'

It takes about two days to scan all the active areas. The mobile system allows quick movement between scanning locations for stop-go data collection.

'I estimate the amount of time saved in tripod setup is about 50%, and we don't have to put out targets, which all adds to time saved in the field,' said Jefferys.

The scanner is mounted on the roof of the truck cab with one GPS receiver mounted directly on the scanner and another on the hood of the truck for scan alignment. The mounting frame for the scanner is made from stainless steel and aluminium, and includes anti-vibration pads. The surveyors only need to lift the scanner head on to the frame, clamp the quick release bracket and connect the cables for transport and scanning.

One scan and two GPS points are recorded for each location. The GPS system coordinates the position and orientation of the scanner, eliminating the need for scan control via other means. Scans can be previewed on the field tablet to ensure all areas are covered.

Each scan takes about five minutes, and the stop-go scanning continues for two solid days during month end measurements, as the crew drives the vehicle to all active areas of the site. The route changes daily as different areas are affected by construction activity; with the scanner mounted on the vehicle it is easy to move to new locations 'on the fly'.

Maptek I-Site Studio™ software is used for processing, modelling and analysing the data. Scans are imported into I-Site Studio in a pre-registered format straight from the cab-mounted controller. Data is accurately registered in a coordinate system in as little as 10 minutes using a one-step global registration tool.

'Being a survey traditionalist, I was sceptical of the global registration process, but it has been tested and proven. It works, and is a huge time saver. Human error is virtually excluded', commented Jefferys.

Editing out vehicles, vegetation and other unwanted objects from the data takes only a few minutes. The topography filter removes overlapping data and redundant points. The data set is reduced to a manageable size, and volumes are quickly calculated for each of the active areas surveyed earlier in the day.

The final step is to export the data for use by the engineers in CAD and mine planning packages. Accurate and timely information helps the engineers make decisions with realistic data.

Other applications for the I-Site system are now being investigated, such as geotechnical mapping and slope stability monitoring. Laser scanning makes it possible to record and monitor areas which can't be surveyed traditionally.

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*Thanks to*
*Sean Jefferys*
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