

Looking for the motherlode? Just point and click

A state-of-the-art project in Sudbury, Ont., deploys 3-D technology to help mining companies see what they're getting into

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Talk about a scary driver's test.

There I am in a 3-D, virtual reality world behind the wheel of a Load Haul Dump vehicle. Think of it as an elongated, elephantine bulldozer that can weigh as much as 14 tonnes and has a giant scoop that can lift 10 cubic metres worth of rock. Only I have to drive the LHD both forward and back through a simulated mine shaft in which I have less than a metre's worth of room on each side.

Every time I hit a wall an X appears on the screen. If I accumulate six X's, the simulation comes to an end -- assuming of course I haven't ended it already by smashing into simulated miners. They are blithely walking back and forth not realizing how limited my field of vision is -- particularly in the reverse. If you hit one of them -- I did that twice after about 30 seconds -- the word FAIL appears in large red-on-black letters across the screen.

The simulation is not the latest demonic creation of some video game developer. Rather, it is one of the products of a Laurentian University virtual reality project that is attempting to change the way that miners, prospectors and mine owners worldwide look at what they are doing.

The impetus for the change was deceptively simple.

"When we looked at the data which had been amassed, we realized that all mines are three dimensional and to truly examine and understand them we had to look at things in a three-dimensional way," says Laurentian University professor Peter Kaiser, who heads up Mining Innovation Rehabilitation and Applied Research Corp. (Mirarco), a collaboration of Laurentian's Mining Research Centres with government and the private sector.

While the conclusion sounds obvious, when Mirarco scientists looked for existing technologies to analyze the multidimensionality of mining data, they soon discovered that no virtual reality software existed that was specifically designed to interpret mine exploration issues.

While other extractive sectors -- oil and gas in particular -- had leaped on a virtual reality (VR) bandwagon, mining was stuck in a view of a world in which engineers sculpted models of mines out of wood or relied on two-dimensional schematics.

"If you want to put it in a negative framework, we looked at VR and said, 'Geez, that's what the mining industry needs,' " Mr. Kaiser says. So, with an eye toward filling this gap and providing new ways for researchers to understand fundamental mining data, the facility was established.

The real world applications of these virtual worlds can be somewhat counterintuitive. When they looked at the safe driving of a LHD program, members of Mirarco's board of directors suggested its immediate use would be to train miners how to be more cautious as pedestrians.

It's necessary: From 1996 to 2006, LHDs were involved in 560 accidents, killing four people, according to Ontario's Mines and Aggregates Safety and Health Association.

But perhaps a bigger application has been to show to the mining companies themselves how to look at data in VR. In one example, Mirarco is working with a U.S. company that has an open-pit mine in Utah. The company wants to add an underground mine below a portion of it. The question is how will the two very different mining operations interact? To understand it, Mirarco has shipped off one of its portable VR machines to the company and is helping to create a simulation that will sort it out. To help make things clear, the information will appear in a "4-D" context, describing the interaction of the two operations over time.

Other presentations have been done in what Mirarco calls 5-D. The fifth dimension is metal price, and the representations -- often on Mirarco's giant, curved 3-by-7-metre presentation screen -- reflect how bouncing prices might affect the economic viability of developing or continuing to excavate less ore-rich areas of a mine.

As part of its mandate to encourage the expansion of VR use by mines, particularly small mines, Mirarco is also creating VR presentations for stock analysts and investors. And yes, you need to watch them through 3-D glasses.

"If a person like myself tries to explain to a layman investor what it is we have and what it is we want to do, it is difficult to convey that message," says Karel Pieterse, a mining consultant who has used Mirarco's facility. "With a 3-D perspective you can say we are standing here, here is where we think the gold to be. And if we make a drill hole here we can actually mine it. And the investor can pass his own judgment on the viability just by looking at it."

The visualizations have also been used to let companies see where they fouled up.

Prof. Kaiser describes how one company's vice-president of exploration allowed schematics of a mine he was supervising be put into Mirarco's software. "Within 15 minutes the VP said: 'If I had seen this before we wouldn't have drilled that hole where we drilled it,' " Prof. Kaiser says.

"VR is going to be, I shouldn't say in every bedroom, but in every family room. So what we in a sense have done is started to develop capacity ahead of what we think will be the ultimate technology," Prof. Kaiser says.

And what will that ultimate technology be?

"The ultimate technology will mean that every mine has the capability to do things in 3-D."