

# The golden touch

Following a recent upgrade of monitoring and scheduling software, Murray Harcus looks at Newmont's Leeville and Midas underground gold mines in Nevada where MICROMINE is at work

**C**orrect scheduling, monitoring and reporting is crucial to the successful running of any mining operation, in both practical production and financial accounting terms.

Traditionally, mines have had no fewer than three types of planning in place:

- A long-term strategic plan, which maps out planned production sequences for years in advance, up to life of mine;
- Medium-term planning on a monthly basis for periodical, especially accounting, requirements; and
- Day-to-day and week-to-week planning, which is concerned with the realities of at-the-face production.

Before strategic schedule optimisation came to prominence, most, if not all, mining companies, had operational short and/or medium-term planning processes in place. The tools used for this level of planning ranged from spreadsheets created in-house to commercial, purpose-built tools. Today, a vast array of scheduling and reporting software packages are available, hosting a variety of functions from personnel tracking to grade management.

MICROMINE's Pitram 3/ Mobile is the company's software offering for planning tasks in a shift. It uses powerful, real-time data-collection capabilities and historical data to help set up, validate and track progress against mine-production plans. The product is aimed at managers who are responsible for achieving shift production targets, which, in most instances, will be the production supervisor or shift boss.

*Miners' brass tag rack at Newmont's Leeville gold mine*



Both mine and operations managers can monitor progress against the mine plan in real time; however, on most occasions it will be those responsible for allocating equipment and operating in a particular shift who use the module.

Mining companies will typically start with a Pitram management-reporting and data-collection system, allowing all of their key production data to be captured and displayed in real time. Value-added modules such as Grade Control can also be added.

Pitram can handle real-time planning and tracking where tasks relating to locations or equipment (including tramming and downtime) are scheduled across the shift. The real-time tracking capability can be used to indicate progress against a task. Where actual progress deviates from the plan, its impact on the current or subsequent shift is shown, allowing production supervisors to reallocate resources to minimise disruption.

## Newmont in Nevada

In September 2010, Newmont announced that, following four years of research and development, it had installed and was integrating a mine-control system at the Leeville gold mine in Nevada, US. Pitram 3/ Mobile came into operation in January, replacing the previous version, Pitram 2.

Newmont claims that the system will improve safety by monitoring miners and mobile equipment, and that it will provide detailed and real-time production data, which is vital to maintaining efficient underground operations.

Previously, if underground workers needed to evacuate, the process could take up to an hour. Now, with the use of Aeroscout, dispatch can see exactly where all of the miners are located at once. Within minutes, they can help to direct them to the nearest refuge chamber or other evacuation points. Dispatch can then track each miner's progress towards the shelters or exits and send assistance if needed.

Although not all of the functions are up and running yet, Newmont states that on completion the system will be able to trigger different kinds of alerts, such as those related to machine health or potential traffic conflicts (between vehicles or people); measure diesel particulate levels



and other environmental data; optimise ore-grade control and feed equipment usage hours into Ellipse; track a miner's qualifications for operating various pieces of equipment and disable a machine if an unqualified person attempts to operate it; optimise preventive maintenance and repair schedules; and secure communications during an emergency/rapid response event.

While the system has been customised for Leeville, Newmont has already installed it at its Midas mine in Nevada, US, and at Jundee mine in Australia, as well as various other operations.

## Leeville

Keith Preston, head of monitoring and running the dispatch office, states that there are 250 personnel on a typical day at Leeville, working two 12h shifts. There are 11 haul trucks in the mine's fleet, as well as tens of other pieces of mobile

*Dispatch office at Newmont's Leeville gold mine*

**“Pitram 3/ Mobile runs on a wireless network, which currently has 75% coverage underground”**

*Access point that clocks the miners' RFID tags as they hang up their brass tags*





Dispatch room at Newmont's Midas gold mine; the portal at the mine; underground access point, used for worker and equipment tracking

**“Dome can also build shift planners, allocate trucks and tell them where to go”**

► equipment, all of which can now be tracked underground.

Mr Preston points out that Pitram 3/ Mobile runs on a wireless network, which currently has 75% coverage underground, so the equipment or personnel being tracked are not always visible, although they are picked up again when they reach the next access point.

AeroScout is used to track equipment and workers in the mine, using Mine Site Technologies (MST), Integrated Communications Cap Lamp (ICCLs) and RFID tags, which, when picked up by an access point, show their location

underground on a dispatch screen.

Mr Preston also points out: “When miners come in after a shift, they hang up their brass tags, which have their names on, and their RFID tags are read by an access point before they return their cap lamps. This clocks them out and lets us keep track of who is still underground.”

One of the dispatchers in the Leeville control room says: “The Pitram 3/ Mobile system has really freed up the radio, and as a result we handle approximately 400 fewer calls a day, as we can now see where the trucks are so they do not need to keep calling in.”

This is because the haul trucks have tablets installed on them and are automated through the WIFI network underground, negating the need to call in every load.

Two men are continually at work in the dispatch office: one monitoring all of the mobile equipment such as jumbos, loaders and haul trucks, while the other handles support, repairs and contractors.





Small Mine Development (SMD) is the on-site contractor, used for production at Leeville. “We have a meeting in the morning to discuss which headings or stopes are being mined, then monitor this

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*Pitram is displayed on tablets in the trucks to help the drivers, automated via the Wi-Fi network underground*

during the shift. We then meet at the end of every shift with the shift boss," states Mr Preston.

He adds: "The dispatchers have come from underground mining to dispatch above ground, and are very good at what they do. They have a huge responsibility and keep the mine going on a day-to-day basis. They are also responsible for co-ordinating emergency evacuations."

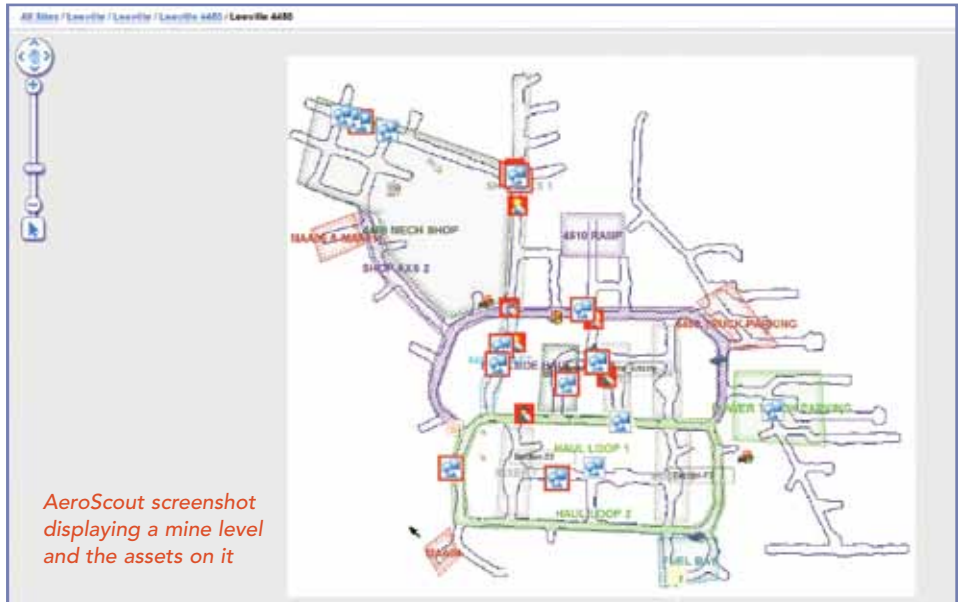
The mine plans come from the engineering department, with three-month, one-month and weekly scale versions. Each Wednesday, a pre-plan meeting is held. Then, on the Thursday, everything is finalised for the week ahead. The contractors are involved, and state how much backfill is needed, tonnages are calculated, stope development is discussed and plans are drawn up.

Dome is Pitram's mine production management system, which uses database and web technologies to integrate and report data from multiple sources in real time. At Leeville, it is used to manage and report actual mine data, and provide an overview of the previous day's achievements.

"The Leeville production report is automatically sent out at 7:15am every day to management, providing details of everything, including the number of rounds shot, tonnages hauled, samples being taken in exploration work, meters drilled, operating rates and equipment availability," says Mr Preston.

Dome can also build shift planners, allocate trucks and tell them where to go. All of the recorded information can be displayed on dashboards in managers' offices, the dispatch room or in common areas for the miners to see, all in easy to read graphs or tables.

Mr Preston says the system has made reporting more timely and flexible, becoming a valuable tool for managers who frequently need the latest



*AeroScout screenshot displaying a mine level and the assets on it*

performance information. He adds that miners were initially cautious of the system, but once they started using it, they could see the benefits, and now they really like it.

**Midas**

Newmont's Midas gold mine started using Pitram 3 in April, a little behind Leeville, and it also has AeroScout and Dome, but no ore-control yet, although this is planned for the future.

Newmont is working through various targets to get the installation up and running on schedule, and it has many additions planned for the system that is currently operating.

Midas underground mine has low, high, and high-high grade ores, which are all trucked out to the surface. Grade information is controlled by the geologists underground, while the truckers are given charts of each stope to map which grade they have on board, so as many eyes monitor the grade as possible.

Currently, dispatch enters grade information for each haul truck and monitors inside the truck prevent drivers from dumping in the wrong pile. Sensors are being installed at the ore dumps to detect the trucks and read which load they are carrying.

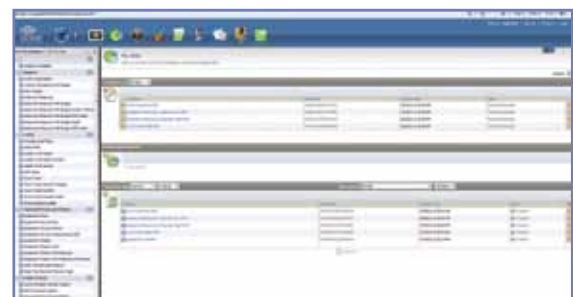
In future, when a truck is assigned to a loader, the loader will 'say' what grade it is mucking and pass this information on to the haul truck. The sensor at the ore pad will then tell the driver where to dump in order to monitor grades and provide useful information to the mill.

Currently, the Midas dispatcher is entering data such as truck and personnel locations into the system, but soon the dispatcher will take on a monitoring only role.

Once all of the rigs, loaders and trucks have been tied into the system, dispatch can analyse how much of the time each machine is being used and increase the efficiency of the overall operation.

The current dispatcher does not think there will be the need for another member of staff on his team, despite increased activity at the mine, as the role has evolved to primarily monitoring only and making corrections where necessary, thanks to the new system. ▼

**"The system has made reporting more timely and flexible, becoming a valuable tool for managers"**



*Dome screenshot showing the reporting/reference database*



*Mobile health screenshot from a truck tablet underground, seen through Pitram Data Acquisition*