

Robots, space technology run Australia's mining miracle

March 28 2010, by Amy Coopes

The heavy clank of machinery rings out across a seemingly deserted Outback mine site as an invisible satellite signal fires Rio Tinto's production line into motion.

Massive stackers and reclaimers begin the task of sifting through rust-coloured piles of rich iron ore, readying them for the rail journey hundreds of kilometres from mine to port.

It's an industrious scene -- with hardly a living being in sight.

"People frequently ask whether we have anyone working here at all," one miner at Rio's Dampier operations told AFP.

"Due to automation and stuff most people are pretty well tucked away from the heat. There's not a lot of manual workers."

Automation has long been a part of the mining industry, but advances in satellite, motion-sensor technology and robotics have made the stuff of science fiction a fact of everyday life.

Machines which scoop the ore, dump it on a [conveyor belt](#) and hose it down are now controlled from the air-conditioned comfort of Rio Tinto's Perth operations centre, 1,500 kilometres (930 miles) away from the arid mine pit.

Hundreds of specially trained operators who once directed machines

from on-site offices watch and direct the action from afar using satellite technology, with surveillance cameras feeding into some 440 monitors.

Once fully operational -- currently scheduled for June -- the operations centre will allow all of Rio's rail, mine and port systems to be coordinated from one place.

Anglo-Australian miner Rio Tinto is one of the world's biggest mining companies, with aluminium, copper, diamonds, gold and iron ore among its major products.

"Process plants have long been managed from a console -- it's just as if this task is now performed with a much, much longer extension cord," Rio said in its latest innovations update.

"But never before, on anything like this scale, has the huge number of tasks been accomplished in full view and full knowledge of everyone else involved."

The operations centre in Perth is central to Rio's "Mine of the Future" programme, which aims for driverless trucks and trains, and sensor-fitted "smart drills" that can be operated remotely.

Since December 2008 it has been trialling automation technologies at a test site called "A-Pit", where robotic trucks with artificial intelligence "learn" the layout of the mine and use sensors to sense and avoid obstacles.

Australian government scientists are working closely with the mining industry, drawing inspiration from space exploration to troubleshoot, explains researcher Ian Gipps.

"It sounds crazy but quite a few of the problems in space and in remote

mining can be similar," said Gipps, from the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

"You don't necessarily want to have people there... so a lot of exploration on planets requires automated and remote operating systems, particularly automated."

Current research was focusing on the use of robots fixed with radar and light-spectrum technology to detect and gauge the quality of minerals, he added. It could be available in as little as two years.

"We want to be able to put sensors on machines that can look at the (rock) face and say, 'the ore's on one half of the face and not the other half of the face and the ore's of a particular grade'," Gipps said.

"You can't just take a sample and send it off to a lab and get it back in 24 hours or 48 hours and say, 'ok, we want to mine that area'. We want to know that within a couple of seconds of being there," said Gipps.

The shift to automation is not without its challenges -- chief among them securing vast satellite networks against cyber-attacks -- but Gipps said it was critical to addressing chronic labour shortages.

"If the industry wants to keep on advancing then it has to make employment more attractive," he said.

In the cyclone-prone and brutally hot Pilbara, the "A-Pit" trial is due to finish later this year. Its findings will form the basis for an operations-wide rollout of remote and driverless technologies.

Chief executive Tom Albanese hopes to position Rio as the world's most technologically advanced mining company, describing it as key to the company's ambitions to boost annual [iron ore](#) production above 600

million tonnes.

"Rio Tinto is changing the face of [mining](#)," he said at the Mine of the Future's 2008 launch.

But will humans ever be removed entirely from the equation? Gipps is sceptical.

"A lot of the challenge is getting machines to understand what's happening around them," he said. "It's remarkable how clever a human is in doing that."

(c) 2010 AFP

Citation: Robots, space technology run Australia's mining miracle (2010, March 28) retrieved 25 April 2024 from <https://phys.org/news/2010-03-robots-space-technology-australia-miracle.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--